MICHIGAN'S LABOR MARKET NEWS

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SPECIAL ISSUE

2017 ANNUAL ECONOMIC ANALYSIS

About Our Cover

True to its nickname, *The Great Lakes State* of Michigan is home to over 3,000 miles of shoreline and over 150 lighthouses, past and present. Pictured on the cover of this special edition of our *Michigan's Labor Market News* is the Crisp Point Lighthouse, located on the state's Lake Superior coastline. It is situated just northeast of Newberry and west of historic Whitefish Point. In 1975, the S.S. Edmund Fitzgerald famously wrecked and sank along with her crew only 17 miles from Crisp Point.

According to the Crisp Point Light Historical Society, the lighthouse was constructed from 1903 to 1904 and was decommissioned by the U.S. Coast Guard in 1993. The 58-foot-tall structure is now owned by Luce County, and leased by the Crisp Point Light Historical Society, who completed a major restoration project of the lighthouse in 2016. The cover photo shows the lighthouse before this project, while the page opposite features the newly restored structure.

TABLE OF CONTENTS

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IT'S BIGGER THAN DATA.

The Bureau of Labor Market Information and Strategic Initiatives is the official source for high quality demographic and labor market information for the state of Michigan and its regions. We administer the state's federal-state cooperative programs with the Bureau of Labor Statistics (BLS) and the Census Bureau and produce high-quality information and analysis through grants from the U.S. Department of Labor and from partner agencies in the state of Michigan. We provide our national, state, and local partners and customers with *accurate, objective, reliable, timely, accessible,* and *transparent* information and insights.

Michigan's labor market recorded steady improvements in 2017 with the state's unemployment rate declining to 4.6 percent and payroll jobs expanding for a seventh consecutive year. Median occupational wages were up slightly in 2017 to $17.62, but Michigan's national ranking remained in the middle of all states. Population growth continued, but at a moderate pace. Future population growth in Michigan will become increasingly dependent upon migration of people into the state, especially as Baby Boomers continue to leave the workforce. Meanwhile, employment is expected to expand by 7.0 percent through 2026, spelling opportunity for residents (and potential residents) in a wide-range of industries and occupations. These and other economic, demographic, and labor market trends are discussed in this year's *Special Issue of Michigan's Labor Market News.*

This issue includes sections on labor force, employment, and unemployment; industry trends; occupational employment and wage; demographic and workforce trends; labor supply; and long-term industry and occupational outlook. We designed this *Special Issue* to support workforce development planning, particularly for the requirements of the Workforce Innovation and Opportunity Act (WIOA). However, this issue is also a useful, general narrative on trends in the Michigan labor market in 2017.

We hope you enjoy this *Special Issue of Michigan's Labor Market News.* Please let us know if there is something you would like to know more about.

JASON PALMER
DIRECTOR
Bureau of Labor Market Information
and Strategic Initiatives

MICHIGAN'S LABOR FORCE, EMPLOYMENT, AND UNEMPLOYMENT

Michigan's labor market recorded steady improvement in 2017, with the state's unemployment rate declining by four-tenths of a percentage point from 5.0 percent in 2016 to 4.6 percent in 2017.

Michigan's 2017 Overall Labor Market

Michigan's overall labor market in 2017 continued to show expansion, however at a somewhat diminished rate compared to a very solid 2016.

- The state's workforce grew in 2017 by 0.9 percent, which lagged the 2016 growth rate of 1.9 percent.
- Michigan's total employment gain of 1.3 percent in 2017 also slowed compared to the 2.4 percent jump posted in 2016.
- The number of unemployed in Michigan in 2017 was 227,000, which was 14,000 below the 2016 total of 241,000.

Unemployment Rate

The four-tenths of a percentage point jobless rate decline from 2016 to 2017 was the eighth consecutive annual unemployment rate reduction for Michigan dating back to 2010. This was the second longest consecutive stretch of annual rate decreases behind the nine years in a row displayed from 1992 to 2000. The state's 2017 unemployment rate was the fifth lowest recorded in Michigan's current official series dating back to 1976. Michigan's lowest annual rate of 3.6 percent was registered in 2000.

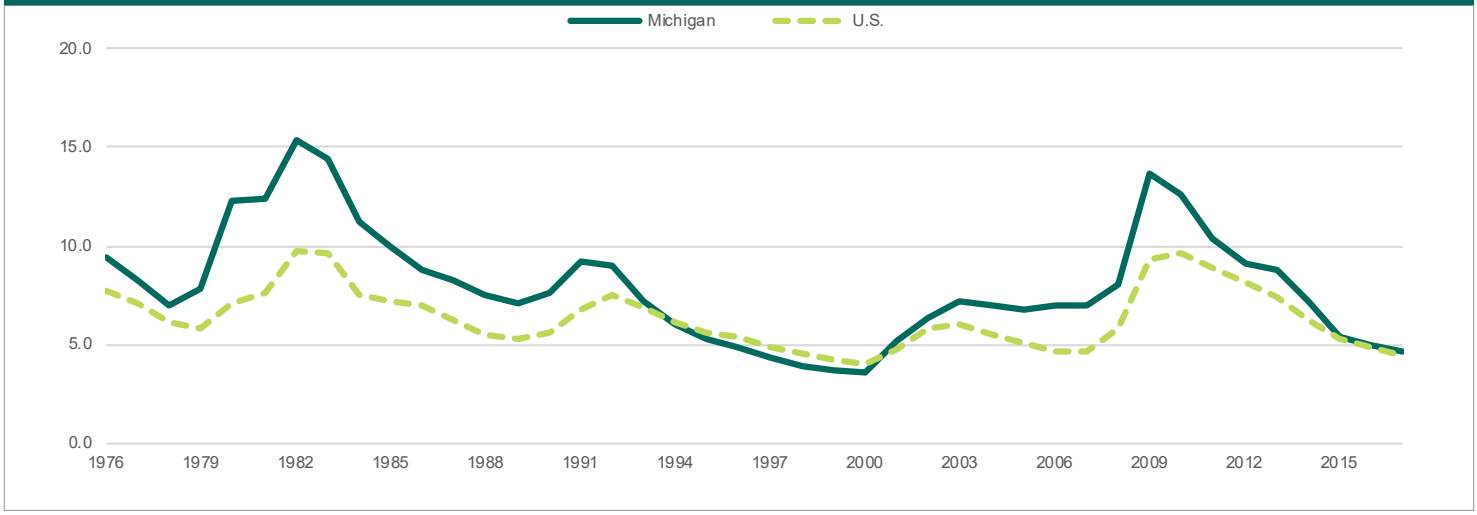
Michigan's jobless rates over the last three years have been very similar to the national rates. The state's annual rates in 2015 and 2016 were one-tenth of a percentage point above the U.S. rates while in 2017 Michigan's rate was two-tenths of a percentage point higher than the national rate. The only period since 1976 that Michigan's annual unemployment rates were below the U.S. rates was from 1994 to 2000. The highest Michigan unemployment rate since 1976 was 15.4 percent, recorded in 1982.

As the Michigan and national labor markets continued to tighten, jobless rate reductions over the last several years have moderated (see Figure 1-4).

Michigan 2017 Workforce

Michigan's labor force advanced in 2017 by 44,000 or 0.9 percent. This was well below the 2016 growth rate of 1.9 percent, but in line with gains recorded since the state's workforce began expanding again in 2013 after the fallout from the

FIGURE 1-1. Michigan and United States Jobless Rates, 1976-2017



Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

Great Recession (see Figure 1-3). The recession ended in mid-2009, however the state's labor force continued to decline through 2012. Since 2013, the state's average yearly workforce addition was 42,000, which was very similar to the 2017 trend.

Michigan's labor force levels dropped for seven consecutive years from 2006 through 2012. Over that period, Michigan's workforce fell by 404,000 or 8.0 percent. The primary reason for the state's labor force reduction from 2006 to 2012 was massive job losses due to restructuring in Michigan's auto industry. With an improved economy, the state's labor force increased by 211,000 or 4.5 percent from 2012 to 2017.

The annual workforce additions in Michigan since 2012 are very positive, however it could take many years for the state to reach the all-time high of 5,163,000 registered in 2000. Barriers exist that will make it difficult to reach 2000 labor force levels including an aging workforce, slow population growth, and lower labor force participation rates. Workforce growth in the future is also contingent on the health of the national and state economies.

