Spatial Mismatch in Housing and Employment: A Tool for Targeted Intervention in Michigan Neighborhoods

INFORMING THE DEBATE

Michigan Applied Public Policy Research Brief

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The MAPPR Program came about in 1992 following a two-day meeting with leaders from the business sector, nonprofit agencies, and university faculty and staff. The group recognized the pressure on urban core leaders to make critical choices having long-term impact on communities with little access to research-based information to consider or support their decisions. A commitment to generate a bank of research as a reference was set in the framework of the MAPPR Program.

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MAPPR Policy Research Brief

Spatial Mismatch in Housing and Employment: A Tool for Targeted Intervention in Michigan Neighborhoods

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EXECUTIVE SUMMARY

The spatial mismatch between housing and employment opportunities contributes to long commutes between work and home (Cervero, 1989; Giuliano & Small, 1993; Wang, 2000), higher transportation costs, more traffic congestion and air pollution, a reduction in work productivity (Cervero, 1989; Giuliano, 1991), and greater racial and economic inequality (Ihlanfeldt & Sjoquist, 1998). Public officials can address issues of spatial mismatch through three primary strategies: encouraging the development of housing in areas with a high number of jobs, encouraging the development of employment opportunities in areas with a high number of residents, and improving transportation systems to ease commute burdens (Gobillon & Selod, 2019). To do so effectively, planners and policymakers must first understand the spatial distribution of housing and employment opportunities across the state.

This report, funded by the Institute for Public Policy and Social Research (IPPSR) at Michigan State University (MSU), describes an analysis and visualization tool – the Michigan Spatial Mismatch (MSM) Tool – developed by researchers at MSU's School of Planning, Design and Construction (SPDC). The MSM Tool allows users to map housing-employment mismatches across the state. Available at http://MSMTool.spdc.msu.edu, it facilitates data-driven decision-making by allowing users to examine two indicators of spatial mismatch – imbalance and disparity indices. The tool assists the identification of neighborhoods that are high-priority areas for housing development for Michigan's workforce or, conversely, high-priority areas for targeted economic development. Imbalances capture the location of housing and employment opportunities by measuring differences in the number of residents and workers in each neighborhood; these indices therefore highlight which neighborhoods are predominantly residential areas and which are predominantly places of employment. Disparities measure differences in the economic or demographic characteristics of residents and the local workforce; these indices therefore provide insight into whether residents in a specific neighborhood are more or less disadvantaged than members of that neighborhood's workforce.

To illustrate how the MSM Tool can be used to analyze housing-employment mismatches throughout Michigan, we answer three research questions in this report: 1) How balanced are housing and employment opportunities in neighborhoods in the Detroit metropolitan area? 2) Is there evidence of income or racial disparities in the composition of residents and workers across the region? 3) Given their physical, social, and economic characteristics, which of these neighborhoods are "high-priority" areas where targeted intervention to promote workforce housing development is warranted? We illustrate that many of the employment opportunities in the Detroit metro area are concentrated in suburban areas outside the cities of Detroit and Pontiac. These suburbs are home to a disproportionate share of the region's jobs, but they provide a limited supply of housing for the region's workforce and have disproportionately low shares of low-

income and Black residents. Large swathes of Detroit and Pontiac, on the other hand, have relatively few employment opportunities and are predominantly home to low-income and Black residents. We then describe how the MSM Tool can be used to examine economic and physical conditions in neighborhoods, such as housing values and walkability, in order to identify target areas for housing or economic development efforts.

We recommend that state and local policymakers/planners visit the MSM Tool to identify housing-employment mismatches across the state or in their local community. To address patterns of spatial mismatch across the state, policymakers in Michigan should support further research on affordable housing in the state; encourage coordinated, regional efforts to address housing-employment mismatches within metropolitan areas; promote affordable housing development in job-rich areas; support economic development in housing-rich areas; and expand and improve transit options to reduce commute burdens.

INTRODUCTION

A number of cities across the state face critical challenges to ensure an adequate supply of affordably priced housing for Michigan's workforce (Ottawa Housing Next, 2017; Traverse City Workforce Affordable Housing Ad Hoc Committee, 2008). Household growth, limited residential construction, an older housing stock, increasing housing prices, and a lower rate of homeownership point toward a lack of affordable housing in the existing market and highlight a pressing need for targeted interventions to address housing affordability in the state (MSHDA, 2019a; MSHDA, 2019b).

Research also suggests many Michigan households, but particularly economically and socially vulnerable residents, face an affordable housing crisis (National Low Income Housing Coalition, 2017; United Way, 2014). One consequence of the state's affordability challenge is the spatial mismatch between housing and employment opportunities. Housing-employment mismatches lead to long commutes between work and home (Cervero, 1989; Guiliano & Small, 1993; Wang, 2000), thereby increasing transportation costs for workers, compounding traffic congestion and the burden placed on transit systems, creating air pollution, reducing work productivity (Cervero, 1989; Giuliano, 1991), and exacerbating racial and economic spatial inequality (Ihlanfeldt & Sjoquist, 1998).

