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Does Spatial Mismatch Still Occur in 2010? An Examination of Race, Income and Urban Geography in the Cleveland-Elyria-Mentor Metropolitan Statistical Area

Kelsey Bridges

The College of Wooster, kebridges12@gmail.com

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Does Spatial Mismatch Still Occur in 2010?

An Examination of Race, Income, and Urban Geography in
the Cleveland-Elyria-

Mentor Metropolitan Statistical Area

By
Kelsey Bridges

A thesis submitted in fulfillment of the requirement of
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Dr. Jim Burnell

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Abstract

Spatial mismatch literature has an extensive, divisive history. In its 1960s origins, it was primarily based on White and African American, residential and employment spatial disparities, but has since expanded. This article will focus on changes in the geographical landscape, such as the addition of inner ring suburbs, and how they have affected spatial mismatch. The study will also question whether race or income is a larger indicator of spatial disparity. Using data from the U.S. Census and Zip Code Business Patterns files, this study provides a regression analysis of occupational and residential spatial disparities for 2010, in the Cleveland-Elyria-Mentor MSA. Results indicate that urban geography does play a role in spatial mismatch, but inner ring suburbs are not a significant indicator. Results also signify that income, rather than race is a larger indicator of spatial mismatch.

Chapter 1: Introduction

The urban landscape is a pool of causes and effects, which are observed and studied regularly. One of the common observations in regards to geographical organization is where people live in relation to where they work. There are different reasons for why people live where they do, but there has also been significant research suggesting that residential location is highly related to employment location. As early as the 1960s, researchers have been monitoring the relationship between housing and employment location (Kain 175). Originally the prominent observations between residential and employment were focused on racial segregation. There have been several studies that have looked into additional factors of spatial disparity such as job search, skills, accessibility, and commuter times, and in almost all cases there is a race component. It is the general consensus that racial segregation is no longer an issue. There have been political policies set in place such as the Civil Rights Act and other equality legislations that have supposedly created institutional equality. However, the urban landscape would suggest otherwise. Even in 2010, there is still a disproportionate amount of minorities and lower income households represented in the central city, suggesting that legislation has not created equality (Frey 742). Exploring the history and potential factors contributing or perpetuating this segregation are essential to better understanding how the urban landscape functions.

During the industrial era, when the iconic United States city began its emergence, it contained pieces of the walkable, traditional European cities but

with the addition of American design concepts. The nation's spatial system was based on density and mixed-use development so that city residents and businesses could function with lower time costs. Shopping, living, working, and entertainment could all be found within the same corridors. People and space were integrated. This is not to say that there was no economic segregation, for there were socioeconomic divisions. Even with these divisions, people of all economic backgrounds could come into contact with each other because all areas of life were integrated. Not only was there integration in urban design, but all socioeconomic levels had access to employment due to the density and mixed-use design of the city (Rowe 2-5).

However, these city characteristics have transitioned over the years to create a new urban redistribution. Greater accessibility of the car gave both city residents and businesses more mobility. This along with federal government promotion of homeownership after WWII, created a preference to move to the suburbs. New federal lending programs through the Federal Housing Administration and Veteran's Administration promoted homeownership by stipulating that loans could only be used for new, single family, detached homes, in effect, suburban homes. Other federal policies such as the interstate highway bill in 1956, and urban renewal in the 1950s and 1960s further promoted this movement away from the city (Duany, Plater-Zyberk, and Speck 7-12). Urban interstates, created as a result of these policies, divided cities structurally by placing roads through city neighborhoods, and also by providing a way to commute to and from the city with greater accessibility. This urban redistribution

consisted of a transition from living and working in the same area, to a separation of these activities. Two areas emerged, the suburbs or “bedroom communities” where people lived, and the city, where suburbanites worked. The car and the single-family home began to dominate the development of suburbia.

Initially single-family homes moved to the suburbs and jobs remained in the central city. Many jobs were still left in the central city, but manufacturing towns also emerged during this time due to agglomeration advantages. The suburbs contained low-cost land and an able workforce. For a factory, profit is one of the main concerns. By moving to the suburbs, factories could build for costs much lower than in the central city. As the urban landscape continued to evolve, a preference for diversified economies emerged, and suburbs began to diversify their economies beyond manufacturing. Service jobs and knowledge-based industries grew while manufacturing became less prominent. Many jobs moved to the suburbs, and deindustrialization moved some manufacturing jobs across national borders, leaving fewer low skilled jobs in the country.

Since many of the manufacturing jobs that remained relocated to the suburbs, an agglomeration of service and knowledge-based industries were focused in the suburbs, rather than the central city, which was the historical trend. This relocation of jobs left central city residents who worked in industries that migrated to the suburbs with longer commutes. This trend continued to accentuate. During the 1970s, locational flexibility for firms and households increased. Residential consumer preferences continued to prefer low-density suburbs, and residents became more detached from the central city. A new spatial

organization began to foster agglomeration in suburban metro areas. This meant that there was less emphasis placed on central city growth, and that those still remaining in the central city were seeing jobs move away from them. Jobs were frequently choosing locations based on growing populations, which were located near the suburban fringe (Covington 562). The exodus of manufacturing jobs into the suburbs, and the creation of more service jobs in the suburbs meant that suburbs were no longer “bedroom communities”. Suburban residents increasingly began working in nearby suburbs, but this was not the same live/work situation as when the city was the dominant employment center. Residents frequently worked in other low-density suburbs, which meant that going to work by foot was not a time efficient mode of transportation. The role of distance became a determinant in the social organization of space. Each aspect of life within the suburb was still separate, sectioned off into work, home, and commercial, but it had less dependence on the central city for economic prosperity.

The central city remained an area where high skilled jobs clustered, however as the expansion of high skilled jobs into the suburbs increased, the central city became less of a focus. Generally, the central city still contains high-skilled jobs, but the skills required for these jobs do not match the majority of the residential population. This trend is reflected of a production-to-service transition that took place beginning in the 1980s. Cities and metropolitan areas that could not make the production-to-service transition due to lack of a diversified economy were more susceptible to urban decline. Many former industrial cities, such as Cleveland, were part of this decline. William H. Frey describes this phenomenon

as a counter-urbanization-redistribution, where suburbs began growing more than cities, exemplifying urban sprawl (Frey 742).

Although, the urban landscape has a history of sprawl and fragmentation, indicating a prevalence of spatial mismatch, more recent trends suggest that this spatial disparity may be declining. As inner-ring suburban houses have aged and decreased in price, they have become more accessible to the central city poor. This suggests that distance from suburban employment may have decreased for those moving into the suburbs. Another trend is the “back-to-the-city” movement by the upper and middle class due to gentrification that began in the 1990s (Covington 562). If wealthier people are moving back to the city, property taxes could increase, increasing funding for central city public education, which could have positive spillovers for human capital development.

The following study will examine these developments and will updated spatial mismatch studies by using 2010 census data and specifically, by looking at income versus race and changes in in urban geography. Does the location of different racial and income groups affect spatial disparity? There is a perception that racial issues are not as prevalent as they used to be. In order to look at this phenomenon in particular, the study will compare race to income. Income is another common sculptor of urban geography and is expected to play a larger role than race in terms of residential and employment location. In addition, this study will look at changes in urban geography. When the spatial mismatch theory was initially postulated, inner ring suburbs did not exist. Since then, houses have aged and new ones have been built. The original suburbs are now becoming accessible

to lower income households, and potentially acting as an escape from the central city. It is expected that the presence of inner ring suburbs will lower the effect of spatial disparity. Updating spatial mismatch literature to accommodate these phenomena is potentially important to policy makers or developers who play a large role in the organization of urban areas.

By using a regression, this study will measure the amount of spatial disparity in the Cleveland-Elyria-Mentor metropolitan statistical area in Ohio using absolute deviations. Cleveland was selected because it is an area with a history of residential segregation and an industrial past, which includes a variety of low-skill jobs (Ganson 966). The first chapter will review spatial mismatch theory and its evolution over the years. It will also discuss factors that are an integrated part of spatial mismatch. The second chapter will consist of a literature review that shows how to measure the theories and is representative of the variation in measures of spatial mismatch.

The third chapter will discuss the particular methodology of this study including the particular spatial mismatch theories being measured. The fourth chapter will include descriptive statistics and six regressions measuring spatial disparity in the MSA. The fifth chapter, conclusions, discusses the outcomes of the regression, and the potential meaning of these results in relation to the Cleveland-Elyria-Mentor MSA and to greater spatial mismatch literature.

Chapter 2: Theoretical Perspective

Spatial mismatch focuses on the relationship between residential and employment location. There are several factors that effect spatial mismatch. This study will focus on human capital, transportation/ accessibility, skills mismatch, job search, and residential location. Each of these factors was selected because of its prominence in current spatial mismatch literature and its importance in residential and employment location.

2.1 Spatial Mismatch

Though the suburbs had a growing service industrial sector, the central city still contained high skilled jobs. However, the residential population in these high skill areas was primarily low skilled. The opposite was true of suburban areas. The suburbs housed many of the commuting high skilled workers, but also contained a supply of low skilled jobs. This disparity between opposite residential and employment locations became known as the spatial mismatch hypothesis. The concept was introduced in the 1960s, by John F. Kain, who noticed a relationship between residential segregation and employment in urban areas. He defined spatial mismatch as “the persistent residential segregation of minorities, particularly blacks, in central cities, combined with the increasing suburbanization of metropolitan employment” (Taylor and Ong 1453). Minorities were trapped in the central city, while low skilled jobs were located in the suburbs. Defining spatial mismatch in terms of racial segregation was appropriate during this time, due to racial tensions in the 1960s.

Later in 1986, David T. Ellwood described the spatial mismatch hypothesis with three criteria.

- 1) “racial residential segregation constrain black’s options in adjusting to the relocation of firms within a metropolitan area.
- 2) Firms and employment opportunities are not equally distributed across all neighborhoods in a metropolitan area.
- 3) Commuting and search costs impose differential constraints on people living in various neighborhoods. Thus, persons living in certain neighborhoods (e.g. in the inner city) are disadvantaged in their employment prospects (Harris, 4).

This follows along closely with Kain’s definition, specifying racial segregation as primarily black. During this time, as well as when Kain made his initial hypothesis, the minorities within the United States were primarily African American, and thus would be the prominent minority effected by a spatial disparity. This definition also looks at how the racial segregation makes it difficult for blacks to access the suburbs.

A more recent definition by Horner and Mefford (2007) defines spatial mismatch as “the premise that home and workplace locations of minorities are constrained as a result of issues of racial discrimination in labor and housing markets and perhaps central city job shortages” (1420). This definition expands upon the previous two to include all minorities because the urban landscape changed since Kain’s initial study and since Ellwood’s 1980s definition. Hispanics are the largest growing minority in the United States and have an increasingly important role in the metropolis. This definition also acknowledges that there are central city job shortages. In more recent years, cities, especially

former manufacturing cities, have had drastic decreases in the economic sector making it more difficult to find employment. It is also possible that income, rather than race, plays a larger role in the spatial disparity between the city and the suburbs.

Much of the spatial mismatch literature has focused on racial segregation within the central city and inner ring suburbs. When Kain first introduced the concept in the 1960s, racism and racial housing barrier effects were still very prominent in the urban landscape. The civil rights movement legislation was still new, and its effects on housing segregation were not yet visible. Therefore, many minorities, specifically blacks, still remained in the central city. Now, it has been over forty-five years since civil rights legislation was set in place. It would be expected that the racial barriers that prohibited minorities from moving to the suburbs would have weakened, and the suburbs would look more diverse. This study will look at income along with race to see if spatial mismatch is still prominent among minorities or if it is primarily based on income disparities.

