

Transit Investment on SEMCOG's Executive Committee
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Summary

In this paper, we will investigate four variables affecting the transit investment of the municipalities represented on SEMCOG's current Executive Committee. We will provide maps of each municipality's participation in the SMART transit service, the frequency of the SMART lines serving those communities, and index of transit dependency, and an index of the propensity of non-transit dependent individuals to ride transit, or transit choice. We will determine that the transit investment of represented communities is generally low, especially further from the urban core, and that this may have negative policy impacts on the future of public transit in southeast Michigan. We will conclude with recommendations for reform based on literature of MPO function.

Introduction to Problem

This study delves into a very particular unit of analysis: the municipalities represented by the current members of the Southeast Michigan Council of Governments (hereafter SEMCOG) Executive Committee (hereafter EC). SEMCOG serves as the Metropolitan Planning Organization (hereafter MPO) for the 7-county southeast Michigan region. Its EC has come under scrutiny in the past for its insensitivity to regional issues of race and class, namely its underrepresentation of majority African-American Detroit and overrepresentation of majority white outer suburbs (Grengs 2005). That specific problem is no longer as pronounced as in the past: Detroit now holds 10 seats, while outer counties have between 4 and 8 (SEMCOG). However, no researchers have studied the character of the municipalities represented by EC members and linked this to public policy decisions. This is an important step because all EC members are primarily politicians representing the interests of their home constituents. The general public has no say in the selection of the EC (SEMCOG), so members will not be held accountable by the wider regional populace for their actions (Orfield and Gumus-Dawes 2009).

We will specifically analyze the character of these municipalities in relation to public transit, using various measures to judge their "investment" in public transportation and relating this information to current transportation policy in the region. We expect to find low investment in public transit in most of the represented municipalities, especially those far from the urban core, and will offer this as a potential, partial explanation for regional policies perpetuating inadequate public transit.

Although with this study we can only provide a moment-in-time analysis of the current EC, which changes yearly, we hope to provide a model for future longitudinal studies and to provide insight into the types of issues the SEMCOG structure and processes may pose for regional transportation policy.

Methods

SMART Participation

We identified four indicators of municipal transit investment to use in our study. The first and simplest is participation in the Suburban Mobility Authority for Regional Transportation (SMART), which provides transit services to the suburbs of Detroit. It is an opt-out organization, so most municipalities have the option of whether to participate in SMART (Martin 2012).

This comes with some caveats. First, SMART's boundaries only extend through Wayne, Oakland, and Macomb counties, so municipalities in other counties do not have the option to participate. Some, like Ann Arbor and Ypsilanti, participate in a separate transit authority, so their participation in SMART is not a good indicator of their transit investment. In addition, Macomb County made the decision to opt in as a county, taking away its municipalities' abilities to opt out individually (Martin 2012). This is why, in Figure 2, all Macomb municipalities show up as green. Finally, although Detroit is not officially a member of SMART, it does receive some service from the provider.

Mapping SMART participation was a fairly straightforward process. After identifying which municipalities have representation on the EC, we cross-referenced this information with the listing of communities served on the SMART website. We then joined to the SEMCOG boundary map a basic chart of yes or no responses and symbolized the municipalities as either green or red, respectively.

SMART Frequency

For those municipalities participating in SMART and receiving service, we decided to overlay a frequency map of transit lines. As outlined by Jarrett Walker, most transit maps do not accurately represent the level of service provided, because they miss the fundamental aspect of frequency, which defines a transit rider's experience (Walker).

In order to map out frequency, we first had to select by location to determine which transit lines served the represented municipalities participating in SMART. We then obtained route schedules from SMART's website. We had to make some assumptions in order to simplify the data to fit the scope of our study. For each line, we chose either the northbound or the eastbound direction (an arbitrary decision that generally will not affect frequency), and chose the weekday schedules in order to focus on the essential function of commuting. We then decided to focus on the afternoon rush hour (which could have just as easily been morning rush hour), and took the three rows of the schedule that began after 4pm but before 6pm and as close to 5pm as possible. After identifying these rows, we calculated the headway in minutes between the first and second and second and third runs for each listed stop, averaged each stop across the row for both intervals, and finally averaged the two intervals together.

Transit Dependency and Choice Indices

Investment in public transit can be politically influenced by both constituents who rely on transit for daily activities, and by those who would like to choose transit over other available modes. As explained by Walker, these two are not perfect or mutually exclusive categories. People generally fall somewhere on a spectrum of burden imposed in the absence of quality transit (Walker 2012). However, we will use these two factors to simplify our study.

In order to create indices for both transit dependency and transit choice, we selected variables based on previous research. The selection of our dependency variables came largely from the study by Cole Grisham, Terra Reed, and Kevin Shelton, which identifies elderly population, median income, vehicle ownership, and youth population as important variables (Detroitography 2014). Further review of scholarly articles confirmed these as important factors (Fan et al. 2010, Wells and Thill 2012). To select choice variables we looked at previous research and identified population density, millennial population, employment status, and means of transportation to work as key demographic variables (Racca 2004, Taylor and Fink 2003). Table 3 outlines the manner in which each affects transit dependency and choice.

We gathered data on the variables in question from the American Community Survey, 2008-2012, which allowed us to pull the data at census tract level and gave us a finer-grained picture than municipality-level would have allowed. We joined this to the spatial data and symbolized each variable to get an initial sense of the results. We then combined the variables with a simple attribute table calculation, slightly modified. We had to subtract the median income variable from one in order to show the inverse relationship with transit dependency, as well as standardizing the format between percentage and decimal. This calculation gave us a new number for each tract, which we used as to symbolize the final index. The results for the separate variables can be seen in Figures 6 through 13.

Findings

SMART participation

Studying the participation of EC-represented communities in SMART gave us a very clear picture. As Figure 2 demonstrates, very few of these municipalities participate in SMART, for a variety of reasons. Those outside Wayne, Oakland and Macomb counties are simply outside the SMART service area and

did not have the opportunity to opt in or out. Ann Arbor and Ypsilanti in fact receive service from a separate provider, the Ann Arbor Area Transportation Authority, and most of Detroit's service comes from the Detroit Department of Transportation. Despite any investment in transit in general, though, these communities' lack of municipal interest in the wellbeing of the SMART system will potentially affect their representatives' decisions about its future. Figure 15 shows the EC communities in relation to the whole tri-county area's SMART participation.

Now we will focus on Wayne, Oakland, and Macomb counties, which are within the SMART service area. All the represented municipalities in Macomb participate, due to its countywide participation in SMART. However, as will be seen in Figure 2, the more distant communities do not receive fixed route service, only demand-response service for the elderly and disabled. Thus, they would not be affected by cuts to the fixed route system. Only 2 out of the 6 represented communities in Oakland County participate, and 2 out of 7 in Wayne County. As the map shows, the representation has a clear spatial pattern. A band of SMART participation, made up of the inner or middle-ring suburbs Inkster, Huntington Woods, Eastpointe, and Grosse Pointe, circles Detroit. This is consistent with our expectations that closer-in suburbs would have a greater investment in public transit. Some outliers do exist: notably Waterford in central Oakland County and New Baltimore on the eastern edge of Macomb County. For future analysis, studying the political and social conditions that enable their participation would be an important exercise.