There are three primary strategies by which public officials can address issues of spatial mismatch: encouraging the development of housing in areas with a high number of jobs, encouraging the development of employment opportunities in areas with a high number of residents, and improving transportation systems to more efficiently connect housing and jobs (Gobillon & Selod, 2019). Addressing both the undersupply of affordably priced housing and patterns of housing-employment

mismatch in Michigan requires planners and policymakers to first understand the spatial distribution of housing and employment opportunities across the state.

This report, funded by the Institute for Public Policy and Social Research at Michigan State University (IPPSR), describes an analysis and visualization tool developed by researchers at the School of Planning, Design and Construction (SPDC) that allows users to visualize and map jobs-housing mismatches across the state. The MSM Tool will assist Michigan policymakers and public officials in addressing jobs-housing mismatches through data-driven decision-making by allowing users to identify neighborhoods that are high-priority areas for housing or economic development. The MSM Tool allows users to 1) map imbalances in the number of residents and workers in neighborhoods across the state, 2) map disparities in the composition (e.g., income, race, etc.) of local residents and the local workforce, and 3) examine physical, social, and economic conditions that might contribute to or be used to ameliorate these imbalances and disparities.

To illustrate how the MSM Tool can be used to analyze housing-employment mismatches throughout Michigan, we answer two research questions in this report: 1) How balanced are housing and employment opportunities in neighborhoods in the Detroit metropolitan area? 2) Is there evidence of income or racial disparities in the composition of residents and workers across the region? 3) Given their physical, social, and economic characteristics, which of these neighborhoods are "high-priority" areas for targeted intervention to promote workforce housing development?

This report is organized as follows. First, we provide a brief overview of research on the importance of spatial mismatch in the United States. We then describe how scholars typically measure issues of spatial mismatch and explain why an interactive, online visualization and analysis tool is needed to facilitate informed, data-driven decision-making to address mismatches between housing and employment opportunities in Michigan. Next we describe the data sources and methods used in this report and the accompanying MSM Tool. We then illustrate how the MSM Tool can be used to understand spatial mismatches in the state by examining imbalances/disparities among low-income and Black residents in Michigan. We conclude by discussing how local and state policies might be used, in conjunction with the MSM Tool, to address issues of spatial mismatch in Michigan and offer a series of policy recommendations.

SPATIAL MISMATCH

In the United States, employment opportunities, especially professional or management positions, are often concentrated in central cities or employment subcenters across metropolitan areas, while residential neighborhoods are largely located in suburban areas (Sultana, 2002; Wang, 2000). Although there is considerable variation between neighborhoods as well as across metropolitan areas, this is the broader spatial pattern of housing and employment opportunities that is

typically referred to as a spatial mismatch: inner cities and employment subcenters tend to be job-rich but housing-poor, while suburban areas tend to be housing-rich but job-poor (Cervero, 1989; Giuliano, 1991).

When housing and employment are mismatched, job-rich areas such as employment centers attract workers from residential neighborhoods, and residents in housing-rich areas need to travel long distances to employment centers. In either case, workers tend to face significant costs when commuting from home to work (Peng, 1997). For example, Cervero (1989) found that in Chicago and San Francisco, jobs-housing mismatches and accompanying transportation costs are higher in suburban areas, where land-use policies prohibit industrial and commercial employment. Similarly, Peng (1997) found that, very job-poor or housing-poor areas in the Portland metropolitan area tend to have workers or residents with longer-distance commutes, while Sultana (2002) found that workers employed in the central part of the Atlanta metropolitan area have longer travel times.

This urban-suburban divide in patterns of spatial mismatch has important implications for low-income and minority communities. Spatial mismatch often occurs when housing prices are too high to be affordable for employed workers in nearby neighborhoods (Sultana, 2002), thus limiting the number of affordable housing options close to their workplaces. Low-income workers (Benner & Karner, 2016; Cervero, 1989; Sultana, 2002) and non-white workers (Horner & Mefford, 2007; Kain, 1992) generally face more acute spatial mismatches, in part due to challenges in relocating to residential neighborhoods near their workplaces (Benner & Karner, 2016; Cervero, 1989; Kain, 1992; Gobillon & Selod, 2019). Moreover, even when, in the aggregate, a specific neighborhood may have balanced numbers of jobs and housing overall, low-income workers may encounter a profound mismatch because of disproportionately high housing prices compared to their wages (Benner & Karner, 2016; Stoker & Ewing, 2014). Similarly, non-white workers often experience more extreme imbalances between housing and employment opportunities as a result of the legacy of racial residential segregation and the lack of affordable housing in areas with a non-white workforce (Horner & Mefford, 2007). For example, in a seminal study on the topic, Kain (1968) found that non-white workers in employment centers in suburban areas lacked access to affordable housing in nearby residential neighborhoods. Similarly, Shen (2000) found that in the Boston metropolitan area a 10 percentage-point increase in the share of Black residents resulted in a 0.4-minute increase in average commute time. More recently, due to employment decentralization in many metropolitan areas, such as Detroit, black residents in inner cities are often isolated from suburban job opportunities (Stoll, 2006).