2.2 Human Capital

Residential segregation does not only create divisions in geographic locations, but it also creates different educational opportunities. In the United States, a large portion of school funding is provided through property taxes. The suburbs tend to have newer, larger lots, and thus a larger tax base with stronger schools. Central city residents, however, tend to have smaller, filtered down housing, which has lower property values, and thus tend to have weaker school

systems. The difference between these two education bases creates a variance in opportunity based on geography.

The fragmented urban land structure further enhances the disparity in education opportunity between central city and suburban areas. As mentioned earlier low skill jobs have increasingly moved away from the central city to the urban fringe, where as the jobs located predominately in the city are high skill. Human capital is dependent upon education and the quality of education is dependent on property tax value. Central city areas tend to have lower level housing, which is taxed less. Therefore, central city schools do not see as much property tax money when compared to the newer, more expensive housing in the suburbs. If the educational opportunities provided between the suburbs and central city are geographically and financially different, the central city youth have less of a chance of receiving a strong education. Receiving a weaker education puts center city youth at a disadvantage when competing for high skill jobs located near their place of residence.

Lack of human capital is relevant to spatial mismatch because it highlights the importance of mobility in job accessibility and physical mobility in the labor market. Having higher human capital leads to increased mobility. Those living in the suburbs with high human capital have increased mobility and are able to commute to and from the central city for employment. Unlike these suburbanites, low skilled, central city residents are not as mobile and have less modal choice traveling to and from low-skill suburban jobs. Without equal educational

opportunities, competition for high skill, city employment is not very accessible for the residents living within the central city.

2.3 Skills Mismatch

Skills mismatch is a phenomenon frequently paired with spatial mismatch literature, and is often thought to be the more prominent dilemma in the geographic landscape. In the context of this study, skills mismatch also relates to human capital. It is the combination of low educational attainment and distance from place of employment, whereas spatial mismatch focuses on the distance from residence to workplace. The spatially uneven character of economic restructuring, where low skill manufacturing jobs are located in the suburbs and high skill professional jobs are located in the central city, has created geographic barriers to entering the workforce.

Bauder and Perle define three job areas: independent primary, subordinate primary, and secondary segment jobs. Independent primary jobs consist of high-earning, high benefits, high job security, and high educational skills. These jobs are prominent across the entire urban landscape but are disproportionately high compared to lower level jobs in central city areas. Subordinate primary jobs typically require strong motor skills, have high physical demands, and have a somewhat increased risk of job loss. The secondary segment consists of low wages, low educational attainment, low benefits, and have a higher risk of job loss (Bauder and Perle 962). These jobs would include your traditional blue-collar jobs

such as manufacturing. Central city residents frequently qualify for secondary sector jobs.

Most available employment in general has shifted from the subordinate primary sector to the independent primary sector. Subordinate primary sector areas of employment tend to focus in lower skilled jobs and have increasingly located in suburbs or moved over national borders. This restructuring creates a disadvantage for central city residents with low skills, because with subordinate primary jobs decreasing, central city residents are forced to look for secondary segment jobs, which have lower security, benefits, and wages. Not only do these secondary segment jobs have lower wages, but they are often located in the suburbs, creating a distance barrier for those seeking employment, creating a spatial mismatch.

2.4 Residential Location

Residential location plays a large role in spatial mismatch, because of the limitations it places on the housing market. Limitations often stem from socioeconomic status, race, and the natural market, which leads to systematic, institutional segregation. Personal preference in connection with protecting property values has also played a role in shaping urban segregation. Homes are assets, and homeowners want to protect property values and their way of life. Zoning, filtering, real estate agencies, lending groups, and the government are all part of the institutional segregation, which has influenced the current single-

family homeowner focused urban landscape. As mentioned earlier the current landscape is sprawled and its continued growth in this pattern has led to place stratification where many groups are segregated systematically often by race and socioeconomic status.

Historically, race has been a factor in determining where specific groups of the population live. Initially, most housing units, regardless of race, were in the central city, but as transportation improved, many whites began moving to the suburbs to live. This movement has been given the name “white flight” because mostly whites were moving to the suburbs while other minorities were left in the cities. Minorities, during the time of white flight, did not join the exodus to the suburbs largely to do systematic obstacles. Red lining, zoning, and discriminatory lending markets acted as racial-ethnic barriers for those wishing to enter suburban communities. Red lining and discriminatory lending markets limited where mortgage loans would be granted. Minority communities were often in those areas, and without mortgage loan assistance, it was almost impossible to afford homeownership.

Zoning represents a hierarchy of land use where single-family dwellings are located at the top. This hierarchy limits the types of housing and structures that can be built in certain areas. Originally, zoning was used for specific discrimination purposes such as limiting where Chinese laundry mats were located and creating separate districts designated specifically for Whites and Blacks (Nelson, Dawkins, and Sanchez 425). Modern zoning cannot discriminate by race and in most communities is focused on maximizing the value of single-

family homes. Even though zoning today is not focused on overt discrimination, it still creates racial and income segregation. In many cases, zoning limits the construction of multi-family dwellings (including affordable housing) near single-family homes in the suburbs. Multi-family dwellings are often seen as lower value housing, and can lead to a decrease in homeowner property values (Nelson, Dawkins, and Sanchez 426). Multi-family housing can foster absentee landlords or renter externalities, which lead to property dilapidation, which makes them unpopular with homeowners. If zoning creates a barrier for multi-family housing in the suburbs, and low-income city residents cannot afford homeownership in the suburbs, it is likely that they will be zoned out to protect residential property values. Since income and race tend to correlate, minorities have, in some cases, been systematically kept from the suburbs (Nelson, Dawkins, and Sanchez 426).

The civil rights era created federal policy which prohibited racism through the passage of the Fair Housing Act of 1968, which forbid residential segregation (Charles 168). However, these policies did not address systematic segregation. Zoning continues, to keep low socioeconomic groups out of the suburbs, and since minorities tend to have low socioeconomic status, they continue to have limited access to the suburbs. Modern, people-based social policies have provided vouchers for suburban housing initiatives, which have decentralized affordable housing in some areas (Covington 562). However, these suburban affordable housing opportunities tend to be concentrated and separate from traditional suburban neighborhoods. In this way, segregation still has a race element, but it also includes economic status and lifestyle differences.

Those minorities that had higher socioeconomic status were able to move to the suburbs, leaving the poor in the central cities. In the 1970s, the migration of successful minorities was evident because central city living deteriorated. The wealthier minorities moved away from the city, leaving the poorer minorities who could not afford housing maintenance costs. The old housing that was left behind filtered down further while low skilled jobs continued to move to the suburbs (Charles 168). This filtering has given the poor access to filtered suburban housing in inner ring suburbs, which were less accessible before (Covington 562). Although filtering is a natural market function, not a function of institutional segregation, it has helped sustain the relationship of lower socioeconomic segregation present in earlier years. Central city residents continue to have limited residential choices.

This limited residential choice is relevant to spatial mismatch because it demonstrates the spatial limitations to accessing suburban housing. Residents of low socioeconomic class may have to find an affordable way to commute to suburban employment or find a way to relocate to the suburbs. With the system of institutional segregation that has shaped the suburbs, central city residents will have to overcome racial and economic barriers if they want to mend the spatial disconnect. The recent introduction of inner ring suburbs to the urban landscape may provide lower income individuals more access to the suburbs.

2.5 Transportation/Accessibility

In 1924, Earnest Burgess created the concentric zone model. This model is based on the idea that circular zones extend from the central city, and each of these zones contains a specific social group (Marzluff 73). Though this model is old, the current urban landscape has similarities with its premise. The central city is still in the middle, and emerging from it are various suburbs. This decentralization has evolved beyond its original, broader definitions of urban and suburban, but now includes, downtown, inner city, central city, inner-ring suburbs, and outer-ring suburbs (Covington 561). The suburban rings have expanded over time physically and economically and have created a spatial disadvantage for those living in cities. A central city resident has two options for commuting to the suburbs: drive a car or ride public transportation.

The personal automobile did not only encourage urban sprawl, but it has continued to encourage this type of development. Roads and highways have been built that connect the various zones, suburbs, and cities. Individuals prefer this type of transportation because it is private and has low time costs. The car-based infrastructure was built to be greater than the human scale. An individual trying to run errands or get to and from work would have to walk great lengths along roads and intersections if he/she did not have a car. The car has become a norm, in society. It is almost expected by employers that workers own a car, and if someone does not have a car they are at an extreme disadvantage.

Public transportation is supposed to act as a car alternative. However, in the United States, personal preference and transportation infrastructure investment

has focused more on single-car ownership. Supported by personal preference and government policies, public transportation has declined. When modern cities were first built, they were dense and had to provide strong modes of public transportation because personal cars were not as prominent or necessary. Density makes public transportation a viable option, especially when driving in a separate car can lead to increased traffic congestion in such a dense space. With the sprawl and infrastructure that has consumed the urban landscape, accessibility and the personal automobile have almost become synonymous.

Without density or frequency, public transportation is slow and not an efficient alternative. High time costs combined with low frequency, and low connectivity make public transportation an unfavorable commuting choice. Reverse commuting (going to the suburbs from the central city) can have high time costs because public transit modes commute away from the central zone to more spatially isolated areas. Driving to multiple stops on the way to one destination already extends a trip, but if those stops are miles and miles apart, a thirty minute commute by car may take two or three hours by bus. These high time costs play a role in where individuals search for employment.

Spatial mismatch looks at “geographic barriers between inner-city workers and employment opportunities” (National Research Council 14). Transportation accessibility is one of these geographic barriers. Not owning a car is not only disadvantageous in accessing a job, but makes it difficult to know what places are employing. People living in the center city tend to either be very wealthy or are very poor (Covington 562). People with lower incomes have a difficult time

acquiring and maintaining a car due to high car operating costs and therefore, are at a disadvantage in the labor market when it comes to finding and commuting to and from a job.

2.6 Job Search

Spatial mismatch includes the commuting distance from residence to place of employment, which can also create job search barriers. “In standard search theory, individuals choose reservation wages and search intensity by comparing the marginal benefits and costs of search and equating them at the margin” (Stoll 296). When searching for employment, a person must consider time and transportation costs.

Geographic barriers create employment information deficits through both physical distance and weak social networks (Covington 562). If residential areas are not near places of employment, it is less likely that residents will know about the opportunities available within those areas, and if social networks are weak, residents are even more disadvantaged.

As mentioned earlier, the urban landscape is segregated into homogenous groupings. Those living in older areas of the central city tend to have lower socioeconomic status, lower skills, and lower social capital. Social capital is “the capacity of individuals to command scarce resources by virtue of their membership in networks or broader social structures” (Kasinitz and Rosenberg 188). Strong social networking is becoming increasingly important in finding employment across all skill levels since employment advertising has evolved. For

this reason, neighborhood relationships are critical in job networking. If a neighborhood has limited social resources, then it is likely that it also would have lower social capital. This means its residents would be disadvantaged when looking for employment.