We also looked at the number of representatives for each municipality to shed greater light on their relative influence. In Oakland County 3 out of 8 representatives come from SMART communities, and in Wayne County only 2 out of 16. It should be noted that this number results from the large number of representatives allocated to Detroit, which, although not a SMART-participating municipality, still has significant interest in the provider's future. Viewing the entire 7-county region, however, the total is 12 SMART to 36 non-SMART communities. This skewed picture results partially from the small number of representatives allocated to inner-ring suburbs.

SMART Frequency

Even limiting our study to weekday afternoon rush hour, we found very low frequency for most of the SMART lines serving EC-represented communities. Most of the lines serving represented inner-ring suburbs run every 45 to 66 minutes, far too large an interval for flexibility and reliability (Walker 2012). Most other municipalities see service every 15 to 45 minutes, and only two lines run buses more frequently than every 15 minutes.

We did find, though, that most of the represented communities that participate in SMART and receive fixed-route service are served by at least one high-frequency line. We use high frequency as a relative term, since 10-15 minute headways still limit the flexibility of riders. Nonetheless, these two routes, the 450 on Woodward and the 560 on Gratiot, run on major corridors and serve 5 of the 6 municipalities in question. However, the picture is slightly misleading. One limitation in our study of this factor was our lack of capacity to represent changes in frequency over the transit line. Thus, although these two routes reach suburbs far from the urban core, the frequency at the same end of the lines is often lower than the average frequency.

Some northern Macomb municipalities, although part of SMART on account of the county, receive only demand response service for seniors and people with disabilities. They are therefore not shown on the map.

Transit Dependency Index

Figure 4 shows an expected block of high transit dependency in Detroit and inner-ring suburbs such as Eastpointe and Inkster, largely due to their low median income and high rates of households without a

car. More surprisingly, though, some outer suburbs fall high on the transit dependency scale, including Waterford, Port Huron, Howell, Mt. Clemens, and Brighton. This may be due to the larger number of elderly people who live in these communities, or in some case large numbers of children. As we note in the Discussion, these results may bode well for the future of transit in southeast Michigan.

In general, however, we did not find very high transit dependency in represented communities, particularly Western Wayne and Oakland County. Furthermore, many suburbs on the urban periphery see high transit dependency limited to only one or two census tracts, so that the overall effect may be low.

Transit Choice Index

The results for the choice index showed very low transit choice throughout the region, with few exceptions. As seen in Figure 5, nearly all census tracts in the seven-county area display the yellow and light orange colors of 0.56 to 1.64. For the most part only Detroit and Ann Arbor contain census tracts with higher rankings, due mainly to Ann Arbor's high millennial population and Detroit's large number of transit riders.

A few other outliers came to our attention: Rochester Hills in eastern Oakland County has one census tract of very high transit choice, despite its low value overall. We predict that this results from the inclusion of Oakland Community College in this tract, and the corresponding large millennial population. Others, such as high transit choice tracts in the corners of Canton and Inkster, are more difficult to explain.

Discussion

Our results have significant implications for policy in southeast Michigan. All the factors we studied demonstrate that overall, municipalities currently represented by the SEMCOG Executive Committee do not display high investment in transit, particularly those farther from the urban core. Since SEMCOG has such influence over the allocation of resources to various transportation projects in the region, this lack of investment could be a factor in low funding for transit and the resulting poor transit system. For communities whose dependence on and investment in transit is higher, result is troubling.

We recommend a push for greater transparency and accountability on SEMCOG, in particular the EC, in order to address this problem. EC members might make different decisions if they felt accountable to the region at large rather than their local constituents. Increased public information about SEMCOG representatives and their decisions, easily accessible and advertised meetings and minutes, and transparency in the internal EC election process would begin to achieve this goal. SEMCOG could also continue its progress towards true population-based representation for all municipalities, which would increase the representation of the more transit-invested central city.

Multiple studies have proposed strategies for improving MPO accountability and citizen engagement. Transportation for America's guidebook "The Innovative MPO" suggests "cultivating an ongoing cadre of informed citizen 'leaders'" (Zimmerman et al. 2014, 33) by hosting workshops for individuals involved in their communities to learn about the decision-making process of the MPO. Some advisory coalitions have even been formed with watchdog powers to keep the MPO on track as it pursues its goals (Zimmerman et al. 2014). The report suggests that going beyond the typical citizen advisory community can lead to greater empowerment, and perhaps a greater reflection of regional need for quality transit.

Myron Orfield and Baris Gumus-Dawes in their 2009 paper "MPO Reform" suggest more structural changes, recommending a requirement that MPO leadership consist not of elected leaders accountable to their local constituents, but of individuals elected directly to the MPO by the regional population, or appointed in another means that holds them accountable to the region at large (Orfield and Gumus-Dawes 2009). They also suggest use of quantitative performance indices of such factors as sprawl, affordable

housing distribution, job growth patterns, racial and economic segregation, and financial disparity, in order to ensure accountability (Orfield and Gumus-Dawes 2009).

In absence of such measures, the gradual demographic changes in the region may still cause greater transit investment. Both the presence of the elderly and of millennials factored into our transit indices. The elderly population in the region continues to grow as Baby Boomers age, and the influence of millennials is increasing as they enter more prominent positions in the workforce and politics. Figures 9 and 11 demonstrate the already outsized influence of millennials in places such as Ann Arbor and Detroit and, importantly, of the elderly in outer suburbs. The concerns of these populations may begin to further influence their regional decision makers, but the process will be hindered if the previously identified conditions of transparency and accountability are not met.

As we mentioned, this is a very limited study that cannot make any claims about cause and effect or identify trends over time. Nonetheless, we hope we have provided a window into the potential policy outcomes of SEMCOG's form and process, and provided a model for continued investigation.