Recent research suggests that spatial mismatches between housing and employment opportunities may be attributable to exclusionary land use regulations. For example, cities in California that enforce stricter parking requirements or place minimum lot size restrictions on accessory dwelling units (ADUs) are more likely to have an imbalance between housing and employment opportunities. However, those that rely primarily on low-density residential zoning are more likely to be

high-income enclaves that rely disproportionately on a low-income workforce (Durst, 2019). Easing these restrictions may reduce housing-employment imbalances. Similarly, cities that enforce urban growth boundaries or offer development incentives to promote affordable housing – such as expedited permit review; more lenient height, parking, or transportation mitigation requirements; and reduced impact or permit fees – appear to have greater balance between housing and employment opportunities and have worker populations with a shorter commute (Durst, 2019).

Measurement

To understand patterns of spatial mismatch and address its myriad impacts on communities, prior studies have developed a series of indices to measure the mismatch between housing and employment opportunities (Peng, 1997; Stoker & Ewing, 2014; Sultana, 2002). The assumption behind many of these housing-employment mismatch indices is that a certain geographical area is considered balanced when job opportunities appropriately match housing provision (Cervero, 1989, 1996; Giuliano, 1991). However, defining the appropriate geographic area for study is complicated by the fact that the indices themselves vary considerably depending upon the scale at which they are measured (Cervero, 1989; Peng, 1997; Stoker & Ewing, 2014). For example, the larger the spatial scale at which one measures the location of housing and employment opportunities, the more balanced these areas will appear (Cervero, 1996; Giuliano, 1991; O'Kelly & Lee, 2005; Stoker & Ewing, 2014). Thus, measuring spatial mismatch at the regional level makes little sense – viewed at this large scale, metropolitan areas inherently contain relatively balanced amounts of housing and jobs, since most residents both live and work within the same metropolitan area (Cervero, 1996; Stoker & Ewing, 2014). Similarly, research at the county or city level may overlook much of the variation in access to employment and housing opportunities between neighborhoods (Benner & Karner, 2016; Cervero, 1996; Giuliano, 1991; Shen, 2000). A number of scholars have used smaller geographic units to measure spatial mismatches: Some have measured spatial mismatch at the level of census tracts (Cervero, 1989) or traffic analysis zones (TAZs) (O'Kelly & Lee, 2005; Wang, 2000), while others have calculated commute sheds within varying distances from the center of a target neighborhood (Cervero, 1996; Charron, 2007; Peng, 1997; Stoker & Ewing, 2014; Wang, 2000). This variation across existing studies suggests that there is no single optimal spatial scale at which to measure spatial mismatch (Cervero, 1996; Peng, 1997; Stoker & Ewing, 2014).

Scenario Planning Tools

In order to address spatial mismatches in Michigan, state and local policymakers need access to easy-to-use tools for evaluating the spatial distribution of housing and employment opportunities. A number of online scenario planning

tools partially address this need, though with important limitations. OnTheMap,[1] an interactive online tool developed by the Census Bureau, lets users map data on the place of work and place of residence for workers in the U.S. The tool allows for a variety of useful analyses, including examinations of distance and direction traveled from home to work (or vice versa) and labor market profiles. However, direct measures of spatial mismatch (e.g., ratios of jobs to housing) are not available through OnTheMap, nor are many of the myriad neighborhood characteristics or land-use patterns that are essential elements in identifying places that warrant targeted investment in new housing or jobs.

Building off research by Stoker and Ewing (2014), the Workforce-Housing Balance App[2] (WHBA) is publicly accessible through Envision Tomorrow. Using data derived from the Census Transportation Planning Products (CTPP) dataset, the WHBA allows users to visualize census tract-level estimates of spatial mismatch. However, the WHBA requires that users have knowledge of and access to a geographical information system (ArcGIS), which only provides insight into imbalances in housing and employment opportunities as measured at a single spatial scale (census tracts), and does not allow visualization of neighborhood characteristics or land-use patterns.

METHODS

In this report, we discuss the development of a free and easy-to-use online tool called the Michigan Spatial Mismatch (MSM) Tool that allows users to map imbalances in the number – or disparities in the composition – of residents and the local workforce in Michigan. We then illustrate how the tool can be used to examine how these imbalances/disparities might be shaped by the physical, social, and economic conditions in neighborhoods. We used four primary data sources in developing the MSM Tool. We used 2015 data from the Longitudinal Employer-Household Dynamics Origin Destination Employment Statistics (LODES) compiled by the U.S. Census Bureau, 2013-2017 5-Year Estimates from the American Community Survey (ACS), data on road networks acquired from OpenStreetMap in 2019, and the Smart Location Database developed by the U.S. Environmental Protection Agency. We display all analyses using census block group boundaries (shapefiles) obtained from the National Historical Geographical Information System (IPUMS-NHGIS).

