Stabilizing and Sustaining: The Economic and Demographic Outlook for Southeast Michigan through 2045
Institute for Research on Labor, Employment, and the Economy

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• Promotes the efficient use of tax dollars for infrastructure investment and governmental effectiveness;

• Develops regional solutions that go beyond the boundaries of individual local governments; and

• Advocates on behalf of Southeast Michigan in Lansing and Washington
Stabilizing and Sustaining:  
The Economic and Demographic Outlook  
for Southeast Michigan through 2045  

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Abstract  
The Southeast Michigan economy has emerged from its most catastrophic period in our lifetime – during  
the first decade of the 2000s, the region lost virtually all of the jobs it had gained during the robust 1990s.  
Since then, the regional economy has picked up and stabilized, recently completing six consecutive years  
of employment growth in 2016, and the unemployment rate has plunged by more than 8 percentage  
points. The region has recovered much of its health, and the near-term outlook is mostly sunny. The  
longer-term outlook is a little foggier. According to our economic and demographic outlook for Southeast  
Michigan through 2045, growth will be sustained, but only at a moderate pace for the region’s population  
and labor market over the next 30 years, much more subdued than what we saw prior to the extended  
downturn. There are a number of challenges on the horizon, not the least of which is the prospect for  
substantial labor shortages – particularly of workers with skills that mesh with the evolving knowledge-  
and information-based economy – spurred by the dramatic aging of the population as the baby-boomer  
generation enters the retirement years. Accelerating growth in the over-65 population and relatively low  
in-migration rates for young adults will put a cap on the region’s ability to expand, compounded by any  
legislation that significantly limits the number of documents to be issued for immigration into the United  
States. It is particularly critical for the region to step up its investment in its human capital, and given the  
local economy’s vulnerability to the vagaries of the auto industry, it is also important to seek out greater  
economic diversification into areas that show promise for future growth and prosperity. The Southeast  
Michigan region has the assets, the wherewithal, and the motivation to get there.

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Introduction

The Southeast Michigan1 economy has emerged from the intensive care unit where it spent a good part of its life in the first decade of the 2000s, departing healthier, wiser, but not necessarily wealthier. From 2000 to 2010, the region lost 372,242 jobs,2 nine of 10 of the gains it had reaped in the robust growth era of the 1990s; its population shrank by 137,375 residents; and its inflation-adjusted (real) personal income per capita retreated from a position 13.7 percent above the U.S. average in 2000 to 4.8 percent below in 2010 (it was 5.6 percent below in its lowest year of 2009). The region’s economic bedrock, the domestic auto industry, fell into serious decline over the period, with the national Great Recession piling on later in the decade. Indeed, four out of nine of the job losses over the 10-year period occurred in one year, 2009. The one thing the area didn’t lose was hope for better health in the days to come, and Southeast Michigan’s resiliency has subsequently been rewarded.

Southeast Michigan’s recovery since 2010 has been inspiring, if not dramatic. The local economy recently completed its sixth consecutive year of employment growth. From 2010 to 2016, we estimate that the region gained back over nine in 10 of the jobs it lost over the prior decade, and it is expected to regain all of them in the next few years. In concert with the employment gains, the unemployment rate plummeted from 13.3 percent in 2010 to 5.1 percent in 2016. Population began growing again in 2012, and real personal income per capita is now about on par with the nation. Underlying this rebound in the regional economy is a U.S. economy that is continuing its moderate recovery and an auto industry that has just completed two years of record sales. And with its fundamentals in place, the regional economy’s near-term outlook seems promising.

When patients leave intensive care, the first goal is to stabilize their health. That is how we would characterize what is transpiring in the local economy, consistent with the dictionary definition of stability: the strength to stand or endure.

After achieving stability, the next stage for good health to is to sustain the recovery, keeping up the momentum in the longer term. Can the region accomplish this? It does have assets and the motivation to create opportunities, but it also has challenges that will loom large in the coming years, not the least of which is the prospect for significant labor shortages and the possibility of legislated limitations on immigration hindering the filling of those slots. Other major issues to be faced are the outlook for the local auto industry, particularly in the era of autonomous vehicles; and the growing need for a more educated and skilled work force. But the darkest cloud on the horizon is the potential fallout from the dramatic aging of the population as the baby-boomer generation enters the retirement years. Aging is a fundamental factor shaping the economy of the future, and it establishes an overarching theme for this report.

In sum, where the Southeast Michigan regional economy goes from here will be determined in part by where the U.S. economy is headed, in part by where the auto industry is headed, and in part by the investments the local community makes, particularly in its human capital, to diversify its economy into areas that show promise for future growth and prosperity, and for which the region has supporting assets.

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1Throughout this report, we use the same definition of Southeast Michigan as does the Southeast Michigan Council of Governments (SEMCOG): Livingston, Macomb, Monroe, Oakland, St. Clair, Washtenaw, and Wayne counties.
2Throughout this report, the employment data are based on the measure published by the U.S. Bureau of Economic Analysis [4], and as such, include the self-employed, farm workers, and military personnel.
But the fundamental driver in determining the longer-term prospects for the region is the demographic trends. These trends are a constraining factor on labor force size and growth, as well as an influence on the extent and distribution of consumer purchases. Triggering the dynamics of the labor force is the changing age structure and the migration patterns of the populace. The impact of the aging of the baby-boomer generation is already beginning to be felt, as the first of the post-World War II babies reached the Social Security Administration’s full retirement age in mid-2012. So, not only does the economy influence some of the labor force trends, such as attracting workers from outside the region when employment opportunities are the magnet, but the demographic movements also shape the composition and forward momentum of the economy. A comprehensive long-term outlook considers the economic and demographic trends in tandem, as we do in this study, with our economic and demographic outlook for the SEMCOG region running through 2045.

Even if we accurately capture the workings of the economy, it is also the case that all forecasts are conditional, that is, they are conditional on the assumptions that guide the results. In this study, we focus on the forecast results that we judge to represent the most likely outcome, which we identify as the baseline forecast. Because we recognize that different outcomes are possible, we also provide five alternative scenarios, two with more pessimistic outcomes than our baseline forecast, and three with more optimistic outcomes. The alternative scenarios reflect events that are plausible, but less likely than the baseline scenario. The two adverse scenarios are based on: (1) a significant reduction in motor vehicle manufacturing activity in Southeast Michigan – less severe than during the 2000 to 2009 period, but a substantial retrenchment nonetheless; and (2) a large reduction in international migration to Southeast Michigan. The three more positive scenarios include: (1) an additional 20,000 jobs in professional services, perhaps in response to the development of autonomous vehicles; (2) training 20,000 local residents as engineers and computer programmers to fill those additional 20,000 slots rather than importing workers into the region to fill the positions; and (3) increasing employment in the finance and insurance industry in Southeast Michigan to match the share of that activity in the Pittsburgh metropolitan area in 2015. The Pittsburgh region is often held up as the standard for regions hard hit by structural change and that are striving for a revitalized economy.3

In the next sections, we discuss our use of an economic model to generate the forecasts for the region, and we provide a schematic outline of the basic demographic and economic relationships. Following that, we discuss recent economic conditions and the inputs underlying the forecast. We then present in detail our baseline economic and demographic forecast for Southeast Michigan, followed by a summary overview of our five alternative forecasts and how they compare with the baseline results. We close with a brief concluding section on our findings.

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3The seven-county Pittsburgh Metropolitan Statistical Area (MSA) includes Allegheny, Armstrong, Beaver, Butler, Fayette, Washington, and Westmoreland counties, with a population in 2015 of 2.353 million.
Method

The forecasts were developed using an economic/demographic model constructed by Regional Economic Models, Inc. (REMI) of Amherst, Massachusetts [2], and adapted by the research team at the University of Michigan. The REMI model has been fully documented and peer-reviewed in the professional literature and can lay claim to be the most widely applied regional economic forecasting and policy analysis tool in the nation. We have been using evolving versions of the REMI model since 1983 to assess projects for several state government agencies in Michigan.

For this study, we were guided by the University of Michigan’s near-term economic forecast for the state, which is used by the administration of the State of Michigan, the House Fiscal Agency, and the Senate Fiscal Agency [1]. We updated economic and demographic information not in the model when it was delivered but that subsequently was released prior to finalizing our forecasts. We also made numerous adjustments to the model based on both our expertise and the comments and insights of members of SEMCOG’s Regional Development Forecast Task Force. Specifically, since no model is able to include all local knowledge on a regional economy, we generated a preliminary set of forecasts in July 2016 and solicited comments. Those comments guided several of the adjustments that contributed to the final set of forecasts summarized in this report.

The REMI model used in this study is a multi-region version that includes all of Michigan’s 83 counties. An economic model was chosen to produce the forecasts for a number of reasons:

- A model imposes a logical consistency and objectivity across counties.
- Its success patterns can be replicated, and forecast errors can be systematically analyzed and corrections introduced.
- The forecasts can be very comprehensive in coverage.
- The forecasts can be generated frequently.
- The model can capture the interactions between demographic and economic forces.
- Sophisticated models can capture trade flows among regions, and thus an area’s responsiveness to activities outside of the area.
- A model does not assume that trends continue indefinitely; unlike extrapolation techniques, a model allows the economy to adjust over time.

Among economic models, the REMI model was selected because of several of its features and credentials:

- It is a state-of-the-art model that has been extensively peer-reviewed in the professional literature.
- It has been field-tested for over 35 years.
- The model is sufficiently comprehensive to incorporate both an economic and a demographic module that interact.
- The model accounts for trade flows among counties.
- It is a very detailed model that captures the dynamic interactions among economic sectors.
- It is used by other government agencies in Michigan.
Schematic Outline of the Demographic and Economic Structure

One advantage of using an economic model to forecast is that it imposes a logical and structural consistency. A model ensures the integrity of certain fundamental relationships that hold true in tracing through the complex interactions of an ever-evolving demography and economy. To give a simple example, the model will not allow an illogical outcome such as a number for total employment that doesn’t match the sum for all the constituent industries. We provide the following schematics to illustrate some of these basic demographic and economic relationships, to serve as a guide as we wind through the details of our forecast inputs and outlook. Pictures also help by highlighting events that can feasibly be changed to achieve a different outcome.