Labor Force Participation Rates

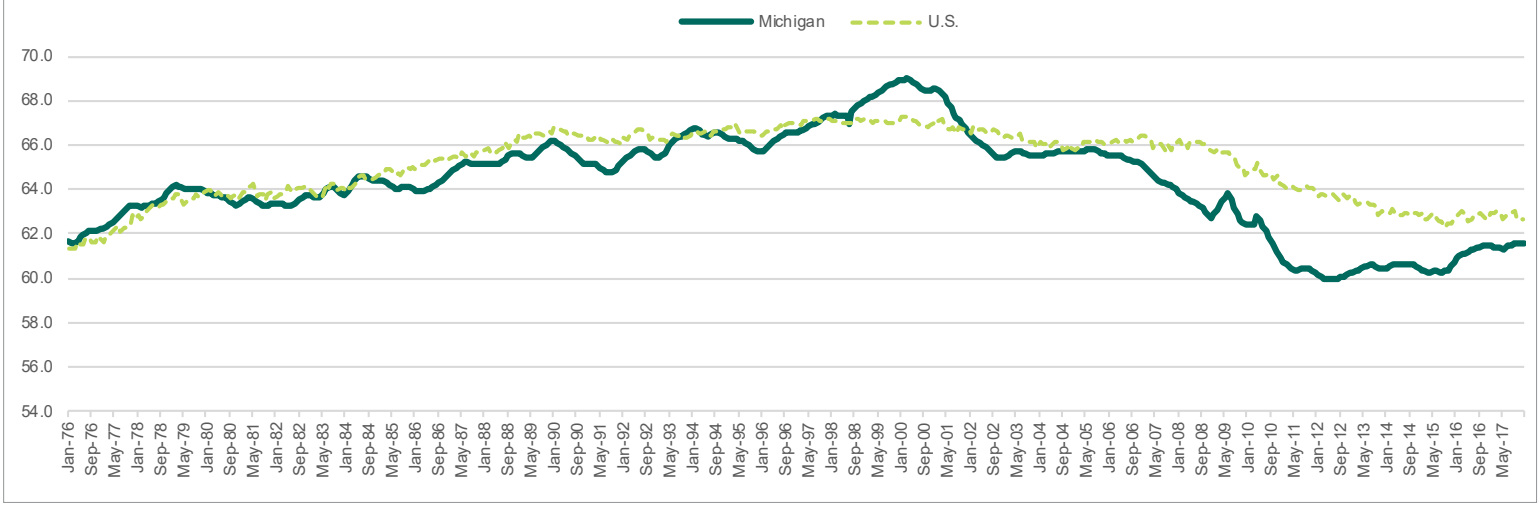
The labor force participation rate is the number of individuals in the labor force as a percentage of the 16 year and older non-institutionalized population. This is an important workforce indicator. Participation rates are generally higher during good economic times, as persons enter the job market as they sense that jobs are available. Participation rates also differ by age group and worker demographics, so as the Michigan and national workforce ages, participation may decline. Sufficient participation is necessary for employers to have a large and qualified talent pool to fill available jobs.

In Michigan (and the nation), labor force participation rates (LFPR) have been generally declining for most of the last two decades (see Figure 1.2). In Michigan, the LFPR trended upward from 1976, reaching a peak rate of 69.0 percent in early 2000. Since then, the LFPR fell to a low of 60.0 percent in March through September 2012.

However, since 2012 the state's LFPR has somewhat stabilized and recorded some slight gains. The 2017 Michigan annual labor force participation rate was 61.4 percent, which was unchanged from the 2016 rate (see Figure 1-5).

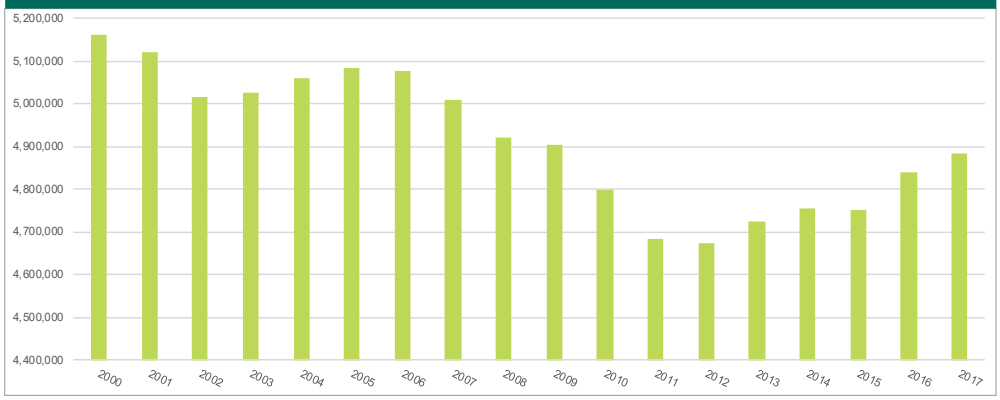
Participation rate changes since 2007 broken out by age group can show the dynamics of the LFPR reductions (see Figure 1-6). Since 2007, participation rates fell for youth (16-19) and the primary working age groups (25 through 54 years old). Participation rose in Michigan for workers aged

FIGURE 1-2. Michigan and U.S. Monthly Labor Force Participation Rates (LFPR), 1976-2017



Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

FIGURE 1-3. Michigan Workforce Levels, 2000-2017



Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

FIGURE 1-4. Michigan and U.S. Annual Unemployment Rate Changes, 2010-2017

YEAR	MICHIGAN	U.S.
2010	-1.1	+0.3
2011	-2.2	-0.7
2012	-1.3	-0.8
2013	-0.3	-0.7
2014	-1.6	-1.2
2015	-1.8	-0.9
2016	-0.4	-0.4
2017	-0.4	-0.5

Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

55 and up. The LFPR for teens has been declining for decades in Michigan and the nation. The 55 and older group's upward trend in participation has occurred for a number of years in Michigan as individuals are living longer and working longer, due to necessity or to keep active.

An important trend to watch is the reduction in participation rates of the primary working age population ages 25-54. This group is key because it accounts for a large share of the state's potential workforce. It will be vital to maintain healthy rates of participation among the prime age worker groups to ensure a strong, future talent pool in the state.

Michigan's 2017 Total Employment

Total employment is the combination of payroll jobs, agricultural employment, unpaid family workers, and the self-employed. From 2016 to 2017, total employment in Michigan advanced by 58,000 or 1.3 percent. Since 2010, total employment rose in Michigan by 463,000 or 11.0 percent, which slightly outpaced the national growth rate over that period of 10.3 percent (see Figure 1-7).

Although the 2017 employment gain was the smallest since 2012, it remained solid. The 2017 total employment count (4,657,000) was the highest in Michigan since 2007.

Figure 1-8 describes the percentage of total employment by age group from 2007 to 2017. Over that period, the age-group dynamics changed notably for the 25 and older age cohorts. Prime-age workers are considered to be in the 25-54 range. From 2007 to 2017, the 25-34 age group posted a percentage gain in the number of employed to the highest age-cohort percentage in the state while the other two prime-age groups (35-44 and 45-54) recorded percentage reductions. Employment percentages grew since 2007 for the 55-64 and 65 and older groups as older workers play a larger part in Michigan's labor market.

Michigan 2017 Unemployment

The number of unemployed in Michigan represents individuals that are currently not working but are actively seeking employment. Individuals that are not actively seeking employment are considered not in the labor force.

The annual average number of unemployed in Michigan during 2017 was 227,000, which was a reduction of 14,000 or 6.0 percent from the 2016 unemployed level (see Figure 1-9). Michigan's 2017 annual unemployment level was the lowest posted for the state since 2000. Since the recent high in 2009 of 670,000, the number of unemployed in the state dropped by 443,000 or 66.0 percent. The national decrease over this period was 51.0 percent.

Michigan's 2017 unemployment decline was the eighth consecutive annual reduction since 2010, however it was the second smallest over that period on a percentage basis.

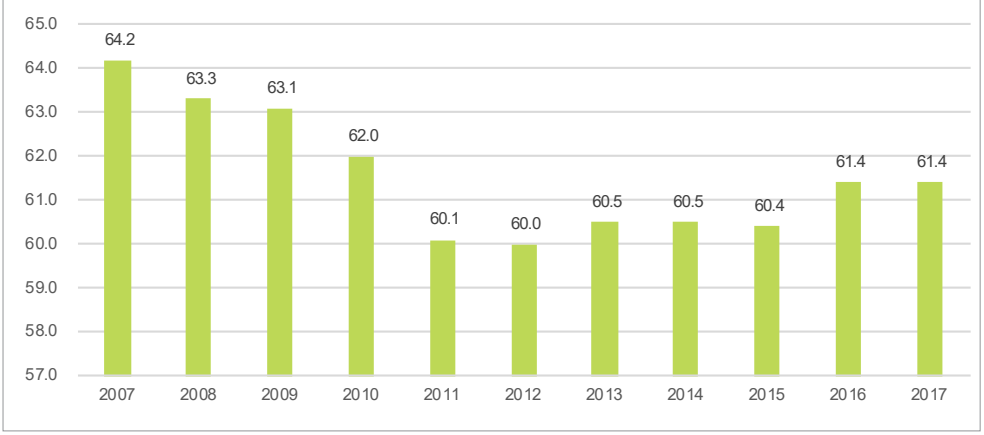
UNEMPLOYMENT LOW, BUT SLACK REMAINS

Michigan's 2017 labor market improved greatly from the depths of the last recession, and since 2015 reached a rare period for the state with relatively low jobless rates and continued job creation. However, even with a tightened labor market, some slack remains. In 2017, about 47,000 individuals were considered marginally attached to the workforce and around 172,000 were working part-time but wanted to work full-time (see Figure 1-10). Along with this, of the 227,000 unemployed in Michigan in 2017, around 45,000 were unemployed for more than 26 weeks.