Imbalance/Disparity Indices

This report, and the accompanying tool, uses two indices to analyze jobs-housing mismatches in Michigan neighborhoods: imbalances and disparities. Imbalances capture the location of housing and employment opportunities by

[1] https://onthemap.ces.census.gov

[2] http://envisiontomorrow.org/jobs-housing-wage-income-bala

measuring differences in the total number of residents and workers in each neighborhood. These indices provide insight into which neighborhoods are predominantly residential areas and which are predominantly places of employment. Disparities measure differences in the economic or demographic characteristics of residents and the local workforce, and can be used to identify neighborhoods where the characteristics of the residential population differs from the composition of its workforce. In this report, for the purpose of simplicity, we primarily discuss disparity indices for low-income and Black workers, although the MSM Tool allows users to visualize disparity indices by income, race, and education. Each index is derived from the aggregation of census block estimates of the place of work and place of residence for workers in 2015, derived from Residence Area Characteristics (RAC) and Workplace Area Characteristics (WAC) files from LODES.

Imbalance Indices

As noted above, our imbalance indices measure the discrepancy between the number of employed residents and the number of workers in neighborhoods, as follows:

$$\text{Imbalance} = 100 * \frac{\text{Employed Residents}}{\text{Employed Residents + Workers}}$$

This results in an imbalance index that ranges, theoretically, from 0 to 100 and represents how large the resident population is relative to the population of both residents and workers. In other words, values of the index between 51 and 100 are indicative of neighborhoods where the number of working residents is larger than the number of workers. These would therefore be primarily residential areas, not places of employment. For example, a value of 75 means that of the people who either live or work in the target area, 75% are residents and 25% are workers. Values of the index between 0 and 49 are indicative of neighborhoods where the number of working residents is smaller than the number of workers. These would be primarily employment hubs, not residential areas. For example, a value of 25 means that of the people who either live or work in the target area, 25% are residents and 75% are workers.

Disparity Indices

Our disparity indices capture differences in the characteristics of residents and workers, as noted above. The disparity index is calculated as the difference between the percentage of working residents from a particular economic or racial group (e.g., low-income or Black) and the percentage of workers in that same group, as follows:

$$\text{Low-Income Disparity} = 100 * \frac{\text{Low-Income Employee Residents}}{\text{All Employee Residents}} - \frac{\text{Low-Income Workers}}{\text{All Workers}}$$

$$\text{Black Disparity} = 100 * \frac{\text{Black Employee Residents}}{\text{All Employee Residents}} - \frac{\text{Black Workers}}{\text{All Workers}}$$

The disparity index ranges, theoretically, from - 100 to 100. Positive values (i.e., 1 to 100) are indicative of neighborhoods where, for example, the percentage of *residents* who have low incomes is higher than the percentage of *workers* who have low incomes. These would therefore be low-income residential neighborhoods that contain primarily high-income employment opportunities. Negative values (i.e., -100 to -1) are indicative of areas where the percentage of *residents* with low-incomes is lower than the percentage of *workers* with low incomes. These, in turn, would be predominantly high-income neighborhoods that are dependent upon a low-income workforce.

Defining Scales of Measurement

After developing these indices, we sought to allow users to examine how imbalances and disparities in housing and employment opportunities differ for economic and racial groups across varying spatial scales. Research suggests that larger spatial scales fail to capture much of the variation in spatial mismatch between neighborhoods (Benner & Karner, 2016; Cervero, 1996; Giuliano, 1991; Shen, 2000; Stoker & Ewing, 2014) and are somewhat meaningless for analyses of spatial mismatch, since housing and employment are relatively balanced when viewed at the level of metropolitan areas or larger (Cervero, 1996; O'Kelly & Lee 2005; Stoker & Ewing, 2014). To avoid the limitation of using a single spatial scale (Cervero, 1996; Peng, 1997; Stoker & Ewing, 2014), and to provide elected officials and local planners flexibility in how to both conceptualize and visualize patterns of spatial mismatch, this report and online tool allow users to examine spatial mismatch at a series of geographic scales.

Commuting patterns are in large part determined by the road network upon which commuters travel. We therefore use this road network to calculate spatial mismatch within commute sheds of four different distances (.5, 1, 2, and 4 miles). To do so, we used data acquired from OpenStreetMap[3] in January of 2019 to identify the location of all roads within the state and any restricted travel (such as one-way routes, tunnels, and bridges). We then used ESRI's Network Analyst to model commute sheds of varying distances from the geographic center (centroid) of each block group outward, as shown in the left side of Figure 1. Doing so allows users to map patterns of spatial mismatch for commute sheds of different sizes while accounting for real-world accessibility to jobs/housing via roads.

[3] https://www.openstreetmap.org

Figure 1. Determining Target Areas: Commute Sheds and Nearest Neighborhood Approaches

We also, however, developed a second method for identifying potential commute sheds that builds on the assumption that housing located in one neighborhood is generally considered accessible to residents who work within that same neighborhood or within a neighborhood nearby. To do so, we simply identified the census block groups that were contiguous with the target neighborhood in question, as shown on the right side of Figure 1. This nearest-neighbor approach relies on fewer assumptions about the expected mode or distance of travel for commuters in the area. These measurements at various scales offer users of the MSM Tool the flexibility to tailor their analysis to the scale at which they plan to intervene when promoting housing or economic development activities.