We feature a few basic relationships related to population movements, portrayed in the schematics that follow. In each of them, we use the universal symbol for change ($\Delta$).

As shown in schematic 1, the natural change in the population is the number of births minus the number of deaths in a given period. Both domestic migration and international migration refer to the number of in-migrants minus the number of out-migrants. Domestic migration is defined as movements to or from locations in the United States outside of Southeast Michigan, and international migration is defined as movements to or from foreign countries. This relationship is inviolate, what economists and mathematicians refer to as an identity relationship. That is, these are the only sources of population change, and the arithmetic holds exactly.

![Schematic 1](image)
The next relationship involves the change in the working-age population. Logically, a change in this cohort comprises a change in total population and a change in the proportion of the total population that is of working age. (Underlying the change in the working-age population are changes in the age, race, and gender distribution of that population.) This relationship is set forth in schematic 2.

![Schematic 2]

Changes in the working-age population are important because they are a major potential source of long-run strength (or weakness) in labor force growth. Another source of labor force change is variations in the labor force participation rate, which is defined as a proportion of current residents who are either working or actively seeking work. Labor force participation can vary considerably across age, race, and gender cohorts in the population. For example, the participation rates of persons aged 16 to 24, or 65 and older, tend to be much lower than the cohort aged 25 to 64 – which is why the size of the 25-64 group is critical to labor force availability. The same is true for race and gender, manifested in different ways. The relationships underlying change in the labor force are represented pictorially as follows:

![Schematic 3]
The labor force is the link between population and the labor market. The labor force consists of the employed and the unemployed, where the unemployed are defined as only those actively seeking employment. Expressed in terms of employment change, the identity relationship is:

\[
\Delta \text{ in labor force} = \Delta \text{ in employed} - \Delta \text{ in unemployed}
\]

These schematics can be used to trace through the interactions and implications of our forecast results. For instance, the question has been raised of where the supply of workers will come from to meet an increase in demand. Additional workers could come from the unemployed, an increase in the labor force participation rate, or an increase in the working-age population. If over the longer term, unemployment and participation settle in at fairly stable rates, workforce gains would largely need to come from increases in the working-age population, which in turn would derive from young residents becoming of working age or from net in-migration. Are these promising sources of labor? We will address that question later. For now, we simply observe that the flows underlying the schematics establish what sets the limits on workforce supply in the region, regardless of the demand for workers. That demand would be determined by the state of the economy, which in turn will affect demographics such as population migration rates and labor force participation rates.
Recent Economic Conditions

The structure of the model, with its embedded mapping of the dynamic movements of the economy and underlying response rates, is a key determinant of the forecast results presented in this study. The results are also influenced by two additional elements: current economic conditions and assumptions incorporated into the model.

The first of the key elements influencing the forecast outcomes is recent and current conditions in the regional economy. This establishes the jumping-off point for the forecast. Obviously, where the economy is headed over the next few years is influenced by how it is performing currently. In this regard, the news is steadily improving.

Indeed, the SEMCOG region has now regained the vast majority of the jobs lost from 2000 to 2010, the worst economic crisis in our lifetime. Over that decade, Southeast Michigan lost a shocking 326,704 jobs (based on the BEA measure). Since 2010, the region has regained 267,828 of those jobs, leaving the region 58,876 jobs, or 18 percent, short of its historical peak in jobs achieved in 2000. But there is more to the story. In terms of wage and salary jobs, in 2015 the region is still 295,481 short of 2000 levels. The more favorable profile in terms of total employment stems from the addition of 236,605 self-employed/proprietor jobs since 2010.

The average wage and salary job, where the employer pays one-half of the social security tax, tends to pay much better than the average self-employment job. In 2015, the average wage and salary job in the region paid $55,755 plus an additional $11,916 in employer-paid benefits, including the employer’s share of social security taxes. Thus, the total compensation for an average wage and salary worker was $67,671 ($55,755 + $11,916) in 2015. In contrast, the average earnings for a proprietor in 2015 amounted to only $27,575. As workers in Southeast Michigan have shifted from wage and salary jobs to self-employment, they have faced a substantial drop in their income.4

Now for the better news: Southeast Michigan is coming closer to full employment, and while that will make it difficult to achieve substantial additional job gains, inflation-adjusted earnings are beginning to increase. Adjusted for inflation, the average wage in the SEMCOG region increased by 3.1 percent in 2015, and now slightly exceeds its peak in 2004.5 How employment and real income are projected to grow over the next 30 years is a primary focus in the rest of this report.

4Some example occupations that include a large share of self-employed workers include real estate agents, barbers, truck drivers, and farmers, as well as taxi and Uber drivers. After deduction of expenses, some of these jobs report negative income on their business tax return.

5Average real compensation increased by 3.0 percent in 2015. Average inflation-adjusted earnings per proprietor grew by 1.3 percent. These data are adjusted for inflation using the U.S. Personal Consumption Expenditure Deflator.
Inputs to the Forecast

The second of the key elements influencing the forecast outcomes is the series of assumptions that serve as inputs to the model. Even if we accurately capture the workings of the regional economy, it is also the case that all forecasts are conditional on the assumptions that guide the results. In the case of regional forecasts, many or most of the inputs take the form of assumptions involving the future path of the national population and economy. In the REMI model, some of the features of the U.S. forecast are fixed in the program; consequently, in some instances we have made direct adjustments to the local-area forecasts.

In the rest of this section, we touch on several of the overarching assumptions on the national demography and economy.

Inputs Related to the Demographics

First, we consider the demographic profile, starting with the age structure of the population. As shown in schematic 3 above, one of the factors influencing the growth of the labor force in the long term is changes in the working-age population. (In addition to setting some limits on the growth of the labor force, the changing age structure is also an important influence on the distribution of consumer purchases across goods and services, which we will discuss later.)

The current age structure of the U.S. population, as well as the past and projected future age distribution, is shown in Figure 1. Between 1990 and 2010, there was a very sharp increase nationally in the older working-age population, those aged 45 to 64. This age group’s share of the population increased from 18.6 percent to 26.4 percent, while the younger population groups saw a significant decline in their population share. During that same period, the share of the population aged 65 and older remained relatively stable, rising from 12.5 percent to 13.1 percent. That is beginning to change.

Figure 1
The impact in the United States of the aging of the baby-boomer generation is already beginning to be felt. The share of the population aged 65 and older rose to 14.9 percent in 2015 and is forecast to jump to 22.0 percent by 2045. To put this in perspective, people 65 and older currently account for 19.4 percent of the population in Florida, a state known for its concentration of retirees. The share of the other age cohorts will decline, with the greatest decline occurring in the 0 to 24 age group.

How does the age distribution of the U.S. population compare in 2015 with that of Southeast Michigan? That can be seen by comparing the age distribution of the United States population in Figure 1 with that of the SEMCOG region in Figure 2. The SEMCOG region currently has a disproportionately large share of baby boomers, as shown in Figure 2. People aged 45 to 64 account for 28.4 percent of the SEMCOG region’s population, compared with 26.2 percent nationally. The share of the population 65 and older is similar in the region and the nation, 14.8 percent and 14.9 percent, respectively. In comparison, the younger age cohorts, that is, those under 45, constitute a smaller share in the region than in the nation. Those aged 25 to 44 account for only 24.9 percent of the region’s population compared with 26.4 percent nationally; and those under 25 make up 31.9 percent of the region’s population compared with 32.6 percent nationally. As will be shown below, the implication is that the share of the over-65-year-old population will grow more dramatically going forward in the SEMCOG region than in the nation.

Figure 2

[Bar chart showing age distribution for 1990, 2010, and 2015]

Inputs Related to the Economy

The most comprehensive measure of output for the U.S. economy is inflation-adjusted (real) Gross Domestic Product (GDP), that is, the value of all goods, services, and structures produced in the economy. Real GDP can be broken out into subcomponents, which are expected to grow at different rates over the forecast period. The changing shares of these subcomponents over time have direct implications for the SEMCOG region forecast. We will focus on three of these subcomponents, shown in Figure 3.
The consumer services share of national output increases steadily over the forecast horizon, reflecting a movement toward a more service-oriented, information-based economy. The dramatic aging of the U.S. population accelerates this trend, especially the increase in the population aged 75 years and older, particularly with an increasing diversion of spending toward health care services. The proportion of real GDP accounted for by consumer expenditures on health care services declined between 1990 and 2000, from 9.9 percent to 9.7 percent. The share of GDP going to health care then began increasing, reaching 11.4 percent in 2015. We are forecasting that the share will increase by an additional 2.9 percentage points between 2015 and 2045, reaching 14.3 percent of real GDP. The expanding demand for services is less subject to global competition in much of the service-producing economy compared with the goods-producing economy. The increase in demand for services supports growth in service employment; this is dampened somewhat by an increase in productivity, but less so than what occurs in the goods-producing economy.

America’s trade deficit (the excess of imports over exports) deteriorated sharply between 1995 and 2005, as the reduction in real GDP from net exports went from 1.0 percent to 5.5 percent. American consumers went on a spending spree that drove the saving rate to nearly zero. As these excesses began to correct, helped along by the Great Recession, the saving rate was sent back up and the trade deficit retreated, reducing real GDP by a smaller 2.7 percent by 2013. As the economy recovers, the trade deficit increases once again, reducing real GDP by 4.3 percent by 2018. The trade deficit then begins to improve slowly, reducing real GDP by 2.8 percent by 2045. This improvement in the trade account would be favorable for Southeast Michigan and its exporting activities.

