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RECESSIONAL POVERTY AND SEGREGATION IN SHELBY COUNTY,
TENNESSEE

by

Jennifer Jehan Marshall

A Thesis

Submitted in Partial Fulfillment of the
Requirement for the Degree of
Master of Science

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Abstract

The Great Recession of 2007-2009 and minor recession in 2001-2002 caused increases in financial strife for which the United States is recovering over 10 years later. Memphis ranks high for poverty, yet few studies evaluate Shelby County, Tennessee for poverty and segregation. This project adds to spatial recessional research by investigating changes in poverty and segregation in the county. Through a tract-level analysis, I located poverty and segregation in Shelby County for 2000 and 2009. I hypothesize that Blacks and Hispanics are the poorest of all groups and experience the most residential segregation. Results from 2000 showed that Black and Hispanic residents lived in poverty twice as much as their White and Asian counterparts. As found by Frey and Meyers (2005), White and Asian groups were the most evenly dispersed. In 2009, Black and Hispanic groups had the highest share of tracts that were in poverty and near poverty states.

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Introduction

Organization of Thesis

This thesis has four major sections. The first section aims to establish an understanding of the topic by providing an overview of the recessional period of study, a description of the Shelby County, Tennessee area of study, and past studies of racial/spatial segregation and poverty. The next section outlines the methods of data analysis. Following this section, the results of the analysis will be explained. The fourth and final section will attempt to create a narrative connecting these results. Following this thesis, Appendices A-D and F contain maps and tables relevant to the information addressed in the body of the thesis. Appendix E explains the relevance of urban renewal to Shelby County while Appendix G provides inferences about how transportation planning has and will play a role in rectifying concentrated poverty and racial segregation. Appendix H proposes related future projects.

The Recent Recessional Period

The National Bureau of Economic Research records that the most recent economic recessions, or contractions in the business cycle, occurred from March 2001-November 2001 and from December 2007-June 2009 (2016). The later of the two contractions is known as “The Great Recession.” According to Elsby, Sahin, and Hobijn of the National Bureau of Economic Research, the Great Recession “represents the deepest downturn in the labor market in the postwar era” (2010). This recession happened after three decades of disparities in wage and educational attainment in the United States (Elsby et al., 2010). Wage inequalities have been influenced by the rise in computerization/automation skill needs and the decrease in average educational

attainment (Goldin and Katz, 2008). Additionally, there was a financial boom between 1990 and 2007 during which the United States' labor market was polarized where there was growth in high-skill jobs and low-skilled jobs. The middle-class jobs in manufacturing and management were in low demand due to globalization and the technological advancement mentioned before (Autor et al., 2006 & Autor, 2010). Elsbey et al. (2010) claim that the Great Recession sustained the job-polarization and wage inequalities. As the economy rebounds, there is to be a mismatch between jobs and needed skills as the unemployed seek jobs which prolongs the overall rebounding process. Leading up to the Great Recession, the housing market boomed and busted from the years of 2002-2006 as part of the Great Moderation period (Verick and Islam, 2010). This event impacted the geographic mobility of workers because many were unable to move due to negative equity created by decreased housing prices (Ferreira, Gyourko, and Tracy, 2010).

This research strives to contribute to literature on poverty and segregation in the southern United States since the beginning of the recent worst economic period. Recessions have great impacts in that they cause increases to the impoverished population of a country (Wu, 2007 in Greene and Pick, 2012). Poverty increased during the recent recessional period. In their analysis of consumption and income-based poverty from 1960-2010, Meyer and Sullivan found that in 2007 and 2008 people were not making enough money and were not consuming as much as in earlier years. However, in between the years of 2008 and 2010, poverty due to the lack of income decreased, yet the amount of poverty due to consumption increased. People were earning the minimum survival income and spending more (2012).

Poverty

The following section will provide ways that researchers have described and measured poverty. Generally, poverty is the situation in which individuals, households, or families are experiencing living conditions that are below-average. Below-average conditions refer to monetary income and access to food, shelter and health resources. Typically, in the United States, specific racial and ethnic groups are overrepresented in poverty (Greene and Pick, 2012). Urban poverty has been a persistent issue since the formation of cities in 19th century America. As the federal government has transferred the responsibility of social welfare to states and localities, there has been a shift of “power and privilege” from the cities and their poor to the urban fringe and suburbs. This has left cities without the resources to address problems of poverty (Goldsmith and Blakely, 2010, p 155). In light of urban poverty, people have migrated out of cities only to face poverty in the suburbs (Kneebone, 2011).

Poverty has several dimensions including concentrated poverty, high poverty, distressed neighborhoods, and extreme poverty. In “The Enduring Challenge of Concentrated Poverty in America: Case Studies from Communities Across the U.S.” generated by the Community Affairs Offices of the Federal Reserve System and the Metropolitan Policy Programs at the Brookings Institution, Paul Jargowsky is cited as creator of the experimental definitions of concentrated poverty and high poverty. High poverty areas are census tracts, or neighborhoods of 2,500 to 8,000 people, where “at least 40 percent of residents live in families at or below the federal poverty line” (2008). Concentrated poverty is the proportion of poor individuals of a city or county who live in neighborhoods of high poverty (Berube and Kneebone, 2008).

Recent publications analyze poverty dynamics across the US south including during the Great Recessional period. For example, in a Brookings article titled “The Growth and Spread of Concentrated Poverty, 2000 to 2008-2012,” Kneebone defines high poverty neighborhoods slightly different than in Berube and Kneebone (2008). Kneebone denotes high poverty neighborhoods as census tracts with poverty rates between 20 and 40 percent and introduces an additional term: distressed neighborhoods. Distressed neighborhoods are places where residents experience poverty rates above 40 percent. Categories of 20 percent and 40 percent are emphasized by Kneebone who cites George Galster’s work in “The Mechanisms of Neighborhood Effects: Theory, Evidence, and Policy Implications” (2010). In his literature review, Galster found that negative outcomes for individuals (crime, leaving school) are minimal until the neighborhood meets or exceeds 20 percent poverty and become widespread until 40 percent poverty is reached (2010). Galster focuses on urban poverty, while Kneebone is highly interested in urban/rural poverty comparisons.

There is a distinct geography of poverty. A recent study focused on the southeastern United States. (Berube and Kneebone, 2008) calculates and compares the 2000 rates of poverty and concentrated poverty of 16 case studies including 11 selected urban areas and 5 selected rural areas in the southeastern United States. Urban neighborhoods include Miami’s Little Haiti, El Paso’s Chamizal, and Cleveland’s Central neighborhood. Rural case studies include Holmes County, Mississippi and McDowell County, West Virginia (See Appendix A for a summary of the results). For each case, the poverty rate for the entire metropolitan statistical area (MSA) and the specific neighborhood were compared. This table also lists the concentrated poverty rate for each

case study communities' surrounding areas. There are consistently greater disparities between the poverty rates of the urban case studies communities and their corresponding MSA. Many of the areas located within the southern US had high concentrated poverty rates.

The recent recessionary period has had lasting impacts. According to Kneebone, although several years have passed since the last economic recession, the recovery efforts have “failed to reach down the economic ladder” and the amount of people that live below the federal poverty line has continued to persist, their location of concentration has simply changed (Kneebone, 2014). In 2000, the majority of urban residents that lived in poverty outnumbered those in suburban/rural areas. After 2000, there was a change and suburban poverty grew higher than urban poverty. Lichter et al (2012) found that during 2005-2009, one in four places (city, suburbs, rural towns) had poverty rates higher than 20 percent. In addition, the poor tended to live close together with 30 percent of all poor residing in “poor places” (Lichter et al, 2012). Place-based segregation in America among the poor and non-poor increased six percent between 1990 and 2009.

It is clear that poverty has changed demographics and location. The recessions caused poverty to become more widespread impacting locations not heavily affected as much prior. Thus, the demographics of those impoverished has been modified. Augmented concentrated poverty in the Midwest and the South resulted in the increased likelihood that “white, native-born, high school or college graduates, homeowners, not receiving public assistance” were living in “extreme poverty neighborhoods,” where 40 percent of residents live below the poverty line, compared to 2000. In the Midwest and South, uneducated African Americans comprised 45 percent of residents of these extreme

poverty neighborhoods in 2005-2009 (Kneebone et al., 2011). This does not differ from the past as Elsby et al. report that the “the constellation of demographic groups most affected (by the Great Recession) – young, male, less-educated, workers from ethnic minorities – is reminiscent of previous downturns” (Elsby, 2010). However, according to Meyer and Sullivan (2012), the poor in the 2000s are more educated and more likely to be neither black nor white than the poor in earlier years. The increase of non-minority poverty and consistency of minority poverty should be considered as topic for future study.

Poverty is influenced by social and systematic mechanisms. Understanding the urban versus rural trajectory is important to the study of poverty, yet there are other concepts to consider. Segregation has been found to influence place-based poverty for minorities. Quillian found that non-white poverty and neighborhood poverty are closely related in segregated metropolitan areas (2012). Statistically an interaction occurs with “segregation and group poverty intensify(ing) each other’s effects in producing spatially concentrated poverty in minority communities” (Massey and Denton 1993 in Quillian 2012). Kneebone reports that during the 2000s, lower poverty neighborhoods were diversified more than before with non-minorities still dominant. The opposite occurred for higher-poverty neighborhoods. Minority presence decreased here. For these years, minorities still experienced concentrated poverty the most (Kneebone, 2014 and Lichter et al., 2012). For the African American community, sociologists theorize that past politically motivated changes and social policies have influenced the lack of investment into black communities, segregation beyond Jim Crow, the lack of economic participation and the relationship between these communities and the criminal justice

system (Sharkey, 2013). Poverty is a truly complex concept and due to its complexity is difficult to study. This work will add to the literature that focuses on poverty and segregation in Memphis/Shelby County, Tennessee. This work also intends to add to socio-spatial recessional research. In addition, this work will contribute to the area of research that seeks to understand the relationship between poverty and segregation during a recessional period.

The Study Area

This section provides geographic information about the study area. It also describes the causes of segregation in the county including population decentralization (“white flight”) and policies to handle the issue of distribution of resources (e.g., annexation), measures to contain sprawl (e.g., exclusionary land use zoning), as well as current school system.

Presently, Shelby County is the most populous county in Tennessee (US Census, 2017). Memphis, Tennessee is the major city of Shelby County and one of the largest cities in the United States. Memphis was nationally ranked 20th largest in 2010 (US Census, 2012). Post recessions in the year 2014, Memphis had a population of approximately 656,000 people, comprising nearly 70 percent of the total 939,000 population of Shelby County. Memphis is the most populous in the county, followed by the total unincorporated area. Figure 1 visually depicts both the land area and street network distinguishing between Memphis and the other municipalities. Memphis city is one of 7 municipalities in Shelby County. Between 2000 and 2010, the population of Memphis declined by 2 percentage points, however the population of Shelby County increased by over 3 percent. The county seat, Memphis has lost population due to

decentralization and eastward movement of population which is apparent in the increase in share of Arlington, Bartlett, Collierville, and Lakeland populations as shown in Table 1 below. Past 2010 into 2014, municipalities Bartlett, Collierville, and Lakeland experienced increases in their share of Shelby County population, whereas Memphis did not change. Germantown has not changed in its share of population over the last 15 years and was overtaken by neighboring Collierville. Memphis has been unable to capture a significant portion of the population growth that Shelby County has experienced, and this has provided a fiscal challenge for the city.

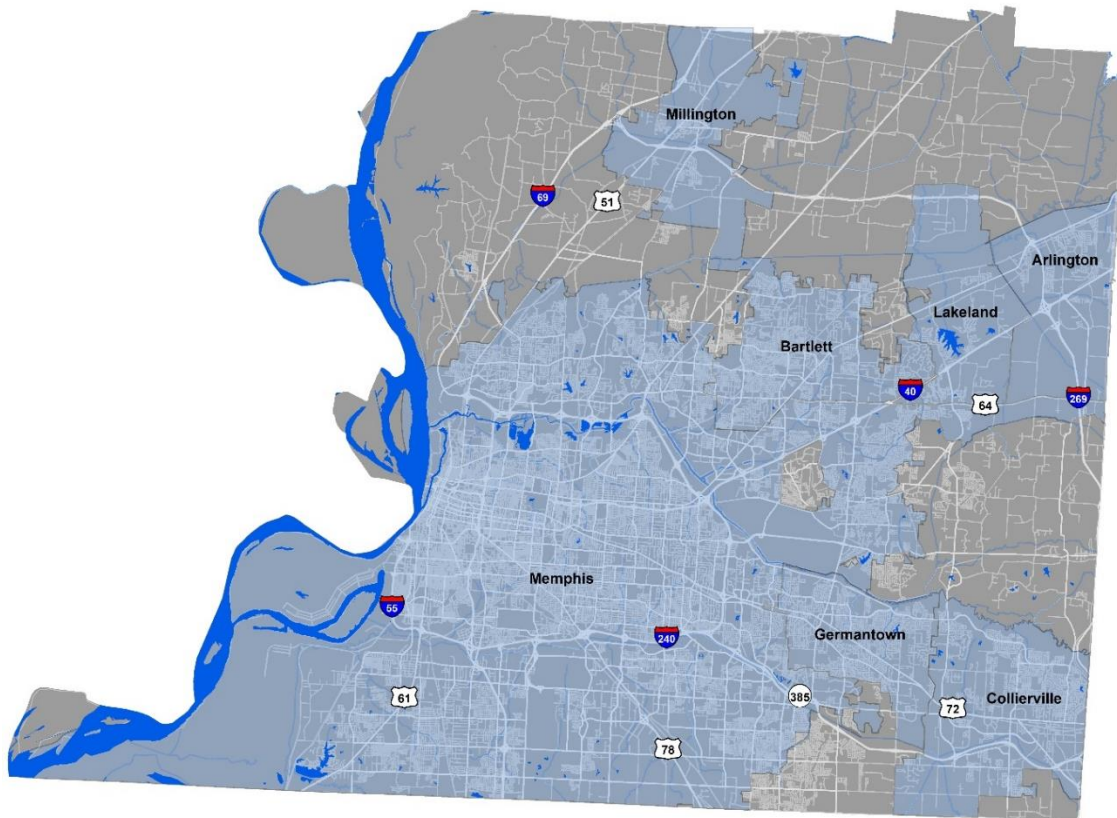


Figure 1: Municipality Map of Shelby County

The land area of Memphis is massive. Between 1950 and 2000, Memphis grew in land area over 150 percent (Smart City Memphis, 2015). Land in the Shelby County was

annexed by Memphis to increase tax revenue and increase population, but quickly became a way to maintain population (Modern Cities, 2017). Between 2000 and 2013, 11 of the 15 annexations since 1998 took place. As of 2010, Memphis, Tennessee has a land area of 315.06 square miles, which is larger than Atlanta (Georgia), Knoxville (Tennessee) and Cincinnati (Ohio) combined (Smart City Memphis, 2015 and US Census, 2016). Population density has shifted to the more rural and undeveloped parts “to be remade to accommodate single-family housing, low-rise office parks, shopping malls and ribbons of highway” (Savitch and Vogel, 2000).

Table 1 - Population Numbers and Percentages of Incorporated and Unincorporated Places in Shelby County in 2000 and 2010 and Land Area

Municipality	2000	2000 %	2010	2010 %	2014	2014 %	Land Area (sq mi)*
Arlington	2,569	0.3%	11,517	1.2%	11,611	1.2%	23.06
Bartlett	40,543	4.5%	54,613	5.9%	58,181	6.2%	26.65
Collierville	31,872	3.6%	43,965	4.7%	48,574	5.2%	29.29
Germantown	37,348	4.2%	38,844	4.2%	39,201	4.2%	19.97
Lakeland	6,862	0.8%	12,430	1.3%	12,538	1.4%	23.47
Memphis	650,100	72.4%	646,889	70%	655,641	70%	315.06
Unincorporated	128,178	14.3%	128,178	12%	109,659	11.7%	325.02
Shelby County	897,472		927,644		938,405		763.17

*Land area: 2010 Census

For Memphis, annexation and sprawl has resulted in a competition between Memphis and other municipalities in Shelby County, Tennessee. This is due to the

tendency of newer governments and recipients of population influx to be protective (Savitch and Vogel, 2000). Sprawl has impacted the Memphis area and has presented the city government with challenges. Now after losses in the tax base, the city seeks to shrink its size and sacrifice nearly \$10 million in net revenue to save in operation costs and infrastructure maintenance (Poe, 2017; Fleishmann, 2000). City government has been intentional in the selection of 7 study areas that are either not densely populated or are interested in annexation from Memphis (Poe, 2017).

Just as Memphis faces competition within Shelby County (and Desoto County), Memphis has always faced comparison to the state capital, Nashville. Memphis and Nashville have had the same issues, however both metropolitan areas have chosen different ways and occasions to handle these issues. The Memphis, TN-MS-AR is the second largest metropolitan area in the state of Tennessee, second to the Nashville-Davidson-Murfreesboro-Franklin, TN Metro Area (US Census, 2017). Nashville has had less decline in the white population compared to Memphis, with a steady decline since 1970, whereas Memphis has observed a sharp decline in white residents since 1960. Both Nashville and Memphis have experienced “white-flight” to the suburbs and a transition to a predominately black core-city population. The affluent leave the city and drive suburban development while leaving the poor in the core with public service needs to all being accomplished on the same capital budget (Raymond and Menifield, 2011). Both cities have taken different routes and have had varying success in handling the issue of inequitable distribution of resources.

Annexation and consolidation are two tools that Memphis and Nashville employ, respectively. Annexation is an important topic for Memphis and Shelby County, because

it usually sparks dialogue about segregation and government consolidation.

Consolidation is a governmental restructuring approach, one of the New Regionalism tools alongside annexation, that seeks to address the issues of place-based polarization in resources that mass suburbanization and urban sprawl encouraged (Fleischmann, 2000; Savitch and Vogel, 2000; Rusk, 2003 in Raymond and Menifield, 2011). These issues include economic and racial segregation (Savitch and Vogel, 2000; Raymond and Menifield, 2011). However, Memphis and the Capitol City have differing government structures. Memphis-Shelby County operate on a dual-governmental system, whereas Nashville houses a consolidated government, where the city and county governments are joined. Nashville and Davidson County consolidated in 1962 (Raymond and Menifield, 2011). The consolidation happened to “demonstrate to other metropolitan areas of the United States a truly progressive solution to the difficult problem of effectively guiding future growth” and handling resource distribution (Nashville, 1956). In Nashville there was the state precedent for consolidation, whereas Memphis has been an example of how to and not to use annexation.

For those municipalities in Shelby County, Tennessee experiencing change from population movement to the east, there is pressure to control physical development and control population demographics to ensure population stability, thus halting flight. According to Savitch and Vogel (2000) many governments implement exclusionary zoning, form-based codes, and are unwelcoming to multi-family and publicly assisted housing in order to drive “desirable growth and social homogeneity” (160). The pressure was present when Memphis sought consolidation of its school system with schools of the County. Memphis City Schools, who served the city of Memphis since 1852, would

expand to serve the county under the Shelby County Schools moniker (Amis and Aissaoui, 2013). When the City of Memphis decided to dissolve its Memphis City Schools charter in 2010 and give the Shelby County board of education power through Shelby County Schools, the school district was 85% African American/Black and 6.5% Hispanic/Latino and 87% of students were economically disadvantaged (Anderson, 2012; Amis and Aissaoui, 2013). Whereas, the Shelby County district was predominately 52.3% white and 42.4% African American/Black and Hispanic/Latino, while 37% were disadvantaged economically (Anderson, 2012; Amis and Aissaoui, 2013). Memphis City Schools served 108,317 students, while Shelby County Schools served 48,243 students in 2010 (Amis and Aissaoui, 2013).

Consolidation of the school system was one of Memphis' ways post-recession to handle disparities that the area was facing. In 2008, 30,000 of 40,000 white school-aged children attended private schools reflecting the lack of diversity in the public-school system. According to the Tennessee Advisory Committee to the United States on Civil Rights (2008), the lack of white students in the public system in Shelby County (Memphis) as in the other most populous counties in Tennessee: Davidson County (Nashville), Hamilton County (Chattanooga) and Knox County (Knoxville) indicated that integration patterns for public schools have been negatively affected over time (34). Thus, the city sought education consolidation and a form of regionalism in the county after realizing that County school performance was better than in the city based on No Child Left Behind measures of dropout and graduation rates (Memphis Report Card, 2004; Tennessee Department of Education, Shelby County Report Card, 2004; No Child Left Behind Act of 2001 in Kiel, 2008).

The school systems legally merged in 2013 and a nearly one-year later, all six suburban municipalities fled the Shelby County School system and created individual school systems to manage, however this comes to no surprise. It was anticipated by local educators that a repeat pattern of white flight was to occur, however it was not anticipated that it would happen so soon (Dillion, 2011). A “de-merger” occurred placing Memphis in the same uncomfortable position as before (Bauman, 2014). The disparities in economic disadvantage of the students between the Memphis and Shelby County before the merger and the lack of willingness of the suburbs to join Memphis indicates that there are poor city-county relations driven by economic and racial differences.

Poor is the appropriate word as there are disparities in Memphis city and Shelby County poverty statistics. In 2013, Memphis was ranked 4th highest regarding national poverty rates among cities with populations greater than 500,000 and 1st highest among metropolitan statistical areas with populations greater than 1,000,000 people (Delavega, 2015). An analysis of poverty between Memphis, Shelby County, and the state of Tennessee reveals more Memphis and Shelby County disparities. In 2013, the poverty in Memphis was 29.8 percent, in Shelby County was 22.9 percent and overall in Tennessee was 18.3 percent. The poverty rates per race were higher in Memphis than in Shelby County. Poverty in Memphis was higher by race than in the state overall except for non-Hispanic whites. As listed in Table 2, Latinos proportionally were the most impoverished of all race groups at 46 percent.

Table 2 - Diversity Rates in the Memphis, Shelby County, State of Tennessee and the United States

2013 Poverty Rate	Overall	Under 18	18-64	Over 65	Non- Hispanic White	Black	Latino	Asian
Memphis	29.80%	46.90%	25.70%	14.50%	13.50%	34.40%	45.50%	26.70%
Shelby County	22.90%	35.50%	20.00%	10.60%	8.60%	31.10%	37.60%	16.50%
Tennessee	18.30%	26.20%	17.40%	10.10%	14.00%	29.70%	34.70%	13.10%
United States	15.50%	22.70%	14.60%	9.50%	10.60%	25.80%	23.70%	12.30%

Source: Delavega E. 2015. 2015 Memphis Poverty Fact Sheet. The University of Memphis and the Mid-South Family & Community Empowerment Institute. <http://www.memphis.edu/socialwork/pdfs/20152povertyfactsheetwebversion.pdf>.

Methodology

Measures Utilized in this Study

The section provides details on measurement of both segregation and poverty. It also includes objectives for the study and hypotheses to be tested.

Segregation is commonly measured with interaction/exposure index and index of dissimilarity. Massey (2001) calculated the interaction/exposure index and index of dissimilarity for Memphis from 1970 to 1990 and found that both indices were more than 70 for both time periods. Massey utilized the interaction/exposure index to measure racial isolation and the index of dissimilarity to measure residential segregation.