FINDINGS

To illustrate how the Michigan Spatial Mismatch (MSM) Tool can be used to examine the degree of jobs-housing mismatch in Michigan, we discuss the imbalance and disparity indices in the Detroit metropolitan area. We first describe broader patterns in the imbalance and disparity indices that highlight policy-relevant findings related to either 1) the location of employment and housing opportunities (imbalance indices) or 2) differences in the economic or racial composition of residents and workers (disparity indices). We then observe variation in the imbalance and disparity indices when measured at differing spatial scales, from a half-mile to four-mile commute sheds, and how users of the MSM Tool might use these indices to conduct targeted decision-making for housing and economic

development. Finally, we illustrate how the MSM Tool can be used to examine potential relationships between the imbalance and disparity indices and key demographic, economic, and physical conditions in neighborhoods.

How Balanced Are Jobs and Housing in the Detroit Metro Area?

Our overall imbalance index provides a first glimpse of the spatial distribution of housing and employment opportunities in the Detroit metro area. Figure 2.A displays the imbalance index for all workers/residents as measured within four-mile commute sheds from the geographic center of each block group within the region. The boundaries of four cities – Detroit, Livonia, Pontiac, and Troy – are shown with varied outlines. As is clear, many neighborhoods in all four cities have darker shading, indicating that they have a large number of workers but a much smaller number of residents. This is particularly true for Livonia and Troy, but also for Downtown and Midtown Detroit, located in the southeastern corner of the city. On the other hand, areas in the northern and southern portions of the map have lighter shading, indicating that in residents in these neighborhoods outnumber workers.

To What Extent Are Low-Income/Black Populations Spatially Isolated from Employment Opportunities in the Detroit Metro Area?

We now turn to an analysis of disparity indices in order to examine whether low-income and Black residents are spatially isolated from employment opportunities in the Detroit metro area. These indices allow users to identify disparities between the composition of residents and the composition of workers in a specific area. For example, planners and policymakers seeking to promote equity in the allocation of funding for affordable housing development may want to identify the location of high-income residential areas that depend disproportionately on a low-income workforce. To facilitate this sort of decision-making, we developed a series of disparity indices for low-income and low-to-moderate-income residents, Black and Latino residents, and residents with high school and college degrees. Figure 3 displays the low-income disparity and Black disparity indices measured within four-mile commute sheds. As shown in Figure 3.A, many neighborhoods to the north, west, and east of the city of Pontiac as well to the west and south of the city of Livonia have a low-income disparity index of less than -10. These are therefore predominantly high-income neighborhoods that depend heavily on a low-income workforce.[4] The opposite is true for large swathes of central Detroit, where the low-income disparity index is greater than 10. These areas are neighborhoods with a high-income workforce but a predominantly low-income resident population.

[4] Specifically, a low-income disparity index of -10 means that the share of residents with low incomes is 10 percentage points less than the share of workers with low incomes.