MARGINALLY ATTACHED TO THE LABOR FORCE

Individuals that are marginally attached to the labor force are not working and have not searched for

FIGURE 1-5. Michigan Labor Force Participation Rates, 2007-2017



Source: U.S. Bureau of Labor Statistics, Current Population Survey

FIGURE 1-6. Michigan Labor Force Participation Rates by Age, 2007 and 2017

AGE/YEAR	2007	2017
16-19	45.3%	41.0%
20-24	76.1%	76.6%
25-34	81.5%	80.3%
35-44	81.6%	80.4%
45-54	79.9%	79.1%
55-64	58.6%	60.9%
65+	14.2%	16.2%

Source: U.S. Bureau of Labor Statistics, Current Population Survey

FIGURE 1-7. Michigan Annual Total Employment Gains, 2011-2017

YEAR	TOTAL EMPLOYMENT GAINS	PERCENT GAIN
2011	4,000	0.1%
2012	48,000	1.2%
2013	61,000	1.4%
2014	101,000	2.4%
2015	84,000	1.9%
2016	106,000	2.4%
2017	58,000	1.3%

Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

work in the previous month, however they have searched for a job in the previous year and thus have recent labor market attachment. They represent workers who could be brought into the labor pool to fill job vacancies.

The marginally attached to Michigan's workforce numbered about 47,000 in 2017, down significantly from the recent peak of 111,000 in 2011 and well below the 2007 total of 81,000.

INVOLUNTARY PART-TIME WORKERS

Involuntary part-time workers would prefer full-time jobs. These Michigan individuals either cannot find full-time work, or their hours have been reduced below 35 hours due to cutbacks at their employer. Like many statewide indicators of labor market health, this indicator has improved. The number of involuntary part-time workers in the state has fallen substantially since the turn of the last decade, down by 173,000 or 50 percent from 2010 to 2017. Just in the last year, this category recorded a reduction of 38,000 or 18.1 percent. However, the number of involuntary part-time workers remains elevated in comparison to 2000, when the total number was 114,000.

LONG-TERM UNEMPLOYMENT

The long-term unemployed are individuals out of work for 27 weeks or more that continue to actively seek employment. Although the number of unemployed peaked in 2009, long-term unemployment in Michigan continued to grow several years after the recession. In 2017, the number of long-term unemployed in Michigan as a percentage of all unemployed was 19.9 percent, down dramatically from the 49.8 percent recorded in 2010 (see Figure 1-11). In numerical terms, 45,100 persons in Michigan were long-term unemployed in 2017 as compared to 51,400 in 2016 and 293,300 in 2010.

In numerical terms, 45,100 persons in Michigan were long-term unemployed in 2017 as compared to 51,400 in 2016 and 293,300 in 2010.

The 2017 percentage fell below the 2007 percentage of 24.2 percent but remains elevated compared to the late 1990's and 2000 in which long-term unemployment hovered around ten percent of the total unemployed.

Most Groups Follow Statewide Trend, But Not All

Although Michigan has been experiencing continued job growth and declining unemployment rates, some demographic groups, while showing improvement, remain somewhat behind in the recovery.

AGE GROUP UNEMPLOYMENT RATES

From 2013 to 2017, all age groups reported jobless rate reductions (see Figure 1-12). Jobless rates for the state's youngest persons, ages 16-19 and 20-24, have fallen since 2013 but remain well above average.

RACE

Since 2013, jobless rates in Michigan for Hispanics, Blacks, and Whites declined. However, the rates for minorities in Michigan continue to be elevated.

For example, while the unemployment rate for Blacks fell by 7.0 full percentage points since 2013, their jobless rate remains more than double that of Whites (see Figure 1-13).

EDUCATIONAL ATTAINMENT

Educational attainment, even with a low statewide unemployment rate, continues to matter (see Figure 1-14).

Although jobless rates have fallen significantly for all groups, rates remain quite high for those that have less than a high school diploma, and those with just a high school diploma, relative to those with some college or a bachelor's degree or higher.

Trends to Watch

Over the past 20 years or so, Michigan's population has stagnated, moving upward only incrementally. This, combined with a rapidly aging workforce and lower labor force participation rates, could cause labor force shortages and curtailed economic growth.

Michigan's labor force participation rates rose marginally over the past few years but remain well below the rates of two decades ago. Participation rates and total employment have been lagging in Michigan's prime age working groups. Although employment and participation rates for the state's older workers have increased over the last ten years, retirement looms for that very large segment of Michigan's population.

Even with a relatively strong labor market, some segments of the workforce continue to be left behind. There is yet room for improvement in Michigan's labor market, as a number of potential workers face barriers to jobs or are not fully employed.

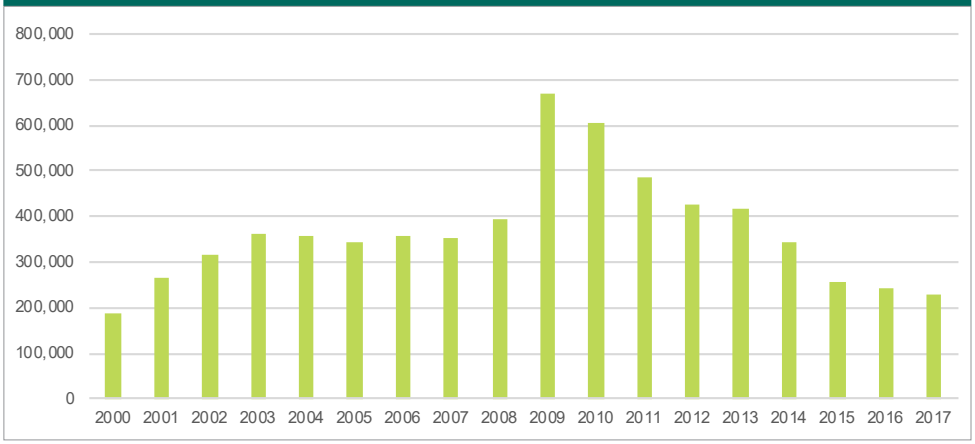
JIM RHEIN
Economic Specialist

FIGURE 1-8. Percentage of Michigan Total Employment by Age, 2007 and 2017

AGE/YEAR	2007	2017
16-19	4.6%	3.8%
20-24	9.6%	9.3%
25-34	19.7%	22.5%
35-44	24.1%	19.3%
45-54	24.8%	22.4%
55-64	13.7%	17.2%
65+	3.6%	5.4%

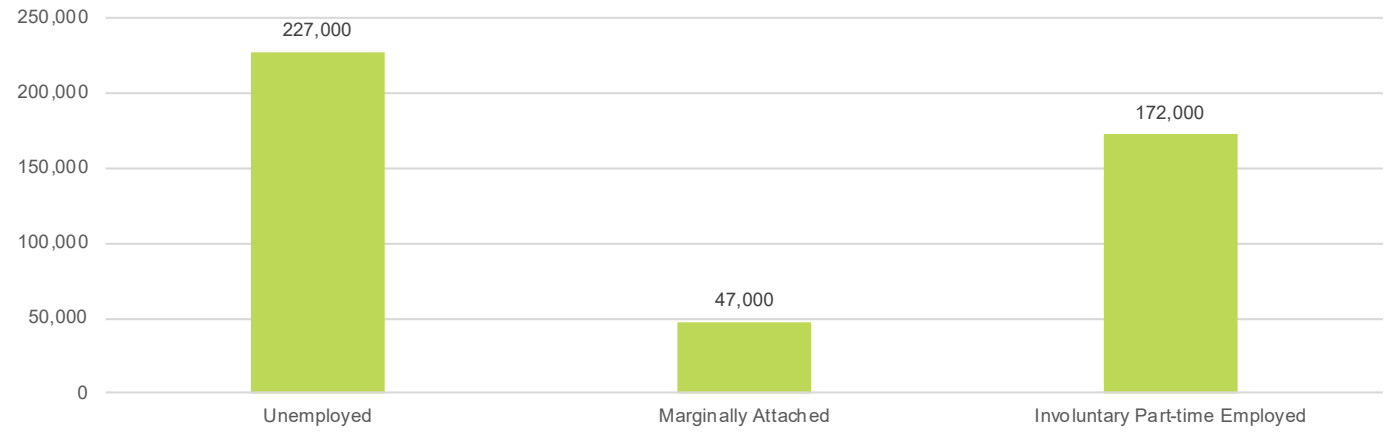
Source: U.S. Bureau of Labor Statistics, Current Population Survey