According to Kasinitz and Rosenburg, social networks have three important functions in the labor market: they provide specific job information, direct sponsorship, and role models of successful employees (Kasinitz and Rosenburg 189). Specific job information includes the details of where the job is located, who to contact, and the best way of getting the job. Direct sponsorship consists of a current employee vouching for the applicant. This is important because increasingly jobs are coming from “positive discrimination” or through referral from a reliable source (Kasinitz and Rosenburg 187). Having a successful employee as a role model is important because an applicant can learn information on how to best function at the company (Kasinitz and Rosenburg 189).

Based on this information, if a person is living in a homogenous neighborhood with weak social capital, he/she would face limited job information, positive discrimination, and would not have successful role models because other neighborhood residents are struggling to find and maintain employment as well. The neighborhood is homogenous, meaning most of the residents are in the same employment situation. If that situation is trying to find employment, then residents are at a disadvantage. Suburbanites tend to have higher social capital, so in a homogenous neighborhood, they have a large networking system. Through

these barriers associated with time and monetary traveling costs and differences in social networks, segregation creates a spatial mismatch in job search.

The above theories identify with the multiple layers of spatial mismatch theory. Social capital and skills mismatch identify disparities in human education and skill. Residential location is an identifier of the geographical barriers to housing which separate segments of society. Transportation/Accessibility and job search expand upon this geographical barrier by adding access to employment. Accessibility reflects both physical transportation and accessibility in regards to social capital. These theories individually capture different aspects of urbanization but collectively are representative of spatial mismatch theory. Each can be measured using a variety of methods, which makes the spatial mismatch literature inconsistent, depending on the theoretical framework applied.

Chapter 3: Literature Review

The following five sections are literature reviews of studies that are relevant to spatial mismatch as defined in this research. The first four sections focus specifically with spatial mismatch and explore a variety of measurements that can be used to look at job accessibility. The fifth section focuses on levels of poverty within a new urban landscape context. Much of the literature looks at total U.S. metropolitan statistical areas and the remaining studies look at individual cities, but most all of them compare either commuting distances, employer and residential locations, and the employment sector through a regression.

3.1 Taylor and Ong

Taylor and Ong (1995) hypothesize that if spatial mismatch exists, commutes from residence to place of employment would be longer and increase in number. They define spatial mismatch as a phenomena where central cities have declining employment for minority residents, and therefore those residents have longer commutes and higher unemployment (1453). The authors point out that measuring this phenomenon would best be tested by measuring commutes. Higher levels of unemployment and low incomes of central city minorities can be caused by a variety of factors that do not directly relate to spatial mismatch. Residents could have a lack of education, experience, or could be victim to discrimination. These variables, according to the authors, may have an effect on

why minorities tend to have low incomes or are segregated in the central city, but they do not directly address the spatial mismatch defined above.

The authors use John Kain's 1968 definition of spatial mismatch, but reference more recent trends in the urban landscape. They recognize that jobs have increasingly moved to the suburbs. Due to this increase, traveling to suburban employment locations from the central city should lead to increased commuter times and distances for minorities with income restraints (1454). Taylor and Ong test this conceptual framework by observing commuting trends among Black, White, and Hispanic workers between 1977-78 and 1985.

They use data from ten metropolitan samples of the American Housing Survey for 53,000 housing units to create multiple regressions. The surveys were reviewed in 1977-78 and then again in 1985. The housing units were divided by race: 5,231 Black commuters, 1,833 Hispanic commuters, and 26,295 White commuters. The metro areas were then divided into 228 travel analysis zones which were defined by residential population as either "white", "mixed", or "minority". If minority commutes were longer in length and time than Whites, then there would be a spatial mismatch presence. To measure occupation, Taylor and Ong divided workers into low skilled and skilled. Those with no-post high school education and an annual income of less than 8000 dollars in 1977-78 or 13,200 dollars in 1985 were classified as low skill workers (1456).

The first analysis had an independent variable of commuter distance and time for each time period and a dependent variable of race, holding constant for modal choice. The results showed that Black, White, and Hispanic commuting

patterns seem to be increasingly similar rather than different. Blacks and Hispanics had shorter commutes in terms of length when compared to Whites, averaging about one mile fewer. The time commute was highest for Blacks in both 1977-78 and 1985, while Hispanics and Whites had about the same average time in minutes for each sample (1485).

The study then looked at modal choice holding constant race and time and length. Modal choice options included driving alone, ride sharing, and taking public transportation. The average ride sharing commute was 11.4 percent longer than the average drive-alone commute, and public transit was 74.8 percent longer than the average drive-alone commuter. Minority drive-alone commuter distances and times in the 1977-78 study were higher than in 1985. Minority ride sharing commute lengths were not as dissimilar from Whites in 1985, but their commute times were different. Black public transit commuter length and time was higher than Hispanics and White public transit commuters in almost all cases (1460).

The authors explain that the difference in public transportation commutes can be explained by the fact that in both studies, twenty percent of Black workers commuted by public transportation when compared to Hispanics, ten percent, and Whites, seven percent.

The first regression looked at the average commute distances for 1977-78 and 1985. The dependent variables were commuter distance in miles, and time in minutes. The independent variables were age, annual income, Black, education, Hispanic, minority area, mixed area, public transit, ride-share, and sex. Age and annual income were significant indicators in both studies and in both commute

distance and time. As age and income increased, so did commuter distance and time. Being Black increased commuter time in both studies, but being Hispanic did not have a significant effect. Commuters living in mixed areas had slightly lower commute distances and times than those living in minority areas. Using public transportation increased commuter time in both periods, while ride-sharing increased commuter times and distances across both studies (1462).

The second regression used the same variables, but controlled for low-skilled workers. This regression showed similar results except living in a minority or mixed area had no significant impact on low-skilled commuter distance and time. If there were a spatial disparity, it would be expected that these areas or at least the minority areas would have increased commute distance and time (1462).

The next analysis looks at commuter time by race, holding constant modal choice and minority areas. The table shows that Blacks had higher commuter times in almost every minority area. Table seven looked at the commute patterns of non-moving workers, or workers that were analyzed in both time periods. This table showed that average distance in commutes remained fairly stable while commuter time tended to decrease for all race groups. Table eight looks at commuter patterns of non-moving workers based on residential areas. This data showed similar results to table seven (1467).

The last analysis looks at the effect of commuter time and distance on job search. The authors compared workers earning wages in both study periods and those only earning wages in 1977-78. They were looking to see if there were changes in the minority labor market due to commuter time or distance increases.

The results show that workers who were leaving the work force had shorter commutes than those who were earning wages across both periods. An additional analysis further looked at job search by testing if race, commuter characteristics, or residential areas were significantly related to workers leaving paid work between the two areas. Results showed that minority workers employed in 1977-78 were not less likely to leave paid work during 1985 when compared to whites holding constant for age, education, income, and sex (1469).

A critique of this study is that it focuses mainly on commuter length, and is missing other important factors in the spatial mismatch hypothesis. The lack of spatial mismatch as defined in this study, may be due to lower-skill people finding jobs closer to the city and therefore, having shorter commutes. The longer length of commute for suburbanites might be due to commuting into the city, which typically has higher skilled employment. Suburbanites would be more able to afford commuting longer distances.

Taylor and Ong's study is relevant to this research because it looks directly at spatial mismatch through commuter distance and times. It uses a regression model to evaluate the effects of different variables such as age, sex, income, education, neighborhood composition, and race. All of these variables could affect spatial mismatch, but could reveal different social outcome such as a skills mismatch. This study is also significant because its results show weak evidence that a spatial mismatch is occurring in a post Civil Rights era. The research conducted in this study will use more recent data to see if these findings still uphold with the modern urban landscape.

3.2 Stoll

Stoll (2004) asks if geographical skills mismatch exists between the location of less educated minorities and high-skill job clusters, causing low employment. He notes that there has been extensive research on increasing skill requirements for jobs when labor skill is not increasing at the same rate, but little has been researched on geographical landscape in relation to skills mismatch.

The main theories used in this study are skills mismatch and job search. Skills mismatch is defined as the variance in the skill of the labor force compared to the skill level required in the labor market. Stoll recognizes that jobs with higher skill requirements tend to be clustered in central cities where the labor supply is frequently low skilled. He also recognizes that Blacks tend to be more concentrated in central city areas (695). In order to further test these propositions, he looks at job search factors for less educated workers. Job search is the costs a person is willing to make in order to find a job. Costs include monetary and time loss. Individuals with less education and less resources tend to have smaller geographic searches. Stoll notes that due to the sprawled urban landscape, individuals with smaller search scopes may have a harder time finding employment. Assuming that Blacks have a tendency to be more concentrated in the central city, they may be effected by job search (697). Based on the results from prior studies, Stoll hypothesizes that Blacks and Latinos will face more geographical barriers in their job search.

The study uses data from the 1992-1994 Multi-city Study of Urban Inequality and Multi-city Employer Surveys for Los Angeles and Atlanta. The

data from the survey looked at single housing units for Blacks, Whites, and Latinos between the ages of 21 and 65. Stoll focused on those without a college degree who stated that they were actively searching for a job. The surveys were distributed through random stratification where households were divided by income and race. More surveys were given to concentrated poverty areas because these are the primary areas of focus in the study. Stoll chose this data because it can look at low-skilled workers who are actively searching for employment. The study used 212 surveys from Atlanta and 522 surveys from Los Angeles (699).

The methods of measurement selected were descriptive statistics and regression analysis. Variables included high-skill job requirements, number of areas searched, residential location, and mode of transportation, controlling for race. In order to measure the percentage of jobs with high-skill requirements during job search and establish the factors of the search, Stoll averaged the percentage of jobs that required a college degree in those areas searched by the respondent. Seven areas were selected as target search areas and then the author monitored the respondent's job search within those seven areas in each city. These seven search areas are divided based on high skill and low skill employer requirements and are distributed throughout the central city and suburban areas. The author then used the surveys to identify the last place of employment for each respondent, and by using GIS techniques, located the employers, allowing Stoll to locate which of the seven search zones the employer was in.

Respondent residence was also identified using GIS techniques and census data. 1990 Census data was used at the census tract level to categorize the racial

composition of the two cities. Racial composition was then divided into seven groups: central business district, Black central city, Latino central city, White central city, Black suburbs, integrated suburbs and White suburbs. Survey respondents were then allocated to one of these seven areas based on their census tract locations. Atlanta did not have a Latino central city area or people located within the central business district (701).

Job search methods were split into four categories on the survey: ‘open’ meaning help wanted signs, ‘social’ meaning through a friend or relative, ‘credential’ meaning sending resumes out or looking at newspapers, and ‘intermediary methods’ meaning school job placement offices or employment agencies (702). Mode of transport was measured in three categories: car, public transportation, and other means. These variable measurements were used in the descriptive statistic model.

The descriptive statistic model looked at the seven search areas and also looked at the areas that were reported by respondents, but were not in the search areas. Within each city were three focuses. The first focus showed the percentage of jobs that require a college degree in each area. The second focus represented the experience and training requested by high skill employers. The third focus further defined high skilled jobs by showing the percentage of employers that require a college degree (702). Results from the model show that similar distributions of high-skill job concentration can be found within specific search areas, or in other words, all three focuses in each search area correlated. This showed that measuring high-skill jobs by employers that require a college degree

is a fairly accurate measurement tool. The model also showed that high-skill jobs were typically clustered near the central business district. It also showed that high-skilled jobs were less prominent in White suburbs and Black residential areas (703).