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Appendix A: Tables

Table 1: Municipalities with representation on SEMCOG's Executive Council, and number of representatives

Name of Municipality	Number of Representatives	Total Population	Name of Municipality	Number of Representatives	Total Population
Ann Arbor	2	115,331	Livonia	1	96,233
Bloomfield Hills	1	3,910	Milford	1	6,265
Brighton	1	7,509	Monroe	4	20,627
Canton	1	90,173	Mount Clemens	3	16,362
Commerce Township	1	115,331	New Baltimore	1	12,044
Detroit	10	706,663	Plymouth	1	9,061
Eastpointe	1	32,524	Port Huron	3	29,819
Fort Gratiot	1	11,108	Richmond	1	5,768
Grosse Ile	1	10,371	Rochester	1	12,782
Grosse Points	1	5,385	Rochester Hills	1	71,737
Howell	3	9,539	Washington	1	25,139
Huntington Woods	1	6,280	Waterford	2	71,707
Inkster	1	25,215	Ypsilanti	3	19,647

Data Source: <http://www.semco.org/Data/exccommittee.cfm>

Table 2. SEMCOG communities and participation in SMART, Wayne and Oakland counties
**highlighted if also represented on SEMCOG Executive Committee*

Communities in Wayne County	Whether In SMART	Communities in Wayne County	Whether In SMART	Communities in Wayne County	Whether In SMART
Allen Park	2	Grosse Pointe Park	1	Plymouth Township	No
Belleville	No	Grosse Pointe Shores	1	Redford Charter Township	4
Brownstown Township	No	Grosse Pointe Woods	4	River Rouge	3
Canton Charter Township	No	Hamtramck	3	Riverview	1
Dearborn	1	Harper Woods	1	Rockwood	No
Dearborn Heights	10	Highland Park	1	Romulus	1
Detroit	No	Huron Charter Township	No	Southgate	1
Ecorse	1	Inkster	1	Sumpter Township	No
Flat Rock	No	Lincoln Park	1	Taylor	1
Gardern City	1	Livonia	No	Trenton	1
Gibraltar	No	Melvindale	1	Van Buren Charter Township	No
Grosse Ile Township	No	Northville	No	Wayne	3
Grosse Pointe	1	Northville Charter Township	No	Westland	3
Grosse Pointe Farms	1	Plymouth	No	Woodhaven	No

Communities in Oakland County	Whether In SMART	Communities in Oakland County	Whether In SMART	Communities in Oakland County	Whether In SMART
Addison	No	Holly	No	Pleasant Ridge	
Auburn Hills		Huntington Woods	1	Pontiac	1
Berkley		Independence	No	Rochester Hills	No
Beverly Hills		Keego Harbor	No	Rochester	No
Bingham Farms		Lake Angelus	No	Rose	No
Birmingham		Lake Orion	No	Royal Oak	
Bloomfield Hills	No	Lanhrop Village	No	Royal Oak	
Bloomfield		Leonard	No	South Lyon	No
Brandon	No	Lyon	No	Southfield	
Clarkson	No	Madison Heights	3	Southfield	No
Clawson		Milford	No	Springfield	No
Commerce Township	No	Milford	No	Sylvan Lake	No
Farmington Hills	1	Northville	No	Troy	
Farmington	1	Novi	No	Walled Lake	No
Fenton	No	Novi	No	Waterford	
Ferndale	1	Oak Park	1	West Bloomfield	
Franklin	4	Oakland	No	White Lake	No
Groveland	No	Orchard Lake	No	Wixom	No
Hazel Park	1	Orion	No	Wolverine Lake	No
Highland	No	Ortonville	No		
Holly	No	Oxford	No		

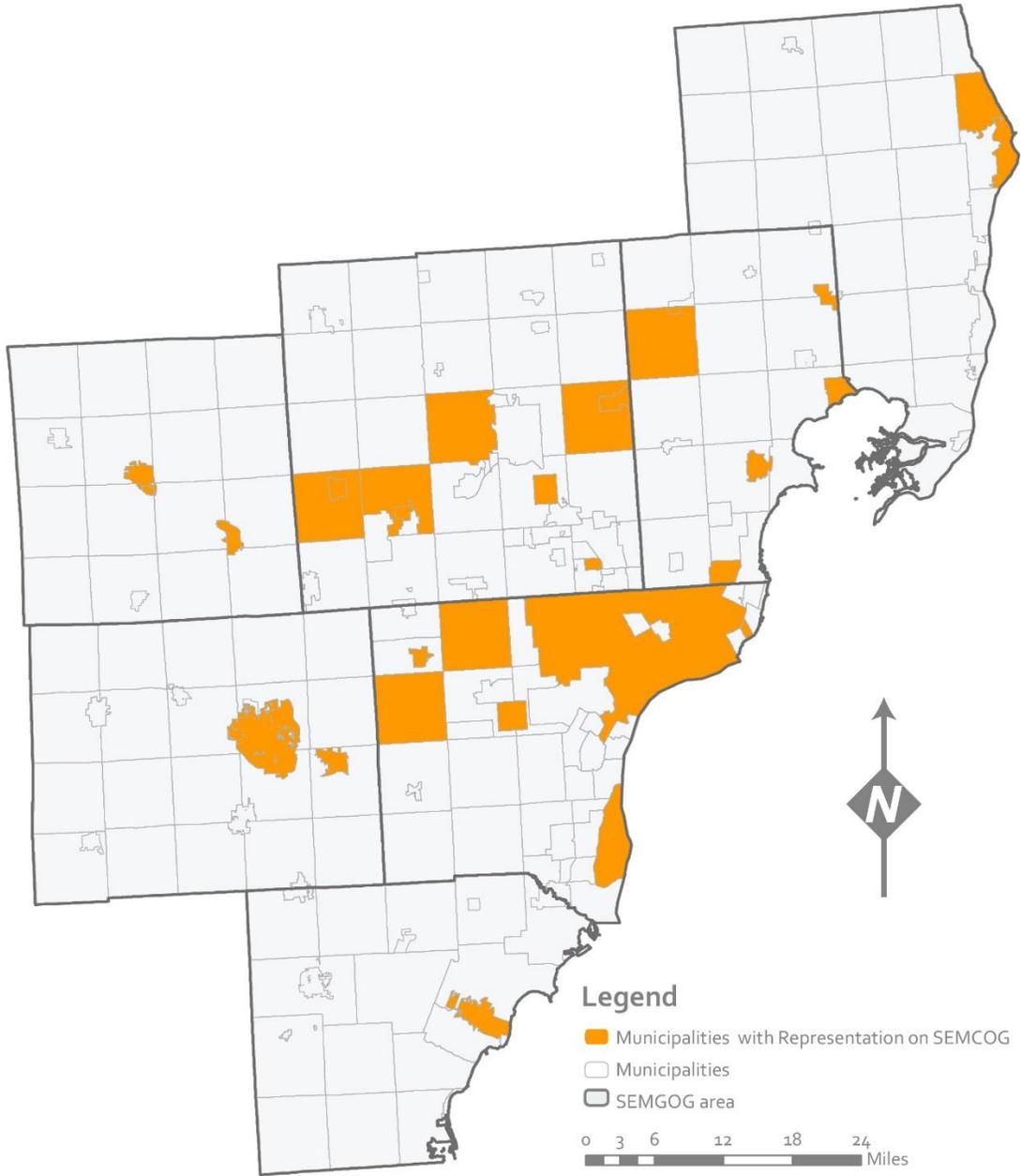
Table 3: Transit Dependency and Choice Index Variables, and Rationale

Transit Dependency Variables	Rationale
Vehicle ownership	Households without access to vehicles will require other modes of transportation to access important destinations.
Population over 65	Senior adults often decide or are required to stop driving, making many destinations inaccessible without transit.
Population under 18	Similarly, most children and teenagers under 18 are unable to drive, and likewise have more difficulty reaching destinations.
Median household income	Households with low incomes will have less money available to purchase a vehicle, as well as less capacity to finance upkeep and repair.

