GETTING TO WORK: A MIXED METHODS ANALYSIS OF METROPOLITAN AREA WORKING POOR EMPLOYMENT ACCESS

DISSERTATION

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By
E. Eric Boschmann, B.A., M.A.T.S.

The Ohio State University
2008

Dissertation Committee:

Professor Mei-Po Kwan, Adviser
Professor Ed Malecki
Professor Larry Brown

Approved by

________________________
Adviser
Geography Graduate Program
ABSTRACT

This dissertation explores the patterns and processes of employment access among the working poor in the Columbus, Ohio metropolitan area. While job accessibility and spatial mismatch has been extensively researched, much of the empirical analysis focuses upon employment barriers among minority populations living in high-poverty inner-city neighborhoods. The ever-changing social and economic structure of U.S. cities warrants the need for more research that looks at employment barriers among the working poor, regardless of race, who increasingly reside outside the central city.

This research utilized a two phase mixed method approach. In Phase 1, the patterns of employment access and factors of geographic context are explored through a standard set of spatial analytical techniques, including pattern analysis, accessibility modeling, geocomputation, cluster analysis, spatial regression, and geovisualization, using geographic information systems (GIS) and statistical software. The analysis is based upon spatially aggregated secondary data from the U.S. Census that provides geographically detailed information about workers at place-of-residence, place-of-employment, and the journey-to-work flow. Phase 2 examines the underlying socio-spatial processes that lead to limited employment access among the working poor and how they negotiate the residence-commuting-employment nexus. Primary data was collected through in-depth interviews and participant sketch mapping with 30 individuals. Informants discussed specific aspects of their everyday lives including, residential and employment histories, location decision-making, employment search strategies, and commuting experiences.

Several key findings emerged from this research. Poverty and working poor housing and employment patterns are decentralized in the metropolitan area, and patterns of high/low job proximity are highly localized. The relationship of geographic context
factors is spatially complex but lacks definitive and suggestive influences. Warehousing and distribution centers offer many higher-paying low-skilled jobs in the Columbus area, and temporary employment agencies play a key role in job search strategies. While the pattern analysis determines that the region has good job access for the working poor population, the local knowledge of individuals reveal how the higher-paying jobs are inaccessible by public transportation.

The characteristics of the Columbus metropolitan area are typical of many mid-sized urban regions across the U.S.: the decentralization of urban functions, a polycentric form, population growth and development of low-density suburban areas, post-industrial service sector economic growth, and inadequate and inequitable CBD-oriented radial public transportation systems. Therefore, the findings here provide useful insight for employment access research in similar urban areas.

This work extends the conceptualization of spatial mismatch by examining the dislocations of work and residence for working poor persons residing throughout the metropolitan area. As a piece of mixed method research, this work illuminates the utility of both primary and secondary sources, whereby the static and dynamic nature of data can greatly enrich understanding of human urban geographic phenomena. It is argued that conflicting outcomes from separate research phases highlights the multiplicity of realities and represent dual truths that should equally be considered valid and informative to broader knowledge. The broader implication of this work recommends locally specific public policies and urban planning to create more socially sustainable and equitable cities.
DEDICATION

To those who arrive by following ‘non-linear’ pathways and eventually find geography as their niche.
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And finally, to Jenny – my partner in learning.
VITA

November 13, 1973…………………………………. Born – Indianapolis, IN

2001………………………………………………… M.A.T.S Theology & Ethics
AMBS, Elkhart, IN

1996………………………………………………… B.A. History/Social Sciences
Wheaton College, IL

PUBLICATIONS


FIELDS OF STUDY

Major Field: Geography
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CHAPTER 1

INTRODUCTION

Enduring socio-economic inequities in metropolitan areas remains a vexing problem in the United States. Particularly in cities, the total number of residents living in poverty continues to rise in the U.S. (Jargowsky 2003). Especially among disadvantaged populations, barriers to employment access exacerbate issues of poverty and thwart attempts by individuals, households, and neighborhoods at creating sustainable livelihoods that meet their basic needs. The working poor spend increasingly disproportionate amounts of their household budgets on commuting (Roberto 2008), a fundamental component of metropolitan life that provides access to employment opportunities and financial self-sufficiency. How urban spatial inequities are traditionally understood and conceptualized is shifting – as cities undergo social, economic, and structural changes. Larger forces of neoliberalism and the global economy have facilitated U.S. cities to continue rapid social and spatial structural changes, invariably affecting the livelihoods of individuals. Immigrant, minority, and impoverished populations no longer reside solely in clustered central urban areas, but increasingly live in suburban and exurban localities. Similarly, low-skilled jobs are progressively more decentralized and scattered throughout the metropolitan landscape. As jobs and residences become more scattered and dispersed, the barriers to employment among disadvantaged populations are more complex and less understood.

Using a mixed-methods approach, this dissertation explores the patterns and socio-spatial processes of employment access among the working poor population in the Columbus, Ohio (U.S.) metropolitan area. It is argued that problems of limited job access does not only afflict inner-city minority neighborhoods with high unemployment
rates, but is experienced by a larger group of disadvantaged persons living and working throughout the metropolitan area. Because barriers to employment are complex, situated, and dependent upon context and the individual, this research exemplifies the utility of mixed-methods, including qualitative, for analyzing these complex social and geographic problems from multiple perspectives. Many previous studies in this topic area tend to use highly aggregated and geographically coarse data with traditional quantitative analytical approaches that miss the underlying complexities and ultimately advocate one-size-fits-all planning and policy initiatives.

The vast spatial mismatch and job accessibility literature has sought to understand the effect of distance (residence-to-workplace) or worker’s race on unemployment rates or commuting differentials. But it is necessary to consider the complexity of factors, beyond distance and race, which may contribute to accessibility barriers among individuals. The literature has also constructed theoretical generalizations on accessibility patterns based upon the broad geographic metropolitan central-city/suburb dichotomy. Yet addressing accessibility at such a coarse spatial scope does not yield insight to access barriers that may be occurring at fine-spatial resolutions; this becomes particularly troublesome when considering the rapid socio-economic metropolitan structural changes. This research argues that: metropolitan patterns of accessibility are more geographically differentiated at refined microgeographic scales; and that barriers to job access among disadvantaged populations are highly complex and situated, contributed by a series of socio-spatial processes of geographic context and individual contingencies. Therefore, this dissertation research is driven by the following specific research questions:

1] What are the microgeographic spatial patterns of job accessibility among the working poor in a metropolitan area, and do the patterns exhibit spatial dependency and differentiation between localities?

2] What socio-spatial processes contribute to limited job accessibility among working poor individuals residing at various metropolitan locations?

To answer these questions, this research utilized a two-phased mixed method approach. Each phase uses different techniques to analyze unique types of data at varying geographic scales. The variation in methods, data, and scale allows for a more
in-depth analysis of a highly complex geographic problem through multiple perspectives and representations. Both phases use geographic information science (GIS) to facilitate the analysis of patterns and processes by using techniques of spatial analysis and visualization conducted at multiple scales.

In Phase 1, the patterns of employment access and factors of geographic context are explored through a standard set of spatial analytical techniques, including pattern analysis, accessibility modeling, geocomputation, cluster analysis, spatial regression, and geovisualization. The analysis is based upon spatially aggregated secondary data from the U.S. Census and is conducted with the aid of geographic information systems (GIS) and statistical software.

The objective of the Phase 1 analysis is to explore the spatial patterns of employment access among the working poor in the Columbus metropolitan area. Here, the working poor are identified by poverty status categories as determined in the U.S. Census. To improve upon geographically coarse analyses that are a major limitation in the literature, this analysis is done with localized data at the Census block group level. Furthermore, the significance of local geographic context is also explored, as neighborhood characteristics can indicate influential forces on access to employment. The spatial structure of such relationships is explored as it is expected that relationships will vary by location in the city.

The spatial distributions of jobs and residences show that the working poor live both in the most central part of the urban area, but also in the urban periphery along the major outer-loop transportation corridor. Patterns of job locations are also concentrated along the urban periphery, and are identical to the job concentrations of all other workers. This finding is consistent with the trends of the increasingly dispersed nature of jobs and housing for lower-income persons, and advocates continued examination of job access for disadvantaged persons who live outside the traditional areas of research focus – inner city high-poverty concentrated neighborhoods.

Local Working Rates is a key variable that indicates job proximity. Theoretically, greater job proximity should relate to better employment access. The pattern analysis suggests that a vast majority of the working poor are employed within 5 miles from
home. This indicates that indeed, relatively good job access is experienced among the working poor as most work close to home. Using local indicators of spatial association (LISA), an exploratory scatterplot and cluster map reveal significant spatial clustering exists in the local working rates variable. That is, zones with high values tend to be located near other zones with high values; and the opposite is true for low values. Interestingly, the patterns of high or low clustering do not match the territorial boundaries of the central-city/suburban dichotomy—a traditional interpretation of in/accessible metropolitan spaces. The clustering patterns reveal greater spatial complexity.

Regression models are fitted to explore how characteristics of local geographic context (neighborhoods) relate to the local working rates values. Using a spatial regimes modeling technique it is found that indeed, certain neighborhood characteristics are significantly related to the observed local working rates. However, those relationships are not constant across the geographic landscape, and in some situations the relationship is reversed. This further highlights the great complexity and local specificity embedded in employment access phenomena. It is also concluded that no single characteristic of local geographic context can point towards underlying processes at work in this issue.

One crucial gap in the employment access literatures is empirical research from a qualitative methodological approach (Preston and McLafferty 1999). Qualitative based research can provide unique perspectives of richly detailed data based on the experiences of individuals and their local knowledge. Phase 2 of this dissertation makes a significant contribution to this gap by offering insight from original research based upon in-depth interviews with 30 working poor individuals. In this phase of the dissertation, the analysis of employment barriers shifts from statistical examination of enumerated data to asking people about their experiences in negotiating the residence-commuting-jobs nexus. The local knowledge of individuals was collected through interviews and sketch maps, in an effort to explore peoples’ experiences of everyday life related to living, working, and commuting in a metropolitan area. The complexity of making the link between home and places of work reveals the central importance of mobility.

Thirty in-depth interviews were conducted from May 2007 through August 2007. Informants were asked to discuss aspects of their lives related to living and working in a
metropolitan area, including residential and employment histories, location decision-making, employment search strategies, and commuting experiences. To collect spatial information about each individual, during the interviews a large paper sketch map was utilized to identify and mark places and areas specific to each informant’s spatial life in the metropolitan area.

The objective was to discover the main underlying socio-spatial processes that lead to limited employment access among the working poor. The literature suggests many plausible answers, including racial discrimination, distance based barriers, education and job-skills barriers, or commuting barriers. This research phase discovers that personal mobility is the most significant barrier to employment opportunities among the working poor. This overarching theme is supported by five sub-themes: people exhibit (spatially) transitory lives in their employment and residential histories; residential choice is determined by many factors, but place-of-employment is not one of them; distance to employment opportunities is important primarily as it relates to commuting mobility; good job opportunities exist, as the local/regional economy in the Columbus metropolitan area supports many higher paying low-skilled jobs; and commuting obstacles related to the existent transportation infrastructure fails to connect workers to the many employment opportunities.

This analysis found that people have knowledge of numerous higher-paying employment opportunities for low-skilled workers, particularly in the job sectors of warehousing and distribution centers, manufacturing, and call centers/customer service/data entry. Most of these higher-paying employment opportunities, which are located peripherally, are not accessible through the public transportation system because of bus service routing and service scheduling. Thus, individuals compromise themselves and take lower paying jobs that they can get to. It is in this way that mobility, the capacity to move through metropolitan space, is the most limiting factor among the sample interviewed. Several other interesting key points were found through the interview analysis process that further relate to the overall issue of mobility: [1] The working poor have highly transitory lives, changing place-of-residence and place-of-employment on a frequent basis. [2] Many factors affect residential choice. People tend
to choose places that have convenient access to a bus line, but they do not make a residential choice based on the proximity to a current place of employment. Jobs are chosen relative to their commuting mobility. [3] Temporary employment agencies are widely used among the working poor as a job search strategy, which functions to expand the geographic scope of the job search area, and broadening the quantity of job opportunities made known to working poor individuals.

Together the findings of the two phases complement each other to create a more complete picture of the complex nature of employment access in the metropolitan area. Interestingly, the two phases arrive at differing conclusions. Whereas Phase 1 found that the metropolitan area exhibits relatively good job access for the working poor populations, the experiences of individuals in Phase 2 indicates that the city has limited job access as many of the higher-paying jobs are inaccessible with the current public transportation infrastructure. The use of multiple data sets sheds light on conflicting realities in the data, leaving irreconcilable differences about truth in knowledge. Such an approach advocates the need to examine complex socio-spatial issues from a multiplicity of perspectives.

The remainder of this dissertation is organized as follows. Chapter 2 provides an overview of the research literatures related to metropolitan area employment access among disadvantaged populations. The extensive job accessibility and spatial mismatch literatures are lengthily reviewed, but focuses upon research since the 1990’s and the reconceptualization of spatial mismatch in light of urban structural changes. Other key literatures are assessed, including urban commuting theory and the meaning of distance; residential mobility, job search strategies, and social networks; and urban change. Key limitations of the literature that shape this dissertation are outlined.

Chapter 3 provides the research design of this dissertation. The research agenda and research questions are laid out first. Then the methodological approaches are discussed, beginning with a rationale for a mixed methods approach. The Phase 1 Spatial Analysis methodological description is very brief, as more details of the approaches used are given in the context of the analysis itself. The Phase 2 In-depth interview data collection and analysis procedures are discussed with greater depth. Then, the study area
of Columbus, Ohio is described, including an analysis of the socio-economic composition of the metropolitan area. The data sources are discussed, including how poverty and ‘working poor’ is defined in this research. Background information for the secondary data from the U.S. Census is given, and a description of the characteristics of the individuals interviewed is provided.

Chapter 4 and 5 are the key analysis sections. In Chapter 4, the results of the spatial analysis of Census data are presented. The chapter uses several different analysis techniques and procedures to construct variable and models. These are well described in the context of the analysis itself. Chapter 5 provides the analysis of the 30 in-depth interviews. The analysis is structured by five key themes that emerged from the data. Each theme is introduced, supportive data is presented, and variants are acknowledged. The over-arching theme of mobility is more thoroughly discussed at the end.

Chapter 6 briefly synthesizes together the two complementary research phases, and reviews some of the major findings of the dissertation. Key intellectual contributions are identified. At the end, broader implications and future directions of the research are noted.
CHAPTER 2

METROPOLITAN AREA EMPLOYMENT ACCESS AMONG DISADVANTAGED POPULATIONS

2.1 Introduction

There are two main objectives in this chapter. First, it provides a general review of literatures pertinent to the topic of this dissertation. The two key bodies of literature explored are job accessibility and spatial mismatch, as these are the core substantive areas to which this research makes contributions. Second, this chapter identifies key limitations in the body of research literature, serving as the basis for this dissertation’s research agenda. This chapter is organized as follows: The employment access literatures of job accessibility and spatial mismatch are reviewed first, with heavier concentration on the latter. After briefly describing the original spatial mismatch hypothesis, an extensive review of recent literatures that broaden the conceptualization of the hypothesis is given. Then, literatures pertaining to urban commuting theory and the meaning of distance are reviewed in the context of job accessibility. Next, residential mobility, job search strategies, and social networks are reviewed, as they have particularly significance to the individual-level analysis of Phase 2. Finally, some key limitations in the literature are identified. In particular, it is noted that research on urban employment access generally lacks a critical perspective, which subsequently influences the conceptualization of the complexity of socio-spatial processes, the methodological approach and scale of analysis, and adapting to on-going urban change.

2.2 Employment Access

The substantive topic of this dissertation relates to the (spatial) barriers to employment access experienced by disadvantaged populations in U.S. metropolitan areas.
Access to employment is not equitable between social groups, nor is it spatially equal across an entire metropolitan landscape. Two inter-related bodies of literature that focus on employment access are job accessibility and spatial mismatch. Here, job accessibility is discussed first, providing the basis of theoretical understanding of accessibility. Spatial mismatch is then discussed as it relates to accessibility – and as a manifestation of spatial inequalities in the metropolitan context. Central to the function of job accessibility and the hypothesis of spatial mismatch, is a particular theoretical understanding of the meaning of distance. Thus, in addition distance is reviewed in the context of urban commuting theory.

2.1.1 Job Accessibility

Accessibility refers to the opportunities at a location in geographic space that can be reached from another location in geographic space. This is often measured separately for different groups in society. Traditionally understood, the level of access is dependent upon the friction of distance, or rather, the costs incurred to transport from one location to another. Thus, on one hand, the key factor of accessibility is the significance of distance. However, non-distance related barriers might also mitigate access to locations, such as the differentiated effects that socio-economic status and cultural identity play in overcoming geographic distance. In urban transportation research, accessibility measures the potential opportunities or interactions within a set geographic space – traditionally measured within a certain distance or a travel time threshold. Job accessibility, therefore, refers to the potential for employment, based upon the distribution of residential locations relative to employment opportunities in the urban area. There are two fundamentally distinct approaches to measuring accessibility, location (place) accessibility and individual (personal) accessibility (Hanson 1995; Kwan 1998; Kwan et al. 2003; Horner 2004).

2.1.2.1 Place-based accessibility (Aggregate measures)

The place-based approach emphasizes relative accessibility of a location by identifying potential interactions between places using aggregated data of geographic zones, such as Census tracts. It also identifies the relative prominence or importance of a location based upon available sets of opportunity. This approach is used in developing theoretical
understandings of urban structures of opportunity and interaction, to geographically visualize actual spatial structures, and to analyze potential maximization (minimization) of benefits (costs) of transportation network structures (Song 1996). Location-allocation models seek to minimize barriers to access (i.e. time or distance) and are extensively used to evaluate the accessibility of public transit systems or in applying public service distributions (Kwan et al. 2003). Spatial interaction models help to understand metropolitan patterns and spatial variations of job accessibility by modeling intra-urban commuting using aggregated commuting and employment data to better understand the (Wang 2000). Two commonly used measures of place-based accessibility are gravity models and cumulative opportunity sets. Gravity models \(^1\) (Hansen 1959) estimate the potential interaction between two places based upon their levels of attractiveness and the distance between them. Cumulative opportunity \(^2\) (Hanson and Schwab 1987) measures suggest accessibility based upon the total (cumulative) potential opportunities within a specified distance.

2.1.2.2 Individual accessibility (Disaggregate measures)

The personal accessibility approach utilizes disaggregate data at the individual level to understand the opportunities available to a specific individual given their spatial-temporal context, personal constraints, household structure, and geographic context – which can greatly affect travel behaviors. This approach understands the travel patterns of individuals based on individual activity and opportunity sets (Hanson and Schwab

\[ I_{ij} = \frac{O_i A_j}{f(d_{ij})} \]

where \(I_{ij}\) is the interaction (trips made) between point \(i\) and point \(j\), \(O_i\) is the outflow from origin \(i\), \(A_j\) is the attractiveness of point \(j\), \(d_{ij}\) is the distance between point \(i\) and point \(j\), and \(f(d_{ij})\) is an impedance function.

\[ A_i = \sum O_j d_{ij}^{-b} \]

where \(A_i\) represents the level of accessibility for location \(i\), \(O_j\) is the set of opportunities at a distance \(j\) from location \(i\), \(d_{ij}\) is a measure of distance (linear, network, travel time, travel cost etc.), and \(b\) is a standard impedance function.
1987) and overcomes the assumed homogeneity within a geographic zone inherent to the place-based approach. One prominent measure of individual accessibility is space-time accessibility (Kwan 1998) built upon Hägerstrand’s (1970) time-geographic framework. The space-time accessibility measure incorporates the effect of interactions between a person’s unique constraints and identity, the available urban opportunities, and derives a potential set of opportunities based upon one’s daily commuting path and spatio-temporal constraints (Kwan 1998). Not only does this approach overcome assumptions of geographic homogeneity, it provides unique insight on fundamental differences in travel behaviors based upon personal identity and constraints by reflecting the “interpersonal differences associated with [the] contingencies of everyday life” (Kwan 1999, 212). For example, Kwan (1999) found women have lower levels of access to urban opportunities than do men, suggesting the significance of gender-based differences in domestic responsibilities, as well as unique individual constraints in travel behavior. Further, the space-time approach found that individual accessibility is more contingent upon individual and household characteristics than the effects of geographic context (Weber and Kwan 2003).

2.1.2.3 Critiquing accessibility measures

There are benefits and limitations to both of these accessibility approaches. The place-based approach gives a generalized look at levels of accessibility at specific locations. This allows for increased theoretical knowledge about accessibility in metropolitan space as it relates to urban form and changing structures of opportunities. It also can provide insight for geographically targeted policy solutions. However, by using aggregated data this approach generally assumes homogeneity of opportunity distribution and travel behavior within zones. Through averaging the data within zones, evidence of outliers, exceptions, and highly unusual cases is lost. Alternatively, the individual accessibility approach provides highly detailed travel behavior information based upon individual experiences of accessibility. By looking at the individual level, it overcomes the assumption of zonal homogeneity and can detect and analyze outliers, exceptions, and highly unusual cases. The highly detailed nature of the data is also its main limitation. Analysis of the data can be computationally intensive; collecting travel-diaries is
expensive and time consuming, thus data availability is quite limited; and travel diary samples tend to under-represent minority and disadvantaged populations. This dissertation research will utilize both approaches to understand place-specific and individual-specific facets of metropolitan employment access.

2.2.2 Spatial Mismatch Hypothesis

2.2.2.1 Introduction

Among theories that seek to explain inequalities in job accessibility, the spatial mismatch hypothesis uniquely identifies the particular spatial arrangement of opportunities in the urban environment as at least in part causal. The spatial mismatch hypothesis suggests that historical socio-spatial processes resulted in spatial disconnections between where people live and where they work, adversely affecting labor outcomes of disadvantaged populations. The body of literature affiliated with spatial mismatch is extensive and broad ranging. It is important to note that in the 40 years since Kain’s (1968) first empirical analysis of this subject, the meaning and understanding of SMH in the research literature has undergone changes and continues to be debated. This dissertation is aligned with a broader conceptualization as outlined below.

2.2.2.2 The Original Spatial Mismatch Hypothesis (SMH)

The traditional conceptualization of the SMH argues that observed high rates of unemployment (as an indicator of labor outcome) among inner city Black males in U.S. cities are due to their spatial separation from distant suburban job opportunities. This hypothesis evolved out of Kain’s (1968) seminal work concluding that a confluence of factors worked conjointly to create this phenomenon. Central to the original SMH argument is the historic decentralization of entry-level low skilled jobs and the geographic barriers to employment through residential segregation and inadequate transportation systems, resulting in the metropolitan polarization between central cities and suburbs. Racial residential housing discrimination reduced the available housing markets and subsequently reduced nearby employment opportunities among urban Black populations. Metropolitan growth in the post-World War II era was accompanied with the dispersal of employment from central-city locations to suburban locations, further reducing employment opportunities of African-American populations.
The historic evolution of U.S. cities is clear and undisputed: as wealthy White residents moved away from the Central Business District (CBD) towards the surrounding outlying suburbs around metropolitan areas, the decentralization of entry-level low-skilled job opportunities towards the suburbs soon followed (Kasarda 1989). These available low-skilled jobs tended to be retail service jobs for the growing suburban residential communities, or manufacturing industrial jobs relocated from near the CBD. Minority residents remaining in the central city experienced a decline in employment opportunities as the distance between jobs and their home increased. In many instances, racial residential segregation thwarted efforts by minorities to relocate to the suburbs and closer proximity to low-skilled jobs. Furthermore, public transit systems were unable to adequately connect central city residents to distance outlying job opportunities (Gobillon et al. 2007).

By the second-half of the 20th century the stark disparities between central cities and suburbs in metropolitan areas across the U.S. became clear. Low-density housing, socio-economic residential homogeneity, and good access to an abundance of nearby low-skilled jobs characterized the outlying suburban areas. The central city contained good access to the remaining low-skilled jobs in the CBD but not those in the suburbs, was riddled with high rates of crime and poverty, swaths of derelict housing, and limited promising educational/skills opportunities. This central city / suburb dichotomy established the dominant theoretical consideration that suburbs are spaces of ‘good job access’ and central cities contain ‘poor job access’.

The first 30 years of empirical spatial mismatch research remained largely within urban and labor economics literatures. Three key papers review the literature from this time period (Jencks and Mayer 1990; Holzer 1991; Kain 1992), and Ilhanfeldt and Sjoquist’s (1998) review also incorporates literature from the mid-1990’s and includes other disciplines. There are several clear characteristics within the early decades of spatial mismatch research. The focus of inquiry was exclusively upon inner city Black males. The objectives of the econometric and regression models used were to test the validity of the spatial mismatch hypothesis, using a variety of independent variables including: residential segregation, residential suburbanization, jobs suburbanization, or
other measures of job access (distance, travel time, job opportunities) (Holzer 1991). In this era, the models all sought to predict and/or discover determinant factors related to high unemployment rates in urban areas.

The vast quantity of empirical studies during this period is evidence that the overall validity of the spatial mismatch hypothesis is generally inconclusive and debated. One key issue centers upon significance of race vs. space, where some argue that spatial distance has less to do with spatial mismatch than does the racial identity of workers (Ellwood 1986). After their extensive reviews of the literature, both Holzer (1991) and Jencks and Mayer (1990) find that the overall results are quite mixed and conclude that the idea of spatial mismatch as explanatory of lower employment among blacks remains controversial. The evidence in the body of literature provides “no direct support for the hypothesis that residential segregation affects the aggregate level of demand for black workers. They provide some support for the idea that job proximity increases the supply of black workers, but the support is so mixed that no prudent policy analyst should rely on it” (Jencks and Mayer 1990, 218-219). Holzer (1991) concludes that while on many issues there is “considerable disagreement and uncertainty… it seems fair to say… that the preponderance of evidence … shows that spatial mismatch has a significant effect on black employment” (1991, 117-118) but the magnitude of causal effects remains uncertain. Despite the confounding evidence and mixed results put forth in these other reviews, Kain (1992) maintains that clearly housing discrimination and residential segregation are important causes of low unemployment levels of central city black residents.

2.2.2.3 Geographical Context

Implicit to these literatures is discovering the ways geographical context relates to employment access. Geographical context are the aspects of the built, social, and natural environment in metropolitan areas. As the arena in which the daily lived experience is manifest, variations in neighborhood and geographical context are important to socio-spatial phenomena. Because neighborhood and residential differentiation is persistent in American society, one underlying principle in human urban geographic research is how place matters. For instance, variations in neighborhood context affect crime (Messner
and Anselin 2004), physical health and exercise (Wen, Browning, and Cagney 2007), or economic hardship (Longley and Tobón 2004). The significance of geographic context is more than the static features of socio-economic composition (e.g. race, class). Rather, it is the mechanisms of social processes that illuminate how neighborhood composition influences and changes social phenomena (Sampson, Morenoff, and Gannon-Rowley 2002).

The urban underclass thesis highlights how neighborhood context has historically influenced employment access and job opportunities in U.S. metropolitan areas. The growth of the urban underclass as a result of job decentralization (Wilson 1987; Kasarda 1989) was a significant indicator of urban form change, from monocentricity towards decentralization and polycentricity in the post-WWII decades. In Wilson’s (1987) assessment of the inner-city underclass, he concluded that the increased “social dislocations” within the ghetto are largely due in fact to issues of social isolation. This social isolation in the ghetto is evidenced by: the out-migration of middle- and working-class black families, the decline in the quality of schools, a shrinking population of marriageable partners, and the decline in access to jobs and job networks. Furthermore, the global change in economics, the subsequent decentralization of jobs in American cities (Kasarda 1989), and the urban economic restructuring, has all precipitated the central-city ghetto environment of social isolation. The far-reaching effects of rampant joblessness are central to the problems of inner-city ghetto (Wilson 1996).

Out of these historical spatial shifts, the geographic focus on most early spatial mismatch research was upon urban neighborhoods with high-concentrations of poverty. The most common accepted absolute measure of high concentration poverty neighborhoods are zones with poverty rates at or above 40%. Ethnographically Jargowsky described such neighborhoods as “…predominantly minority. They tended to have threatening appearance, marked by dilapidated housing, vacant units with broken or boarded-up windows, abandoned and burned-out cars, and men ‘hanging out’ on street corners” (1997, 11). While high-poverty neighborhoods should continue to be the focus of research attention, this dissertation argues that problems of job access are also being experienced in other neighborhoods throughout the city, not just the inner-city.
In light of these arguments, factors of geographical context are consistently incorporated into empirical studies to determine which are most significantly related to measures of employment access. Primarily, key variables of geographic context have included racial/ethnic composition or residential segregation (McLafferty and Preston 1996; O’Regan and Quigley 1996; Gabriel and Rosenthal 1996; Carlson and Theodore 1997; Immergluck 1998a, 1998b; O’Regan and Quigley 1998; Mouw 2000; Gottlieb and Lentek 2001; Sultana 2005; Cristaldi 2005; Horner and Mefford 2007), poverty rates or income levels (Gabriel and Rosenthal 1996; O’Regan and Quigley 1996; Carlson and Theodore 1997; McLafferty and Preston 1997; Raphael 1998). Furthermore, transportation access and reliance on public transit (Taylor and Ong 1995; McLafferty and Preston 1996, 1997; Sanchez 1999; Gottlieb and Lentek 2001; Shen 2001; Kawabata 2003; Blumeberg and Shiki 2004; Parks 2004; Horner and Mefford 2007) and skills appropriate job proximity (Ilhanfeldt and Sjoquist 1990; Carlson and Theodore 1997; Immergluck 1998a, 1998b; Parks 2004) are significant context characteristics widely used in empirical analyses. Additionally, levels of job skills or education (McLafferty and Preston 1992; Gabriel and Rosenthal 1996; O’Regan and Quigley 1996; Raphael 1998; Bauder and Perle 1999; Immergluck 1998b, Cristaldi 2005) and gender/household structure (McLafferty and Preston 1992, 1996, 1997; Hanson and Pratt 1995; Cristaldi 2005) variables have also been incorporated.

Again, as with the urban underclass thesis, the argument behind these variables supposes a critical influence that social surroundings impacts employment opportunities and outcomes. However, this research argues that while geographical context may have significant influences on employment access, they may not exert the same influence in all places of the urban landscape. Furthermore, the changing socio-economic structure of cities necessitates analysis of neighborhoods outside concentrated poverty zones, to include suburban areas where poverty growth has increased. Thus, the design of this research is to analyze an entire metropolitan area, at very localized levels, to move beyond the central-city/suburb dichotomy, and explore how the patterns of access vary across the city.
2.2.2.4 Broader Spatial Mismatch Conceptualizations

By the 1990’s, empirical research on spatial mismatch and job accessibility became of interest to a much wider academic community beyond urban and labor economics. The work of Wilson (1987, 1996) and Kasarda (1989) brought to light again the plight of the urban “underclass” with broad appeal, renewing interest in spatial mismatch and job accessibility issues in U.S. cities. In particular, new research in geography, regional science, and city and regional planning bodies of literature not only imported fresh approaches, but also broadened the conceptualization of spatial mismatch (Preston and McLafferty 1999). During this period, the studied populations extended beyond urban Black male youths, and utilized indicator proxies of labor outcomes other than unemployment rates. Furthermore, research since the 1990’s has drawn upon more sophisticated methods and technologies, improved data quality, and has moved beyond simply testing the hypothesis itself towards investigating specific causally related factors behind the barriers to employment (Ihlenfeldt and Sjoquist 1998; Preston and McLafferty 1999).

While the broadened conceptualization has precipitated a wider body of empirical research, it has also caused more confusion about the changing meaning(s) of spatial mismatch. To date there has been little formalized distinction of the many meanings, interpretations, and conceptualizations of spatial mismatch, creating confusion, miscommunication, and disagreement about what spatial mismatch technically means. This current dissertation research does not intend to unravel the breadth of meaning within the body of literature. But this research does align with the broader definition of spatial mismatch adopted by Preston and McLafferty (1999) that suggests a need to look beyond just spatial (distance) barriers between jobs and workers. Here spatial mismatch is understood as unjust geographical barriers to employment opportunities (a labor market disadvantage) that arise from changing social and economic relations in the urban landscape. In addition, this present research project argues that due to on-going metropolitan structural changes, spatial mismatch is not a problem only for inner-city residents, but potentially is experienced by disadvantaged residents throughout the metropolitan area.
The next 2 subsections extensively review recent empirical research that has moved beyond the traditional conceptualizations of spatial mismatch. First, many argue that spatial mismatch is not just an unemployment phenomenon. Thus how spatial mismatch is manifested can also include workers who experience longer commutes or limited job proximity. Secondly, many also argue that spatial mismatch does not afflict only urban Black males. Thus, who experiences spatial mismatch also includes many disadvantaged populations.

2.2.2.4.1 Extended Proxy Indicators of Spatial Mismatch

One fundamental extension to the spatial mismatch hypothesis is the use of proxy measures other than unemployment rates. In the broadened conceptualization, inequalities in employment access are considered to also be relevant among persons who are currently employed, but may experience some kind of unjust barrier in employment access. That is, the spatial mismatch between jobs and housing may result in persons compromising and taking lower paying jobs, or persons experiencing extreme journey-to-work commutes. The variety of proxies utilized to measure spatial mismatch has been reviewed extensively (Ihlenfeldt and Sjoquist 1998; Houston 2005; Gobillon, Selod, and Zenou 2007). Two dominant approaches during the era of reconceptualized spatial mismatch include commuting time/distance, and job proximity.