In their analysis of “Racial Segregation in US Metropolitan Areas and Cities, 1990-2000: Patterns, Trends, and Explanations,” Frey and Myers (2005) calculated the index of dissimilarity for white residents and African Americans/Black residents, Asian residents and white residents, and Hispanic/Latino and white residents for 318 metropolitan areas including Memphis, Tennessee. This was done for the years of 1990 and 2000. They found that the Black/White dissimilarity index was over 60 for Memphis

in 2000 and the change in the index between 1990 and 2000 was between -5 and 0. The Asian/White index revealed a score of 40 to 50 for the Memphis area with a change between the years as similar to Black/White. The Hispanic/White index for 2000 was between 50 and 60. Overall, Memphis was labeled as a majority White and Black city as were Nashville and Chattanooga (2005). In other words, the Black and White residents in Memphis were more segregated than other racial groups in 2000, followed by the Hispanic and White, while the Asian and White residents were the least segregated in the area.

Sharma (2017) calculated various diversity and entropy measures for 10 metropolitan areas in Tennessee. For Sharma (2017), entropy measures spatial segregation. For Memphis, it was found that Memphis was one of the most segregated metropolises in the state with an entropy index of 0.321 in 2012 (Sharma 2017). Memphis was found to be more diverse than Chattanooga and Jackson which had entropy value of 0.301 and 0.238 accordingly. Sharma (2017) concluded through analyses that there was an association between high segregation, poverty and income polarization (Sharma, 2017).

The observation that poverty is ubiquitous and can be found in every city spurred the War on Poverty in 1963 (Greene and Pick, 2012). During this time, the United States created its numerical definition of poverty based on the minimal cost of basic living items for a family. In response to inflation, this definition has changed and is currently applied. A poverty threshold sets the maximum income that a family can have to be considered poor (U.S. Census, 2009; Poverty, 2016). The Census Bureau uses money income thresholds by size of family and composition to measure poverty. Per the US Census

Bureau, the poverty threshold in 2000 (in red below in Table 2) was \$17,643 and in 2009 was \$21,756. In 2017, the poverty threshold is \$24,036 for a family of two adults and two children under 18 years (Table in Appendix B). This family size was used because near 2000 and 2010 families were on average larger than 3 people (Household, 1997; Household, 2010).

Table 3 - Poverty Thresholds for 2000 by Size of Family and Number of Related Children Under 18 Years

Size of family unit	Weighted average poverty thresholds	Related children under 18 years								
		None	One	Two	Three	Four	Five	Six	Seven	Eight or more
One person (unrelated individual)	8,794									
Under 65 years	8,959	8,959								
65 years and over	8,259	8,259								
Two people	11,239									
Householder under 65 years	11,590	11,531	11,869							
Householder 65 years and over	10,419	10,409	11,824							
Three people	13,738	13,470	13,861	13,874						
Four people	17,603	17,761	18,052	17,463	17,524					
Five people	20,819	21,419	21,731	21,065	20,550	20,236				
Six people	23,528	24,636	24,734	24,224	23,736	23,009	22,579			
Seven people	26,753	28,347	28,524	27,914	27,489	26,696	25,772	24,758		
Eight people	29,701	31,704	31,984	31,408	30,904	30,188	29,279	28,334	28,093	26,753
Nine people or more	35,060	38,138	38,322	37,813	37,385	36,682	35,716	34,841	34,625	33,291

Source: U.S. Census Bureau.

The conclusions from the aforementioned studies and the devises mentioned will be applied in the study. The overall objective is to investigate the disparities in poverty categorized by race and ethnicity (African-Americans, Whites, Hispanic/Latinos, and Asians) in Shelby County, TN. The specific objective is to understand the temporal trend of the spatial distribution of those in poverty countywide. The magnitude and movement of poverty will be spatially and statistically analyzed using GIS.

It will be tested that:

- H1: African Americans/Blacks and Hispanic/Latinos are the poorest in Shelby County, TN having the lowest income-to-poverty ratios of all groups.
- H2: African Americans/Blacks and Hispanic/Latinos experience the most residential segregation in Shelby County, TN marked by low values for the interaction/exposure index and high values for the index of dissimilarity.

Data Collection

Population and median income data was obtained through the United States Census Bureau website for the Decennial Census of 2000 and 2009 in the geographic boundary type of census tracts. The tables were downloaded, cleaned and joined in ArcMap to 2000 United States Census TigerLine shapefiles of the census tracts of Shelby County, Tennessee. The groups that data was collected for analysis are below in Table 3. It is important to note that White, Black, and Asian groups are treated by the census as mutual exclusive categories, whereas Hispanics and Latinos can be of any other group (Forest, 2005).

Table 4 - Data Type and Spatial Scale

Type	Level	Year
Total Population/Median Income	Census Tract	2000/2009
Black Resident Totals/Median Income	Census Tract	2000/2009
White Resident Totals/Median Income	Census Tract	2000/2009
Hispanic Resident Totals/Median Income	Census Tract	2000/2009
Asian Resident Totals/Median Income	Census Tract	2000/2009

Data Analysis

Total Population Percentage by Race/Ethnicity

Population percentage was calculated for overall population and by race and ethnic group. This was done with the purpose to understand the population proportion dynamics in Shelby County between 2000 and 2009.

Spatial Means by Race and Ethnicity and Standard Deviation Ellipses

Total population density was calculated for spatial representation and to proceed with calculation of spatial means and standard deviational ellipses. The population totals for 2000 and 2009 were divided by the square mileage of the corresponding census tract. Population density was calculated for the total amount of people in the census tract and not for each racial/ethnic group in this study. Population percentage by census tract was calculated for each group.

Based on Greene and Pick (2012), in ArcGIS, the spatial mean and standard deviational ellipse tools in Spatial Analyst were utilized to identify the spatial mean and distribution of one standard deviation of population from the mean. This was done for the White residents, Black residents, Asian residents, and Hispanic/Latino residents of 2000 and 2009.

Population Percentage by Census Tract

Using the population totals for each group by census tract, the percentage of each group was calculated and spatial represented in ArcGIS.

Segregation Measures

This study will employ two measures of evenness (index of dissimilarity and entropy) and one measure of isolation (interaction/exposure index) to investigate segregation in Shelby County (Iceland et al., 2002).

Index of Dissimilarity

The index of dissimilarity is measured using the formula with values ranging between 0 and 1:

$$D = \frac{1}{2} \sum_{i=1}^n \left| \frac{b_i}{B_T} - \frac{w_i}{W_T} \right| \tag{1}$$

Where variables are defined in Table 5 below:

Table 5 – Variables for Index of Dissimilarity

Variable	Representation
n	number of tracts
w _i	number of White residents in tract i
W _T	total number of White residents in the city
b _i	number of Black residents in tract i
B _T	total number of Black residents in the city
a _i	number of Asian residents in tract i
A _T	total number of Asian residents in the city
h _i	number of Hispanic/Latino residents in tract i
H _T	total number of Hispanic/Latino residents in the city

(Source: Forest, 2005 and University of Michigan, 2010)

D is the proportion of each group that would need to move in order to facilitate a uniform distribution. A D value closer to zero represents tracts that have group

proportions reflective of the total population. A D value higher than zero represents a disproportion of groups present in the tracts. Six D values for six possible combinations among three racial and ethnic groups were calculated to understand the relationship between Whites and Blacks, Whites and Asians, Whites and Hispanics, Blacks and Asians, Blacks and Hispanics and Asians and Hispanics. The results are symmetrical.

Interaction/Exposure Index

The second formula utilized measures of the exposure or interaction of groups through the calculation of probability also with output values that range between 0 and 1. The interaction/exposure index reads:

$$B_{wb} = \sum \left(\frac{n_{iw}}{N_w} \right) \left(\frac{n_{ib}}{n_i} \right) \tag{2}$$

Whereas variables are defined in Table 6 below:

Table 6 – Variables for Index of Interaction

Variable	Representation
n_i	total population of tract i
n_{iw}	number of White residents in tract i
N_w	total number of White residents in the city
n_{ib}	number of Black residents in tract i
N_b	total number of Black residents in the city
n_{ia}	number of Asian residents in tract i
N_a	total number of Asian residents in the city
n_{ih}	number of Hispanic/Latino residents in tract i
N_h	total number of Hispanic/Latino residents in the city

(Source: Forest, 2005)

where B is the probability that in this case, a White person will meet a Black person. The higher the value, the more probable an interaction. The results are not symmetrical. Thus, the interaction/exposure index was calculated with a total of 12 times to account for all group interactions. The probability for White to Black, White to Asian, White to Hispanic, Black to White, Black to Asian, Black to Hispanic, Asian to White, Asian to Black, Asian to Hispanic, Hispanic to White, Hispanic to Black, and Hispanic to Asian will be provided.

Entropy Index

The last segregation index used measures entropy. Entropy will be calculated using the formulas below:

$$H = (\hat{H} - \bar{H}) / \hat{H} \tag{3}$$

$$\hat{H} = \sum_{i=1}^n P_i \times LN \frac{1}{P_i} \quad H = \sum_{i=1}^n P_t \times h \quad h = \sum_{i=1}^n P_p \times LN \frac{1}{P_p}$$

Whereas variables are defined in Table 7 below:

Table 7 – Variables for Entropy Index

Variable	Representation
H	entropy index
\hat{H}	average countywide entropy
\bar{H}	average census tract entropy
h	intermediate entropy variable
P_i	group proportion of population in the county
P_t	total population proportion of all county tracts
P_p	proportion of group present in tract <i>i</i>

(Source: Iceland, 2004 and Forest, 2005)

Entropy is calculated to describe the homogeneity of the county by race and ethnicity. H is the entropy index, \hat{H} represents the average entropy for the county, and \bar{H} represents the predicted entropy for the county. Entropy values can range from 0 to 1, where values close to 1 imply segregation with values close to 0 implying integration. If H is 1, then \bar{H} will be close to 0. In this case, census tracts are homogeneous. Whereas, if H is 0, the predicted entropy is closely similar, if not equal, to that of each census tract ($\hat{H} = \bar{H}$). The higher the H , the less uniform the county is ethnically, while a low H value implies more ethnic uniformity.

Income-to-Poverty Ratio

The income-to-poverty ratio compares household incomes by census tract to the poverty threshold as established by the United States Census Bureau. Contrary to population totals that had an entry for every census tract, income was not available for each group for each tract due to sampling. The median income by race and ethnicity was obtained for both years by census tract. This value was then inserted into the formula below along with the poverty thresholds shown in Table 8. Population thresholds for four-person households with specifically two children and two adults was inserted into the formula below because the average household has between one to two adults and one to two children:

(4)

$$\text{Income - to - poverty ratio} = \left(\frac{\text{Income (Census Tract)}}{\text{Poverty Threshold for the Year}} \right)$$

Whereas the poverty thresholds utilized are listed in Table 8 below:

Table 8 – Poverty Thresholds for the Average Sized Family

Poverty Thresholds	2000	2009
Four Person Household with Two Adults and Two Children	\$17,643	\$21,756

Source: US Census Bureau

Income-to-poverty ratios can be categorized into 4 categories: deep poverty, poverty, near poverty and above poverty. Census tracts with ratios below 50 percent, meaning that the tract income is half of the poverty threshold or less, are considered to be in deep poverty. Those in poverty experience a ratio between 50 and 100 percent. Tracts in near poverty have income-to-poverty ratios between 100 and 125 percent meaning the tract has median income 1-25 percent above the poverty threshold. Finally, tracts above poverty have poverty ratios above 125 percent indicative of income that is more than 25 percent of the poverty threshold.

Results

Total Population Percentage by Race/Ethnicity

Below in Table 9 are the percentages of population by race and ethnicity in Shelby County in 2000 and 2009. The percent share of White residents decreased by four percentage points from 2000 to 2009. However, Asians maintained the same share of the population in both years. The Black and Hispanic population both increased by nearly two percentage points in the nine-year period. There are more people of color in the county. Overall, Black and White residents are the majority groups, while Asian and Hispanic/Latinos are the minority groups.

Table 9 – Percentage of Population

Percentage of Population				
Year	White	Black	Asian	Hispanic
2000	47%	49%	2%	3%
2009	43%	51%	2%	5%
Change	-4%	2%	0%	2%

Total population percent change by census tracts between 2000 and 2009 is indicated in Figure 2 below. Percent change goes beyond the calculating the difference in percentage points between years as done in Table 9. Percent change provides an idea of the magnitude of the increases or decreases in population. Most of the census tracts of Shelby County experienced an increase in population between 2000 and 2009 reflected in a total percent change between 0 and 100 percent. However, these areas of positive change are not in the city core. Nearly all of the census tracts that experienced population decrease at a percent change below 100 percent were in Memphis, with the exception of parts of Millington and Collierville municipalities. Neighborhoods include Frayser, Raleigh, Uptown, and Orange Mound. Census tracts that areas of unincorporated Shelby County south of Lakeland and Arlington experienced the highest increase in population with a percent change of all with change above 100 percent between 2000 and 2009.

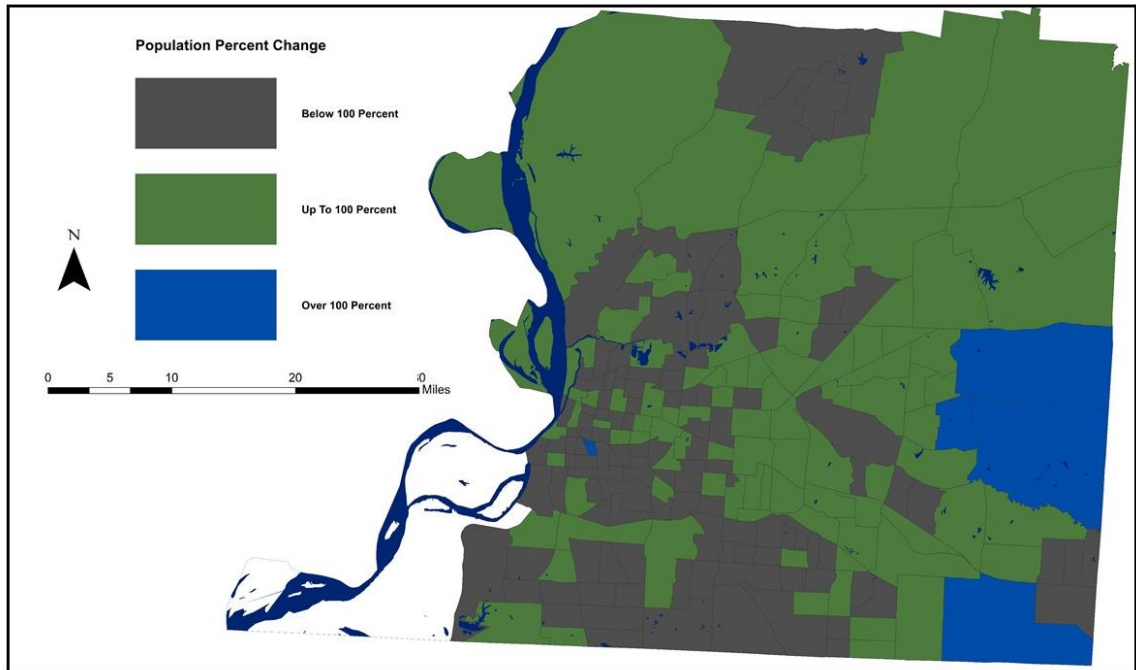


Figure 2: Map of Total Population Percent Change for 2000-2009

In 2000, the population density in Shelby County was greatest in the Memphis, Bartlett, Germantown and Collierville municipalities. Areas of Lakeland, Arlington, and Millington were not as dense in this year. Census tracts with population densities between 2000 and 4000 people per square mile were located in the fringe of Memphis. Areas with densities over 4000 people per square mile were located in the Downtown/Midtown Core and along the western end of Poplar Avenue.

By 2009, the areas with population densities below 4000 people per square mile maintained the same density as 2000. However, there is observed change in the tracts that has densities above 4000 people per square mile in 2000. These census tracts became less dense. Census tracts in the Downtown/Midtown Core lost density and it appears that people moved eastward, near the old Mall of Memphis site, but maintained a close distance to Interstate 240.

Spatial Means by Race and Ethnicity and Standard Deviation Ellipses

Population proportions were presented above by group, however standard deviations and means, both spatial and numeric are useful to understanding the dispersal of people around Shelby County, Tennessee. For the census tract data, means and standard deviations were calculated. As indicated in Table 10, the average number of residents by census tract by race/ethnicity allows a comparison in group size similarly to how the population proportions by group did above. The means from greatest to least for both 2000 and 2009 are for Black residents, White residents, Hispanic/Latino residents, and Asian residents. The increase in Hispanic/Latino population between the years is captured in the increase in mean. There was a decrease in White population' proportion and also a decrease in census tract mean from 2000 to 2009. For Asian residents, there was an increase in the mean between 2000 and 2009. On average, each census tract has over 4000 people, which is the United States Census Bureau's optimum sized population for a census tract (Census 2010).

Table 10 – 2000 and 2009 Census Tract Average and Standard Deviations by

Race/Ethnicity

Year	Total	White	Black	Asian	Hispanic
2000					
Mean	4154.96	1966.82	2017.70	68.03	108.17
S. Dev	2385.30	2184.86	1934.04	101.43	147.67
2009					
Mean	4250.86	1846.92	2151.93	92.81	193.26
S. Dev	2698.92	2247.17	1904.08	176.53	314.53

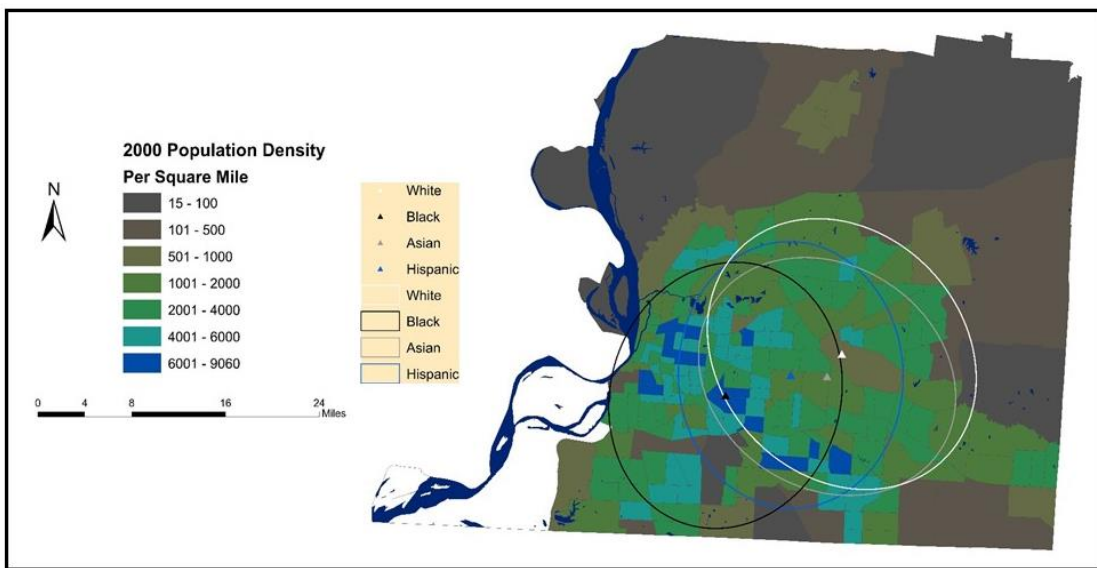
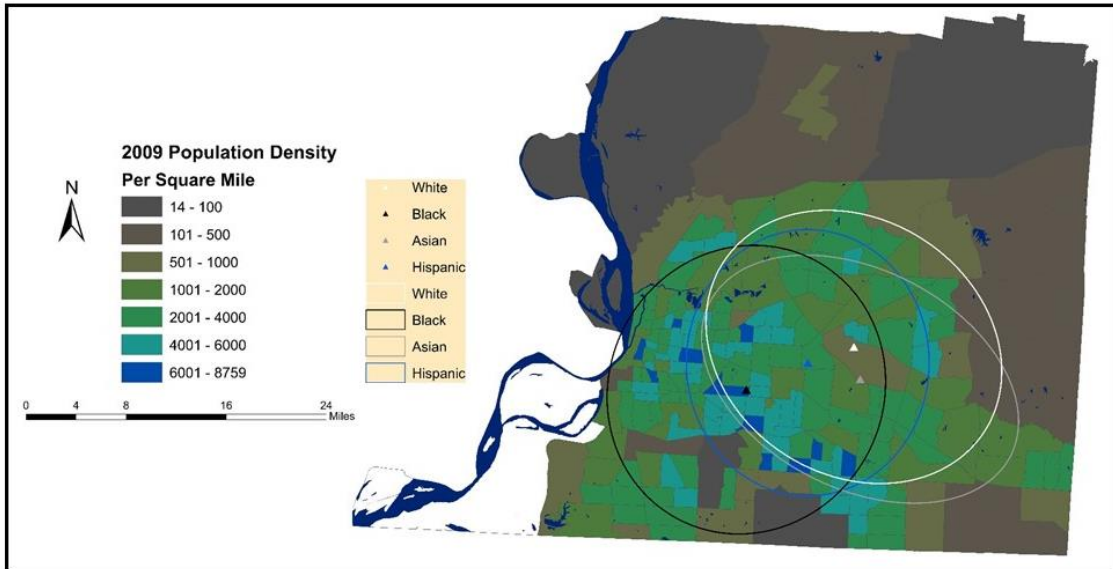


Figure 3: 2000 Population Density

Figure 4: 2009 Population Density

Previously, numeric means and standard deviations were scrutinized to understand the variance of census tract populations by racial or ethnic group. Through calculating the spatial means and spatial standard deviational ellipses by group for 2000

and 2009, the visual representation of census tract population variance can be observed. In both Figure 3 and 4 spatial representations of the means and standard deviations of the populations of each race and ethnic group for the two years are provided. The black ellipse and triangle is representative of African American/Black residents, the blue represents Hispanic/Latino residents, the white for White residents and the gray symbolizes Asian residents. The ellipses are presented as an overlay of the total population density for the respective year.

The ellipse that represents the Hispanic/Latino population becomes shorter along the vertical axis indicating the area of residency has become smaller and thus more concentrated. The spatial mean moved the northeast. For Asian residents, their ellipse has extended along its vertical axis even more towards the suburbs. Their ellipse is longer than all other groups as well indicating that Asian residents occupied land area than all other groups. For 2000 and 2009, the ellipse of this group overlapped that of their White counterparts more than any group, implying integration between groups. Their spatial mean moved southeast yet maintained locational population density between 2000 and 2009.

For Black residents, the ellipse is wider along its horizontal axis and more distant from the spatial mean in 2009 than 2000. This indicates that this group of residents moved eastward between the two years. It also indicates that Black residents have covered greater area by 2009. In both years, Black residents had spatial means that were located in densely populated census tracts. The location of the spatial mean moved from the center of a specific tract in 2000 to the east boundary of the same tract by 2009. For White residents, the spatial mean moved to the northeast by 2009 and the standard

deviation ellipse maintained the same size for the years of 2000 and 2009. However, the ellipse shifts slightly northwest from 2000 to 2009 possibly indicating that this group began movement back towards Memphis.

An analysis of population density indicates a decrease in Downtown and Midtown Core populations between the years. Generally, in 2000, people lived closer together and by 2009 people were moving southeast. The location of the spatial means for each group demonstrate a shift to the east that population density trends capture. Hispanic/Latino and White residents maintained their spatial mean and deviations for the two years. However, Black residents occupied space in all directions further than they did in 2000. Asian residents occupied census tracts in the southeastern part the county more than any other groups. The space occupied by Asian residents also mimicked the space the occupied by White residents the most. Yet, for both years, the ellipses of White, Asian, and Hispanic/Latino residents overlapped each other in a way that was not observed for the ellipse of Black residents and any other group(s). Additionally, the ellipse axis of White and Asians residents extended from the northwest to the southeast, while the ellipse axis of Black and Hispanic residents extended roughly due north to due south.