The next descriptive model compared less educated Blacks, Latinos, and Whites in terms of geographical skills mismatch. The results showed that there were statistically significant racial differences in high-skill job clusters related to residential location. Less educated Blacks saw more of a skills mismatch and during their job search were more likely to search in high-skill areas.

The first regression looked at search in areas characterized by high-skill job requirements. The variables were the same as the ones used in the descriptive model with the dependent variable being high-skill job requirements. The results showed that when compared to White suburbs, living in the central city or in Black suburbs increases the likelihood that a resident will search for jobs in high-skill areas. Latinos were less segregated from Whites, so saw less residential segregation. The results also showed that car access matters when searching for employment in areas with lower levels of high-skill job clusters (708).

In the last regression, Stoll investigates whether search in areas with high-skill job clusters is correlated with employment. He hypothesized that this would determine how correlated geographical skills mismatch is with employment by race. The dependent variable was employment status. Results showed that increases in the percentage of jobs requiring a college degree in areas searched decreases employment. It also showed that lowering the amount of jobs that

require a college degree in areas searched to that of the level of Whites would increase both Black and Latino employment rates (710).

Most of the results were consistent across both cities. They supported the hypothesis that when compared to compatible Whites, Blacks and Latinos undergo a geographical skills mismatch. However, there are several limitations to this study. First, it was limited by the fact that the study only looked at seven search areas in each city based on resident survey responses. This meant that there were areas that were not represented in the models, which may have revealed different results. This was especially noticeable in Atlanta, which had eleven areas that were not used. A second limitation was that not all high skill search areas have exclusively high skill jobs, but the study recognized job search in these areas as searching in a high skill employment area. A third limitation is that mode of transportation only looked at mode of transportation to and from current employers or former employers. If the study assumes that residents are located in low income areas, then that would mean they probably had financial limitations, and job search mode of transportation may be different than when they were employed.

Stoll's study is relevant to this research because it uses a dissimilarity index to identify where low and high skill level employment is located in relation to the racial composition of the cities. The research in this study will be focusing on the job sector composition in relation to metro residential composition. Using a similar dissimilarity index could help measure spatial mismatch disparities between residence and employment.

3.3 Gottlieb and Lentnek

Gottlieb and Lentnek (2001) look at spatial mismatch in the central city and suburbs controlling for race in Cleveland, Ohio. Unlike several studies, which focus on Kain's central hypothesis of spatial mismatch, the authors in this study recognize that there are two aspects of Kain's hypothesis and break it into categories. First, they look at racial discrimination in the housing market and how that affects the location of Black employment. Second, they look at the suburbanization of jobs and how that would affect low-skill Blacks in the central city. The authors note that most spatial mismatch studies focus on the second hypothesis (1162). Gottlieb and Lentnek's study considers these two premises and focuses on if African-Americans have longer commutes because of discrimination in employment and if central city workers have longer commutes because many entry-level jobs are located outside of the city.

In order to measure these hypotheses, they measure commuting time and distance across four neighborhoods, controlling for occupation, gender, and mode of transit. The four neighborhoods are divided into two majority Black and two majority White suburban and central city locations (1162). The authors use commuting data from the 1990 Census Transport Planning Package (CTPP), which has data on commuting flows in 1000 transit analysis zones (TAZs). In order to measure the commuter distances and times, based on modal choice, a TAZ-to-TAZ matrix was collected from the North-east Ohio Area Coordinating Agency (1164). The data was then used to compare average commuting times and

distances between neighborhood groups using a two-tailed t-test to look for mean differences.

The independent variables were the four neighborhoods and the dependent variables were the commuter times. The four neighborhoods are a “poor Black neighborhood on the east side of Cleveland that was designated a federal empowerment zone in 1994, a largely White neighborhood on the west side of Cleveland, a Black working-class suburb in the south-eastern part of the central country, and a White working-class suburb very close to the Black suburb” (1165). Employment discrimination is defined as an impediment to employment in a specific location based on race. It is measured by looking at where neighborhood residents are employed in relation to their residence.

Results from the study showed that when comparing the two Black neighborhoods, occupants in the central city empowerment zone had shorter commutes than comparable residents in the suburb. Similar results were found between the White central city and suburban residents. Although, the central city residents had shorter commutes, they had varied distances. The results also showed that public transit took significantly more time than other modes, and empowerment zone workers were the group most likely to use it (1168).

The t-test also compared results across neighborhoods based on race. The Black suburb had longer commutes than the White suburb. However, the Black and White central city locations did not differ significantly in commuting times or differences. There was however a difference in central city commuting patterns

between Black and White women, where Black women typically had longer commutes typically due to transit dependence (1168).

Based on the results, the author's assumed that the shorter commutes in the empowerment zone were due to a reasonable supply of skill matched employment opportunities. The zone was in close proximity to the central business district and University Circle. In order to see if these areas had jobs that were obtainable for low skilled workers, the authors looked at the density of entry-level jobs by zip code in each of these areas, and determined that these were skill-matched areas (1170).

Despite what the spatial mismatch hypothesis would suggest, the two central city neighborhoods actually had more accessibility to jobs, and the two Black neighborhoods were closest to job growth. However, the evidence showed that there was more labor competition for jobs in the central city, which could explain its higher unemployment rate. From this evidence, the authors conclude that there is not strong evidence of a spatial mismatch based on race in the central city location of Cleveland (1176). However, when commuter lengths and transportation mode are considered, Blacks have longer commutes and are more likely to use public transportation. This evidence would suggest a spatial mismatch in terms of Black choice limitations.

When looking at the second hypothesis, of the suburbanization of low-skilled jobs, there were different findings. The Black suburb had longer commutes when compared to the White suburbs and central city neighborhoods. This could suggest that there is discrimination in the workplace. The authors noted that 51%

of Black suburban residents commuted into the central city, while only 17% of White suburbanites commuted into the central city. The authors explain this phenomenon by pointing out that much of upward mobility of Blacks in the post-war period has been in public administration and education. These jobs are frequently located in the city (1180). According to the data, the Black suburbanites have slightly more residents in these fields when compared to White suburban residents. Therefore, employment discrimination may not be the cause of longer commutes, but rather a historical preference for jobs that are located within the central city (1183).

The limitations to this study are that there were no direct measures of employment discrimination. The authors primarily looked at where residents were employed and assumed that the increased length in Black suburban commutes was due to historical preference. Another limitation was that CTPP data only looks at broad geography commutes, which may alter findings. Race is determined by TAZ zones, however, not all communities are solely one race. The data does not have the ability to measure different races within the same community, because it only has the ability to look at the TAZ zones. Even though Cleveland is fairly segregated, this information could reveal compromised results.

The Gottlieb and Lentnek's study is related to the study of this paper because it focuses on Cleveland, Ohio, which this study will do. Although this study will use different methods to divide the metropolitan area into three categories: central city, inner ring suburb, and outer ring suburb, it will look at the

job sector like this study. Since this study looks at Cleveland, it may be useful as a comparison between spatial mismatch results.

3.4 Covington

Covington (2009) hypothesizes that the modern fragmented urban landscape fosters isolation between employment location and residential location for the poor. The author's definition of spatial mismatch references Kain's study (1968), but focuses more on the decentralization of inner city employment centers. Covington recognizes three limitations in current spatial mismatch literature. First, while decentralization of the central city is a critical element of spatial mismatch, its definition has likely expanded as the urban landscape has continued to develop. Factors within and between metropolitan areas, such as migrations in population, employment, business, and development changes also have increasing significance (560). Second, she states that much of the literature fails to look at job isolation for the poor specifically (559). There have been studies that look at mismatch based on residential and employment location, but do not focus on that spatial disparity with relation to those who would be impacted the most by this inequality. Lastly, she continues to look at race, as many prior spatial mismatch studies have done, but also incorporates socioeconomic status as a possible equally important, if not more significant, factor.

The study uses the 1990 and 2000 U.S. Census of Population and Housing, the 1992 Economic Census, and the 1999 U.S. Department of

Commerce's Zip Code Business Patterns files to look at 314 MSAs in the United States. The research questions focus on change in job access for the poor, what factors drive the change in access, what factors are important to the disparity in job access between the poor and non-poor, and how has metropolitan change affect the disparity between the poor and non-poor (561). To test these questions, Covington uses descriptive analysis and multivariate least square regressions. Descriptive statistics look at the effects of single variables on job imbalances for poor and non-poor families by race and year. In addition, the multivariate regression can compare the descriptive statistics with other possible contributing metropolitan factors.

The descriptive analysis uses a jobs-to-people imbalance (job isolation), which measures the imbalance between jobs and residential locations of families using a dissimilarity index. The study uses eight jobs-to-people indices: poor and non-poor total families, White, Black, and Latino poor and non-poor families. Employment is measured in total employment and retail employment because a large portion of retail-jobs are low skilled (563). To calculate the index, zip code level data are used to find employment and geographic locations. Metropolitan-wide job isolation factors are measured in two areas: between-metropolitan area migration (migration across MSAs) and within-metropolitan area improvements (residential or job location changes that occur).

Descriptive analysis results show that in 1990 and 2000, the poor were more spatially isolated from jobs than the non-poor. However, it also showed that in both years the poor were less spatially isolated from job access opportunities

than the non-poor. The results also showed that total and retail job isolation between non-poor and poor workers did not differ significantly, suggesting that there is little spatial mismatch between the poor and non-poor in terms of access to low skilled jobs. It also showed that Blacks are the most isolated from jobs regardless of their poverty status, and that Blacks and Latinos are the most isolated from both total and retail jobs (567). However, the analysis shows that poor black and Latino families saw greater access in job access than did poor Whites in the 1990s.

The metropolitan analysis shows that poor Black and Latino families are the most isolated from jobs when comparing all of the MSAs involved in this study. It also showed that most of the job isolation reduction for the total poor in the 1990s were due to within metropolitan changes and that most of these changes were due to residential mobility rather than job movement (569). These changes varied some by race. Blacks tended to see more improvements based on residential mobility, while Latinos saw more improvements in mismatch from increased access to retail jobs.

In order to look at how job isolation and metropolitan landscape trends are actually effected, a multivariate analysis is used to look at related variables controlling for race. The descriptive analysis showed that there was job isolation in some areas, but the regression will look at the strength of factors, which effect the movement of people and firms. Employment was divided into manufacturing, retail trade, and service. To look at affordable housing within each MSA, a housing cost burden coefficient of variation was created. Geographic and

demographic variables were used as well including region, city age, percent Black, percent Latino, percent 65 years or older, percent with college degree, and number of political jurisdictions.

The first regression looks at what factors explain variation in job isolation across individual MSAs for poor families in 2000. The dependent variable was job isolation for the poor controlled for by race. The results showed that among all poor families manufacturing and service sector employment accessibility minimized job isolation while job sprawl increased isolation. Residential heterogeneity also increased job isolation. Results also showed that the greater the Latino, Black, or college graduate population, the higher the likelihood of job isolation. Most significantly important is the job sprawl variable, which holding all other variables constant, job sprawl developments worsen job isolation.

The second regression looks at what metropolitan features explain the gap in job access for the poor as compared to the non-poor in 2000. The dependent variable was job isolation between the poor and non-poor controlling for race. The results showed that decentralizing jobs and the diversity of housing cost burdens are the main causes of job isolation. As jobs move past the central city, job isolation of the poor increases and access to affordable housing decreases. Like the previous regression large minority populations expand the job isolation disparity between the poor and non-poor. Interestingly in this model, the representation of poor and non-poor blacks was limited; only 9 percent of the job isolation could be explained by the model. Covington suggests that this could be because Blacks are generally more tolerant in residential preferences when

compared to Whites, and that a more dynamic model would be necessary to capture these factors (578).