FIGURE 1-9. Number of Unemployed in Michigan, 2000-2017



Source: U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics

FIGURE 1-10. Michigan Unemployed and Underutilized, 2017

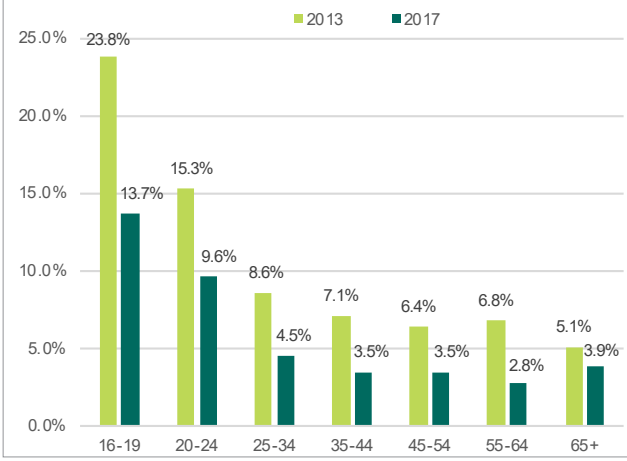


Source: U.S. Bureau of Labor Statistics, Current Population Survey

FIGURE 1-11. Long-Term Unemployed as a Percent of All Unemployed, 2007-2017

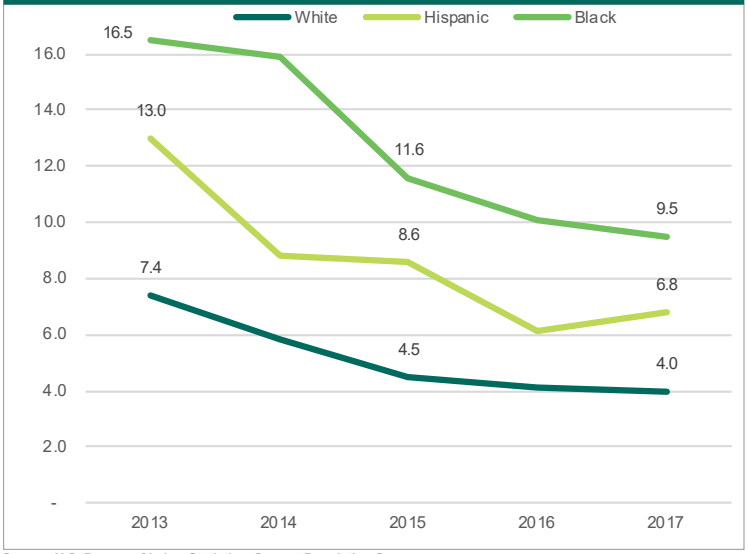
Source: U.S. Bureau of Labor Statistics, Current Population Survey

FIGURE 1-12. Michigan Jobless Rates by Age Group, 2013 and 2017



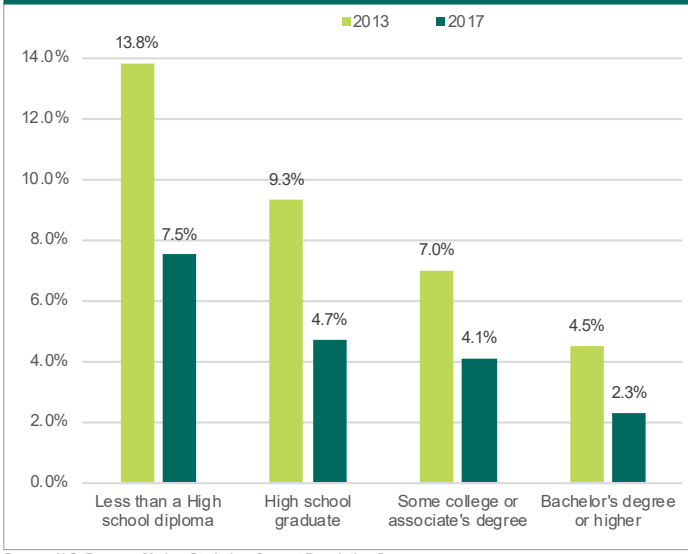
Source: U.S. Bureau of Labor Statistics, Current Population Survey

FIGURE 1-13. Michigan Jobless Rates by Race, 2013-2017



Source: U.S. Bureau of Labor Statistics, Current Population Survey

FIGURE 1-14. Michigan Jobless Rates by Educational Attainment, 2013 and 2017



Source: U.S. Bureau of Labor Statistics, Current Population Survey

MICHIGAN INDUSTRY TRENDS

Michigan 2017 Nonfarm Job Trends

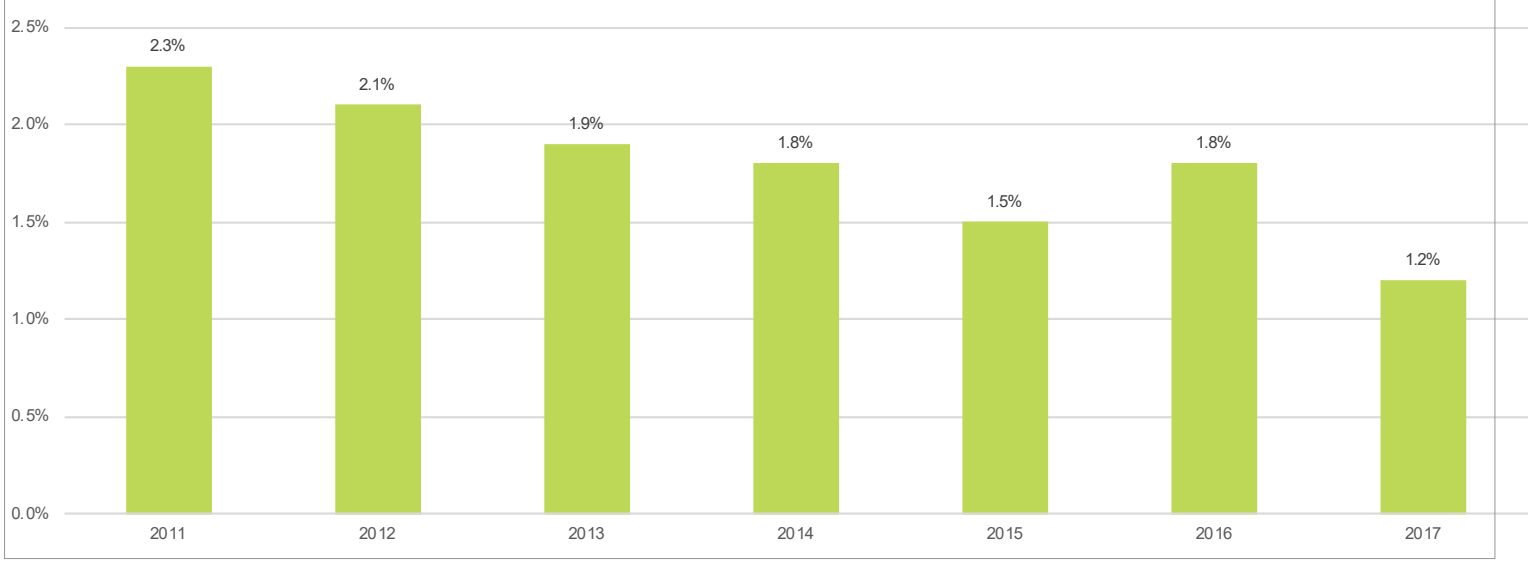
Total nonfarm employment levels in Michigan increased for a seventh consecutive year, adding 52,200 jobs for a growth rate of 1.2 percent, somewhat below the 1.6 percent expansion nationally for this period. In Michigan, the amount of total payroll jobs added during 2017 was the fewest since the state began to recover from the national recession in 2011. This continued the diminishing rate of annual job growth that characterized the period of 2012 through 2015.

Many of the broad industry sectors responsible for the lower job growth in 2017 continued to add jobs but in smaller numbers than the previous year. These included *Manufacturing, Trade, transportation, and utilities, Professional and business services*, and *Education and health services*. The *Information* sector reported job losses in 2017.