The auto industry benefited greatly from the consumer spending boom. Consumer spending on motor vehicles and parts grew from 2.1 percent of real GDP in 1990 to 3.0 percent in 2003. Its share then slipped to 2.6 percent of real GDP in 2007, and collapsed to 2.2 percent in 2009-11. Consumer spending on motor vehicles and parts recovered to around 2.6 percent of real GDP by 2015, where we expect it to remain through 2023. We are forecasting consumer spending on autos as a share of real GDP to decline

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6The Great Recession was a severe global economic downturn sparked by the late-2000s financial crisis. In the United States, the recession began officially in December 2007, with the trough month for business activity pegged as June 2009. Peak to trough, output fell 4.2 percent, and the subsequent pace of recovery was atypically slow.
slowly after that, reaching 2.4 percent in 2045. Given Southeast Michigan’s heavy dependence on the manufacture of motor vehicles, any shift away from spending on the region’s dominant product would have adverse consequences for the local economy.

Our current forecast is based upon motor-vehicle production and consumer purchasing of motor vehicles continuing to behave as they have throughout their history, accounting for the business cycle and the trend shift toward consumers purchasing more services, such as health care. The advent of autonomous vehicles, however, could have a dramatic effect on the level of sales. Vehicle sales could well increase as they become more technologically advanced and embody even more consumer activities. Then again, consumers could reduce vehicle purchases in large quantities, opting instead to rent an autonomous vehicle whenever they need to travel by land.

As shown in Figure 4, U.S. sales of light vehicles by the Detroit Three peaked in 1999 at 11.5 million units, and then declined systematically thereafter until 2009, when sales hit bottom at 4.5 million units. Total employment in the SEMCOG region, highly correlated with Detroit Three sales, followed suit with a collapse of its own. Through 2005, the plummet in Detroit Three sales was almost solely due to a rapid decline in market share, which shrank from 68.2 percent in 1999 to 56.1 percent in 2005, as shown in Figure 5. By the second half of the decade of the 2000s, total sales were in decline as well, and that augmented the negative effects of a still-declining market share, which fell to 43.2 percent by 2009.

Figure 4
Detroit Three Light Vehicle Sales, 1996-2016

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7Light vehicles include cars, minivans, sport utility vehicles (SUVs), crossovers (CUVs), and pickup trucks.
Possibly the best single statistic to answer the “why” question on the retrenchment of the local economy is found in the market share numbers, along with data on the still-heavy concentration of the auto industry in Southeast Michigan. The rebound in Detroit Three sales following the low point of 4.5 million units in 2009 to 7.5-7.6 million units in 2015-16 coincides with record annual sales of total U.S. light vehicles and with an improving regional economy. We see the Detroit Three sustaining sales in the range of 7.5-7.6 million units for most of the rest of this decade.

The revival in Detroit Three sales bodes well for the region’s near-term outlook. In the longer term, we don’t view autos as a growth industry, but past evidence shows that the local economy can expand so long as there is stability in the auto sector, at least in an output sense. The prospects for employment in the auto industry, and in manufacturing in general, are less favorable in our view, as we expect fairly robust long-term productivity growth over time.

We now turn to a detailed analysis of our baseline economic and demographic forecast for Southeast Michigan.
Forecast for the SEMCOG Region through 2045

Current conditions locally, as well as anticipated future trends nationally, portend moderate growth for Southeast Michigan’s population and labor market over the next 30 years. We should recognize from the outset that long-term forecasts are intended to identify economic trends, not to predict movements in the business cycle. These forecasts are also unable to capture major one-time events for which there is no prior knowledge, such as a terrorist attack or an oil embargo.

With these caveats in mind, we now review the headline items for our regional forecast.

**Real GDP**

In the United States as a whole, the average annual growth in real GDP is forecast to slow from 2.3 percent between 1990 and 2015 to 1.9 percent between 2015 and 2045, as shown in Figure 6. In contrast, real GDP in Southeast Michigan accelerates from 1.3 percent per year between 1990 and 2015 to 2.0 percent per year between 2015 and 2045. This acceleration in growth reflects the bounce-back from the weak performance of the local manufacturing sector, and especially motor vehicle manufacturing, during the first decade of the 2000s, as Southeast Michigan then gains an increasing share of U.S. manufacturing output.

![Figure 6](image)

**Average Annual Growth in Real GDP, United States vs. SEMCOG Region**

In Southeast Michigan, real GDP in manufacturing is forecast to grow by 2.1 percent per year between 2015 and 2045 (Figure 7), while real GDP in motor vehicle manufacturing grows by 2.0 percent per year (Figure 8). Output in both of these sectors is expected to grow faster in the SEMCOG region than it does nationally over the next 30 years, a significant reversal from the prior quarter-century when the region’s manufacturing sector and auto industry lost ground to the rest of the United States. As noted previously, much of the relatively weak performance in the past resulted from a loss of market share by the Detroit Three between 1996 and 2009, which we don’t expect to continue in the future.
Figure 7
Average Annual Growth in Real GDP, United States vs. SEMCOG Region, Manufacturing

Figure 8
Average Annual Growth in Real GDP, United States vs. SEMCOG Region, Motor Vehicle Manufacturing
Population

We consider first our forecast of Southeast Michigan’s total population trajectory, which is central to the speed limits imposed on the region’s employment growth in the long run. The path of total population in the SEMCOG region from 1990 to 2045 is shown in Figure 9. Data from 1990 to 2015 are provided by the U.S. Bureau of the Census [3], and the extension through 2045 is generated by our forecast.

Figure 9
SEMCOG Population, 1990-2045

The region’s population grew between 1990 and 2001 at an average rate of 0.49 percent per year. Between 2001 and 2011 it declined 0.31 percent per year. Population started growing again in 2012, and this growth is expected to continue through 2045. By 2027 the SEMCOG region’s population exceeds its 2001 peak of 4.849 million, and by 2045 it reaches almost 5.105 million.
Population growth in the United States after 2015 will be only about half what it was between 1990 and 2000, as shown in Figure 10. Population growth in Southeast Michigan post-2015 will be weaker than that, growing about 0.26 percent per year over the next 30 years.

Figure 10
Average Annual Change in Population, United States and SEMCOG Region, 1990-2045
So, what underlies this slow growth in Southeast Michigan’s population post-2015? The impetus behind these movements in population is shown in Figure 11, which breaks out the total change in population per year into its primary components: natural change (births minus deaths) and net migration (the number of in-migrants minus the number of out-migrants). Total migration consists of domestic migration (movements to or from locations in the United States outside of Southeast Michigan) and international migration (movements to or from foreign countries).

Figure 11
Components of Population Change in the SEMCOG Region, Average per Year

During the prosperous 1990s, Southeast Michigan’s population increased by 24,422 residents per year, as the annual excess of births over deaths (29,361) and net gains in international migrants (8,801) more than made up for a net loss in domestic migrants (13,739). Between 2000 and 2010, however, the region lost an average of 13,758 people per year, a combination of large domestic out-migration (45,954) reflecting the dismal economy; a slightly higher net international migration (11,347); and smaller natural increases (20,850).

With the economic recovery after 2010, population growth turns positive with a small annual gain from 2010 to 2015 (4,455), due to less domestic out-migration (19,938 per year). Domestic out-migration continues during the forecast period, but at a declining rate, and the rate of international in-migration continues to increase moderately. These improvements are countered by consistently shrinking additions in natural growth as the population ages, resulting in the relatively modest growth in total population that we are forecasting. In fact, by 2040 the number of deaths each year exceeds the number of births.

Without international migration, SEMCOG’s population would not have resumed growing in 2012. Furthermore, without international migration the region’s population would be continually declining throughout the forecast period, which would lead to a weaker employment profile as well.

Underlying many of the population trends overall is the dramatic aging of the population over the next 30 years. This is the case for the United States as a whole, but Southeast Michigan also has a greater
proportion of baby boomers than the nation. As shown in Figure 12, the number of Southeast Michigan residents aged 24 and younger is expected to decline by 108,408 between 2015 and 2045, and the population aged 25 to 64 increases by only 27,348. In contrast, the region’s population aged 65 and older grows by 463,329 over this period. And much of this growth occurs in the population aged 85 and older, which increases by 145 percent.

Figure 12
Population Change by Age Group in the SEMCOG Region, 2015-2045
Another cut of the data is shown in Figure 13. The share of the population aged 65 to 84 in Southeast Michigan is forecast to increase from 12.6 percent in 2015 to 17.9 percent in 2045, and the population 85 or older increases from 2.1 percent in 2015 to 4.8 percent over the same period. Correspondingly, the share of the population in cohorts under 65 shrinks. For example, the prime-working-age population cohort, those aged 25 to 64, is expected to shrink from 53.3 percent of the region’s population to 49.9 percent between 2015 and 2045. For a statistic where a one-percentage-point change is notable, this represents a dramatic transformation in the age distribution of the region’s population. The components contributing to sluggish population growth among the working-age population – the relatively low rate of in-migration of young adults and the aging of a disproportionately large share of the population into the typical retirement years – will put an increasing strain on the supply of available labor in Southeast Michigan.

Figure 13
Population Distribution by Age Group in the SEMCOG Region, 2015 and 2045

The strain on the supply of labor in Southeast Michigan will be particularly acute during the next 13 years. Between 2017 and 2030, the population aged 25 to 64 in the SEMCOG region is forecast to decline by 65,025, making it increasingly difficult for employers to find workers.
As noted previously (Figure 2), Southeast Michigan currently has a disproportionately large share of baby boomers, and this cohort is moving into senior citizen status. Along with the expected continuation of net domestic out-migration, this means that the region will become older than the nation. In 2015, 14.8 percent of the region’s population was 65 and older compared with 14.9 percent in the nation, but by 2045, 22.7 percent of Southeast Michigan’s population will be 65 or older, compared with 22.0 percent nationwide (Figure 14). Furthermore, by 2045 only 24.6 percent of Southeast Michigan’s population will be young, working-age adults (those aged 25 to 44) compared with 25.0 percent nationally. The largest discrepancy in 2045 between the SEMCOG region and the nation is in the share of the population under 25: 27.4 percent in Southeast Michigan compared with 28.6 percent in the United States.