The last regression looks at what metropolitan factors drove the change in the gap in job isolation among the poor and the non-poor between 1990 and 2000. The dependent variable was the change in the gap in job isolation between the poor and non-poor controlling for race. The results showed that the change in the number of jobs in the manufacturing sector in the 1990s decreased, minimizing the ability of the poor to reach equality with the non-poor. It also indicated that job sprawl does not significantly effect job access between Black and Latino poor and non-poor. Overall, the model concluded that mostly manufacturing employment minimizes inequalities while job sprawl maximizes inequalities in job isolation among the poor and non-poor (580).

A critique of this study is that by looking at entire MSAs, the data picks up rural residents, which tend to have longer commute times due to their remoteness. The author points out that 21 percent of the MSA populations she used lived in rural areas. Another critique would be to have a larger focus on gaps between the poor and non-poor individually, rather than the poor and non-poor within each race. This could reveal a general trend, which could be used to compare the comparable race findings. A greater focus on Black residential preference and class segregation factors would be important as well, since Blacks historically have had increased spatial mismatch.

Covington's study is relevant to this research because although it looks at racial elements, it also focuses heavily on socioeconomic limitations as well,

which may be relevant in a study of the current urban landscape. The study in this paper will focus on socioeconomic status as a primary factor in spatial mismatch along with race, so referencing a study that focuses on similar factors will be useful in developing a methodology. It is also significant because it finds that spatial mismatch has improved in terms of job isolation. Firstly, the poor's isolation from jobs has declined more than the non-poor's job isolation because they have had more accessibility to areas with obtainable jobs. Secondly, it finds that these declines in job isolation were most prominent in Black and Latino populations where spatial mismatch tends to be most exaggerated.

3.5 Cooke

Cooke (2010) focuses on a newer phenomenon in the urban landscape, inner ring suburbs. Although there have been many poverty studies conducted, these studies have focused primarily on suburban and central city areas. Cooke acknowledges that although more recent studies may suggest that the poverty among the central city and suburbs has improved, these studies do not account for the spread of the urban poor into inner ring suburbs in more recent years. The author states that the 2000 census shows a decrease in central poverty, but it also indicates an increase in suburban poverty (179). Cooke notes that there could be several causes to this increase. They could be due to the economic health of metropolitan areas, national trends, changes in housing distribution, or improvements in residential mobility. The health of metropolitan areas would be a factor because if the city grew, then this growth could affect the extent of city

poverty. National trends, such as immigration and the decentralization of aging industrialized cities, could be factors because they would affect mobility opportunities of the poor. Changes in housing distributions could have an impact because the national policy changed from a policy predominately focused on dense public housing to more housing options for the poor. Residential mobility could be a factor because filtering has made inner ring suburbs not only more affordable but also convenient, since they are close to the central city (181).

This study uses geocoded data from the Panel Study of Income Dynamics (PSID) from 1989-2005, which collects data biannually. Cooke chose this data because it can look at the patterns of poverty as well as exact data on location of residence. This data defines poverty similar to the family income, family size, and poverty thresholds mentioned in the U.S. Census. He had a sample size of 111,333 individuals across 315 MSAs (182). In order to define what locations were classified as central city, inner ring, and suburbs, three geographic definitions were used. The first definition came from the census and strictly defined suburbs and central cities, where all land outside of the metropolitan area is defined as suburban. The second definition looked at Cooke and Merchant's (2006) definitions of urban core, inner ring, and outer ring suburbs, which are based on population density and filtering. The central city has the highest population density and most filtering down, while the outer ring suburbs have the lowest population density and had the slowest filtering (183).

The third definition, Cooke calls the hybrid method. This definition acknowledges that the inner ring suburbs often fall in central-city boundaries, and

therefore, are under the same metropolitan policies. In order to adjust for this, the study combines the first two approaches. All tracts in the central city are measured in the central city, and any areas defined as inner ring suburbs outside of that spatial barrier are labeled as such (184).

Cooke suggests that the increases in poverty rates mentioned could be due to an increase in the number of poor people or a decrease in the number of non-poor people living in the inner-ring suburbs (185). In order to measure the change, he uses a RHS net change, or the change in the number of poor people in an area, by looking at the transition of people in and out of poverty within and between MSAs.

The results showed that in the first graphical representation, comparing suburbs to central city, that neither area had a change in poverty. Results after adjusting the census definition to include inner ring suburbs showed that poverty patterns match those of central city areas. Results for the hybrid method show similar results to the Cooke and Merchant method. There are increases in poverty along the outer limits of the central city and inner suburbs.

Results after adding the net change of poverty within and between MSAs showed that for central cities poverty rates generally increased from 1989-1997. From 1997-2001, central city poverty declined and from 2001-2005, poverty began to increase again. Overall, the graph showed that the out-migration of the poor from central cities did not contribute to decreases in urban poverty in the 1990s. The net change in poverty for inner-ring suburbs was similar to that of central cities, so migration of the poor did not contribute to increases in inner-ring

poverty. Cooke notes that this finding is significant because previous research has assumed that any increase in inner-ring poverty was the result of a decrease in central city poverty (187-188).

Net changes in poverty in outer-ring suburbs results show that poverty rates were fairly stable between 1989 and 1997, dropped from 1997-2001, and have remained around those levels through 2005. Central city and inner-ring results showed that movement into poverty surpassed movement out of poverty, however the opposite is true for outer ring suburbs. Results showed that these areas had an increase in non-poor individuals, suggesting that those transitioning out of poverty were moving to suburban areas (188).

In order to look at national trends, the study split the MSA results for all three areas into regions of the United States: South and West, and Midwest and Northeast. This addition showed that central city poverty rates showed less variation over time in the South and West while there was more decline in Northeast and Midwest areas between 1997-2001. The central city transition in and out of poverty rates are similar for both regions. Though the central city trends seemed to be similar to each other and to the total MSA results, they did differ on inner ring poverty. Inner ring poverty increased more in the South and West than it did in the Midwest and Northeast. This difference is due to the steady, high out-migration of the non-poor in the South and West. However, the higher presence of inner ring poverty is decreasing in the South and West, which Cooke attributes to improved economic activity (190-191).

Though this study focuses on a critical change in the urban landscape, it does have some weaknesses. Firstly, it has data limitations because inner ring poverty increases in poverty have only been observed in the 1990 and 2000 census, limiting the resources available for study. Secondly, defining and drawing physical boundaries for inner ring suburbs can be complex, because they border the central city and outer ring suburbs. Their municipal allegiance becomes an important indicator of which category they belong, and can be somewhat difficult to define. Lastly, this study cannot analyze movements within any given metropolitan areas. This is important because knowing where and when individuals move within a metropolitan area can indicate where the poor and non-poor are locating and relocating.

Cooke's analysis is relevant to this research because it looks at a newer observation in the urban landscape, inner ring suburbs. If as Cooke's study shows, poverty is spreading to the edges of the suburbs, then this could suggest that lower-income households are moving closer to suburban employment opportunities. This could insinuate less of commuting spatial disparity between residence and employment location, but this does not necessarily mean that income will increase or that poverty will decrease. It could simply indicate that poverty is moving into the suburbs. Cooke's definitions used to define central city, inner-ring, and outer-ring suburbs will be used in the following research to look at this phenomenon from a spatial mismatch context.

The methods and findings of the above literature are important to better understanding spatial mismatch and its function in modern cities. They reveal that

elements of spatial mismatch have continued to affect urban areas despite efforts to minimize segregation and spatial disparities. The following study will consider previous theoretical frameworks and findings in order to evaluate the presence of spatial mismatch in 2010.

Chapter 4: Methodology

The following study varies from previous spatial mismatch studies because it uses the most recent census data to look at how a historically segregated city has developed through changes in the urban landscape. Spatial mismatch involves many characteristics: human capital, skills mismatch, residential location, transportation/accessibility, and job search, all of which have arguable levels of importance in the theory. Each of these elements effects spatial mismatch, and there are several ways in which to measure them as is evident in the above literature review. While these theories are relevant and applicable to spatial mismatch research, the following study concentrates on changes in the urban landscape that may have led to alterations in the location of lower income housing in relation to eligible employment. It updates older research, and also adds a new element, expanded urban geography.

The following study expands upon current spatial mismatch literature by using 2010 census data and through observing geographical changes in the urban landscape. The location of the study is Cleveland, Ohio, a historically segregated city. It focuses on potential social, racial changes as well as changes in urban structure and employment. It asks if demographic changes in the urban landscape have reduced the amount of spatial mismatch occurring, and is income, rather than race, a more accurate determinant of spatial mismatch? It is hypothesized that demographic changes in the urban landscape have reduced that amount of spatial mismatch, and that those living in inner ring suburbs will have more access to jobs than those in the central city, but less than those in the outer ring suburbs.

It is also expected that racial segregation has decreased and income is a greater indicator of spatial mismatch than race. The following regression will focus specifically on human capital, skills mismatch, and residential location as well as additional demographic elements.

In order to update research that has been done on spatial mismatch, it is necessary to look at what the changes in urban structure have been since Kain's original hypothesis, through more recent studies. Taylor and Ong (1995) focused on commuter distance and times in ten United States metropolitan statistical areas in relation to race, and found weak evidence for the spatial mismatch hypothesis. Gottlieb and Lentnek (2001) focus their study on racial discrimination in the housing market, and the suburbanization of employment. They looked at Cleveland central city and suburbs and found that city residents did not have weak job accessibility, but rather that Black suburbanites have longer commutes than residents in White suburbs. They also noted that more Black suburbanites worked in the central city despite more access to skill-matched employment locally. Both of these studies used older data.

Stoll (2004) focused on geographical skills mismatch. He looked at Los Angeles and Atlanta and found that Black and Latino residents search for employment in areas with higher skill employment requirements. He also notes that mode of travel is a significant indicator of spatial mismatch and that Black commuters were more likely to use public transportation and have higher commuter times. Covington (2009) focused her study specifically on low-income residential location in relation to employment location. She found that spatial

mismatch had decreased in terms of job isolation for the poor, and attributes that decrease to increased job accessibility for the poor. Cooke (2010) did not focus on spatial mismatch specifically, but looked at the geographic trends of poverty. He found that poverty is spreading to the suburbs, and that the migration of the central city poor to the suburbs does not necessarily decrease poverty. The above authors approach spatial mismatch from different perspectives, commuter times, employment locations, transportation mode, and job search, but each focuses on different elements of the complex theory of spatial mismatch.

In order to update current research, new data is needed which will better reflect current trends. Taylor and Ong used 1977-78 and 1985 data, Stoll and Gottlieb and Lentnek, both used 1990 data, and Covington and Cooke used data from 2000. None of these authors have data past 2005, but there is evidence to consider geographical changes in residential location. Cooke's research shows that there have been changes in the urban landscape. These changes may affect the extent of spatial mismatch that occurs. Recent changes in urban structure include further divisions of city and suburban areas, with recognition of the inner ring suburbs. This change may not have been as prevalent in 1980 or 1990 data. Rather than looking directly at if spatial mismatch is occurring through commuter times or distance, this study uses an approach similar to Covington with the addition of structural changes in the landscape.