Transit Choice Variables	Rationale
Population density	Transit works best in dense areas due to more easily connected destinations, and denser areas will be able to generate more riders.
Population between 18 and 35	“Millenials,” as they are called, have demonstrated less interest in car ownership and more interest in public transit than other generations.
Employment status	Those who participate in the labor force are more likely to have reliable daily destinations, thus increasing the need for transit.
Means of transportation to work	Those who already rider “alternative” modes of transit are more likely to ride any future additional transit.

Appendix B: Figures

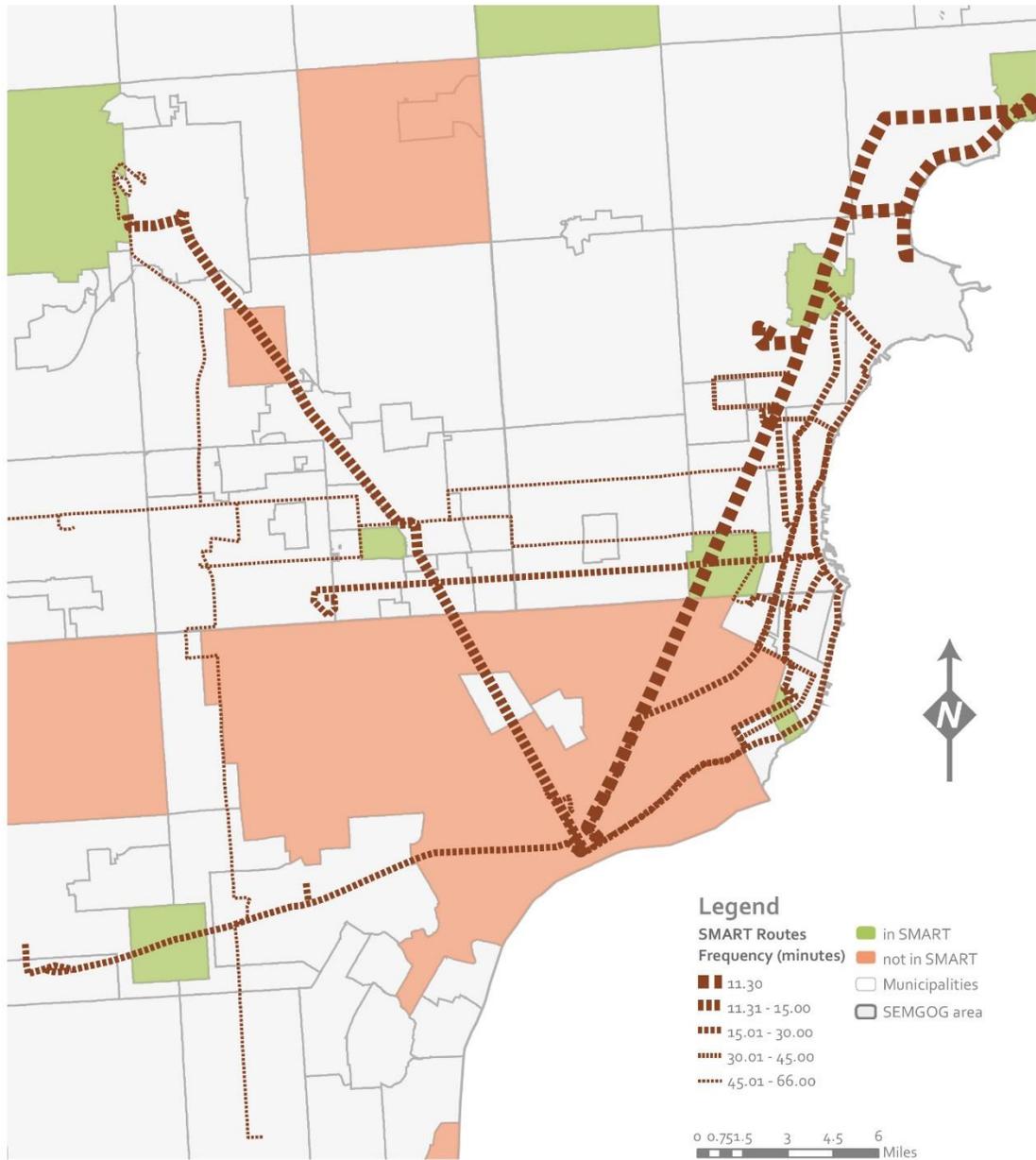
Figure 1: Municipalities with representation on SEMCOG's Executive Committee, 2014