Job additions in the state's key *Transportation equipment manufacturing* industry continued to moderate. After reaching a post-recessionary annual growth rate of 10.8 percent in 2011, employment in this industry in Michigan increased at a reduced rate in each subsequent year and rose by 3.4 percent in 2017.

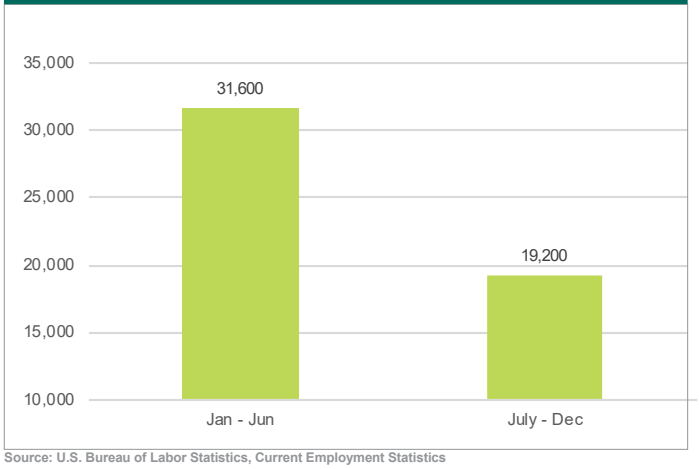
On a seasonally-adjusted basis, Michigan added payroll jobs in nine out of the 12 months in 2017. Most of the payroll job additions (+31,600) occurred in the first half of the year. January was the month with the largest gain in jobs as smaller-than-typical seasonal declines in *Retail trade, Healthcare and social assistance, Accommodation and food services*, and *Other services* combined with larger than typical payroll additions in *Professional, scientific, and technical services.* The second half of the year saw a job decline in July that was related to the annual model changeover in the automotive industry. A small September job cut was primarily due to temporary layoffs in the auto sector. The state registered solid job expansion in all three months of the fourth quarter of 2017, as job gains in this quarter occurred in *Manufacturing, Leisure and hospitality, Administrative services,* and *Construction.*

FIGURE 2-1. Michigan Annual Percent Job Growth, 2011-2017



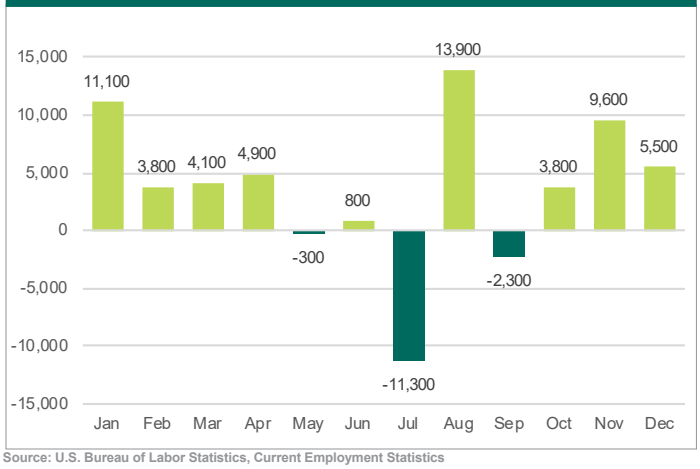
Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

FIGURE 2-2. Michigan 2017 Job Growth, Jan-Jun and July-Dec
(SEASONALLY ADJUSTED)



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

FIGURE 2-3. Michigan Monthly Job Change, 2017
(SEASONALLY ADJUSTED)



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

2017 Industry Developments

MINING AND LOGGING

After recording a 6.4 percent job decline in 2016 due to a mine closure and job loss in the oil and gas sector, employment levels stabilized during 2017, edging down by 100. Nationally, job levels grew by 1.5 percent.

CONSTRUCTION

The *Construction* sector (+7,700 jobs, +5.0 percent) continued to have the largest job growth in percentage terms in Michigan during 2017. The majority of this employment gain took place in *Construction of buildings* (+2,200 jobs) and *Specialty trade contractors* (+5,000 jobs). Michigan job gains outpaced growth nationally (+3.4 percent) during 2017.

MANUFACTURING

Despite the slower pace of job growth over the year, *Manufacturing* employment levels in Michigan continued to expand by 1.7 percent (+10,100 jobs). This continued to exceed the national growth rate of 0.7 percent during 2017. In Michigan, this job advance mostly occurred in the *Durable goods* (+7,900 jobs) sector. Two of the state's key industries, *Transportation equipment manufacturing* (+3,400 jobs) and *Furniture and related products manufacturing* (+500 jobs) accounted for about half of the *Durable goods* sector increase.

Employers in *Nondurable goods manufacturing* (+2,200 jobs) also added jobs during the year with the largest job expansion reported in *Food manufacturing* (+1,500 jobs) and *Plastics and rubber products manufacturing* (+900 jobs).

TRADE, TRANSPORTATION, AND UTILITIES

Payrolls in this sector grew by 5,500 or 0.7 percent during 2017 as jobs advanced in *Wholesale trade* (+2,300 jobs) and *Transportation, warehousing, and utilities* (+3,100 jobs). Employment levels in the *Retail trade* subsector were essentially unchanged in 2017. The sluggish nature of retail employment was mostly due to continued industry restructuring. Within the *Wholesale* sector the largest job gains were reported in the *Durable goods component* (+2,400 jobs). The subsectors of *Air transportation* (+1,500 jobs) and *Warehousing and storage* (+1,100 jobs) provided most of the employment gains in *Transportation, warehousing, and utilities*. Nationally, this broad sector grew by 0.9 percent in 2017.

INFORMATION

Job levels in the *Information* sector declined by 800 workers or by 1.5 percent during 2017. This followed a nearly equal job increase during the previous year. Nationally, payrolls in this sector were relatively unchanged in 2017.

FINANCIAL ACTIVITIES

Employment in the *Financial activities* sector grew for a seventh consecutive year by adding 5,400 jobs (+2.5 percent) in 2017. Payroll additions were reported in both the *Finance and insurance* (+3,900 jobs) and *Real estate and rental and leasing* (+1,500 jobs) subsectors. Nationally, employment levels expanded by 2.0 percent.

PROFESSIONAL AND BUSINESS SERVICES

Jobs in this industry sector rose by 5,700 or 0.9 percent in 2017, following a gain of 8,500 jobs in 2016. This industry has been a source of considerable job expansion in Michigan since the end of the recession, however the number of jobs added annually has declined steadily since the post-recessionary addition of 38,600 jobs in 2011.

During 2017, the largest job advance was reported in the *Professional, scientific, and technical services* (+7,800) subsector. This industry is auto-related with the *Architectural, engineering, and related services* (+3,700 jobs) and *Computer systems design and related services* (+1,400 jobs) subsectors as primary sources of job creation. *Management of companies and enterprises* added 2,500 jobs while the *Administrative and support and waste management services* subsector edged down by 4,600 jobs on significant job declines in *Temporary help services*. Nationally, broad sector payrolls grew by 2.1 percent in 2017.

EDUCATION AND HEALTH SERVICES

Employment levels reached a new high of 671,300 in 2017, up by 6,500 or 1.0 percent. This was about half the number of jobs that were added in 2016. Michigan job levels in *Educational services* remained essentially unchanged throughout the year as the *Colleges, university, and professional schools* (-900 jobs) component sector contracted. The *Health care and social assistance* subsector recorded a 6,400 increase in jobs with the majority of this growth reported in *Hospitals* (+3,300 jobs) and *Ambulatory health care services* (+2,300 jobs). Nationally, total nonfarm payrolls grew by 2.4 percent in 2017.

LEISURE AND HOSPITALITY

Payrolls in this highly seasonal broad sector grew by 7,300 jobs or by 1.7 percent in 2017. This marked the seventh consecutive year of job expansion in this sector. Most of the 2017 gain occurred in the *Accommodation and food services* (+6,800) subsector. A more modest increase of 500 jobs was recorded in the *Arts, entertainment, and recreation* subgroup. Nationally, payrolls grew by 2.5 percent in 2017.

OTHER SERVICES

Employment growth is this sector was flat during 2017, moving higher by 400 or 0.2 percent. Job gains of 1,000 in *Personal and laundry services* were countered by a 600-job loss in *Religious, grantmaking, civic, and similar organizations.* Nationally, payrolls grew by 1.5 percent in 2017.

GOVERNMENT

Jobs in the public sector increased by 4,600 or 0.8 percent in 2017. Most of this increase occurred in the *State government educational services* sector (+2,100). Nationally, employment levels moved higher by 0.4 percent in 2017.