4.1 Data and Sample

The primary sources used in this study are the 2010 American Community Survey, 2009 County Business Patterns, the Missouri Census Data Center, and the Northeast Ohio First Suburbs Consortium. The area focused on is the Cleveland-Elyria-Mentor metropolitan statistical area, which includes ninety-nine zip codes representative of neighborhood trends. Since this study is focusing on one MSA, rather than several across the United States, zip codes are necessary to capture changes that occur within the MSA rather than across MSAs. Much of the information collected was not yet in zip code form or was not available in zip code form, so it was geocoded using resources from the Missouri Census Data Center. The zip code data is used for analysis of individual residential location and demographics as well as for the location of employment centers. Employment centers used in the empirical analysis were identified using the 2009 County Business Patterns. The Northeast Ohio First Suburbs Consortium was used to identify the inner ring suburbs in the MSA. The data sets include two dissimilarity indices and socio-demographic information by zip code. The first dissimilarity index is composed of income and employment and measures how evenly distributed jobs are based on income by zip code. The second index measures how evenly distributed jobs are distributed based on race.

Cleveland was selected because it has a history of racial segregation and today, still has one of the highest White/Black dissimilarity indexes in the country. In 1990, the Black White dissimilarity index was 82.8%, in 2000, it decreased to 78.2%, and in 2010, it decreased again to 74.1% (censusscope.org).

Although, dissimilarity trends show a decline in segregation, the Cleveland-Elyria-Mentor MSA remains one of the highest Black segregated cities in the United States. The study will provide a strong representation of race in comparison with income divisions. Cleveland is also a rust belt city that developed during the industrial revolution and would have witnessed many of the geographical changes in landscape that have occurred since Kain's original hypothesis: residential sprawl, employment sector changes, filtering, "white flight", and zoning.

4.2 Operationalization of Spatial Mismatch

To assess the spatial mismatch hypothesis in Cleveland, a regression model was used not only because it is the model used in a majority of the literature, but because it can test the explanatory relationships between two variables while holding constant for other factors. As mentioned previously, spatial mismatch is a product of many factors and in order to test and control it at an individual level, a testing method must be able to compare several independent variables at the same time while controlling for others. The sample consists of zip code data, which represent residential and employment location. The dependent variables are absolute deviations of race and income. These deviations measure the evenness with which individuals are distributed across the Cleveland MSA. These deviations represent the first step in a traditional dissimilarity index for a metropolitan area. Since, this study looks at zip code level data rather than data for an entire MSA, it was more appropriate to use a smaller level of measurement

in order to capture neighborhood trends. The race deviation measures the deviation between the race population concentration and employment concentration between zip codes in the MSA.

$$\left| \frac{\text{zip race}}{\text{MSA race}} - \frac{\text{zip paid employees}}{\text{total paid MSA employees}} \right|$$

The income deviation measures the deviation between the population concentration income and employment concentration between zip codes in the MSA. It will measure where the levels of affluence and poverty are located. Income was divided into three sections: ‘lower income,’ ‘middle income,’ and ‘higher income’. ‘Lower income’ includes individuals making \$34,999 or less. ‘Middle income’ includes individuals making between \$35,000 and \$99,999. ‘Upper income’ includes individuals making \$100,000 or more. These divisions were selected using the Thompson and Hickey class division structure based on US Census Bureaus data pertaining to personal income and educational attainment for those 25 years and older (www.websters-online-dictionary.org). Areas averaging lower incomes will be indicative of lower skilled individuals. Large absolute values will indicate that there is a spatial dissimilarity between income and employed workers.

$$\left| \frac{\text{zip income}}{\text{MSA income}} - \frac{\text{zip paid employees}}{\text{total paid MSA employees}} \right|$$

4.3 Independent Variables

The independent variables include occupation, income, race, and urban geography. These variables were chosen because they all reveal aspects of the population in the MSA in relation to spatial mismatch.

Occupational attainment is strongly associated with skills mismatch. If an area has low human capital, it is more likely that it will have a lower skilled working population. The occupation variable acts as an indicator for skills mismatch and human capital. It is represented as the percent of working individuals 25 and older in each zip code who work in a manufacturing, retail, and service industries based on the U.S. Census. It looks at occupations that are typically categorized as low skilled: manufacturing, retail, and service. Covington states that manufacturing has historically been a low-skill occupation and accounts for 13% of all low skilled jobs. She goes on further to mention more recent low skill occupations such as retail and service industries (Covington 572). Areas with higher employment in these sectors will be indicative of having lower skilled working populations. It is expected that areas with low educational levels will have a greater number of employees in these sectors.

The above two variables look at specific spatial mismatch theories, where as the following variable, race, looks at demographic indicators. It is used to measure the amount of diversity in the area. The racial groups being observed are 'White', 'Black', and 'Hispanic or Latino'. 'White' and 'Black' were chosen for two reasons. They are historically represented in spatial mismatch literature and they are the two largest racial groups in the MSA. 'Hispanic and Latino' was

selected because this group is becoming the largest minority in the United States and thus could reflect a change in spatial mismatch (factfinder.com). Research in the literature review has shown that minorities are more abundant in central city locations, thus presumably subjects of spatial mismatch. It is expected that this trend will be evident in the Cleveland-Elyria-Mentor MSA. Looking at race in relation to income could indicate whether or not spatial mismatch is predominately a race based or income related issue.

A final variable is urban geography. It will measure central city areas, inner ring suburbs, and outer ring suburbs and is reflective of residential location in the theory chapter. This variable is important because it represents a relatively new phenomenon in the urban landscape, inner ring suburbs. Inner ring suburbs are typically filtered down suburbs located between the central city and newer, outer ring suburbs. Since they contain filtered housing, they are more accessible to lower income individuals or families. The presence of these suburbs could decrease spatial mismatch by moving lower skill, lower income individuals closer to eligible jobs.

The geographic divisions were created using First Suburbs of North East Ohio and census data. First Suburbs, in general, selects its suburbs based on if they were built before 1960, and their adjacency to central cities. “Those ‘first’ suburbs now are 40 to 80 years old, and with age many have begun to experience what had been exclusively central city challenges: deteriorating and obsolete real estate, problematic sewer and water systems, disinvestment, and residents with modest or low incomes” (firstsuburbs.org). This definition is similar to Cooke’s

(2010) definition of inner ring suburbs, and is used to define the inner ring suburbs in this study. The central city areas were selected based on Cooke's urban core definition. The zip code's included are centrally located, contain tracts with greater than 400 pre-1940 housing units per square mile and have a population density of at least 1,000 people per square mile (Cooke 183). Areas categorized as inner ring or outer ring suburbs, in accordance with human capital and residential location theory, are expected to have higher incomes, better schooling, and better access to employment than the central city.

Figure 4.1 Variable Operationalization

Variable Name	Definition	Measurement
Race Absolute Deviation	$\left \frac{\text{zip race}}{\text{MSA race}} - \frac{\text{zip paid employees}}{\text{total paid MSA employees}} \right $	Measures deviation between the race population concentration and employment concentration between zip codes in the MSA
Income Absolute Deviation	$\left \frac{\text{zip income}}{\text{MSA income}} - \frac{\text{zip paid employees}}{\text{total paid MSA employees}} \right $	Measures deviation between the income population concentration and employment concentration between zip codes in the MSA
Human Capital	% of people 25 and older who working in a specific occupation	Measures working population skill level
Race	Number of individuals within White, Black, or Hispanic/Latino	Measures individual race
Urban Geography	Zip codes located in central city, inner ring, or outer ring suburb	Measures residential location

4.4 Conclusion

Using human capital, income, race, and urban geography to measure for income and race absolute deviations in employment concentrations should reveal the presence or absence of a spatial mismatch in 2010, for the Cleveland-Elyria-Mentor MSA. It is expected, due to Cleveland's history of segregation, that there will be a spatial mismatch and that lower income, minority groups will be effected the most by limitations to job accessibility. The regression will also reveal what factors are the most prominent indicators of spatial mismatch. It is expected that there has been progression in race relations since the Civil Rights era, thus income, rather than race, should be a greater indicator of spatial mismatch. In addition, it is expected that access of inner ring suburbs by the poor will create better access to employment in either the central city or outer ring suburbs.

Figure 4.2 Expected Results of Regression

Variable Measurement	Variable	Expected Sign
Human Capital	Retail	+
	Service	+
	Manufacturing	+
Race	White	-
	Black	+
	Hispanic/Latino	+
Urban Geography	Central City	+
	Inner Ring Suburb	+
	Outer Ring Suburb	-

+ The higher the variable, the more likely the resident will be effected by spatial mismatch

- The higher the variable, the less likely the resident will be effected by spatial mismatch

Chapter 5: Results

The following are regression results measuring spatial mismatch in the Cleveland-Elyria-Mentor MSA. The first three sections will look at the race paid employee absolute deviations in terms of Black, White, and Hispanic/Latino. This reflects spatial mismatch measurement in a traditional sense, by race. The last three sections will focus on the element of income in regards to spatial mismatch. They will look at lower, middle, and upper income absolute deviations.

5.1 *White Paid Employees*

There is a 45.2% variation in the White paid employees absolute deviation that is explained by the independent variables. Those zip codes with populations living in the central city and those zip codes within the inner ring suburbs did not have a significant impact on the on the effect of spatial mismatch. This is reflective of white flight, mentioned in the residential location theory chapter. Whites were more likely to move out of the central city during the initial movement to the suburbs.

The percentage of zip codes working in the service sector had a positive effect on spatial mismatch. If a zip code had service occupations, the spatial disparity for White employees increased. However, this effect is not present in manufacturing or retail employment, which both have no significance. Each of these occupational areas is roughly representative of subordinate primary and secondary segment jobs, which are associated with low skill employment and suburban-based location. A positive White employee spatial disparity in service occupations could suggest that Whites travel farther to service jobs. For example,

if service jobs are largely located downtown, Whites may choose to commute longer distances.

Figure 5.1 White Paid Employees Demographics and Urban Geography

Variable	Coefficient	t-value
Central City	-.043	-.434
Inner Ring Suburb	.145	1.539
% Population in Service	1.067	4.565*
% Population in Manufacturing	-.057	-.198
% Population in Retail	-.437	-1.459

*p < .05

Regression found in appendix

5.2 Black Paid Employees

There is a 54.3% variation in the Black paid employees absolute deviation that is explained by the independent variables. Zip codes with populations living in the central city had a positive effect on spatial mismatch. If a zip code was located in the city, the spatial disparity for Black paid employees increased. This was expected since spatial mismatch literature suggests that Blacks represent a disproportionate amount of the central city when compared to the greater MSA. The zip codes within the inner ring suburbs did not have a significant impact. This means that central city location increased spatial disparity, but suburban locations, even if in the inner ring suburbs had no impact on spatial disparity for Black paid employees.

The percentage of the population working in service occupations had a positive effect on spatial mismatch. If a zip code had service occupations, the spatial disparity for Black paid employees increased. There was no spatial disparity for manufacturing or retail employment. This suggests that there is a

location barrier for Blacks accessing service employment relative to their home residence.