This analysis implies that more Black residents are located in Memphis, and movement in any direction, other than west, provides more racial and ethnic diversity. It is expected that the following analyses will provide support that Black to any group interaction comparisons will be lower than interactions between the other three groups within themselves implying that Black residents are more isolated than other groups.

Population Percentage by Census Tract

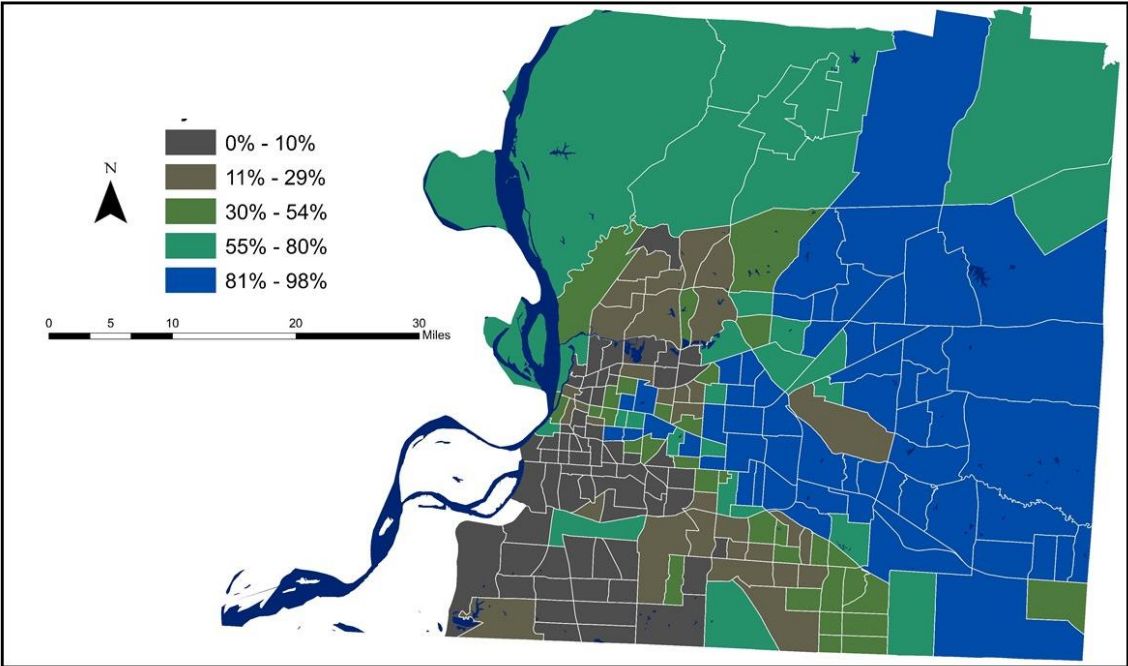


Figure 5: White Population Percentage by Census Tract for 2000

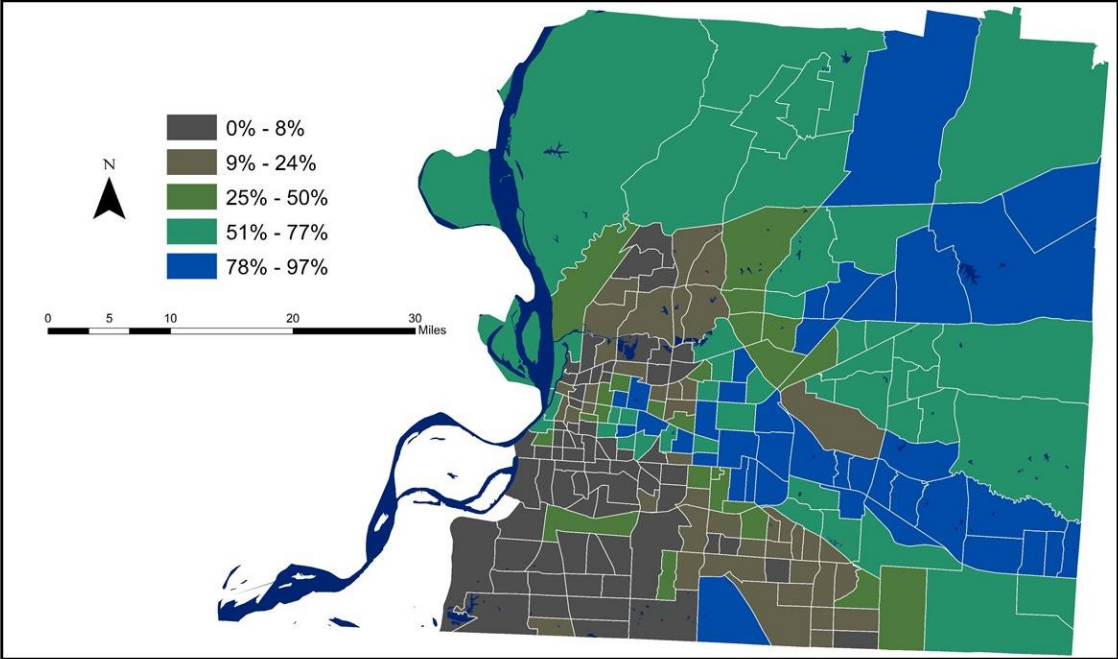


Figure 6: White Population Percentage by Census Tract for 2009

For 2000, White residents, as indicated in the blue in Figure 5, resided in high percentages in the eastern part of the county and unincorporated areas, composing up to 98 percent of population in some census tracts. Thus, White residents were found in lower proportions in the Memphis city core. It is apparent that by 2009, in Figure 6, that there are less census tracts with high proportions of White residents, which reflects the total share decrease of this group between the two years. There are more people in the middle of the interstate loop in 2009 compared to 2000, however the occupancy of the Downtown core and southern part of the county appear the same.

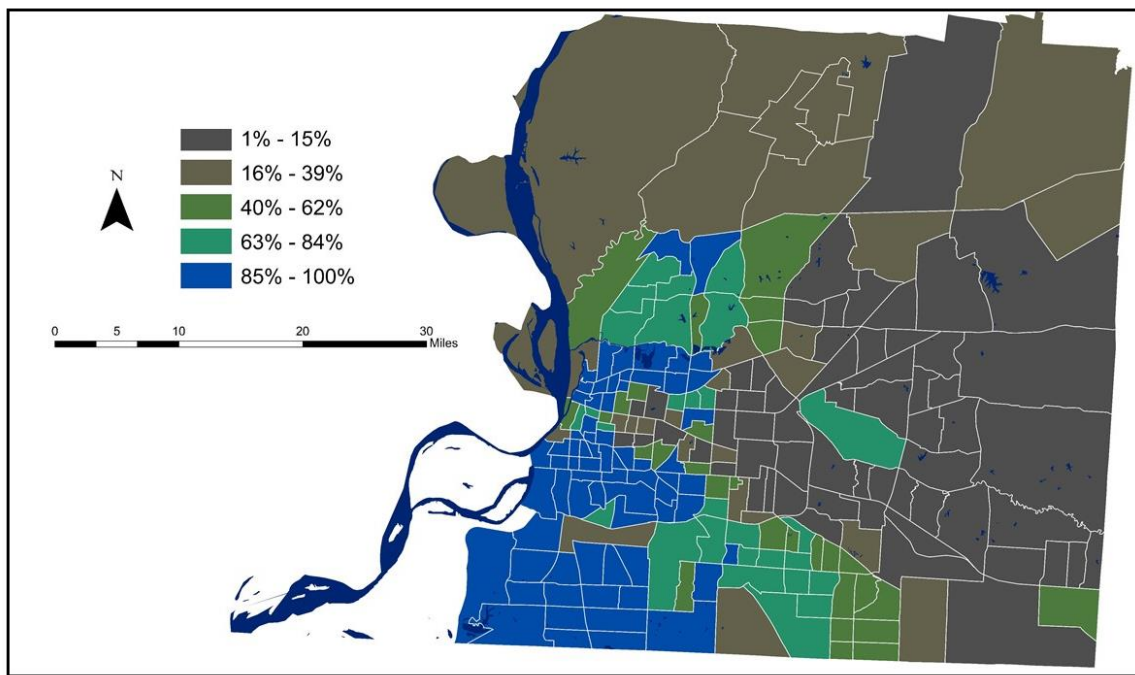


Figure 7: Black Population Percentage by Census Tract for 2000

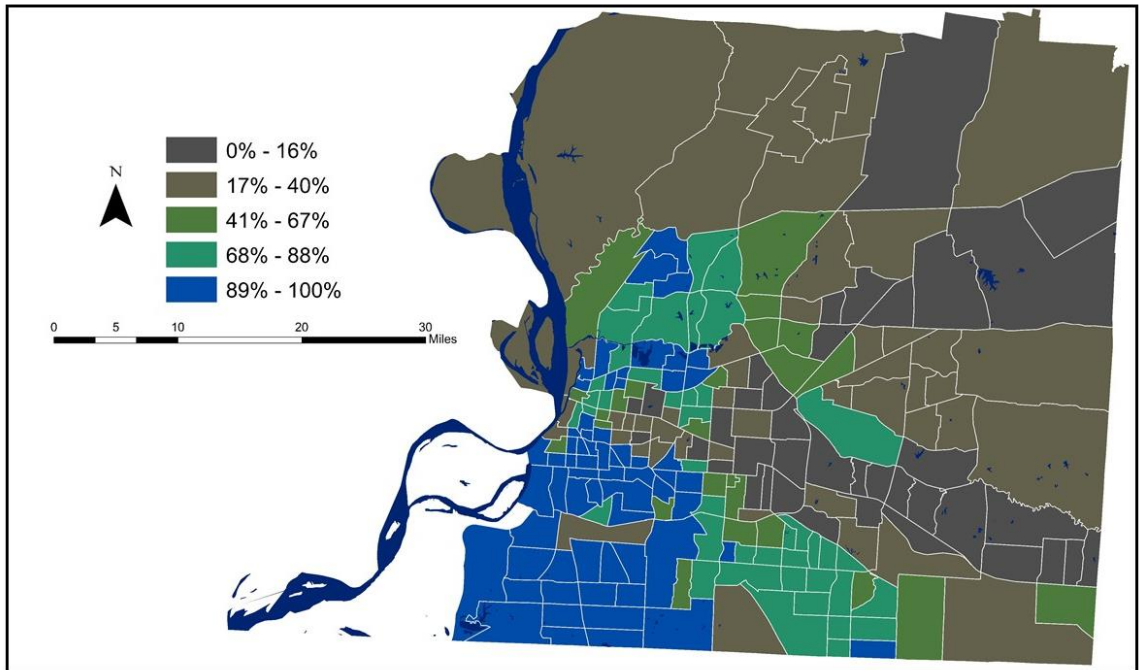


Figure 8: Black Population Percentage by Census Tract for 2009

The census tract occupancy of Black residents in 2000 was inverse of where White residents were. Black people had the highest share of residents in census tracts located inside the interstate bypass loop and in the southern part of Shelby County. Some census tracts were 100 percent occupied by Black residents in 2000. For 2009, this distribution appears exactly the same as in 2000, however there is a minor difference in the census tracts of the Downtown core. There are less Black residents here in a cluster of 5 census tracts in this area. This difference may be related to the progress of relocation and displacement of Home Opportunities for People Everywhere (HOPE IV) as explored in Appendices E and F.

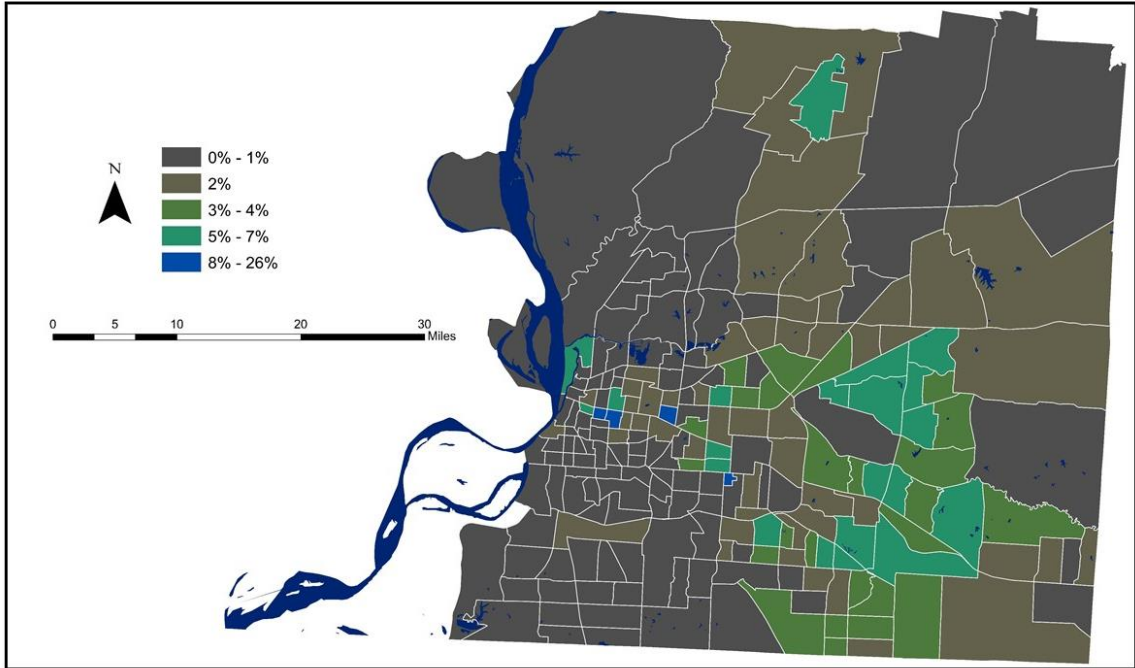


Figure 9: Asian Population Percentage by Census Tract for 2000

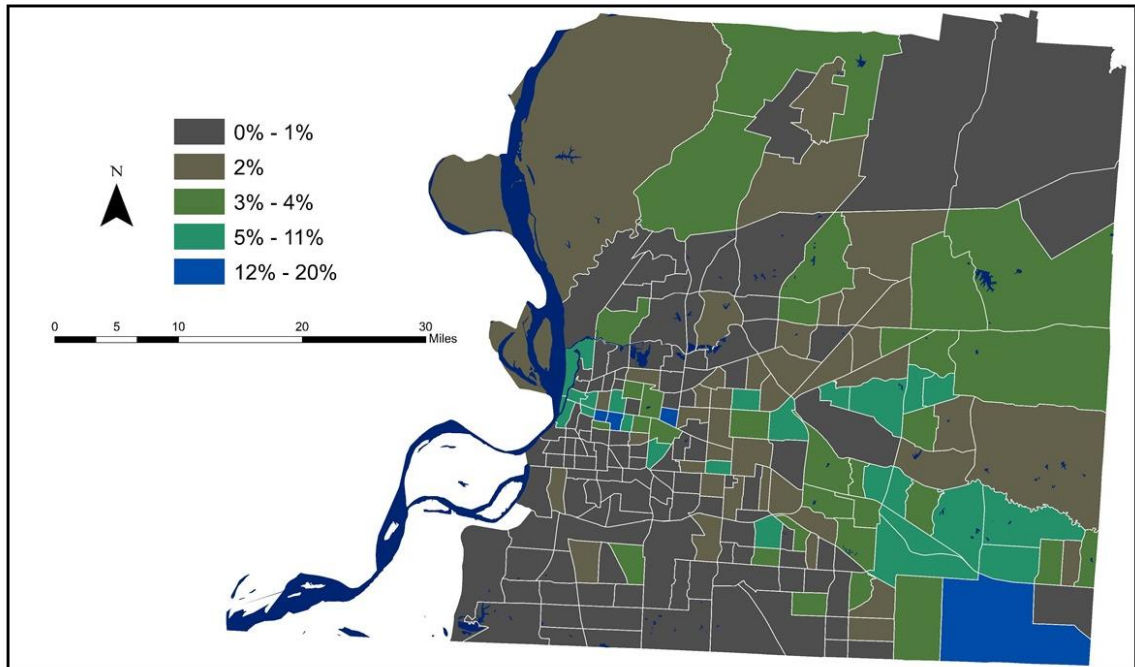


Figure 10: Asian Population Percentage by Census Tract for 2009

Asian residents of Shelby County in 2000 were concentrated in the eastern part of the county in areas like Cordova, Germantown, Hickory Hill, and Bartlett. The highest concentration, up to 26 percent, was found in the census tracts located in the Medical District of Memphis and Harbor Town. By 2009, more Asian residents, between 5 and 20 percent, moved to the Mississippi riverside and near Union Avenue in the Medical District of Memphis. In addition, many moved to Lakeland, Arlington, and Millington up to 4 percent. The same share of Asian residents occupied census tracts in Germantown. However, Collierville in the southeast corner of Shelby County, experienced the greatest growth and housed a share of resident of nearly 20 percent. The same tract had a 2 percent share of Asian residents in 2000.

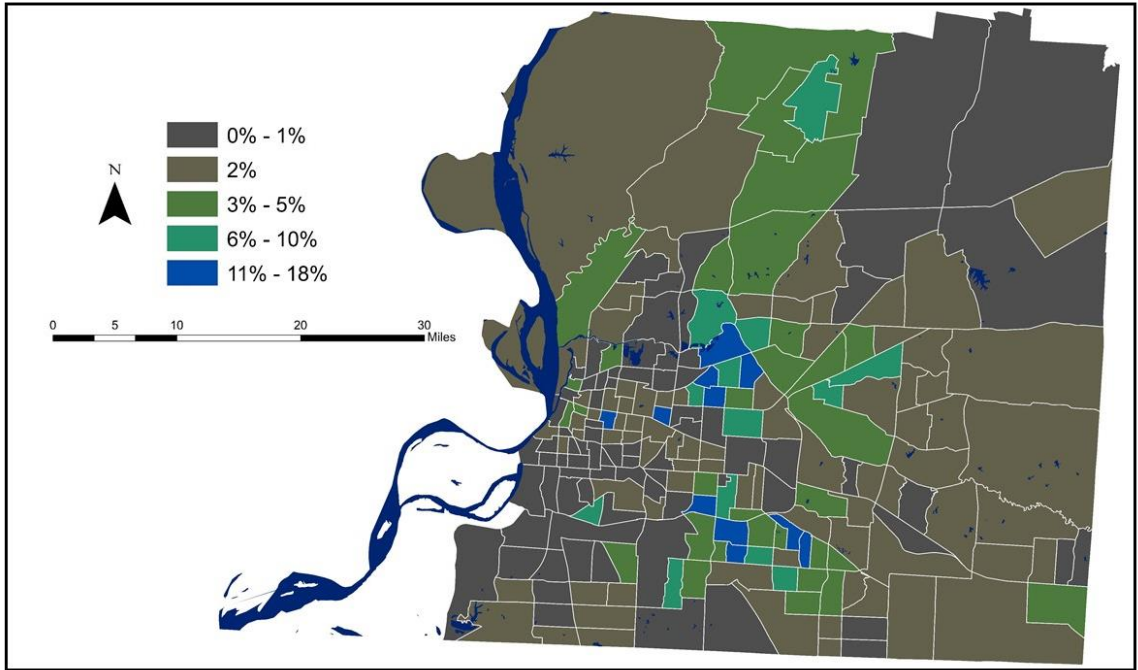


Figure 11: Hispanic Population Percentage by Census Tract for 2000

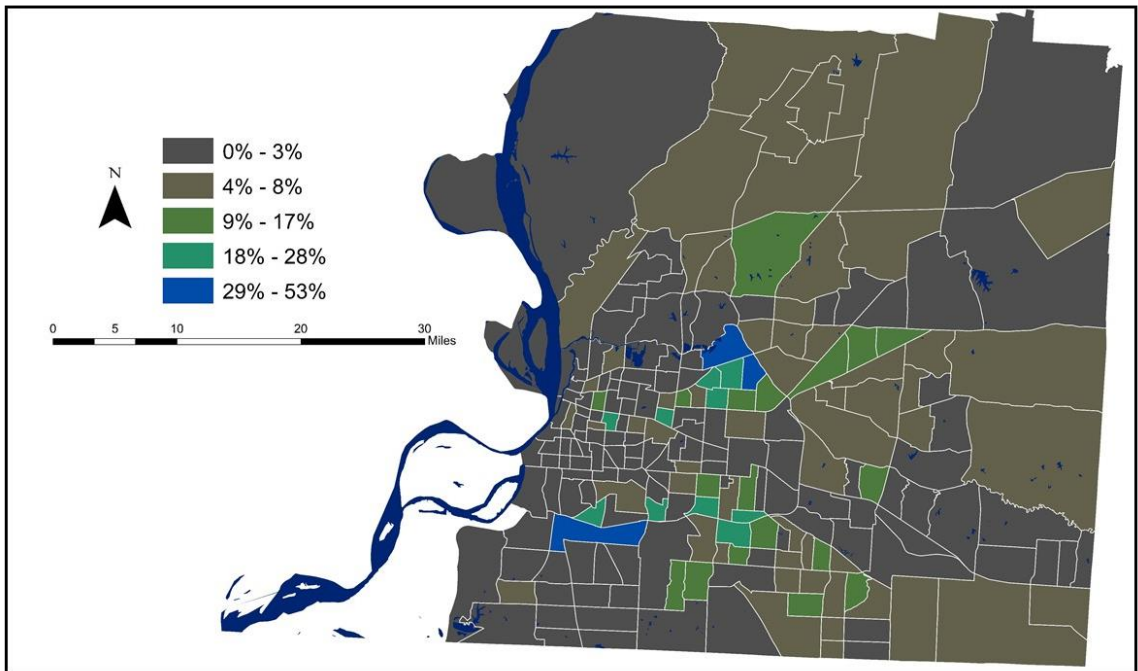


Figure 12: Hispanic Population Percentage by Census Tract for 2009

Hispanic residents lived in proportions up to 18 percent in census tracts adjacent to where Asian residents were. Most significantly, in the northeast corner of the interstate bypass (Berclair community), Hispanics occupied tracts in high percentages there compared to other groups. Compared to 2000, it is notable that in 2009, Hispanics occupied less census tracts and lived closer to and in the city of Memphis, as seen in Figure 12. Additionally, the maximum share of Hispanic population in a census tract increased by more than 300 percent in this time period.

Index of Dissimilarity

In Table 11 are the results of applying the formula for index of dissimilarity to Shelby County. For five of six tests, there were increases in the indices of dissimilarity from 2000 to 2009. This implies that between the two years, there was an increase in the number of people that would have to move to achieve even dispersal. The exception is the test considering White residents and Black residents which indicated a marginal decrease. In this case, the amount of White or Black residents that would need to move decreased. However, this test, for both years, still produced one of the highest results. The dissimilarity for the White to Black test is second to the dissimilarity index calculated through the Black to Asian test. The low value of index of dissimilarity between White to Asian means the lowest dissimilarity for both years and the most evenness than all other group pairs. This relationship is visible in the location of ellipses where the ellipses for White and Asian residents overlapped more so than with other groups.