Michigan Job Growth 2015-2017

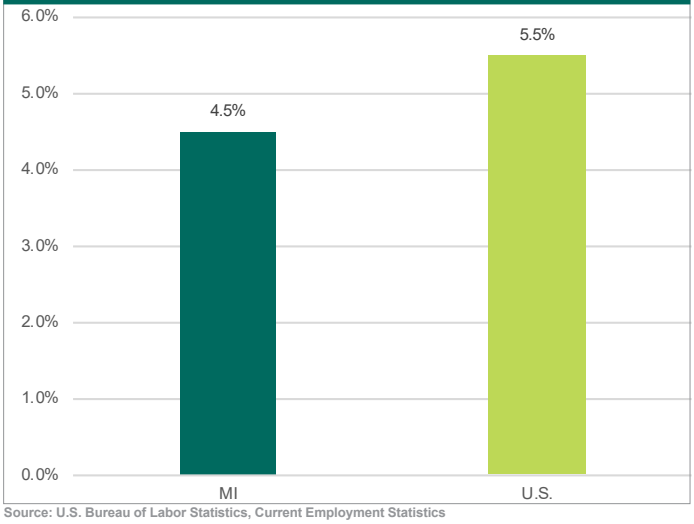
Between 2015 and 2017, total nonfarm employment in Michigan advanced by 189,600 or by 4.5 percent. This was below the 5.5 percent growth rate nationally during this period. In Michigan, three major industry sectors accounted for more than half of these job additions. These sectors were *Manufacturing* (+40,400 jobs), *Trade, transportation, and utilities* (+29,600 jobs), and *Education and health services* (+28,200 jobs).

Michigan's *Manufacturing* sector also ranked high nationally in job creation over the past three years. In numeric terms, Michigan has ranked either first or second in the total number of *Manufacturing* jobs added for the years of 2015 through 2017. In the Great Lakes Region, which consists of Illinois, Indiana, Michigan, Ohio, and Wisconsin, Michigan has ranked first in both the number of *Manufacturing* jobs added over the past three years and in the rate of industrial job expansion.

Automotive and related manufacturing industries including *Transportation equipment manufacturing, Primary metals, Fabricated metals, Machinery manufacturing, and Plastic and rubber products manufacturing* accounted for 26,100 or nearly two-thirds of the Michigan *Manufacturing* jobs added over the last three years. The *Computer and electronic product* manufacturing sector has also added about 2,000 jobs since 2014, as the production of electronic components were impacted by increased car sales.

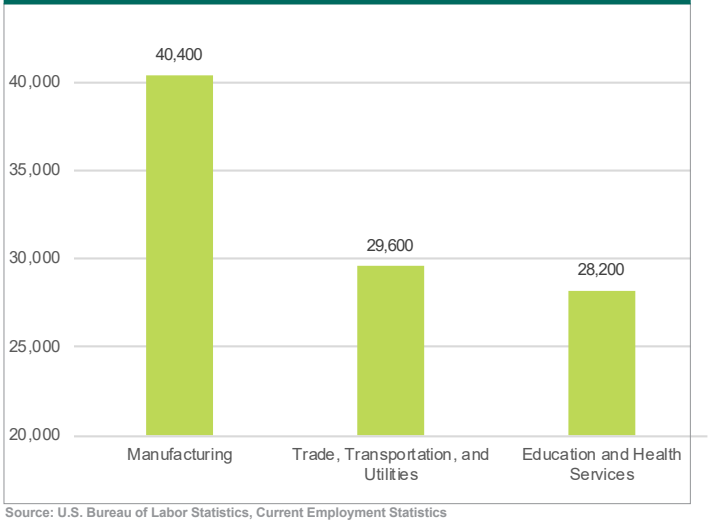
Since 2014, job growth in *Trade, transportation,*

FIGURE 2-4. Michigan and U.S. 3-Year Job Growth, 2015-2017



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

FIGURE 2-5. Top 3 Michigan Industries with Largest 3-Year Net Job, 2015-2017



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

FIGURE 2-6. Michigan Manufacturing Job Ranking

YEAR	OVER THE MONTH		OVER THE YEAR	
	NUMERIC GROWTH	PERCENT GROWTH	NUMERIC GROWTH	PERCENT GROWTH
2015	2	6	1	1
2016	1	7	1	1
2017	1	12	1	1

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

FIGURE 2-7. Automotive and Related Manufacturing Industries Job Change, 2015-2017

INDUSTRY	JOB CHANGE
Manufacturing	**40,400**
Transportation Equipment Manufacturing	18,700
Plastic and Rubber Products Manufacturing	3,900
Machinery Manufacturing	3,600
Computer and Electronic Product Manufacturing	2,100
Primary Metal Manufacturing	0
Fabricated Metal Product Manufacturing	-100

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

and utilities took place in all three of the component sectors of *Wholesale Trade* (+6,600 jobs), *Retail trade* (+11,800 jobs), and *Transportation, warehousing, and utilities* (+11,200 jobs). The payroll additions in *Education and health services* occurred in the *Health care and social assistance* sector (+28,700) since 2014.

Industry Structure

Michigan's employment distribution by industry during 2017, or industry structure, shows that 17.9 percent of total nonfarm payrolls were in the *Goods-producing* sector with 82.1 percent of industry jobs located in the *Service-providing* sector. Nationally, this distribution was 13.7 percent and 86.3 percent, respectively.

GOODS-PRODUCING SECTOR

The industry sectors that make up the *Goods-producing* group are *Mining and logging, Construction, and Manufacturing*. In Michigan, *Goods-producing* jobs are concentrated in the *Manufacturing* sector. During 2017, *Manufacturing* jobs accounted for 14.1 percent of total nonfarm employment. This was significantly higher than the 8.5 percent *Manufacturing* share nationally. Michigan's higher proportion of *Manufacturing* employment is largely due to the presence of the state's vital automotive industry. In 2017, the *Transportation equipment manufacturing* industry accounted for 30.5 percent of *Manufacturing* jobs and 4.3 percent of total nonfarm jobs. These proportions are significantly higher than the respective 13.1 percent and 1.1 percent shares nationally.

The *Manufacturing* and associated auto-related job shares have notably diminished, however, both in Michigan and nationally over the past 17 years. In the year 2000, the *Manufacturing* sector in Michigan accounted for a larger 18.9 percent of total industry jobs with the *Transportation equipment manufacturing* industry accounting for 7.2 percent of total nonfarm employment. Nationally, the *Manufacturing* sector employed 13.1 percent of jobs in 2000 with the *Transportation equipment manufacturing* industry accounting for 1.6 percent of this total.

The *Construction* sector employed 3.7 percent of total nonfarm workers in Michigan in 2017 while the *Mining and logging* industry employed 0.2 percent. The comparable figures nationally are 4.7 percent and 0.5 percent, respectively.

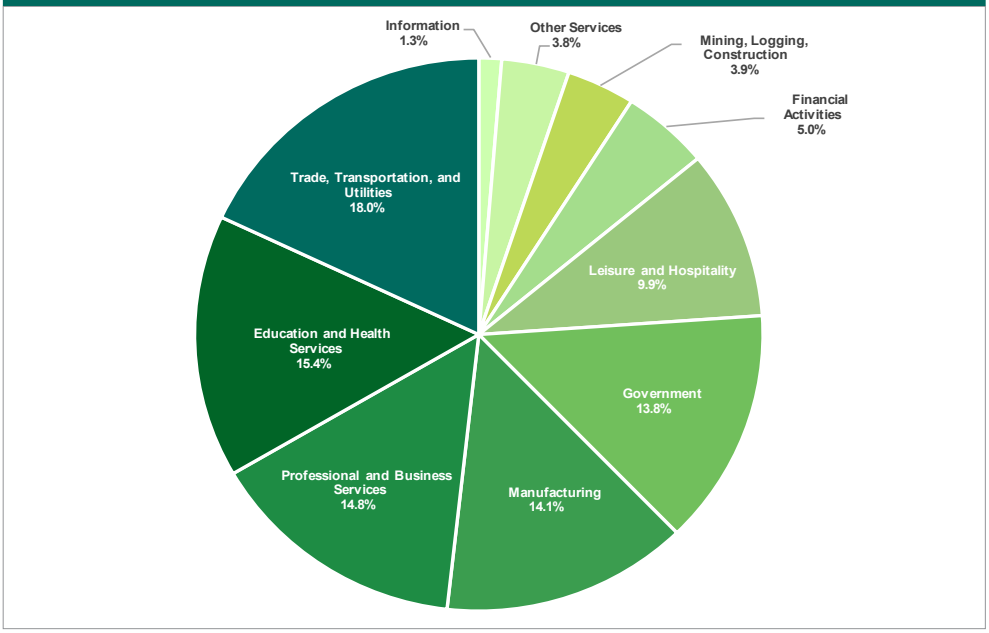
SERVICE-PROVIDING INDUSTRIES

The major industry sectors that comprise the *Service-providing* group include *Trade, transportation, and utilities, Information, Financial activities, Professional and business services, Education and health services, Leisure and hospitality, Other services,* and *Government.* The *Service-providing* industries accounted for 82.1 percent of total nonfarm payroll employment in Michigan during 2017. This proportion was noticeably lower than the 86.3 percent share nationally. In the year 2000, these shares were 76.4 percent and 81.3 percent, respectively.