2.2.2.4.1.1 Commuting Time or Distance

With improved computational capabilities and the availability of detailed transportation datasets, commuting-based spatial mismatch studies became more common during the 1990’s, especially within the field of geography. This approach seeks to uncover differences in average commuting time or distance among various population groups. As a surrogate measure, the measure suggests that if particular individuals have poorer access to jobs, it should be reflected in their having a longer commute time, on average, than other populations. There are many benefits of such commuting-based studies including: the wide availability and continual improvement of commuting data (e.g. U.S. Census based PUMS and CTPP), commuting as a directly measurable and intuitive approach to analyzing location mismatches between housing
and employment, and commuting is largely an integral component to the everyday lives of all employed persons.

However, many criticisms suggest commuting times are a weak test for measuring spatial mismatch. One major problem is sample selection bias, as commuting datasets do not include unemployed persons (Preston and McLafferty 1999). Also, the proxy does not indicate relative access to the full set of job opportunities, but simply indicates the distance/time of commutes for persons in a neighborhood (Parks 2004). Second, commute-based studies are limited in distinguishing the causes of long/short work trips. Given that the meaning of long/short commutes are varied and often based upon socio-economic indicators as well as larger social processes, commute-based studies are unable to indicate reasons why a longer commute might exist, such as social accessibility (Parks 2004), employment discrimination, or transportation issues (Ihlanfledt and Sjoquist 1998). Long commutes for higher-income workers may be a choice, in order to enjoy the residential amenities in more distant locations, reflecting the ability to absorb associated commuting costs. Long commutes for low-income workers may be a burden, as racialized housing discrimination or economic limitations prohibit movement closer to employment locations, reflecting the inability to adequately absorb associated commuting costs. Thus, distinguishing the causes of long work trips remains a limitation to commuting studies (Ihlanfledt and Sjoquist 1998; Preston and McLafferty 1999). Third, commuting studies are unable to isolate significant aspects of individual commuter behavior. Commuting based studies assume a person’s residence as the point of origin, and are unable to untangle alternative commuting practices such as trip chaining (Kwan 1999). Finally, it has been criticized that the “relationship between spatial mismatch and commuting distance is indeterminate if employment probabilities decline as the distance from job site to residence increases”, suggesting that commuting measures are mis-specified as rates of employment probability vary with distance, and thus lead to the contradictory empirical findings (DeRango 2001, 1521). It should also be noted that commuting studies are not directly measures of geographical location, but the process of commuting. As urban sprawl and metropolitan growth continues, commuting times may rise, but not as a result of driving further but perhaps in driving slower in more congested
traffic. This measure does indicate geographic barriers that must be overcome, but does not isolate/indicate characteristics of geographic contexts.

2.2.2.4.1.2 Job Proximity

While commuting time/distance remains a debated and troublesome measure, job proximity offers an intuitive, direct measure of spatial mismatch that is on stronger conceptual footing than most other proxy measures (Houston 2005). Several features make job proximity a particularly useful proxy measure for spatial mismatch and job accessibility research.

For one, it reflects the particular sensitivity to distance apparent among low-skilled workers. Low-skilled workers exhibit more spatially constrained labor market opportunities in terms of job search strategies and transportation capabilities than do middle- or high-skilled workers (Simpson 1991; Immergluck 1998a). Thus, proximity to local employment opportunities may be assumed as integral to job accessibility for low-skilled workers, who are more affected by spatial barriers to employment than other workers (Kain 1968; Simpson 1991; Immergluck 1998a). As such, the measure substantiates the idea of ‘local working’ – workers employed near their residential neighborhood. The job proximity approach is also useful as it can provide an indicator of accessibility among currently employed, and thus is not limited to considering just the ill-effects of unemployment. Finally, the measure is capable of incorporating local labor market competition and demand. A properly specified measure (see Shen 1998 for example) not only considers the total nearby employment opportunities, but also considers the local demand for jobs and a weighted effect of distance. Furthermore, such proximity computations can isolate only skills-appropriate jobs. This approach is regarded having the ability to focus on the local available skills-appropriate jobs, capture fine-grained patterns, and avoids surrogate measurement, like commuting times (Preston and McLafferty 1999). It is the approach used in this dissertation research.

Distance thresholds for defining ‘proximity’ vary by research study. Sometimes the threshold seems arbitrary but in most cases is rationalized based on local conditions and mean observations. One common threshold is based on commuting travel time. Using a 25-minute travel time radius in Chicago, Carlson and Theodore (1997) find that
African-American residents have reduced access to jobs, but high-poverty neighborhoods do not exhibit diminished opportunities. A 30-minute travel time used by Shen (2001) compared the relative accessibility of auto commuters against those who use public transport. Another technique considers accessibility based upon within-zone employment, such as within Census tract (Hanson et al. 1997). Yet another widely used approach measures job proximity based upon radius distance from a zone centroid. For example, Immergluck (1998a) utilized a 2-mile radius in Chicago, and 3-mile radii were used for Los Angeles (Ong and Blumenberg 1998) and Buffalo, New York (Hess 2005). In each of these studies the relative proximity of suitable jobs was found to benefit the labor outcomes of low-income workers. Duly noted, straight-line distance as a commuting measure is not without conceptual limitations. But the approach gives a suitable approximation and relative picture of accessibility that is less computationally intensive and data dependent than network analysis; with sub-tract spatial data it provides a superior estimation when compared to coarse geographic data; and the estimations can in fact be quite robust (trustworthy) when calculated from actual origin-destination flow data.

2.2.2.4.2 Extended Identity of the Disadvantaged

Another fundamental extension to the spatial mismatch hypothesis during this period was a broadened understanding of who are the disadvantaged populations. The traditional conceptualization focused on inner-city young Black males in an effort to understand high unemployment rates. In the post-1990 era, the empirical research has sought to understand spatial inequalities in employment access for many socially disadvantaged populations. This has included looking at women, other ethnic/racial minority groups, African-Americans, the transit dependent, and low-skilled workers.

2.2.2.4.2.1 Race and Ethnic Identity

Disparity in employment access for Blacks is the dominant subject of analysis in the original SMH empirical research (Jencks and Mayer 1990; Holzer 1991; Kain 1992). In the broader conceptualization of spatial mismatch, employment access has also been analyzed for other racial and ethnic minority groups, particularly Hispanics or other locally significant immigrant groups. As with other types of spatial mismatch research,
the findings have been mixed, ranging from supportive evidence, no evidence, and inconclusiveness.

Several job opportunity based studies have concluded that minority populations suffer from poorer spatial proximity to employment than do other populations. Ihlanfeldt and Sjoquist (1990) found that in Philadelphia, nearness to jobs had a strong effect on both Black and White youth, but 33%-54% of the employment probability gap between the two races can be attributed to space; thus, more than an issue of race, employment was found as an issue of proximity to jobs. These findings were supported by similar results in Chicago and Los Angeles. In a similar methodological approach, Bauder and Perle (1999) found young Black males in the Detroit area had lower probability of being employed than Whites due in part to definitive accessibility differentials. These differentials, however, begin to disappear as labor market skill levels increased. In the Los Angeles context, Parks (2004) found that spatial accessibility among native-born Black women was significantly correlated with levels of unemployment. The findings were similarly true for several foreign-born ethnic populations, including Mexican and Vietnamese. Analyzing the processes of job relocation in Detroit and Chicago, Mouw (2000) found that the combined effects of job decentralization and residential segregation has resulted in higher unemployment rates of African Americans in both cities during the 1980’s and 1990’s.

Several commuting-based studies also found that racial and ethnic minorities suffer from longer commuting times/distances than do other populations. Gabriel and Rosenthal (1996) found that Blacks commute longer than White and Asian workers, but one-third of the commuting differential is offset by neighborhood amenities and housing price differentials. An increase in the level of educational attainment among blacks precipitated a decline in commuting length. Analyzing the post-industrial urban context of Atlanta, Sultana (2005) found severe cases of spatial mismatch (in terms of commuting differentials) for married Black males, but the levels of commuting variation among blacks exhibited particular geographical structures. Blacks who live in predominantly Black suburbs showed evidence of spatial mismatch, while blacks living in predominantly white suburbs showed no evidence. Johnston-Anumonwo (1997) only
found commuting based spatial mismatch among Black female reverse commutes, a small sub-set of the entire minority population, and Cooke (1997) found longer commutes to find and keep jobs, among blacks, yet minority labor market participation was not lower. Similarly, racial segregation in residential locations was found to constrain choice, and subsequently lead to higher minority commuting commutes (Gottlieb and Lentnek 2001) or confined commuting ranges among minorities (Horner and Mefford 2007). Downey (2005) conducted research that found minorities in Detroit did not exhibit the detrimental health effects indicative of living near polluting manufacturing sites, suggesting they did not reside spatially near the employment opportunities at the manufacturing sites.

Several empirical studies have concluded that the evidence of racial differences in spatial mismatch is either diminishing, does not exist, or can be attributed to other indicators. Suggesting a declining significance of space, Holloway (1996) found a converging of job accessibility among Whites and Blacks between 1980 and 1990 in 50 metropolitan areas; that is, the accessibility differential gap over this period of time was diminishing. Wyly (1996) did not find significant indicators that race contributed to spatial mismatch in Minneapolis-St.Paul; and Immergluck (1998a) did not find evidence of spatial mismatch, but concluded employment outcomes were based on race discrimination and skills. Some studies question the validity of the hypothesis since the CBD often remains a significant source of entry-level jobs, and many Blacks are physically closer to more jobs than Whites in the suburbs (e.g. Cohn and Fossett 1996). More so than race or ethnicity, McLafferty and Preston (1997) found that means of transportation, employment wages, and household characteristics were the most significant determinants to individuals’ commuting times. Whereas Parks (2004) found spatial accessibility to be significantly correlated with levels of unemployment among certain minority female populations in Los Angeles, the correlation was not significant among Chinese, Korean, Guatemalan, and Salvadoran ethnic groups. The difference, it is suggested, is due in part to the extensiveness of social networks (or social accessibility) among different racial and ethnic populations.
Most commonly, spatial mismatch evidenced among racial and ethnic minorities has been attributed to other indicators, primarily reliance upon mass transit. Disentangling this transit reliance from race/ethnicity in spatial mismatch research has led many to suggest the evidence is less definitive. Especially among commuting-based studies, there are concerns that greater reliance on public mass transit systems among minority groups subsequently complicates the signatures of spatial mismatch. In New York, the greater reliance on mass transit among African American and Latino populations was a significant determinant of longer commuting trips McLafferty and Preston (1997). Alternatively, however, Cooke (1996) found evidence of spatial mismatch among blacks in an inter-metropolitan comparison, but it was only evident in central-cities with poor transit systems – thus a metropolitan characteristic, not necessarily a universal racial effect. However, Taylor and Ong (1995) found that longer commutes in 10 metropolitan areas was not due to race, but to an \textit{automobile mismatch} and that this automobile mismatch is not a racialized process, but simply that those who are reliant on transit suffer greater mismatch between jobs and housing.

\textbf{2.2.2.4.2.2 Gender}

One key limit to the original SMH was the absence of research on the employment barriers experienced by women (Preston and McLafferty 1999). This approach considers whether women are constrained spatially, leading to reduced levels of employment, lower wages, or compromised commutes. As the empirical research indicates, while women may have different accessibility patterns than men, the evidence of purely spatial constraints is very tenuous. Rather, space, in conjunction with many other factors contribute to variations in employment access of women. The evidence from gender-specific research of spatial mismatch has produced mixed results.

The spatial entrapment theory suggests a gendered difference exists in commuting patterns between men and women, which can be largely attributed to traditional domestic responsibilities. Assuming a greater burden of domestic responsibilities (household shopping/errands, transporting children to school/daycare) women tend to work closer to home than do men (England 1993; Hanson and Pratt 1988, 1995; Kwan 1999). In the Italian context, Cristaldi (2005) found gender-specific commuting differences that were
consistent with those found in the U.S. literatures. In comparison to the commuting patterns of men, women travel shorter distances (but as education levels increase, so does the commuting time), the mode choice of women commuters is different, and women tend to depart for and return from work at different times. When comparing women across lines of racial difference, McLafferty and Preston (1997) found that means of transportation, wages/education, and household characteristics were the most significant determinants of commuting differences among women. The conventional explanations of ‘domestic responsibilities’ that contribute to shorter commutes among women, is especially true among Whites, but not other minority groups.

The research also suggests that spatial mismatch may affect women differently, depending upon racial/ethnic identity. In an analysis of native-born Black and immigrant women, Parks (2004) found spatial accessibility to be significant in employment outcomes for only some race/ethnicity groups; further, residing within an ethnic enclave showed no benefits to employment. Johnston-Anumonwo (1997) found no gender specific spatial mismatch for intra-urban commutes, but that Black urban females experience longer commutes to suburban employment; however, female work trips are more ‘compromised’ (short commutes to low-wage jobs) and ‘constrained’ (long commutes to low-wage jobs) than male work trips. McLafferty and Preston (1992) found that while minority women generally have longer commute times due to a reliance on mass transit, Latina women suffered less from spatial mismatch than did African American women. Further, McLafferty and Preston (1996) found only that minority women in suburban areas exhibited evidence of spatial mismatch. When looking at racially and urban/suburban identified neighborhoods, Gottlieb and Lentnek (2001) generally found less prevalent differential commuting times for women than for men; however White women residing in the city had shorter commuting times than Black women living in the city.

Not all studies found evidence of spatial barriers to female employment. Hanson, et.al. (1997) found that spatial variables are not important in determining female employment outcomes, except within a very specific subset of women, suggesting that residential location does not affect the employment outcomes for all women. Similarly,
Wyly (1996) did not find substantial evidence to support spatial mismatch in the Twin Cities area for any group, including women.

2.2.2.4.2.3 Transit Mode

Commuting mode has been another crucial focus in recent spatial mismatch studies. Conventional wisdom suggests commuters reliant upon public transit systems will experience longer commute times than private automobile commuters, even though their commute distances may be shorter (McLafferty and Preston 1996; Gottlieb and Lentnek 2001). The freedom and flexibility of private automobile commuting allows for covering greater distances in a shorter amount of time, whereas public transit users are dependent upon transit schedules, frequent stops, and a propensity for city street usage over freeway travel. Further, the African American labor population disproportionately relies upon public transportation for work trips than all other races (McLafferty and Preston 1996; Gottlieb and Lentnek 2001). The cost for purchasing, insuring, registering, fueling, and maintaining a private automobile is prohibitive for many low-income populations. For these key reasons, it is generally practiced within the research literature that transit mode should be held constant when conducting analyses. If the urban environment were equitable, therefore, by holding travel mode constant, differences in commute time among workers based upon factors of race, gender, or class should not be expected. While most conclusions suggest that users of public transportation experience temporally longer commutes, many studies deduce interesting nuances related to modal split.

One line of research suggests that the effects of spatial mismatch are less influenced by modal split factors than differences in race and/or class. McLafferty and Preston (1992) empirically demonstrate the gender and race commute differences based upon transportation mode. The combinatorial effects of gender, race, commute mode, and labor market segmentation, reflect that minorities and female minorities in ‘secondary’ occupations who are reliant upon mass transit do experience spatial mismatch. McLafferty and Preston (1996) confirmed the overall increased commute time for all public transit users, and the higher reliance on public transportation modes for all minority populations in both the suburbs and the city. In some occupational groups,
Black women who were dependent upon transit had longer commute times than did White women of the same occupational group (Gottlieb and Lentnek 2001). Regardless of mode choice, Blacks and Hispanic minority groups in Atlanta are more spatially constrained in flexibility of choice among residential and work locations (Horner and Mefford 2007).

Simultaneously, however, research also suggests that the effects of spatial mismatch are more influenced by the modal split variable than conditions of race and/or class. In a Cleveland analysis, central city Blacks did not have longer commutes than suburban Blacks, and there were few commuting differences between central-city residential Blacks and central-city residential Whites (Gottlieb and Lentnek 2001). Metropolitan characteristics (including efficiency and coverage of mass transit systems) are important in determining the effects of spatial mismatch. Central-city Blacks in large metropolitan areas with inefficient transit systems have a more difficult time gaining access to suburban jobs than do central-city Blacks in large metropolitan areas with efficient transit systems (Cooke 1996). For all persons, use of public transportation reduces overall access to job opportunities (Cooke 1997). Taylor and Ong (1995) found that disparities in commute times/distance, incomes, and employment outcomes were not based upon racial or spatial factors, but on transit mode. Those who lived with the bane of slow mass transit, regardless of race or spatial location, experienced longer commutes, lower incomes, and less favorable employment outcomes; thus, they conclude no findings of spatial mismatch, but automobile mismatch. When considering only automobile commuters, Holloway (1996) found a declining significance of space among Black and White teenage males (thus, a comparative converging of disparity), suggesting that race as a determining factor in spatial mismatch is diminishing when using a similar transit mode; and Johnston-Anumonwo (1997) found that African American men and women and White women had shorter automobile commutes than did White men, who are more likely to experience ‘compensatory’ (long commute, high income) commutes.

It should be noted that the quality, effectiveness, and available service of regional public transit systems are not similar between metropolitan areas in the U.S. Historically, transit systems evolved in the context of densely populated cities where routes focused
upon moving people between the central business district (CBD) and the surrounding inner-city and suburbs. The current challenge for metropolitan areas is adapting to progressively more polycentric, dispersed, and low-density suburban development (Pucher 2004). Today, commuting flows are increasingly destined for places other than the central city – including more intra- and inter-suburban travel, as well as commutes to other nearby metropolitan areas (Pisarski 2006). While some urban regions have adapted their transit systems to effectively serve these changing urban forms, many remain entrenched in old center-oriented transit systems (Thompson and Matoff 2003; Thompson et al. 2006) further exacerbating the problems of transportation equity for disadvantaged populations without private automobiles (Bullard et al. 2004). Research shows that very large urban regions as well as mid-sized urban areas in the West region of the United States provide the most effective transit service due to their population densities, population growth patterns, transit investments, and multidestination network orientations (Thompson and Matoff 2003; Thompson et al. 2006). Thus, when considering the research findings on transit mode and job accessibility, it is important to bear in mind the distinctively different transit systems between urban regions.

2.2.2.4.2.4 Job Skills

Just as with race/ethnicity and gender based studies, other studies have sought to understand the barriers to employment faced by persons with lower job skill sets. This approach is increasingly important as the residential and employment patterns of low-skilled workers and jobs in metropolitan areas continue to become less centralized. Low-skilled individuals are considered disadvantaged because they: 1] have limited education that greatly diminishes employment opportunities; 2] generally receive minimum wage incomes and no benefits; and 3] obtain poor quality jobs with limited stability, few opportunities for advancement, and are prone to exploitation.

Skills mismatch studies have focused on the diminished access to jobs that are skill-appropriate for workers in the metropolitan area. While some conclude that skill and occupational level differences do not influence spatial mismatch (Taylor and Ong 1995), research has suggested that labor market segmentation, and the type of job-skills employment does not singularly influence levels of spatial mismatch, but in many cases
contributes to inequalities in access in combination with other variables (e.g. McLafferty and Preston 1992). Immergluck (1998a) found that the effect of nearby jobs on neighborhood employment rates depends on: [1] the ratio of nearby jobs to nearby labor force, and [2] the matching of occupational levels of nearby jobs to workers. These two factors were found to be effective together, but not separately. The findings of Bauder and Perle (1999) suggest a combined spatial-skills mismatch effect. As the skill level of Blacks increases, the spatial barriers to employment tend to disappear. Racial differences in job accessibility are most evident among the lower labor market segments, where Blacks experience more inaccessibility. City Blacks have less access than city whites, but the racial difference diminishes with increasing segments of labor market; the racial difference is less evident for suburban residents. However, the authors further conclude that individual and household characteristics (e.g. gender and households with only one vehicle) are more determinant of employment probability among the lower labor segments than is the difference in accessibility (Bauder and Perle 1999).

Among women specifically, greater education (Cristaldi 2005) and increased wages (attributed to skills and education level) (McLafferty and Preston 1997) result in higher commutes and increased mobility. Further, for college-educated women with children, local employment context is significant in contributing to female employment outcomes (Hanson et al., 1997). There are some arguments, however, that job seekers with low job-skills have greater accessibility to available jobs. This finding runs counter to the notion that the suburbs are more job-rich than in the central city. By analyzing job growth and job turnover, Shen (2001) found the central city to be a job-rich area for low skilled individuals, and a majority of residential locations have a high level of access, if able to commute 30 minutes by automobile. This finding is counter to traditional conceptions of urban form, and urban commuting, but it points towards the need for alternative visions of analyzing urban commuting.

This dissertation focuses on socio-spatial employment barriers among people based upon social class – not racial identity, transit mode, or gender. This research does not attempt to disentangle issues of race or gender identity relative to employment access. Rather, this dissertation seeks to explore the hardships in employment faced by the
working poor in society. Job skills are one indicator of social class, as it is closely tied to educational attainment and approximate income levels. As discussed elsewhere, this social emphasis is deemed appropriate as the structure of opportunities and housing in U.S. metropolitan areas continue to evolve: residential segregation is increasingly along lines of social class, poverty is becoming less centrally concentrated, and clusters of job opportunities within metropolitan areas continues to shift.

2.2.2.4.3 Conclusions from the research literature

By extending the parameters (subjects of study, and proxy measures) of spatial mismatch in the more recent literature, the understandings have become more confounding. The variety of proxy measures for spatial mismatch (e.g. unemployment rates, commuting times, job proximity, wage differentials) make it difficult to compare findings across studies, as each measure has different inherent meaning and interpretation. Similarly, the focus on varying sub-populations also makes it difficult to compare findings, and further muddies the already disputed theoretical meaning of spatial mismatch. Even still, acceptance of spatial mismatch based on the empirical evidence remains quite mixed: from complete certainty (Kain 2004), to questioning the validity of the hypothesis (Cohn and Fossett 1996; Ellwood 1986), to suggesting that the validity depends, as different people can be affected differently in different places for different reasons (Hodge 1996).

These confounding conclusions suggest that the causal factors of spatial mismatch cannot be singularly isolated and identified, but that a multitude of individual, household, neighborhood, and metropolitan factors potentially figure into the complexities of the phenomena. For one, the findings “suggest that gender, race, and class are mutually constituted, rather than separate, additive social divisions” (McLafferty and Preston 1992, 428) figuring into the complexity of spatial mismatch. Further, when considering the role of distance, geographical access is more complex than merely the location of jobs relative to residential locations (Preston and McLafferty 1999; Bauder 2000).

What does all this imply, and why is more spatial mismatch-like research needed? From these works it is clear that socio-spatial isolation and unjust access to employment affects more than inner-city Black populations. Further research is needed for
comprehensive engagement to better inform public policy, influence sustainability initiatives, and to advance theoretical understandings of urban social-economic processes. New research that is impacting with significant contributions should adequately consider the role of geographic context, individual contingency, complex meanings of geographic access, and carry out such analysis at very localized levels. These advancements will be needed as ICTs, globalized economies, edge-city growth, transportation changes, land-use changes, or redistributions of affordable housing have potentially detrimental effects upon the ability of metropolitan area residents to access employment.

2.3 Urban Commuting Theory and the Meaning of Distance

At the heart of accessibility and spatial mismatch is a fundamental assumption regarding the significance of spatial distance. It is widely accepted that the proximity to which people live in relation to job opportunities is the key factor in their outcomes of accessibility to jobs. Here it is important to examine fundamental theories of distance, as it pertains to urban commuting, and the significance of urban form.

In the monocentric model of urban form, urban functions and opportunities are concentrated in and around the central business district (CBD) around which outlying residential areas are focused. Bid-rent curves and theories of land use and economic value, suggest that land values decrease steadily as distance from CBD and the concentration of urban functions increases. In this model, housing costs are cheapest nearer to the CBD whereby low-income populations are able to reside near places of employment (Alonso 1965; Muth 1969). With regard to urban commuting theory, this assumes a specific relationship between land use and urban transportation. The basic assumption holds that in household behavior, people will make a tradeoff between housing and commuting, choosing housing that minimizes their commuting costs (Mills 1972). Thus, greater distance between the workplace and place of residence will increase commuting costs (through time spent or cost of transport).

As an outcome of this traditional model, there becomes a duality in the meaning of distance with regards to urban commuting. On one hand, distance is interpreted as prestige/choice. Persons with higher incomes chose to consume residential amenities offered in the outlying areas (spaciousness, quality schools, socially homogenous
neighborhoods, pastoral settings, secure social conditions), and offset those amenities with longer commutes to work. On the other hand, distance is also interpreted as constraint/oppression. For persons with lower incomes or who experience residential segregation, they have limited residential choice. They are left to consume less expensive, less desirable living conditions nearer to the CBD (small living space, high-density populations, mixed race and class neighborhoods, proximity to manufacturing pollutants, etc…). Furthermore, with job decentralization, they are forced to endure longer commutes to low-paying jobs in outlying areas – if affordable transportation is available.

There are several limitations to this neo-classical model of urban structure and its implications on urban commuting. First, the perspective assumes cities are structured in a monocentric form, when in fact cities are increasingly polycentric. While the CBD continues to have significant concentrations of urban functions, the emergence of edge cities (Garreau 1991) highlights the multiple nodes of concentrated activity within a metropolitan area. Furthermore, it is argued that postmodern cities today are more or less organized in ways other than distance, and their structures of opportunities are more chaotic and quasi-random (Dear and Flusty 1999; Soja 2000).

Second, this perspective assumes humans have complete (perfect) knowledge of all work and residential opportunities and act as rational beings to fully maximize housing amenities and employment outcomes, while minimizing commuting costs (time, expenses, distance). However, the jobs-housing balance literature (Giuliano 1991; Cervero 1989) suggests that the assumptions about housing and commuting tradeoff do not adequately explain observed location patterns, and that factors other than distance are significant. Thus, the journey to work plays only a limited role in residential choice (Guiliano and Small 1993). Similarly, space-time accessibility research poses serious challenges to the significance of distance as a determinant of individual accessibility. It suggests that time and individual constraints are more influential on accessibility than is proximity to opportunities (Kwan 1999; Weber and Kwan 2003; Weber 2003).

Third, the classic dualistic meaning of distance is too simplistic. Rather, the meaning of distance in regards to geographical access is quite complex. The use of
choice and constraint is a simple binary, offering no useful insights to “questions posed as clear-cut either/or” (Hanson and Pratt 1995, 104), particularly when analyzing individual level accessibility. While distance from opportunities remains a significant factor to accessibility, it can only be the first approximation (Kwan et al. 2003). Other more complex meanings of geographical access should be considered that incorporate and the unique contingencies of individuals and the situation of local geographical context (Preston and McLafferty 1999).

Finally, distance can be manifest in multiple and complex ways through socio-spatial processes. It is more than simply a spatial connection between workers to places of employment. Examples of distance as a socio-spatial process include: the racialized processes of residential segregation (Kain 1968) and hiring discrimination (Kasinitz and Rosenberg 1996; Turner 1997); spatial confinement to potential opportunities as a result of domestic responsibilities (Hanson and Pratt 1995; Kwan 1999) or reliance upon public transportation (Blumenberg and Manville 2004); diminished labor outcomes from poor access to quality public education or geographically confined job search areas (Simpson 1991); the spatial scope of social networks and social accessibility in obtaining employment opportunities (Gilbert 1999; Chapple 2001; Parks 2004).

Thus this dissertation explores job access with a careful consideration of the role distance plays, and how influences of distance may be variously interpreted.

2.4 Residential Mobility, Job Search Strategies, and Social Networks

Some factors related to the spatial mismatch hypothesis that are integral to this research are residential mobility, job search strategies, and social networks. Each factor is significant to how individuals and households negotiate between residential and employment locations and the searching for new employment. In turn, they are also significant to conceptualizations of employment access. A preliminary review of literature for each factor is provided here.

Stages of life, socio-economic, and racial factors contribute to residential mobility. The classic theoretical model suggests life-cycle factors determine residential mobility (Rossi 1955). For instance, mobility peaks near age 30 as the confluence of employment, marriage, and schooling events precipitate changes in residence (Long
The presence of children deters mobility (Long 1972), while household crowding encourages mobility (McHugh et al. 1990). Residential preference is similarly important to residential mobility (Moore and Rosenberg 1993), but is largely determined by socio-economic factors. Higher education is more associated with long-distance residential mobility (Long 1988), but is less associated to local intra-metropolitan mobility (South and Deane 1993). Rising property values relegates lower-income households to live in rental properties, which experience tightening markets (Moore and Rosenberg, 1993), thus a spatial confinement to mobility. Mobility among renters is higher than among home-owners (Lee, Oropesa, and Kanan 1994). Higher household economic resources facilitate residential mobility towards housing preferences in the suburbs (Fuguitt and Brown 1990), while persons receiving public assistance are impeded from movement out of inner-cities (Kasarda 1989). Finally, along racial lines residential mobility among African-Americans is further influenced by factors external to the household, especially housing market discrimination (Galster 1991; Massey and Denton 1993).

Social networks are the “kin, neighbors and friends to whom an individual is tied socially, usually by shared values, attitudes, and aspirations”, and may be spatially concentrated (Johnston 2000, 759). Women tend to have social networks established around neighbors and kin, while men tend to have social networks based on co-workers; these gendered differences in social networks reflect differences in labor market structures (Moore 1990). In some research, African-American social networks do exhibit more extensive networks via extended family and church community than white counterparts (Oliver 1988). Lower income inner-city residents experience intensive local ties (Oliver 1988) due to mobility limitations. Likewise, for spatially rooted poor working women, in has been found that local social networks are an essential survival strategy as these place-based networks are gateways to jobs, childcare, and housing (Gilbert 1998).

Job search strategies are highly tied to social networks. Regardless of job-skill level, most people obtain jobs through social networks rather than through formal methods (Granovetter 1974; Hanson and Pratt 1991). The spatial scope of one’s social network has direct implications upon the spatial extent of their job search area (Chapple
The research of Hanson and Pratt (1991) highlights the significance of personal contacts in the job search, as a majority of their sample found jobs while not actively searching, and these jobs came through informal avenues. Residential rootedness (tenure) was higher among those who found jobs via informal contacts (Hanson and Pratt 1991). The particular connections of social networks and job search strategies are differentiated by race/ethnicity and gender. Hispanics rely the most on social networks to find employment (Green et al. 1999), while Blacks are more likely to find jobs through formal methods (Holzer 1987). Women are also likely to find employment through social networks, however, research has shown that this creates a particular spatial boundedness. The significance of social networks to the survival of working poor women further creates a geographical boundedness that, not only facilitates survival, but also spatially restricts daily activity patterns and access to jobs (Gilbert 1998, 2000), and in many cases leads to lower wage female-dominated occupations (Hanson and Pratt 1995). Among other things, the shorter commute times of women may be attributed to finding local employment through local social networks (Hanson and Pratt 1995).

2.5 Key Limitations in the Literature

There are four key inter-related limitations to the job accessibility and spatial mismatch literatures that create the research agenda for this dissertation. Research on urban employment access generally lacks a critical perspective, which subsequently influences the conceptualization of the complexity of socio-spatial processes, the methodological approach and scale of analysis, and adapting to on-going urban change.

2.5.1 Critical Geographies

There is limited research on job accessibility and spatial mismatch conducted from a critical approach. Central to a critical geographic approach is the belief that knowledge is situated and partial. Positionality of the research requires reflexivity in the research process, as the researcher holds preconceptions that influence their knowledge inquiry (Rose 1997). Traditional assumptions hold that “researchers are privileged sources of understanding relative to their informants” (Leitner and Sheppard 2003, 521) and are able to distill a universal truth from an objective and neutral perspective. Rather, a critical perspective challenges the false sense of objectivity, neutrality, and universality
of truth. Instead, commonly held assumptions about the world are critically questioned, and a strong belief in multiple realities, ways of knowing, and a plurality of truths exist. Critical geographic approaches are furthermore concerned with dismantling dominant forms of power and knowledge that perpetuate social injustice or oppression (Sharp 2003; Blomley 2006) and seek empowerment through the research process. To improve understanding of urban employment access patterns and processes, research from a critical geographic perspective is needed that considers issues of power, knowledge construction, representation, social justice, methodological approaches, and questions commonly held assumptions (Kwan 1999; Preston and McLafferty 1999; Bauder 2000).

In job-accessibility / spatial mismatch research, signals of dominant representations include: traditional statistical methods; the use of highly aggregated secondary data; creating knowledge based on averages rather than uniqueness, individuality, and the everyday experiences of individuals; the use of secondary data collected and (re)produced by persons of privilege; and particular geographic representations of (in)accessible space based on the researchers’ privileged view of the world. A more critical approach would renegotiate power relations in research so as to better reflect the people living within the research scope, thus tapping residents’ experience and local knowledge as a source for understanding the structure and process of the city and urban-oriented livelihoods (Leitner and Sheppard 2003; Sharp 2003). This dissertation research considers a critical geographic approach necessary in order to identify the short-comings of traditional theoretical understandings of geographical access and the meaning of distance, to better examine the relations between social processes and metropolitan urban form/structure, and overcome essentialist (Gilbert 2000) explanations of constrained job access. Naturally, a critical perspective influences the methodological and epistemological approach in research – which leads to several other noted limitations to which this dissertation addresses.