Figure 14
Population Distribution by Age Categories, SEMCOG vs. United States, 2045

These demographic trends have an important influence on economic trends, as we’ll now see.
Employment

Our forecast of total employment for the SEMCOG region through 2045 is shown in Figure 15. Data from 1990 to 2015 are from the U.S. Bureau of Economic Analysis (BEA) [4], and the extension through 2045 is our forecast. Between 2000 and 2010, Southeast Michigan lost 326,704 jobs; between 2010 and 2015, the region regained 82 percent of that loss. We expect that strong employment growth will continue through 2018, when Southeast Michigan slightly exceeds 2000 employment levels. Employment then remains virtually flat through 2030, adding less than 2,000 jobs between 2018 and 2023, followed by a loss of about 15,000 jobs between 2023 and 2030. As noted previously, this corresponds with an absolute decline in the prime-working-age population. After 2030, employment in the region increases slowly, at about one-quarter of a percentage point per year, as the prime-working-age population begins to grow again. The region’s total employment in 2045 is a little under 2.96 million.

Figure 15
SEMCOG Region Employment, 1990-2045

As mentioned, we measure employment using the BEA employment statistic, which includes self-employed, farm, and military employees who are excluded from the better known Bureau of Labor Statistics (BLS) wage and salary measures [5]. Because of these additional employee categories, the BEA total employment measure is greater than the wage and salary employment measures. In 2015, total employment measured by the BEA in the SEMCOG region was 2,791,823 and wage and salary employment also measured by the BEA was 2,203,557. The availability of different measures of employment can be confusing, but what is most important is that they generally tend to move in the same direction and with the same order of magnitude. For example, between 1990 and 2000, BEA showed total employment in Southeast Michigan increasing by 15.0 percent, and wage and salary employment by 14.3 percent.
From 2000 to 2010, however, there was a notable difference in employment change as measured by different statistics, as seen in Figure 16. In this time interval, employment in the SEMCOG region declined by 11.5 percent according to the BEA total employment measure compared with a decline of 20.4 percent in the BEA wage and salary measure. The reason for this discrepancy is that the number of self-employed or proprietors actually grew by 183,282, or 52.1 percent. Consequently, the ensuing job gains between 2010 and 2015 leave total BEA employment in 2015 only 58,876 jobs short of its 2000 peak in Southeast Michigan, whereas wage and salary employment was 295,481 jobs short of its 2000 peak.

Figure 16
Change in Employment in SEMCOG Region by Category, 1990-2015

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8The number of self-employed (proprietors) in the United States also increased sharply between 2000 and 2010 (35.1 percent) even as the number of wage and salary workers declined, although much less so than in Southeast Michigan. The BEA count of proprietors is based upon the Internal Revenue Service count of individuals filing business tax returns.
As shown in Figure 17, BEA total employment in Southeast Michigan is forecast to grow, on average, only 0.1 percent per year between 2015 and 2030, and all of those gains occur between 2015 and 2018. Note that the United States is also forecast to see very modest employment gains over this period, averaging only 0.2 percent per year.

Figure 17
Average Annual Change in Employment, United States and SEMCOG Region. 1990-2045

Employment growth accelerates after 2030 in both the SEMCOG region and the nation, by 0.8 percent per year in the United States between 2030 and 2045, and by 0.3 percent per year in Southeast Michigan. With respect to the United States, these employment gains are more typical of what the country saw between 2000 and 2010 than what has occurred since the end of the Great Recession or during the 1990s. In Southeast Michigan, employment change will be positive, unlike during the 2000 to 2010 period, but much weaker than in the 2010 to 2015 period or during the 1990s. Local employment growth is slower than in the nation because of slower population growth.
The future path of employment in the region is, of course, the net result of the outlooks for the industries that make up the local economy. Over the entire period 2015 to 2045, total employment is forecast to grow by an average of 0.21 percent per year in the SEMCOG region, as shown in Figure 18, but there is a wide variation in the performance of the constituent industries. The strongest growth is in the private education and health services industry category, dominated by the health care segment and expected to expand at a rate of 0.79 percent per year. This industry has been the most robust over the recent past, including the difficult decade of the 2000s. Since we are on the threshold of a surge in the number of people reaching retirement age, the longer-term prospects are very favorable as well.

Figure 18
Change in Employment in SEMCOG Region, 2015-2045

The major knowledge economy service industries (information, finance and insurance, professional services, and company management) also have comparatively rapid employment growth of 0.59 percent per year from 2015 to 2045. Administrative support services, which includes the very rapidly growing temporary help services industry, is expected to expand at a pace of 0.55 percent per year.

Over the next 30 years, a rapidly growing senior population will propel relatively brisk employment growth in leisure and hospitality services (0.36 percent per year), which includes arts and recreation, accommodations, and eating and drinking places.

At the other end of the spectrum is manufacturing, where employment is forecast to decline on average by 1.04 percent per year. This does not mean that the output of local manufacturing firms will decline; indeed, we are forecasting an increase in manufacturing output averaging 2.1 percent per year from 2015

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9The manufacturing industry only includes jobs at production facilities. White-collar jobs in pre-production, including research, development, design, and other engineering functions, are classified as professional services in our data from the federal government. Likewise, those at corporate headquarters are designated as headquarters employees. This is the case even if the employer is a manufacturing firm such as General Motors or Ford.
to 2045. But because productivity growth in manufacturing is relatively high, employment declines despite the expansion of output.

Employment also declines in retail trade over the next 30 years. We expect that brick-and-mortar jobs will continue to be negatively affected by the growth in Internet shopping, along with evolving labor-saving technology (for example, self-service checkouts), and the trend away from labor-intensive stores and toward discount stores and warehouse clubs.

Natural resources, which includes farming, forestry, fishing, and mining, is forecast to lose jobs over the next 30 years.

Employment in government grows over that same period, but at a slower-than-average rate of 0.12 percent per year.

**Income**

Income is another important dimension of Southeast Michigan’s economic profile. Inflation-adjusted (real) personal income per capita is generally regarded by economists as the best single measure of economic well-being for a region. The standard of living for a region can rise even with sluggish employment growth if the incomes of residents are rising sufficiently. Growth in real personal income per capita (2016$) for the SEMCOG region and the United States is shown in Figure 19.

Figure 19
**Average Annual Growth in Real Personal Income Per Capita, United States vs. SEMCOG Region**

Growth in real income per capita in the United States is forecast to slow from 1.7 percent per year recorded between 1990 and 2015, to 1.3 percent per year between 2015 and 2045, as shown in Figure 19. In Southeast Michigan, however, real income per capita grows at a faster pace between 2015 and 2045 (1.5 percent per year) than it did between 1990 and 2015 (1.3 percent per year).

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10The measure is adjusted for inflation using the Personal Consumption Expenditure Deflator for the United States and the local version of this measure for states and counties, which is embodied in the REMI model.
Average real earnings per worker in the SEMCOG region are forecast to grow by 1.4 percent per year between 2015 and 2045, as shown in Figure 20. This represents a substantial improvement in earnings growth compared with the 1990 to 2015 period, when earnings were growing at only one-half this rate. As with real income per capita, real earnings per worker grow at a slightly faster pace in Southeast Michigan than in the United States overall from 2015 to 2045.

Figure 20
Average Annual Growth in Real Earnings per Worker, U.S. vs. SEMCOG Region
Personal income per capita in the SEMCOG region has historically been substantially higher than in the United States overall. In 2000, personal income per capita in the SEMCOG region was 13.7 percent higher than it was in the United States (Figure 21). The Detroit Three auto-centered economy then collapsed, and by 2009, personal income per capita in Southeast Michigan was 5.6 percent below the national average (an index reading of 94.4 in Figure 21). During the ensuing recovery from the Great Recession, the local economy outperformed the national economy, so that by 2015, personal income per capita in the SEMCOG region rose to an index reading of 98.2 (we are projecting that in 2016 it gets back to an index value of 99.9, essentially on par with the nation).

Through the first 18 years of our forecast, local growth in personal income per capita continues to outpace the nation. By 2033, local income per capita exceeds that of the nation by 5.6 percent (an index value of 105.6 in Figure 21). In the next 12 years, growth in income per capita is slightly stronger in the nation, so that by 2045, personal income per capita in Southeast Michigan exceeds that of the United States by a smaller margin, 3.7 percent (an index value of 103.7).

Despite these gains, personal income per capita in Southeast Michigan relative to that of the country does not return to its 2000 peak over the forecast horizon, or to any value reached in the 1990s. It appears that the retrenchment in Southeast Michigan during the first decade of the 2000s lowered the region’s standard of living relative to the nation for the lifetime of the current generation.

The baseline forecast we have reviewed in this section is our best estimate of where Southeast Michigan goes from here if current trends continue. The prospects for the regional economy would be less favorable if the auto situation turns uglier or if it was unable to attract international migrants to meet its labor force needs. Prospects would be more favorable if the region were able to expand the local white-collar auto industry even more than we anticipate in our baseline forecast, or if the region were able to emulate Pittsburgh’s experience in developing a robust finance sector. To understand more fully the implications of these possibilities, we have generated five alternative scenarios to our baseline forecast, and we turn to that analysis now.
Alternative Forecast Scenarios

In choosing alternative scenarios to the baseline forecast, we selected five possible developments that could alter the outlook for the region in a meaningful way. As such, these alternative scenarios do not represent outcomes that we judge to be most likely – the baseline forecast does that – but they do explore possibilities we judge to be feasible if some of our assumptions are off the mark. Another qualifier: the five scenarios should not be interpreted as confidence intervals, or likelihood brackets, around our baseline forecast. They are simply as advertised: alternative scenarios based on a modified set of assumptions. Figures 22 and 23 and Tables 8 and 9 present a summary of the alternative forecast scenarios.