In Michigan during 2017, the broad service sectors with the largest share of total nonfarm jobs were *Trade, transportation, and utilities* (18.0 percent), *Education and health services* (15.4 percent), and *Professional and business services* (14.8 percent). The *Professional and business services* category is the only broad service sector that employs a larger proportion of workers in Michigan than nationally (14.0 percent). The higher-than-national average proportion of Michigan workers in *Professional and business services* is partially due to the significant link to the automotive industry in the *Architectural, engineering, and related services* subsector. In 2017, this subsector accounted for 1.9 percent of total payroll jobs in Michigan compared to 1.0 percent nationally.

The broad industry sector with the largest shift in the proportion of total nonfarm jobs was *Education and health services.* In 2000, this sector accounted for 10.7 percent of payroll employment. By 2017, this proportion had jumped to 15.4 percent, an increase of 4.7 percentage points. Nearly all this shift occurred in the *Health care and social assistance* (+4.1 percentage points) industry.

FIGURE 2-8. Industry Sector Job Share, 2017



Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

Other *Service-providing* industries that have attained a larger share of Michigan industry jobs since 2000 include *Leisure and hospitality* (+1.4 percentage points), *Professional and business services* (+0.9 percentage points), *Financial activities* (+0.5 percentage points), and *Other services* (+0.1 percentage points). The broad industry categories with a reduced share since the year 2000 are *Government* (-0.8 percentage points), *Trade, transportation, and utilities* (-0.8 percentage points), and *Information* (-0.3 percentage points).

Major Industry Sectors Report All Time High Job Levels

The published total nonfarm employment series by industry sector dates to 1990. These series indicate that the majority of major Michigan industry sectors recorded employment peaks in the year 2000 or before. Two broad industry sectors posted job highs in the years following the 2001 national recession, and three major sectors reached peak job levels in 2017.

Total payroll jobs in Michigan reached a peak of 4,675,700 in the year 2000. Starting with the 2001 national recession, the number of payroll jobs in Michigan began a steady decline and reached a low of 3,863,600 in 2010. The period of 2011 to 2017 saw rising job levels with 4,371,300 Michigan payroll jobs in 2017. As a result, Michigan nonfarm payrolls remain 304,400 (-6.5 percent) below the year 2000 peak level.

Surprisingly, about half of the 11 major Michigan industry sectors registered peak job levels in the year 2000 or earlier. These include *Mining and logging, Construction, Manufacturing, Trade, transportation, and utilities, Information,* and *Professional and business services*.

In terms of the actual number of jobs, the *Manufacturing* sector has the largest job deficit since its peak employment level in 1999. Job loss in the *Transportation equipment manufacturing* (-143,600 jobs) subsector accounted for over half of the 1999 to 2017 job cut in overall *Manufacturing*. When the other traditional automotive-related manufacturing industries of *Primary metals, Fabricated metals, Machinery manufacturing*, and *Plastic and rubber products manufacturing* are included, the automotive-related sector's share of *Manufacturing's* job decline since 1999 in Michigan jumps to 79 percent.

The table below presents major Michigan industries with peak year job levels, 2017 job levels, and the numeric and percent changes over these time frames.

The broad Michigan industry sectors with job peaks since 2001 are displayed in the table below. *Other services* and *Government* reached peak job levels in 2005 and 2002, respectively.

Three major industry sectors registered peak job levels in the year 2017. These sectors were *Financial activities* (218,100 jobs), *Education and health services* (671,300 jobs), and *Leisure and hospitality* (432,500 jobs). The *Financial activities* and *Leisure and hospitality* sectors reached recessionary lows in 2010 and have recorded payroll expansions of 15.9 percent and 14.5 percent respectively through 2017. These growth rates were above the increase in total nonfarm payrolls of 13.1 percent during this period.

The *Education and health services* sector continued to add jobs, even throughout the duration of the most recent recession. These job gains were concentrated in the *Health care and social assistance* subsector. Since 2010, job levels in the broad sector have grown by 59,500 or 9.7 percent.

Trends to Watch

According to the University of Michigan's Research Seminar in Quantitative Economics (RSQE) November 2017 forecast, Michigan's Total nonfarm employment is expected to grow by approximately 1.0 percent in 2018 and by 1.1 percent in 2019. These expected growth rates are similar to the 1.2 percent expansion recorded during 2017.

RSQE anticipates the broad private industry sectors of *Professional and business services* (+2.7 percent), *Construction* (+2.7 percent), *Financial activities* (+1.5 percent), and *Other services* (+1.1 percent) to record the largest job growth during 2018.

The major sectors projected to experience a modest decline in jobs during 2018 are *Natural resources and mining* (-0.4 percent) and *Manufacturing* (-0.8 percent). Payrolls in the state's key *Transportation equipment manufacturing* sector are expected to fall by 2.0 percent in 2018.

The RSQE forecast for 2019 indicates the largest job expansion is expected in *Construction* (+3.4 percent), *Professional and business services* (+2.7 percent), *Leisure and hospitality* (+1.8 percent), and *Financial activities* (+1.3 percent).

The broad sectors of *Manufacturing* (-0.6 percent) and *Natural resources and mining* (-1.2 percent) are again projected to be the two sectors with modest payroll decreases in 2019.

JEFFREY AULA
Economic Analyst

FIGURE 2-9. Major Industry Sectors with Job Peak in 2000 and Prior

INDUSTRY	PEAK YEAR	PEAK JOB TOTAL	2017 JOB TOTAL	DIFFERENCE	
				LEVEL	PERCENT
Total Nonfarm	**2000**	**4,675,700**	**4,371,300**	**-304,400**	**-6.5%**
Mining and Logging	1990	11,500	7,100	-4,400	-38.3%
Construction	2000	209,700	162,800	-46,900	-22.4%
Manufacturing	1999	887,800	614,700	-273,100	-30.8%
Trade, Trans. & Utilities	2000	881,200	788,100	-93,100	-10.6%
Information	2000	72,700	56,500	-16,200	-22.3%
Professional & Bus. Services	2000	651,100	648,200	-2,900	-0.4%

FIGURE 2-10. Major Industry Sectors with Job Peak Since 2001

INDUSTRY	PEAK YEAR	PEAK JOB TOTAL	2017 JOB TOTAL	DIFFERENCE	
				LEVEL	PERCENT
Total Nonfarm	**2000**	**4,675,700**	**4,371,300**	**-304,400**	**-6.5%**
Other Services	2005	179,600	168,100	-11,500	-6.4%
Government	2002	686,600	604,000	-82,600	-12.0%
Financial Activities	2017	218,100	218,100	0	0.0%
Education and Health Services	2017	671,300	671,300	0	0.0%
Leisure and Hospitality	2017	432,500	432,500	0	0.0%

Source: U.S. Bureau of Labor Statistics, Current Employment Statistics

MICHIGAN'S OCCUPATIONAL EMPLOYMENT AND WAGES IN 2017

Each year, the Bureau of Labor Market Information and Strategic Initiatives conducts the Occupational Employment Statistics (OES) survey, which is a federal-state cooperative program with the U.S. Bureau of Labor Statistics (BLS). This program annually surveys approximately 400,000 nonfarm establishments nationwide, including 11,000 in Michigan to collect employment and wage information for over 800 Standard Occupational Classification (SOC) job titles. This is the only official survey that provides employment levels and mean/median wages for individual occupations for the nation, states, and metro and nonmetropolitan areas.

Figure 3-1 shows the intermediate occupational groups in descending order by median wage. According to OES data, 2017 overall occupational employment in Michigan was 4,276,000. The median occupational wage in Michigan was $17.62 per hour, which was lower than the national median of $18.12, and ranked 24th overall among states. It should be noted that the OES total employment number may differ from other surveys or programs because it does not include agricultural or self-employed jobs.