Figure 5.2 Black Paid Employees Demographics and Urban Geography

Variable	Coefficient	t-value
Central City	.302	3.365*
Inner Ring Suburb	-.010	-.122
% Population in Service	1.088	5.095*
% Population in Manufacturing	-.311	-1.192
% Population in Retail	-.326	-1.192

*p < .05

Regression found in appendix

5.3 Hispanic/ Latino Paid Employees

There is a 54.3% variation in the Hispanic/Latino paid employees absolute deviation that is explained by the independent variables. Inner ring suburb residence had a positive effect, but central city zip codes had no significance. If a zip code was located in an inner ring suburb, there was an increased spatial disparity for Latinos. This is interesting considering neither Blacks nor Whites had inner ring suburb significance. This phenomenon could be reflective of the tendency of Hispanic/Latino families to live in the suburbs, potentially, inner ring suburbs. This would mean that location in the inner ring suburbs does not help Hispanics/Latinos with respect to job opportunity; they work further from where they live.

Manufacturing had a positive effect, whereas retail had a negative effect. If a zip code contained manufacturing, the spatial disparity for Hispanic/Latino paid employees increased. In other word, the higher the percentage of

manufacturing in a zip code, the greater the effect of Hispanic/Latino spatial disparity. If a zip code contained retail occupations, the spatial disparity for Hispanic/Latino paid employees decreased. The significance of manufacturing and retail on the Hispanic/Latino population is interesting since neither of these occupations affected White or Black groups. The percentage of the population in service occupations had no significance in the Hispanic/Latino population. This was not the case in Black and White groups. A possible explanation for these differences is that Hispanic/Latino populations frequently have ethnic stores near where they live, which would reduce the spatial disparity in retail, but not necessarily manufacturing. Another possible explanation of this difference is that the Hispanic/Latino population is relatively small in comparison to Blacks and Whites in the MSA.

Figure 5.3 Hispanic/Latino Paid Employees Demographics and Urban Geography

Variable	Coefficient	t-value
Central City	.034	.276
Inner Ring Suburb	.244	2.072*
% Population in Service	.103	.351
% Population in Manufacturing	1.021	2.847*
% Population in Retail	-.858	-2.286*

*p < .05

Regression found in appendix

5.4 Lower Income Paid Employees

There is a 75.1% variation in the lower income paid employees absolute deviation that is explained by the independent variables. Central city location had a positive effect, but inner ring suburb zip codes had no significance. If a zip code was located in the central city, the spatial disparity for lower income paid

employees increased. This supports spatial mismatch theory because lower income zip codes living in the central city are typically limited in their job opportunities and transportation availability and thus would have reduced access to employment. Since inner ring suburbs had no significance, living in the inner ring suburbs would not affect spatial disparity. This could coincide with Cooke's findings that living in the inner ring suburbs does not eliminate poverty, but rather moves its location.

The percentage of the population working in service occupations had a positive effect, whereas the percentage of the population within a zip code working in retail had a negative effect. The percentage of the population working in manufacturing was insignificant. If a zip code had service occupations, the spatial disparity for lower income paid employees increased. The opposite was true for retail occupations. If a zip code had retail occupations, the spatial disparity for lower income paid employees decreased. Unlike originally hypothesized, not all of these industries led to an increase in spatial mismatch. Only, service occupations had a positive effect, suggesting that these jobs may be less prominent in areas where lower income individuals live.

The presence of Whites and Blacks in the zip code had a significant impact on spatial disparity, however, the disparity was worse for Blacks. There was no evidence to support Hispanic/Latino significance. If a zip code had a White or Black presence, the spatial disparity for lower income paid employees increased. This significance could be due to the fact that Cleveland has a higher White and Black population when compared to its Hispanic/Latino population.

Blacks had a slightly more significant impact, which coincides with traditional spatial mismatch hypothesis definitions.

Table 5.4 Lower Income Paid Employee Demographics and Urban Geography

Variable	Coefficient	t-value
Central City	.146	1.991*
Inner Ring Suburb	.026	.397
% Population in Service	.790	3.134*
% Population in Manufacturing	-.133	-.585
% Population in Retail	-.524	-2.245*
White	.211	1.836*
Black	.359	3.394*
Hispanic/Latino	.075	1.099

*p < .05

Regression found in appendix

5.5 Middle-Income Paid Employees

There is a 59.7% variation in the middle-income paid employees absolute deviation that is explained by the independent variables. There were no significant factors in either of the three categories, urban geography, human capital, or race. This means that overall, location does not affect spatial disparity for middle-income paid employees. This is expected based on theory. Middle-income individuals are more likely to live in suburban areas and are more able to financially overcome accessibility issues. Human capital theory states that suburban areas typically have better schools. This could suggest that middle-income suburbanites are less likely to work in subordinate primary or secondary segment jobs and therefore are not affected by spatial mismatch.

Table 5.5 Middle Income Paid Employee Demographics and Urban Geography

Variable	Coefficient	t-value
Central City	.133	1.431
Inner Ring Suburb	.133	1.614
% Population in Service	.279	.870
% Population in Manufacturing	.395	1.362
% Population in Retail	.037	.136
White	.055	.376
Black	.033	.242
Hispanic/Latino	-.037	-.425

*p < .05

Regression found in appendix

5.6 Upper Income Paid Employees

There is a 42.9% variation in the upper income paid employees absolute deviation that is explained by the independent variables. This percentage is lower than for the lower-income and middle-income dependent variables, suggesting these factors are not as prominent in upper income paid employees as in the other groups. Inner ring suburb location had a positive effect, whereas central city location had no effect. If a zip code was located in the inner ring suburbs, the spatial disparity for upper income paid employees increased. This is interesting, considering inner ring suburbs are categorized as having filtered down housing. However, it could express that filtered down housing in the inner ring suburbs pushes outer ring suburbs farther away from the central city, increasing their distance from the central business district.

Both of the percentages of the population working in service and manufacturing affect upper income employees. Service occupations have a negative effect. If a zip code has service occupations, the spatial disparity for

upper income paid employees decreases. According to residential location theory, upper income residents are more likely to be located in suburban areas. A negative effect of service occupations supports spatial mismatch theory by suggesting that upper income service jobs are located closer to suburban areas. Manufacturing occupations had a positive effect. If a zip code contained manufacturing occupations, the spatial disparity for upper income paid employees increased. This is interesting because it could suggest that manufacturing in the Cleveland-Elyria-Mentor MSA is more centrally focused, contradictory to spatial mismatch theory.

The presence of Whites had a positive effect. If a zip code had Whites, the spatial dissimilarity for upper income employees increased. This could reflect residential location theory, which states that Whites make up a disproportionate amount of the suburbs, but work in the central city. If this is true, it would be expected that there was a spatial disparity. Hispanic/Latino presence had a negative effect. If a zip code had Hispanics/Latinos, the spatial disparity decreased. Blacks had no statistical significance.

Table 5.6 Upper Income Paid Employee Demographics and Urban Geography

Variable	Coefficient	t-value
Central City	.153	1.378
Inner Ring Suburb	.234	2.386*
% Population in Service	-.626	-1.639*
% Population in Manufacturing	.659	1.908*
% Population in Retail	.353	1.079
White	.362	2.077*
Black	-.063	-.392
Hispanic/Latino	-.177	-1.710*

*p < .05

Regression found in appendix

These results show a mix of historical spatial mismatch evidence and potentially some new trends. Race still remains an indicator of spatial disparity, but income appears to have an effect as well. Urban geography plays a role in residential and employment location, but does not seem to be the largest impact.

Chapter 6: Conclusion

The research conducted regarding the spatial mismatch hypothesis since the 1960s has produced various results. Kain found a relationship between residential segregation and urban employment areas. In 1986, David T. Ellwood added the specific element of Black racial segregation and residential limitations. This definition expanded to include all minorities and acknowledge central city job shortages with Horner and Mefford's 2007 spatial mismatch definition. As the years went by, it did not appear that spatial mismatch was disappearing but rather evolving with the urban landscape. This change in definition has also been expressed in a wide array of findings, suggesting the difficulties in appropriately measuring spatial disparities. Taylor and Ong found little evidence of spatial mismatch based on commuter times and lengths alone. Gottlieb and Lentnek found little evidence of traditional spatial mismatch, but found there were still racial elements in relation to employment commutes. Stoll found that spatial mismatch is still occurring, based on job search indicators and modal choice. Covington acknowledged that job search limitations were still occurring as well, but saw they were improving over time.

Each of these studies was conducted using different measurements of spatial mismatch. Some focused on human capital and skills mismatch, while others focused on a mix of residential location, transportation, and job search. These elements all have a roll in spatial mismatch, but identifying which ones are the most prevalent or largest indicators of spatial organization are what is key. Human capital is a measurement of education or skills and can be observed to see

where specific populations live in relation to space. Skills mismatch expands upon human capital to detect where various levels of educated populaces live in relation to areas of eligible employment. Residential location is composed of a variety of factors such as filtering and zoning which help shape urban geography. A connection between eligible housing and suitable employment are critical in minimizing spatial mismatch. Access to transportation modes is also relevant in detecting spatial mismatch. Areas with weaker transportation systems may contain higher spatial disparities. All of the above factors can influence jobs search. Where people look for jobs is largely dependent on available transportation, who they know, their skill level, and where they live. This study did not look at all of these theories, but focused on human capital and residential location.

This study asks if demographic changes in the urban landscape have reduced the amount of spatial mismatch occurring? Urban landscape changes focused particularly on the introduction of inner ring suburbs as an indicator of residential location in relation to low skill jobs, a measure of human capital. Results showed that demographic changes did play a role in spatial disparity, but living in inner ring suburbs did not reduce spatial mismatch as originally hypothesized. Central city location was significant in both lower income and Black paid employee absolute deviations. This coincides with spatial mismatch theory in that the central city contains a disproportionate amount of lower income and Black populations when compared to the greater Cleveland-Elyria-Mentor MSA.

Inner ring suburban location was significant in upper income and Hispanic/Latino absolute deviations. This could be the result of two trends. First, Hispanic/Latino populations, more so than Blacks, are more likely to live in suburban settings. This could mean that they are better represented in inner ring suburbs, away from employment sectors where they work. Second, some inner ring suburbs could be well preserved, and occupied by upper income individuals. However, by looking at the Census Bureau's American Community Survey interactive racial and ethnic distribution map, it becomes clear that most of Cleveland's First Suburbs do not include larger numbers of the Hispanic/Latino population, and are not better represented in inner ring suburbs. Only one First Suburb, Brooklyn, has a significant Hispanic/Latino population. Most Hispanic populations are located on the west side of highway 176, and are in central city locations rather than inner ring suburbs (Mapping America: Every City, Every Block). The other inner ring suburbs are either predominately White, Black, or mixed. This being said, it is unlikely that the Hispanic/Latino population is overly represented in inner ring suburbs.

The hypothesized results for human capital were not observed. In no case were all three occupational areas impacted or not impacted, other than Middle Income Paid Employees. The variety in significance suggests that these occupational locations are not located in similar locations but distributed throughout the MSA. Considering service employment was a significant indicator in both White and Black absolute deviations and lower and upper income absolute deviations, it could be that these types of employment are located primarily in the

outer ring suburbs, but upper level service jobs are located in the central city. This would follow spatial mismatch theory. Manufacturing was only significant in Hispanic/Latino and Upper Income absolute deviations. It is difficult to make any assumptions about the location of manufacturing sectors based on these findings. Retail occupations were significant in Hispanic/Latino and lower income absolute deviations. The percentage of the population working in retail had a negative effect on spatial disparity for lower income residents suggesting that these jobs are located near zip codes with high lower income populations. Since the percentage of the population in retail also had a negative effect on Hispanic/Latino absolute deviations, it can be assumed that there is a linear correlation between lower income and Hispanic/Latino locations within the MSA.