Alternative Scenario 1: Regional Auto Industry Takes Another Big Hit

We estimate that in 2000 the SEMCOG region accounted for 17.1 percent of motor vehicle manufacturing employment in the United States. Over the next nine years, the industry lost jobs throughout the nation, but the largest loss occurred in the SEMCOG region. By 2009, the region is estimated to have had 82,772 jobs in motor vehicle manufacturing, or about 12.2 percent of all such jobs in the nation. The economic recovery and the accompanying increase in vehicle sales (see Figure 4) led to an increase in industry employment in the region, to 109,990 by 2015, or 13.3 percent of all motor vehicle manufacturing jobs in the United States.

We are forecasting an additional increase in local motor vehicle manufacturing employment, to 113,779, in 2016, but after that employment in motor vehicle manufacturing in the SEMCOG region declines slowly in our baseline scenario. In 2020, employment is about the same as in 2015, and then gravitates down from there to 83,365 jobs in 2045. This would amount to 13.2 percent of all motor vehicle manufacturing jobs in the United States in 2045. Thus, in our baseline forecast Southeast Michigan would roughly sustain its share of motor vehicle manufacturing jobs in the country (13.3 percent in 2015 compared with 13.2 percent in 2045).

In the first alternative scenario, we explore what the outcome would be in the SEMCOG region if the local auto industry went through another round of rapid decline in motor vehicle manufacturing employment, in this case a bit less severe than what occurred between 2000 and 2010. We assume that this loss of jobs would take place in the period between 2020 and 2025.

In the baseline forecast, we see motor vehicle manufacturing employment in Southeast Michigan declining from 110,001 in 2020, to 104,779 in 2025 (4.7 percent), and 83,365 in 2045 (24.2 percent). Under the alternative scenario, industry employment declines from 110,001 in 2020 to 78,638 in 2025 (28.5 percent), and then to 63,786 in 2045 (42.0 percent).

Between 2000 and 2010, the local motor vehicle manufacturing industry lost 62.3 percent of its jobs, and even accounting for the gain in jobs since 2010, employment in the local industry declined by 50.9 percent between 2000 and 2015. So, a decline in the number of motor vehicle industry jobs of 42.0 percent in the alternative scenario is not an unreasonable outcome. But even with this magnitude of job

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11The motor vehicle manufacturing industry is defined throughout this report to include NAICS industries 3361, 3362, and 3363.
loss in the alternative scenario, the SEMCOG region would still house 10.1 percent of all motor vehicle manufacturing jobs in the United States in 2045.

The impact of assuming this additional reduction in auto manufacturing employment in the SEMCOG region, including spinoff effects, is shown in Table 1. By 2025, total employment is reduced by 122,650 (4.3 percent), the population by 74,401 (1.5 percent), and real personal income (in 2016 dollars) by $10.5 billion (3.7 percent). Due to the lagged responses embodied in the REMI model, the population losses grow over time, reaching 245,450 (4.8 percent) in 2045. The real personal income losses also grow over time, reaching $15.8 billion (4.2 percent) in 2045.

Table 1
Alternative Forecast of Employment in Motor Vehicle and Parts Manufacturing between 2021 and 2045, SEMCOG Region

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2025</th>
<th>2030</th>
<th>2045</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total employment</td>
<td>-27,072</td>
<td>-122,650</td>
<td>-116,502</td>
<td>-120,249</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>-0.95%</td>
<td>-4.29%</td>
<td>-4.09%</td>
<td>-4.06%</td>
</tr>
<tr>
<td>Direct emp., M.V. mfg.</td>
<td>-5,466</td>
<td>-21,951</td>
<td>-20,272</td>
<td>-17,465</td>
</tr>
<tr>
<td>Population</td>
<td>-6,013</td>
<td>-74,401</td>
<td>-152,484</td>
<td>-245,450</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>-0.13%</td>
<td>-1.54%</td>
<td>-3.11%</td>
<td>-4.81%</td>
</tr>
<tr>
<td>Personal income 2016$ (millions)</td>
<td>-2,137</td>
<td>-10,509</td>
<td>-11,975</td>
<td>-15,841</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>-0.81%</td>
<td>-3.73%</td>
<td>-3.85%</td>
<td>-4.19%</td>
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</table>

Under this scenario, total employment in the SEMCOG region in 2025 would be 35,164 below 2015 levels (1.3 percent), and even by 2045, employment would exceed 2015 levels by only 63,952 (2.3 percent). Indeed, under this scenario total employment in 2045 as measured by the BEA would remain below its 2000 peak level, and the total population in the region would barely exceed its 2001 peak level.

**Alternative Scenario 2: Substantial Reduction in International Migration**

President Trump has indicated that one of the priorities of his administration is to reduce the number of international migrants to the United States, including the future number of permanent, documented migrants admitted. Thus, one logical alternative scenario would be to forecast how a drastic reduction in the number of international migrants to the SEMCOG region would change the local economy. Between 2018 and 2045, our baseline forecast indicates that 489,564 international migrants would move into Southeast Michigan. For the purposes of the experiment, we assume that the number of international

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12 The U.S. Bureau of the Census data [3] on international migration do not distinguish between documented and undocumented immigrants. Thus, our analysis is based on a change in total international migration.
migrants to Southeast Michigan would be cut almost in half, with a phased reduction starting in 2018. Under this assumption, the total number of in-migrants to the SEMCOG region between 2018 and 2045 would be only 259,294.

It is important to note that under this scenario, we changed only the number of international migrants into the SEMCOG region. We did not change the number of international migrants into the rest of the state or the country. This undoubtedly means that the effect of such a drastic change in international migration on the SEMCOG region is understated, as we will discuss below.

The effect of this reduction in international migration into Southeast Michigan is shown in Table 2. By 2045, the cumulative reduction in international migration of 230,270 residents results in a loss of 16,654 jobs (0.6 percent), and a loss of $2.832 billion in real income (2016 dollars). The population in 2045 is forecast to decline by 105,794 residents.

| Alternative Forecast of International Migration between 2018 and 2045, SEMCOG Region |
|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | 2018            | 2025            | 2030            | 2045            |
| Total employment| -464            | -4,599          | -7,663          | -16,654         |
| % of control forecast | -0.02%          | -0.16%          | -0.27%          | -0.56%          |
| Direct int'l. migration | -3,103          | -52,668         | -94,248         | -230,270        |
| Population      | -2,911          | -39,179         | -61,071         | -105,794        |
| % of control forecast | -0.06%          | -0.81%          | -1.25%          | -2.07%          |
| Personal income 2016$ (millions) | -62             | -704            | -1,193          | -2,832          |
| % of control forecast | -0.02%          | -0.25%          | -0.39%          | -0.75%          |

Note that the projected decline in total population is less than the cumulative loss of international migrants. This results from a dynamic response in the model reducing domestic out-migration from the region because of a perceived tightening of the local labor market relative to the rest of the country as a consequence of the shrinkage in the number of international migrants locally. Had we been able in this experiment to reduce international migration in the rest of the country, those external labor markets would also be tightened, enhancing their attractiveness. This would largely negate the positive feedback effect in the model of a comparatively attractive local labor market. Thus, if we were able to model in the rest of the country the implications of a proposed change in national immigration policy, then the loss of employment, income, and population for the SEMCOG region would be larger than is shown in Table 2.

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13The number of international migrants in 2017 counts all international migrants between July 1, 2016, and June 30, 2017. Some reduction in international migration in response to the proposed change in national policy could well occur during this period, but here we change only the number of international migrants after June 30, 2017 (years 2018 through 2045).
Alternative Scenario 3: 
Increase Professional and Technical Services Employment

In this scenario, we gradually increase employment in the professional and technical services industry by 20,000 additional workers between 2021 and 2025. In the baseline forecast, we are projecting that there will be 304,936 jobs in professional services in 2021; 313,701 jobs in 2025; and 372,163 jobs in 2045. In the alternative scenario, we are forecasting that this industry will have 310,421 jobs in 2021; 335,656 jobs in 2025; and 393,575 jobs in 2045. The industry-specific job gains in 2025 and 2045 are slightly greater than the value of 20,000 that we entered into the experiment because they include spin-off jobs created in the same industry in response to those direct jobs added. For example, in 2025 the total number of new jobs in professional and technical services is 21,955 (335,656 – 313,701), which includes 20,000 direct jobs and 1,955 spin-off jobs.

The effect on the Southeast Michigan economy of this hypothetical increase in professional services industry jobs is shown in Table 3. The additional jobs in professional and technical services increase total employment in 2045 by 37,424 jobs (1.3 percent), population by 1.2 percent, and real personal income by one percent.