2.5.2 Methodological Approach and Scale of Analysis

From a critical perspective, there is a need for alternative methodologies and more detailed scales of analysis of microgeographic patterns and processes than has traditionally been conducted in job access research. The dominant methodological
approaches to explore the determinants of spatial mismatch and job accessibility have largely utilized multivariate statistical methods, including logit model (e.g. Cooke 1997; Kawabata 2003), path model (e.g. McLafferty and Preston 1992, 1997), covariance structure model (e.g. Wyly 1996), and principal component analysis (e.g. Cristaldi 2005). The U.S. Census Public Use Microdata Sample (PUMS) dataset has been widely used in the literature, as it provides detailed information about individuals. However, the individual data is geographically aggregated over very large areas, providing limited insight to spatial differentiation of accessibility across a metropolitan area. These coarse macro-geographies have facilitated the false central-city/suburb dichotomy related to spatial theories of accessibility, suggesting an assumption that processes of job accessibility occur over spatially large areas and have limited localized influences. While these approaches have contributed substantive knowledge about accessibility among societal groups, the spatial detail has generally been limited to broad averages based on aggregated data with assumptions of uniformity and homogeneity across space. Explicit considerations for spatial effects has also been limited, including spatial autocorrelation and spatial non-stationarity; it cannot be realistically assumed that statistical relationships between indicator variables is a constant and unchanging relationship across the entire metropolitan landscape. These approaches have limited new theoretical insight on urban form and job accessibility. What remains unknown are microgeographic patterns of job accessibility in cities and the significance of local contextual factors.

It is also important to consider the arguments that critical geographic approaches can in fact employ quantitative techniques and GIS technologies. The push to move beyond the early representations of GIS from the ‘quantitative, empiricist, and positivist’ and the quantitative-qualitative dualism (Sheppard 2001), has precipitated many new possibilities for GIS, alternative knowledges, and the bridging of critical human geographies with spatial analytical geographies (cf. Sheppard 2001; Kwan 2004; Schuurman and Kwan 2004; Gender, Place, and Culture 9(3) 2002; Cartographica 39(1) 2004). Within spatial mismatch / job accessibility, feminist approaches using GIS and quantitative methods have been conducted (McLafferty and Preston 1997; Wyly 1998;
see Kwan 2004) and are especially appropriate given the technology’s ability to incorporate the social dimensions of geographical analysis (Schuurman and Kwan 2004). Furthermore, except for some notable exceptions (c.f. England 1993; Hanson and Pratt 1995; Kasinitz and Rosenberg 1996; Turner 1997), few spatial mismatch and job accessibility research has used qualitative methods. Interview based data can provide richly detailed nuanced information about individual accessibility experiences at localized scale levels.

### 2.5.3 Geographic Complexity – socio-spatial processes

Access to employment is a complex socio-spatial process, but the research literature tends to separate social processes from spatial processes and patterns. The unremitting ‘space versus race’ debate in spatial mismatch literature suggests a need to reconsider the meaning(s) of geographical access. While some argue that the fundamental causes of spatial mismatch are due to race, not space (Ellwood 1986), others argue that racialized processes in the United States are spatially manifested (Preston and McLafferty 1999); still others conclude race is not a factor in spatial mismatch (Houston 2005). Similarly, theoretical assumptions on the significance of space/distance have also been mixed. The weight of empirical evidence suggests that the significance of space/distance is dependent: space does matter in issues of job accessibility, but not similarly in all places, and not for similar reasons (Hodge 1996).

Emerging from these empirical debates has been an implication that factors in spatial mismatch and job accessibility are more complex than simply issues of identity (e.g. race) or distance to employment relative to residential locations, and that new research should recognize the highly contextual and contingent nature of spatial mismatch (Preston and McLafferty 1999; Bauder 2000) – that patterns and processes of job-accessibility are highly people and place specific. This argument suggests access to employment is more complex than location of residences relative to jobs, but in fact is influenced by many mutually constituted factors of identity and difference. Therefore, research should consider the many contingencies individuals face when negotiating their employment, housing, and commuting (identity; location; household/domestic responsibilities; social networks; conceptualizations of space), and the characteristics of
local context/place (local and metropolitan level structures of opportunity; neighborhood characteristics; residential segregation; metropolitan transportation infrastructure). As such, when considering local context and individual contingencies, more complex definitions of geographical access could be constructed (Preston and McLafferty 1999) that incorporate this situatedness, and move beyond simplistic understandings of distance and essentialist conclusions regarding identity (Gilbert 2000).

2.5.4 Urban Change and the Central-city / Suburb Dichotomy

Finally, rapid socio-economic changes in cities today and the structures of opportunities indicates that newer metropolitan conceptualizations of accessibility need to evolve beyond the classic central city / suburb dichotomy. The use of more detailed levels of analysis is especially warranted today as cities continue to undergo rapid socio-economic structural changes – changes that call into question the central city / suburb differentiation of metropolitan space. The growth of the urban underclass as a result of job decentralization (Wilson 1987; Kasarda 1989) was a significant indicator of urban form change, from monocentricity towards decentralization and polycentricity in the post-WWII decades. This structural change has remained dominant within the job access literature as the theoretical construction of a central-city / suburb dichotomy roughly divides metropolitan areas into two urban localities, each with distinct identities in relation to accessibility. The central-city assumes characteristics of urban decay, derelict housing, poor access to entry-level jobs, and concentrated minority residential areas. Suburbs are characterized as economic growth points rich with entry-level jobs, low-density segregated housing, and socio-economic homogeneity.

However, given the significant influence urban structure has upon job accessibility and commuting (Giuliano and Small 1993; Horner 2004; Martin 2004), the spatial differentiation of central-city versus suburb may not be relevant for contemporary accessibility research in U.S. cities. For one, this dichotomy is built around political municipality boundaries, not based upon observed patterns of accessibility. As such, a high degree of homogeneity within these two zones is often assumed, despite the highly varied shape, size, and distances covered in the central cities and suburbs of many U.S. metropolitan areas. When considering the socio-economic structure of metropolitan
spaces, it becomes erroneous to assume suburbs in and around U.S. cities are homogenous in character and structure, and that they are immune to many of the challenges faced by the urban core (Hudnut 2003). “The myth of urban deterioration and suburban prosperity suggests that social and economic decline stops neatly at the borders of central cities,” particularly as high levels of suburban differentiation question the myth of the suburban monolith (Orfield 2002, 33). Due to the spatial differentiation of job accessibility, therefore, caution is needed when assuming that the socio-economic patterns in metropolitan areas strictly follow jurisdictional lines.

At the same time, such geographically coarse conceptualization is deficient in recognizing the highly varied characteristics within metropolitan areas that are emerging as cities undergo rapid change (Wyly 1999). In particular, patterns of residential segregation and economic social class challenge how the urban landscape should be conceptualized in accessibility research. For example, social diversity in suburbs across the U.S. is increasing (Frey 2003), and with greater frequency African Americans reside in suburban locations (Schneider and Phelan 1993) and relocate towards decentralized jobs (Martin 2004). Suburbs increasingly serve as new immigrant gateways to minority groups, where they become employed in suburban low-end service industry jobs (Singer 2004; Smith and Furuseth 2004). The effects of gentrification and urban revitalization signify a ‘reurbanism’ movement that challenges notions of ‘urban decay’ as higher-skilled/higher-income workers choose density, concentration, and urban living over suburban amenities (Fishman 2005). Also, the patterns of metropolitan poverty are changing, as the evolving spatial distribution of residential affordability has resulted in a decline in concentrated poverty neighborhoods in central-cities, and an increase in household poverty rates in older suburbs (Jargowsky 2003; Cooke and Marchant 2006).

Given these changes in the socio-economic structure of cities, it is argued that the geographic patterns of residential segregation in U.S. cities are becoming more based upon economic class rather than race or ethnicity (Abramson et al. 1995). At a point in time historically, the specific pattern of racial segregation was fundamental to the original spatial mismatch hypothesis. More contemporary considerations of spatial mismatch suggest that perhaps today the jobs and housing disconnect applies more to lower-skilled
workers, regardless of race, who might be residing outside the central-city (Ihlanfeldt and Sjoquist 1998). In fact, this increased metropolitan structural heterogeneity has already been reflected in job accessibility research that shows evidence of barriers that counter the common city/suburb assumptions, including urban residents having commuting advantages over suburban residents, and suburban residents experiencing worse job accessibility than urban residents (Gottlieb and Lentnek 2001; Ong and Miller 2005; Sultana 2005).

This chapter provided a review of the most current empirical research literature on issues of job accessibility and spatial mismatch in metropolitan areas. Several other key bodies of literature that pertain to the research direction of this dissertation were also addressed. Significant limitations within the job access research literature were noted at the end of the chapter. The next chapter builds upon these noted limitations by first outlining the research agenda of the dissertation. Then, the methodological approaches are discussed, data sources introduced, and characteristics of the study area are highlighted.
CHAPTER 3

RESEARCH DESIGN

3.1 Research Agenda

The vast spatial mismatch and job accessibility literature has sought to understand the effect of distance (residence-to-workplace) or worker’s race on unemployment rates or commuting differentials. But it is necessary to consider the complexity of factors, beyond distance and race alone, which may contribute to accessibility barriers among individuals. The literature has also constructed theoretical generalizations on accessibility patterns based upon the broad geographic metropolitan central-city/suburb dichotomy. Yet addressing accessibility at such a coarse spatial scope does not yield insight to access barriers that may be occurring at fine-spatial resolutions; this becomes a particularly troublesome when considering the rapid socio-economic metropolitan structural changes. This research argues that: metropolitan patterns of accessibility are more geographically differentiated at refined microgeographic scales; and that barriers to job access among disadvantaged populations are highly complex and situated, contributed by a series of socio-spatial processes of geographic context and individual contingencies. Therefore, this dissertation research is driven by the following specific research questions:

1] *What are the microgeographic spatial patterns of job accessibility among the working poor in a metropolitan area, and do the patterns exhibit spatial dependency and differentiation between localities?*

2] *What socio-spatial processes contribute to limited job accessibility among working poor individuals residing at various metropolitan locations?*
3.2 Methodology

3.2.1 Mixed Methods Approach

To answer these questions, this research utilized a two-phased mixed method approach. Each phase uses different techniques to analyze unique types of data at varying geographic scales. The variation in methods, data, and scale allows for a more in-depth analysis of a highly complex geographic problem through multiple perspectives and representations. Both phases use geographic information science (GIS) to facilitate the analysis of patterns and processes by using techniques of spatial analysis and visualization conducted at multiple scales.

Mixed methods research combines the data collection and analysis techniques of qualitative and quantitative approaches in parallel or sequential phases, for the purposes of breadth and depth of understanding and corroboration (Johnson et al. 2007; Tashakkori and Teddlie 2003). The benefits of a mixed approach includes the ability to answer research questions that other methodologies cannot, providing the opportunity for presenting a greater diversity of divergent views, and allowing for a multi-scaled analysis and exploration of multiple realities.

Specifically, a sequential two-phased is used, whereby each phase is conducted, analyzed, and concluded separately. Their findings are synthesized together afterwards. The objective for using a mixed methods approach is complimentarity. Often times mixed methods are used for purposes of triangulation: to validate findings from one method against the findings of another method. Instead, a complementarity purpose is used here to allow the different methodological strategies investigate separate aspects the issue, and arrive at a more complex and detailed understanding (Tashakkori and Teddlie 2003).

3.2.2 Phase 1: Spatial Analysis

In Phase 1, the patterns of employment access and factors of geographic context are explored through a standard set of spatial analytical techniques, including pattern analysis, accessibility modeling, geocomputation, cluster analysis, spatial regression, and geovisualization. The analysis is based upon spatially aggregated secondary data from the
U.S. Census and is conducted with the aid of *ArcGIS 9.2* and *ArcView 3.2* GIS platforms and *GeoDa* and *SpaceStat* statistical software.

The objective of this analysis is to explore the spatial patterns of employment access among the working poor in the Columbus metropolitan area. Here, the working poor are identified by poverty status categories as determined in the U.S. Census. To improve upon geographically coarse analyses that is a major limitation in the literature, this analysis is done with localized data at the Census block group level. Furthermore, the significance of local geographic context is also explored, as neighborhood characteristics can influence access to employment. The spatial structure of such relationships is explored as it is expected that relationships will vary by location in the city.

Complete details of Phase 1 methodological techniques are best described in the context of analysis discussion, and are thus more thoroughly outlined in Chapter 4.

**3.2.3 Phase 2: In-depth Interviews**

Phase 2 consists of the analysis of primary data that was collected through in-depth semi-structured interviews and participant sketch mapping. In an effort to understand more complex meanings of geographical access (Preston and McLafferty 1999) and underlying processes related to job access, the objective of this phase is to obtain detailed information and alternative geographic representations about the daily lives and experiences of individuals, as a unique perspective for understanding metropolitan accessibility. The remainder of this section discusses the data collection process and analysis procedures.

Information on individual experiences related to negotiating the residence-commuting-employment nexus were collected through in-depth semi-structured interviews. Interviews are useful for collecting data as they help fill gaps in knowledge, investigate the complexity of human behaviors, provide a diversity of perspectives and opinions, and empower the participants. Through the “examination of experiences, feelings, or opinions” (Kitchin and Tate 2000, 213) of individuals, the data collected in in-depth interviews is rich, detailed, multi-layered, and ultimately creates a deeper picture of understanding than is available in quantitative methods (Valentine 1997). Interviews
are also appealing as they access alternative knowledges that may have previously been neglected in research. Interviews “allow a wide range of experiences to be documented, voices to be heard, representations to be made and interpretations to be extracted.” They allow “people to speak for themselves about their own views and experiences of the world” (Smith 2001, 29). Semi-structured interviewing allows for flexibility in questioning as the interview evolves, but remains content focused (Dunn 2000). They are fluid forms of conversation, provide data in the informants’ own words, facilitates wide-ranging areas of discussion, allows the researcher to explore complexities more completely, and potentially raise unanticipated issues (Valentine 1997).

Participant sketch mapping was used to collect individual spatial data, although it has limited precedent as a research tool. Drawing upon a related technique, public participation GIS (PPGIS) has been used to “represent and visualize” peoples’ lives and to “highlight the importance of geographical context” (McLafferty 2002, 266). In similar ways, sketch maps have been used to explicitly collect information about a person’s experience of neighborhood space (Cieri 2003) or to understand property land use (D’Antona et al. 2008). In this dissertation the sketch maps work interactively with the interviews to enrich the collection of data by embedding the conversation with spatially referenced data unique to the individuals’ own experience of urban space and mobility.

Data collection procedures

Recruitment of interview participants commenced in April 2007. Working poor individuals were sought from the entire population of working poor in the Columbus area. Specifically, the target sample was 25-40 individuals employed in low-paying entry level jobs. Using gatekeeper recruitment methods (Valentine 1997), letters detailing the research and requesting help in soliciting participants were mailed to over 100 employers throughout the city. Follow-up telephone calls were also made. Addresses of employers were found through a GoogleEarth database of retail locations, and the Columbus Dispatch newspaper employment classified ads. Recruitment flyers were also posted at public spaces, such as public libraries.

Recruiting participants for interviews was a difficult task. The gatekeeper method proved unsuccessful, as most employers seemed hesitant and skeptical – some citing the
need to get “approval” from central office supervisors. Most informants were secured through snowballing methods – participants who told other acquaintances about the interviews. The main criteria for participation in the study were individuals who earned $10 an hour or less, were employed or recently unemployed, and were not financially dependent upon parents or guardians. A total of 60 individuals inquired about participating in the research interviews. Only 30 of these were selected after preliminary pre-screening questions.

![Sample base map with sketches](image)

**Figure 3.1: Sample base map with sketches**

*Columbus, Ohio (MSA)*

USA Contiguous Albers Equal Area Conic projection, 1:91,200 scale

Thirty interviews were conducted between May – August 2007. All Institutional Review Board (IRB) approvals were met, and protocol was followed. The interviews were conducted in convenient public locations, such as libraries, fast food restaurants, or
shopping mall food courts. Three interviews were conducted in the participants’ homes. Each interview lasted between 30 and 120 minutes in length, and all participants were compensated for their time. Notes were not taken during the interview, but two digital recorders provided audio files for later use.

To collect data along specific research themes, each interview followed a prepared interview schedule of questions. The main themes explored with each individual were: residential and employment histories; employment search strategies; journey-to-work commuting; location decision-making; activity spaces, and social networks; and livelihood and quality of life. A sample of the interview guide is found in the Appendix. During the interview, a conversational style of questioning was used to create a comfortable setting and establish rapport. The semi-structured nature allowed for following interesting threads in the conversation. Paper base maps were brought to each interview, and laid out in front of the informant. Each base map measured 24” x 32”, and contained major street network features and place names in the metropolitan area. During the interviews, important places identified by the informants were marked on the based maps using colored ink markers. Figure 3.1 is a sample base map with colored sketches.

*Analysis procedures*

Analysis of the qualitative materials was driven by the most widely used technique of grounded theory (Glaser and Strauss 1967), a “qualitative research method that uses a systematic set of procedures to develop an inductively derived grounded theory about a phenomenon” (Strauss and Corbin 1990, 24). It is not unusual, however, for researchers to use general grounded theory principles without adopting the full set of procedures recommended by the developers. For instance, grounded theory calls for the collection of data before consulting any research literature to ensure that the analysis is grounded in the data and not shaped by pre-existing knowledge. Similarly, grounded theory assumes the researcher approaches data collection and analysis simultaneously in an iterative manner, so that subsequent data collection is informed by the emerging theories of previously collected data. But many of these rules can be impractical as
researchers commonly arrive with theoretically based questions, or collect all their data before analysis commences (Gibbs 2002).

Guided by the basic premise of grounded theory and allowing theoretical insight to emerge (inductively) from the data, the analysis procedures used in this research were developed by drawing upon several key resources (including Bazeley 2007; Charmaz 2006; Gibbs 2002; Strauss and Corbin 1998; Kvale 1996; Weiss 1994; Miles and Huberman 1994). The analysis of qualitative data is a pervasive, on-going process from the point of conducting the interview until the final write up, through which the discovery of dominant themes emerges. The analysis procedures in Phase 2 of the dissertation were as follows:

First, interview data was transcribed from audio files. The researcher conducted most of the transcription, though a consultant was hired to transcribe five of the interviews. By having the interviewer also do the transcription helped ensure greater accuracy in transcribing the spoken word, including uncommon names, references, or specific contexts. Verbatim transcripts were made although analysis only utilized the core content, not nuances in phrasing, linguistic styles, etc...

Second, finished transcript material was then coded. Coding is the process of reducing data (interview transcripts) into smaller meaningful ideas by linking a respondent’s words to certain concepts and ideas (nodes). This process was conducted using the NVivo software package. The initial sets of nodes were developed based upon the original interview script. More nodes were added, as new ideas were revealed by the interviews themselves. As a fluid process, the nodes and categories are ever-changing – guided by the interview data itself – allowing for constant refinement of concepts.

Third, coded materials were subjected to in-depth analysis. Here, coded interview text data was linked together with similarly coded texts from other transcripts. The analytical processes included organizing, grouping, and compiling together nodes to read texts more closely with grouped ideas. By this stage, after collecting, transcribing, and coding the data, the researcher had intimate knowledge of the data and several core themes became clearly evident.
Figure 3.2: Sample #1 GIS digitized sketch map
Columbus, Ohio (MSA)
Figure 3.3: Sample #2 GIS digitized sketch map
Columbus, Ohio (MSA)
Write-up was the final stage of analysis. This included developing the ideas behind the core themes that point towards the central over-arching theme regarding the research problem. Each core theme begins with a main line statement summarizing the ‘mini-theory’, followed by supporting data from the interview materials, and discussions on any variants to the main line statement.

To create the sketch maps, each interview base map was scanned into a digital image format and subsequently imported into ArcGIS 9.2 as a digital image file. To digitize the sketch map data, the image file was georeferenced in the GIS for spatial accuracy, and then all features identified by the informants with colored markers were digitized into vector typology of points, lines, or polygons. Figures 3.2 and 3.3 are examples of the digitized sketch maps. The georeferenced features were linked to a spatial database that categorized feature type, informant source, and any special comments. The digitized sketch maps were analyzed dynamically with the transcript materials. Individually, as each informant’s transcript was analyzed, the sketch map was consulted to explore his or her patterns relative to their own residence-commuting-workplace situation. Comparisons were also made across all individual level sketch maps. Some sketch map features were aggregated (appended) together to look at the spatial patterns of the interview sample as a whole and overlaid with Phase 1 results.

3.3 Study Area

The research is conducted in the Columbus (Ohio, USA) metropolitan statistical area (MSA), which includes the central county (Franklin) and six surroundings counties (Delaware, Fairfield, Licking, Madison, Union, and Pickaway) illustrated in Figure 3.4. The central city of Columbus has an expansive political boundary resulting from its long history of annexation, and the balance of the urbanized area is occupied by a series of inner- and outer-suburbs (City of Columbus 1993). Following traditional terminology (Pisarski 2006), the suburbs are all places in the metropolitan area outside the City of Columbus. A close-up view of Franklin County (Figure 3.5) highlights the complex urban territorial geography with many municipalities and major transportation corridors, especially the I-270 highway loop that circumnavigates the city.
Historically, Columbus’ economy did not endure the same major urban declines as experienced in Ohio’s other metropolitan areas. The economies of Cleveland, Youngstown, Dayton, and Akron were focused on heavy industrial firms, and suffered major losses in manufacturing as plants closed or relocated. Instead, Columbus’ steady economic growth in the service sector throughout the 20th century buffered the city from these devastating losses in manufacturing. Today the region’s economy remains focused on the service sector: particularly governmental, education, corporate headquarters, and research and development. In addition, the Columbus metropolitan area has large manufacturing such as Honda, Inc. located in western Union County, and numerous warehousing and distribution centers situated along the major highway corridors around the city (Hunker 2000).

Often considered a ‘typical’ U.S. city, the socio-economic structural changes in the Columbus area are representative of similar events in other mid-sized cities in the U.S. (England 1993). In recent decades, the Columbus metropolitan area has undergone rapid sprawling growth along the urban fringe producing many polycentric nodes of urban functions, particularly employment opportunities (Wang 2001). Many jobs, including low-end service industry have decentralized, and minority and economically disadvantaged residential populations have also grown in the periphery. The transportation infrastructure in this region is unquestionably automobile-oriented, as approximately 95% of commuting workers travel by automobile (U.S. Census 2000). The Central Ohio Transit Authority (COTA) operates the public transportation bus system for the Columbus metropolitan area. The system has a traditional radial structure with CBD-oriented routes, has received comparatively less investment than similar urban regions of high population growth rates, and is challenged to adequately service the decentralized job destinations (Thompson and Matoff 2003). The Columbus area has been used previously as a research site for studying broad issues of employment access, characteristics of individual identity and access, and larger social processes underlying accessibility (England 1993; Holloway et al. 1999; Kwan 1999; Wang 2001; Kenda 2006).
Figure 3.4: Research Study Area – Columbus, Ohio Metropolitan Statistical Area (MSA)
Figure 3.5: Detailed Study Area with Urban Municipalities
Columbus, Ohio (MSA)
In 2000, the population of the Columbus, OH MSA was 1,581,066, with an estimated population growth between 2000-2005 at 5.9%. The seven counties have a wide range in population size and estimated growth rates: Franklin Co. (1,068,978; 2.0%); Delaware Co. (109,989; 35.3%); Fairfield Co. (122,759; 12.8%); Licking Co. (145,491; 6.4%); Madison Co. (40,213; 1.7%); Pickaway Co. (52,727; 0.5%); Union Co. (40,909; 11.8%). Franklin County is clearly the largest, as it contains the city of Columbus (711,470). In terms of population growth, the Columbus, OH MSA outpaces the national growth average during this period (5.3%). However, the rapid rate of growth is most prominent in the surrounding counties, especially Delaware Co. to the north, Union Co. to the northwest, and Fairfield Co. to the southeast. These areas experience both rapid job and residential development growth.

<table>
<thead>
<tr>
<th></th>
<th>Columbus city</th>
<th>Columbus, OH MSA</th>
<th>Suburbs</th>
<th>State of Ohio</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>66.9%</td>
<td>81.2%</td>
<td>92.9%</td>
<td>84.0%</td>
<td>69.1%</td>
</tr>
<tr>
<td>Black</td>
<td>24.3%</td>
<td>12.5%</td>
<td>2.9%</td>
<td>11.4%</td>
<td>12.1%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>3.4%</td>
<td>1.8%</td>
<td>0.4%</td>
<td>1.9%</td>
<td>12.5%</td>
</tr>
<tr>
<td>Asian</td>
<td>2.1%</td>
<td>2.3%</td>
<td>2.4%</td>
<td>1.2%</td>
<td>3.6%</td>
</tr>
<tr>
<td>All Other</td>
<td>3.3%</td>
<td>2.3%</td>
<td>1.4%</td>
<td>1.5%</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Table 3.1: Race and ethnicity population proportions, by scale
Source: U.S. Census, 2000, Summary File 3

The racial composition of the Columbus, Ohio MSA is less diverse than the national average, but is in line with the State of Ohio. Table 3.1 shows the race/ethnicity population proportions by several geographical scales. Most strikingly is the absence of Hispanic populations in Columbus – and the State of Ohio – relative to the national proportions. While the Black population in the metro area is similar to state and national averages, the White population is higher than in the United States. As would be expected, there are higher proportions of Blacks residing in the central city of Columbus (24.3%), and the suburb regions are overwhelmingly White (92.9%).

55
<table>
<thead>
<tr>
<th></th>
<th>Columbus city</th>
<th>Columbus, OH MSA</th>
<th>Suburbs</th>
<th>State of Ohio</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total: Population</strong></td>
<td>693,771</td>
<td>1,537,212</td>
<td>843,441</td>
<td>11,046,987</td>
<td>273,882,232</td>
</tr>
<tr>
<td><strong>Income below poverty level</strong></td>
<td>102,723</td>
<td>152,582</td>
<td>49,859</td>
<td>1,170,698</td>
<td>33,899,812</td>
</tr>
<tr>
<td><strong>% of population in poverty</strong></td>
<td>14.8%</td>
<td>9.9%</td>
<td>5.9%</td>
<td>10.6%</td>
<td>12.4%</td>
</tr>
<tr>
<td><strong>Total: Blacks</strong></td>
<td>168,302</td>
<td>194,304</td>
<td>26,002</td>
<td>1,227,364</td>
<td>32,714,224</td>
</tr>
<tr>
<td><strong>Income below poverty level</strong></td>
<td>39,360</td>
<td>43,388</td>
<td>4,028</td>
<td>325,857</td>
<td>8,146,146</td>
</tr>
<tr>
<td><strong>% of Blacks in poverty</strong></td>
<td>23.4%</td>
<td>22.3%</td>
<td>15.5%</td>
<td>26.5%</td>
<td>24.9%</td>
</tr>
<tr>
<td><strong>% poverty held by Blacks</strong></td>
<td>38.32%</td>
<td>28.44%</td>
<td>8.08%</td>
<td>27.83%</td>
<td>24.03%</td>
</tr>
<tr>
<td><strong>Total: Whites</strong></td>
<td>463,016</td>
<td>1,245,464</td>
<td>782,448</td>
<td>9,307,054</td>
<td>189,785,997</td>
</tr>
<tr>
<td><strong>Income below poverty level</strong></td>
<td>49,993</td>
<td>92,153</td>
<td>42,160</td>
<td>749,760</td>
<td>15,414,119</td>
</tr>
<tr>
<td><strong>% of Whites in poverty</strong></td>
<td>10.8%</td>
<td>7.4%</td>
<td>5.4%</td>
<td>8.1%</td>
<td>8.1%</td>
</tr>
<tr>
<td><strong>% poverty held by Whites</strong></td>
<td>48.67%</td>
<td>60.40%</td>
<td>84.56%</td>
<td>64.04%</td>
<td>45.47%</td>
</tr>
<tr>
<td><strong>Total: Latinos</strong></td>
<td>16,963</td>
<td>27,400</td>
<td>10,437</td>
<td>207,134</td>
<td>34,450,868</td>
</tr>
<tr>
<td><strong>Income below poverty level</strong></td>
<td>3,166</td>
<td>4,831</td>
<td>1,665</td>
<td>42,104</td>
<td>7,797,874</td>
</tr>
<tr>
<td><strong>% of Latinos in poverty</strong></td>
<td>18.7%</td>
<td>17.6%</td>
<td>16.0%</td>
<td>20.3%</td>
<td>22.6%</td>
</tr>
<tr>
<td><strong>% poverty held by Latinos</strong></td>
<td>3.08%</td>
<td>3.17%</td>
<td>3.34%</td>
<td>3.60%</td>
<td>23.00%</td>
</tr>
</tbody>
</table>

**Table 3.2: Race and poverty populations, by scale**
Source: U.S. Census 2000, Summary File 3, Poverty Status Income in 1999

Similarly, the demographics of poverty by racial/ethnic group in Columbus is consistent with state and national averages. Whites account for most poverty in the State of Ohio and in the Columbus MSA, although poverty is disproportionate among Blacks in the city, state, and nation. Table 3.2 presents populations in poverty by race for several geographical scales. While Whites hold 60.4% of all poverty in the Columbus MSA, only 7.4% of the White population lives at or below the poverty level. On the other hand, Blacks hold 28.4% of all poverty in the MSA, but 22.3% of Blacks live at or below the poverty level. In the year 2000, there were 152,582 people living in poverty in the Columbus MSA. Two-thirds of the poverty was in the City of Columbus (102,723 people) and one-third was in the suburbs (49,859). This supports the findings that poverty in U.S. cities is increasingly decentralized and becoming more present in suburbs. Most Black poverty residents are in the City of Columbus (39,360) and some
reside in the suburbs (4,028). Nearly all suburban poverty is White (84.56%), although there is nearly equal numbers of Whites in poverty living in the City of Columbus (49,993) as are living in the suburbs (42,160).

3.4 Data

Two sources of data were utilized in the different phases of the research. The Phase 1 pattern analysis was based upon secondary data from the 2000 U.S. Census for the 7-county Columbus, Ohio (US) metropolitan statistical area (MSA). In Phase 2, primary data was collected through in-depth interviews with 30 individuals. Each of these data sources is described below. However, the data are contingent upon definitions of poverty and working poor, which are discussed next.

3.4.1 Poverty Status and the Working Poor

There is little consensus in how poverty is defined; it can be measured in absolute or relative terms. Absolute measures define thresholds, or poverty lines, that are constant over time, whereas relative measures “explicitly define poverty as a condition of comparative disadvantage, to be assessed against some relative, shifting, or evolving standard of living” (Iceland 2006, 21). The most dominant and standard measures of poverty are absolute, including the approach taken by the U.S. Census. To isolate working poor populations, this dissertation uses absolute measures of poverty. However, some challenging issues to this approach are noted in the Chapter 6 discussion.

In determining poverty, the U.S. Census adheres to the federal government’s official definition, which was developed in 1964 by the Social Security Administration and revised most recently in 1980. Specific income thresholds, with relation to a person’s family size and composition, determine poverty status. For example, the poverty threshold in 1999 for a family unit of 4 people, with 2 related children under 18 years old is $16,895. An additional child increases the income threshold to $19,882 (U.S. Census 2002). In 2000, 31 million Americans were considered living below poverty, most being children and elderly adults outside the workforce.

The working poor are individuals who spent at least 27 weeks in the labor force (or searching for work), but whose income fell below the official poverty level. There are 6.4 million Americans classified as working poor. A profile of the working poor
indicates that the less educated, minorities, females, and younger people are more likely to be working poor. More women (5.5%) are classified as working poor than men (4.0%). Working poor status is higher among minority racial groups, with 10% of Hispanics, 8.7% of Blacks, and 4.0% of Whites. High school graduates (5.4%) are less likely to be considered working poor than high school dropouts (12.9%). Younger people are more likely to be among the working poor with 8.7% of 20-24 year olds, 4.5% of 35-44 year olds, and 2.7% of 45-54 year olds categorized as such (U.S. Department of Labor 2002).

Phase 1 of this research utilizes the Census Poverty Status category to define Working poor. The Census disaggregates Poverty Status into three categories: “Below Poverty Status”, “Between 100% and 150% of Poverty Status”, and “Greater than 150% of Poverty Status”. These categories are available in datasets that enumerate only the working population. In an effort to capture more of the population that may face financial hardships, especially considering the very low poverty threshold established by the Census, the Working Poor in Phase 1 will include both categories of “Below Poverty Status” and “Between 100% and 150% of Poverty Status”. Those above these two categories are considered all other workers.

In Phase 2, interview participants were recruited who earned approximately less than $10 per hour, equivalent to an annual salary of $20,800 for a 40 hour work week. This was somewhat of an arbitrary threshold but proved to be successful. It is higher than minimum wage, yet below relative indications of a “good job”. In July 2007 the national minimum wage was increased to $5.85 per hour, although the State of Ohio increased the wage to $6.85 in January 2007 with mandated annual increases to follow inflation. The Center for Economic Policy Research defines a “good job” as one that pays at least $17 per hour ($34,000 annually) and includes employer provided health insurance (Schmitt, 2007).