Created by Carolyn Lusch

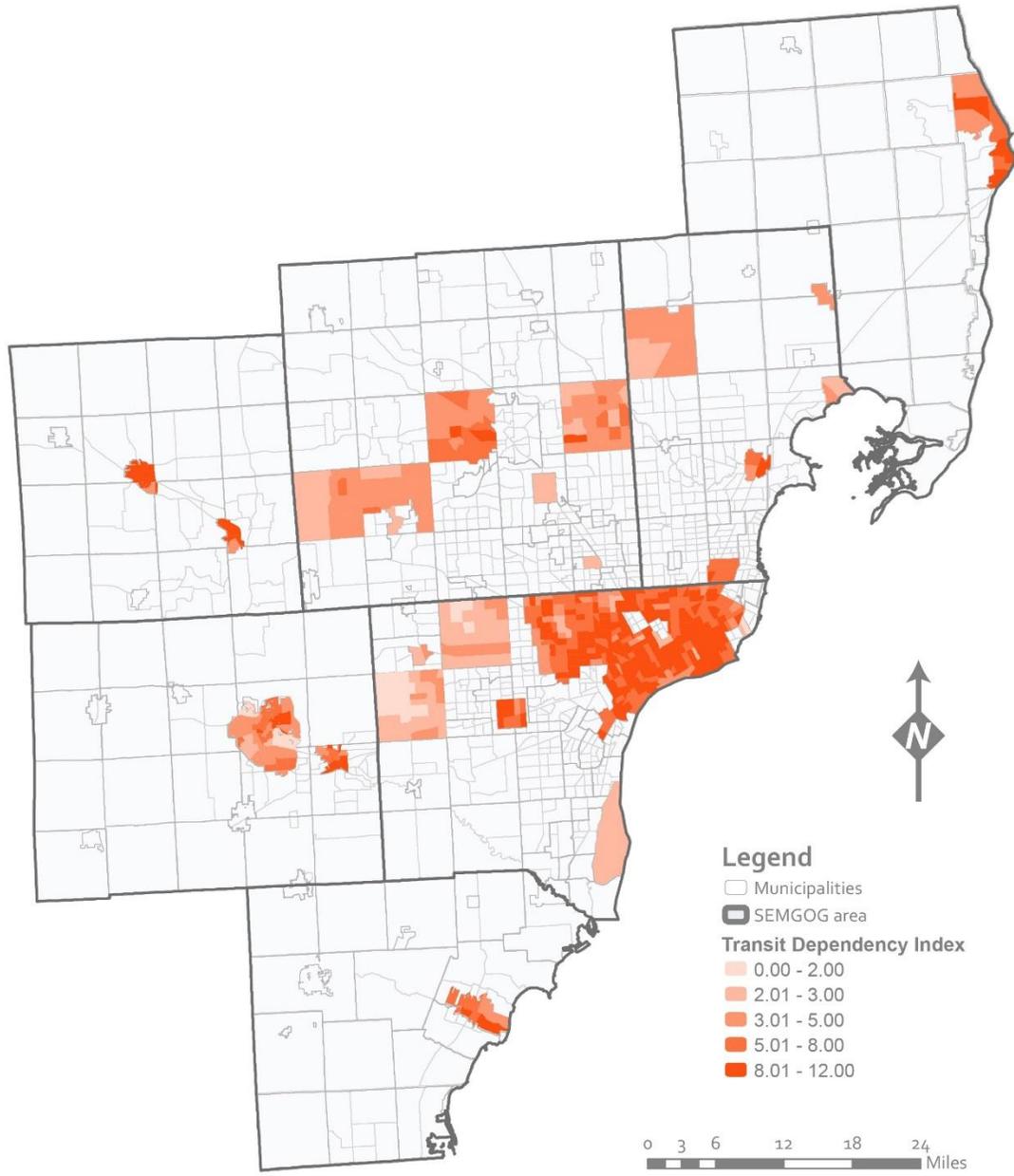
Data Sources: Michigan Geographic Data Library, Michigan Geographic Framework Base; SEMGOG.org.

Figure 3: Frequency of SMART at peak time (around 5pm) in weekdays, 2014



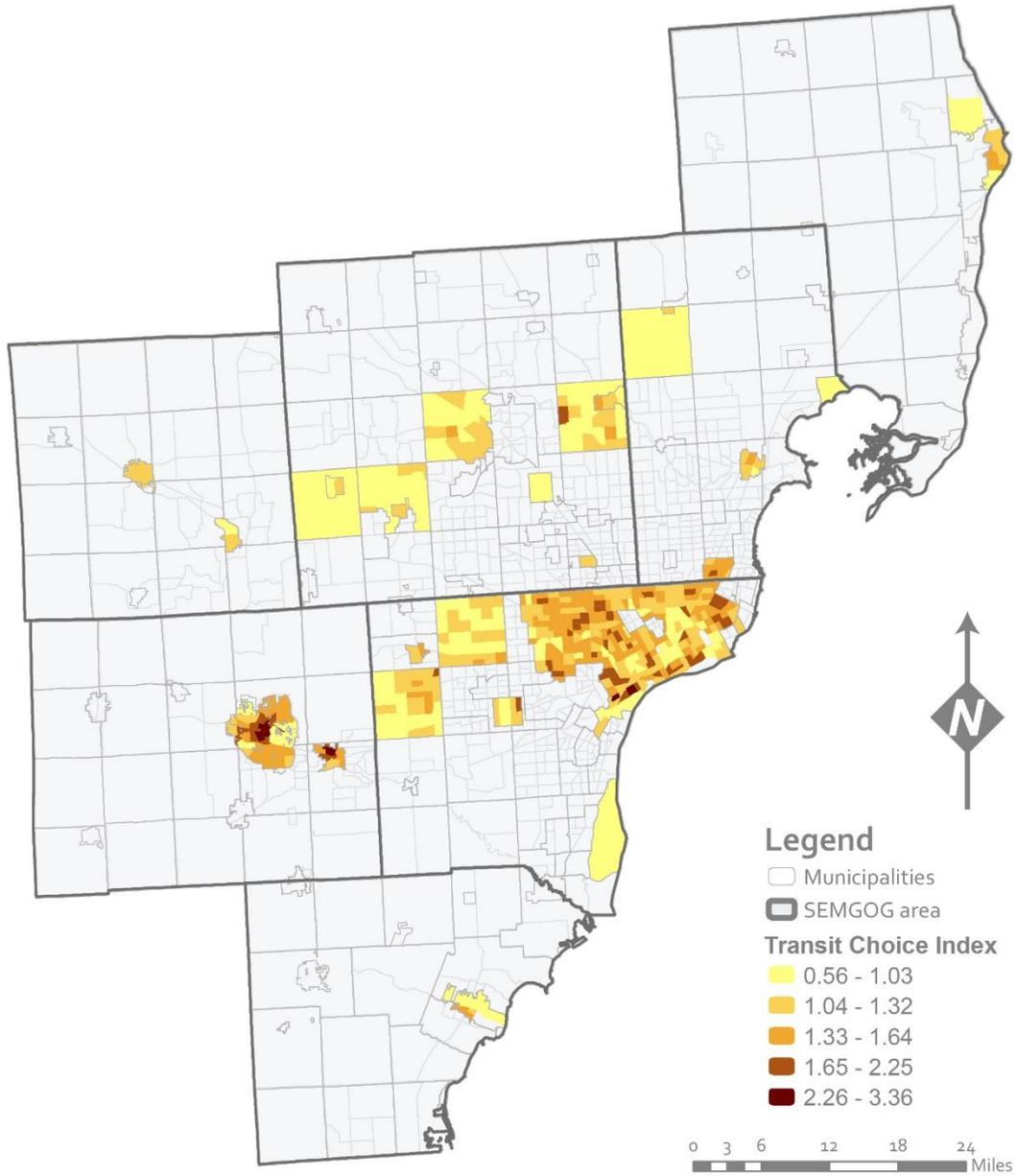
Created by Carolyn Lusch
 Data Sources: American Community Survey 2008-2012 via Social Explorer, tables SE_Too2, SE_Too7, SE_To33, SE_T128, Bo83o3, and B11oo1; Michigan Geographic Data Library, Michigan Geographic Framework Base; SEMGOG.org.

Figure 4: Transit Dependency Index - degree of transit dependency by Census tract, 2008-2012



Created by Yichun Ding
Data Sources: American Community Survey 2008-2012 via Social Explorer, tables SE_To07, SE_To57, B08141; Michigan Geographic Data Library, Michigan Geographic Framework Base; SEMGOG.org.

Figure 5: Transit Choice Index: Likelihood of non-transit-dependent riders choosing transit options by Census tract, 2008-2012



Created by Carolyn Lusch

Data Sources: American Community Survey 2008-2012 via Social Explorer, tables SE_T002, SE_T007, SE_T033, SE_T128, Bo8303, and B11001; Michigan Geographic Data Library, Michigan Geographic Framework Base; SEMGOG.org.