Figure 2. Imbalances in the Detroit Metro Area: Four-Mile Commute Sheds

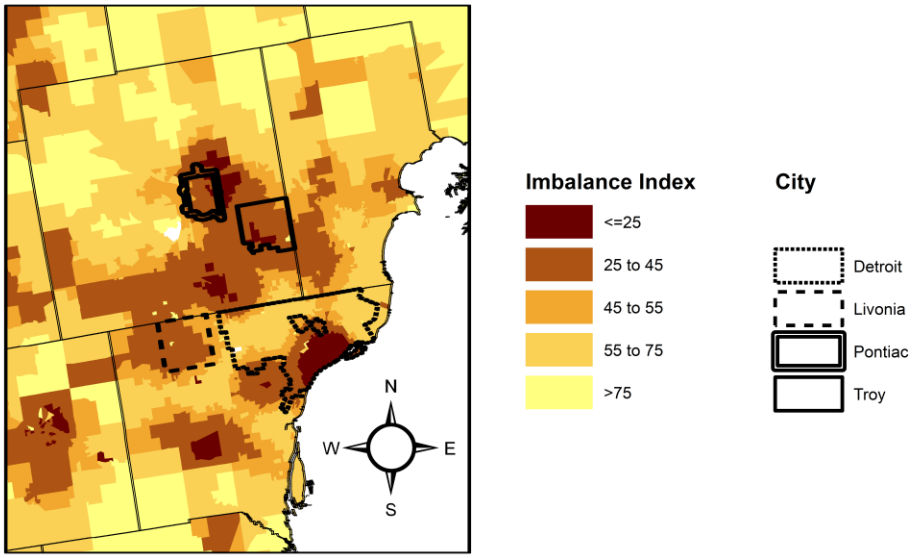
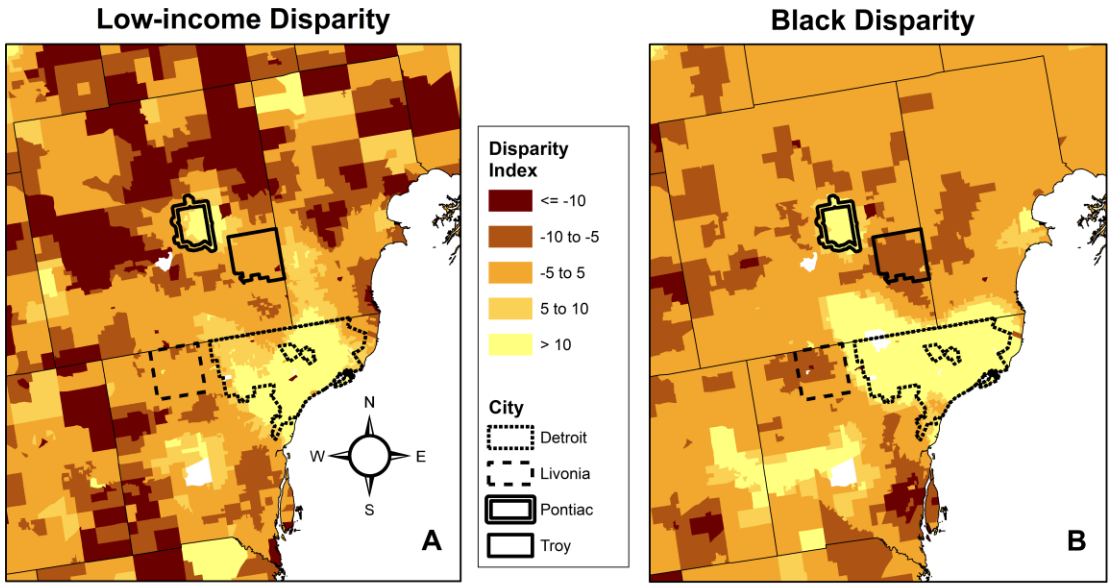


Figure 3. Low-income and Black Disparity Indices: Four-Mile Commute Sheds



Racial disparities between the composition of residents and workers, as indicated by the Black disparity index (Figure 4.B), also highlight distinct spatial patterns of disparity in access to employment opportunities for Black residents. For example, the Black disparity index (measured within four-mile commute sheds) is greater than 10 for the entire city of Pontiac and nearly the entire city of Detroit, with the exception of the southernmost portion of the city. This high disparity also extends northward from western Detroit into Oakland County. These

neighborhoods are home to disproportionate shares of Black residents despite their reliance on a more racially diverse workforce.

Examining Spatial Mismatch at Various Spatial Scales

The MSM Tool allows users to select alternative geographies to visualize housing-employment imbalances. For example, planners and policymakers who want to promote access to employment in walkable neighborhoods may prefer to toggle between a four-mile commute shed and a smaller geographic scale, such as a one-mile or half-mile commute shed, which more closely resembles the typical commute by foot. Figure 4 displays the imbalance index for the cities of Troy (to the northwest) and Detroit (to the south) within both four-mile (Figure 4.A) and half-mile (Figure 4.B) commute sheds. When measured within half-mile commute sheds, large swathes of the city of Detroit have imbalance index values of greater than 75, meaning that *residents* make up more than 75% of all workers and residents within a half-mile commute of the center of these neighborhoods. This points to the need for an expansion of employment opportunities in these areas. In contrast, when the imbalance index in the city of Troy is viewed within half-mile commute sheds, a number of neighborhoods in the south of the city have low index values (dark shading), suggesting the need for more housing, while neighborhoods to the north and east have high index values (light shading), suggesting the need for more employment opportunities. These small-scale variations in housing and employment opportunities were obscured when measured within four-mile commute sheds, but they may still play an important role in informing housing or economic development efforts that seek to promote walkability within neighborhoods. The MSM Tool allows for users to modify the scale of analysis to fit the intended need.

Examining the Demographic, Economic, and Physical Characteristics of Neighborhoods

As illustrated above, the MSM Tool allows users to visualize imbalances between the location of jobs and housing or disparities between the composition of residents and workers in order to facilitate data-driven decisions regarding the identification of target neighborhoods for housing or economic development. However, a variety of other neighborhood-level factors are important when evaluating patterns of spatial mismatch. The MSM Tool therefore allows users to map the demographic, economic, and physical characteristics of neighborhoods and to examine the relationship between these characteristics and the degree of imbalance or disparity within a specific area of study. For example, Figure 5 displays two variables of interest: median housing values for owner-occupied units and neighborhood walkability, as measured by the Environmental Protection Agency's Walkability Index.