3.4.2 Secondary Data – 2000 U.S. Census

All data for Phase 1 of the research was derived from the 2000 U.S. Census Bureau. The Census of Population and Housing is the decennial survey of the population mandated by the U.S. Constitution (Article 1, Section 2). Census information is collected
through both the Short and Long Forms. The Short Form consists of a 100% survey of the population and contains minimal population and housing characteristics. The Long Form surveys approximately 1 in 6 households in the population and contains more extensive information on the characteristics of the population, socio-economics, household structure, commuting patterns, and housing stock.

This research seeks to understand the spatial disconnects between where people live and work. The Census Transportation Planning Package (CTPP) is one useful dataset for obtaining such detailed information, and has been utilized in recent empirical spatial mismatch and job accessibility research (e.g. Immergluck 1998a, 1998b; Gottlieb and Lentnek 2001; Shen 2001; Horner and Mefford 2007). The CTPP is a special tabulation from the U.S. Census 1-in-6 sample survey, and is designed for transportation planners. It provides geographically detailed data about metropolitan areas in 3 separate parts: place of residence (Part 1), place of employment (Part 2), and origin-destination flows between areal units (Part 3). This data set was used to identify actual spatial locations of residences and employment areas, as well as the commuting flow between place-of-residence and place-of-employment. Furthermore, the CTPP dataset allows for disaggregation of this information based upon poverty status.

Other data detailing the characteristics of local geographical context were derived from Summary Files 1 and 3 of the 2000 U.S. Census. Summary File 1 (SF1) contains basic population characteristics from U.S. Census 2000, and the information is based on the Short Form. Summary File 3 (SF3) contains more detailed information on U.S. residents from the U.S. Census 2000, based upon the Long Form. Specific variables used in the analysis are described with more detail in Chapter 4.

A crucial objective of this research is to conduct analysis at a fine geographic resolution. To achieve this objective, the geographic unit of analysis throughout the Phase 1 research is the Census block group. For the 7-county Columbus metropolitan area there are 1,235 Census block groups. Each block group varies in size and population, but the optimal population for Census block groups is approximately 1,500 residents, with a range from 600 – 3,000. Thus, block-groups in Franklin County and near the major towns of surrounding counties are smaller in area than the less urbanized
units along the periphery of the study area. This scale of analysis greatly improves upon the spatial detail of the Public Use Microdata Sample – which in the Columbus area contains only 13 geographic units.

3.4.3 Primary Data – In-Depth Interviews

While recruitment can impose uncertainty in the sample population, the intent was to obtain non-dependent workers representing various stages of life. In fact, the 30 individuals who participated in the interview do come from a wide range of situations.

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender and Race</th>
<th>HH structure / life stage</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 – 25 yrs.</td>
<td>7 Female</td>
<td>Married, with kids</td>
<td>no high school degree</td>
</tr>
<tr>
<td>26 – 35 yrs.</td>
<td>8 Male</td>
<td>Single mother</td>
<td>H.S. or G.E.D.</td>
</tr>
<tr>
<td>36 – 45 yrs.</td>
<td>10 Black</td>
<td>Single, older M/F</td>
<td>some college / trades</td>
</tr>
<tr>
<td>46 – 55 yrs.</td>
<td>5 White</td>
<td>Single, young male</td>
<td>in college</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Singe, (college) females</td>
<td>college degree</td>
</tr>
</tbody>
</table>

Table 3.3: Characteristics of Interview Participants

Table 3.3 provides identity characteristics of all the interview participants. The sample’s ages were quite normally distributed. The oldest was 55, and youngest 18; the median age was 35, and a mean of 34.8. Fifteen (15) of the respondents are between 18 – 35 years old, and 15 respondents are between 36 – 55 years old. Perhaps the only missing age bracket are those closest to retirement age. Sixty percent (60%) were female, and the sample was overwhelmingly Black (80%), the balance being White (20%). There were no other ethnicities represented, nor any immigrant populations interviewed. A majority had at least a high school diploma or G.E.D. (80%), while 50% had some education or technical training beyond high school, though college-educated persons were almost completely absent from the sample.

In terms of household structure and life-stage, there was quite a balance of representation. Nine informants were married with kids – of these, 3 married couples were interviewed. Five were single mothers with 2 to 5 children each. Eight were single
Figure 3.6: Thirty interview participants at place-of-residence specified by age, race, and gender
Columbus, Ohio (MSA)
older adults (over 35) who may have grown children or were previously married; but
their current status suggested fewer domestic responsibilities. There were two distinctive
groups among the young (under 35) singles. The four young single males interviewed
were not in college, but taking part-time classes at a local community college, or spoke of
intents to attend school. Their main objective was working, and several were paying
child support. The young single females were mostly college students who worked 30-40
hours per week to support themselves through school. There was one single young
female with no kids, and not attending school.

With a small sample size, statistically significant representation of various
population sub-groups is not possible. But the objective here was to obtain illustrative
examples of various individuals’ experiences related to job commuting issues. The
informant sample collected was successful in obtaining perspectives from several
different life stages, without being particularly biased towards any certain group.

Figure 3.6 illustrates the spatial distribution of the sample population by place-of-
residence at the time of the interview. Except for the northwest quadrant, which is the
most affluent residential zone, all areas of the city are represented in this sample. There
is a light dispersions of informants from the north, west, and south regions of the city.
And a heavy concentration appears in the east / southeast corner of the city. This is likely
due to some snowballing effect in the recruitment process. But it is an area concentrated
with lower-income African American populations in the city. There were no participants
represented from far outside the I-270 loop corridor.

This chapter laid out the dissertation research agenda by highlighting the key
research questions, outlining details of the methodological procedures, and profiling the
study area. In the next chapter, analysis results from Phase 1 of the research are
presented. Additionally, many of the Phase 1 methodological details omitted in this
chapter will be discussed in the context of the analysis itself.
CHAPTER 4

THE WORKING POOR AND EMPLOYMENT ACCESS: EXPLORING PATTERNS, LOCAL WORKING RATES, AND GEOGRAPHIC CONTEXT

4.1 Introduction

This chapter discusses Phase 1 of the dissertation research. In Phase 1, the patterns of employment access and factors of geographic context are explored through a standard set of spatial analytical techniques, including pattern analysis, accessibility modeling, geocomputation, cluster analysis, spatial regression, and geovisualization. The analysis is based upon spatially aggregated secondary data from the U.S. Census and is conducted with the aid of ArcGIS 9.2 and ArcView 3.2 GIS platforms and GeoDa and SpaceStat statistical software.

The objective of this analysis is to explore the spatial patterns of employment access among the working poor in the Columbus metropolitan area. Here, the working poor are identified by poverty status categories as determined in the U.S. Census. To improve upon geographically coarse analyses, which are a major limitation in the literature, this analysis is done with localized data at the Census block group level. Furthermore, the significance of local geographic context is also explored, as neighborhood characteristics can influence access to employment. The spatial structure of such relationships is examined, as they are expected to vary by location in the city.

In section 4.2, the spatial distributions of jobs and residences of the working poor are explored, and a traditional gravity-based accessibility model is constructed. The patterns show that the working poor live both in the most central part of the urban area, but also in the urban periphery along the major outer-loop transportation corridor. Patterns of job locations are also concentrated along the urban periphery, and are identical to the job concentrations of all other workers.
The remainder of the analysis focuses upon the local working rates job proximity variable. In Section 4.3, after discussing the theoretical significance of this variable, details on the variable construction are given. The pattern analysis suggests that a vast majority of the working poor are employed within 5 miles from home. This distance threshold becomes the job proximity dependent variable for the regression modeling. To examine spatially significant patterns in this local working rates variable, cluster analysis is conducted in Section 4.4. Using local indicators of spatial association (LISA), an exploratory scatterplot and cluster map reveal significant spatial clustering exists in the local working rates variable. That is, zones with high values tend to be located near other zones with high values; and the same is true for low values. Interestingly, the patterns of high or low clustering do not match the territorial boundaries of the central-city/suburban dichotomy – a traditional interpretation of accessible metropolitan spaces. The clustering patterns reveal greater spatial complexity.

Finally, in Section 4.5 a series of regression models are fitted to explore how characteristics of local geographic context (neighborhoods) relate to the local working rates values. Using a spatial regimes modeling technique it is found that indeed, certain neighborhood characteristics are significantly related to the observed local working rates. However, those relationships are not constant across the geographic landscape, and in some situations the relationship is reversed. This further highlights the great complexity and local specificity embedded in employment access phenomena. It is also concluded that no single characteristic of local geographic context can point towards underlying processes at work in this issue.

4.2 Employment and Residential Patterns

4.2.1 Spatial Distribution of Jobs and Residences

The working poor have a distinctively different spatial distribution of residences when compared to all other workers, but show striking similarity in job concentrations. Using raw data counts from the CTPP Parts 1 and 2, Figure 4.1 illustrates the concentrations of jobs and residences of the working poor. On the left, the place-of-residence patterns suggests the working poor are not concentrated centrally, but in fact are scattered throughout the region, particularly along the peripheral areas of Franklin
Figure 4.1: Residence and workplace concentrations of working poor
Columbus, Ohio (MSA)
Figure 4.2: Residence and workplace concentrations of all other workers
Columbus, Ohio (MSA)
County and the I-270 corridor. The large concentration of working poor located just
north of the central business district (CBD) is a ‘college student’ effect around The Ohio
State University, as students are included in the Census at their place-of-residence while
at school. On the right, the place-of-work similarly shows a more scattered dispersion of
job concentrations. Jobs for the working poor are not centrally located, but seem to
cluster particularly along the I-270 corridor in Franklin County. There are also high job
concentrations around Newark, Lancaster, and the Honda assembly plant in western
Union County. This map illustrates that jobs and housing among the working poor are
not co-located. They illustrate patterns that are not centrally concentrated, but more
scattered peripherally around the urban core.

For comparison purposes, Figure 4.2 shows the spatial distribution of jobs and
residences of all other workers. On the left, the residential patterns show high
concentrations of non-poverty workers living along the periphery of Franklin County and
in select areas throughout the metropolitan area. Most noticeable is the donut-like shape
around the central core of Franklin County, indicating lower concentrations of residences.
The patterns of workplace concentrations are almost identical to that of the working poor.
This suggests the similarity of job concentrations throughout the metropolitan area. In
particular, the CBD and Ohio State University main campus are distinctive employment
clusters centrally; the retail and office parks around the I-270 corridor are also distinctive
concentrations, as are a few locations in the surrounding counties, including the Honda
assembly plant in Union County.

Using a traditional central city / suburb conceptualization of metropolitan
structures, there are clear distinctions in the locations of jobs and residences between the
different classes of workers. In Table 4.1, the number and percentage of jobs and
residences for the various worker classes are divided by their location in the city or
suburb region of the metropolitan area. Clearly the non-poverty workers tend to have a
higher rate of jobs and residences in the suburbs than any of the poverty worker classes.
The lowest economic class (“below poverty”) has a vast majority of their jobs and
residences located in the central city of Columbus, and slightly more jobs and housing in
the suburbs for the next highest class. This pattern shows consistency with the dominant
theories of urban structure that lower economic classes tend to reside more in central city neighborhoods while non-poverty groups tend to live in suburbs.

<table>
<thead>
<tr>
<th></th>
<th>Below Poverty</th>
<th>Between 100-150% Poverty</th>
<th>Working poor</th>
<th>Non-Poverty workers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Jobs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>25,053</td>
<td>22,539</td>
<td>47,592</td>
<td>408,874</td>
</tr>
<tr>
<td></td>
<td>62.19%</td>
<td>58.12%</td>
<td>60.19%</td>
<td>55.42%</td>
</tr>
<tr>
<td>Suburb</td>
<td>15,230</td>
<td>16,244</td>
<td>31,474</td>
<td>328,963</td>
</tr>
<tr>
<td></td>
<td>37.81%</td>
<td>41.88%</td>
<td>39.81%</td>
<td>44.58%</td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>26,342</td>
<td>22,716</td>
<td>49,058</td>
<td>300,561</td>
</tr>
<tr>
<td></td>
<td>69.06%</td>
<td>63.57%</td>
<td>66.40%</td>
<td>43.50%</td>
</tr>
<tr>
<td>Suburb</td>
<td>11,800</td>
<td>13,019</td>
<td>24,819</td>
<td>390,445</td>
</tr>
<tr>
<td></td>
<td>30.94%</td>
<td>36.43%</td>
<td>33.60%</td>
<td>56.50%</td>
</tr>
</tbody>
</table>

Table 4.1: Columbus area distribution of jobs and residences between city/suburb by worker class

Figure 4.3 compares the residential locations of the working poor with the high-poverty concentration neighborhoods. Again, these are neighborhoods where 40% or more of the residents (including non-workers) live below the poverty line. Clearly there is spatial overlap between high-poverty neighborhoods and where the working poor live. However, there are also numerous zones on the periphery of Franklin County that have a high concentration of working poor residence, but the zones are not categorized as concentrated poverty. Research that focuses only on concentrated poverty neighborhoods overlooks the realities that the poor, especially working poor, reside peripherally in neighborhoods that are less poverty concentrated. And this is increasingly true as poverty becomes more decentralized.

4.2.2 Gravity – based Job Accessibility

Relating the location of jobs and housing by worker class can produce a preliminary indicator of job accessibility. A gravity-based job accessibility measure
Figure 4.3: Working poor residence overlaid with high-poverty neighborhoods
Columbus, Ohio (MSA)
indicates potential job opportunities for resident workers. For each areal unit, an index value indicates the relative level of job access such that more jobs (supply) and fewer workers (demand) in closer proximity will increase the potential for nearby work opportunities. This place-based accessibility estimates the potential level of job access relative to local spatial competition – not the actual observed worker-to-job connection.

A working-poor job access measure for each Census block group was calculated using a traditional gravity model (Hansen 1959), which is widely used in previous empirical research (Parks 2004; Wang 2001; Raphael 1998; Mouw 2000). Importantly, the job accessibility model utilized here extends the traditional gravity model to incorporate labor market competition. That is, in addition to examining the relative potential of job opportunities nearby to residents in a particular location, the model also considers the supply (jobs) and demand (workers). Shen (1998) and Wang (2001) developed this version of the gravity-based model to examine job accessibility:

\[ A_i = \sum_{j=1}^{n} \frac{S_j d_{ij}^{-\beta}}{V_j}, \quad \text{where} \quad V_j = \sum_{k=1}^{m} D_k d_{kj}^{-\beta} \]

where, \( A_i \) is the gravity based index of accessibility at location \( i \); \( S_j \) is the supply capacity at location \( j \); \( d_{ij} \) is the distance or time between the demand (location \( i \)) and supply (location \( j \)); \( B \) (beta) is the travel friction coefficient\(^3\); \( n \) and \( m \) are the total numbers of supply (\( n \)) and demand (\( m \)) locations by areal unit; \( V_j \) is the population potential (workers at place of residence) for each job/supply location; \( k \) is all demand locations within a threshold travel distance from location \( j \); and \( D \) is the demand at location \( k \) that falls within the catchment. Distance is determined as centroid-to-centroid linear distance.

\(^3\) To calibrate the distance-decay travel friction coefficient, a basic regression spatial interaction model following Wang (2001) and Fotheringham and O’Kelly (1989) is computed:

\[ T_{ij} = a W_i J_j d_{ij}^{-\beta} \]

where \( T_{ij} \) is the number of commuters between residence location \( i \) (with \( W_i \) workers) and job location \( j \) (with \( J_j \) jobs). The estimated \( B \) (beta) parameter is then inserted as an e (exponential) function in the gravity model above. The impedance function was calibrated separately for the two populations: poverty-status workers and non-poverty-status workers.
The resultant accessibility measure \( (A_i) \) is interpreted as the ratio of jobs to workers, by place of residence. Thus, a measure of 1 suggests there is a one-to-one relationship of jobs to workers. Below 1 suggests there are fewer jobs for more workers, and above 1 indicates more jobs relative to the number of workers living nearby. While the results indicate the relative accessibility for worker-residents in each specific block group, the spatial competition for jobs and other workers incorporates nearby block groups by weighted distance. The results of this job accessibility gravity model for both worker classes are illustrated in Figure 4.4. Several key observations are made regarding the job accessibility of the working-poor and non-poverty-status workers.

First, the distinctive spatial difference in the job accessibility indicator suggests a varied structure of urban job opportunities between the two worker classes. For the working poor, the structure of opportunities is highly monocentric, with higher potential for employment available to residents living in and around the CBD when considering spatial competition for jobs. Except for the 3 concentric rings directly around the CBD within Franklin County, the balance of the study area has an accessibility index below 1 for the working poor. Thus, for working poor individuals living outside these darkest blue rings, there are fewer nearby jobs available relative to the number of competing workers also living nearby. For all other workers, the structure of urban employment opportunities is decidedly polycentric. While the CBD may be characterized as a dominant location for high employment accessibility, many other key locations do appear highly accessible, including: Dublin, Polaris, Worthington, south Gahanna, Canal Winchester (southeast Franklin County). Additionally, the major towns of the surrounding counties also exhibit high levels of accessibility, particularly Newark, Lancaster, London, and Delaware. The significance of the Honda assembly plant in western Union County is again apparent. It might be expected that the competition for jobs in the outlying areas among non-poverty status workers would be high. This map indicates that in specific job centers (Polaris, Dublin, the Honda plant area, Gahanna) there is a dearth of relative nearby employees. That is, there are numerous workers living in the outlying areas, and numerous jobs out there as well.
Figure 4.4: Gravity-based job accessibility index
Columbus, Ohio (MSA)
Note: the spatial data is categorized into quintiles. However, in the non-poverty worker map the dark blue [highest index] category was expanded to include values of 2.0 and above.
Second, the accessibility index range between the two worker classes is drastically different. For non-poverty status workers the range is quite broad, from 0.03 – 18.7, while the working-poor ranges from 0.43 – 1.44. It is important to keep in mind that there are far fewer residents and jobs in the working-poor class. In some zones, among non-poverty status workers there are up to 18 nearby jobs for every resident. There is one block group with an index above 18 (located at the Honda assembly plant in Union Co.); 12 block groups between 5.135 – 7.937 located directly on the CBD; and 72 block groups between 3.0 – 4.67 centered around the CBD in addition to southern and northern Pickaway Co. This suggests that there are many locations where non-poverty status workers do not actually reside near the job centers.

Third, there are limitations with this accessibility indicator. This index measures the potential for employment access; it does not exhibit the actual spatial interaction between workers at place-of-residence and their place-of-employment. Thus it only gives a generalized idea of what might be expected if all workers sought to minimize their journey-to-work commutes. This limitation is noticed when comparing the results with spatial distribution of jobs and residences in Figure 4.1. Whereas Figure 4.1 indicated that the jobs and residential locations for the working poor are not centralized, the gravity-based accessibility model suggests monocentricity in structure. This difference raises the question of suitability for the accessibility index to adequately portray employment-residential patterns in the metropolitan area. Also, as a place-based accessibility measure it is an estimation based on objectives to minimize commutes; it does not represent reality. The results are aggregations of populations within each zone, obscuring aspects of individual mobility, time dimensions, or differences based on individual identity or contingencies. Despite these noted limitations, this measure is widely used in the literature as one indicator of geographic context, and was used in regression analysis later in this chapter.

4.3 Local Working Rates (LWR) as Job Proximity Measure

As discussed in Chapters 2 and 3, job proximity is a key indicator of access to employment, especially among disadvantaged populations as low-skilled workers are more spatially constrained in their job-search strategies and in their ability to commute
long distances to work. Job proximity can be specified many different ways and has been used extensively in other empirical research (Carlson and Theodore 1997; Hanson et al. 1997; Immergluck 1998a, 1998b; Ong and Blumenberg 1998; Shen 2001; Hess 2005). As a proxy measure of job proximity, a *local working rates* (LWR) variable was constructed to examine how close to home people actually work. Local working rates measures the rate of residents whose places-of-employment are within a specified distance threshold of their place-of-residence. The variable returns a rate for each block group in the study area. It indicates the degree to which residents of that zone work locally. The determination of ‘local’ is subjective and is discussed below. With sufficiently disaggregated data, local working rates can be determined for different socio-economic groups separately.

Of central concern in this dissertation is the theoretical importance of distance to employment for the working poor. Local working rates, based on the observed flow data, provide a highly detailed perspective of peoples’ actual spatial employment patterns. Thus, local working rates (LWR) is a critical variable that is the focus of the remaining analysis components of this chapter. After discussing the techniques for computing the variable, the spatial patterns of LWR observations are analyzed. Then cluster analysis procedures are used to identify “hot spots” of local working rates throughout the study area. Finally, the LWR variable is used as the dependent variable in regression modeling to explore the relationship between neighborhood/geographic characteristics and job proximity among the working poor in Columbus.

### 4.3.1 Computing LWR with Areal Interpolation

Data for constructing the local working rates is made available through the 2000 Census Transportation Planning Package. As discussed in Chapter 3, the CTPP Part 3 data set is a special tabulation of journey-to-work information based on the Census long form (1 in 6 population sampling). Most usefully it contains the observed commuting flows between origin (place-of-residence) and destination (place-of-employment). Furthermore, it disaggregates the flow data along many commuting and socio-economic characteristics, including ‘Poverty Status’.
Since the CTPP Part 3 dataset is flow data between areal units, in GIS vector topology this appears as polylines – with each line representing spatial flows connecting all geographic units. Therefore, areal interpolation (Goodchild and Lam 1980) techniques were needed to transform the polyline flow information between two zone centroids \((i, j)\). This technique apportions a zone’s attribute value relative to the proportion of that zone’s area that falls under an overlay distance buffer zone, according to these procedures: [1] A straight-line radius from zone of origin centroid creates a buffer that determines the distance threshold; [2] Compute the area proportion of each block group that falls under the buffer ring (interpolate); [3] Apportion the attribute value (here, commuting flow) based upon the area proportion within the buffer zone, and sum together.

The technical procedures for areal interpolation in GIS used here were similar to Wang (2006) and computed using *ArcGIS 9.2* and *ArcView 3.2* GIS platforms and *SPSS* and *Excel* for spreadsheet manipulation and calculations. For the dataset in this dissertation, the potential flow matrix was 1,235 x 1,235. However, only a fraction of the potential O-D flows actually occurs between all block groups. Using these procedures, local working rates were calculated at multiple distance thresholds: up to 2 miles, up to 3.5 miles, up to 5 miles, between 5-10 miles, and greater than 10 miles. To mitigate edge effects, the surrounding 14 contiguous counties were included in order to capture work commute flows with destinations outside the study area.

This approach for determining the local working rates is not without specific drawbacks. First, the apportioning method described above assumes equal distribution of workers and jobs across space within each zone, yet this is not a fully rational assumption about spatial allocation of opportunities. Second, since the CTPP suppresses data for purposes of confidentiality at the small geographies scales, there is a potential for data loss. In certain tabulations of Part 3, the suppression of data is limited only for O-D flows with fewer than 3 unweighted observations (U.S. Census, 2002). These two drawbacks are not serious enough to derail the significance of the research results here, but cautious interpretation is warranted. The benefit gained from a fine-scaled disaggregated flow data outweighs the potential data loss from the CTPP. Though not
ideal nor perfect data, complications in securing an optimal dataset led to this compromise. To mitigate the effects of data loss at the block group level, the areal interpolation technique described above was conducted using tract-level data, then reapportioned to block-groups\(^4\). Since the research work conducted here is exploratory in nature, approximation is suitable for giving a generalized idea of the spatial patterns; exactitude is not the objective. Finally, despite these potential limitations and drawbacks, it is argued that the generalized picture created here with detailed data is still an improvement in micro-geographic analysis when compared to the limitations in spatial knowledge from the PUMS dataset.

### 4.3.2 Pattern analysis and interpretation of Local Working Rates

By examining the local working rates data it is clear a distance-to-work difference exists by economic status. Table 4.2 shows the percentage of workers by poverty-status, working within various distance thresholds as computed through the areal interpolation technique. The trends show that lower economic status groups have higher rates of people who work close to home. Over one-third (34.16\%) of ‘below poverty-status’ workers, and 29.23\% of the ‘between 100\%-150\% poverty status’ workers are employed within 2-miles of their home. But only one-fifth (19.55\%) of the non-poverty status workers are employed within 2-miles of their home. Also, when comparing the two poverty-status classes, the lowest economic class continues to show higher rates of people working close to home. Similar trends exist in the 3.5 and 5 mile thresholds.

Most of the working poor population (49.48\%) is employed within the 3.5 mile threshold. For the ‘below poverty’ group, 52.64\% work within 3.5 miles of home. This finding is drastically different when compared to the 33.59\% of the non-poverty status group. Employed within 5 miles of home is two-thirds (65.37\%) of ‘below poverty status’ workers and 59.05\% of ‘between 100\%-150\% poverty status’. This is a clear majority of the working poor population. Yet, the same is not true for the non-poverty

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\(^4\) A rough estimation of data loss suggests that suppression of data for block-groups in the study area reached 60-70\%. For Census tracts the loss only reached 30\% at a maximum. Since data is suppressed for O-D flows with fewer than 3 observations, it could be inferred that the loss of data is higher for O-D flows of higher distances.
status class, where less than half (46.23%) work within 5 miles. Working more than 10 miles from home constitutes only 12.33% of the working poor population and 23.3% of the non-poverty working population. These numbers clearly indicate the greater likelihood of shorter commute distances for working poor populations and the striking disparity in journey-to-work commutes between the populations. This does not, however, give any indication whether the working poor suffer diminished labor outcomes, compromises, or higher commuting costs. This exemplifies some of the limits to knowledge secondary data poses.

<table>
<thead>
<tr>
<th>Distance Threshold</th>
<th>Below Poverty</th>
<th></th>
<th>100%-150% Poverty</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of class</td>
<td>cumulative</td>
<td>% of class</td>
<td>cumulative</td>
</tr>
<tr>
<td>&lt; 2 miles</td>
<td>34.16%</td>
<td>34.16%</td>
<td>29.23%</td>
<td>29.23%</td>
</tr>
<tr>
<td>2 - 3.5 miles</td>
<td>18.48%</td>
<td>52.64%</td>
<td>16.80%</td>
<td>46.03%</td>
</tr>
<tr>
<td>3.5 - 5 miles</td>
<td>12.72%</td>
<td>65.37%</td>
<td>13.02%</td>
<td>59.05%</td>
</tr>
<tr>
<td>5 - 10 miles</td>
<td>23.79%</td>
<td>89.16%</td>
<td>27.00%</td>
<td>86.05%</td>
</tr>
<tr>
<td>&gt;10 miles</td>
<td>10.84%</td>
<td>100.00%</td>
<td>13.95%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Table 4.2: Columbus area persons employed within distance thresholds, by worker class

<table>
<thead>
<tr>
<th>Distance Threshold</th>
<th>&quot;Working Poor&quot;</th>
<th></th>
<th>&gt;150% Poverty</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% of class</td>
<td>cumulative</td>
<td>% of class</td>
<td>cumulative</td>
</tr>
<tr>
<td>&lt; 2 miles</td>
<td>31.80%</td>
<td>31.80%</td>
<td>19.55%</td>
<td>19.55%</td>
</tr>
<tr>
<td>2 - 3.5 miles</td>
<td>17.68%</td>
<td>49.48%</td>
<td>14.03%</td>
<td>33.59%</td>
</tr>
<tr>
<td>3.5 - 5 miles</td>
<td>12.86%</td>
<td>62.34%</td>
<td>12.64%</td>
<td>46.23%</td>
</tr>
<tr>
<td>5 - 10 miles</td>
<td>25.33%</td>
<td>87.67%</td>
<td>30.46%</td>
<td>76.70%</td>
</tr>
<tr>
<td>&gt;10 miles</td>
<td>12.33%</td>
<td>100.00%</td>
<td>23.30%</td>
<td>100.00%</td>
</tr>
</tbody>
</table>
The geographic patterns of local working rates between the two classes of workers are also distinctively different in Figures 4.5 – 4.9. These maps represent the percentage of residents in each zone that are employed within the specified distance from home. At the shorter distance thresholds, within 2 miles (Fig. 4.5) and 3.5 miles (Fig. 4.6), the working poor and non-poverty workers show similar patterns. These patterns are both centralized near the CBD, but also decentralized in peripheral areas of Franklin Co, and throughout the metropolitan area, especially around the major towns. More distinctive differences between the two worker classes are evident in the 5 mile threshold map (Fig. 4.7). The non-poverty worker class employed within 5 miles is residentially more concentrated around the CBD area in Franklin Co. and around the major towns of surrounding counties. For the working poor employed within 5 miles are residentially much more scattered throughout Franklin Co. This suggests that the residential patterns of working poor workers employed within 5 miles are less centralized and concentrated than non-poverty workers. This pattern possibly reflects the increased diffusion of lower housing costs and low-end employment opportunities on the urban periphery. For residents with longer commutes, between 5-10 miles (Fig. 4.8) and more than 10 miles (Fig. 4.9), the patterns show workers tend to reside throughout the metropolitan area except in the central-most area around the CBD. Such a donut-like pattern is particularly clear for non-poverty workers. For the working poor the pattern is a bit more scattered in Franklin and Delaware Counties.

Again, it is important to note that these observations support the theory that lower-skilled, lower-income workers tend to be employed closer to home, while higher-skilled higher-income groups have longer commutes. Furthermore, the patterns suggest the working poor are not centralized in inner urban areas, but are more geographically scattered. Yet regardless of where they live – whether centralized or peripherally – the working poor tend to work close to home.

Based on the analysis of the data, 5 miles is a significant threshold for employment distances in the Columbus metropolitan area. In this specific context, working ‘locally’ is designated as working within 5 miles of home. While it may seem subjective, it is not an arbitrary designation. It is rooted in the data, as 5 miles
Figure 4.5: Percentage of zone working poor employed within 2 miles from home
Columbus, Ohio (MSA)
Figure 4.6: Percentage of zone working poor employed within 3.5 miles from home
Columbus, Ohio (MSA)
Figure 4.7: Percentage of zone working poor employed within 5 miles from home
Columbus, Ohio (MSA)
Figure 4.8: Percentage of zone working poor employed 5-10 miles from home
Columbus, Ohio (MSA)
Figure 4.9: Percentage of zone working poor employed >10 miles from home
Columbus, Ohio (MSA)
incorporates a vast majority of the working poor population. The 5 mile distance is a more generous threshold than other job proximity research (see Chapter 2). But given the local conditions, a less-dense metropolitan environment dependent upon the private automobile for commuting, a broader threshold seems necessary. Furthermore, initial regression analyses conducted in subsequent sections showed that the 5 mile threshold created a consistently more significant model than all other thresholds. Designations of ‘local’ for other metropolitan areas would need to be derived from the data specific to that context. The remainder of this analysis will consider local working rates based only upon the 5 miles from home threshold (shorthand notation: LWR_5m).

4.4 Local Working Rate Cluster Analysis

While the previous section explored geographic patterns of the observed data, it is important to determine whether or not those patterns are spatially clustered. Here, spatial cluster analysis is used to better characterize the patterns of Local Working Rates and explore more deeply the underlying structure of the observed patterns. Exploratory Spatial Data Analysis (ESDA) techniques are used to interactively and visually identify spatial dependency through cluster analysis and the detection of LWR ‘hot spots’. The objective of this section is to determine particular patterns of high or low employment access in the metropolitan area, and whether they are consistent with the traditional central city / suburb dichotomy. This analysis is conducted using GeoDa (Anselin et al. 2006) software. The results of this examination are explicitly incorporated into a spatial regimes model in the next section to investigates the plausibility of spatial non-stationarity.

4.4.1 Spatial Association and LISA

Spatial dependency is the phenomenon whereby the variation in observations values is dependent upon location in geographic space. The tendency for observations with locational similarity to have similarity in value is known as spatial autocorrelation (Anselin 1988). Moran’s I (Cliff and Ord, 1973) is a common indicator for spatial autocorrelation through a global correlation index measuring the extent to which observations in the whole region exhibit spatial dependency. As an index, a Moran’s I value of 1 suggests complete spatial dependency of observations across the study area,
while 0 indicates no spatial association among the observations in the study area. Here, the variable of interest (LWR_5m) has a global Moran’s I of 0.5980, indicating a moderate degree of spatial dependency across all 1,235 block groups. This index value, however, does not uncover any intricacies or variations of spatial dependency at different locations in the metropolitan area. As a global indicator, Moran’s I index measures the degree of global association across the entire spatial data and fails to reveal spatial difference at localized levels.

To examine the geographic differences of spatial dependency at a more local scale, local indicators of spatial association (LISA) (Anselin 1995) decompose the global statistics into local constituents. Thus, a local Moran’s I statistic gives indications of local instability in spatial association. A positive local Moran’s I indicates spatial clusters of observations that share similarly low or high values; a negative local Moran’s I indicates a clustering of observations of dissimilar values. Significance of local Moran’s I values can be tested through conditional randomization using a samples of 99 or more permutations (Anselin 1995). For this research, the exploratory techniques of LISA permit a localized examination of patterns and clusters. This is important to suggest differences in job proximity that occur more locally than globally. Two exploratory tools in GeoDa were used to examine spatial dependency at localized scales, the Moran scatterplot and LISA cluster map.