Figure 6: Rate of population with no vehicle ownership by Census tract, 2008-2012

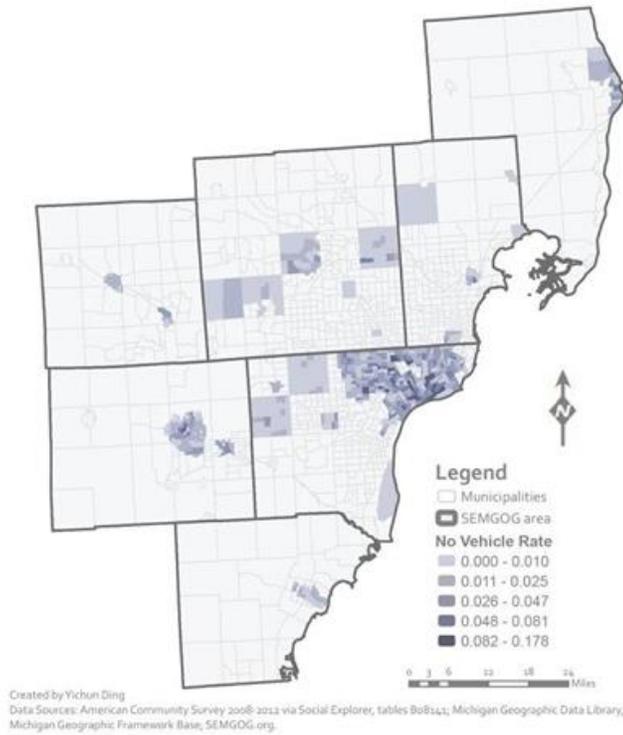


Figure 7: Ratio of the municipalities' median household income to the counties' by Census tract, 2008-2012