Table 11 - Countywide Index of Dissimilarity for Shelby County, TN

Year	WB	WA	WH	BA	BH	AH
2000	0.69	0.33	0.48	0.69	0.53	0.46
2009	0.68	0.38	0.51	0.72	0.57	0.6

Between 2000 and 2009, the values for White to Black and Black to Asian and also, White to Hispanic and Black to Hispanic were nearly the same. The values for White to Asian and Black and Hispanic marginally increased. The largest increase was experienced between Asians and Hispanics at fourteen percentage points which indicates that uneven dispersal has increased through time. In 2000, the index for White to Black (0.69) and Black to Asian (0.69) were the same, while the values for White to Hispanic (0.48) and Asian to Hispanic (0.46) were similar as well. For the White to Black and Black to Asian tests, the high amount of dissimilarity in these two tests fall in line with the findings of ellipses test. The ellipses of the White and Asian groups overlapped below 50% of the ellipses of Black residents.

In 2009, the indices for White to Black (0.68) and Black to Asian (0.72) were the similar, as were the values for Black to Hispanic (0.57) and Asian and Hispanic (0.60). Additionally, this supports previous findings in that the ellipses for White and Asian residents overlapped the least with the ellipses for Black residents and also the ellipses representative of the dispersal of Black and Asian residents overlapped the least with that of Hispanic residents. Generally, Black to Asian had the highest index (0.69, 2000; 0.72, 2009), White to Asian had the lowest index (0.33, 2000; 0.38, 2009), and Asian to Hispanic made the highest increase over the nine-year period.

Interaction/Exposure Index

Significant increases in interaction/exposure index for White to Hispanic and Black to Hispanic occurred from 2000 to 2009. Marginal increases in the White to Asian and Asian to Hispanic happened in this time frame. Asian to White had the highest interaction/exposure index for both years, while Black to Asian had the lowest value for both years. The values for Asian to Hispanic were the next lowest. For 2000, the interaction index for Hispanic to White and Hispanic to Black were similar. For 2009, White to Hispanic and Asian to Hispanic were the same as were White to Black and Hispanic to Asian. All Hispanic to other group indices declined by 2009. All Asian to other group indices, except Asian to Hispanic declined between the two years.

The interaction/exposure index for White to Black and Black to White was nearly the same value for both years indicating consistency in the amount of exposure between both groups. The encountering probabilities are also below 25% which explain the high measure of unevenness between the groups as reported in the results of the previous test. For both years, the Black to Asian isolation index was the lowest of all tests meaning there is minor Asian visibility in Black communities. The White to Asian probability was just as low. The interaction/exposure index for the Hispanic to White (0.46, 2009) and Hispanic to Black (0.43, 2009) groups were nearly equally as high and sustained through the years. The lowest value was the Hispanic to Asian group (0.024, 2009). The consistency of these probability values indicate that the proportions of the comparison groups have not changed since 2000. This aligns with the population proportion results presented in the beginning of this study that did not indicate significant change.

Yet, when the probability that majority groups would encounter a Hispanic/Latino person in their daily life doubled between 2000 and 2009. For White residents, the likelihood increased by nearly 100 percent from 2.6% in 2000 to 5% in 2009. For African American/Black residents, the likelihood also increased nearly 100 percent from 2.4% in 2000 to 4% in 2009. Because proportionally, Hispanic/Latino residents nearly doubled population in the county between 2000 (3%) and 2009 (5%), the change in interaction/exposure index between White and Black Residents to Hispanics is explained. For Asian residents, they encountered Hispanic at low likelihoods, which increased by one percentage point between 2000 (4%) and 2009 (5%). The likelihood that a Hispanic person would encounter an Asian person was lower than the inverse implying that there are more Hispanic people in the county, which is true.

The values for Asian to White (0.63, 2009) and Asian to Black (0.27, 2009) decreased from 2000 to 2009. The lowest interaction index for Asian probability was the Asian to Hispanic group (0.05, 2009). It was interpreted from previous tests that Asian and White residents occupied the same spaces fairly evenly. However, if this were true, it is assumed that their index of interaction/exposure values would be the same. The indices are drastically different and can be interpreted as follows: the likelihood that an Asian person will encounter a White person nearly 30 times more probable than a White person encountering an Asian person. Although, the group are evenly distributed in the space they share, the interaction index reveals in these spaces, Asian residents are minorities.

Table 12 – Interaction/Exposure Index in Shelby County, TN

Year	WB	WA	WH	BW	BA	BH	AW	AB	AH	HW	HB	HA
2000	0.21	0.022	0.026	0.21	0.01	0.024	0.64	0.28	0.04	0.47	0.45	0.025
2009	0.24	0.032	0.05	0.203	0.012	0.04	0.63	0.27	0.05	0.46	0.43	0.024

Entropy

Generally, Shelby County had an even ethnic distribution, and this did not change between 2000 and 2009. In fact, by 2009, Shelby County was less spatially integrated than in 2000 indicated by the increase in H. The lower \bar{H} value of 2000 implies that census tracts were less diverse within themselves than in 2009.

Table 13 - Entropy values for Shelby County

Year	\hat{H}	\bar{H}	H
2000	0.867	0.516	0.351
2009	0.931	0.582	0.375

Income-to-Poverty Ratio

The income-to-poverty ratio analysis is purposed to make a connection between poverty and place in Shelby County. Income-to-poverty ratios can be categorized into 4 categories: deep poverty, poverty, near poverty and above poverty. Census tracts with ratios below 50 percent, meaning that the tract income is half of the poverty threshold or less, are considered to be in deep poverty. Those in the poverty states experience a ratio between 50 and 100 percent. Tracts in near poverty have income-to-poverty ratios

between 100 and 125 percent meaning the tract has median income of 1-25 percent above the poverty threshold. Finally, tracts above poverty have poverty ratios above 125 percent indicative of income that is more than 25 percent of the poverty threshold.

In 2000, most census tracts of Shelby County were above poverty as demonstrated in Table 15 below and Figure 13. Most of the county had a income-to-poverty ratio above 125. The three percent of census tracts that were in deep poverty, 6 total, were in the Downtown Core of Memphis. Close in proximity was census tracts experiencing poverty, which are present in the Downtown Core and parts of North Memphis along the Interstate 40 West portion of the interstate bypass loop. Areas of near poverty occurred close to area in poverty, particularly tracts in South Memphis.

As shown in Table 15, in 2000, the Hispanic percentage of people in deep poverty, poverty, and above poverty was the same as the countywide average. Asian residents were in deep poverty at a higher proportion than other groups at 5.2 percent, which is 2 percent more than the county average. White and Black residents experienced deep poverty at a higher proportion than the county average with 3.5 percent and 3.8 percent, respectively. As hypothesized, Black and Hispanic residents lived in poverty twice as much as White and Asian counterparts. Black residents also had the most tracts with income-to-poverty ratios in near poverty at nearly 3 times as much as the other groups. White and Asian residents lived above poverty the most, followed by Hispanics, with Black residents having the least census tracts in an above poverty status.

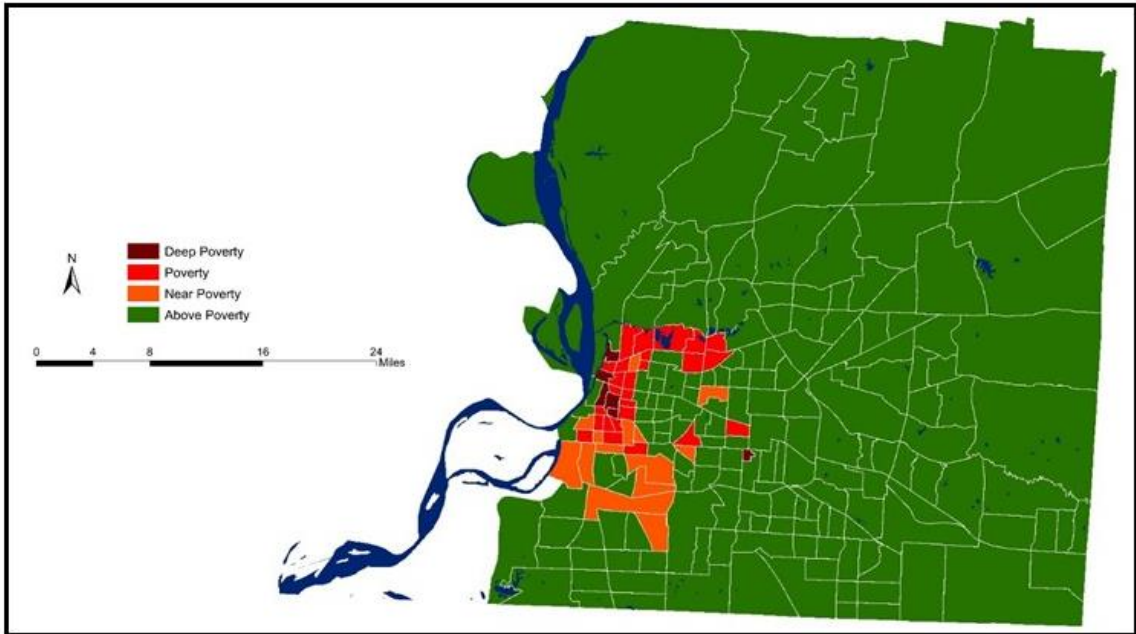


Figure 13: Income-to-Poverty Ratio for 2000 by Census Tract

Table 14 – Percentage of Tracts in Poverty in 2000

Percentage of Tracts in Poverty 2000

		Deep Poverty	Poverty	Near Poverty	Above Poverty
	Number of Tracts	<50	50-99.9	100-125	125>
Total	214	3%	12%	7%	79%
White	200	3.5%*	8%	4%	85%*
Black	210	3.8%*	13%*	14.5%*	69%
Asian	134	5.2%*	7%	5%	84%*
Hispanic	148	3%	12.8%*	5%	78%

(*) Percentages that are higher than the total percentage for the county

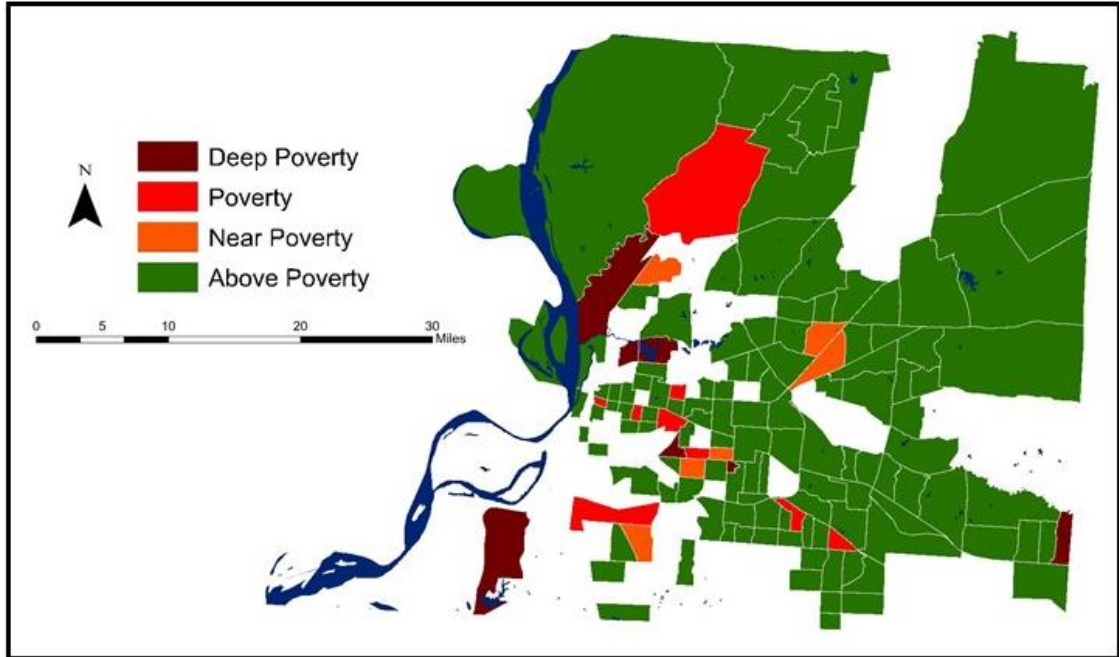


Figure 14: Asian Poverty in 2000

Areas of deep poverty were not always close to areas of poverty for Asian residents. This is a reflection of the overall density of Asian residents throughout the county. Tracts that experienced deep poverty were not the most populated by Asian residents in 2000. This implies that a spatially isolated minority of Asian residents were impacted by poverty.

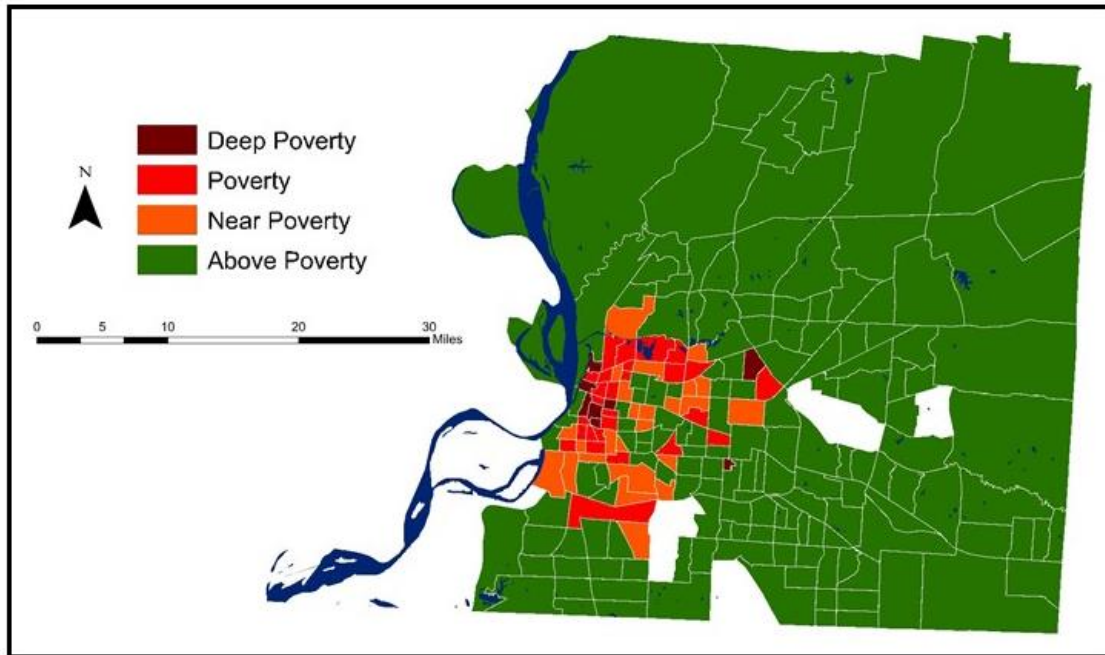


Figure 15: Black Poverty in 2000

For Black residents in 2000, areas of deep poverty were typically located near areas of poverty. These areas of poverty were adjacent to areas of near poverty. Thus, these residents are experiencing concentrated poverty. The most populous census tracts create a crescent shape around the Midtown core. However, in Figure 15, above areas of near poverty are located in that Midtown core. The poverty of Black residents in Shelby County in 2000 occupied more census tracts than any other group in that year. For White residents (Figure 16), deep poverty and poverty were constrained to areas inside of the interstate bypass. Deep poverty was concentrated in the southern areas inside the loop. However, areas of near poverty were found away from the Memphis city core.

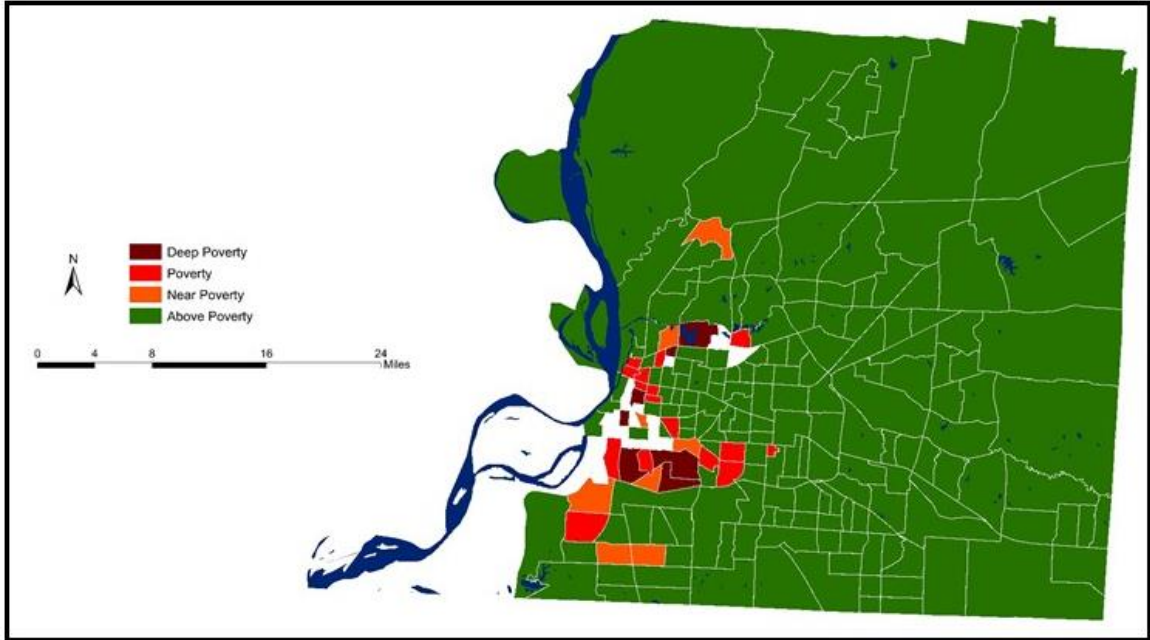


Figure 16: White Poverty in 2000

Poverty was worse in Shelby County by 2009. Yet, most census tracts of Shelby County were still above poverty as demonstrated in Table 15 below and Figure 17. The three percent of census tracts that were in deep poverty still were in the Downtown Core of Memphis. Areas of poverty and near poverty spread northward and southward, but overall concentrated in the Memphis municipality. Near poverty spread eastward. Many tracts in the southwest part of the county transitioned to the next worse poverty state: from above poverty to near poverty and from near poverty to poverty.

Black, Asian, and Hispanic residents occupied a share of tracts that experienced deep poverty more than the countywide share in 2009. Black residents had shares of poverty and near poverty that was greater than all other groups. Black poverty in 2009 occurred proportionally in twice as many census tracts as Hispanic poverty. There was above a 15-percentage point difference in the proportion of Black census tracts above

poverty compared to the other groups. Generally, Black residents experienced aggregated poverty (deep poverty and poverty figures combined) more than all other groups at nearly 30 percent with the lowest figure of 7 percent for White residents. Although, Black and White residents are nearly equal in population in Shelby County, they have drastically different poverty outcomes. Black poverty and Hispanic poverty nearly mirror the countywide figures which implies that these groups strongly influence poverty in Shelby County.

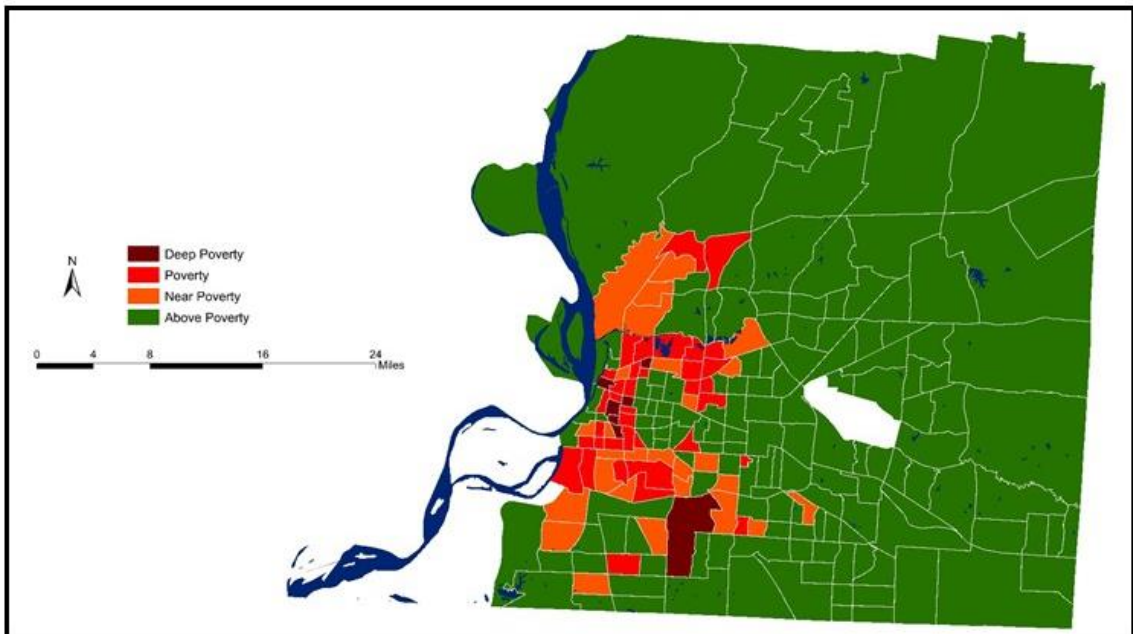


Figure 17: Income-to-Poverty Ratio for 2009 by Census Tract

Table 15 – Percentage of Tracts in Poverty 2009

Percentage of Tracts in Poverty 2009

		Deep Poverty	Poverty	Near Poverty	Above Poverty
	Number of Tracts	<50	50-99.9	100-125	125>
Total	214	3%	17%	13%	67%
White	179	3%	4%	9%	84%*
Black	210	5.2%*	23%*	12%	60%
Asian	74	5.5%*	6%	7%	82%*
Hispanic	105	4.8%*	12%	10%	74%*

(*) Percentages that are higher than the total percentage for the county

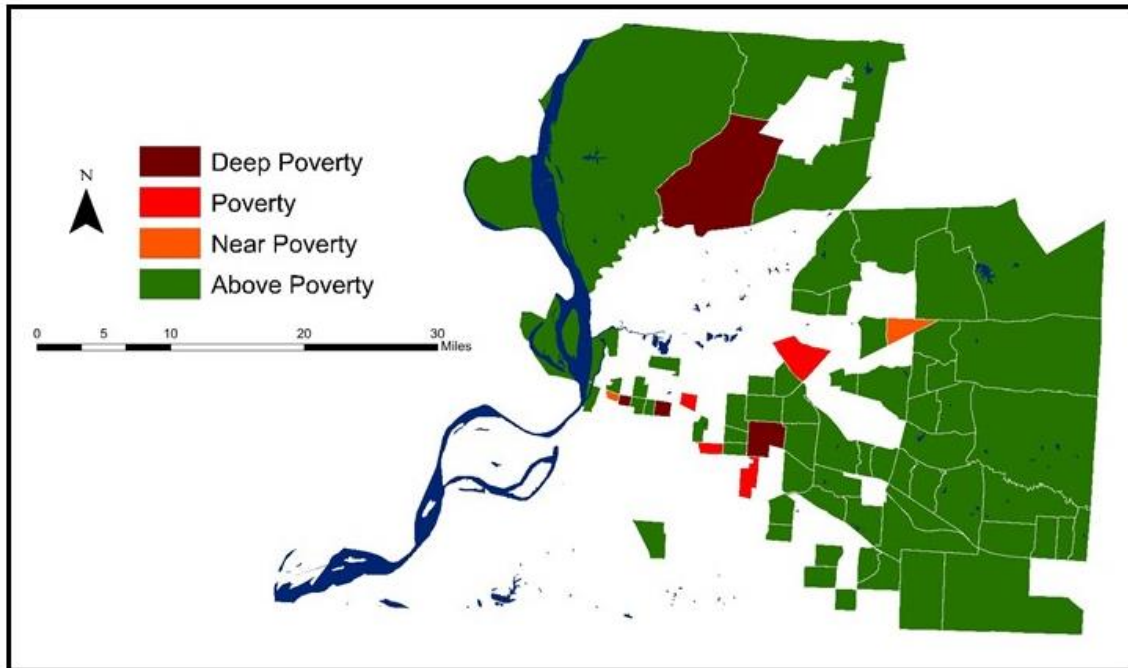


Figure 18: Asian Poverty in 2009

By 2009, Asian residents occupied 50 percent of the census tracts that they did in 2000. This is visible in Figure 18. In addition to the lack of occupied spaces, many Asian residents were not experiencing poverty, especially concentrated poverty. Millington has a proportion of Asian residents that were in deep poverty. The areas to the eastern side of Shelby County including parts of unincorporated areas, Lakeland, Arlington, Germantown, and Collierville had Asian residents living above poverty.