Figure 4. Imbalance Indices: Four-Mile and Half-Mile Commute Sheds

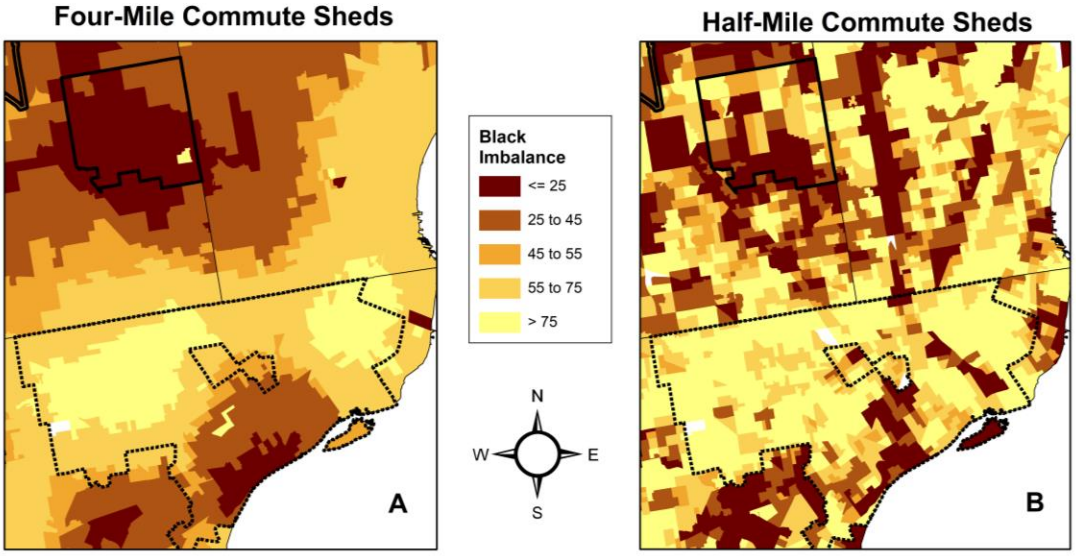
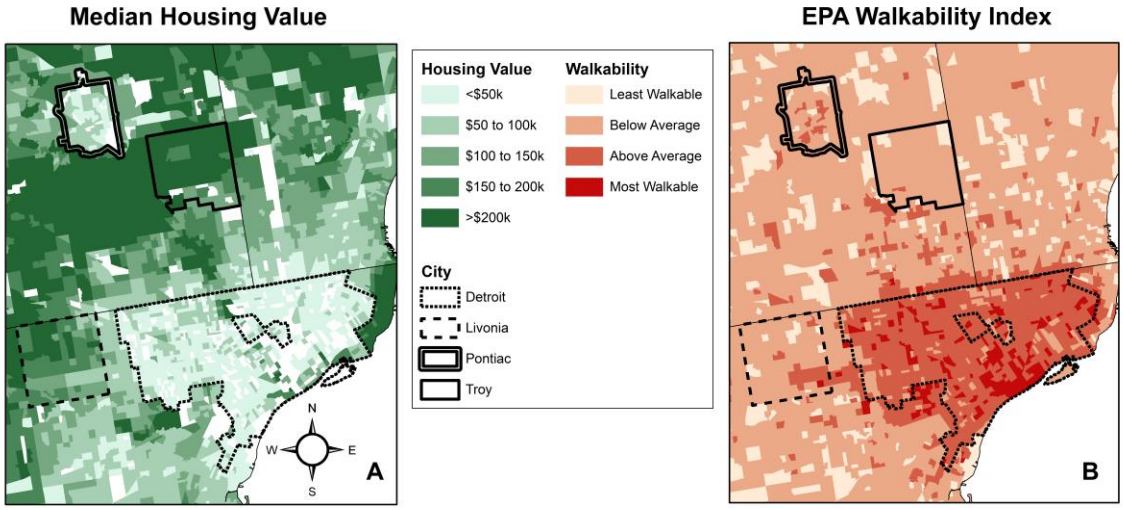


Figure 5. Two Characteristics of Neighborhoods in the MSM Tool: Housing Values and Walkability



These two indicators point toward the tradeoffs that policymakers and public officials may face when attempting to reduce housing-employment mismatches. For instance, cities such as Livonia and Troy have relatively high housing values, as indicated by dark shading in Figure 5.A. It is therefore not particularly surprising that these same cities tend to have a low imbalance index and a low Black disparity index (see Figures 2 and 3). Promoting affordable housing development in these cities would likely reduce these patterns of spatial mismatch. However, as illustrated in Figure 5.B, successful efforts at promoting targeted housing development in Livonia and Troy would also need to grapple with the fact that many of the neighborhoods in these cities have below-average ratings for walkability. Thus, any housing development efforts would need to explicitly

consider changes to the design of neighborhoods to promote walkability or would need to be coordinated with the expansion of options for alternative modes of travel. On the other hand, most of the neighborhoods in the region that have been classified as being "above average" or "most walkable" on the EPA's Walkability Index are located in the city of Detroit. Yet, as the preceding analysis illustrates, Detroit has a high imbalance index and very high low-income and Black disparity indices. Thus, although these neighborhoods are classified as both walkable and affordable, they are primarily in need of expanded employment opportunities rather than targeted housing development.