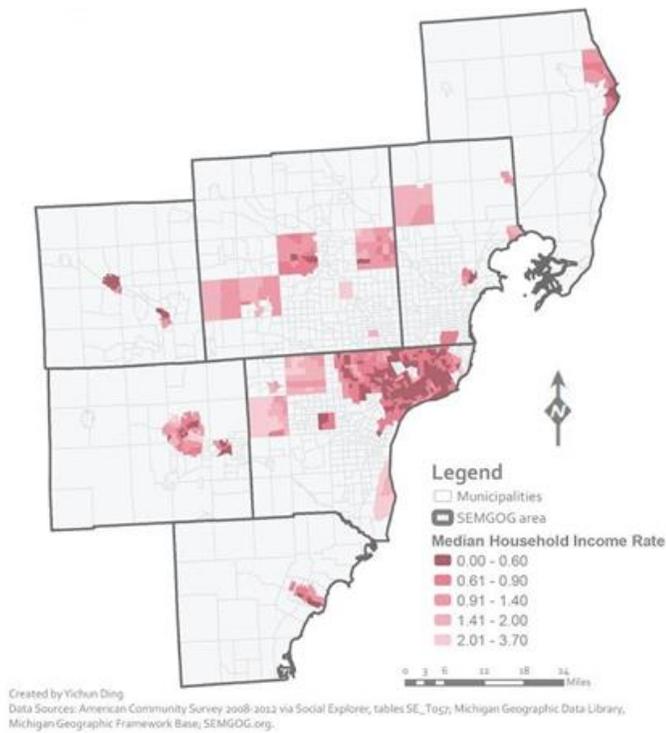


Figure 8: Rate of population under 18 years by Census tract, 2008-2012

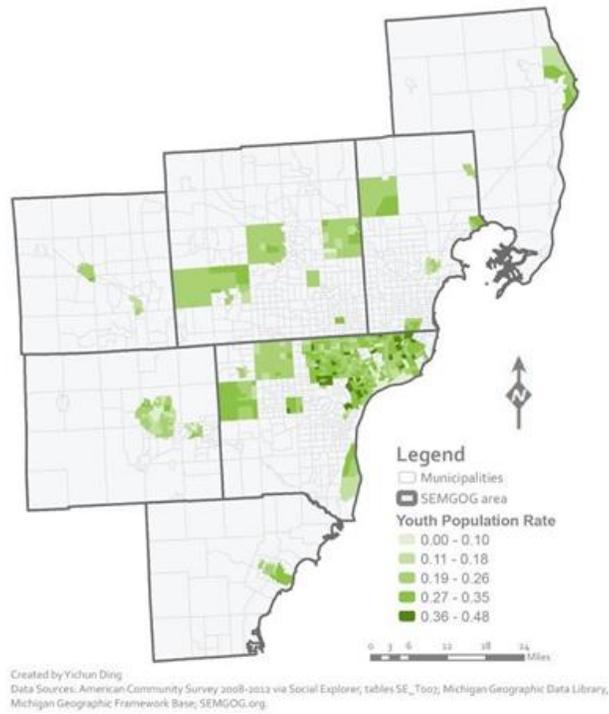


Figure 9: Rate of population over 65 years by Census tract, 2008-2012

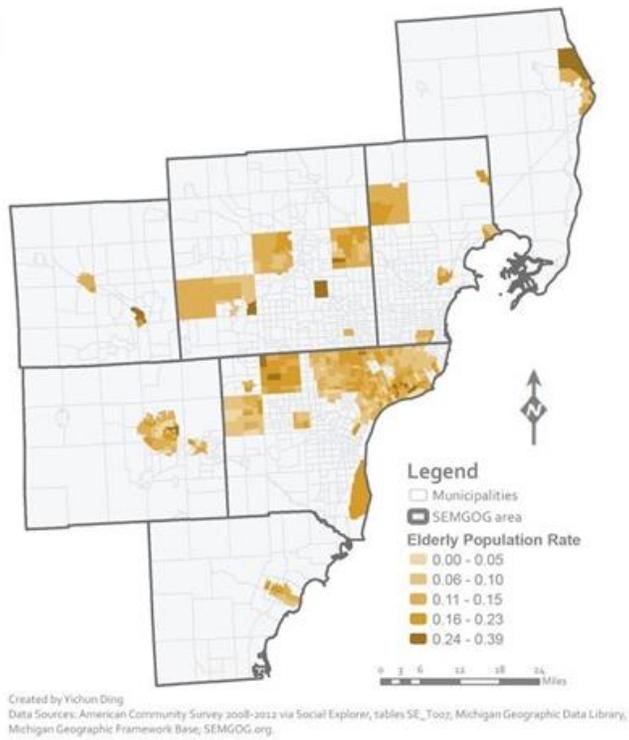


Figure 10: Number of population per square mile by Census tract, 2008-2012

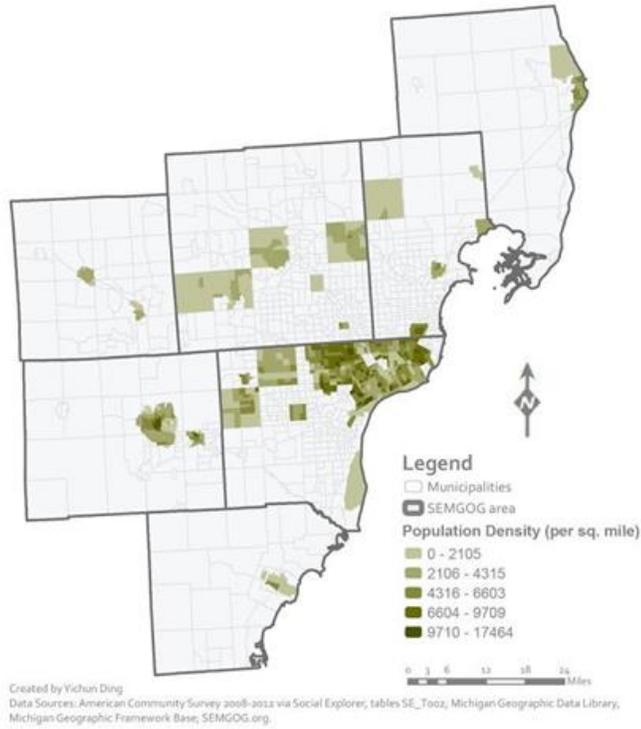


Figure 11: Rate of population 18-35 years old by Census tract, 2008-2012

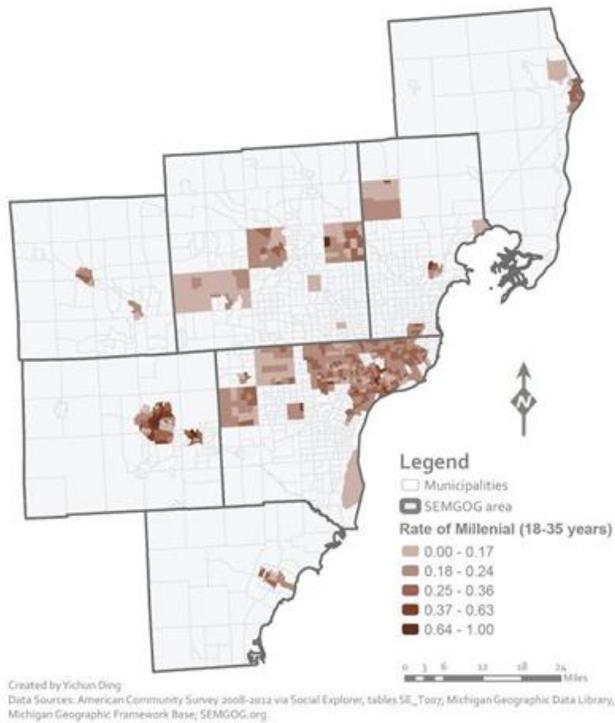


Figure 12: Ratio of population traveling by bus, carpool, or bike by Census tract, 2008-2012