Based on the above findings, evidence supports that urban geography does play a role in spatial mismatch in 2010. Black groups and lower income areas are affected by a spatial disparity in central city zip codes. There is not enough information to assume the exact role of inner ring suburbs in a spatial mismatch context, but it does not appear that inner ring suburbs reduce spatial mismatch as previously hypothesized for this study.

Next the study asked if income, rather than race, was a more accurate determinant of spatial mismatch? It was expected that income was a greater indicator of spatial mismatch than race. Results showed that the independent variables in the income based absolute disparities seemed to have a greater impact on spatial mismatch than the race based absolute disparities. This suggests that while there are still race factors affecting spatial mismatch, they may not be as

significant as income. When looking at Cleveland's two predominate race absolute deviations, White and Black, both have a spatial disparity in the percentage of the population in service, and other than the central city variable for Blacks, have no other significant indicators. However, there was a spatial disparity for lower and upper income groups where zip codes were located in the central city and inner ring suburbs.

Although income seems to be a greater factor in determining spatial disparity, evidence from this study supports that racial factors are still a component of spatial mismatch, despite efforts made by government policies and social programs. White paid employees did not have any spatial disparities in relation to urban geography trends, while both Blacks and Hispanics/Latinos had spatial disparities based on geographical trends. Blacks and Whites both expressed spatial disparities concerning the percentage of the population in service occupations; however, this could express different phenomena for each group. Gottlieb and Lentnek found that suburban Blacks were more likely to work in Cleveland central city, service occupations (Gottlieb and Lentnek 1183) If this is true, it could suggest that Blacks have migrated farther away from the central city residentially, but their jobs have not migrated with them. White spatial disparities in relation to service occupations could suggest that Whites travel farther to service jobs. This would recount to Gottlieb and Lentnek's study by implying that a significant amount of service jobs are located in the central city.

The Hispanic/Latino absolute deviation regression expressed almost opposite results compared to the Black and White absolute deviations, suggesting

that they may be susceptible to different spatial disparity trends that are not reflected in traditional spatial mismatch theory. Further research into these trends could be informational in regards to where specific employment sectors are located in relation to Hispanic/Latino populations.

These findings support that spatial mismatch is still an obstacle for specific races and socioeconomic classes in the Cleveland-Elyria-Mentor metropolitan statistical area. In order to address these issues, government programs such as empowerment zones may be helpful in creating low-skill employment in low-income neighborhoods. Other place-based programs that encourage Black and White residential neighborhoods, such as Cleveland Heights and Shaker Heights, could also be beneficial (Keating, Krumhoz, and Perry 304). People-based programs that promote training and education could also be valuable in training people for employment located near their residence.

6.1 Future Research

This study expands upon existing spatial mismatch studies in three ways. First, it looks at new developments in urban geography, inner ring suburbs. Second, it focuses on the significance of income and race in regards to spatial disparity. Lastly, it uses zip code level data within a metropolitan statistical area rather than looking at all MSAs in the United States. This is helpful as it reveals neighborhood trends rather than purely MSA trends, which may hide regional differences. It expresses how an individual city is divided rather than lumping it with cities from across the country. Different regions have a variety of histories

and paths and should also be looked at on an individual level. Cleveland is a good example of historical Black and White segregation, but another city may give a better perspective on the Hispanic population. Different areas will also have different employment trends as the South and West developed differently than the East and Midwest.

Limitations to this study included having no measures of modal choice or job search. Modal choice did not fit into the model, which focused primarily on how human capital and residential location affected race, income, and locational spatial disparities. Knowing the transportation methods accessible by location would have been informative in a different research model. It could have revealed unmeasured limitations to spatial mismatch. There have not been many studies exploring job search aspects, which are complex in that they require knowledge of individuals actively searching for jobs, and this data is not found in the U.S. Census or Community Housing Survey.

Future research could focus more on regional trends, research into inner ring suburbs, and could also address job search theory in more detail. Although, this study did not find inner ring suburbs to play a large role in spatial disparity, this is significant. It shows that although lower income households are moving into the suburbs, they are not seeing suburban benefits. Cooke's study found that contrary to popular belief, moving to the suburbs does not reduce poverty, but rather poverty is spreading into the suburbs (Cooke 188). Further research into the structure of inner ring suburbs could reveal why this occurs. Like urban geography, the way people search for employment is different than it was a few

years ago, and even more different then when Kain originally hypothesized spatial match theory. Focusing on search methods may be very insightful method for recognizing spatial disparities among income groups.

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Appendix

The following tables represent the descriptive statistics and regressions used in this study.

The graph at the end is representative of the racial composition of the Cleveland-Elyria-Mentor metropolitan statistical area.

Descriptive Statistics

Central City and Inner Ring

		Central City	Inner Ring
N	Valid	98	98
	Missing	0	0
Mean		.11	.18
Median		.00	.00
Std. Deviation		.317	.389
Range		1	1
Minimum		0	0
Maximum		1	1

Central City

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	87	88.8	88.8	88.8
	1	11	11.2	11.2	100.0
Total		98	100.0	100.0	

Inner Ring

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	80	81.6	81.6	81.6
	1	18	18.4	18.4	100.0
Total		98	100.0	100.0	

Race

		White	Black or African American	Hispanic or Latino
N	Valid	98	98	98
	Missing	0	0	0
Mean		15155.39	4208.91	892.12
Median		12592.00	1460.00	507.00
Std. Deviation		12614.893	5897.745	1049.206
Range		57514	27064	5383
Minimum		370	0	0
Maximum		57884	27064	5383

Percentage in Occupation

		% pop in Service	% Pop in Manu	% pop in Retail
N	Valid	98	98	98
	Missing	0	0	0
Mean		1.3151828217	.009710848408	.009806053368
Median		.9525325300	.006696578250	.006684517500
Std. Deviation		1.15514912712	.0084266442124	.0086617522946
Range		5.08574362	.0417421179	.0433298271
Minimum		.08833008	.0006840771	.0007172229
Maximum		5.17407370	.0424261950	.0440470500

Race Paid Employees

		White paid employees	black paid employees	latino paid employees
N	Valid	93	93	93
	Missing	5	5	5
Mean		.006591648116	.008415862164	.007246956459
Median		.004920040300	.004037094300	.003851862000
Std. Deviation		.0060904526763	.0119982972713	.0089131823843
Range		.0319695770	.0597960980	.0523835178
Minimum		.0000099580	.0000121080	.0000080742
Maximum		.0319795350	.0598082060	.0523915920

Income Paid Employees

		Lower Income paid employees	Middle Income Paid employees	Upper Income Paid Employees
N	Valid	94	94	94
	Missing	4	4	4
Mean		.006697	.006720	.006918
Median		.003822	.004352	.004866
Std. Deviation		.0075370	.0061508	.0068940
Range		.0349	.0257	.0330
Minimum		.0001	.0001	.0001
Maximum		.0350	.0258	.0331

Regression

Lower Income Paid Employees

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.879 ^a	.772	.751	.0037638

a. Predictors: (Constant), Hispanic or Latino, Central City, Inner Ring, % pop in Retail, Black or African American, White, % Pop in Manu, % pop in Service

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.001	.001		1.151	.253
	% pop in Service	.005	.002	.790	3.134	.002
	% Pop in Manu	-.119	.203	-.133	-.585	.560
	% pop in Retail	-.452	.186	-.524	-2.425	.017
	Central City	.003	.002	.146	1.991	.050
	Inner Ring	.001	.001	.026	.397	.692
	White	1.260E-7	.000	.211	1.836	.070
	Black or African American	4.691E-7	.000	.359	3.394	.001
	Hispanic or Latino	5.389E-7	.000	.075	1.099	.275

a. Dependent Variable: Lower Income paid employees

Middle Income Paid Employees

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.795 ^a	.631	.597	.0039056

a. Predictors: (Constant), Hispanic or Latino, Central City, Inner Ring, % pop in Retail, Black or African American, White, % Pop in Manu, % pop in Service

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.001	.001		1.003	.318
	Central City	.003	.002	.133	1.431	.156
	Inner Ring	.002	.001	.133	1.614	.110
	% pop in Service	.001	.002	.279	.870	.387
	% Pop in Manu	.287	.211	.395	1.362	.177
	% pop in Retail	.026	.193	.037	.136	.892
	White	2.676E-8	.000	.055	.376	.708
	Black or African American	3.476E-8	.000	.033	.242	.809
	Hispanic or Latino	-2.163E-7	.000	-.037	-.425	.672

a. Dependent Variable: Middle Income Paid employees

Upper Income Paid Employees

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.691 ^a	.478	.429	.0052102

a. Predictors: (Constant), Hispanic or Latino, Central City, Inner Ring, % pop in Retail, Black or African American, White, % Pop in Manu, % pop in Service

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.001	.001		1.179	.242
	Central City	.003	.002	.153	1.378	.172
	Inner Ring	.004	.002	.234	2.386	.019
	% pop in Service	-.004	.002	-.626	-1.639	.105
	% Pop in Manu	.537	.281	.659	1.908	.060
	% pop in Retail	.278	.258	.353	1.079	.284
	White	1.973E-7	.000	.362	2.077	.041
	Black or African American	-7.496E-8	.000	-.063	-.392	.696
	Hispanic or Latino	-1.161E-6	.000	-.177	-1.710	.091

a. Dependent Variable: Upper Income Paid Employees

Black Paid Employees

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.753 ^a	.568	.543	.0081141473140

a. Predictors: (Constant), % pop in Retail, Central City, Inner Ring, % pop in Service, % Pop in Manu

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.001	.001		.718	.475
	Central City	.011	.003	.302	3.365	.001
	Inner Ring	.000	.003	-.010	-.122	.903
	% pop in Service	.011	.002	1.088	5.095	.000
	% Pop in Manu	-.440	.369	-.311	-1.192	.236
	% pop in Retail	-.448	.376	-.326	-1.192	.236

a. Dependent Variable: black paid employees

Hispanic/Latino Paid Employees

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.430 ^a	.185	.138	.0082770545362

a. Predictors: (Constant), % pop in Retail, Central City, Inner Ring, % pop in Service, % Pop in Manu

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.003	.001		2.324	.022
	Central City	.001	.003	.034	.276	.783
	Inner Ring	.006	.003	.244	2.072	.041
	% pop in Service	.001	.002	.103	.351	.726
	% Pop in Manu	1.073	.377	1.021	2.847	.005
	% pop in Retail	-.876	.383	-.858	-2.286	.025

a. Dependent Variable: latino paid employees

White Paid Employees

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.694 ^a	.482	.452	.0045092631353

a. Predictors: (Constant), % pop in Retail, Central City, Inner Ring, % pop in Service, % Pop in Manu

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.002	.001		2.985	.004
	Central City	-.001	.002	-.043	-.434	.665
	Inner Ring	.002	.002	.145	1.539	.127
	% pop in Service	.006	.001	1.067	4.565	.000
	% Pop in Manu	-.041	.205	-.057	-.198	.843
	% pop in Retail	-.305	.209	-.437	-1.459	.148

a. Dependent Variable: White paid employees

Cleveland-Elyria-Mentor MSA 2010 Racial Distribution

Source: <http://projects.nytimes.com/census/2010/explorer>