### 4.4.2 LWR_5m Scatterplot

A local Moran’s scatterplot is a graphical representation of spatial association, comparing standardized observed values with standardized mean values from local observations, based on the designated spatial weights matrix (Anselin, 1996). With standardized mean at zero (0), ‘low’ is considered below the mean and ‘high’ is above the mean. The four quadrants of the scatterplot (see Figure 4.10) represent four types of spatial association. Both Q1 and Q2 are quadrants of positive spatial association; they are spatial clusters. Q1 represents clusters where zones of high values are nearby zones with similarly high values (High-High), while Q2 represents clusters where zones of low values are nearby zones with similar low values (Low-Low). Both Q3 and Q4 are quadrants of negative spatial association and are considered spatial outliers, or zones of
dissimilarity. Q3 contains zones with high values near to zones with low values (High-Low), and Q4 represents zones with low values near zones with high values (Low-High).

Figure 4.10 is a Moran’s scatterplot showing the degree of spatial association for the LWR_5m variable. The x-axis portrays the standardized LWR_5m value for each of the 1,235 block groups. Whereas the y-axis contains the standardized LWR_5m value as an average of spatially lagged nearby block groups. A spatial weights matrix of first-order contiguity is use throughout this analysis to determine the spatial lag. The chart plots the LWR_5m of zone x against the average LWR_5m for all zones directly bordering zone x. As can be seen in the scatterplot, there are definite clustering trends in the data. A majority (82.02%) of block group observations fall within quadrants 1 and 2,
indicating spatial clusters of similar values. Specifically, quadrant 1 covers 568 block groups (50.0% of total), and quadrant 2 covers 445 block groups (36.03% of total). Yet, a significant portion of the observations falls within quadrant 3 (113 block groups, 9.15%) quadrant 4 (109 block groups, 8.83%), indicating spatial outliers of dissimilar values. It can be inferred that a trend of positive spatial association appears in the data, resulting in particular clustering patterns. That is, block groups with low LWR_5m tend to be geographically near other block groups with low levels of LWR_5m. The same is true for block groups with high levels of LWR_5m.

### 4.4.3 LWR_5m Cluster Map

A LISA cluster map provides geographic representation of the local Moran’s scatterplot, with distinct categories representing each type of spatial association corresponding to the four quadrants of the scatterplot. The cluster map (Figure 4.11) illustrates the four types of spatial association across the metropolitan landscape for the LWR_5m variable. Dark red and dark blue correspond with quadrant 1 and quadrant 2, respectively, of the scatterplot. The dark red indicates zones with both high (above average) LWR_5m values, and whose neighboring zones are also high (above average). The dark blue indicates zones with both low (above average) LWR_5m values, and whose neighboring zones are also low (above average). The spatial outliers are indicated by the light blue and light red, corresponding to quadrants 3 and 4, respectively. The light blue represents zones with low LWR_5m, but whose neighboring zones have high LWR_5m. Conversely, light red represents zones with high LWR_5m, but whose neighboring zones have low LWR_5m.

Examining the Figure 4.11 cluster map highlights very interesting patterns of local working rates among the working poor in the Columbus metropolitan area. Consider the City of Columbus, which has a highly irregular shape with many far-reaching arms, and several interior holes of non-central-city enclaves (inner suburbs such as Bexley or Upper Arlington). The core of the central-city is clustered with zones of high LWR, suggesting that most of the working poor residents in the city’s core area work within 5 miles. Clusters of low LWR_5m within the central-city boundaries appear in some of the furthest corners of the city limits, particularly to the south and southeast, to
Figure 4.11: Cluster analysis: LISA Cluster Map
Columbus, Ohio (MSA)
Inset map highlights the City of Columbus territorial boundaries
the west and southwest, and to the northeast. These specific peripheral areas within the central-city boundaries correspond with minority, immigrant, and poverty residential patterns. Outside of the City of Columbus, many significant clusters of high LWR_5m exist. In many cases these zones border directly to the central-city, or within a short distance away, such as the suburbs of Gahanna, Reynoldsburg, Pickerington, and Obetz on the east and southeast edges of Franklin Co. Also, the retail centers of Polaris and Tuttle Crossing indicate high LWR_5m on the periphery of the city. Zones of high LWR_5m also surround the nearby towns, particularly around Delaware, Newark, Lancaster, and Circleville, which is not unexpected. But in a traditional metropolitan-wide central-city/suburb dichotomy, all of these zones including the major towns would be categorized as suburbs – potentially disrupting understanding of localized processes related to job access and spatial mismatch.

If high levels of LWR_5m are considered a proxy indicator of good job accessibility or low spatial mismatch, than these patterns reveal interesting insight. Good job access among the working poor exists in multiple locations in the metropolitan area: in the core area around the central business district, in peripheral job centers at the edges of Franklin County, and near the cities of the surrounding counties. Conversely, low levels of local working occur at the extremities of the central-city and dominates the non-urbanized areas of the metropolitan area. As such, this indicates that great caution must be exerted when utilizing the central-city / suburb dichotomy when delineating metropolitan spaces of low (high) job access or spatial mismatch. The patterns are much more localized when considered at the scale of block-groups, and have significant importance in how geographic access should be conceptualized. Here, metropolitan spatial structure of accessibility is identified based on empirical observations (clusters of high or low local working rates), rather than politically designated geographic boundaries (i.e. central cities and suburbs). Regions with high or low local working rates are not geographically synonymous with the central city / suburb dichotomy in the metropolitan landscape. The regression analysis in the following section uses these clusters as explicit spatial sub-regions of the metropolitan area.
4.5 Modeling geographic context, local working rates, and spatial non-stationarity

As argued in Chapter 2, empirical studies examine the characteristics of geographic (local) context to determine which/if aspects of place seem to relate statistically with observed levels of employment access. The dominant arguments suggest that poorer neighborhoods with higher concentrations of minorities (Blacks) and limited transportation infrastructure suffer greater obstacles/barriers in accessing jobs throughout the metropolitan landscape. In this chapter, the spatial analysis reveals that patterns of LWR_5m as a social phenomenon are not uniform across intra-urban metropolitan space, nor that they are randomly distributed – but exhibit particular clustering patterns. The next question is whether relationships between characteristics geographic context (explanatory variables) and local working rates (dependent variable) remain fixed across the entire metropolitan landscape.

One critical need in job access research is the examination of characteristics of geographic context at fine local scales. Such scaled analysis can help determine localized statistical relationships that provide improved insight to urban structure patterns than through a coarse central-city/suburban dichotomy. It is believed that these factors of place do not have spatially uniform influence (non-stationary), but exert differential influence between spatial units. That is, the geographic context characteristics related to neighborhoods with high local working rates in one location of the city, may not have the same statistical relationship as in other locations of the city.

In job accessibility and spatial mismatch research, multivariate regression is the most common methodological approach (Ihlanfeldt and Sjoquist 1998; Preston and McLafferty 1999; Houston 2005), as it enables useful interpretation of factors that may significantly influence the indicators of accessibility. Yet this standard method may limit the ability to unravel underlying barriers to job access, particularly when spatial effects are present in the data.

Spatial effects refer to both spatial dependency and spatial heterogeneity (Anselin 1988). When data are spatially dependent, there is a coincidence of value similarity with locational similarity, also known to as spatial autocorrelation. This condition may violate basic assumptions of standard linear regression that observations are independent
and random, and errors are uncorrelated and can lead to unreliable statistical inferences from ordinary least squares (OLS) estimations. With few exceptions (Immergluck 1998a, 1998b; Mouw 2000; Kawabata and Shen 2007), the effects of spatial autocorrelation have not been explicitly accounted for in previous spatial mismatch and job access research. Spatial heterogeneity refers to the possible interaction of structural factors with features of the geographic context that may be reflected through regression parameters, which are not stable over space. Given the varying nature of socio-spatial phenomenon, it is untenable to assume a fixed relationship between independent and dependent variables that is constant across geographic space (Anselin 1992).

The objective of this section is to consider spatial effects in a model that relates local working rates among the working poor to characteristics of local geographic context. The assumption is this: the relationship of local characteristics to LWR_5m is not always uniform, and might change depending on spatial location. Ultimately these procedures assist in enabling better understanding of localized processes and urban structures that impact job access for the working poor population in Columbus, Ohio area.

4.5.1 Model Specification

To examine the spatial non-stationarity of geographic context, a spatial regimes model was specified. Independent variables representing characteristics of geographic context were selected based upon their theoretical significance and performance in preliminary modeling. The process of specification required a progressive series of models, including ordinary least squares (OLS), spatial lag, and spatial regimes multivariate regressions. At each step, diagnostics helped determine the appropriate subsequent model. All modeling was computed using SpaceStat 1.91 and GeoDa software packages on a Windows XP operating system platform. A total of 6 separate models were constructed, each with 3-6 independent variables. In the spatial regimes analysis, each of the 6 models was computed 4 times for different regime structures.

4.5.2 Characteristics of Local Geographic Context (independent variables)

Based on the spatial mismatch and job accessibility literature, several place-based characteristics were selected as independent variables (see Table 4.3). In most cases,
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<td>22.21</td>
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<td>10.23</td>
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<td>0.12</td>
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<td>0.03</td>
<td>0.05</td>
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<td>PCT_BLK</td>
<td>Percentage of zone residents of African American race</td>
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<td>Median age of housing units in zone&lt;sup&gt;b&lt;/sup&gt;</td>
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<td>Natural log of population density</td>
<td>7.65</td>
<td>8.22</td>
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**Table 4.3: Variables of geographical context**

<sup>a</sup> Here, “central-city” is designated as Block Groups with >49% of their land area falling within the City of Columbus political jurisdiction boundaries. All balance of block groups in the metropolitan area are designated as “suburb”.

<sup>b</sup> Natural Log of year 2000, minus (-) median year built.
these variables have proven in past empirical research to be significantly related to incidents of spatial mismatch or diminished job accessibility among disadvantaged populations. Thirteen independent variables are used to represent characteristics of geographic context, and fall into four categories: socio-economic composition; household structure; commuting and transportation; and urban structure. Initially over 20 independent variables were examined, but only 13 are included in this analysis. This final list of variables was selected by trying to balance several objectives: minimize collinearity and interaction among the variables, obtain a variety of categories, select the most consistently significant factors, and build models with the highest coefficient of determination ($r^2$) as possible.

Lower employment access is most associated with economically deprived and high minority neighborhoods. The historical processes of job decentralization resulted in neighborhoods with higher concentrations of poor and minority residents that were more centrally located in metropolitan areas and geographically isolated from jobs in the periphery. It is expected that the percentage of zone Black population (PCT_BLK) measures has a negative relationship: local working rates will decline as PCT_BLK increases (Gabriel and Rosenthal 1996; Carlson and Theodore 1997; Immergluck 1998a, 1998b; Mouw 2000; Gottlieb and Lentek 2001; Sultana 2005; Cristaldi 2005). Similarly, economically depressed neighborhoods reflect barriers to beneficial employment outcomes. In the traditional sense of SMH, poorer neighborhoods would relate to lower levels of local working rates because there are limited nearby job opportunities. Three measures of economic deprivation are used: percentage poverty (POVERTY) (O’Regan and Quigley 1996; Carlson and Theodore 1997), per capita income (INC) (Raphael 1998), and unemployment rates (UNEMPR)$^5$. Local working rates are expected to decline with increases in poverty and unemployment, and decreases in income.

Two measures of household structure are in many ways extensions of socio-economic indicators. The percentage of female-headed households (FEFAMR) is

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$^5$ Since this study does not examine unemployment rates as a dependent variable, the use of unemployment as an independent variable here does not impose sample selection bias. If zone rates of unemployment are high, this might indicate that fewer jobs are available nearby, and result in lower local working rates.
expected to positively relate to local working rates, as women with more domestic responsibilities end up having more spatially constrained activity spaces (Hanson and Pratt 1995; Kwan 1999). Household size (HH_Size) does not appear in the literature to have a direct theoretical relationship, and the outcomes are uncertain. The presence of more children may place a greater financial burden on working adults and thus may lead to lower levels of job access. But considering the spatial constraints that domestic responsibilities pose, it would be expected to relate positively and lead to higher LWR.

Available transportation and local infrastructure directly affects people’s mobility to places of employment. Thus, three commuting and transportation measures are included. The percentage of working poor with no car (NoCar) (Taylor and Ong 1995; Gottlieb and Lentek 2001; Shen 2001; Blumenberg and Shiki 2004; Parks 2004) and the percentage of working poor who commute by transit (TRANSIT) (McLafferty and Preston 1996, 1997; Sanchez 1999; Shen 2001; Kawabata 2003; Horner and Mefford 2007) are expected to relate negatively to Local Working Rates – as increased dependence on modes other than private automobile would decrease one’s ability to travel to distant jobs. The percentage of working poor car drivers who commute under 30 (Auto30) was included to capture those who drive to work, but may in fact be a misspecified variable that adds little insight.

Several indicators of urban structure were also included in these models. These are intended to capture the many ways structures of opportunities are manifest in the urban environment. Job accessibility based on potential employment opportunities (ACCESS) would logically have a positive influence: the more skills-appropriate jobs nearby relative to surrounding labor competition, relates to an expected increase in local working rates (Ilhanfeldt and Sjoquist 1990; Carlson and Theodore 1997; Immergluck 1998a, 1998b; Parks 2004). The ACCESS variable is based upon the gravity measure discussed in section 4.2.2. The city / suburb dummy variable (CITY_SUB), housing unit age (HU_AGE), and population density (POP_DEN) were utilized to capture indications of more centralized urban environment versus more sprawled peripheral areas. This relates to the direct theoretical indications that more low-end service jobs exist in ‘suburban’, outlying, and decentralized areas. But also, more dense urban areas may
facilitate increases in social network development, which fosters access to jobs (Chapple 2006).

### 4.5.3 Ordinary Least Squares (OLS) model

The first step in model specification began with estimating an ordinary least squares (OLS) regression model. This initial OLS estimation helped facilitate selecting significant variables to build the model, to establish base-line model fit and variable associations for comparison with subsequent models, and to obtain diagnostics on heteroskedasticity and spatial dependence. A standard OLS model was used:

$$y = \alpha + X\beta + \epsilon,$$

where $y$ is a vector of $n$ observations of the dependent variable; $X$ is a matrix of independent variables; $\beta$ is a vector of regression coefficients; $\epsilon$ is a vector of random errors. As detected in the previous cluster analysis, spatial association is apparent in the dependent variable, thus the basic assumption in OLS – uncorrelated normal errors with constant error variance – cannot be assumed. Therefore, with full knowledge of the existence of spatial autocorrelation, interpreting meaning and drawing conclusions would be problematic. However, it is possible to examine a few key signals from these models in order to build more sufficient models that correct for spatial autocorrelation.

The initial OLS estimation procedure helped build suitable models by testing different independent variables. The objective was to create models with the highest $R^2$ possible, while retaining as many highly significant independent variables without compromising too much multicollinearity. Due to issues of multicollinearity between the variables, multiple smaller models were fitted to allow for closer examination of the importance in each geographic context variable. Six models were estimated and their results are presented in Table 4.4. All 6 models return an unimpressive $R$-squared value in the 0.24 - 0.28 range, suggesting limited variation in the dependent variable that is explained by the model independent variables. Each model was constructed with variables significant to $p < 0.05$, with most at $p < 0.01$ level of significance. In looking at all the model results, all but four explanatory variables have a positive (coefficient) relationship with the dependent. And in most cases, the relationships occur as expected. Some level of multicollinearity in the models is expected, given the nature of U.S.
Census tabulated data. The Condition Number is a helpful diagnostic, where values much beyond 20-30 become suspect, with the potential to harm regression estimates (Belsely et al. 1980; Anselin 1992). The particular combination of variables in models 2 and 6 result in higher Condition Numbers, 25.40 and 23.87, respectively deserve some caution. But the remainder of the models with values below 17 is acceptable.

In all models except #3 and #6, the Jarque-Bera test for normality of errors are not significant suggesting that 4 of the 6 models have normally distributed errors. When errors are non-normal, the tests for heteroskedasticity and spatial dependence should be interpreted with caution (Anselin 1992). In all 6 models, heteroskedastcticity (errors with non-constant variance) is clearly a problem, as noted by the highly significant Breusch-Pagan, Koenker-Bassett, and White tests. When heteroskedasticity is diagnosed, there is a potential need for more explicit expression of spatial effects, such as regimes (Anselin 1992). Therefore the spatial regimes model may correct for the occurrence of heteroskedasticity.

Finally, the diagnostics for spatial dependence (spatial autocorrelation) help determine which alternative estimation is most appropriate. It is known that spatial autocorrelation is clearly a problem in all models. Spatial dependence, however, can occur in different ways. If the dependent variable is correlated with the dependent variable of nearby locations, this is known as spatial lag. When the regression errors are correlated with the errors of nearby locations, this is known as spatial error. The former is more problematic, as it is reflecting spatial correlations related to substantive components of the regression model, while the latter problem is merely a nuisance, since the errors, are simply model residuals. The best guidance for selecting an appropriate alternative model is a joint use of the LM-error and LM-lag statistic (Anselin and Rey 1991). Further, when a decision cannot be made based on either of these statistics, the Robust LM statistics should be consulted (Anselin 2005). In all 6 models, the Robust LM (error) is not significant (p < 0.01), while the Robust LM (lag) is significant (p < 0.01). Thus, based upon the decision model flowchart in Anselin (2005), the most appropriate alternative for all of these models is to specify a spatially lagged model.
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**Measures of fit**

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**Spatial dependence**

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**Table 4.4: Ordinary Least Squares (OLS) Regression Results**

Dependent Variable: LWR_5M  
Level of significance: *p<0.01; **p<0.05; ***p<0.10
Weights: first-order contiguity
DF = degrees of freedom; ‘-’ indicates variable is not included in the model
Table 4.5: Spatial Lag Regression Results

Dependent Variable: LWR_5m  
Level of significance: *p<0.01; **p<0.05; ***p<0.10  
Weights: first-order contiguity, row-standardized.  
DF = degrees of freedom; '-' Indicates variable is not included in the model

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Dependent Variable: LWR_5m  
Level of significance: *p<0.01; **p<0.05; ***p<0.10  
Weights: first-order contiguity, row-standardized.  
DF = degrees of freedom; '-' Indicates variable is not included in the model
4.5.4 Spatial Lag Model

Theoretically a spatial lag regression is similar to OLS, except for the additional lag term: \( y = X\beta + \rho W y + \epsilon \), where \( y \) is a vector of \( n \) observations of the dependent variable; \( X \) is a matrix of independent variables; \( \beta \) is a vector of regression coefficients; \( \epsilon \) is a vector of random errors, and \( \rho W y \) is a spatially lagged term based upon a spatially weighted matrix of nearby \( y \) dependent variables. By adding the spatial lag term, correlations between nearby observations are accounted for, if it appears as significant to the model. The results of the spatial lag models are presented in Table 4.5. In all six models, the spatial lag variable was significant, indicating that the proper OLS alternative model was chosen. Heteroskedasticity also remains a problematic issue. From these results the decision was to construct a spatial lag spatial regimes model using groupwise heteroskedasticity estimation. Together, these OLS and spatial lag models were necessary steps in constructing a spatial regimes model that explores the potential structural change.

4.5.5 Spatial Regimes Model

Spatial regimes (Anselin 1988, 1992) modeling is conceptually straightforward. In standard multivariate regression, the relationship between independent and dependent variables is fixed, regardless of the spatial location. With spatial regimes, it can be assumed that the dependent-independent variable relationship for observations within one sub-region (regime) of the study area is different than the dependent-independent variable relationships in other regimes. The notation for a spatially lagged spatial regimes model is:

\[
\begin{align*}
  y_1 &= \alpha_1 + \rho W y + X_1 \beta_1 + \epsilon_1 & \text{for } r = 0 \\
  y_2 &= \alpha_2 + \rho W y + X_2 \beta_2 + \epsilon_2 & \text{for } r = 1 \\
  y_n &= \alpha_n + \rho W y + X_n \beta_n + \epsilon_n & \text{for } r = n 
\end{align*}
\]

where, assuming \( n \) regimes distinguished by the indicator variable \( r \), \( y_r \) and \( X_r \) are the dependent and explanatory variables related to the first regime, \( y_2 \) and \( X_2 \) for the second regime, and \( y_n \) and \( X_n \) for the \( n \)th regime; \( \alpha_1, \alpha_2, \alpha_n \) and \( \beta_1, \beta_2 \) and \( \beta_n \) are corresponding regression coefficients, and \( \epsilon_1, \epsilon_2, \epsilon_n \) error vectors (Anselin, 1992). Since this spatial
regimes model will be estimated with the spatial lag term, $\rho W y$ represents the spatial lag term based upon a first-order contiguity spatial weights matrix of nearby $y$ dependent variables.

With this approach, different regression intercepts and coefficients are estimated for spatial subsets of the dataset, specified by the separate regimes (Anselin 1988). This technique is well suited for analyses of socio-spatial phenomena, as exemplified in recent research to examine patterns of crime (Messner and Anselin 2004), economic convergence (Ertur et al. 2006), and poverty hardship (Longley and Tobón 2004). In spatial mismatch and job accessibility research, this approach has the potential to highlight the differential influence of geographic context upon indicators of job access that varies across space, and allows for more explicit structural differentiation to be modeled beyond a simple central-city/suburb regression dummy variable.

From the previous cluster analysis, four different regime structures are devised to model structural instability. Each regime structure divides the urban landscape into areas of homogeneity in the levels of local working rates for the working poor at 5 miles (LWR_5m), except ‘D’ which divides the metropolitan area according to the classic city/suburb dichotomy. The different representations of structural change (regime structures) are as follows:

- **Regime Structure A** (2 regimes): the clusters of High/High (Quadrant 1) LWR_5m block groups, and all other block groups.
- **Regime Structure B** (2 regimes): the clusters of Low/Low (Quadrant 2) LWR_5m block groups, and all other block groups in the other regime.
- **Regime Structure C** (3 regimes): the clusters of High/High (Q1), the clusters of Low-Low (Q2), and the spatial outliers (Q3, Q4).
- **Regime Structure D**: (2 regimes): ‘central-city’ and ‘suburb’, with structure determined by the city_sub independent variable.

The use of four different regime structures was developed so as to make more informed interpretations of the overall structural instability. For example, Regime Structure A explores how zones with High LWR_5m are structurally different from all other zones. To test the validity of arguments that city/suburbs have greater/lesser employment access,
Regime Structure D was devised\(^6\). Since the spatial designation in D is not based upon any observed values of LWR, it is not expected to perform similar to A, B, and C in the models.

The spatial regime estimation results are presented in six tables (Tables 4.6 – 4.11). A few key diagnostics and goodness of fit measures assess the relative strength and performance of these models. In all models for all regime structures, the Chow-Wald test of structural instability is highly significant to \( p < 0.01 \). Within each model the null hypothesis that the regression coefficients are the same between the model regimes can be safely rejected. The indication of *stability of individual coefficients* utilizes the same test. In all models (except Regime Structure B in models 1 and 3, and Regime Structure D in model 6), there is at least one coefficient whose relationship to the dependent variable is different between the model regimes (\( p < 0.05 \)). This suggests that in all cases, the regression coefficients are significantly different between regimes in the various regime structures.

With regard to regression model measures of fit, the spatial regimes estimation is clearly of superior fit over the OLS and the spatial lag (non-regimes) estimations. Because maximum likelihood estimation is utilized in the spatial lag approaches, \( R^2 \) comparison is not appropriate. Instead, models should be compared using the log-likelihood, Akaike Information Criterion (AIC) and Schwartz Criterion (SC), whereby the highest log-likelihood or the lowest AIC and SC are the best measures of fit (Anselin 1992). In all of these goodness-of-fit measures, all models in Regime Structures A, B, and C outperform the non-regimes models (OLS and spatial lag). The city-suburb Regime Structure D is actually outperformed by the non-regimes spatial lag model. From this it can be inferred that models predicting accessibility based on geographic context characteristics perform better when some structural specification is incorporated – and the exact spatial structure does matter.

\(^6\) To eliminate issues of perfect collinearity, the city\_sub independent variable was removed for all models with this regime structure.
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<th>B</th>
<th>C</th>
<th>D</th>
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<td>(1224)</td>
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**Measures of fit**

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**Diagnostics**

- **Test on Structural Instability**
  - Chow - Wald (DF): 504* (5) 485* (5) 649* (10) 23.1* (4)

- **Stability of individual coefficients (DF)**
  - CONS_0: 30.53* 48.01* 62.5* 10.6*
  - ACCESS_: 1.22 1.34 14.8* 5.63**
  - CITY_SUB_: 1.61 0.9 5.6*** -
  - TRANSIT_: 0.07 0.03 1.08 0.21
  - INC_: 11.34* 0.86 12.6* 0.14

Table 4.6: MODEL 1 Spatial Lag with Spatial Regimes Regression

Results for Regime Structures A, B, C, D

Groupwise heteroskedasticity estimation

*Level of significance: *p<0.01; **p<0.05; ***p<0.10

Dependent Variable: LWR_5m; Weights: first-order contiguity

DF = degrees of freedom; '-' Indicates variable is not included in the model.

Regime Structure A: _0 = all others; _1 = High/High
Regime Structure B: _0 = all others; _1 = Low/Low
Regime Structure C: _0 = all spatial outliers; _1 = High/High; _2 = Low/Low
Regime Structure D: _0 = suburbs; _1 = city
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**Measures of fit**

| R^2 | 0.63 | 0.65 | 0.72 | 0.44 |
|LIKELIHOOD| 767  | 728  | 885  | 524  |
|AIC | -1508| -1430| -1732| -1026|
|SC  | -1441| -1364| -1635| -969 |

**Diagnostics**

**Test on Structural Instability**

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</tbody>
</table>

**Stability of individual coefficients (DF)**

| CONS  | 4.88** | 3.9** | 5.7** | 8.6*    |
|ACCESS | 0.18   | 0.11  | 25.5* | 11.4*   |
|UNEMPR | 5.95** | 1.7   | 6.01**| 0.34    |
|FEFAMR | 3.22** | 2.68***| 5.69***| 5.29**  |
|HH_SIZE| 3.37** | 6.62* | 8.9** | 1.05    |
|CITY_SUB| 1.59   | 0.008 | 6.43**| -       |

Table 4.7: MODEL 2 Spatial Lag with Spatial Regimes Regression

Results for Regime Structures A, B, C, D

Groupwise heteroskedasticity estimation

*Level of significance:* *p<0.01; **p<0.05; ***p<0.10

Dependent Variable: LWR_5m; Weights: first-order contiguity

DF = degrees of freedom; '-' Indicates variable is not included in the model.

Regime Structure A: _0 = all others; _1 = High/High
Regime Structure B: _0 = all others; _1 = Low/Low
Regime Structure C: _0 = all spatial outliers; _1 = High/High; _2 = Low/Low
Regime Structure D: _0 = suburbs; _1 = city
### Table 4.8: MODEL 3 Spatial Lag with Spatial Regimes Regression

Results for Regime Structures A, B, C, D

<table>
<thead>
<tr>
<th>Variables</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
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<td></td>
<td>(DF)</td>
<td>(DF)</td>
<td>(DF)</td>
<td>(DF)</td>
</tr>
<tr>
<td>W_LWR_5M</td>
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<tr>
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<td>0.45*</td>
<td>0.43*</td>
<td>0.03</td>
</tr>
<tr>
<td>ACCESS_0</td>
<td>0.09**</td>
<td>0.005</td>
<td>0.091*</td>
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</tr>
<tr>
<td>CITY_SUB_0</td>
<td>-0.003</td>
<td>-0.24***</td>
<td>-0.05*</td>
<td>-</td>
</tr>
<tr>
<td>POVERTY_0</td>
<td>0.09</td>
<td>0.07***</td>
<td>-0.03</td>
<td>0.17**</td>
</tr>
<tr>
<td>NOCAR_0</td>
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<td>0.05</td>
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<td>0.13***</td>
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<td>-</td>
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**Measures of fit**

- $R^2$: 0.63, 0.65, 0.71, 0.43
- LIKELIHOOD: 759, 719, 873, 519
- AIC: -1497, -1417, -1714, -1020
- SC: -1441, -1361, -1632, -974

**Diagnostics**

- **Test on Structural Instability**
  - Chow - Wald (DF): 484* (5), 488* (5), 629* (10), 25.5* (4)
- **Stability of individual coefficients**
  - (DF): 42.9*, 54.5*, 78.2*, 11.35*
  - 0.001, 0.82, 27.0*, 8.6*
  - 4.5**, 1.93, 10.26*, -
  - 2.07, 0.63, 5.14***, 2.2
  - 1.23, 1.12, 2.20, 1.7

Groupwise heteroskedasticity estimation

*Level of significance:* *p<0.01; **p<0.05; ***p<0.10*

Dependent Variable: LWR_5m; Weights: first-order contiguity

DF = degrees of freedom; '-' Indicates variable is not included in the model.

Regime Structure A: _0 = all others; _1 = High/High
Regime Structure B: _0 = all others; _1 = Low/Low
Regime Structure C: _0 = all spatial outliers; _1 = High/High; _2 = Low/Low
Regime Structure D: _0 = suburbs; _1 = city
Table 4.9: MODEL 4 Spatial Lag with Spatial Regimes Regression
Results for Regime Structures A, B, C, D

<table>
<thead>
<tr>
<th>Variables</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>W_LWR_5M</td>
<td>0.427*</td>
<td>0.428*</td>
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<td>0.67*</td>
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<td>0.05**</td>
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<td>0.11</td>
<td>0.003</td>
<td>-0.05</td>
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<tr>
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<td>-0.012**</td>
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<td>0.03*</td>
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</tr>
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<td>-0.0008</td>
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<td>0.004</td>
</tr>
<tr>
<td>ACCESS_1</td>
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<td>-0.10**</td>
<td>-0.09**</td>
<td>0.33*</td>
</tr>
<tr>
<td>TRANSIT_1</td>
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<td>0.05</td>
<td>0.038</td>
<td>0.05</td>
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<td>POPDEN_1</td>
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<td>0.03*</td>
<td>0.03*</td>
<td>0.008</td>
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<tr>
<td>CONST_2</td>
<td>-</td>
<td>-</td>
<td>0.70*</td>
<td>-</td>
</tr>
<tr>
<td>PCT_BLK_2</td>
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<td>-</td>
<td>0.14**</td>
<td>-</td>
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<tr>
<td>ACCESS_2</td>
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<td>-</td>
<td>-0.17***</td>
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</tr>
</tbody>
</table>

Measures of fit
R²: 0.63 0.65 0.72 0.46
LIKELIHOOD: 760 732 884 532
AIC: -1498 -1442 -1737 -1042
SC: -1442 -1386 -1655 -987

Diagnostics
Test on Structural Instability
Chow - Wald (DF): 496* (5) 517* (5) 674* (10) 42* (5)

Stability of individual coefficients (DF)

<table>
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<tr>
<th></th>
<th>A</th>
<th>B</th>
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<th>D</th>
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<td>22.35*</td>
<td>27.32*</td>
<td>45.18*</td>
<td>10.33*</td>
</tr>
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</table>

Table 4.9: MODEL 4 Spatial Lag with Spatial Regimes Regression
Results for Regime Structures A, B, C, D

Groupwise heteroskedasticity estimation
Level of significance: *p<0.01; **p<0.05; ***p<0.10
Dependent Variable: LWR_5m; Weights: first-order contiguity
DF = degrees of freedom; '-' Indicates variable is not included in the model.
Regime Structure A: _0 = all others; _1 = High/High
Regime Structure B: _0 = all others; _1 = Low/Low
Regime Structure C: _0 = all spatial outliers; _1 = High/High; _2 = Low/Low
Regime Structure D: _0 = suburbs; _1 = city
<table>
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<th>C</th>
<th>D</th>
</tr>
</thead>
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<td>(1224)</td>
<td>(1219)</td>
<td>(1226)</td>
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<td>0.42*</td>
<td>0.39*</td>
<td>0.70*</td>
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</tr>
<tr>
<td>CONST_0</td>
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<td>0.45*</td>
<td>0.44*</td>
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<tr>
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<td>0.087*</td>
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</tr>
<tr>
<td>FEFAMR_0</td>
<td>0.15**</td>
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<td>-0.07**</td>
<td>0.28*</td>
<td></td>
</tr>
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</tr>
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<td>ACCESS_1</td>
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<td>0.33*</td>
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<td>0.24*</td>
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<td>CITY_SUB_1</td>
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<td>-0.003</td>
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<tr>
<td>PCT_BLK_1</td>
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<td>-0.07</td>
<td>-0.08***</td>
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</tr>
<tr>
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<td>0.12</td>
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</tbody>
</table>

**Measures of fit**

| R²          | 0.63 | 0.65 | 0.72 | 0.44 |
|LIKELIHOOD   | 763  | 723  | 880  | 522  |
|AIC          | -1504| -1424| -1729| -1026|
|SC           | -1447| -1367| -1646| -980 |

**Diagnostics**

*Test on Structural Instability*

| Chow - Wald (DF) | 495* (5) | 502* (5) | 658* (10) | 33.9* (4) |

*Stability of individual coefficients (DF)*

| CONST_       | 47.7* | 59.4* | 90.1* | 13.9* |
|ACCESS_       | 0.01  | 0.64  | 25.9* | 11.9* |
|FEFAMR_       | 9.07* | 10.1* | 19.6* | 10.0* |
|CITY_SUB_     | 3.47**| 0.72  | 7.7** | -    |
|PCT_BLK_      | 1.23  | 3.87**| 6.3** | 4.75**|

Table 4.10: MODEL 5 Spatial Lag with Spatial Regimes Regression

Results for Regime Structures A, B, C, D

Groupwise heteroskedasticity estimation

*Level of significance:* *p<0.01; **p<0.05; ***p<0.10

Dependent Variable: LWR_5m; Weights: first-order contiguity

DF = degrees of freedom; '-' Indicates variable is not included in the model.