Table 3
Alternative Forecast of Employment in Professional Services between 2021 and 2045, SEMCOG Region

<table>
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<th>2025</th>
<th>2030</th>
<th>2045</th>
</tr>
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<tr>
<td>Total employment</td>
<td>9,829</td>
<td>40,827</td>
<td>38,598</td>
<td>37,424</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>0.34%</td>
<td>1.43%</td>
<td>1.36%</td>
<td>1.26%</td>
</tr>
<tr>
<td>Direct emp., prof. svs.</td>
<td>5,000</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Population</td>
<td>1,713</td>
<td>20,081</td>
<td>40,859</td>
<td>62,681</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>0.04%</td>
<td>0.42%</td>
<td>0.83%</td>
<td>1.23%</td>
</tr>
<tr>
<td>Personal income 2016$ (millions)</td>
<td>679</td>
<td>3,037</td>
<td>3,298</td>
<td>3,820</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>0.26%</td>
<td>1.08%</td>
<td>1.07%</td>
<td>1.01%</td>
</tr>
</tbody>
</table>

One thing to keep in mind is that the professional services industry has been thriving in Southeast Michigan since the end of the Great Recession. In 2010, there were 225,471 jobs in professional services in the SEMCOG region (1.9 percent of national employment in this industry). By 2015 this number had grown to 285,935 (2.2 percent of national employment). In our baseline forecast, the region’s share of national employment in this industry slips back a bit to 2.0 percent by 2045. Under this alternative scenario, the region’s share of professional services employment nudges up to 2.1 percent in 2045. In 2015, the SEMCOG region accounted for 1.5 percent of total employment in the United States, so the region is disproportionately concentrated in professional services and apparently will continue to be so for the foreseeable future.
Alternative Scenario 4: 
Increase Professional and Technical Services Employment + 
Labor Supply of Engineers and Computer Programmers

In this scenario, we gradually increase employment in the professional and technical services industry by 20,000 additional workers between 2021 and 2025, as in alternative scenario 3, but in this case we also increase the local labor supply by training an additional 20,000 engineers and computer programmers (10,000 in each occupation) over the same period. In scenario 3, the labor supply necessary to meet the increased demand for employees is filled mostly by changing domestic migration. That is why in scenario 3 the population increases by 40,859 in 2030 and by 62,681 in 2045. In scenario 4, we impose an increase in the local supply of appropriately trained workers, thereby reducing the need to add new residents. In scenario 4, the local population increases by smaller numbers: 34,844 in 2030 and 49,481 in 2045, as shown in Table 4.

Table 4
Alternative Forecast of Employment in Engineers and Computer Programmers between 2021 and 2045, SEMCOG Region

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2025</th>
<th>2030</th>
<th>2045</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total employment</td>
<td>9,825</td>
<td>41,146</td>
<td>39,738</td>
<td>38,735</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>0.34%</td>
<td>1.44%</td>
<td>1.40%</td>
<td>1.31%</td>
</tr>
<tr>
<td>Direct emp., engineers</td>
<td>2,500</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Direct emp., programmers</td>
<td>2,500</td>
<td>10,000</td>
<td>10,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Population</td>
<td>1,635</td>
<td>18,137</td>
<td>34,844</td>
<td>49,481</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>0.03%</td>
<td>0.38%</td>
<td>0.71%</td>
<td>0.97%</td>
</tr>
<tr>
<td>Personal income 2016$</td>
<td>678</td>
<td>3,045</td>
<td>3,344</td>
<td>3,855</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>0.26%</td>
<td>1.08%</td>
<td>1.09%</td>
<td>1.02%</td>
</tr>
</tbody>
</table>

Although the increase in total population is smaller under scenario 4 compared with scenario 3 (49,481 versus 62,681, respectively, in 2045), the increase in employment is slightly larger (38,735 versus 37,424 in 2045). So is the increase in real personal income ($3.855 billion compared with $3.820 billion in 2045). The difference between scenarios in these metrics shows the benefits in the long run of increasing the training and skill levels of the local populace.

Additional training of existing residents increases local employment and real income slightly compared with the importation of workers, but potentially more important, it will provide a more accessible source of labor as we approach an extended period of tight labor markets all across the country. At that point it will become increasingly difficult to attract trained workers from outside of the region.
Alternative Scenario 5: Increase Finance and Insurance Industry Employment Up to the Share of Employment in the Pittsburgh Metropolitan Area

In 2015, the finance and insurance industry accounted for 5.8 percent of total employment in the Pittsburgh Metropolitan Area (MSA). In the SEMCOG region, the industry accounted for only 4.5 percent of total employment (nationally it was 4.4 percent of total employment). In this scenario, employment in the finance and insurance industry in the SEMCOG region gradually increases between 2021 and 2025, so that by 2025 it accounts for about the same share of local employment as in the Pittsburgh MSA in 2015. That employment share is sustained through 2045 in the SEMCOG region. Pittsburgh is often held up as the standard for regions hard hit by structural change and that are striving for a revitalized economy.

The structure of this experiment required that we impose an increase in the number of industry jobs of 27,446 in 2025, rising to 28,373 in 2045, as shown in Table 5. Most of these additional jobs are in the banking and other credit intermediation industries. The disparity between the SEMCOG region and Pittsburgh with regard to jobs in the banking industry undoubtedly reflects the fact that there are no longer any major banks headquartered in Detroit, whereas the headquarters for PNC Bank is in Pittsburgh and BNY Mellon also has a very large presence there.

Table 5
Alternative Forecast of Employment in Finance and Insurance between 2021 and 2045, SEMCOG Region

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2025</th>
<th>2030</th>
<th>2045</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total employment</td>
<td>19,123</td>
<td>103,499</td>
<td>103,849</td>
<td>114,061</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>0.67%</td>
<td>3.62%</td>
<td>3.65%</td>
<td>3.86%</td>
</tr>
<tr>
<td>Direct emp., insurance</td>
<td>817</td>
<td>4,088</td>
<td>4,067</td>
<td>4,226</td>
</tr>
<tr>
<td>Direct emp., sec. &amp; inv.</td>
<td>82</td>
<td>410</td>
<td>408</td>
<td>424</td>
</tr>
<tr>
<td>Direct emp., banking, other</td>
<td>4,588</td>
<td>22,948</td>
<td>22,835</td>
<td>23,724</td>
</tr>
<tr>
<td>Total direct</td>
<td>5,487</td>
<td>27,446</td>
<td>27,310</td>
<td>28,373</td>
</tr>
<tr>
<td>Population</td>
<td>3,484</td>
<td>45,708</td>
<td>104,739</td>
<td>189,184</td>
</tr>
<tr>
<td>% of control forecast</td>
<td>0.07%</td>
<td>0.95%</td>
<td>2.14%</td>
<td>3.71%</td>
</tr>
<tr>
<td>Personal income</td>
<td>1,374</td>
<td>8,076</td>
<td>9,424</td>
<td>13,179</td>
</tr>
<tr>
<td>2016$ (millions)</td>
<td>0.52%</td>
<td>2.86%</td>
<td>3.07%</td>
<td>3.49%</td>
</tr>
</tbody>
</table>

By 2045, these additional finance and insurance industry jobs would increase total employment in the SEMCOG region by 114,061 (3.9 percent), increase population by 189,184 (3.7 percent), and grow real personal income (2016 dollars) by $13.179 billion (3.5 percent). These relatively large benefits from expanding the finance and insurance industry in the region result from a relatively large employment increase.

14See footnote 3 for the definition of the Pittsburgh MSA.
multiplier effect for a service industry (3.8 in 2025 and 4.0 in 2045). The size of the multiplier reflects both the relatively high compensation on average in this industry and intermediate demand purchases from local firms.

**Looming Labor Shortages**

We raised the issue previously of where the supply of workers will come from in future decades. The schematics earlier in the report identify an exhaustive list of the potential sources of labor:

- Increases in the working-age population as young residents come of age.
- Increases in net in-migration of the working-age cohort.
- Increases in the labor force participation rate of current residents.\(^{15}\)
- Drawing from the unemployed.

Our forecast and its underlying architecture suggest that the number of additional workers from any of these sources will be severely limited. The fundamental problem, of course, is the rapid aging of the population over the next 30 years. According to our forecast (Figure 13), the share of SEMCOG’s population aged 65 or older will increase from 14.7 percent in 2015 to 22.7 percent in 2045—a more dramatic aging profile than in the nation as a whole. Sluggish population growth among SEMCOG’s working-age group stems from a dramatic slowing (and after 2040, a decline) in natural population growth with the aging of the population, and the low rate of in-migration of young adults that we anticipate (the first two sources of labor listed above, and shown in Figure 11).

One factor that could compensate somewhat for weak growth in the working-age population would be increases in the labor force participation rate, identified above as the third source of labor. In our forecast, we are estimating a fairly large increase in participation rates in almost every age category.

Even though almost every individual age component shows an increase, the labor force participation rate overall declines between 2015 and 2025, and then slowly increases to 61.4 percent in 2045, a rate only slightly higher than we saw in 2010, digging out of the Great Recession. How so? Because the total participation rate is a weighted average of the rates across age groups, and over time the older cohorts with the lowest rates gain significantly in their proportion of the population. Indeed, if we are off the mark here, it is more likely that we have been too generous on the increases in participation rates among the age cohorts, suggesting that labor supply could be even more squeezed from this source.

The last source of labor supply listed above is drawing from the unemployed, but the unemployment rate in the SEMCOG region is down to 5.1 percent in 2016. For comparison purposes, the region’s unemployment rate was 13.3 percent in 2010 and 3.3 percent in 2000. Thus, the region is getting closer to the historical low in its unemployment rate.

So, among the four sources of labor supply listed above, where is the potential to squeeze out significantly greater numbers of workers? Realistically, there is only one: the trends most subject to influence would be the migration rates. Employment opportunities are the strongest magnet for these people, but educational opportunities, quality of life, and family ties also matter. Otherwise, the labor supply constraints outlined here ultimately impose a serious speed limit on economic growth. The

\(^{15}\)Examples of people not participating would be those who do not work outside of the home, retirees, full-time students, or those on welfare.
prospect for labor shortages in the future, particularly of workers with skills that mesh with the emerging knowledge- and information-based economy, is an issue that will only grow in importance.
Conclusion

So, where does this leave us? The Southeast Michigan economy has clearly left the intensive care unit where it resided during the first decade of the 2000s, a time when the region lost virtually all of the jobs gained in the robust growth decade of the 1990s. Since then, its health has picked up and stabilized. Southeast Michigan is almost back to 2000 employment levels according to the BEA measure, and the unemployment rate plunged by over 8 percentage points from 2010 to 2016. The local economy is not all the way back, however, especially in terms of wage and salary jobs that offer employer benefits and more job security than self-employment. But the region has recovered much of its health, and the near-term outlook is mostly sunny.