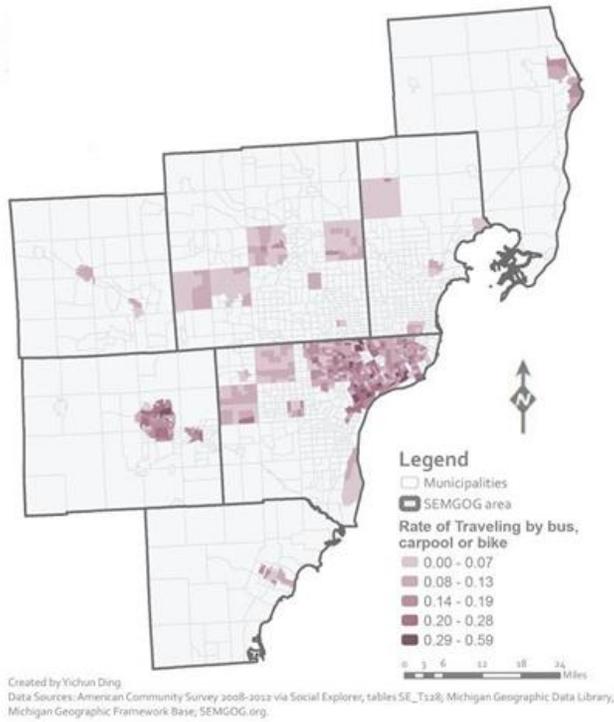


Figure 13: Ratio of population over 16 in labor force by Census tract, 2008-2012

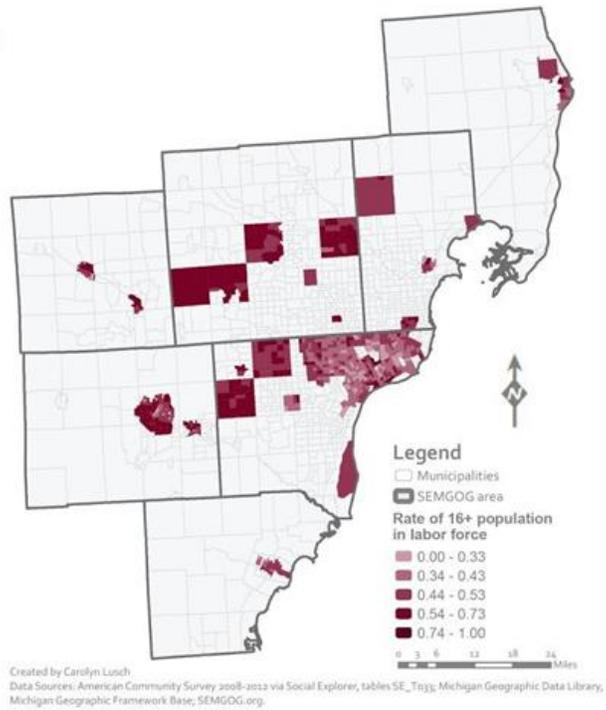
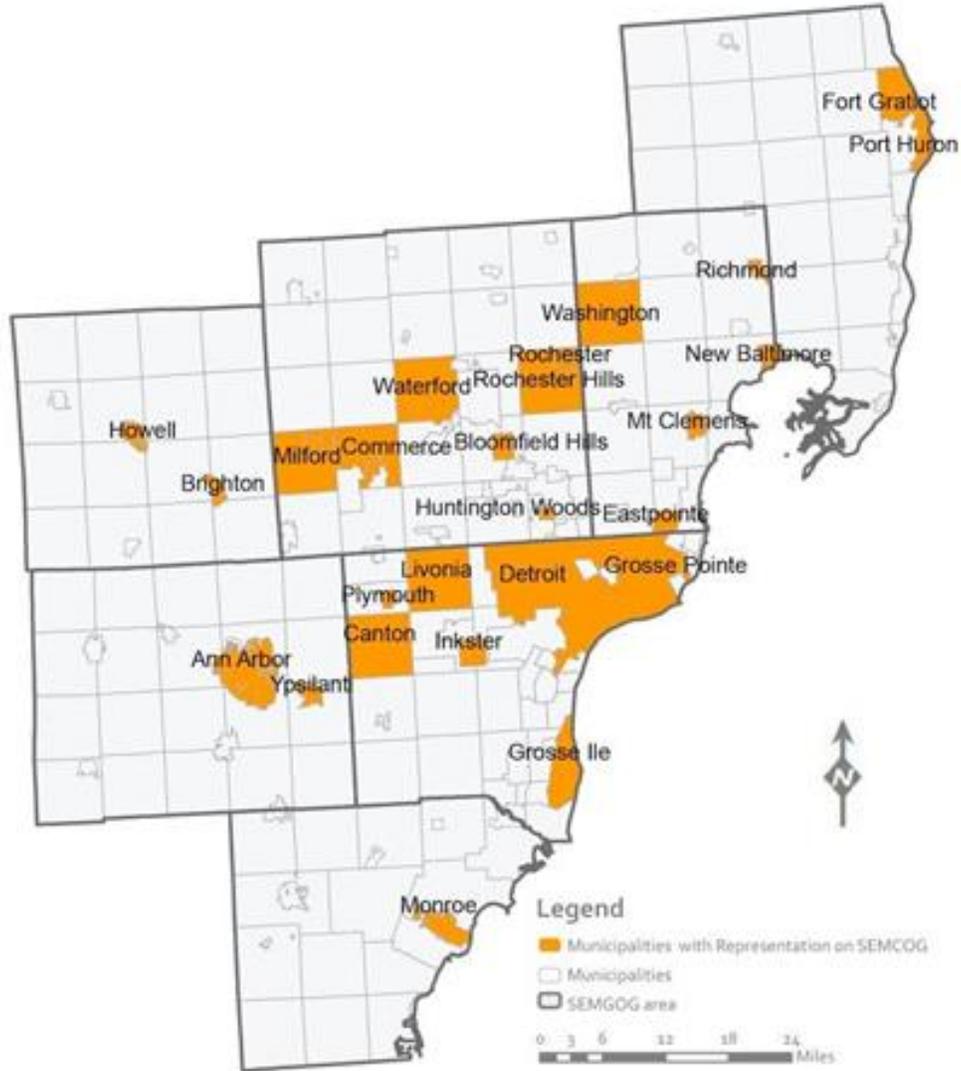
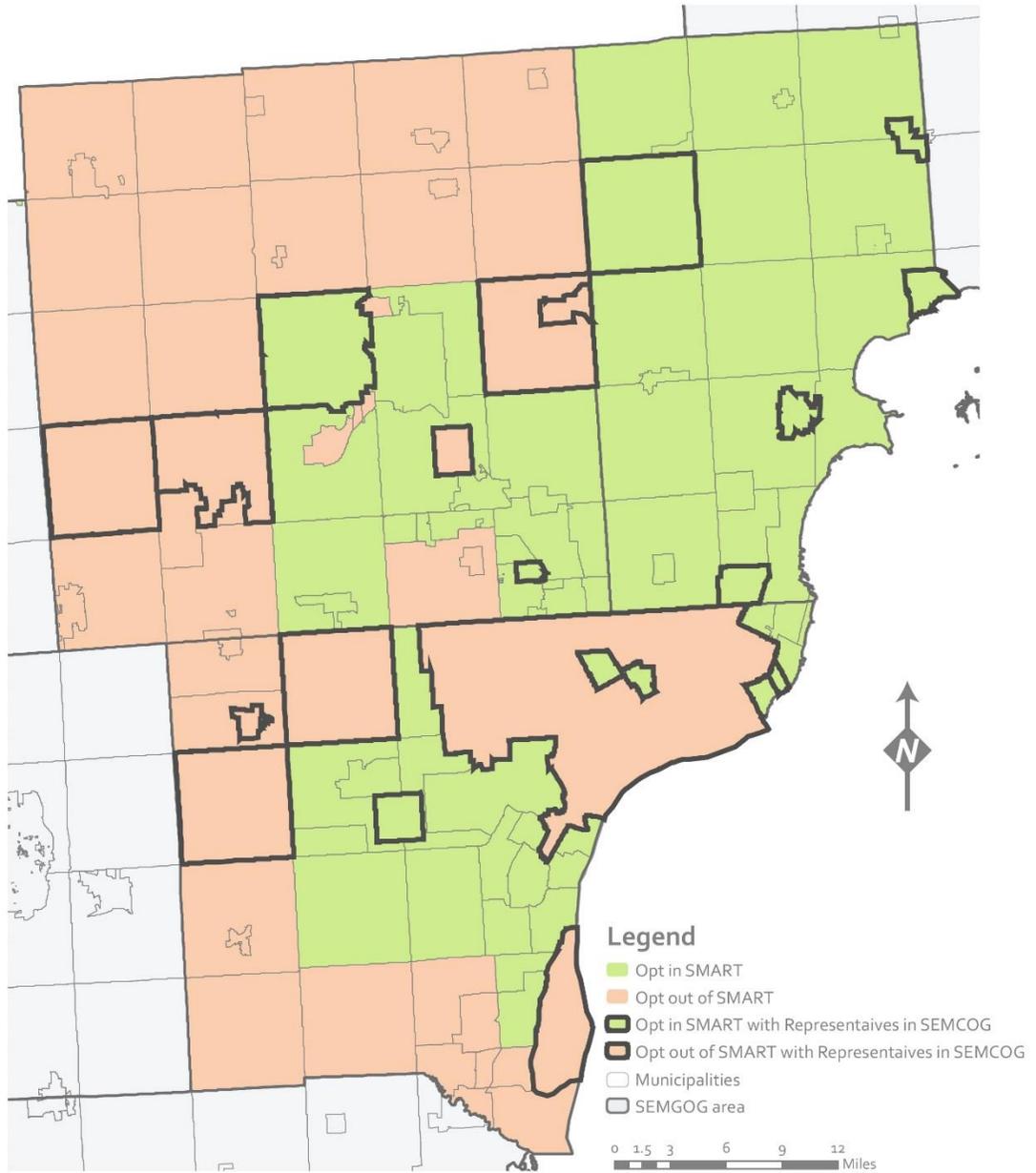


Figure 14: Names of represented municipalities, 2014



Created by Carolyn Lynch
Data Sources: Michigan Geographic Data Library, Michigan Geographic Framework Base, SEMCOG.org

Figure 15: SMART participation in tri-county area and EC representation, 2014



Created by Yichun Ding
Data Sources: Michigan Geographic Data Library, Michigan Geographic Framework Base; SEMGOG.org, <https://www.smartbus.org/Services/Services-By-Community>