Regime Structure A: _0 = all others; _1 = High/High
Regime Structure B: _0 = all others; _1 = Low/Low
Regime Structure C: _0 = all spatial outliers; _1 = High/High; _2 = Low/Low
Regime Structure D: _0 = suburbs; _1 = city
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<tr>
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<th>Regime Structure A</th>
<th>Regime Structure B</th>
<th>Regime Structure C</th>
<th>Regime Structure D</th>
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<tr>
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<tr>
<td>Measures of fit</td>
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<tr>
<td>R²</td>
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<td>873</td>
<td>526</td>
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<td>SC</td>
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<td>Diagnostics</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Test on Structural Instability</td>
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</tr>
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<td>Chow - Wald (DF)</td>
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<td>492* (6)</td>
<td>651* (12)</td>
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<td>1.09</td>
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</table>

Table 4.11: MODEL 6 Spatial Lag with Spatial Regimes Regression

Results for Regime Structures A, B, C, D

Groupwise heteroskedasticity estimation

Level of significance: *p<0.01; **p<0.05; ***p<0.10

Dependent Variable: LWR_5m; Weights: first-order contiguity

DF = degrees of freedom; '-' Indicates variable is not included in the model.

Regime Structure A: _0 = all others; _1 = High/High
Regime Structure B: _0 = all others; _1 = Low/Low
Regime Structure C: _0 = all spatial outliers; _1 = High/High; _2 = Low/Low
Regime Structure D: _0 = suburbs; _1 = city
Noticeable differences also appear when comparing the measures of fit between the four Regime Structures. In all instances, Regime Structure A and B have similar levels of fit to their models. Regime Structure C outperforms all of the different models, and Regime Structure D has the poorest performance. The high performance marks for Regime Structure C is likely attributed to the more complex spatial structure, as it is most explicitly defined using three distinct sub-regions to represent spatial clusters and the spatial outliers of accessibility indicators. Further, the underperformance of Regime Structure D is perhaps not surprising given that the regime structure is not based upon observed clusters in the dependent variable, but upon external political boundary designation that has indirect relevance to local working rates. This should have important ramifications upon the conceptualizations of metropolitan structure in future accessibility research.

4.6 Model Results and Discussion

Three general findings point towards the overall mixed success in the spatial regimes model results. First, given the strength of the diagnostics and goodness-of-fit measures, it can be concluded that spatial regimes is a successful approach for modeling social spatial phenomena that provides significant insight. Second, the results indicate spatial variability exists in the statistical relationships between dependent and independent variables. Although the direction (+/-) of the relationship may not change, the slope (intensity) often does. The empirical evidence shows that these determinant variables exert differential influence upon the dependent variable, based upon the regime structures. Sometimes this differential influence is apparent within a single model and structure, and sometimes it is inferred by looking across models and structures. This finding is of critical significance in how metropolitan areas are conceptualized for regression analyses. Third, the results, however, do not provide sufficient evidence to make substantive conclusions about the general effects of specific context characteristics as they relate to Local Working Rates. In many cases, models emerge with only 1 or 2 significant variables, leading to the inability of drawing conclusions related to the insignificant variables. Furthermore, no single factor of geographic context seemed to have consistent and overwhelming influence on Local Working Rates. Despite these
somewhat disappointing returns, it must be reiterated that the original objectives of the model was to uncover the realities that social phenomena are highly varied across geographic space. The results of the urban structure, socio-economic, household structure, and commuting/transportation variables are now interpreted more closely.

There were four indicators of urban structure. As expected, the accessibility measure (ACCESS) is one of the most frequently significant variables in all models and structures, and in most cases has a positive relationship to the dependent variable. This is not surprising, as the level of local working rates should be highly related to the access level of potential employment opportunities with relation to the labor competition for those same jobs within a specific distance threshold. However, in Regime Structure C for all models and in Model 4 Structure B, there is a significant negative relationship for the spatial regime associated with clusters of low LWR. That is, in clustered zones with below average levels of local working rates, higher potential access to jobs (ACCESS) leads to lower observed LWR. This is a very curious result without immediate explanation.

Population density (POPDEN) is significant in Model 4 for all four regime structures and exhibits a differential relationship. It is generally a positive-significant relationship for sub-regions of High LWR, and a negative-significant relationship for sub-regions of Low LWR and ‘suburbs’. This performs as expected: where the density of population is higher, it is more likely that the working poor will be employed within 5 miles of home. More dense urban structures invariably could precipitate more job opportunities in the local area. However, greater population density in certain metropolitan areas leads to decreases in observed LWR. This may be indicative of metropolitan areas with concentrations of residential zones but limited mixing of employment opportunities.

For the city/suburb structural variable (CITY_SUB), generally the variable has a significant negative relationship in all models for the High LWR sub-regions in Structure A and C. In structure B, it is negatively significant for the non-Low LWR sub-region. Thus, it can be inferred that among the clustered areas of High LWR, the LWR of the working poor tend to be higher in suburban zones than city zones. This supports the
theoretical understanding that job decentralization towards the periphery leads to more employment opportunities in the suburbs. For issues of perfect colinearity, the city_sub variable does not appear in Regime Structure D.

Finally, in Model 6, as mean age of housing units (UNIT_AGE) in a zone increases, the observed LWR decreases. As a crude measure of urban structure, this suggests that in areas with newer aged homes – which tend to be peripheral – the observed local working rates of the working poor are in fact higher. And in areas with older aged homes – more centrally located – the LWR are lower. Again, this supports the same point made above.

For socio-economic characteristics, zone per capita income (INC) appears only in Model 1 (Table 4.6) and exhibits a differential relationship. In Structure A, INC has a significant positive relationship to LWR in high LWR clusters; as the entire zone per capita income rises, so does the percentage of that zone’s working-poor population that are employed within 5 mile radius. However, in Structure D the opposite trend occurs in places designated politically as ‘suburbs’, where increases in per capita income leads to decreased LWR of the working poor. This trend is unsurprising especially as few working poor actually would reside in more affluent suburbs.

Similarly, the percentage of zone poverty (POVERTY) in Model 3 (Table 4.8) has a significant and positive relationship in 4 instances. Depending upon the particular regime structure, an increase in the rate of zone poverty relates to increased LWR in the suburbs (Structure D), High/High clusters (Structure C), and Low/Low clusters (Structure B). This indicates that throughout the metropolitan area, increased concentration of poverty does lead to more of the working poor being employed closer to home. This finding is consistent with the theoretical assumptions in the literature. By looking closely at the coefficients, we see that although the relationships are positively and significantly related, there are some occasions where the relationship is twice as influential.

The zone rate of unemployment (UNEMPR) has a significant and positive relationship in most instances where it appears in Models 2 and 6, regardless of Regime Structure. As the zone rate of unemployment increases, the level of working poor who are employed within 5 miles of home also increases. This is theoretically expected: more
depressed neighborhoods that have more people unable to find work, likely suffer from inadequate access to employment. Those who are employed, are more likely to work very close to home.

Together the economic indicators of local geographic context have a complex relationship with local working rates among the working poor. On one hand, higher LWR relates to zones with high poverty and unemployment, suggesting a type of spatial confinement for working poor looking for opportunities. Yet at the same time, within clusters of high LWR, increases in zone income is related to increased LWR suggesting some sort of economic benefit in working closer to home. Of course the complexity in these relationship will require further research to unravel.

The neighborhood racial composition indicator, zone percentage of African American population (PCT_BLK), has less influence than is theoretically expected, as the variable is significant in only 4 of 18 instances. Furthermore, in Models 4 and 5 (Tables 4.9 and 4.10) PCT_BLK illustrates a spatially varying relationship. In some instances there is a positive relationship: as the % of Blacks increases, the observed local working rates of the working poor also increases. It occurs for 2 different regimes in Model 4: the High/High clusters in Structure A, and the Low/Low clusters in Structure C. There are also indications of a negative relationship: as the % of Blacks increases, the observed local working rates of the working poor decreases. This relationship is theoretically expected. This occurs for different regimes in Model 5: the High/High clusters on Structure C and the “suburbs” in Structure D. Together this suggests that the relationship of local racial composition with indicators of job access is quite complex, is dependent upon location in the urban environment, and specific to model construction.

Indicators of household structure generally show a changing relationship based upon the particular sub-regions. In some instances, average zone household size (HH_Size) is significantly and positively related to local working rates among the working poor. This occurs in for the regime of clustered High LWR on Model 2 (Table 4.7) in Structure A. The relationship is negative for High LWR zones in Structure C and in Low LWR zones in Structure B. This variable exhibits how characteristics of geographic context can exert a differential relationship depending on spatial location or
model construction. Female-headed households (FEFAMR) in Models 2 and 5 (Tables 4.7 and 4.10) similarly show a differential relationship, with generally a negative relationship in clustered areas of high LWR, and a positive relationship in suburb and low LWR clustered areas. This finding is quite interesting: female-headed households in ‘suburbs’ and in clusters with low LWR are more likely to be employed closer to home, than in zones with high levels of local working rates. Again, the indications here suggest geographic complexity in the relationships between household structure and measures of job access.

Quite surprisingly, variables measuring transportation/commuting factors are rarely significantly related to local working rates. Despite appearing in 3 separate models the rate of public transportation usage (TRANSIT) never appears as significant. In Model 6, 30-minute commutes by auto (Auto30), is significantly and positively related to LWR in both the “city” and “suburb” sub-regions of Structure D, as well as one regime in Structure A. The zone rate of no automobile available to working poor (NoCar) appears only in Model 3, and is significantly and positively related to LWR in “suburb” sub-region in Structure D. There is some concern about the validity of using these indicators within the model. Not only did they underperform, but in retrospect, considering how transportation can be directly significant to job access and rates of working locally, the indications here may have been mis-specified.

4.7 Conclusion

This chapter presented the analysis results that explored the patterns of employment access among the working poor population, at a geographically localized scale, in the context the Columbus metropolitan area. Three specific analyses were conducted. First, the spatial patterns of job and residential concentrations and distributions of various worker classes were analyzed, compared, and discussed in the context of the urban structure. Second, an indicator variable called Local Working Rates was constructed to measure observed job proximity based upon the actual flow between of where workers live and where they are employed. A cluster analysis of this job proximity measure helped to reveal the complex spatial arrangement of where workers
have high or low employment access. Finally, the significance of geographic context was explored through a series of regression models.

The general findings of this chapter suggest a high degree of complexity in the patterns of job access among the working poor. The working poor live and work in a diversity of localities throughout the metropolitan areas, a finding that is consistent with the evolving and changing structure of cities in the United States. Furthermore, the influential factors of geographic context also suggest a high degree of complexity, as the spatial statistical analysis reveals geographically varying influences exerted upon job access levels. More specific and detailed findings are summarized below:

- **The place-of-residence and place-of-employment patterns for the working poor in Columbus, Ohio are dispersed both centrally and peripherally.** Jobs and housing for the working poor tend to be spatially dispersed, rather than clustered in the urban core. In addition to concentrations in and around the central business district, they are dispersed along the city periphery in Franklin County, and around major towns in the surrounding counties. Working poor employment concentrations are spatially similar to all other workers. However, the working poor residential concentrations do not extend out beyond the I-270 corridor – where all other workers have high concentrations of residences. Despite the high concentrations of jobs along the I-270 corridor, the place-based measure of potential job accessibility for the working poor suggests a highly monocentric structure of employment opportunities for the working poor. This study shows that the working poor reside in numerous neighborhoods outside of the concentrated poverty neighborhoods, which traditionally are the geographic focus areas in job access studies.

- **The working poor in the Columbus area have good access to employment.** This is true if employment close to home is indicative of good job access. As an indicator of job proximity, the Local Working Rates measure suggests 62% of the working poor work within 5 miles of their place of residence (and half work within 3.5 miles of home). Conversely, less than 50% of non-poverty status workers are employed within a similar distance threshold. There is positive spatial association with the local working rates measure among the working poor. Significant spatial clusters exist,
where similarly high or similarly low rates occur near together. But the patterns of these clusters is geographically complex, and does not coincide directly with the territories of the traditional central-city/suburb dichotomy.

- **The urban structure of employment access is more complex than the central-city/suburban dichotomy.** The central-city (City of Columbus) remains the dominant realm in which the working poor live and/or work: two-thirds (66%) of the working poor live in the central city, and 60% work there. The significant activity in suburban places is evidence of the outward movement of not only jobs, but also residences of the poverty status workers. However, this traditional conceptualization of metropolitan spaces is less accurate in identifying distinct spaces of good/poor access to employment than spatial designations based on observed commuting flows. Spatial cluster analysis reveals that Columbus’ actual areas of high or low job access are more complex, and determined by residential and employment concentrations.

- **Characteristics of geographic (neighborhood) context statistically relate to high or low local working rates, but they exhibit complex relationships that do not relate similarly in all places of the metropolitan landscape.** Spatial non-stationarity is evident: the factors of geographic context vary in their relationship to measures of job access at localized levels. They do not remain constant across space. There is complexity in the socio-spatial process related to employment access. It cannot be confirmed that racial composition or economic deprivation of neighborhoods leads to poorer access to employment. For example, per capita income correlates positively with local working rates in some zones, but negatively in others. This could be interpreted both as spatial confinement or economic benefit, based upon residential location. Looking at geographic context alone does not reveal the full dimensions associated with barriers to employment access.

The analysis of Chapter 4 has shown the complex geographical patterns of job accessibility, and that the patterns are increasingly varied throughout the metropolitan area. It is argued that places of high or low job access for disadvantaged populations can no longer be coarsely defined along traditional central-city/suburb metropolitan conceptualization. This study has revealed that working poor populations reside and are
employed in locations both centrally and peripherally. As the social, economic, and political structures of cities in the U.S. become increasingly complex, future job access research must continue to utilize resources that facilitate highly localized geographic analysis.

This study also illustrated that factors of geographic context which relate to employment access, vary across the landscape. However, it did not reveal any single or set of factors that consistently and significantly influences employment access among the working poor. This lack of any definitive and suggestive influences fails to uncover explicit insight to any underlying socio-spatial processes, supporting the argument of local specificity. Perhaps due to limitations in the methodological approach of regression analysis, the inability of enumerated aggregated data to “speak” directly about broader processes that influence job access warrants analysis from alternative approaches. While geographic context is certainly a significant and influential factor related to employment access, it must be considered in light of many other significant factors – especially the experiences of individuals. To get a better understanding of potential underlying socio-spatial processes at work requires an alternative methodological approach. The analysis in Chapter 5 highlights more distinct findings that emerge through in-depth interviews.
5.1 Introduction

One crucial gap in the employment access literatures is empirical research from a qualitative methodological approach (Preston and McLafferty 1999) which can provide unique perspectives of richly detailed data based on the experiences of individuals and their local knowledge. Phase 2 of this dissertation makes a significant contribution to this gap by exploring peoples’ experiences of everyday life related to living, working, and commuting in a metropolitan area. This chapter presents analysis and discusses the findings from thirty (30) in-depth interviews conducted with working poor individuals between May 2007 and August 2007. The complexity of negotiating the residence-commuting-jobs nexus reveals the central importance of mobility.

Informants were asked to discuss aspects of their lives related to living and working in a metropolitan area, including residential and employment histories, location decision making, finding employment, and commuting experiences. The complete interview guide is available in the Appendix. To collect spatial information about each individual, during the interviews a large paper sketch map was utilized to identify and mark places and areas specific to each informant’s spatial life in the metropolitan area. The process of recruitment and data collection, the sample profile, and the analysis procedures are discussed in more detail in Chapter 3.

My position as a privileged researcher attempting to engage working poor individuals raises philosophical and ethical concerns. Before this research commenced, it was clear that I as researcher had a socio-economic identity vastly different than the target population. In light of critical discussions on researcher positionality and power
(Rose 1997), a question increasingly plagued my mind: *who am I, a White middle-class highly educated male, to be out researching people who face economic hardships, racial discrimination, or social exclusion on a daily basis? If I cannot identify with this, can I justly research it?* Some of the fear was whether the social divide would dissuade people from talking to me, or provide enough insight into their lives to enable meaningful interpretation. But, being an outsider from a privileged position in society, I was more fearful of being accused of some neo-colonialist agenda and perpetuating cycles of domination, power, and ‘fixing problems’ from afar. There were periods of serious hesitation – near the point of abandoning the project – where I felt it unethical for me to investigate this issue as planned. Fortunately, I moved forward and the interviewing process began. I quickly learned that although certain social identity differences exist, there were also many commonalities I had with the people I interviewed: We live and work in the Columbus area, and exchanged knowledge about the places in the city we were familiar with. We took pleasure in human contact through meaningful conversation, engaging in mutual exchange, and were motivated to address the problems of commuting. We agreed that driving a private automobile is more convenient, desirable, and comfortable, but we find ourselves riding the city bus. Both the distinct differences and unique commonalities are what made this a rewarding endeavor. Thus, regardless of perceived and real socio-economic differences or barriers between the informants and I, many valuable commonalities emerged and the interviews were processes of mutual exchange focusing upon a real-world problem. Although the analysis approach here allows the data to inductively ‘speak for itself’, the process cannot be devoid of natural influences from me as researcher.

By becoming engaged with peoples’ daily lived experience – rather than a distant abstracted viewpoint – several interesting findings were revealed. First, personal mobility is of central importance in making the link between home and work, and mediates individuals’ residential and employment decisions. Second, temporary employment agencies are a significant factor in peoples’ job search strategy, effectively extending their spatial knowledge of available jobs. This employment mechanism has not been previously considered in job access research. Third, Columbus has a large
supply of low-skilled high-paying jobs in the warehousing and distribution economic sector, but the inadequacy of public transportation service limits the ability of the working poor to gain access. Fourth, limited public transportation service is a major barrier to better employment opportunities, which causes individuals to compromise and take lower-paying jobs that are accessible by bus. These findings provide unique insight otherwise not available through statistical examination of enumerated secondary data, suggesting the importance of multiple and alternative perspectives in research approaches.

The objective was to discover significant underlying socio-spatial processes that lead to limited employment access among the working poor. The literature suggests many plausible answers, including racial discrimination, residential segregation, distance based barriers, education and job-skills barriers, or commuting barriers. This research phase discovers that personal mobility is the most significant barrier to employment opportunities among the working poor. This overarching theme is supported by five sub-themes that emerged from the interview data: people exhibit (spatially) transitory lives in their employment and residential histories; residential choice is determined by many factors, but place-of-employment is not one of them; distance to employment opportunities is important primarily as it relates to commuting mobility; good job opportunities exist, as the local/regional economy in the Columbus metropolitan area supports many higher paying low-skilled jobs; and commuting obstacles related to the existent transportation infrastructure fails to connect workers to the many employment opportunities. The analysis procedure in this chapter focuses upon these 5 themes. In the sections 5.2 – 5.6 below, each theme is introduced, supportive data are presented, and variants to the theme are discussed. The final section is an integrative discussion on these themes focusing upon their implications and relation to the overall mobility issue. A summary of the individuals interviewed is provided in section 3.4.3 in Chapter 3.

5.2 Transitory Lives

People lead transitory lives – changing residences and switching jobs on a frequent basis. One of the most striking characteristics of the sample interviewed is their transitory existence. If place-of-residence and place-of-employment are frequently
changing, or continuously impermanent, this characteristic provides interesting insight into employment access and how persons spatially organize their lives.

5.2.1 Residential Histories

The tenure of current place-of-residence among the informants is quite short. Twenty (20) people have lived in their current residence for only one year or less. Four (4) people have lived in their current residence more than 1 year and less than 3 years. Three (3) people have lived in their current residence for 3 years or more and less than 10 years, and three (3) people have lived in their current residence for 10 years or more. Figure 5.1 indicates the aggregation of all current residential locations, based upon the sketch map data. As noted in Chapter 3, geographically the informants predominantly reside on the east side of Columbus, with significant numbers to the west and northeast.

Past residential histories also suggest relative domicile impermanence and the high transitional nature of where people live. However, their complex and varied trajectories is difficult to quantify or make direct comparisons between informants. Some informants are new to Columbus, some cannot recollect all their past residential locations, and there is a vast range of life-stage phases among the informants (from newly on their own to pre-retirement older adults). Although the current residential pattern exhibits very short tenures, a normal range of past residential tenures among the informants was to change residences frequently – some as short as “a couple months” to as long as “several years”. What is interesting is how much people use the phrase “I stay” to refer to where they live. This may be a cultural colloquialism, but it suggests a perception of acceptance of impermanence with regard to their living situations. The individual sketch maps provide a quick visual indication of past residential histories. Most frequently, people relocate within their areas of familiarity. That is, each individual’s past residences patterns tend to be spatially clustered. There are exceptions where persons facing certain hardships move “across town”, or transitory young single males who move around frequently, often without signing rental leases, but instead “moving in with someone” for short periods of time. Figure 5.2 shows the aggregation of all past residences noted on the sketch maps. The 54 points locating past residences indicate very similar residential patterns to the current locations of the sample – primarily
Figure 5.1: Current places of residence, employment, and potential job opportunities - based on sketch map data
Columbus, Ohio (MSA)
Figure 5.2: Past residences and places of work - based on sketch map data
Columbus, Ohio (MSA)
Note: at this scale, there are 7 past places of work outside of this geographic view.
concentrating on the far east side of town, with some in the west and northeast. As a whole, there is little distinctive difference between the locations of past and current residences among all the informants.

Several key reasons for the high level of residential transition in the sample emerged in the interviews. First, many people are new residents to the Columbus area. Six of the informants (013,017,018,026,028,029) have only lived in Columbus for less than 3 years. Their main motivation for migrating to the Columbus area was the knowledge of good job opportunities here. Second, homeownership is indicative of greater permanence, although none of the informants own their own home. One couple (021 and 023) did own a home previous to their bankruptcy hardship, and Kimberly (030) is working on a lease-to-buy situation with her husband. At the time the interviews were conducted, another couple (013 and 018) was in process of purchasing a home. Otherwise, all informants had rental leases or lived with someone else. One informant’s comment is indicative of how residential movement is closely tied to homeownership:

Jamie: “Until you buy a house, you are never really settled anywhere.”

Social and financial hardships in life are another reason for high residential transition. Single mothers with children are highly transitional, constantly looking for places that are affordable, and near schools/child-care and bus-lines. Jamie (007) is perhaps one extreme example of frequent residential relocation. Over the 10 years of independence/adulthood, she has generally changed residence every year. This is always driven by whatever circumstances she faced at the time. As leases expired, she always relocated to find less expensive leases. On a few occasions she temporarily lived with family or friends to help reduce expenses, receive child-care, or to be close to her then current job(s). Several women also noted living in shelters or public housing during various points in time. Losing a job also precipitates movement. In many cases, individuals who are single will “move in with someone” temporarily while they are financially unstable.

Finally, differences in life stage relates to higher residential transition. For people who are “out on their own” for the first time, are not yet settled and quite transitory.
From the sample, the informants who fit this life stage exhibit a situational difference between females and males. There are three females whose primary focus is college, and work jobs to support their educational futures. There are several young males who focus on work and income, maybe paying child support, and are attempting to go to college night classes. Their residential history was peppered with more instances of “moving in with someone” temporarily, rather than signing rental leases. Another highly transitional group are older, single individuals who might have grown children. As they are transitioning out of long-term career jobs, their financial stability changes and frequently change residences. With varying degrees, Edith, William, and Mark exemplify older single adults who are making more residential transitions now than they may have earlier in life.

The life stage of family stability is one key variant to this theme. For people who have lived in their current residence for many years, and/or their past residences in the Columbus area for many years are generally people from intact nuclear families (married) with children (e.g. 009-010; 021-023; 030), or are stable, mature (older) individuals without child responsibilities (004; 022, 020). These represent the people who have lived in their current residence for 5 years or more.

5.2.3 Employment Histories

High transition is also a characteristic of current and past employment histories among the interviewed sample. Twenty-one (21) have been employed at their current job for less than 1 year, and sixteen (16) of these have been for less than 6 months. People transition in and out of many different jobs in an effort to keep income flowing. For many, there are numerous past places of employment. Most commonly, they work in fast-food service, grocery and other retail, hotel housekeeping, janitorial, and construction sectors. Several comments were indicative and illustrative to the frequency of job changes and the variety of job types.

Jewel: “I can’t even name them there have been so many.”

Willie: “Been all kinds of jobs I had. Oh let’s see…”
Paul: “I did security, janitorial, I’ve done (food service) work. Been a cook several times. Been a dishwasher. Everything. Just to pay rent and bills. I have a lot of job skills as far as work. Painting. Gone through a lot of temporary services agencies.”

Very few individuals have a long tenure with their current place of employment. Three (3) have been employed at the same place for more than one year – two of whom are a married couple with children, who maintain a relatively stable existence. Two (2) people are currently unemployed. Both are older individuals in more stable and mature situations; they have a spouse or companion upon whom they rely during their period of unemployment. Four (4) people have been employed at the same place more long-term, but it is characteristically unsteady work. William has been working for the same temp agency for seven years; Edith has been a home health aide all her life, but the flow of clients changes frequently; Adrianne has worked evenings at night clubs for 6 years, but the work is not steady; and Paul has worked for a friend in construction for 3 years, but gets called on an as-needed basis.

Although there is striking evidence that most everyone has undergone recent employment transitions, examining the employment histories reveals some individuals have more stability in their past. Particularly, single women with no children at home (e.g. Rhonda, Jewel, Queen, Maritha), have held jobs in the past for 3 to 9 years. Also, a few individuals had previously established long-term professional careers, but were laid-off through forces of economic downsizing (Darrell, 14 years; Mark, 6 years; William, 22 years).

Figures 5.1 and 5.2 illustrate the current and past employment locations of the sample, based upon the sketch map data. There are 54 points identifying current jobs (including those with multiple job sites) held by the informants. Also, there are 91 points identifying past places of employment. As a whole, the aggregate of current and past places of employment tend to be more geographically dispersed than do the patterns of residential change. The jobs are scattered throughout Franklin County, with some jobs in nearby Union, Delaware, and Madison counties. There are a few instances (at the individual level and only apparent in the individualized sketch maps) where jobs are
consistently close to residences (e.g. 003, 009, 011, 015, 018), though not evident in the aggregated maps.

5.3 Residential Choice

People do not choose their place of residence based upon employment location. People identify multiple reasons for residential choice at specific living locations. Most commonly people look for a place with a “nice neighborhood”, where they “feel safe” away from crime, and is convenient to shopping opportunities – especially groceries. Residential choice is also mediated by being “familiar” with specific areas. Spatial residential histories reflect that people commonly choose to remain in their “side of town”, or the neighborhoods they are familiar with and most comfortable in. Familiarity comes either through personal experience or social network recommendations. For people with young children, local schools and child-care facilities are also important factors in their decision. Housing affordability also determines residential choice for all informants. Significant cross-town relocations are isolated only to those facing major financial hardships or the transitory young males.

While proximity to place-of-employment was never explicitly voiced as a determinant of residential choice, proximity to a major bus line is central to residential choice echoed by many of the informants. A bus-line serves as an access point to employment opportunities, and is central to facilitating the entire household mobility needs.

Harry: “My wife came to town for a couple of weeks, and she looked for something here (that was) convenient, schools for our daughter, and like the stores and the bus line, is kind of convenient right there. Every thing is accessible. There is a school bus stop for my daughter, and two city bus lines that will take me pretty much wherever. I just walk to Hamilton or Kimberly Pkwy, (and take the) #89 and the James bus.”

EEE: “And the most important criteria you said was the neighborhood?”
Jewel: “Location. It’s on a bus line. I got 3 buses I can catch out here. You know, basically I moved right here because a lot of things is in walking distance and I don’t have to catch the bus real far to go a lot of places.”
EEE: “So finding a residential location on a bus line is important.”
Jewel: “Oh yeah, very.”
Being on a bus line is also critical for people to access other important activity spaces. For example, Adrianne is a single mother of 4 who works nights and attends college during the day. Access to a convenient bus line was the most crucial factor in her residential choice causing her to compromise other preferred locations.

*EEB:* “So your decision to live here at Cooke and Karl was mostly driven because of its proximity to campus?”

*Adrianne:* “Not to the campus… to the COTA bus line. The #8 bus is in front of my home, and it drops me off at the OSU Gateway (Center) around 11th and High or something like that. So its just one bus, versus having to catch 2 or 3 buses. I mean there was a place I wanted to live a lot more, it actually cost less and the school system for my children would have been a lot better than the schools now, but I would have literally have to catch 3 busses, just to get here.”

Cecilia was in a similar situation. Her preferred location in Canal Winchester had a quiet neighborhood, was close to shopping opportunities and good schools for her kids, and was very affordable housing. She was forced to relocate out of this desired residential setting because of the lack of bus lines to connect her to any jobs.

Even among households with an automobile, proximity to a bus line can still be an important factor in residential choice. Particularly if the auto is unreliable, access to a bus serves as a critical alternative commuting mode.

*Maritha:* “So you know – I was thinking, if something happened to my car, I was able to catch the bus. I like to be off the bus line (for a back-up). I’ve always been like that. I like public transportation just in case.”

Furthermore, in large households with several adults and older children, the diverse activity spaces and mobility needs cannot be met by a single automobile. Thus even households that own an automobile will still seek a residential location along a convenient bus line.

There are a few exceptions where residential choice was determined by an informants’ place of employment. Mark, who previously was substitute teaching in Westerville, looked for an affordable place to live nearby in anticipation of gaining a permanent position there. To reduce driving and get child-care, Jamie moved in with family temporarily which was a midpoint between her two jobs – one at Honda and one at a gas station. When Rhonda saved enough money to move out of public assisted
housing, she chose an affordable place right near her job – a place where she could walk to work in case her car broke down.

Finally, in some instances residential choice was not mediated by access to a bus line. Several of the young single males and females with an automobile chose residential locations based on proximity to family or significant social activity space, or the convenience to highway access to facilitate commuting. And as mentioned previously, on a few occasions residential choice was determined solely by factors of financial hardship or recent transitions which necessitated that the individual move in with someone and thus did not choose location or bus line access per se.

5.4 Distance, Mobility, and Job Searches

*People primarily choose places of employment relative to their commuting mobility.* The most critical question workers ask when searching for employment is, “How am I going to get there?” The previous theme established that residential location decisions are based on criteria other than current location of place-of-employment. However, place of employment decisions are made relative their current place-of-residence. Proximity to home is less important; transportation access, though, is decisive.

Two interrelated points support this theme. First, jobs are found through traditional formal and informal strategies. But considerable reliance on temporary employment agencies broadens workers’ knowledge of job opportunities, provides them with many job opportunities, and significantly expands their spatial search area. Second, the specific location of a job and distance relative to one’s place-of-residence is less important than is their ability to reach a job through available means of transportation.

5.4.1 Job Search Strategies

The informants use a wide range of formal and informal job search strategies. Most frequently these include finding job openings through newspaper advertisements and on-line clearinghouses, utilizing social networks to learn about jobs, or “walking around” putting in unsolicited applications. An unexpected finding was the discovery
that temporary employment agencies (temps) are a crucial strategy through which people find work. No fewer than 20 of the sample informants have used temps – some more extensively than others. The use of temp agencies has an effect of expanding the geographic scope of peoples’ job search area, ultimately broadening the quantity of job opportunities made known to working poor individuals.

Temps are in the business of buying and selling labor. The temp agency provides contractually based labor to companies who are seeking short-term workers. These contracts can be as short as 1-day or as long as several months. The temps buy labor from workers, and sell this labor to the companies. The workers, therefore, are actually employees of the temp agency, not the company where the labor is occurring. Worker paychecks from the temps reflect a reduction in the actual labor cost, with the balance retained by the temp agency for its services. In reflecting on the difficulty of finding good paying work on his own, one informant comments on relative control temp agencies have in the labor market.

Jeffery: “…the temp service has all the jobs. You go through them, they cut your wage… at a $15/hour job, you make $8.50.”

Many informants accept this situation, as they find the temps provide a source of consistent job opportunities that keep needed income flowing.

EEB: “Can you tell me about your experience with the temp service?”
Jewel: “… I mean you work a job, you make a few bucks. Some of them don’t last but a week. You know, so there is nothing really to tell. But just in case I need some real fast money…They are just warehouse jobs, basic warehouse jobs [like] Radio Shack… I can’t even name them all there have been so many.”