The longer-term outlook is a little foggier. We see long-term growth being sustained, but only at a moderate pace for Southeast Michigan’s population and labor market over the next 30 years, much more subdued than what transpired in the 1990s prior to the extended downturn. A consequence of the poor performance of the local economy between 2000 and 2010 is a deep hole for the economy to dig out of. On the demand side, we don’t see especially strong growth nationally and we don’t view the region’s dominant sector, the domestic automotive industry, as a long-term growth sector, particularly in terms of employment given the solid productivity gains we anticipate.

The largest clouds are on the supply side, however. Population is central to the speed limits imposed on local employment in the long run. If, over the longer term, unemployment and labor force participation settle in at fairly stable rates, work force gains would largely need to come from increases in the working-age population, which in turn would derive from young residents becoming of working age or from net in-migration. But because the SEMCOG region has a disproportionately large share of baby boomers, it will age more dramatically than the nation as a whole. That leaves net in-migration, which has typically been low for young adults and who to date have not altered the region’s profile in a meaningful way.

This concern is exacerbated by the federal administration’s current intention to impose significant limits on the number of documents to be issued for immigration into the United States. Regions of the country, including several in urban areas of the Rust Belt, have relied on immigrants to fill out their work force needs. In our analysis of the SEMCOG region, for instance, we indicate that without international migration, SEMCOG’s population would not have begun growing in 2012, and would continue to decline throughout the next 30 years, which would lead to a weaker employment profile as well.

So, the biggest problem the region will face over the next 30 years will be labor shortages, particularly of workers with skills that mesh with the evolving knowledge- and information-based economy. It is particularly critical for the region to step up its investment in its human capital, especially since it is going to become increasingly difficult to attract workers from other localities as their labor markets also tighten up. Given the vulnerability of the local economy to the vagaries of the auto sector, as witnessed by recent history and highlighted by our first alternative forecast scenario, it is also important to seek out greater economic diversification into areas that show promise for future growth and prosperity.

Our policy prescription remains the same as the last time we engaged in this exercise: investment in a more highly skilled and educated work force, and retention of greater numbers of our high-income retirees. Our forecast and the underlying data suggest that there are challenges that need to be addressed, but the Southeast Michigan region has the assets, the wherewithal, and the motivation to get there. We believe that it will.
References


About the Authors

Donald R. Grimes holds a master’s degree in economics from the University of Michigan. He is a senior research area specialist at the University of Michigan’s Institute for Research on Labor, Employment, and the Economy, where he is assistant director of the Center for Labor Market Research. His primary research interests are in labor economics and economic forecasting.

For more than 30 years, he has been engaged in economic forecasting for state and local governments, and is frequently called upon for policy advice. He has worked for many years with the Michigan departments of Transportation and Treasury and the Michigan Economic Development Corporation on policy analysis and evaluating economic strategies. He is co-director of a project to generate long-term economic and demographic projections for all of the counties of Michigan.

He has been involved in other research projects sponsored by the U.S. Department of Commerce, the U.S. Department of Labor, the Federal Reserve Bank of Chicago, and the Robert Wood Johnson Foundation.

Among his publications, he has co-authored several papers in the professional literature, including: “Change in the Concentration of Employment in Computer Services: Spatial Estimation at the U.S. Metro County Level” (Growth and Change, March 2007); “Exploring Wage Determination by Education Level: A U.S. Metropolitan Statistical Area Analysis From 2005 to 2012” (Economic Development Quarterly, August 2016); and “Economic Effects of Medicaid Expansion in Michigan” (The New England Journal of Medicine, February 2017).

George A. Fulton received his Ph.D. in economics from the University of Michigan. He is currently director emeritus of the Research Seminar in Quantitative Economics in the Department of Economics at the University of Michigan. He is also research professor emeritus at the University’s Institute for Research on Labor, Employment, and the Economy, where he is director of the Center for Labor Market Research.

Dr. Fulton has been forecasting economic and fiscal activity in the state of Michigan for over 35 years. In addition, he is co-director of a project to generate long-term economic and demographic projections for all the counties of Michigan. He has served as a principal advisor on the economy to the State of Michigan, providing testimonies on the economic and revenue outlooks at the Michigan Consensus Revenue Estimating Conference twice each year since 1992. He has given the keynote presentation at the Governor’s Economic Outlook Briefing since 1984. He was appointed by the state treasurer as one of three principals to the City of Detroit Consensus Revenue Estimating Conference. He has written a book on the Michigan regional economies, co-authored with Harold T. Shapiro, former president of both the University of Michigan and Princeton University. His research crosses disciplines, having been published in diverse professional journals and sponsored research reports.

Professor Fulton has received numerous awards for his career accomplishments. These include: the inaugural Lifetime Achievement Award for Excellence in Economic and Demographic Analysis from Regional Economic Models, Inc. (REMI); a Special Tribute from Michigan Governor Rick Snyder; a Special Tribute from the State of Michigan Legislature; a Letter of Commendation from University of Michigan President Mark S. Schlissel; a Distinguished Speaker Award from the Michigan Governor, Lt. Governor, and State Treasurer; a County Executive Declaration from Oakland County Executive L. Brooks Patterson; and a Recognition for Excellence in Economic Forecasts from mlive.com and The Ann Arbor News.
Appendix

2045 Regional Forecast Totals

Population by Age
Employment by Industrial Class
Baseline and Alternative Population Forecasts
Baseline and Alternative Employment Forecasts
### Table 6
Population by Age, Southeast Michigan, 2015-2045

<table>
<thead>
<tr>
<th>Age Group</th>
<th>2015</th>
<th>2025</th>
<th>2035</th>
<th>2045</th>
<th>Numeric Change '15-'45</th>
<th>Percent Change '15-'45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 0-4</td>
<td>268,516</td>
<td>271,076</td>
<td>273,414</td>
<td>265,940</td>
<td>-2,576</td>
<td>-1.0%</td>
</tr>
<tr>
<td>Age 5-9</td>
<td>284,050</td>
<td>265,678</td>
<td>277,916</td>
<td>273,543</td>
<td>-10,507</td>
<td>-3.7%</td>
</tr>
<tr>
<td>Age 10-14</td>
<td>306,146</td>
<td>267,705</td>
<td>277,131</td>
<td>282,700</td>
<td>-23,446</td>
<td>-7.7%</td>
</tr>
<tr>
<td>Age 15-17</td>
<td>195,381</td>
<td>169,341</td>
<td>165,212</td>
<td>173,287</td>
<td>-22,094</td>
<td>-11.3%</td>
</tr>
<tr>
<td>Age 18-19</td>
<td>127,905</td>
<td>113,200</td>
<td>105,194</td>
<td>112,071</td>
<td>-15,834</td>
<td>-12.4%</td>
</tr>
<tr>
<td>Age 20-24</td>
<td>325,541</td>
<td>306,243</td>
<td>279,290</td>
<td>291,586</td>
<td>-33,955</td>
<td>-10.4%</td>
</tr>
<tr>
<td>Age 25-29</td>
<td>284,745</td>
<td>325,091</td>
<td>321,664</td>
<td>302,072</td>
<td>17,327</td>
<td>6.1%</td>
</tr>
<tr>
<td>Age 30-34</td>
<td>281,517</td>
<td>314,406</td>
<td>339,957</td>
<td>322,414</td>
<td>40,897</td>
<td>14.5%</td>
</tr>
<tr>
<td>Age 35-39</td>
<td>303,928</td>
<td>290,015</td>
<td>338,274</td>
<td>339,255</td>
<td>35,327</td>
<td>11.6%</td>
</tr>
<tr>
<td>Age 40-44</td>
<td>328,844</td>
<td>281,524</td>
<td>321,664</td>
<td>349,787</td>
<td>20,943</td>
<td>6.4%</td>
</tr>
<tr>
<td>Age 45-49</td>
<td>352,657</td>
<td>297,787</td>
<td>290,440</td>
<td>340,799</td>
<td>-11,858</td>
<td>-3.4%</td>
</tr>
<tr>
<td>Age 50-54</td>
<td>354,181</td>
<td>315,536</td>
<td>275,708</td>
<td>317,000</td>
<td>-37,181</td>
<td>-10.5%</td>
</tr>
<tr>
<td>Age 55-59</td>
<td>304,690</td>
<td>330,762</td>
<td>284,747</td>
<td>281,976</td>
<td>-22,714</td>
<td>-7.5%</td>
</tr>
<tr>
<td>Age 60-64</td>
<td>238,765</td>
<td>312,136</td>
<td>283,789</td>
<td>252,648</td>
<td>13,833</td>
<td>5.8%</td>
</tr>
<tr>
<td>Age 65-69</td>
<td>164,425</td>
<td>246,338</td>
<td>273,205</td>
<td>238,700</td>
<td>74,275</td>
<td>45.2%</td>
</tr>
<tr>
<td>Age 70-74</td>
<td>111,616</td>
<td>180,950</td>
<td>242,978</td>
<td>226,104</td>
<td>114,488</td>
<td>102.6%</td>
</tr>
<tr>
<td>Age 75-79</td>
<td>82,591</td>
<td>112,229</td>
<td>174,627</td>
<td>198,855</td>
<td>116,264</td>
<td>140.8%</td>
</tr>
<tr>
<td>Age 80-84</td>
<td>65,077</td>
<td>60,460</td>
<td>104,019</td>
<td>144,435</td>
<td>79,358</td>
<td>121.9%</td>
</tr>
<tr>
<td>Age 85-89</td>
<td>79,088</td>
<td>28,863</td>
<td>43,393</td>
<td>72,211</td>
<td>45,123</td>
<td>166.6%</td>
</tr>
<tr>
<td>Age 90-94</td>
<td>6,541</td>
<td>10,913</td>
<td>12,099</td>
<td>23,501</td>
<td>16,960</td>
<td>259.3%</td>
</tr>
<tr>
<td>Age 95-99</td>
<td>982</td>
<td>1,635</td>
<td>2,198</td>
<td>3,964</td>
<td>2,982</td>
<td>303.7%</td>
</tr>
</tbody>
</table>