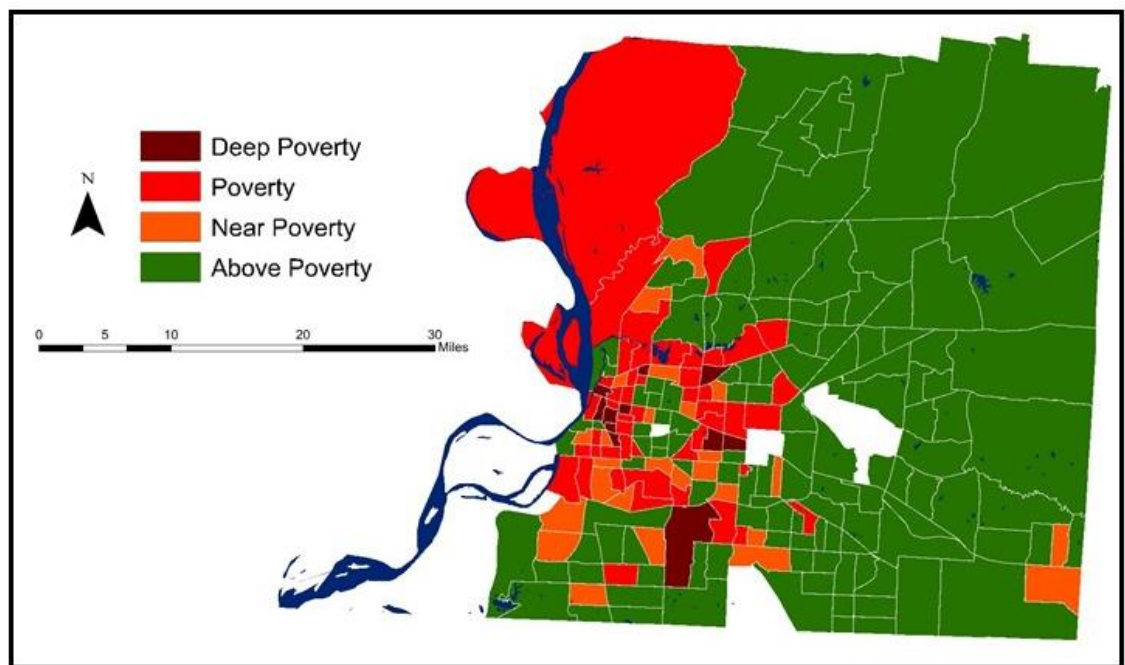


Figure 19: Black Poverty for 2009

Poverty moved eastward for Black residents by 2009 with census tracts in deep poverty and poverty having transitioned from poverty and near poverty states. Whereas in 2000, areas of poverty were constrained to the inside of the interstate bypass, by 2009, poverty and near poverty moved northward and southward to reach the boundaries of Shelby County.

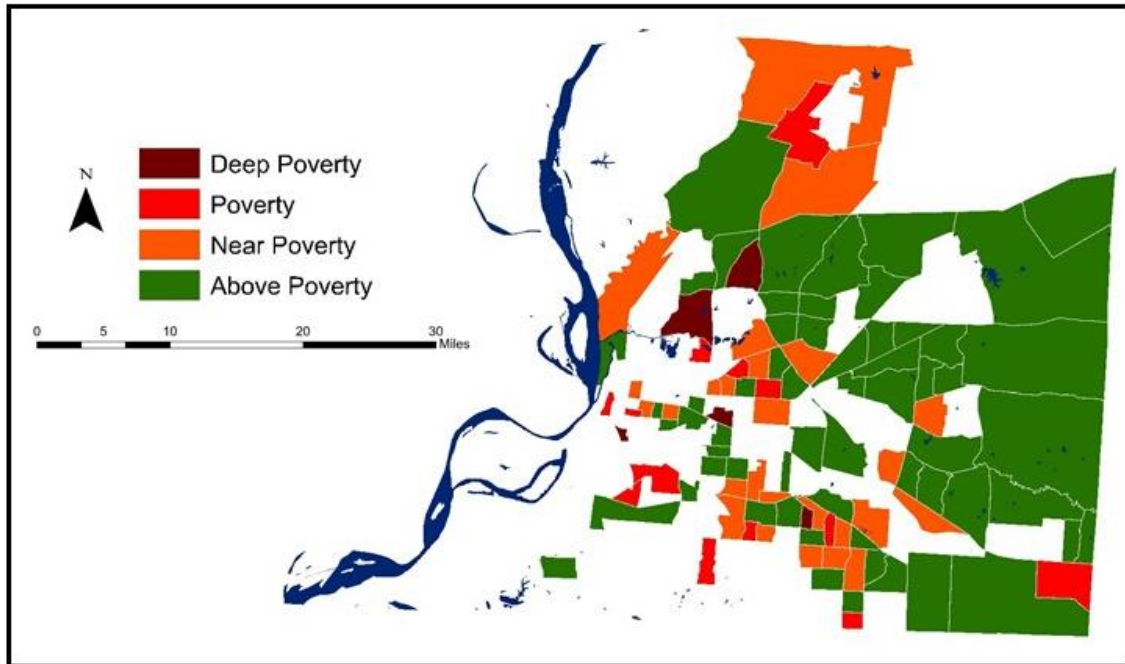


Figure 20: Hispanic Poverty in 2009

Poverty for Hispanic residents in 2009 was widespread and patchy in pattern. There were areas of clustered poverty and near poverty. Deep poverty was not spatially concentration for Hispanic residents in this year.

Although the proportion of deep poverty between 2000 and 2009 remained the same, the proportion of above poverty tracts decreased by 12 percentage points while the tracts with poverty and near poverty increase 5 and 8 percentage points accordingly. Percentage point change is shown in Table 16. Figure 20 indicates the tracts in the county by percent change in their income-to-poverty ratio. The magnitude of positive percent change indicates the growth of the tract to be less impoverished. The tracts that experienced the most positive change with percent change above 500 percent were 2 tracts: one located north of the Downtown Core and the other located in the southern part of Memphis' Downtown. Most tracts experienced negative change in their income-to-

poverty ratios between 2000 and 2009. There were others than experienced change between 0 and 100 percent. These tracts were located along the Poplar Avenue corridor, in the Downtown Core, in Millington, TN, Collierville, north of Desoto County, MS; Lakeland and Arlington, TN.

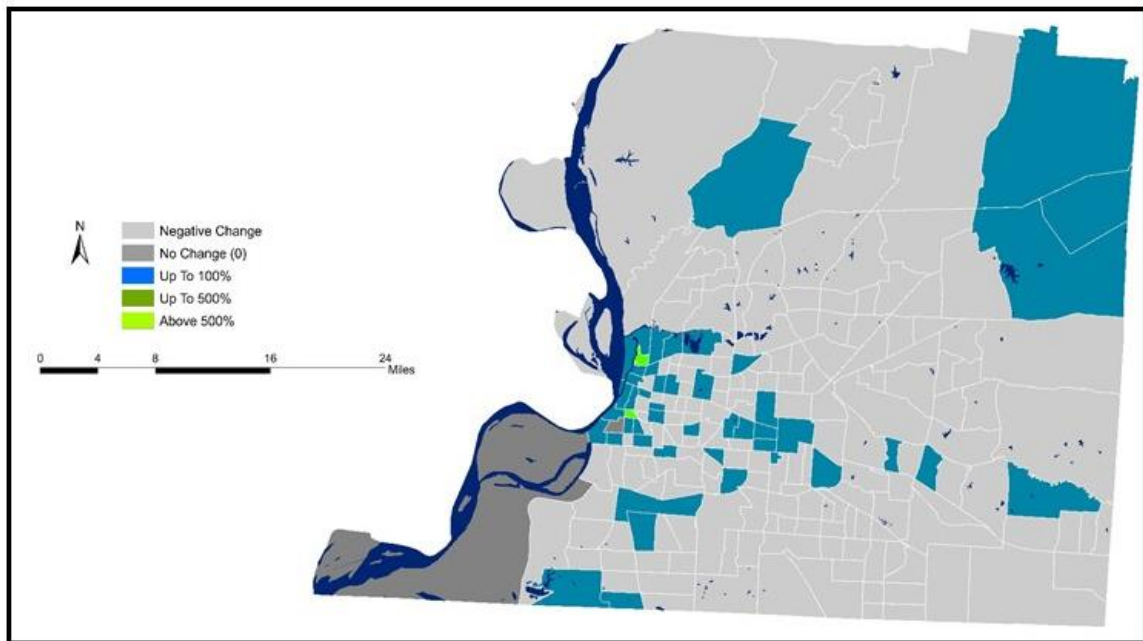


Figure 21: Total Percent Change in Poverty 2000-2009

Table 16 – Change in Percentage of Poverty 2000-2009

Change in Percentage of Tracts in Poverty 2000-2009

		Deep Poverty	Poverty	Near Poverty	Above Poverty
Number of Tracts	<50	50-99.9	100-125	125>	
Total	214	0	+5	+8	-12
White	179	-0.5	-4	+5	-1
Black	210	+1.4*	+10*	-2.5	-9
Asian	74	+0.3*	-1	+2	-2
Hispanic	105	+1.8*	-0.8	+5	-4

(*) Percentages that are higher than the total percentage for the county

From 2000 to 2009, the proportion of White people in poverty decreased, but those in near poverty did increase. For black people, the trend is different. The proportion of those in deep poverty and poverty increased, while the percentage of black people in near poverty and above poverty decreased. For Hispanics from 2000 to 2009, the percentage of deep poverty, near poverty, and above poverty all increased. The Asian population was the most stable and there was little change in the poverty statistics between the two years. All groups experienced increases in near poverty and decreases in above poverty tracts between the years. This implies that during this period, people were financially vulnerable. White residents had the lowest change in the percentage of above poverty census tracts. Every group had increases in deep poverty between 2000 and 2009 except White residents. Black people experience poverty at a proportion twice the county amount. The decreases in near poverty and above poverty and increases in the other

categories position Black people as the most financial vulnerable and impoverished group in Shelby County.

Discussion

The first hypothesis set out to test whether African American/Black and Hispanic/Latino residents were the poorest in Shelby County, Tennessee for 2000 and 2009. It was expected that these two groups would be the poorest. The income-to-poverty ratio values for 2000 showed that in this year Black residents and Hispanic residents lived in poverty twice as much as their White and Asian counterparts. Black residents were most vulnerable having the most tracts with income-to-poverty ratios in near poverty at nearly 3 times as much as the other groups. Black residents, then Hispanics had the least census tracts in an above poverty status. Black people lived in the more deep poverty designated census tracts than their Hispanic counterparts. Thus, African Americans were the most impoverished group in Shelby County with Hispanics following behind in 2000.

In 2000 and 2009, Asian residents had the greatest share of census tracts that were in deep poverty, however Black and Hispanic residents were close behind. For the county, Asian poverty was split between deep poverty and above poverty categories, barely occupying the categories in-between (near poverty and poverty). Despite this, the Black and Hispanic groups had the highest share of tracts that were in poverty and near poverty states. These groups also had the lowest share of tracts that were considered above poverty with Blacks having the least. There was above a 15-percentage point difference in the proportion of Black census tracts above poverty compared to the other groups.

During this period, both Black and Hispanics observed the greatest increases of deep poverty tracts; tracts with Black people saw a ten-percentage point increase in the poverty share and a decrease in the near poverty share; and both groups had a decrease in the percentage of tracts above poverty between 2000 and 2009. This hypothesis was proven true because tracts with Black residents were the poorest of this time period followed by tracts with Hispanic residents.

The final hypothesis wished to test whether African Americans/Blacks and Hispanic/Latinos experience the most residential segregation in Shelby County, TN. My position is that they were the most segregated of the four groups. I set out to prove this using the values of the dissimilarity and interaction/exposure indices. I expected high values for the dissimilarity index indicating that there was an unevenness between Blacks and Hispanics with any group. What was found was that the White and Asian test had the lowest value indicating that these groups were the most evenly dispersed. The other five tests, which compared Black residents or Hispanic residents, produced values that were thirteen-percentage points more or higher in 2009. For Hispanics, there was an increase in unevenness between 2000 and 2009 for them and the Asian group. Additionally, the results from application of the index of dissimilarity were on par with the results of Frey and Myers (2005).

I expected low values from the interaction/exposure index and it was found that exposure was dependent on population proportions countywide. White and Black residents are the majority groups of the county, while Asian and Hispanic residents are the minority groups of the county with a lower share of total population. Overall, the tests assessing the exposure of majority group members to minority group members (AW, AB,

HW, and HB) were all tests that produced high probabilities. The tests comparing the exposure of minority group members to majority group members (WA, WH, BA, and BH) had some of the lowest probabilities as did the test calculation minority group exposure to minority groups (AH and HA). Probabilities for majority group to majority group (WB and BW) produced similar results because their share of county population is similar. It is important to note that the increase in probability of White to Black and minor decrease in Black to White is due to a decrease in the proportion of White population and increase in the proportion of Black population in the county. Thus, it is difficult to support for the second hypothesis with the interaction/exposure index.

Further support can be drawn through the interpretation of population distributions by group, the spatial means and the standard deviational ellipses. For the Blacks residents, the tracts of occupancy are opposite that of White residents in both years. Black residents lived in western Shelby County census tracts at high percentages, whereas White residents lived in eastern census tracts the most. For Hispanic residents, because their share of the population is small, it is difficult to determine spatial isolation in this study. The Hispanic population appeared generally scattered with concentrations of population in the Berclair and Hickory Hill neighborhoods. The standard deviational ellipses provide more support for Black segregation/isolation from other groups. It was found that the spatial ellipsis representative of Black residents failed to strongly overlap the ellipses of the other groups as strongly as the ellipses of the other three groups overlapped one another implying more integration between the three. Thus, only part of the second hypothesis is true and Black residents experienced the most racial segregation.

The population distribution of Black residents visually matched the areas of high poverty. Hispanic residents appeared to occupy less census tracts in 2009 than in 2000 which may modify their narrative of concentrated poverty. However, the results from this study cannot confirm nor deny this. Future effort can be dedicated to statistical testing to confirm the relationship between population density and poverty. Although no conclusions in this realm can be made, this study did produce results that indicated where poverty is located in Shelby County. This information should serve as the foundation for more complex studies of poverty in this area.

Aside from the hypotheses, the entropy measures revealed that the overall level of segregation increased by nearly 20 percentage points between 2000 and 2009. This result is on par with the work by Sharma (2017) who calculated the entropy index for 2012 ($E=0.321$). However, there was variance in value for the weighted individual tract entropy for the years. By 2009, individual tracts were more diverse than in 2000 than the city overall. This may be attributed to the growth in the Hispanic/Latino population and future studies should investigate this.

**Appendix A - Summary Table from “The Growth and Spread of Concentrated
Poverty, 2000 to 2008-2012”**

Table A1 - Poverty rates in the case study communities and their comparison areas, 2000(% of individuals in poverty) & Concentrated poverty in the case study communities’ surrounding areas, 2000 (% of poor living in high-poverty neighborhoods)

	<u>Case Study</u>	<u>MSA</u>	<u>Difference</u>	<u>Concentrated Poverty</u>
Albany, GA: East Albany	45	22	23	50
Atlantic City: Bungalow Park/Marina District	41	10	31	35
Austin: East Austin	46	12	34	11
Fresno: West Fresno	51	23	38	43
Greenville, NC: West Greenville	42	20	22	64
Milwaukee: Northwest	49	10	39	28
Rochester: Northern Crescent	43	11	32	38
Springfield: Old Hill, Six Corners and South End	43	13	30	35
Miami: Little Haiti	45	15	30	38
El Paso: Chamizal	59	25	34	11
Cleveland: Central	65	11	54	30
Holmes County, MS*	41	23	28	71
McDowell County, WV*	38	20	18	21
Martin County, KY*	38	21	17	49
McKinley County, NM: Crownpoint*	45	20	25	68
Blackfeet Reservation: Ponderosa and Glacier Counties, MT*	35	25	10	31

***Rural communities are shaded grey**

Appendix B – Poverty Thresholds

Table B1 - Poverty Thresholds for 2009 by Size of Family and Number of
Related Children Under 18 Years

Size of family unit	Weighted average poverty thresholds	Related children under 18 years									
		None	One	Two	Three	Four	Five	Six	Seven	Eight or more	
One person (unrelated individual)	10,956										
Under 65 years	11,161	11,161									
65 years and over	10,289	10,289									
Two people	13,991										
Householder under 65 years	14,439	14,366	14,787								
Householder 65 years and over	12,982	12,968	14,731								
Three people	17,098	16,781	17,268	17,285							
Four people	21,954	22,128	22,490	21,756	21,832						
Five people	25,991	26,686	27,074	26,245	25,603	25,211					
Six people	29,405	30,693	30,815	30,180	29,571	28,666	28,130				
Seven people	33,372	35,316	35,537	34,777	34,247	33,260	32,108	30,845			
Eight people	37,252	39,498	39,847	39,130	38,501	37,610	36,478	35,300	35,000		
Nine people or more	44,366	47,514	47,744	47,109	46,576	45,701	44,497	43,408	43,138	41,476	

Source: U.S. Census Bureau.

Table B2 - Poverty Thresholds for 2017 by Size of Family and Number of
Related Children Under 18 Years

Size of family unit	Weighted average poverty thresholds	Related children under 18 years								
		None	One	Two	Three	Four	Five	Six	Seven	Eight or more
One person (unrelated individual)										
Under 65 years	12,752									
65 years and over	11,756									
Two people										
Householder under 65 years	16,414	16,895								
Householder 65 years and over	14,816	16,831								
Three people	19,173	19,730	19,749	19,096						
Four people	25,283	25,696	24,858	24,036	24,944					
Five people	30,490	30,933	29,986	28,995	29,253	28,805				
Six people	35,069	35,208	34,482	33,342	33,787	32,753	32,140			
Seven people	40,351	40,603	39,734	38,421	39,129	38,001	36,685	35,242		
Eight people	45,129	45,528	44,708	43,230	43,990	42,971	41,678	40,332	39,990	
Nine people or more	54,287	54,550	53,825	52,046	53,216	52,216	50,840	49,595	49,287	47,389

Source: U.S. Census Bureau.

Appendix C - Population Percentage by Census Tract

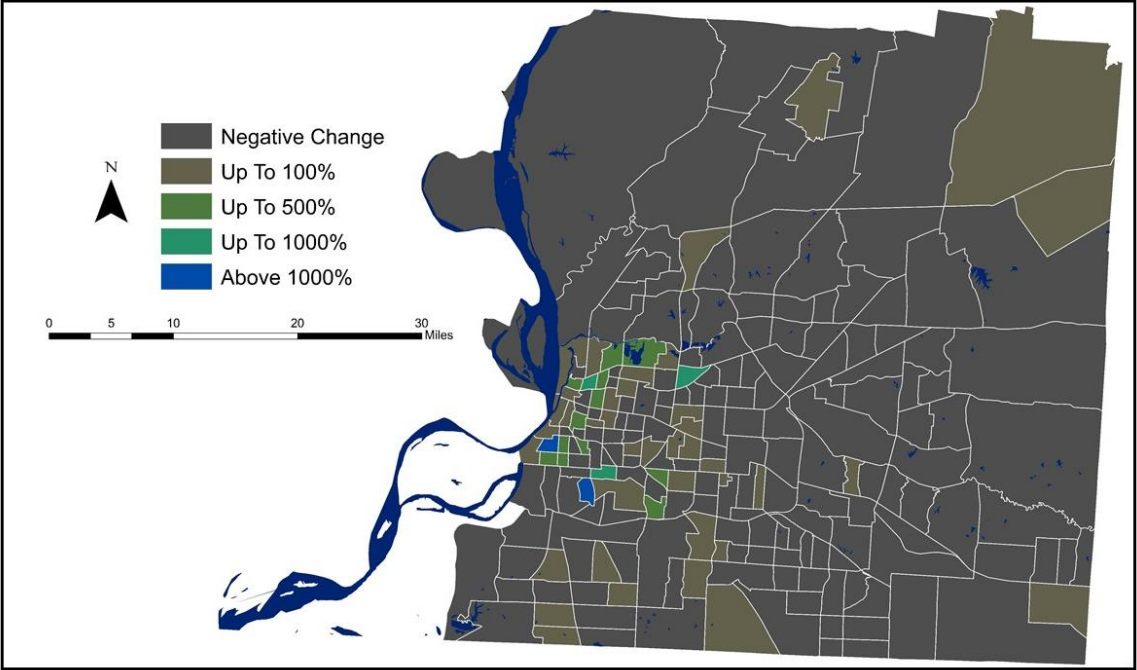
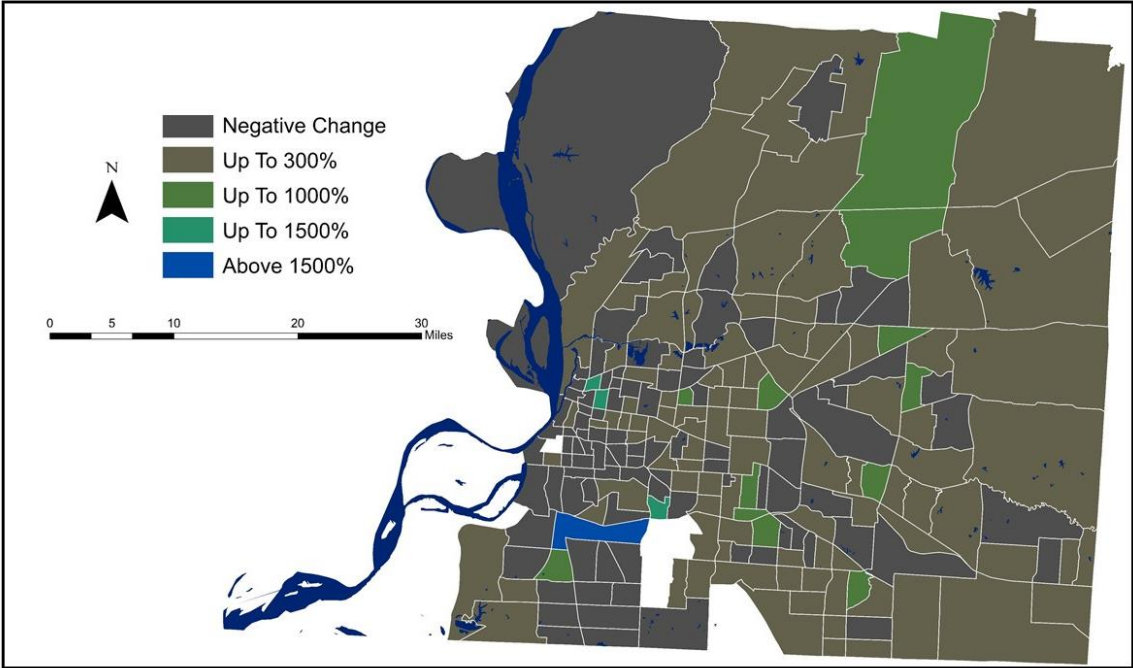