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7 The unexpected finding of the significant role temp agencies play in the lives of the working poor prompted a search of the research literature. There is a small, but growing body of recent literature on temporary employment among geographers. Several papers (Peck and Theodore 1998, 2001; Theodore and Peck 2002) have explored contingent work in the United States, characterizing the rapid growth of temporary employment agencies and its connections to neoliberal expansion, the effects of contingency labor as an exploitative niche, its influences upon local labor-markets, and the limits to contingency labor. More recently, two papers (Ward 2004; Coe et al. 2007) explore global temporary-help and the internationalization of this industry. There is an absence of recent work exploring the role of temp agencies in the local context of metropolitan areas and the effects upon the working poor and their spatial search strategies.

8 While most work is in-town, some informants engaged in temporary employment opportunities that were out-of-town. In such cases, transportation and lodging was provided by the temp.
Other than Mark, who has not been able to find “the right job” through any temp agency, for most this can be a more successful strategy for finding work than conducting in/formal job searches independently.

_Willie_: “I’ve worked numerous companies, especially through the temp service. Which seems like in a lot of sense the only way to really attract half-way decent or real nice jobs. Because if I tried it out on my own, it was impossible doing applications and stuff. You have some people that call back some don’t.”

Temp agency representatives streamline the process of finding work by presenting employment options that fit workers’ schedules and qualifications.

_Julius_: “The lady at the temp service, she’s pretty nice and knows my situation. When she calls me with everything I give her [the hours and days I can work]. She pretty much handles everything and gives me right what I need when I need it. She’ll call me. Like last week she called me and said, ‘Julius, I need you to go out to Kaycan today because they really need somebody.’ And that typically is not one of my workdays. But I was off. So it was pretty much good.”

In a similar manner, the temp agency representatives know the workers transportation limitations, calling them only with work opportunities that are along major bus lines, for example.

In some cases, the temp agencies are able to help overcome certain obstacles that otherwise might keep an individual from gaining employment or having a successful job search on their own. For instance, one informant remarked that the temp agency was able to find him work despite his “criminal record” – a problematic barrier when looking for jobs on his own. Furthermore, temp agencies sometimes provide transportation to more distant job sites. For example, one temp had an extensive contract with Honda and offered shuttle service from downtown Columbus to the job site. Although the shuttle was not free to workers, it provided the critical transport linkage that otherwise was not available.

Working through the temps is sometimes a gateway towards becoming permanently hired by the company seeking labor. Jamie’s current job began as a placement by a temp agency, and after 8 months was hired on permanently.

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9 which is located 40 miles from downtown Columbus, in west Union County.
Jamie: “To be honest, I’ve been working with Kelley Services since they opened the company back in 2002. Off and on. Working for beneficial companies, like Bank One before they merged. Working off and on with them I have seen all types of companies to work for of course. Different types of positions. Basically you go into a temp agency, and you know it is temporary, but it could turn permanent.”

5.4.2 Proximity and Mobility

People initially report that distance to their place-of-employment from home is an important factor. But upon further investigation – it matters mainly as distance relates to commuting mobility and preferences towards convenience. For most people, the preference in working close to home is a matter of convenience; especially regarding the time spent commuting (either in traffic or making multiple bus connections). Some people with specific family obligations noted a greater need to work close to home in order to get back home quickly in case of an emergency. Ultimately, the general consensus among the sample suggests that “It doesn’t matter how far the job is. What matters is if I can get there.”

The information collected from these individuals suggests that distance to work is relative to available transportation. Also, distance to work is not necessarily dependent upon commuting mode. Table 5.1 reports each informant’s primary, alternative, and/or past transportation modes. The table also reports distance to work based on a straight-line Euclidean measure from the sketch map features, which keeps in continuity with Phase 1. The distance data are useful for comparative purposes between the experiences of individuals. But the data does not lend itself to calculating an average distance between home and work, as each individual has many contingencies and conditions related to the distance between place-of-residence and place-of-employment. Calculating an average distance among the sample would produce a misleading aggregation. But the information highlights two critical things: distance is quite relative, and commuting mode does not necessarily determine distance to work.

Distance to work is subjective and an inconsistent measure – since in many instances peoples’ daily work involves multiple job sites. There may be non-fixed work locations (e.g construction job sites that continually change), a fixed set of multiple locations visited daily or weekly (e.g. home health aides; property maintenance crews), or
<table>
<thead>
<tr>
<th>Informant</th>
<th>Primary</th>
<th>Alternative / Previous</th>
<th>Distance to work</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Adrianne&quot;</td>
<td>Bus</td>
<td>Multiple sites (night clubs)</td>
<td></td>
</tr>
<tr>
<td>&quot;Gary&quot;</td>
<td>Bus</td>
<td>Bus, girlfriend’s car</td>
<td>13.8 Miles</td>
</tr>
<tr>
<td>&quot;Ashley&quot;</td>
<td>Car</td>
<td>.75 to current job; 4.2 miles to new job</td>
<td></td>
</tr>
<tr>
<td>&quot;Jeffery&quot;</td>
<td>Rides</td>
<td>Suspended license; partner drives; bus</td>
<td>Unemployed (9 miles to most recent work)</td>
</tr>
<tr>
<td>&quot;Lewis&quot;</td>
<td>Bus</td>
<td></td>
<td>7.4 miles</td>
</tr>
<tr>
<td>&quot;Ariana&quot;</td>
<td>Car</td>
<td></td>
<td>1.5 miles from home; 5.7 miles from school</td>
</tr>
<tr>
<td>&quot;Jamie&quot;</td>
<td>Car</td>
<td>Previously bus only</td>
<td>6.8 miles</td>
</tr>
<tr>
<td>&quot;Ashton&quot;</td>
<td>Rides, walk</td>
<td>Relies on friends for rides; does not ride bus</td>
<td>4.6 miles</td>
</tr>
<tr>
<td>&quot;Latisha&quot;</td>
<td>Bus, walk</td>
<td>Previously had car(s)</td>
<td>1.2 miles</td>
</tr>
<tr>
<td>&quot;Paul&quot;</td>
<td>Bus, walk</td>
<td>Previously had car(s)</td>
<td>Job 1: pick up location .5 miles; job 2: .5 mile</td>
</tr>
<tr>
<td>&quot;Charlette&quot;</td>
<td>Rides</td>
<td>Previously rode bus, and had car</td>
<td>2.1 miles</td>
</tr>
<tr>
<td>&quot;Willie&quot;</td>
<td>Car</td>
<td>Previously bus only; drives wife around</td>
<td>2.5 miles; commutes his wife 11.5 miles to her job 1, 1.0 mile to her job 2</td>
</tr>
<tr>
<td>&quot;Harry&quot;</td>
<td>Car</td>
<td>Previously bus only; drives wife around</td>
<td>Multiple sites: Job 1 (3 sites w/in 1-2 miles; 1 site 12 miles); Job 2: 4 miles</td>
</tr>
<tr>
<td>&quot;Rhonda&quot;</td>
<td>Car</td>
<td>Previously bus only</td>
<td>Multiple sites (home health aide)</td>
</tr>
<tr>
<td>&quot;Edith&quot;</td>
<td>Bus</td>
<td>Gets rides</td>
<td>Multiple sites (home health aide)</td>
</tr>
<tr>
<td>&quot;William&quot;</td>
<td>Bus</td>
<td>Previously had car(s)</td>
<td>Multiple sites (temp agency)</td>
</tr>
<tr>
<td>&quot;Mark&quot;</td>
<td>Car</td>
<td></td>
<td>3.6 miles</td>
</tr>
<tr>
<td>&quot;Rocky&quot;</td>
<td>Bus</td>
<td>Husband drives her</td>
<td>Multiple: In-home; and 2.5 miles</td>
</tr>
<tr>
<td>&quot;Jewel&quot;</td>
<td>Bus</td>
<td>Catching a ride has been unreliable</td>
<td>6.3 miles</td>
</tr>
<tr>
<td>&quot;Queen&quot;</td>
<td>Car</td>
<td>Bus as critical backup; previously bus only</td>
<td>Multiple job sites: 2.2, 3.0, and 4.7 miles</td>
</tr>
<tr>
<td>&quot;Dana&quot;</td>
<td>Shared car</td>
<td></td>
<td>1.6 miles</td>
</tr>
<tr>
<td>&quot;Martha&quot;</td>
<td>Car</td>
<td>previously bus only</td>
<td>14.5 miles</td>
</tr>
<tr>
<td>&quot;Darrell&quot;</td>
<td>Shared car</td>
<td>carpools with co-worker</td>
<td>16.5 miles</td>
</tr>
<tr>
<td>&quot;Julius&quot;</td>
<td>Car</td>
<td></td>
<td>Job 1: 2.3 miles; Job 2: 4.2 miles</td>
</tr>
<tr>
<td>&quot;Julian&quot;</td>
<td>Car</td>
<td>previously bus only</td>
<td>Multiple sites (temp agency)</td>
</tr>
<tr>
<td>&quot;Abraham&quot;</td>
<td>Bus; rides</td>
<td></td>
<td>7.7 miles</td>
</tr>
<tr>
<td>&quot;Cecilia&quot;</td>
<td>Rides</td>
<td></td>
<td>Delivery area: 3.6 miles from home</td>
</tr>
<tr>
<td>&quot;Stacy&quot;</td>
<td>Shared car</td>
<td>Bus as critical backup; previously bus only</td>
<td>6 miles</td>
</tr>
<tr>
<td>&quot;Jaqueline&quot;</td>
<td>Bus</td>
<td></td>
<td>6.7 miles</td>
</tr>
<tr>
<td>&quot;Kimberly&quot;</td>
<td>Bus</td>
<td>She drives husband's car for shopping</td>
<td>In-home</td>
</tr>
</tbody>
</table>

Table 5.1: Informant commuting modes and current distance to work.
short-term work locations supplied through temporary employment agencies. Furthermore, even when job locations are spatially fixed, it is not uncommon for working poor individuals to have more than one job\textsuperscript{10}. Similarly, distance is less relevant as commuting is not always a direct link between home and work. For some, commutes to/from work originate from other activities spaces (e.g. college students who commute to work after school). Or, in households that share one automobile, dual-commuting scenarios involve one householder dropping off another householder at work before heading off to their own workplace.

Having access to a reliable non-shared personal automobile does not necessarily relate to the freedom and flexibility to make longer home-work distances. For example, two of the three longest home-work distances (Gary 13.8 miles, Darrell 16.5 miles) are held by individuals that rely on other modes of commuting transportation – either carpooling, getting a ride, or using the bus. Additionally, Adrienne’s work at night-clubs – some which are 11 miles away, are accessed only by getting a ride from someone else. William was temporarily employed at Honda and commuted using a temp agency shuttle service. At the same time, some very short home-work distances are held by people who drive their own vehicle (Ashley .75 miles; Ariana 1.5 miles; Mark 3.6 miles; Julius 2.3 miles). This suggests problems with theoretical assumptions that travel mode is likely to determine commute distance.

Decisions about places of employment are primarily mediated by assurances of being able to “get there”.

\textit{EEB}: “So when the temp agency says there is a job at West Jefferson, New Albany, or Dublin, you generally have to turn those down?”
\textit{William}: “Most of the time, yeah. Because I have no way to get there. Don’t make sense to commit myself to something I couldn’t be obligated to.”
\textit{EEB}: “So when they present you with job opportunities you figure out, ’can I get there?’.”
\textit{William}: “Right that is my first thing.”

\footnote{10 This is a critical data limitation in the U.S. Census, which does not record multiple jobs for individuals.}
When people have insecure transportation resources, working close to home provides greater assurance that they will be able to get to work in situations of desperation (e.g. broken down car, problems with bus).

Finally, the rising cost of gas has a negative effect on peoples’ mobility. Not only among car owners, but also people who share cars or get rides – they too must help pay for gas. More expensive fuel causes people to work more hours, make compromises.

*Gary:* “It leads me to work weekends.”

*Jeffery:* “[I could work at Buckeye Steel], that would be ideal, maybe not the best job, but ideal for us saving on gas.”

*EEB:* “What about gas prices? Has the increase in cost affected you?”
*Mark:* “Of course. At $8 an hour?”

People’s willingness to drive far for a good paying job is very sensitive to the wages earned. Most people with access to a car indicated that they would be willing to travel far, if the wages more than compensated for the higher cost of gas. Julius worked in Madison County at ABS Trucking for several months, which necessitated a 45 minute commute in his own car.

*EEB:* “Did you mind that commute?”
*Julius:* “Not really. The money, it was a motivation for me. They started me out at $10.25. By the time I left there, I got 3 different raises because of my productivity. When I stopped I was actually making about $15. In about a month and a half I went from $10.25 to $15. For a young man at 20 or 21, that’s good money.”

*EEB:* “So trading off that long commute was worth it do you.”
*Julius:* “Yes, in gas… a day’s worth of pay is a full tank. And a full tank can get me out there for a week. So it was a good trade off.”

### 5.5 Metropolitan Area Employment Opportunities

*“Good jobs are out there…”* For lower-skilled workers, Columbus’ local and regional economy contains a large supply of available higher paying jobs. Indications from the informant pool suggest that around the Columbus metropolitan area there are numerous well-paying jobs, particularly in the warehousing and distribution center industry, as well as call center / customer service. Most of these jobs are accessible to individuals who do not have more than a high school diploma or G.E.D., though some may require specialized training (e.g. forklift operating). To most people, a “good” job is
one that pays above $10 an hour, or above $15 an hour with benefits (for persons supporting families)\textsuperscript{11}.

Regarding the perception of job availability, the predominant voices among the sample are those with a minimum of a high school education. They are knowledgeable of many good paying jobs that exist throughout the city. Their knowledge comes through the temp agencies, what they hear others say, or from their own job searching. Throughout the interviews, these good jobs repeatedly were the focus of peoples’ job search attention – even though many weren’t currently employed at these jobs.

\[\text{Paul:} \text{“Um, wow, that’s a good one.  Wow, there are some good jobs out there.”}\]
\[\text{EEB:} \text{“What do you mean?”}\]
\[\text{Paul:} \text{“There are jobs that start off pretty good. Grove City is one. That’s the Wal-Mart distribution, that is a good job. Then Fisher Road, a place called Steve and Barry’s that’s a stable company. They got a couple things out there. They got the Big Lots, Sally’s Beauty Supply, Steve and Barry’s. I’d love to work at any of those three.”}\]
\[\text{EEB:} \text{“Those are warehouses?”}\]
\[\text{Paul:} \text{“Yes. Past 270.”}\]
\[\text{EEB:} \text{“And the warehousing jobs, pay more...?”}\]
\[\text{Paul:} \text{“Pay more, more stability. They pay like $13 an hour. That’s not bad if you didn’t go to college.”}\]

\[\text{Jeffery:} \text{“That’s the thing about it. Like right now, almost every warehouse in Grove City needs help. Or they say they do. Even in these little paper ads, they say ‘Warehouse helper needed’, or ‘Dock helper needed’.”}\]

When asked where in the city the better paying jobs were located, most people indicated they were “far out”, in the “outlying areas”, or the “suburbs”.

\[\text{Willie:} \text{“To find work that pays more than $10 an hour I have to go to Grove City, Obetz, Dublin, or Polaris.”}\]

\[\text{EEB:} \text{“So you would go out to some of these orange circled areas (Groveport/Obetz; north Columbus along Route 161; west Columbus at I-70 and I-270; Reynoldsburg)? To warehousing jobs?”}\]
\[\text{Lewis:} \text{“Yes. Where the pay is more higher.”}\]

\[\text{EEB:} \text{“What do you hear about the jobs around the city? Are there better paying jobs?”}\]

\[\text{\textsuperscript{11} The Center for Economic Policy Research identifies a “good job” as one that pays $17/hour plus employer provided healthcare benefits (Schmitt 2007)}\]
Latisha: “Better paying jobs in Hilliard. And New Albany. My friend was going to get me a job there.”

EEB: “It was a higher paying job she was going to get for you?”

Latisha: “Yes.”

Jeffery: “And you know they got that building [construction jobs] along the outer-belt. Outside 270 and all that.”

Table 5.2 highlights many of the known ‘good jobs’ in the Columbus area that research participants discussed during the interviews. Most frequently people noted the warehousing and distribution centers jobs. Additionally, jobs in the manufacturing and industrial sector, or call center, customer service, or data entry jobs were also brought up as desired jobs. In Figure 5.1 the geographical location of some of these potential employment opportunities are identified. The map is consistent with what the informants are saying – that good paying jobs are located out on the periphery.

<table>
<thead>
<tr>
<th>Job Sector</th>
<th>Area Employers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warehousing and distribution centers</td>
<td>Big Lots, Eddie Bauer, Sally’s Beauty Supply, Steve and Barry’s (all in west Columbus); Red Envelope (Obetz), K-Mart (Groveport), Kroger (Delaware), Sears and Wal-Mart (Grove City); PetsMart (Gahanna); Designer Shoe Warehouse (near Port Columbus airport).</td>
</tr>
<tr>
<td>Manufacturing and industrial</td>
<td>Anheuser-Busch and Worthington area manufacturing (Worthington, Columbus- Busch Blvd area); Honda (Marysville); Griffin Wheels (Groveport); Buckeye/Columbus Steel Castings (south Columbus); General Motors (near Rickenbacker airport)</td>
</tr>
<tr>
<td>Call centers, customer service, and data entry</td>
<td>Discover Card (New Albany); Medco (Dublin); Gap Inc. (Grove City); TelePerformance (Columbus/ Schrock Road); Dish Network (Hilliard)</td>
</tr>
</tbody>
</table>

Table 5.2: List of ‘good jobs’ noted by interview participants, by job sector

In several cases the informants had worked at some of these higher paying jobs, or had been hired. For example: Willie, City of Delaware maintenance at $20.50 /hour; Mark, full-time substitute teaching in Lancaster; Kimberly, Grove City warehouse starting at $11.50/hr; Stacy, several call center jobs in Hilliard at $14-15/hr; and Cecilia, a call center job with Dish Network in Hilliard starting at $15/hr, and TelePerformance on Schrock Road at $13/hr. But commuting mobility barriers ultimately prohibited these
individuals from continuing to work at, or actually taking these jobs – which is the major topic in the next section.

Lower-paying fast-food, retail, and service jobs are also widely available in the Columbus metropolitan area. For informants without a high school diploma or G.E.D., these are the primary jobs available to them. Yet even for those with a degree, these jobs are often more geographically accessible as many of them are near their residential neighborhoods. Generally, these jobs are seen as last resort opportunities if all other options fail. Out of desperation, many are willing to work in these less-than-ideal jobs.

*Paul:* “Like this part-time job at fast-food [my second job], I am not really liking it. That’s not my style. It’s a different type of work. Real dead-end. Somebody offered it to me, so I took it there.”

*Gary:* “McDonald’s is hiring. I’d probably work at McDonald’s if I didn’t work [at the J.C. Penney warehouse]. Anything to pay the bills.”

These low-end jobs are frequently reported as being available closer to residential neighborhoods where the informants live.

*EEB:* “So you feel the area where you live in, there is not that many jobs available?”

*Jeffery:* “No, I mean cause there is nothing in this area besides homes mainly, and then food restaurants, Wal-Mart, those kind of jobs. You know, low money, low money. Low money…low money and short hours.”

*EEB:* “So the jobs that are here don’t pay enough, and aren’t in your line of work.”

*Jamie:* “Just around the suburban areas you have more community than actual positions. 9 times out of 10 they are taken by teenagers from the community. Your Krogers, your Wendy’s.”

The main variant to this theme are those individuals who expressed having been unable to find adequate work in the Columbus area. These are people either with higher levels of education / skills, significant job experience, or are looking specifically within their “line of work”. Mark and Darrell previously held high-paying jobs in administrative and management positions and were laid-off due to downsizing and changes in the economy. Both have since struggled to find similar position jobs with equivalent pay and benefits.
**EEB:** “Do you feel there are sufficient job opportunities in the city?”  
**Mark:** (with emphasis) “No. I go through and read the paper, I’ve tried temp agencies, I’ve tried going through Columbus State (Community College). I’ve tried all these various avenues. I just don’t see where the jobs are, again, for someone at my age with my background [experience and qualifications].”

For them, they do not see the warehousing distribution jobs as lucrative options. Their mindset is focused upon specific types of professional jobs – which they say are difficult to find in Columbus.

Similarly, some people are looking for jobs in their “line of work” and remain hesitant to take minimum wage low-end jobs, or work with the temp agencies, in hopes that something better comes up. Both Jeffery and Edith are older adults, who take great pride in the work they do, yet cannot find employment in their field. Jeffery expresses his decision to hold out for a cement job than to work fast-food:

**Jeffery:** “I’m saying, look, I’m sure they need help here [McDonald’s]… but then being 45 years old working with people that are 15 or 16. Then your boss might, you know. I been thinking about being a manager or something. But that is not my thing. And that is another thing that I feel is important about jobs – work – you want to work somewhere you are happy, and the work you’re doing is most important. I’ve learned that. Being in the jobs you don’t want to work, you don’t like the work – then you don’t want to go to work. Think about it. Think of your performance. See, like me and my concrete, they are going to look at that for years. You know, people will look at that and say, “Man, who did that?” That’s why we put a stamp on our work: another good job done by J & J, Jeffery and Johnny.”

And Edith prefers her life-long work as a home health aide, but is contemplating the need to get back with the temporary agencies until she starts getting more clients in her area.

**Edith:** “I been thinking now, maybe I should go back to temporary if I hear something. But then if I get on somewhere else, like cleaning, packing, assembling, and I get into it, and my other jobs call me, you know… I can only do so much. Its like, you know, I don’t want to get greedy – I can’t do this, I can’t do that.”

### 5.6 Employment Barriers

“…*but the bus can’t get me there.*” Commuting mobility emerges as the most significant obstacle people face that keeps them from getting (to) a higher-paying job in the metropolitan area. In particular, the regional transit system routes and schedules are inadequate to connect workers with jobs. In many instances limited mobility results in
Figure 5.3: COTA bus routes and informant employment locations – based on sketch map data Columbus, Ohio (MSA). Weekday bus routes, as of September 2007.
lost employment opportunities. Also, extreme commutes – up to 2 hours – exemplify peoples’ attempts to overcome mobility barriers in times of desperation. And yet, access to an automobile does not assure sufficient mobility. Lack of education or appropriate job skills appears as another significant employment barrier.

Figure 5.3 shows the past, current, and potential places of employment relative to the Central Ohio Transit Authority (COTA) bus routes. The bus routes that extend furthest into the urban periphery are mostly express bus routes, indicated in red. Express routes differ from local routes in that they make less frequent stops, focus on moving people from the periphery to the central business district, and operate mainly on weekdays during peak rush hours. There are 29 express bus routes in the entire COTA system, 7 of which offer some reverse commuting scheduling – to move people from the central business district towards peripheral job centers. All express routes, however, operate only on weekdays and accommodate 1st shift work schedules.

The public transportation service in Columbus is insufficient to connect workers with higher paying low-skilled jobs. This was by far the most overwhelmingly common barrier to good employment expressed by the informant sample. Paul’s comment here summarizes the dual complaints people have regarding Columbus’ public transportation system. For one, the routing doesn’t go “far enough out” to connect people with jobs, and secondly the scheduling and timing is not frequent enough, “cuts off too early”, nor does it accommodate shift work schedules.

Paul: “…Columbus’ bus system is not good. It just cuts off early. Here it stops at 11 (pm). Plus they limit it…the bus cuts off at certain points. It don’t go past Reynoldsburg, or past West Jeff, you know for Grove City, the bus probably stops at Urban Crest. It limits when they don’t have stable buses that go way out to these jobs.”

The public transit busing system limits worker mobility as the established bus routes do not extend far enough into the urban periphery to connect them with available employment opportunities. Willie illustrates this point, and highlights the length to which people are creative and resourceful in making job commutes possible.

EEB: “The biggest problem you mentioned with the bus is that it doesn’t run frequently enough.”
Willie: “Especially to the area where the good jobs are. Now the bad thing, the reason why I had to have my bicycle, all these areas: Upper Arlington,
Westerville, Groveport, Obetz, Blacklick, Pickerington, wherever, whenever the bus would get you there, there wasn’t an efficient bus system in these little towns, so it would take you to the edge, and I would have to take my bike. Sometimes I would ride 20 miles on just my bike.”

Nearly all bus-dependent informants similarly repeated his comment. To some degree people express satisfaction with the convenience of the bus along some routes, or to some destinations – particularly within the I-270 loop. But although there are some bus routes that do extend deep into the periphery, they may be serviced infrequently and one-directional during peak hours.

*Kimberly:* “The transportation, you just can’t get out there to the better paying jobs, you know, farther out. It was fine when I was working downtown, it was easy to get there. It’s not that far to ride from here to downtown. But getting to anywhere else is hard. There is only one bus to Busch Blvd., but not one to get you home.”

The public transit bus system also limits worker mobility because the route service stops too early in the evening, does not run on weekends (especially express routes), or runs too infrequently. Primarily, people express that the scheduled bus service often hindered their commutes to work in a timely manner. Most frequently this included making multiple transfers, making out-of-the-way transfers at the downtown focal point, having to allow 1.5 – 2 hours to get to work, and or being stranded for several hours. In addition, the scheduling of bus routes does not accommodate 2nd or 3rd shift workers.

*Kimberly:* “…And those that do go far out right now, they stop running too early. Say if you worked a second shift, you ain’t got no way to get home. Some that do go further out, you can’t get back if you work 2nd shift.”

Even for people who had temp agency provided shuttle service to work at Honda, the lack of overnight bus schedules prevented some from getting to/from the shuttle stop.

*EEB:* “So working up at Honda was an option?”
*Jewel:* “Yeah but, I was like, “No”. I don’t remember exactly where the shuttle bus stop was, but it doesn’t really matter because when they drop you off, how the hell are we going to get back to where we need to? Unless you have someone waiting on you.”

*EEB:* “So they would provide a ride on a shuttle from somewhere in Columbus, but you have to get to/from the shuttle, and if it is a 3rd or 2nd shift-”

*Jewel:* “Yeah you get kind of hit, when they quit running.”
Jewel’s case illustrates the significance of mobility over distance. For her the 40 miles to Honda was less the obstacle than the 4 miles between her home and the downtown Columbus shuttle stop.

Several people have endured extreme commutes out of desperation and lack of any alternative. These extreme commutes, while perhaps not the norm, generally encompass long hours spent riding the bus. But they illustrate the desperation people are in, and the tremendous obstacles many must overcome. In one case, an extreme commute resulted in very high costs for Cecilia.

*Cecilia:* “I used to catch a cab…from Canal Winchester to right here off of Courtright Road. I caught a cab every single day for a whole month – back and forth. And my kids went to daycare right next door, which was nice, and I would pick them up after I leave and go home. But that was like $26 a day to catch a cab.”

*EEB:* “Because there was no bus?”

*Cecilia:* “No buses.”

She initially chose to live in Canal Winchester before knowing it was unserviced by a bus line and continued this extreme commute until her rental lease expired.

There are numerous instances of people who rode 1-2 hours on the bus, just to get to work. Lewis, who currently lives south of downtown, allows 2 hours to get to the J.C. Penney’s distribution center on the east side of Columbus (at I-70 and I-270 intersection). His commute consists of a 10 minute walk to catch the #1 Livingston bus to James. After getting off at James, he walks another few minutes to Main Street, and catches the #2 East Main bus which takes him out to his job. He leaves home at 7am to arrive at work by 9am. The total distance covered is about 8 miles. His is one example where the bus does make the connection to place-of-employment, but the commute is appallingly long.

Before Jamie got a car and a more stable job, she used to have several extreme commuting scenarios.

*EEB:* “What about some of your commutes in the past?”

———

12 These generally are people who do not have other family obligations (e.g. children). Jamie, Jewel, Rhonda, and Lewis told compelling stories of their experiences in long bus commutes.
Jamie: (quickly) “Oh I had fun when I lived out on Billingsley. The Smokey Row bus, I used to get on that every morning at 6 am, commute to downtown, catch another bus going back up High Street… to my job at Speedway [convenience store]”

EEB: “How long was that commute for you?”

Jamie: “Almost 2 hours…So it was a good hour down, of course waiting on the bus to go back up High Street. Commuting time was anywhere from 1.5-2 hours.”

EEB: “How long did you do that?”

Jamie: “Probably 10 months, at least.”

Jamie’s long commuting experience was echoed also by Jewel and Rhonda, who previously worked in housekeeping at hotels in Worthington north of I-270 off High Street. These instances exemplify excessively long bus commutes that people endure out of desperation for work.

The inadequacy of the regional bus system was the core of peoples’ complaints about their work commuting problems. Many who previously lived in other cities, cited Columbus’ transit system as inferior, less accessible, and less convenient than systems in Cleveland, Atlanta, Pittsburgh, and New York. Because of the limited bus service in Columbus, many informants were quick to believe the best solution is owning a personal automobile.

Abraham: “If you ain’t got no transportation in Columbus you cannot get from the point A to the point B. That’s the problem. For me, I was working all the time in New York, because the bus come every two minutes. But here, if I miss the bus – that happen to me a lot of times – the bus will only come back 3 or 4 hours later. So then I am going to be late to work, or miss that day. I got a lot of problems with that. Right now I am trying to hustle to get me a car, because the bus don’t work for me.”

As Abraham highlights, the automobile represents freedom and improved accessibility, and is the preferred mode of transport. After relying on the bus for 6 months, Harry’s experience once obtaining an automobile illustrates the obvious convenience, autonomy, and extended job choice that comes with private automobility.

EEB: “Now that you have a car, you say you would go get a different job – why does having a car change your mind?”

Harry: “Because I can get to places more better, and I wouldn’t have to leave as early. Course when I catch the bus, I’d have to leave an hour or two early. And when I am working around these places [current employment] I can get up a half-hour before it is time to go and still make it on time.”
Yet the interview data also suggests access to an automobile does not necessarily improve mobility. While it may theoretically enable a direct home-work link to good jobs otherwise not serviced by the bus, there are many other obstacles to automobility. For Harry, he chose to temporarily remain at his close, but lower paying job, so as to maintain a good employment record of stability. He intends to change jobs “when the time is right” and find a higher paying job in the outlying new construction areas.

But more significantly, few informants have access to a reliable non-shared private automobile. A common situation for people who are not entirely bus dependent is to have access to a shared vehicle within the household. While these situations might provide some improved mobility, it still contains obstacles, as one spouse must catch a ride or take the bus. The cost of vehicle maintenance and upkeep also means that several people drive unreliable cars, decreasing their mobility and making commuting situations complicated. Even with access to a private automobile, the rising cost of gas (as noted in 5.4 above) is an increasing barrier to automobility.

Stacy: “(Being close) is important because of the cost of gas. It is much cheaper if I were to find a $14-15 job and commute on the bus with a bus pass. But I couldn’t possibly catch a bus over there [from her eastside home to a Hilliard call center job]. And it would take me $100 in gas a week.”

“Catching a ride” with someone else is another form of automobility people draw upon. For Darrell, without his carpooling scenario, he could not afford driving 15 miles alone to his $9/hr job near Polaris. But others find that catching a ride can be as unreliable as other forms of transportation, or quite costly.

Jewel: “…I worked at Sears way out west on Georgesville Road, way back in distribution. And I had trouble getting out there. There isn’t no bus that goes out there. I was riding with somebody else that worked there. So I was kind of like on their schedule. When they called off I couldn’t make it because it was so far away. They was real reliable at first, but then towards the end, when I seen them kept missing days, I just said forget it, I can’t work like this and I started looking for something else. That’s when I learned that it’s not a good idea to— that’s why I don’t rely on people to get around.”
Cecilia experienced a similar situation for a decent paying job with MRDD\textsuperscript{13} in southwest Columbus. When her ride got fired from that job, Cecilia had to quit. Now she delivers \textit{Columbus Dispatch} newspapers every morning, and pays another friend half her paycheck to drive her on the delivery route.

Such mobility problems are reflected in the stories people told of good job opportunities they received but turned down due to transport access issues. These are instances where people had known jobs offered to them, but were unable to accept.

\textit{EEB}: “Has reliance on the bus ever limited you in finding jobs?”

\textit{Harry}: “Um, yeah. Where I want to look. Because I had a couple of jobs: one at Honda, but that is way up in Marysville – a good little ride 40 minutes. They pay pretty good, for the position I had, it started at $15, so it might have been worth it. Then 90 days you get more; keep getting raises, keep getting raises. So that might have been worth it, but I couldn’t go. Then I had one in Worthington, they called me. They make locks or something. And another one, that makes furnaces, out on…. I forget the name of it. I couldn’t get to that on the bus either at night… So I couldn’t get there at the time, so there wasn’t no sense in taking it. When I rode to where it was for the interview, I just knew I wasn’t getting there. I had to bum a ride there, and bum a ride back.”

Harry was somewhat unique in the sample in that he had several offers for better paying jobs without going through temp agencies. As mentioned previously, the temps function to expand the spatial scope of employment for people, but mobility does remain a key obstacle.

\textit{EEB}: “What was your experience with the temp agencies? Was it positive?”

\textit{Jacqueline}: “It was pretty positive except the only thing that I didn't like, like I said is not having transportation because sometimes they have good jobs that come up but if you just don't have a way of getting there it's kind of hard.”

For one woman from a single-car household, making a daytime home-work linkage inside the I-270 loop proved impossible.