**Total** | **4,722,670** | **4,823,623** | **4,984,434** | **5,104,936** | **382,266** | **8.1%** |
Table 7
Employment by Industrial Class, Southeast Michigan, 2015-2045

<table>
<thead>
<tr>
<th>Class</th>
<th>2015</th>
<th>2025</th>
<th>2035</th>
<th>2045</th>
<th>Numeric Change '15-'45</th>
<th>Percent Change '15-'45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farm</td>
<td>7,523</td>
<td>7,107</td>
<td>6,526</td>
<td>6,128</td>
<td>-1,395</td>
<td>-18.5%</td>
</tr>
<tr>
<td>Forestry, Fishing, and Other</td>
<td>1,268</td>
<td>1,398</td>
<td>1,473</td>
<td>1,557</td>
<td>289</td>
<td>22.8%</td>
</tr>
<tr>
<td>Mining</td>
<td>5,046</td>
<td>4,826</td>
<td>4,740</td>
<td>4,353</td>
<td>-693</td>
<td>-13.7%</td>
</tr>
<tr>
<td>Utilities</td>
<td>8,546</td>
<td>7,811</td>
<td>7,054</td>
<td>6,222</td>
<td>-2,321</td>
<td>-27.2%</td>
</tr>
<tr>
<td>Construction</td>
<td>114,426</td>
<td>121,350</td>
<td>122,659</td>
<td>123,882</td>
<td>9,456</td>
<td>8.3%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>264,055</td>
<td>241,353</td>
<td>212,759</td>
<td>192,929</td>
<td>-71,126</td>
<td>-26.9%</td>
</tr>
<tr>
<td>Motor Vehicles and Parts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>109,990</td>
<td>104,779</td>
<td>91,948</td>
<td>83,365</td>
<td>-26,624</td>
<td>-24.2%</td>
</tr>
<tr>
<td>Non-Motor Vehicle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufacturing</td>
<td>154,065</td>
<td>136,574</td>
<td>120,811</td>
<td>109,563</td>
<td>-44,502</td>
<td>-28.9%</td>
</tr>
<tr>
<td>Wholesale Trade</td>
<td>100,370</td>
<td>103,115</td>
<td>102,383</td>
<td>101,761</td>
<td>1,390</td>
<td>1.4%</td>
</tr>
<tr>
<td>Retail Trade</td>
<td>270,342</td>
<td>264,568</td>
<td>247,269</td>
<td>234,836</td>
<td>-35,506</td>
<td>-13.1%</td>
</tr>
<tr>
<td>Transportation &amp; Warehousing</td>
<td>79,168</td>
<td>79,425</td>
<td>79,855</td>
<td>81,833</td>
<td>2,664</td>
<td>3.4%</td>
</tr>
<tr>
<td>Information</td>
<td>42,845</td>
<td>40,534</td>
<td>39,385</td>
<td>38,352</td>
<td>-4,942</td>
<td>-10.5%</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>127,595</td>
<td>134,331</td>
<td>133,546</td>
<td>133,948</td>
<td>6,353</td>
<td>5.0%</td>
</tr>
<tr>
<td>Real Estate, Rental, &amp; Leasing</td>
<td>122,642</td>
<td>122,366</td>
<td>122,729</td>
<td>125,131</td>
<td>2,488</td>
<td>2.0%</td>
</tr>
<tr>
<td>Professional &amp; Technical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td>285,935</td>
<td>313,701</td>
<td>341,424</td>
<td>372,163</td>
<td>86,228</td>
<td>30.2%</td>
</tr>
<tr>
<td>Management of Companies</td>
<td>41,197</td>
<td>45,307</td>
<td>47,569</td>
<td>49,022</td>
<td>7,825</td>
<td>19.0%</td>
</tr>
<tr>
<td>Administrative, Support, &amp;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste Services</td>
<td>206,403</td>
<td>221,223</td>
<td>231,863</td>
<td>243,219</td>
<td>36,816</td>
<td>17.8%</td>
</tr>
<tr>
<td>Private Educational Services</td>
<td>57,511</td>
<td>58,536</td>
<td>59,627</td>
<td>62,473</td>
<td>4,962</td>
<td>8.6%</td>
</tr>
<tr>
<td>Healthcare and Social Services</td>
<td>353,160</td>
<td>387,074</td>
<td>415,883</td>
<td>456,985</td>
<td>103,825</td>
<td>29.4%</td>
</tr>
<tr>
<td>Arts &amp; Recreation</td>
<td>53,801</td>
<td>56,509</td>
<td>58,064</td>
<td>59,934</td>
<td>6,133</td>
<td>11.4%</td>
</tr>
<tr>
<td>Accommodation &amp; Food Services</td>
<td>194,625</td>
<td>206,518</td>
<td>210,887</td>
<td>217,055</td>
<td>22,430</td>
<td>11.5%</td>
</tr>
<tr>
<td>Other Services</td>
<td>162,951</td>
<td>164,953</td>
<td>163,690</td>
<td>161,592</td>
<td>-1,359</td>
<td>-0.8%</td>
</tr>
<tr>
<td>Federal Government, civilian</td>
<td>31,665</td>
<td>31,183</td>
<td>30,779</td>
<td>30,523</td>
<td>-1,142</td>
<td>-3.6%</td>
</tr>
<tr>
<td>Federal Government, military</td>
<td>8,840</td>
<td>8,695</td>
<td>8,667</td>
<td>8,588</td>
<td>-252</td>
<td>-2.9%</td>
</tr>
<tr>
<td>State Government</td>
<td>92,667</td>
<td>97,167</td>
<td>99,927</td>
<td>102,411</td>
<td>9,743</td>
<td>10.5%</td>
</tr>
<tr>
<td>Local Government</td>
<td>141,945</td>
<td>142,957</td>
<td>143,116</td>
<td>143,830</td>
<td>1,885</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

Total Employment                2,774,523| 2,862,009| 2,891,873| 2,958,724| 184,201| 6.6%
Figure 22
Baseline and Alternative Population Forecasts

Table 8
Baseline and Alternative Population Forecasts

<table>
<thead>
<tr>
<th>Scenario</th>
<th>2015</th>
<th>2025</th>
<th>2035</th>
<th>2045</th>
<th>Numeric Change '15-'45</th>
<th>Percent Change '15-'45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance Up</td>
<td>4,722,670</td>
<td>4,869,329</td>
<td>5,128,753</td>
<td>5,294,121</td>
<td>571,451</td>
<td>12.1%</td>
</tr>
<tr>
<td>Professional Up</td>
<td>4,722,670</td>
<td>4,843,701</td>
<td>5,037,570</td>
<td>5,167,617</td>
<td>444,947</td>
<td>9.4%</td>
</tr>
<tr>
<td>Professional &amp; Labor Up</td>
<td>4,722,670</td>
<td>4,841,758</td>
<td>5,028,200</td>
<td>5,154,418</td>
<td>431,748</td>
<td>9.1%</td>
</tr>
<tr>
<td>Baseline</td>
<td>4,722,670</td>
<td>4,823,623</td>
<td>4,984,434</td>
<td>5,104,936</td>
<td>382,266</td>
<td>8.1%</td>
</tr>
<tr>
<td>Immigration Down</td>
<td>4,722,670</td>
<td>4,784,442</td>
<td>4,905,005</td>
<td>4,999,143</td>
<td>276,473</td>
<td>5.9%</td>
</tr>
<tr>
<td>Autos Down</td>
<td>4,722,670</td>
<td>4,749,219</td>
<td>4,783,737</td>
<td>4,859,487</td>
<td>136,817</td>
<td>2.9%</td>
</tr>
</tbody>
</table>
Figure 23
Baseline and Alternative Employment Forecasts

Table 9
Baseline and Alternative Employment Forecasts

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th>2025</th>
<th>2035</th>
<th>2045</th>
<th>Numeric Change '15-'45</th>
<th>Percent Change '15-'45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finance Up</td>
<td>2,774,523</td>
<td>2,965,508</td>
<td>2,996,479</td>
<td>3,072,785</td>
<td>298,262</td>
<td>10.8%</td>
</tr>
<tr>
<td>Professional &amp; Labor Up</td>
<td>2,774,523</td>
<td>2,903,156</td>
<td>2,930,700</td>
<td>2,997,460</td>
<td>222,936</td>
<td>8.0%</td>
</tr>
<tr>
<td>Professional Up</td>
<td>2,774,523</td>
<td>2,902,836</td>
<td>2,929,100</td>
<td>2,996,148</td>
<td>221,625</td>
<td>8.0%</td>
</tr>
<tr>
<td>Baseline</td>
<td>2,774,523</td>
<td>2,862,009</td>
<td>2,891,873</td>
<td>2,958,724</td>
<td>184,201</td>
<td>6.6%</td>
</tr>
<tr>
<td>Immigration Down</td>
<td>2,774,523</td>
<td>2,857,410</td>
<td>2,880,895</td>
<td>2,942,070</td>
<td>167,547</td>
<td>6.0%</td>
</tr>
<tr>
<td>Autos Down</td>
<td>2,774,523</td>
<td>2,739,359</td>
<td>2,777,263</td>
<td>2,838,476</td>
<td>63,952</td>
<td>2.3%</td>
</tr>
</tbody>
</table>