Figure C1: White Population Percent Change by Census Tract (2000-2009)

Figure C2: Hispanic Population Percent Change by Census Tract (2000-2009)



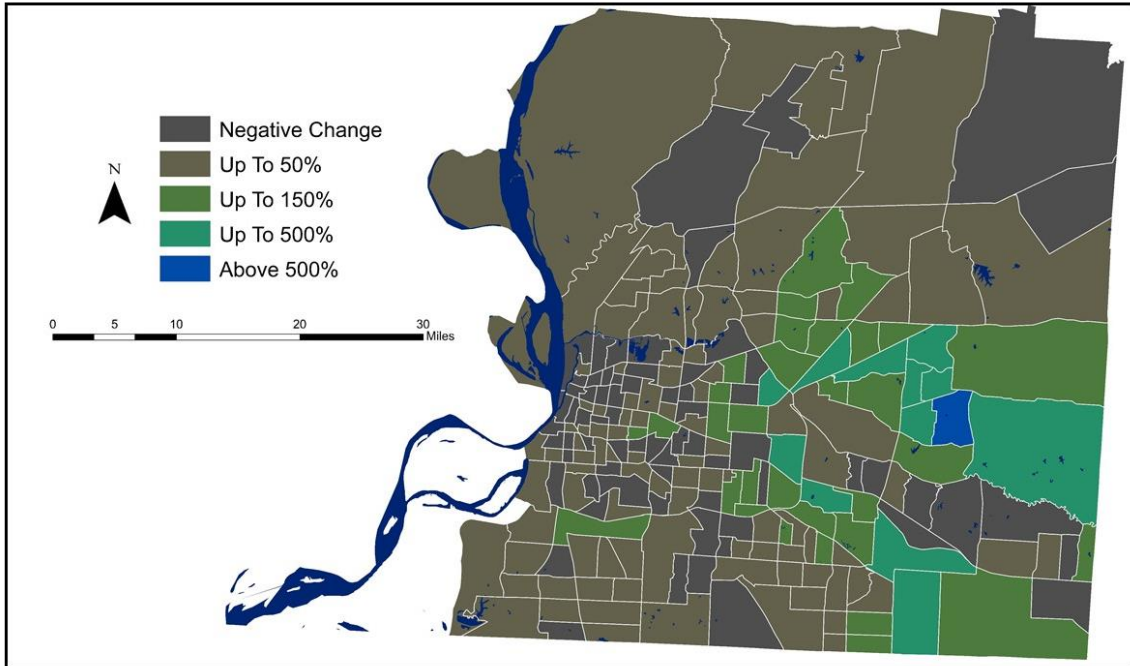


Figure C3: Black Population Percent Change by Census Tract (2000-2009)

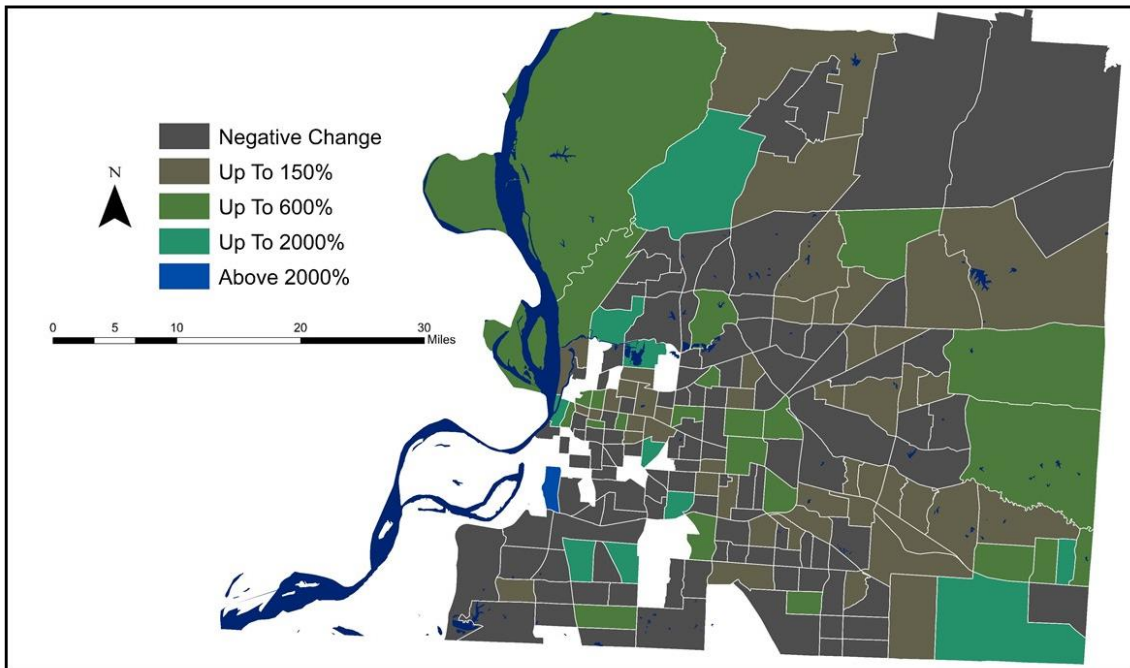


Figure C4: Asian Population Percent Change by Census Tract (2000-2009)

Appendix D – Income-to-Poverty Ratio

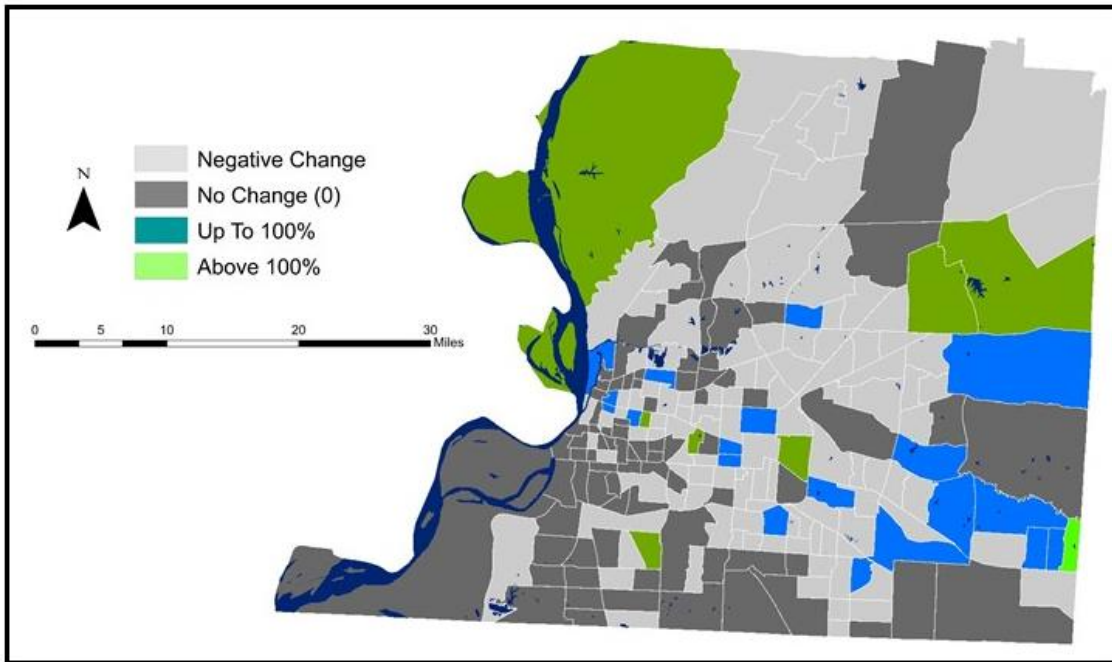


Figure D1: Asian Poverty Percent Change by Census Tract (2000-2009)

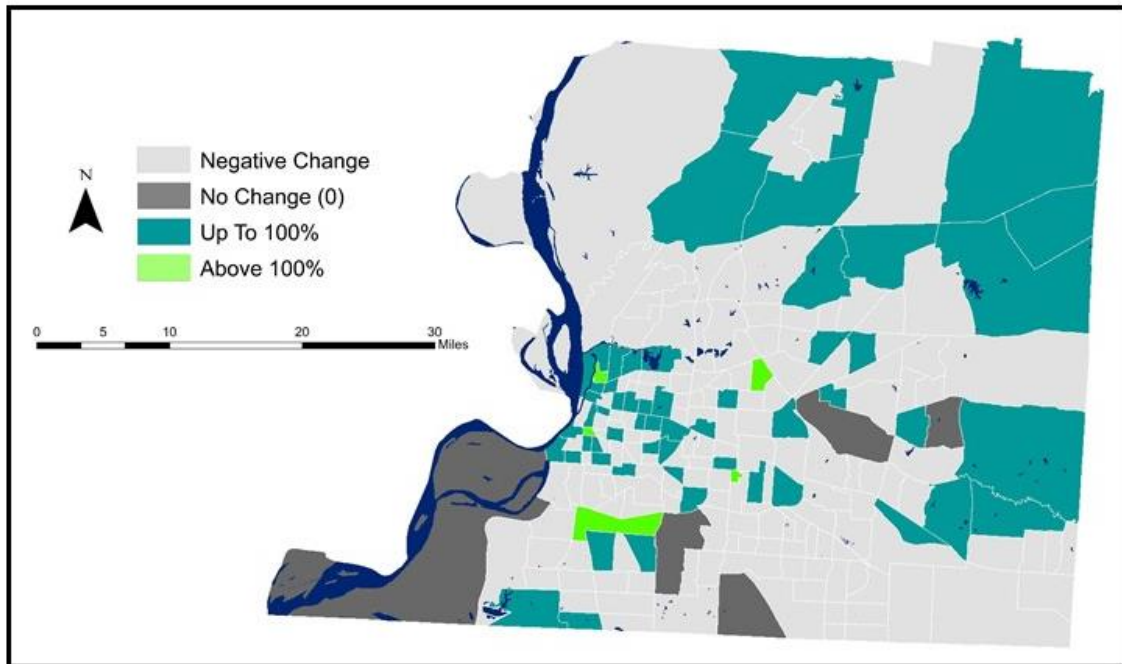


Figure D2: Black Poverty Percent Change by Census Tract (2000-2009)

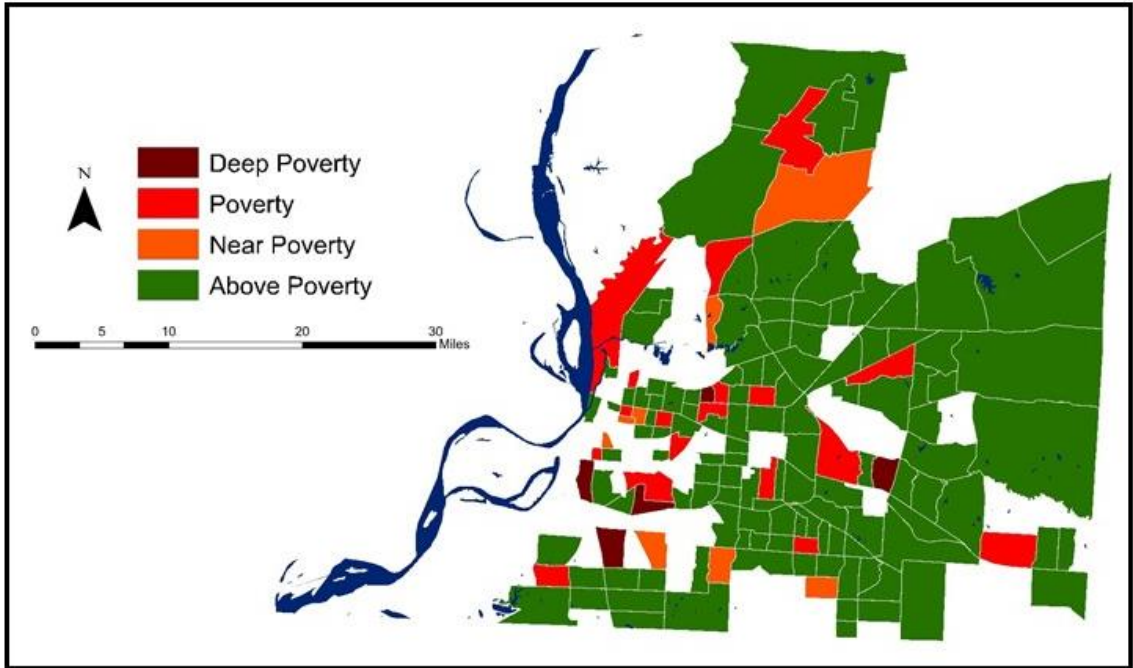


Figure D3: Hispanic Poverty in 2000

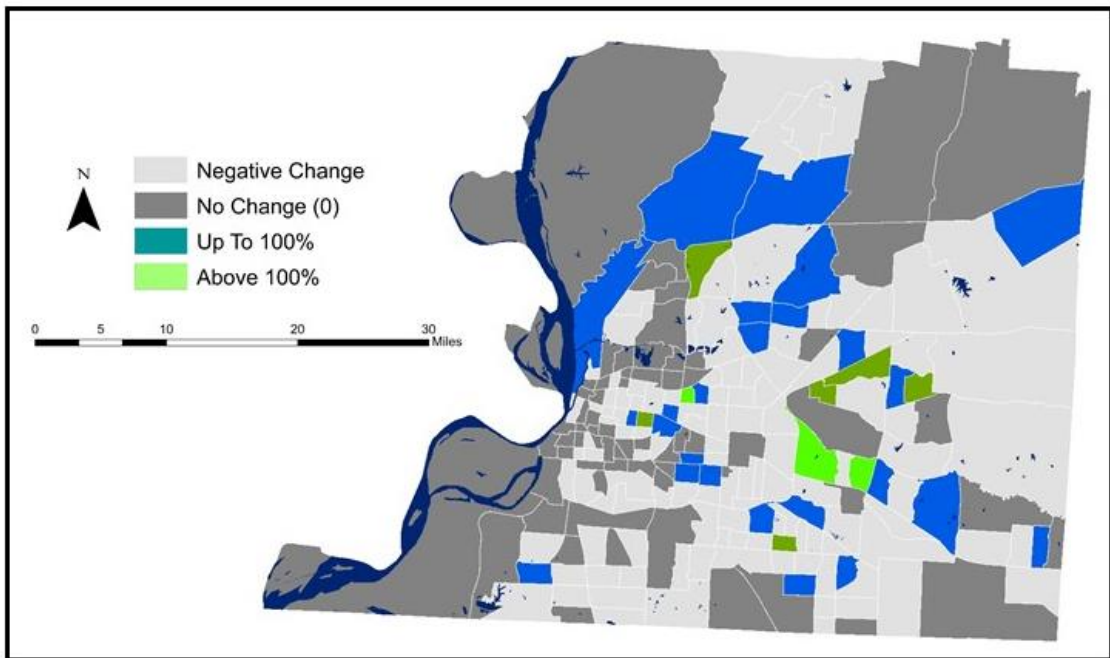


Figure D4: Hispanic Poverty Percent Change by Census Tract (2000-2009)

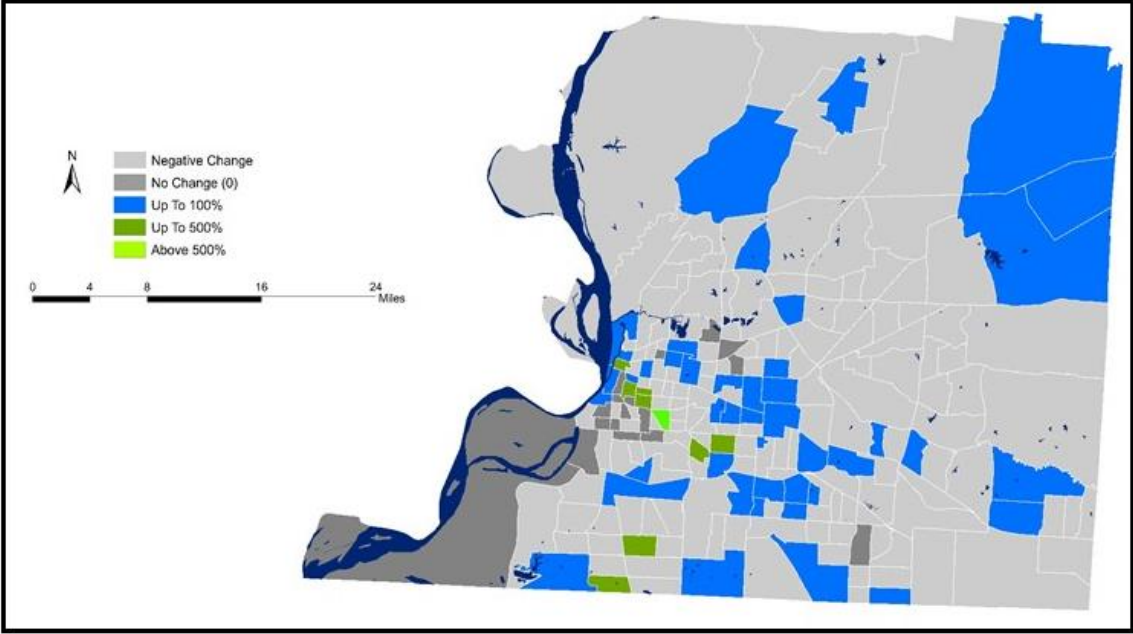


Figure D5: White Poverty Percent Change by Census Tract (2000-2009)

Appendix E – HOPE VI

This section provides details and outcomes of the Home Opportunities for People Everywhere VI (HOPE VI) program.

Federal policy attempts to mitigate the problem of concentrated poverty by introducing various programs. To demonstrate, the HOPE VI program originated in 1992 by the United States Department of Housing and Urban Development aimed to transform public housing projects into mixed-income communities. Although HOPE VI is known to employ New Urbanism design concepts and, in the process, decrease place-specific poverty and crime, the negative outcomes of displaced residents is not as publicized (Walker and Hanchette 2015). The HOPE VI model seeks to force residents to relocate in the short term to better neighborhoods, so that they can eventually move back to their original, improved neighborhood. The short-term disadvantages of moving are expected to be outweighed by the long-term benefits of safety and job security (Goetz 2010). Most low-income relocators did not move far from the central city and most likely less far from social resources (Comey 2007 and Kleit and Manzo 2006). In fact, in Buffalo, New York, residents moved nearly 1.5 miles away from their original residence in order to take advantage of social supports to balance out the work and family aspects of their lives (Trudeau 2006).

However, this federal program has driven changes in the geographical location of poverty as an unintended result. Walker and Hanchette (2015) studied residents displaced by HOPE VI revitalization projects in Louisville, KY and found that the intended mission to deconcentrate poverty resulted in reconcentration of poverty in nearby poor neighborhoods. Goetz (2010) reports that HOPE VI program evaluation indicates that

displaced residents tended to move to neighborhoods that they believe are better than their previous neighborhoods. This movement was facilitated because some displaced residents received Housing Choice Vouchers (HCV) that ensured access to private market housing. However, Goetz continues, there are not consistent reports that residents that were displaced actually had better life outlooks.

Despite the reported movement of relocators to better neighborhoods, an analysis of poverty rates showed higher than average poverty rates in the new neighborhoods and lower poverty rates in the original neighborhood (Clampet-Lundquist, 2004; Goetz 2010; Trudeau, 2006). Specifically, the average poverty rate for census tracts of HOPE VI sites was 75.8 in 2003, with a tract average of 99.2% minority (Kingsley et al. 2003). Memphis, like Chicago, Cincinnati, Cleveland, Detroit, Louisville, New Orleans, was a place where Housing Choice Voucher recipients relocated to places with high poverty rates transcending 30%. Kingsley et al. (2003) also calculated the index of dissimilarity to compare Section 8 households versus non-Section 8 households and Memphis scored 0.39, which was below their calculated average for metropolitan areas of 0.46.

Thus, there is more evidence that those who were low-income and were displaced by HOPE VI took their poverty with them. Many HCV recipients were worried about handling the costs of their new place that were offset by the voucher (Clampet-Linquist 2004). At one time, it was believed that there was a connection between rising crime and the presence of Housing Choice Voucher recipients. Much of the evidence was provided by Janikowski and Betts who found that rising crime and Housing Choice Vouchers were commonplace in Memphis, Tennessee (Rosin 2008). Since then, many researchers have proved no relationship. Van Zandt and Mhatre (2013) challenged the link between high

crime and Housing Choice Vouchers for Dallas, Texas and found that high crime areas were more likely to accept Housing Choice Vouchers than areas with lower levels of crime. Therefore, it appeared that there was a connection. Consideration of Housing Choice Vouchers in this study is of importance because past research indicates that they may be a vehicle for black suburbanization, suburban poverty, and urban concentrated poverty.

Housing Choice Vouchers

Housing voucher data was obtained from the Shelby County Housing and Community Development Office that provides the magnitude of change in housing voucher recipients in specific zip code areas in Shelby County, Tennessee for the years of 2002-2010. The housing choice voucher data categorizes the changes in zip codes based on 4 classes: decrease, no change, an increase up to 100% and an increase above 100% in housing voucher recipients. The data for every year from 2002-2010 was combined to localize the magnitude of change in each zip code in the time period. The data was digitized in ArcMap.

As mentioned previously, the data collected was aggregated into four categories of results. The data was digitized for future spatial analytic use in ArcMap. To create sum the yearly data, each category was given a numeric equivalent to be summed. The categories are provided below in Table E1. There were nine values that were added to assess the total change in housing choice voucher recipients between 2002 and 2010. The zip codes that do not have data are 38004, 38011, 38029 and 38054.

Table E1 – Zip Code Scoring for Housing Voucher Criteria

HCV Summary	
	Value
Decrease	-1
No Change	0
Increase up to 100%	1
Increase Above 100%	2

Between 2002 and 2003, there was only one zip code that had an increase in HCV recipients in the area. This zip code is 38134, which is in the Bartlett municipality as shown in Table E2 that shows zip codes by municipality in Shelby County for reference. The zip codes that experienced a decrease in HCV recipients are in located in Memphis communities such as Downtown (38103), Frayser (38127), North Memphis (38108), Berclair (38122), Midtown (38104), Orange Mound (38114), part of Whitehaven (38116) and the Airport area (38118). Much of the eastern part of Shelby County that includes Lakeland (38002), Arlington (38002), part of Bartlett (38133), Collierville (38017), and Germantown (38138 & 38139) had no change in HCV recipients. Increases of housing choice voucher recipients up to 100 percent occurred in zip codes appears to radiate from the center of Memphis.