POLICY IMPLICATIONS

Our analysis above highlights widespread imbalances in regard to the location of jobs and housing in the Detroit metropolitan area. Cities such as Livonia and Troy have a surplus of employment opportunities – the number of jobs within these cities far exceeds the number of employed residents. In short, these cities are job-rich. The imbalance between employment and housing opportunities within these two cities contributes to disparities between the racial composition of the cities' workforce and residents: African Americans make up a relatively high share of workers but a relatively low share of residents. In other words, these are predominantly white cities that are dependent upon a substantial Black workforce. Detroit and Pontiac, two job-poor cities, face the opposite challenge; in large portions of these cities, the number of employed residents is higher than the number of workers. This, in turn, also contributes to racial and income disparities between residents and the local workforce: Detroit and Pontiac are disproportionately home to low-income and Black residents, despite having a more economically and racially diverse workforce. These findings have clear policy implications.

Support Research on Affordable Housing in Michigan

The link between these patterns of spatial mismatch, land use regulation, and housing policy in Michigan is unclear, though recent evidence from California suggests that land use regulation and housing policy are closely associated with the distribution of housing and employment opportunities (Durst, 2019). Moreover, recent research by the Michigan State Housing Development Authority highlights critical housing needs (MSHDA, 2019a) and points toward the potential role of zoning and other regulatory barriers in limiting the supply of new housing in the state (MSHDA, 2019b). More research is needed to identify specific policies and regulations that may exacerbate or ameliorate issues of housing affordability and spatial mismatch in Michigan.

Promote Coordinated Regional Efforts to Address Spatial Mismatches

As the analysis above illustrates, patterns of spatial mismatch in Michigan largely exist *between* rather than *within* cities. This suggests the need for

coordinated regional efforts, rather than piecemeal local efforts, to address the complex mix of housing, economic development, and transportation policy necessary to reduce spatial mismatches between housing and employment within the state. In part, this emphasis on regional coordination is already recognized by the Michigan Association of Planning (MAP). For example, the Housing Policy adopted by the MAP Board of Directors "supports a cooperative and mutually supportive relationship among federal, state, and local governments based on the recognition that funding for housing programs is best implemented with regional coordination, while programs are best designed with local input, and delivery is best implemented at the local level" (Michigan Association of Planning, 2016). Our findings suggest the need for regional efforts to address housing-employment mismatches. There are three primary means by which local and state officials can seek to do so.

Promote Affordable Housing Development in Job-Rich Areas

State, regional, and local governments should strive to promote affordable housing options in job-rich areas. The policy levers by which public officials could do so are already on the radar of local and state policymakers, planners, and other public officials in Michigan. For example, the Michigan Association of Planning (MAP) supports "efforts to expand affordable housing opportunities by facilitating the development and preservation of accessory dwelling units, reducing or eliminating minimum dwelling unit floor area requirements, and allowing cluster housing, manufactured housing, mixed-income housing, shared residences, and single room occupancy (SRO) developments" (Michigan Association of Planning, 2016).

Promote Economic Development in Housing-Rich Areas

State and local policymakers can also address housing-employment mismatches by promoting targeted economic development in low-income and minority residential areas where employment opportunities are scarce – i.e., housing-rich areas. Currently, a variety of initiatives led by the Michigan Economic Development Corporation (MEDC)[5] aim to promote investment in new businesses, create new employment opportunities, and revitalize underserved communities. Similarly, state and local governments can leverage federal Opportunity Zones to promote economic development in disadvantaged communities.

Expand and Improve Transit Options to Reduce Commute Burdens

Lastly, state and regional governments can also coordinate transit service to link job-rich and housing-rich areas or promote multi-modal transportation options to encourage alternative modes of commuting, such as biking and walking, where appropriate.

[5] https://www.michiganbusiness.org/services/incentives-and-taxes/

RECOMMENDATIONS FOR IMMEDIATE ACTION

Acting upon many of the recommendations above requires that state and local policymakers have access to easy-to-use tools for visualizing patterns of spatial mismatch across the state. The MSM Tool is designed for users to easily identify patterns of spatial mismatch and examine the physical, demographic, and economic characteristics of neighborhoods in order to identify areas that warrant targeted intervention to promote housing or economic development for Michigan's workforce. The MSM Tool provides a number of intuitive ways to map and visualize patterns of spatial mismatch.

After analyzing housing-employment imbalances and disparities using the MSM Tool, we encourage an examination of local policies, programs, and plans to evaluate how they may shape patterns of spatial mismatch. At a minimum, for example, local communities could compare their most recent comprehensive plan with the imbalance and disparity indices available through the MSM Tool. Meanwhile, state policymakers and planners could evaluate geographically targeted statewide housing and economic development programs, such as the implementation of Opportunity Zones, to examine whether they appropriately target eligible communities. The MSM Tool is a flexible platform that may be used to analyze the relationship between and the impact of important factors – such as existing or proposed infrastructure, land use regulations, or economic development activity – on patterns of spatial mismatch.

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