\textit{EEB}: “So you found here that the bus doesn't get you to the jobs?”

\textit{Rocky}: “A lot of the buses -- I wanted to go to Worthington. I had a job for data entry that paid $16 an hour. And it, ya know, it was perfect for me considering

\textsuperscript{13} Mental Retardation and Developmental Disabilities
I'm, ya know, I'm used to being a stay-at-home mom and I couldn't take that job because no bus goes there and (my husband) couldn't take me because he works through the day and I couldn't get the job because, I mean, it's 3:00 in the afternoon, you mean to tell me no bus goes to, ya know, there's no bus at that time of day? I think the bus system here sucks.”

While mobility has been found here as the most crucial employment barrier, there are several variants to this theme. Most significantly, lack of education or job skills – particularly those without a high school diploma (or G.E.D.) – is a barrier that keeps some people from getting better paying jobs. For them, they are limited to minimum wage jobs in low-end retail, food service, and janitorial sectors. Some take personal responsibility for not finishing their degree, and express desire and future hopes to rectify.

Kimberly: “A lot of it is too, I hate that I didn’t finish school. My education has kept me from getting a lot of jobs.”

EEB: “Do you feel like you have equal opportunities as other people in the city?”
Jewel: “Well no, but I don’t blame that on the city or others. If anything, I blame that on myself because I didn’t graduate from school. I didn’t take up a trade, I didn’t further my education, so, I don’t really blame that on no body. But I do believe I am more limited than other people are because of my education. You know, I didn’t… you know, back then I guess I was into partying and wasn’t taking it really serious.”

Several men and women referred to their criminal records as having played a role in their (in)ability to gain employment. Admission of a criminal history was voluntarily disclosed by only 4 informants. But each one did express the limitations their record has placed upon their working lives. This variant was explored no further. Finally, broader economic slumps and job down-sizing has left experienced, highly qualified, older persons in challenging positions.

EEB: “What has been the biggest problem in find work?”
Mark: “My age. No one wants to hire someone with my experience. They want to hire someone out of college, pay them half what they want to pay me. I mean I’ve even been told that, which is highly illegal. Over the phone when I’ve called to follow up. One lady said, “No, we’re not taking applications from anyone over 30.” So they see my application coming in and put it in the trash.”
Mark has illustrated this unique situation among the entire sample. But some of his experiences have been echoed by others as well.

5.7 Personal mobility: Negotiating the residence-commuting-employment nexus in everyday life

The ability to move between places of residence and opportunities for employment in the urban landscape emerged as a major socio-spatial process that creates barriers to employment. Issues of personal mobility is a common thread linking together the five sub-themes discussed above.

In an urban context, how do working poor individuals spatially organize their lives? Having a place-of-residence and a place-of-employment are necessary facets of everyday life. But perhaps they are not the central organizing feature of peoples’ lives. Jobs are not viewed as careers that people commit themselves to; rather, they are sources of necessary income. Since there are always “more jobs out there” – more day-to-day paycheck sources – people can frequently change jobs due to various circumstances. The same is true for housing, especially for persons not in traditional nuclear family structures. Outside of homeownership, a place to live is merely a private location to sleep and eat; it is viewed as a non-permanent place where people “stay” until their lease expires, or their financial status changes. The presence of young children, especially in traditional nuclear families, influences the tendency to being more residentially fixed. But young singles, the older single empty-nesters, and single-mothers are highly transitory. Is long-term rootedness in housing and employment a common objective that everyone strives for? Or is a transitory existence the reality of life? Much of this is likely due to life-stage, marital status, and economic status.

Given that peoples’ residential and employment histories are highly transitory, it is argued that people organize their lives according to their personal mobility in the urban context. Decisions about where to live (or “stay”), or what job they can get to, are entirely mediated by their current spatial mobility situation. This finding supports recent research that working families choose their residential location and commute mode simultaneously (Cervero et al. 2006). Complicating matters is that the modes of transportation available to individuals are also constantly in flux. Just as housing and
employment are impermanent, available modes of transportation fluctuate. People are creative and resourceful in the face of non-constant mobility resources. Their daily commutes may vary between public transportation, biking, walking, getting rides from social networks, or driving a borrowed car. Even car-commuters rely on public transit or “getting a ride” as a critical back up.

It is argued that mobility is central to peoples’ lives, and is the main structure around which individuals spatially organize in the urban context. In many ways, mobility is more central than employment. Although employment is a key feature to financial self-sufficiency in constructing livelihoods, mobility makes employment possible. Mobility, as the capacity to travel through urban space, is the filter through which spatial decision-making flows. The diagram in Figure 5.4 illustrates the spatial decision-making process of how people negotiate the residence-commuting-employment nexus in their everyday lives.

Figure 5.4: Mobility as central organizing structure in spatial decision-making.
This diagram represents the over arching theme of mobility-as-centralizing-unit. An individual’s current “situation” of mobility is the filter through which flows all decisions on spatial activities in the urban environment. Both place-of-residence and place-of-employment decisions are based upon available mobility options. When a change in residence occurs, people look for affordable housing – usually within an area of familiarity. Their residential choice ultimately depends upon what forms of mobility they have, and what type of mobility is offered at a specific residential location. Place of residence choice does not consider current place of employment. Yet when employment changes, the selection of plausible employment location is mediated both by current place-of-residence and mobility options. Mobility itself is ever changing, as people’s access to different modes of transportation is often unstable over time as social and economic conditions evolve.

5.8 Summary
- Columbus’ local economy has numerous job opportunities for low-skilled workers. The region is centrally located in the eastern United States along major transportation lines, including north-south (I-71) and east-west (I-70) Interstate Highways. This relative location has resulted in an agglomeration of warehousing and distribution centers and associated services. These sectors of the economy provide a large supply of higher-paying jobs for low-skilled workers in the Columbus area. However, many of these jobs are located on the urban periphery, and not accessible via public transportation. Furthermore, many of the positions at these firms are made available through temporary employment agencies, which ultimately reduces the wages, benefits, and job stability for the low-skilled worker. Further investigation of this point reveals overall significance of the warehousing and distribution center in the regional economy. Between 1982-2002, the largest employment increases in this sector across the nation occurred in Franklin County. However, as distribution centers require large land areas and proximity to major
highways, they tend to be located in less populated peripheral areas resulting in declines in minorities and women employees (Bowen 2008; U.S. Equal Opportunity Commission, 2004).

- **For the working poor, the Columbus metropolitan area has limited access to employment.** The findings in this analysis corroborates with an expanded conceptualization of the *spatial mismatch hypothesis* (Preston and McLafferty 1999). The people in this study are not unemployed, nor do they reside in the ‘inner-city’ neighborhoods of concentrated poverty. They are disadvantaged populations – racial minorities, women, and less educated individuals – currently employed in low-paying jobs. They have knowledge of many job opportunities that pay higher wages, but these jobs are inaccessible via available means of transport. This conclusion suggests that people are settling for lower-paying jobs because they are unable to get to the available higher paying jobs. Indeed, a spatial mismatch between workers and jobs does exist in this particular context. But it is a mismatch experienced by employed persons residing outside the inner-city.

- **Temporary employment agencies increase the spatial extent of workers’ knowledge of job opportunities.** Traditional theories suggest that low-skilled workers’ knowledge of jobs is spatially confined to their local areas of activity and social networks. As clearinghouses of metropolitan area employment opportunities, temporary employment agencies reduce the effects of distance and separation, and increasing worker knowledge of available opportunities. Temps are a critical mediator in matching laborers with work, albeit temporarily. While mobility barriers might block individuals from making those connections, the accessibility barriers are not due to lack of knowledge of employment opportunities. It is argued that employment searches are less spatially confined than theoretically believed. Low-skilled working poor individuals have extensive knowledge of job opportunities throughout the metropolitan area. This finding is significant, as the influence of such temp agencies has yet to be raised within the employment access literatures.

- **Consistent, reliable, and efficient mobility to places of employment is the most significant barrier to employment.** People have knowledge of good jobs that exist
in the metropolitan area, but can’t get to them. The evidence suggests that transit mode poses barriers to the working poor in Columbus. Those dependent upon public transportation are unable to reach good jobs on the urban periphery because of limits in transit service area and service scheduling. Relying upon social networks for rides to work is often an unreliable source of transportation. Those with an automobile convey a less sense of struggle in making the journey-to-work connection. But access to a private automobile improves mobility to jobs only if it is a non-shared and reliable automobile. Even still, automobility is increasingly tempered by rising fuel costs. This finding supports the automobile mismatch hypothesis (Taylor and Ong 1995) which suggests that differences in transit mode – not race, gender, or skills – is the most likely to cause barriers to employment.

- **Life stage and household structure have significant impacts on mobility, spatial decision-making, and livelihood construction.**

- **Distance as employment barrier is questioned.** “It doesn’t matter how far the job is. What matters is if I can get there.” The findings here corroborates with research literature which conclude that employment access is more that connecting persons between place-of-residence and place-of-employment (e.g. Kwan 1999). Rather, knowledge of job opportunities increases through temporary employment agencies. Further, the ability to move between activity sites, mobility, is the single most significant barrier. Thus, the concept of employment access is complex, and dependent upon multiple factors. Employment that is ‘close to home’ is not a satisfactory indicator of employment access.
CHAPTER 6

SYNTHESIS AND CONCLUSIONS

6.1 Summary of findings

In Phase 1 the patterns of employment access among the working poor were examined at a localized geographic scale. The findings here provide supportive evidence that poverty residences are increasingly decentralized. The patterns of place-of-residence and place-of-employment are dispersed along the urban periphery as well as concentrated centrally. Using a job proximity measure of Local Working Rates, it was determined that the working poor residents in the Columbus area have relatively good job access, as most are employed within 3.5 miles from home, and a large majority are employed within 5 miles from home. Thus, the working poor are finding employment near to their residences without enduring major commuting time and expense burdens. The patterns of employment access in this study are more spatially complex than the traditional metropolitan conceptualization of central-city / suburb. The cluster patterns of local working rates reveals that high/low job proximity is more locally differentiated than simply along city/suburb boundaries. Patterns of geographical context were also explored. It was found that characteristics of neighborhood context have a complex spatial relationship with the job proximity measure. Thus, while concentration of minorities or poverty populations may statistically relate to observations of job access, they do not relate similarly in all metropolitan places. The lack of definitive and suggestive contextual influences supports the argument of local specificity. Thus it is concluded that geographic context alone does not reveal the full dimensions associated with barriers to employment access.

Phase 2 found individual mobility as the most significant and consistent socio-spatial process contributing to constrained job access among the working poor. This
analysis revealed that people have knowledge the Columbus area’s numerous higher-paying employment opportunities for low-skilled workers, particularly in the job sectors of warehousing and distribution centers, manufacturing, and call centers/customer service/data entry. Most of these higher-paying employment opportunities, located peripherally, are not accessible through the public transportation system because of inadequate service routing and service scheduling. Thus, individuals compromise themselves and take lower paying jobs they can get to with available means of transport. It is in this way that mobility, the capacity to move through metropolitan space, is the most limiting factor among the sample interviewed. Several other key points were found through the interview analysis process. The working poor have highly transitory lives, changing place-of-residence and place-of-employment on a frequent basis. While many factors affect residential choice, people tend to choose places that have convenient access to a bus line, but they do not make a residential choice based on the proximity to a current place of employment. Jobs are chosen relative to their commuting mobility. Temporary employment agencies are widely used among the working poor as a job search strategy, which functions to expand the geographic scope of the job search area, and broadening the quantity of job opportunities made known to working poor individuals.

6.2 Synthesis of Phase 1 and Phase 2

A key objective of this dissertation was to explore the implications of employing a mixed methods research methodology. In using a complimentary mixed methods approach, the two research phases come together and enrich understanding about employment access by contributing separate and unique insights. The two phases were not designed to triangulate perspectives upon a single question. Rather, each phase was to explore different facets of the patterns and processes of employment access, and come together to create a fuller picture. Conducted separately and independently of each other, the question remains, in what ways do these two speak to each other? What new knowledge has been gained, and are the benefits of this approach?

As already implied, the approach has provided unique insight into an on-going urban problem. Table 6.1 outlines the differences and similarities in the findings from
the two research phases and data sources. There are several noteworthy comparisons made. First, the pattern analysis of Phase 1 illustrated the decentralization of jobs and residences of poverty status populations. This finding was corroborated by the interview data, as the spatial patterns for the 30 informants show considerable decentralization (see Figures 4.1, 5.1 and 5.2). Second, the Local Working Rates analysis in Phase 1 concluded that poverty status workers have good job access, as most are employed within 3.5 and 5 miles from home. Phase 2 also finds that many of the working poor are employed close to home. However, the interpretations are directly conflicting, as most informants indicate that their current employment is a compromise to the available, yet inaccessible, higher-paying jobs. This contradictory finding illuminates one key benefit of qualitative based data collection and analysis: the ability to follow-up with secondary questions that enrich tabulated type data to better understand underlying processes.

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**Table 6.1: Comparison of methods and findings**
Third, the cluster analysis in Phase 1 reveals the complex spatial patterns of job proximity. In the metropolitan area, high or low indicators of job proximity vary greatly across the geographic landscape in very localized patterns. It highlighted the inadequacy of conceptualizing the metropolitan space according to city/suburb dichotomy. In Phase 2, the distribution of informants shows near equal distribution across the specific zones with no discernable pattern. Figure 6.1 overlays the spatial cluster maps of local working rates with the sketch map points of current residences and jobs of the interview participants. Ten (10) informants live in the clusters of High local working rates, 13 live in the clusters of Low local working rates, and seven reside in the spatial outliers. In comparing the informants that live within each cluster, there is no discernable pattern as to the type of individual (their life stage, household structure, or job histories) within each cluster group. One exception may be that none of the 10 informants residing in clusters of high LWR zones has access to a private automobile.

Finally, the analysis of neighborhood characteristics again suggests conflicting findings. The Phase 1 research revealed how factors of geographic context exhibit a complex spatial relationship to the Local Working Rates indicator, and that many context characteristics have significant relationships in various models within specific sub-regions. However, no factor was decisively significant throughout the models, and interestingly, transportation indicators were not significant. This is directly contradictory to the core finding in Phase 2, which suggested personal mobility is a key barrier limiting peoples’ ability to obtain higher paying jobs in the outlying regions.

The collection and analysis of primary data also reveals many limitations in utilizing U.S. Census data for some kinds of research. The two data sources are fundamentally different in their dynamic or static natures. Interview data provides a real-time view of the world and allows for nuanced and highly detailed information about subjects and their experiences. In the context of an interview, there is a limitless direction and depth to which new information can be discovered and pursued. On the other hand, the Census is a static enumeration of aggregated data, averaged across the population and landscape, giving insight about the population at various summary levels.
Information and knowledge from the Census is limited only to those topical areas collected in tabular format.

Figure 6.1: Local Working Rate clusters and informant residence and workplace Columbus, Ohio (MSA)
The aggregate quality of Census data obscures the true social and economic composition of population sub-groups. For example, who are the people that fall within the Census’ absolute measure of poverty status? Certain datasets (e.g. PUMS) may allow for disaggregation to determine other characteristics of individual identity (age, race, gender, employment status, housing situation). However it is impossible to know much about the daily realities of a poverty status individual. Analyses assume this category captures individuals and families that face particular financial hardships, characterizing a sub-population of impoverishment. The recruitment process of Phase 2 illuminated that absolute measures of poverty elicited individuals with high levels of human capital – namely college students and downsized professionals. These persons were living below the $10/ an hour threshold, but in relative terms based on their potential human capital and extended networks of financial support, are not necessarily at a comparative socio-economic disadvantage. The critical insight posed here reveals that behind the aggregated numbers of Census data exists a diversity of people in different life situations.

Census data is further limited in illuminating the complexity and dynamic nature of human existence in everyday life. The qualitative interviews revealed this concretely regarding the working poor. In real life, people change residences and their place of employment on a frequent basis. Many times people hold multiple jobs or commute to several different job sites. Even their modes of transportation and commuting are ever changing, depending on their current circumstances and financial condition. Static enumerated data is unable to adequately capture such intricacies of peoples’ daily lives. Furthermore, the use of multiple data sources challenges the researcher to reconcile the differences. For instance, the interviews in Phase 2 revealed that residential choice was largely driven by factors of neighborhood characteristics (desirability), affordability, and mobility. A critical conclusion was drawn that current place-of-employment does not influence residential choice. However, the American Housing Survey suggests otherwise – for persons living below poverty in Columbus MSA, the top three reasons for choice of current residence were: 1) convenience to friends or relatives; 2) convenience to job; and 3) looks/design of neighborhood. Convenience to public transportation was one of the
least important reasons (U.S. Census 2003). Such conflicting realities in the data leave researchers in an uncertain position as how best to reconcile these differences without invalidating one source or privileging another source.

Another significant outcome of this mixed methods analysis is the support it makes towards the critical debates on epistemology and the pursuit of knowledge in research endeavors. Particularly in urban geographic research exploring human behaviors and activity patterns, the complexity and diversity suggests that answers to long-standing problems are less than straightforward for quantitative techniques alone.

The methodology of Phase 1 is the traditional and dominant approach used in the research literature. But the findings in this dissertation call into question the trustworthiness of relying solely upon a singular analytical approach and source of data. The conflicting results highlighted here suggest the multiple realities and ways of knowing when researching the human world.

The differences in analytical perspectives reveal fundamental opposition in underlying questions and theoretical premises. For example, from a top-down perspective, the aggregated view of Phase 1 suggests the population has good access to jobs. Here, ‘close to home’ is the detached objective researchers investigate from the vantage point of perfect knowledge of job opportunities, housing, and transportation in the geographic landscape. However, from a bottom-up individual view, mobility barriers cause people to compromise and take lower-paying jobs. Here, “can I get there?” is the underlying question individuals ask. In this way, these two phases are fundamentally looking at the same problem from two different perspectives. They are incapable of answering the same research questions, but they are not mutually exclusive. The detached assumption of job proximity versus the lived experience of mobility and “getting there” are dual truths that should equally be considered valid and informative to broader knowledge.

6.3 Research Contributions

This dissertation research makes several significant intellectual contributions. First, while a mixed methods research is not novel to geography and the social sciences, it has been an under-utilized approach in job accessibility and spatial mismatch. The
unique mixed-methods empirical analysis here contributes to these literatures by revealing the complexity of underlying issues. The outcomes of this research advocate the necessity to utilize mixed methodological approaches for dynamic, complex human phenomena in urban research. The two independent phases provide unique and sometimes divergent perspectives on the problem of job accessibility.

Second, this research within the Columbus regional context has implications upon metropolitan area job access research in similar cities. The conclusions and findings of are likely indicative of similar patterns and processes happening in cities across the country. Other mid-sized metropolitan regions in the Midwest and across the country may exhibit similar characteristics and findings:

- Metropolitan population growth and development is occurring in outlying low-density suburban areas
- The decentralization of major urban functions, especially housing and jobs, is creating a more polycentric urban form
- The decentralization of poverty, with housing and employment concentrations more prevalent in the periphery – is outside the traditional ‘high-poverty’ neighborhoods
- Post-industrial growth of local / regional economies in the services sector, offers more high-paying jobs for low-skilled workers
- The rising presence of temporary employment agencies acts as new and under-studied mediators of local labor markets
- A spatial mismatch between low-skilled workers and higher-paying jobs exists
- The classic central city / suburb dichotomy does not adequately conceptualize the highly localized spaces of high and low job access in the metropolitan area
- The radial CBD-oriented public transportation system is woefully inadequate to effectively and equitably serve the growing demands of on-going jobs and housing decentralization

Third, in light of the changing structure of cities, the findings here support calls to broaden and reconceptualize spatial mismatch and job access research (Preston and McLafferty 1999). This research finds that a mismatch does occur – disallowing disadvantaged individuals from getting to job opportunities that would improve their
economic condition and livelihood. Here, spatial mismatch is not just about the unemployed: working poor individuals struggle to earn sufficient livelihoods with the type of jobs they are in, and sometimes the mismatch keeps them from obtaining better jobs that would improve their family livelihood. Limited access does not just afflict inner-city residents – or concentrated poverty neighborhoods – who are spatially and socially isolated from peripheral job opportunities. The patterns show that working poor are residentially located throughout the central county of the metropolitan area – not just clustered in the inner-city. Even living near the periphery does not guarantee a mobile connection to good paying jobs nearby. Further, as is argued by many, access to employment is not a matter of distance, but mobility. Working close to home is a nice convenience for many, but the biggest obstacle people face is the lack of mobility allowing them to get from home to work with reasonable financial and temporal costs. Finally, with regard to geographic context, there is no singular characteristic of neighborhoods most significantly related to employment access. Several different indicators are significant in different situations, and there is spatial variability. Thus, research should be concerned more with the processes that are encountered within neighborhoods, rather than solely the concentrations of minorities or poverty in a neighborhood.

6.4 Broader Implications

The policy implications of employment access have been debated for over 30+ years, and three dominant policy solutions are advocated in the literature. The inner-city development strategy, or enterprise/empowerment zones approach, focuses on moving or creating jobs closer to the residential location of low-income workers. A desegregation strategy facilitates worker relocation by moving low-income families closer to jobs in the suburban periphery. Mobility strategies focus on transportation-based policies to make it easier for low-income people to get to existing jobs (Blumenberg and Manville, 2004; Ihlanfeldt and Sjoquist 1998; Kain 1992).

The Welfare Reform Act of 1996 (Personal Responsibility and Work Opportunity Reconciliation Act) enforced time limited assistance to needy families, resulting in more individuals actively seeking employment. Noting empirical evidence of spatial disconnects between centrally located low-income workers and suburbanized jobs,
subsequent federal policies focused upon transportation-based solutions. The
Transportation Equity Act of the 21st Century [TEA-21] (U.S. Congress, 1998) and the
follow-up Safe, Accountable, Flexible, Efficient Transportation Act: A Legacy for Users
[SAFETEA-LU] (U.S. Congress, 2005) both sought to develop transportation services to
connect low-income persons to jobs.

However, the findings of this dissertation research support arguments that the
three dominant policy solutions – including transportation-based policies – are many
times misguided attempts to overcome very localized problems. Policies should be
directed towards people not just geographical areas. Focusing on enterprise/
empowerment zones in the inner-city “fall into the fallacy-of-aggregation trap” (Bauder
2000, 319). Particularly as this research has shown, many people who suffer from
limited employment access do not live in specific urban geographical zones (i.e. the
inner-city). Yet at the same time, the localized nature of problems requires locally
specific policy. The complex nature of job accessibility and spatial mismatch suggests
there is no one-size-fits-all solution that can be applied to all U.S. cities. For example,
the Columbus area labor economy is stronger than other cities in Ohio. Thus, a blanket
economic growth and stimulus policy would be less likely to connect workers to the jobs
that already exist here. Even at the intra-metropolitan level, solutions for one social or
life-stage group in one neighborhood may not be useful for all groups or neighborhoods.

Purely transportation-based policies are insufficient solutions to the larger vexing
problem facing low-income workers. Automobility as anti-poverty policy is problematic,
as cars are heavy financial burdens on individuals, metropolitan infrastructures already
face traffic congestion problems, and energy limitations and sustainability objectives
cannot support more private automobile ownership. Similarly, public transportation does
not provide a singular solution to these problems (Blumenberg and Manville, 2004).

While empirical evidence does illuminate the spatial disconnect between workers
and places of employment, policies should also focus upon non-geographical and non-
transportation initiatives. Two alternative solutions posed by Chappel (2006) are
supported by the findings of this research. Social networks are important avenues
through which people not only find work opportunities, but also establish and increase
their mobility. Chance encounters with people, or weak ties in social networks, are fundamental to peoples’ survival strategies. Several individuals interviewed in this research found jobs through such chance encounters. Development of social networks can be enhanced through initiatives that increase participation in community organizations, improvements to non-work transportation mobility, and facilitates dynamic activity patterns. Workforce development is another key alternative policy solution, and increasing worker education and skills is obviously critical. Several interview informants also suggested the importance of “apprenticeship” and “volunteering” experiences earlier in life that bolstered their skill set, connected them with “important people with many contacts”, and ultimately increased their job opportunities.

6.5 Future Directions

Employment accessibility among disadvantaged persons will continue to remain an important topic of research. Socially relevant geographic research is particularly well situated to explore patterns and processes of spatial inequalities. There are numerous directions this type of research could go. For one, as the demand for urban sustainability research grows, accessibility type research is poised to contribute significantly in large collaborative investigations on balancing the environmental, economic, and social dimensions of sustainability in urban context. This dissertation research was in part motivated by and at times placed within sustainability frameworks. However, the research outcomes did not produce substantive contributions to the sustainability dialogue. Future work is needed to find adequate ways to design sustainability metrics and discover sustainability-based themes in empirical research.

Also, there are tremendous possibilities to build upon the qualitative interview data an analysis. Here, the interview data produced insight specific to the Columbus context, yet indicative of wider urban processes. These findings could be used to develop questionnaire surveys to sample larger populations of working poor individuals for increased statistical analysis. Future work should also begin to explore issues from the perspective of other actors, including: regional planning and government agencies, social service providers, employers, and the temporary employment agencies. In terms of research design, future work would benefit from a more iterative process between multiple phases. This way, as new and unexpected insight is discovered in one phase
(e.g. the role of temp agencies), that path can be explored further through other methods and data sets (e.g. employment data on temporary agency labor).

6.6 Conclusion

In this dissertation, the patterns and processes of employment barriers for the working poor were explored through a mixed methods approach. Phase 1 explored job access using geographic analytic tools and U.S. Census data, while Phase 2 collected and analyzed qualitative data from 30 in-depth interviews with working poor individuals. With the Columbus, Ohio metropolitan region as the study area, the findings of this research have implications upon urban areas with similar characteristics: decentralization of urban functions, polycentric form, population growth and development of low-density suburban areas, post-industrial service sector economic growth, and inadequate and inequitable CBD-oriented radial public transportation systems.

Several key findings emerged from this research. Poverty and working poor housing and employment patterns are decentralized in the metropolitan area, and patterns of high/low job proximity are highly localized. The relationship of geographic context factors is spatially complex but lacks definitive and suggestive influences. Warehousing and distribution centers offer many higher-paying low-skilled jobs in the Columbus area, and temporary employment agencies play a key role in job search strategies. While the pattern analysis determines that the region has good job access for the working poor population, the local knowledge of individuals reveal how the higher-paying jobs are inaccessible as they are not well serviced by public transportation.

This work extends the conceptualization of spatial mismatch by examining the dislocations of work and residence for working poor persons residing throughout the metropolitan area. As a piece of mixed method research, this work illuminates the utility of both primary and secondary sources, as the static and dynamic nature of data can greatly enrich understanding of human urban geographic phenomena. It is argued that conflicting outcomes from separate research phases highlights the multiplicity of realities and represent dual truths that should equally be considered valid and informative to broader knowledge.
APPENDIX

Below is the formalized and complete interview guide utilized in Phase 2. Interview sessions did not strictly follow the progression of questions, nor ask every question. Rather, this template served as a conversational guide to assist in remaining focused on the main categories of interest while allowing for pertinent deviations.

A. BACKGROUND INFORMATION
1. How did you hear about this interview?
2. Participant name:
   Selected pseudonym:
3. Age:
4. Gender:
5. Race/ethnicity:
6. Years of schooling:

B. RESIDENTIAL HISTORY
7. How long have you lived in the Columbus, Ohio area?
8. Where do you currently live?
   i. Describe the place you live:
      i. House / apartment?
   ii. Who do you live with?
   iii. How long have you lived here?
   iv. Why did you move here?
   v. Why did you choose to live here?
   vi. Describe for me the characteristics of the neighborhood you live in:
      i. What are the people like?
      ii. Are there a lot of shopping places nearby?
      iii. How is the available transportation (buses, streets)?
      iv. How are the area schools?
      v. Are there a lot of jobs available nearby?
9. Where did you live previously (for all prior living places?) [repeat above questions]
10. Which of these has been your favorite place to live, and why?
11. Where in the city do you desire to live? Why?
12. Are there areas of the city you would never consider living in? Why?
13. How did you decide where to live in the city/metropolitan area? What are the most important factors for you when choosing a place to live?

C. EMPLOYMENT HISTORY

14. Where are you currently employed?
   i. What is the address / location?
   ii. What is your position – what do you do at work – what are you hired to do?
   iii. How much do you earn per hour?
   iv. How many hours a week do you work?
   v. How did you first hear about this job, before you applied?

15. Do you have other jobs right now? [repeat above questions]

16. What previous jobs have you had? [repeat above questions]

17. Which of these has been your favorite place to work, and why?

18. How important is it for you to find a job that is close to your home? Why?

D. JOB SEARCH STRATEGIES

19. In the recent past, what strategies have you used to find employment? (e.g. newspaper classifieds; the Internet; social network / word-of-mouth from friends or family; employment agency; driving around)

20. In your decision to take a job (both past and present), how important was the location of the job in relation to the location of your residence in that decision?

21. In your recent job searches, in which geographic areas did you look for work?

22. Do you prefer to work closer to home? Why? How has this affected your search for jobs?

23. Have you ever needed to change your residential location in order to be closer to your job(s)? Was it easy to find suitable housing near your place of employment?

24. Have you ever experienced any form of discrimination when looking for employment? (Racism, ageism, sexism, skills/education/experience). Please describe.

25. Do you feel you have received adequate skills / education to find a good job? Does education/skills ever present a road-block in finding work?

26. Do you believe there are sufficient job opportunities in this city? From your knowledge, where are there a lot of jobs? Are there enough jobs near your home?

27. What has been some of the biggest challenges in finding places to work?

E. JOURNEY-TO-WORK COMMUTING

28. What forms of transportation are available for you to get to work?

29. Describe your commute to work.
   i. How long is your commute to work?
   ii. What form of transportation do you use to get to work, and why?
      i. If you take a bus:
1. Describe your overall/general experience of using the public bus system to get to work. Do you have to make transfers?
   
   ii. If you use an automobile:
       1. Describe your overall/general experience of getting to work.
       2. Do you carpool, or get a ride from someone else? Provide rides for others?
   
   iii. What route does your commute take to get to work?
   
   iv. What time do you leave home? And arrive at work?
   
   v. At the end of the shift, what time do you leave work? And arrive back home?
   
   vi. During your commute to work, do you typically stop anywhere else and run errands (e.g. the bank, grocery store, child-care,)? Please describe.
   
   vii. Does your network of family, friends, acquaintances, and co-workers play a role in your commuting to work? If so, describe.

30. Can you describe any commuting obstacles that have made it difficult for you to get to work?
   
   i. Describe
   
   ii. Have you ever experienced difficulties in getting to work? Please describe these instances.
       What were the difficulties?
   
   iii. Has increased costs caused you to change your commuting behavior, such as increased prices of gas or COTA fees?

31. Describe for me your ideal commuting scenario.
   
   i. What would that look like? How long a commute? What mode? What time of day?
   
   ii. What keeps you from attaining this ideal?

G. ACTIVITY SPACES
32. Other than your job, are there other obligations and responsibilities that you attend to on a daily basis, such as child care, household chores, shopping, duties?

33. Other than work and home, what other places in the city do you go frequently (on a daily or weekly basis)?
   
   i. Such as shopping, sports/leisure, food/dining, entertainment, religious, bank.
   
   ii. What do you do in your free-time? How do you get there? How often?

34. Where are your friends, family, acquaintances located?

35. How often do you go to? (name some places ____):
   
   i. Downtown? Ohio State? The mall, the airport

36. What do you know about the suburbs/outlying areas (city)?
   
   i. How often do you go there?
   
   ii. What kind of jobs are available there?
   
   iii. What kind of housing is available there?
   
   iv. How does this differ from where you live?

H. Livelihoods & Quality of Life

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37. When I say “quality of life”, what does that mean to you?
   i. Describe your quality of life.
   ii. Do you feel like you have sufficient quality of life?
   iii. What do you desire to change in your quality of life?
   iv. How does your current job – commute – residence scenario affect your quality of life?
38. How about equality? In your opinion, do you feel you have equal opportunity to obtain good jobs and
   affordable and decent housing in this city?
39. Do you have any problems meeting your basic needs, or making a living?
   i. Do you think your current job-home-commuting scenario affects this?
40. Please describe your experiences related to these additional characteristics of quality of life: leisure
   time; overall comfort in life; safety and security; social/racial segregation; isolation or exclusion from
   society or friends and family.
G. CONCLUDING QUESTIONS
41. What is the main obstacle that keeps you from getting a job that: [pays you more money], [is closer to
   home], [gives you more hours], [allows more flexibility with your responsibilities]?
42. What do you think is the biggest problem people who earn less than $10 face – with regards to the
   things we have discussed (getting to work, finding work, the location of jobs, the location of housing)?
43. Assuming that there are not enough suitable jobs near to where people live, which do think is a good
   solution?
   i. Create jobs in the area close to where people live;
   ii. Relocate people (move residences with gov't assistance) to areas of the city nearer more jobs
   iii. Improve the transportation system (public transit, automobile assistance)
   iv. Others?
44. Some people in society have an unfair disadvantage (more difficult time) in getting to work, or finding
   employment, because of large distances separating their housing and available places of employment.
   Do you find this to be true? Do you think access to jobs is unfair in this city? Why or why not?
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