Table E2 – Zip Codes by Municipality

Year	Zip Codes
Memphis	38016, 38101, 38103-38109, 38111-38120, 38122, 38124-38128, 38130-38133, 38135, 38137-38139, 38141, 38157, 38167-38168
Unincorporated	38014, 38017, 38028, 38029, 38088
Arlington	38002
Bartlett	38133-38135
Collierville	38017
Germantown	38138-38139
Lakeland	38002
Millington	38053, 38054, 38083

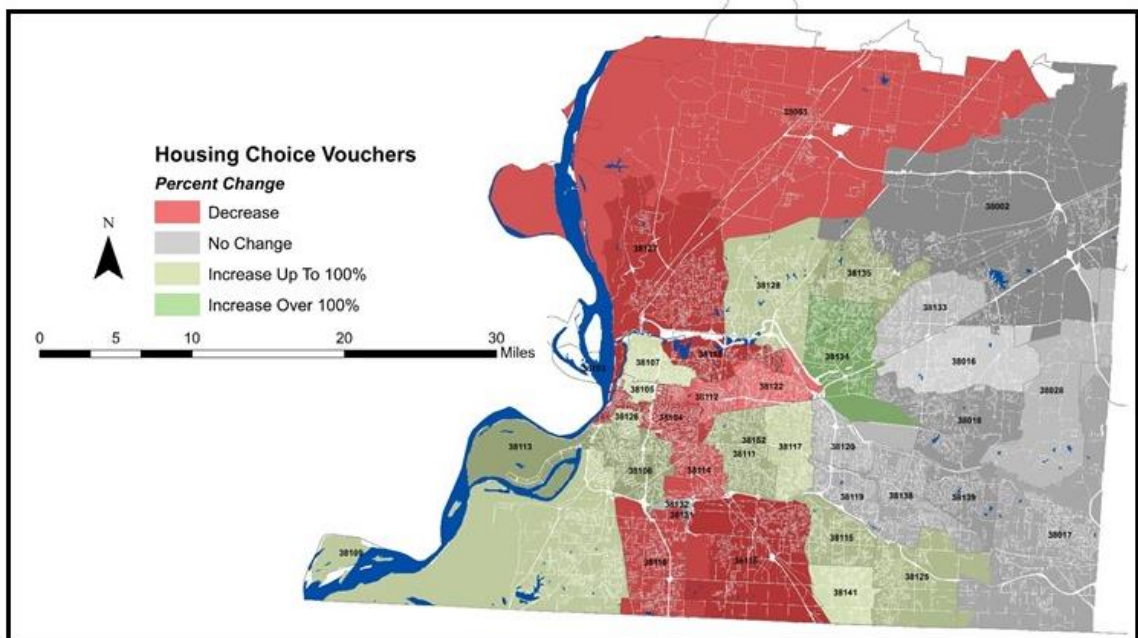


Figure E1: Percent Change of Housing Choice Vouchers from 2002-2003

Table E3 – Percent Change of Housing Choice Vouchers from 2002-2003 by Category

Percent Change	Zip Codes
Decrease	38053, 38127, 38103, 38108, 38104, 38118, 38122, 38116, 38112, 38114
No Change	38119, 38133, 38018, 38016, 38002, 38113, 38120, 38131, 38132, 38138, 38017, 38028, 38139
Increase Up To 100%	38125, 38141, 38109, 38135, 38115, 38128, 38105, 38111, 38117, 38126, 38107, 38106
Increase Over 100%	38134

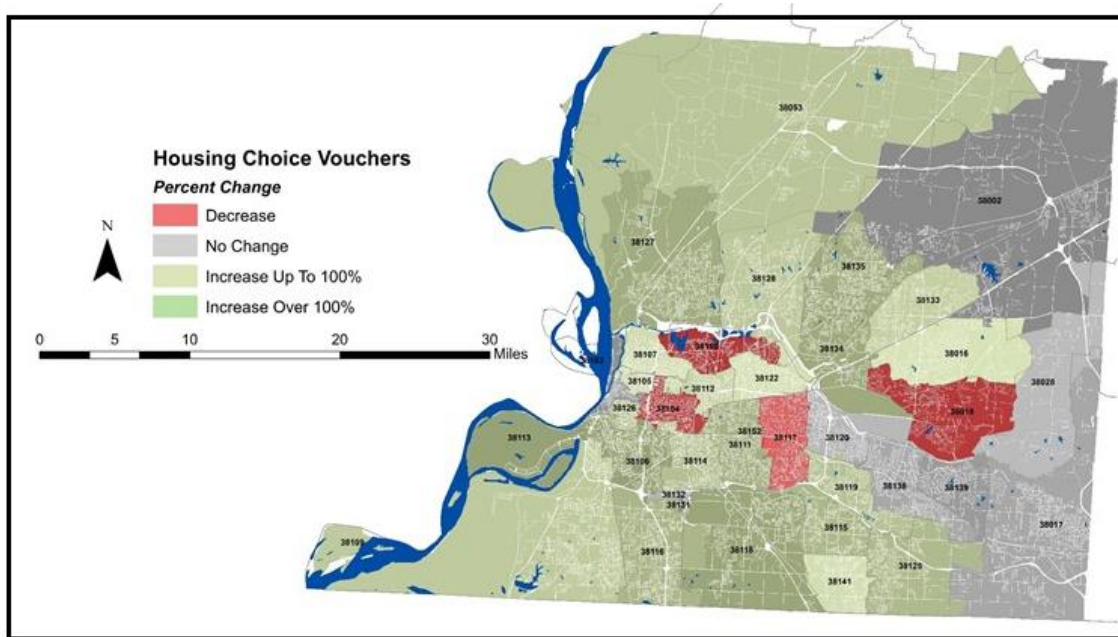


Figure E2: Percent Change of Housing Choice Vouchers from 2008-2009

Table E4 – Percent Change of Housing Choice Vouchers from 2008-2009 by Category

Percent Change	Zip Codes
Decrease	38018, 38104, 38117, 38108
No Change	38002, 38138, 38113, 38120, 38131, 38132, 38028, 38139, 38017, 38103
Increase Up To 100%	38135, 38119, 38133, 38016, 38134, 38125, 38141, 38109, 38115, 38128, 38105, 38107, 38053, 38127, 38118, 38122, 38111, 38126, 38106, 38116, 38112, 38114
Increase Over 100%	

By 2009 and 2010, most zip codes in Shelby County saw an increase up to 100 percent of housing choice voucher recipients, however in this range, there were no zip codes that had an increase over 100 percent. The zip codes that experienced no change in HCV recipients were in the municipalities of Collierville (38017), Germantown (38138 & 38139), Lakeland/Arlington (38002). Decreases in HCV recipients occurred in Midtown (38104), North Memphis (38108), South Cordova (38018) and East Memphis (38117).

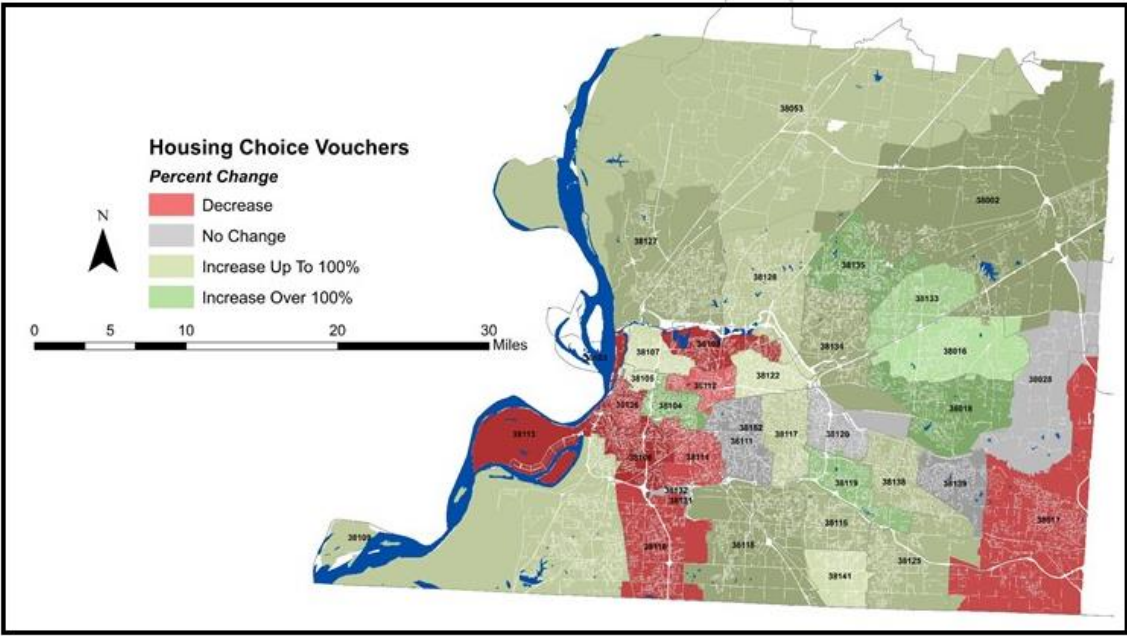


Figure E3: Percent Change of Housing Choice Vouchers from 2009-2010

Table E5 – Percent Change of Housing Choice Vouchers from 2009-2010 by Category

Percent Change	Zip Codes
Decrease	38126, 38106, 38017, 38103, 38108, 38116, 38112, 38114
No Change	38111, 38113, 38120, 38131, 38132, 38028, 38139
Increase Up To 100%	38134, 38125, 38141, 38109, 38115, 38128, 38105, 38117, 38107, 38002, 38138, 38053, 38127, 38118, 38122
Increase Over 100%	38135, 38119, 38133, 38018, 38016, 38104

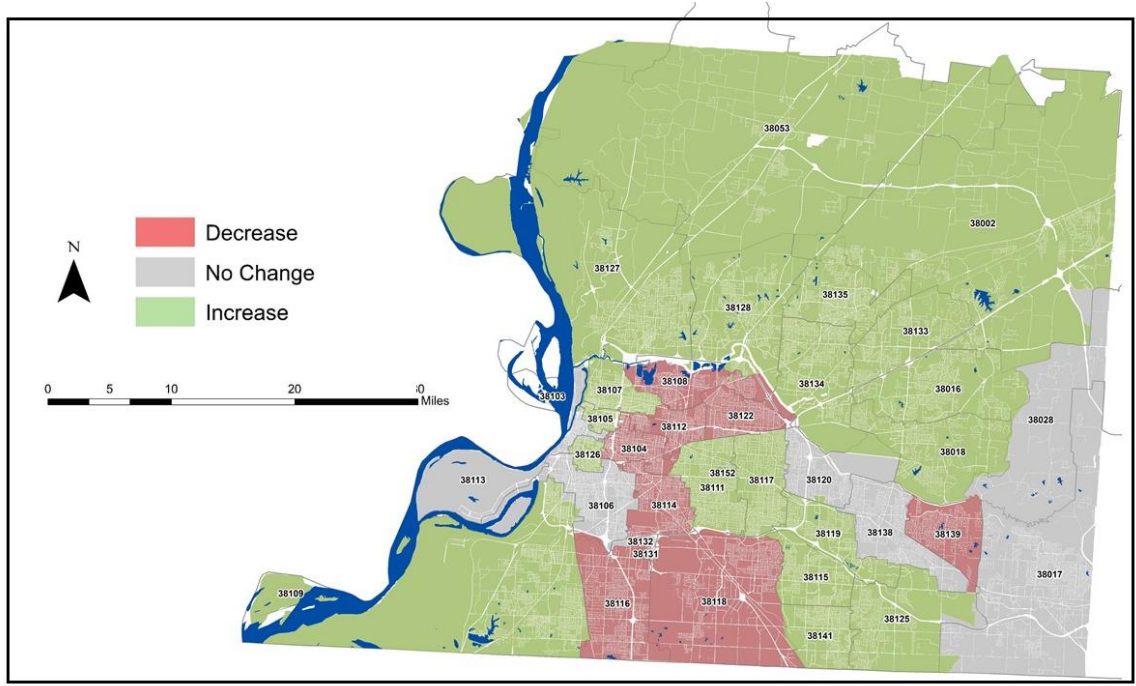


Figure E4: Percent Change of Housing Choice Vouchers from 2002-2010

Throughout the years, from 2002 to 2012, housing choice voucher recipients decreased in the middle of Memphis and the southern portion of the city. Recipients also decreased in Germantown (38139). There was an increase in recipients in the north and northeast areas of Shelby County, as well as the eastern and southeast areas of the county. No change in HCV recipients occurred in parts of Germantown (38138), Collierville (38017), Downtown and Harbortown (38103), Unincorporated Shelby County (38028) and Soulsville (38106).

Table E6		– Percent
Change	Percent Change	Zip Codes
	Housing Vouchers	Decrease
2002- Category	No Change	38106, 38138, 38113, 38120, 38131, 38132, 38028, 38017, 38103
	Increase	38119, 38125, 38141, 38135, 38109, 38133, 38134, 38115, 38128, 38053, 38018, 38016, 38105, 38111, 38126, 38117, 38107, 38127, 38002

For the housing choice voucher recipients for HOPE VI between 2002 and 2010, it was found that generally there was an increase in voucher recipients in zip codes located away from the center of the city. There was a decrease in recipients in this period in seven zip codes in the west part of the county, there was one zip code in east that had a decrease located in Germantown. This decrease may be due to the suppression of housing voucher recipients through policy or steering, as found by Galster 1990 as cited in Massey 2001, however this study cannot confirm this and will have to be investigated in future work. Also, there are zip codes that had no change in housing voucher recipients over the years that are locally high demand housing areas presently, except the zip code

38016. This zip code may have housed some other the community renewal projects which may affected its status.

Appendix F-Housing Choice Voucher Maps

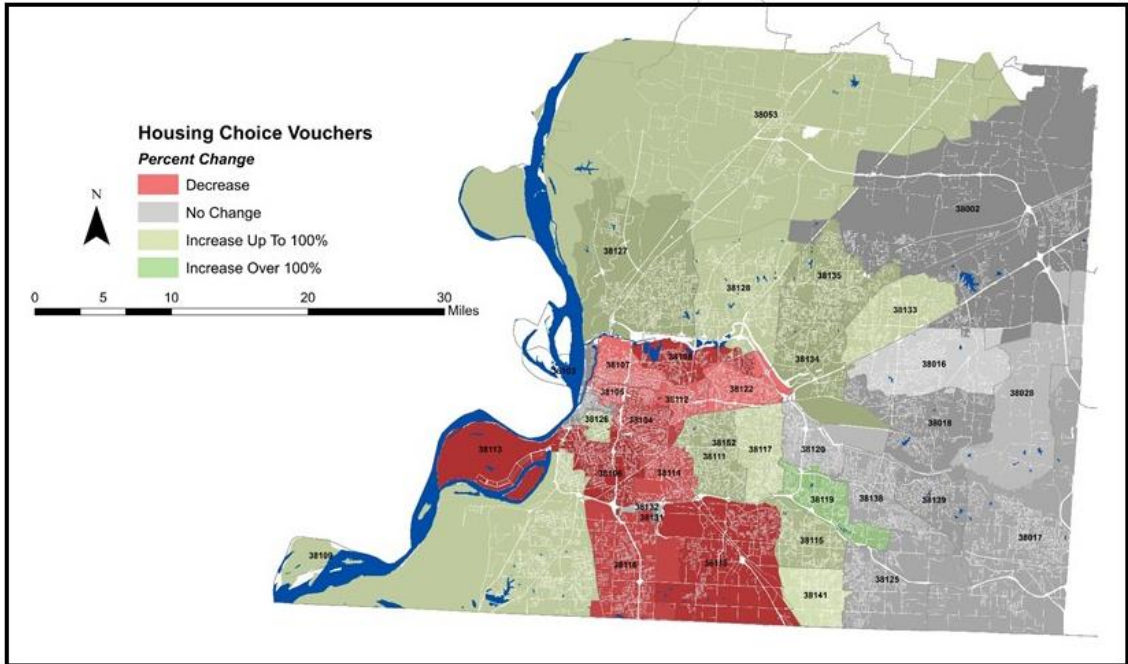


Figure F1: Percent Change of Housing Choice Vouchers from 2003-2004

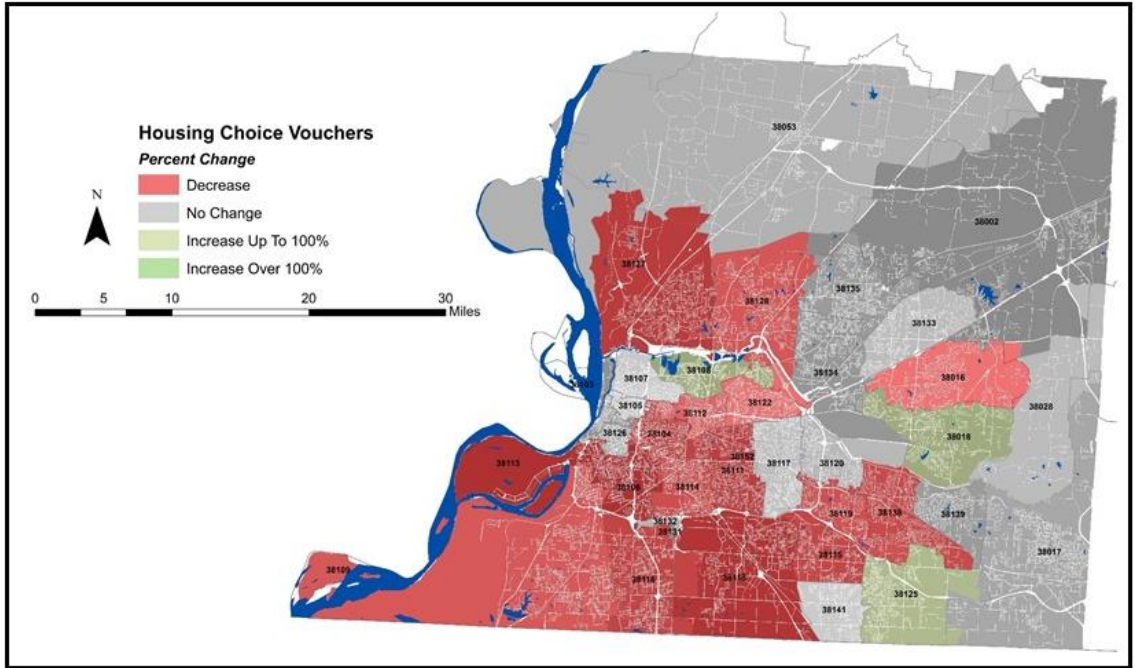


Figure F2: Percent Change of Housing Choice Vouchers from 2004-2005

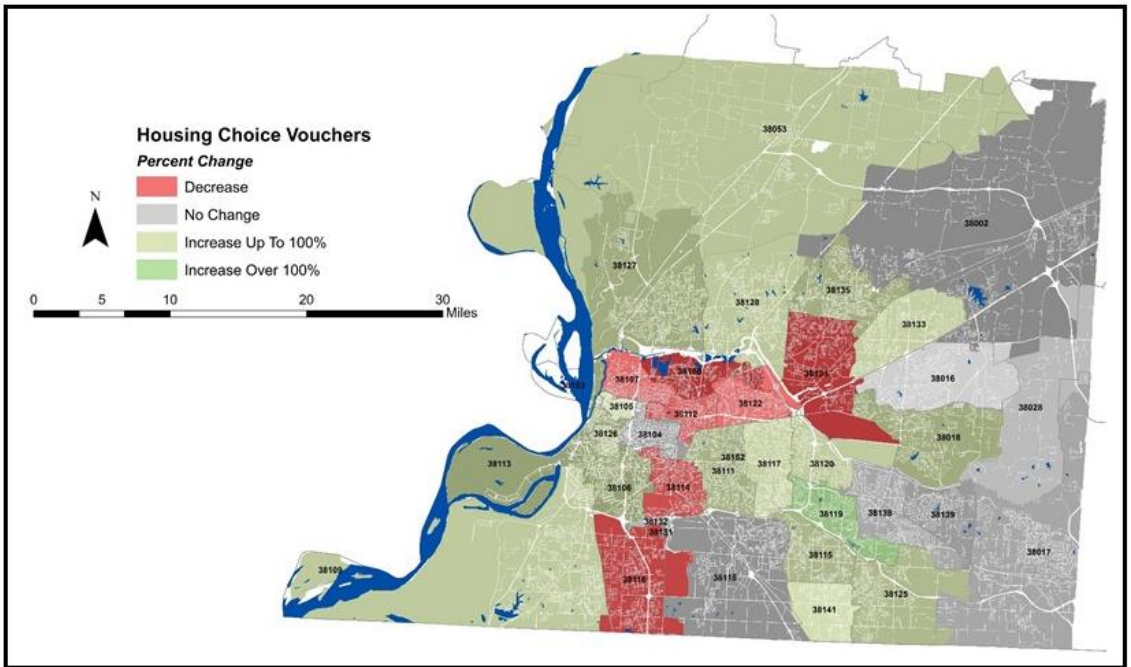


Figure F3: Percent Change of Housing Choice Vouchers from 2005-2006

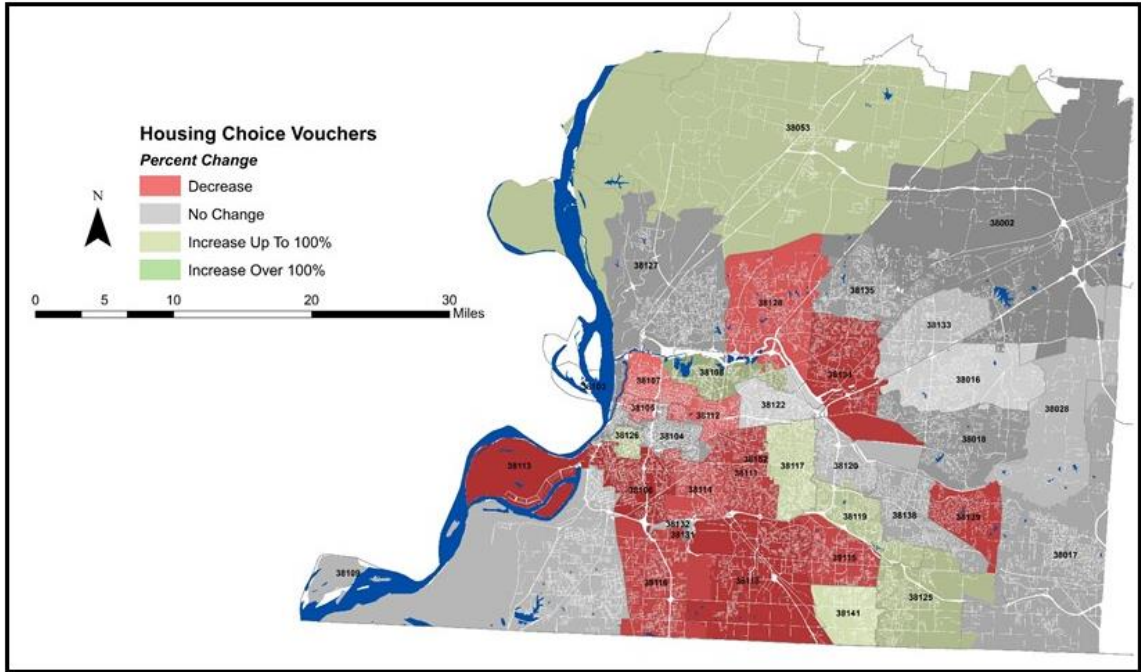


Figure F4: Percent Change of Housing Choice Vouchers from 2006-2007

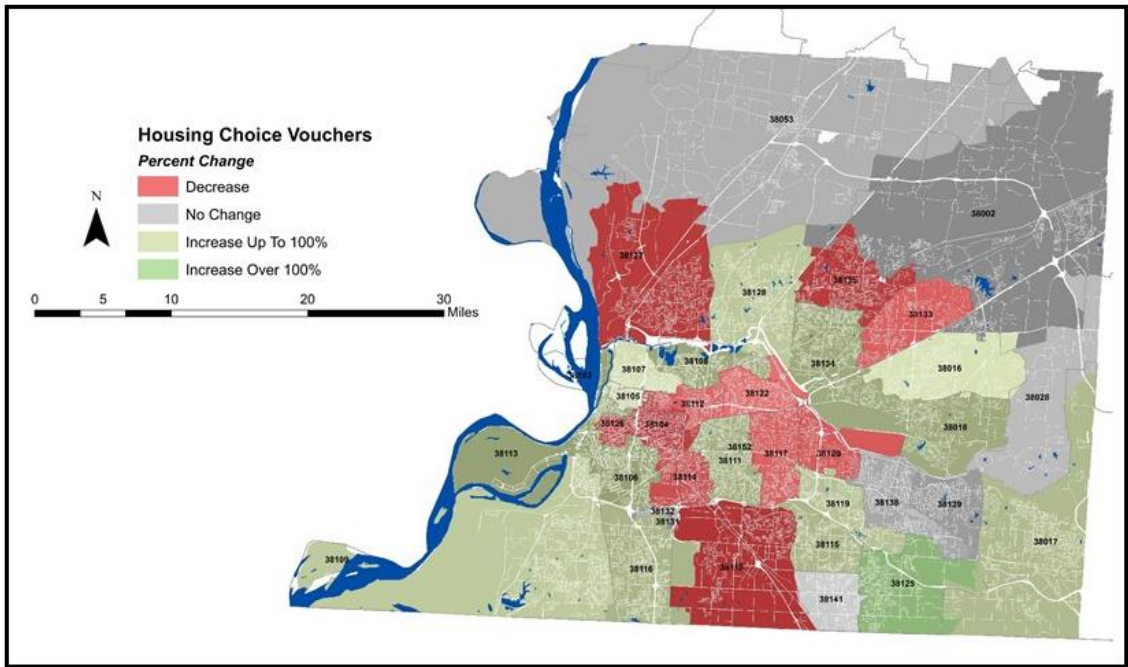


Figure F5: Percent Change of Housing Choice Vouchers from 2007-2008

Appendix G-From a Planner's Perspective: The Usage of TOD to Correct Inequality

Arguably, past transportation planning is blamed for the economic and racial segregation that is present today. The past paradigm of transportation planning sought to increase the mobility of people by connecting places across lengthy distances. Ebenezer Howard created his “Garden City” model in 1898 to provide a solution to urban over crowdedness by designing a space that integrates public spaces of the city with personal space of the country. This city would be easily assessible to other cities by way of the boulevard. Frank Lloyd Wright was just as displeased with urban over-crowding and provided the “Broadacre City” in 1932 as the solution. This “Broadacre City” emphasized highway use as the expression of human freedom and treated space similarly to Howard. Howard and Wright proposed the development of large-scaled cities to evenly distribute public and private land, however they most likely never anticipated the issues that we have with distributing jobs, schools, and grocery stores that we have today.

Yet, these theories influenced the creation of policy that led to the present urban form of American cities. New Deal policies embodied the creation of individual freedoms that Howard and Wright theorized. One of the many legacies of New Deal policy was the creation of the highway system through the Federal Highway Act. New transportation infrastructure resulted in the adaption of a culture that encourages personal vehicle use as the primary mode of travel. During the same political period, the passing of the Federal Housing Act radically increased privatization of the housing market. As highways extended farther from the city center, the residential, retail, and industrial development followed. This strategy of land use has persisted since conception due to perceived

economic benefit. In retrospect, there are many unforeseen costs associated with this revolution. Neighborhoods were sacrificed and fragmented for highway construction. Our sprawling suburbs and excessive modifications to the natural environment have polluted our environment and dispersed investment. Decentralized investment has influenced the magnitude of urban poverty that is present today. Transit-oriented development (TOD) is an approach to land use that addresses alternative forms of transportation and dense development to indirectly impact equity, but is TOD as utopian as the land use theories of the past (The New Transit Town 8)?

TOD is the accepted model for walkable community development as it seeks to foster urban efficiency by decreasing car dependence and augmenting accessibility to work, home, and shopping. Unlike the current model of land use, best practices of TOD incorporate alternative modes of transportation besides the personal vehicle. However, development guided by TOD is extensive and mostly privatized as was in the past. Real estate developers view the chance to transform communities as lucrative which could be problematic. The goals of TOD are to:

- Organize growth on a regional level to be compact and transit-supportive.
- Place commercial, housing, jobs parks, and civic uses within walking distance of transit stops.
- Create pedestrian-friendly street networks that directly connect local destinations.
- Provide a mix of housing types, densities, and costs.
- Preserve sensitive habitat, riparian zones, and high-quality open space.
- Make public spaces the focus of building orientation and neighborhood activity.

- Encourage infill and redevelopment along transit corridors within existing neighborhoods.

(Ohland and Dittmar page 6)

TOD gained popularity in 1990s as a solution to urban sprawl as influenced by the three theorists above. Peter Calthorpe, an architect and urbanist, first increased interest in urban development surrounding transit. Through his design practice and writing Calthorpe refined the concept of mixed-use development and density around transit. Calthorpe's theory of TOD is not different than the theories of Howard and Wright because they all recommend design interventions as a catalyst of societal change. However, the content in Calthorpe's theory imposes design through transit-oriented zoning codes or design guidelines to increase urban density while the past theorists sought to decrease urban density. In this way, change and resource redistribution can occur quickly, similar in the way HOPE IV was implemented. It appears that TOD will continue a profit driven way of changing physical space. Based on the past, physical change and societal change have a bi-directional relationship and produce unexpected issues such as economic and racial segregation. In the future, hopefully we can use our past to anticipate these externalities.

Appendix H-Future Implications

The results of this thesis are extremely relevant to the study of poverty and segregation in Shelby County, especially in the recessional period. I wished to use more variables to measure diversity and education attainment as in Sharma (2017). With more variables, it would be plausible to create visual typologies and statistical models. There is more to be desired to accomplish as a researcher. Thus, I have a variety of future study ideas that serve as an extension and continuation of this study. These projects are listed below:

- How did the HOPE VI policy impact Memphis during the Recessional Period?
- Memphis Metro: A Post-Recession Demographic Analysis
- Environmental Resilience/Vulnerability and the Great Recession in Shelby County, Tennessee
- What does the decline of shopping centers mean to the decline of Neighborhoods?
- The Role of the Poplar Avenue Corridor in Memphis' Future
- Which communities have been the most and least affected by segregation and poverty since 2000?
- How did Nashville overtake Memphis in population?
- Bicycle Facilities in the Memphis Metro: Have they bettered communities?

References

- Amis JM and R Aissaoui. 2013. Readiness for Change: An Institutional Perspective. *Journal of Change Management* (13): 69-95.
<https://babel.hathitrust.org/cgi/pt?id=mdp.39015081956263;view=1up;seq=1>.
- Anderson MW. 2012. Making a Regional District: Memphis City Schools Dissolves into its Suburbs. *Columbia Law Review Sidebar* (112): 47-61. <http://columbialawreview.org/wp-content/uploads/2016/05/Anderson.pdf>.
- Autor D. 2010. The Polarization of Job Opportunities in the US Labor Market: Implications for Employment and Earnings. MIT Economics. <https://economics.mit.edu/files/5554>.
- Autor DH, Katz LF and MS Kearney. 2006. The Polarization of the US Market. MIT Economics. <https://economics.mit.edu/files/11579>.
- Bauman C. 2017. Report: De-Merger of schools in Shelby County cemented inequities in public education. Commercial Appeal via Chalkbeat:
<https://www.commercialappeal.com/story/news/local/2017/06/21/report-de-merger-schools-shelby-county-cements-inequities-public-education/416244001/>.
- Berube A and E Kneebone via the Community Affairs Offices of the Federal Reserve System and the Metropolitan Policy Program at the Brookings Institution. 2008. The Enduring Challenge of Concentrated Poverty in America: Case Studies from Communities Across the U.S. http://www.frbsf.org/community-development/files/cp_fullreport.pdf.
- Bishaw A and B Glassman. 2016. Poverty: 2014 and 2015. American Community Survey Briefs:
<https://www.census.gov/content/dam/Census/library/publications/2016/demo/acsbr15-01.pdf>.

- CensusScope. 2018. Segregation: Dissimilarity Indices. US Metro Areas Ranked by White/Black Dissimilarity Index.
http://www.censusscope.org/us/rank_dissimilarity_white_black.html.
- Chernick H, Langley A, Reschovsky A. 2011. The Impact of the Great Recession and the housing crisis on the financing of America's largest cities. *Regional Science and Urban Economics* 41: 372-381.
<http://www.sciencedirect.com/science/article/pii/S0166046211000536>.
- Clampet-Lundquist S. 2004. "Moving Over or Moving Up? Short-Term Gains and Losses for Relocated HOPE VI Families." *Journal of Policy Development and Research*, 7 (1): 57–80.
- Comey J. 2007. HOPE VI'd and On the Move. Urban Institute: Metropolitan Housing and Communities Center.
<https://www.urban.org/sites/default/files/publication/46286/311485-HOPE-VI-d-and-On-the-Move.PDF>.
- Delavega E. 2015. 2015 Memphis Poverty Fact Sheet. The University of Memphis and the Mid-South Family & Community Empowerment Institute.
<http://www.memphis.edu/socialwork/pdfs/20152povertyfactsheetwebversion.pdf>.
- Dillon S. 2011. Merger of Memphis and County School Districts Revives Race and Class Challenges. *The New York Times*: NY. Found at:
http://collierville.com/images/stories/NY_Times_-_Merger-of-Memphis-County_Schools_11-2011.pdf.
- Elsby MW, Hobijn B, Sahin A. 2010. The Labor Market in the Great Recession. National Bureau of Economic Research. <http://www.nber.org/papers/w15979.pdf>.

- Extract from: Howard E. (1898) Garden Cities of Tomorrow
- Extract from: Lloyd Wright F. (1958) The Living City (pp. 12-18, 43-50, pp. 62-66).
- Ferreira F, Gyourko J, and J Tracy. 2010. Housing Busts and Household Mobility. *Journal of Urban Economics*, 68(1): 34-45.
- Finer LD and MR Zolna. 2014. Shifts in Intended and Unintended Pregnancies in the United States, 2001-2008. *American Journal of Public Health* 104 (S1): 543-548.
- Fleischmann A. 2000. Regionalism and City-County Consolidation in Small Metro Areas. *State & Local Government Review*, 32(3), 213-226. Retrieved from <http://www.jstor.org/stable/4355269>.
- Forest, B. 2005. Measures of Segregation and Isolation. <http://www.dartmouth.edu/~segregation/IndicesofSegregation.pdf>.
- Frey WH and D Meyers. 2005. Racial Segregation in US Metropolitan Areas and Cities, 1990-2000: Patterns, Trends, and Explanations. University of Michigan Institute for Social Research: Population Studies Center. http://www.frey-demographer.org/reports/R-2005-2_RacialSegregationTrends.pdf.
- Frey WH. 2009. The Great American Migration Slowdown: Regional and Metropolitan Dimensions. Washington DC: Brookings Research Report.
- Galster GC. 2010. The Mechanisms of Neighborhood Effects: Theory, Evidence and Policy Implications. Wayne State University. http://archive.clas.wayne.edu/Multimedia/DUSP/files/G.Galster/St_AndrewsSeminar-Mechanisms_of_neigh_effects-Galster_2-23-10.pdf.
- Goetz EG. 2010. Better Neighborhoods, Better Outcomes? Explaining Relocation Outcomes in HOPE VI. *Cityscape*, 12(1): 5-31.

- Goldin C and LF Katz. 2009. The Race between Education and Technology: The Evolution of U.S. Educational Wage Differentials, 1890 to 2005. Harvard University and National Bureau of Economic Research.
- https://scholar.harvard.edu/files/lkatz/files/the_race_between_education_and_technology_the_evolution_of_u.s._educational_wage_differentials_1890_to_2005_1.pdf.
- Goldsmith WW and EJ Blakely. 2010. Separate Societies: Poverty and Inequality in U.S. Cities. Temple University Press: Philadelphia, Pennsylvania.
- Greene RP and JB Pick. 2006. Exploring the urban community: a GIS approach. Upper Saddle River, N.J.: Pearson Prentice Hall.
- Iceland, J. 2004. The Multigroup Entropy Index.
- https://www.census.gov/housing/patterns/about/multigroup_entropy.pdf.
- Journal of Economic Perspectives 20: 47-68.
- <http://www.vanneman.umd.edu/socy789b/hoynesps06.pdf>.
- Kiel D. 2008. Exploded Dream: Desegregation in the Memphis City Schools. Law Inequality: A Journal of Theory and Practice, 26 (1):
- <https://scholarship.law.umn.edu/cgi/viewcontent.cgi?referer=https://scholar.google.com/&httpsredir=1&article=1099&context=lawineq>.
- Kingsley GT, Johnson J, and KS. Pettit. 2003. "Patterns of Section 8 Relocation in the HOPE VI Program." Journal of Urban Affairs 25, (4): 427-447.
- Kleit RG. and L Manzo. 2006. To move or not to move: relationship to place and relocation choices in HOPE VI, Housing Policy Debate, 17(2): 271-308.

- Kneebone E, Nadeau C, Berube A. 2011. "The Re-Emergence of Concentrated Poverty: Metropolitan Trends in the 2000s."
<http://www.brookings.edu/research/papers/2011/11/03-poverty-kneebone-nadeau-berube>.
- Kneebone E. 2014. "The Growth and Spread of Concentrated Poverty, 2000 to 2008-2012."
<http://www.brookings.edu/research/interactives/2014/concentrated-poverty#/M10420>.
- Lichter DT, Parisi D, Taquino MC. 2012. The Geography of Exclusion: Race, Segregation, and Concentrated Poverty. Society for the Study of Social Problems: 364-388.
https://www.researchgate.net/profile/Daniel_Lichter/publication/259732864_The_Geography_of_Exclusion_Race_Segregation_and_Concentrated_Poverty/links/00463535a40beb9a45000000.pdf.
- Massey D and NA Denton. 1993. American Apartheid: Segregation and the Making of the Underclass. Harvard University Press: Cambridge, MA.
- Massey DS. 2001. Racial Segregation and Neighborhood Conditions in US Metropolitan Areas. From: Smelser, Neil J., William Julius Wilson, and Faith Mitchell, Editors. America Becoming: Racial Trends and Their Consequences. Volume I. Washington, D.C.: National Academy Press, 2001.
- Meyer BD and Sullivan JX. 2009. Five Decades of Consumption and Income Poverty.
<http://www.nber.org/papers/w14827.pdf>. Winning the War: Poverty from the Great Society to the Great Recession. Brookings Papers on Economic Activity, Economic Studies Program, The Brookings Institution 45: 133-200.
<http://harris.uchicago.edu/sites/default/files/BPEA2.0.pdf>
- Meyer BD and Sullivan JX. 2012. Winning the War: Poverty from the Great Society to the Great Recession. Brookings Papers on Economic Activity, Economic Studies Program, The

Brookings Institution 45: 133-200.

<http://harris.uchicago.edu/sites/default/files/BPEA2.0.pdf>

Modern Cities. 2017. Memphis wants to shrink. <https://www.moderncities.com/article/2017-feb-memphis-wants-to-shrink>.

Molloy R, Smith CL and A Wozniak. 2011. Internal Migration in the United States. *Journal of Economic Perspectives*, 25(3): 173-196.

<https://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.25.3.173>.

Nashville City and Davidson County Planning Commissions. 1956. Plan of metropolitan government for Nashville and Davidson County. Pdf:

<https://babel.hathitrust.org/cgi/pt?id=mdp.39015081956263;view=1up;seq=1>.

Ohland G and H Dittmar. (2004). *The New Transit Town: Best Practices In Transit-Oriented Development*. Washington, DC: Island Press.

Poe R. 2017. Memphis looks at seven areas for de-annexation.

<https://www.commercialappeal.com/story/news/government/city/2017/02/02/memphis-eyes-s-cordova-southwind-windyke-de-annexation/97398810/>.

Quillian L. 2012. Segregation and Poverty Concentration: The Role of Three Segregations.

American Sociology Review 77(3): 354-379.

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3956000/>.

Raymond ES and CE Menifield. 2011. A Tale of Two Cities: An Exploratory Study of Consolidation and Annexation Policies in the Cities of Memphis and Nashville. *Public Administration Quarterly*. Pdf.

- Rosin H. 2008. American Murder Mystery. The Atlantic, July August Issue.
<https://www.theatlantic.com/magazine/archive/2008/07/american-murder-mystery/306872/>.
- Rusk D. 2000. Growth management: The core regional issue. In B. Katz (Ed), Reflections on regionalism. Washington, D.C.: Brookings Institution Press.
- Savitch HV and RK Vogel. 2000. Paths to New Regionalism: Introduction to “New Regionalism and Its Policy Agenda”. State Local Government Review, 32 (3): 158-168. Pdf.
- Semega, J, Fotenot, KR, MA Kollar. 2017. Income and Poverty in the United States: 2016. Census Bureau:
<https://www.census.gov/content/dam/Census/library/publications/2017/demo/P60-259.pdf>.
- Sharkley P. 2013. Urban Neighborhoods and the End of Progress toward Racial Equality. The University of Chicago Press.
- Sharma M. 2017. Income Divide and Race/Ethnicity in Tennessee Metropolises. International Journal of Geospatial and Environmental Research 4(1).
<https://dc.uwm.edu/cgi/viewcontent.cgi?article=1053&context=ijger>.
- Shelby County, Tennessee Government. 2017. List of Annexations by the City of Memphis, 1998-present. <https://shelbycountyttn.gov/DocumentCenter/View/25601> .
- Smart City Memphis. 2015. Data Points: Land Area.
<http://www.smartcitymemphis.com/2015/03/data-points-land-area/>.
- Tennessee Advisory Committee to the United States Commission on Civil Rights. 2008. School Desegregation in Tennessee: 12 Districts Released from Desegregation Orders; 17

Districts Remain Under Court Jurisdiction.

<http://www.usccr.gov/pubs/TNDESEGFULL.pdf>.

The National Bureau of Economic Research. 2016. "US Business Cycle Expansions and Contractions." <http://www.nber.org/cycles.html>.

Townsend P. 2005. Case Study Two: North Hollywood Dump Superfund Site, Memphis, TN. Draft. <https://www.sfaa.net/files/6713/7329/3950/memphis.pdf>.

Trudeau, D. 2006. "The Persistence of Segregation in Buffalo, New York: Comer vs. Cisneros and Geographies of Relocation Decisions Among Low-Income Black Households." *Urban Geography* 27 (1): 20–44.

US Census Bureau. 1997. Households and Family Characteristics: March 1997. 2010 Current Population Reports. <https://www.census.gov/prod/3/98pubs/p20-509.pdf>.

US Census Bureau. 2012. Households and Families: 2010. 2010 Census Briefs. <https://www.census.gov/prod/cen2010/briefs/c2010br-14.pdf>.

US Census. 2015. [Poverty Thresholds for 2015 by Size of Family and Number of Related Children Under 18 years](#). At: [http://www.census.gov/topics/income-poverty/poverty.html](http://www.census.gov/topics/income-poverty/poverty/poverty.html). Accessed September 6, 2016

US Census Bureau. 2011. "Racial and Ethnic Segregation in the United States: 1980-2000." https://www.census.gov/hhes/www/housing/housing_patterns/pdftoc.html. Appendix B. http://www.census.gov/hhes/www/housing/resseseg/pdf/app_b.pdf.

University of California at Davis. 2017. "How is poverty measured in the United States?" <https://poverty.ucdavis.edu/faq/how-poverty-measured-united-states>.

University of Michigan Population Studies Center. 2016. "Racial Residential Segregation Measurement Project." <http://enceladus.isr.umich.edu/race/calculate.html>.

University of Michigan Population Studies Center: Institute for Social Research. 2010. New Racial Segregation Measures for Large Metropolitan Areas: Analysis of the 1990-2010 Decennial Census. <https://www.psc.isr.umich.edu/dis/census/segregation2010.html>.

University of Wisconsin at Madison. 2016. How is poverty measured in the United States?. Institute for Research on Poverty: <https://www.irp.wisc.edu/faqs/faq2.htm>.

University of Wisconsin: Institute for Research on Poverty. 2014. <http://www.irp.wisc.edu/faqs/faq2.htm#depth>.

US Census Bureau. 2002. Racial and Ethnic Residential Segregation in the United States: 1980-2000. <https://www.census.gov/prod/2002pubs/censr-3.pdf>.

US Census Bureau. 2010. “Geographic Terms and Concepts – Census Tract.” https://www.census.gov/geo/reference/gtc/gtc_ct.html.

US Census Bureau. 2016. Poverty. “How the Census Bureau Measures Poverty”. <https://www.census.gov/topics/income-poverty/poverty/guidance/poverty-measures.html>.

US Census. 2000, 2009, 2017. Poverty Thresholds. <http://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html>.

US Census. 2000. Population, Housing Units, Area, and Density: 2000 - County -- County Subdivision and Place .”Census 2000 Summary File 1 (SF 1) 100-Percent Data”

US Census. 2010. Census Blocks of Shelby County, TN Shapefile. <https://www.census.gov/geo/maps-data/data/tiger-line.html>.

US Census. 2010. Population, Housing Units, Area, and Density: 2010 - County -- County Subdivision and Place. 2010 Census Summary File 1. https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml

- US Census. 2012. Top 20 Cities. <https://www.census.gov/dataviz/visualizations/007/>.
- US Census. 2013. Income and Poverty in the United States: 2013: “Current Population Reports.”
http://www.census.gov/content/dam/Census/library/publications/2014/demo/p60-249.pdf?eml=gd&utm_medium=email&utm_source=govdelivery.
- US Census. 2015. . QuickFacts: Shelby County, Tennessee.
<http://quickfacts.census.gov/qfd/states/47/47157.html>.
- US Census. 2015. QuickFacts: Memphis (city), Tennessee.
<http://quickfacts.census.gov/qfd/states/47/4748000.html>.
- US Census. 2016. QuickFacts: Memphis (city), Tennessee.
<https://www.census.gov/quickfacts/fact/table/memphiscitytennessee/PST045216> .
- US Census. 2017. 2016 Population Estimates.
<https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>.
- US Census. 2017. Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017.
<https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>.
- US Census: American Community Survey. 2013. Population and Median Income Tables.
<http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.
- USDA: Economic Research Service. 2017. Poverty Overview.
<https://www.ers.usda.gov/topics/rural-economy-population/rural-poverty-well-being/poverty-overview.aspx>.
- Van Zandt S and PC Mhatre. 2013. Growing Pains: Perpetuating Inequality Through the Production of Low-Income Housing in the Dallas/Fort Worth Metroplex, Urban Geography, 30(5): 490-513.

Verick S and I Islam. 2010. The Great Recession of 2008-2009: Causes, Consequences and Policy Responses. The IZA – Institute of Labor Economics. Discussion Paper Series No. 4934. <http://ftp.iza.org/dp4934.pdf>.

Walker MA and C Hanchette. 2015. Residents' experiences in the aftermath of a HOPE VI revitalization project: A three-pronged, grounded visualization approach. *Applied Geography*, 57: 71-79.

Wu F. 2007. The Poverty of Transition: From Industrial District to Poor Neighborhood in the City of Nanjing, China. *Urban Studies*. 44(13).