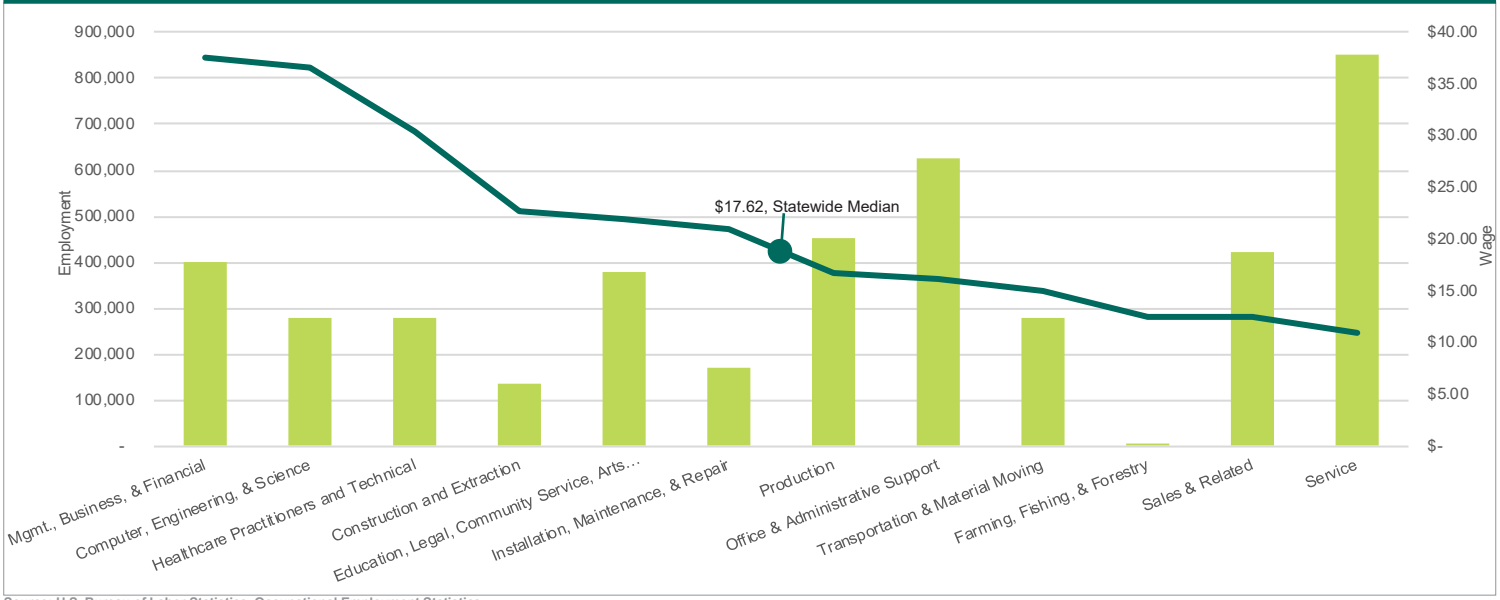
The group with the highest overall employment was *Office and administrative support occupations,* as was the case in every state and territory except Washington D.C. The major group with the highest wage was *Management occupations,* at 398,370 jobs. This also follows the national trends, occurring in all but six states or territories in the U.S.

The second highest employer in Michigan among major occupational groups was *Production occupations,* which differed from most of the nation largely due to the predominance of domestic auto manufacturing. Michigan has the fifth highest concentration of *Production occupations* in the U.S. This group also has a slightly higher median hourly wage at $16.69 than the national wage of $16.34, but remains below the statewide median.

A group with significant employment and a median wage above the statewide average is *Healthcare practitioners and technical occupations*. This group is made up of some of the highest wage occupations, with many physician occupations earning over $80 per hour, along with one of the occupations with the highest employment totals in the state, *Registered nurses.*

Figure 3-2 shows the distribution of jobs by hourly wage in Michigan. About 58 percent of all occupations in Michigan paid $20 per hour or less, with almost 16 percent paying under $10. On the other end of the scale, about 12 percent of workers were earning over $40 per hour, and a little over one percent of workers earned over

FIGURE 3-1. Wages and Employment of Intermediate Groups in Descending Order by Median Wage



Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics

$90. This distribution is on par with the shares seen nationally, and is heavily influenced by the high job counts in certain common low wage occupations with minimal education and training requirements.

Wages and Employment by Select Occupational Group

Beyond the broader groups previously mentioned, the SOC classification system also combines occupations into minor groups. These are small groups that are comprised of related individual occupational titles. Highlighting a few of these minor groups can give a broader view than looking at specific occupations. The four upcoming are select groups that are an important part of Michigan's economy.

METAL WORKERS AND PLASTIC WORKERS

Metal workers and plastic workers was the largest production occupational group with employment of 138,570, making up 31 percent of all production occupations, and 3.2 percent of all jobs in Michigan. The concentration of jobs in this category was much lower nationally, at only 21 percent of production occupations, and 1.3 percent of all occupations in the U.S. This was the largest gap between Michigan and national concentrations of any occupational category. This group was one of only two non-supervisory production categories with a wage ($17.91) higher than the statewide median, but it was slightly below the national hourly wage of $18.37 for this group.

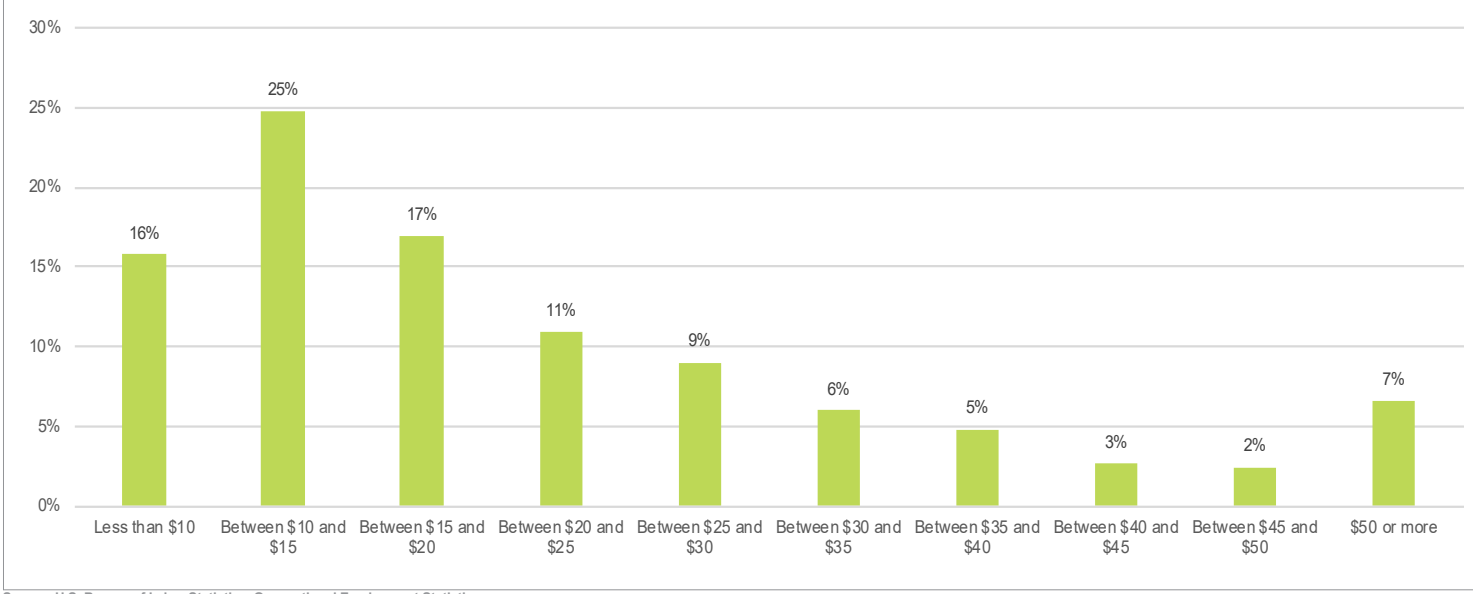
This group is made up of 26 occupations that ranged in employment from 180 (*Layout workers, metal and plastic*) to 26,970 (*Machinists*), and in hourly wages from $14.25 (*Plating and coating machine operators*) to $30.73 (*Model makers, metal and plastic*). Figure 3-3 shows the top five jobs in this group by employment, with respective wage rates. *Tool and die makers* is a top occupation in number of jobs and average wage, and has the second highest location quotient in Michigan.

This group contains some of the key jobs in Michigan's defining industry - *Manufacturing*. These occupations all require less training and education than a bachelor's or associate's degree, but still offer opportunity for wages at or above the overall median wage in Michigan.

CONSTRUCTION TRADES WORKERS

Construction trades workers is another important group in Michigan that provides good paying jobs without a need for a bachelor's degree. Most of

FIGURE 3-2. Michigan Distribution of Jobs by Hourly Wage



Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics

the occupations in this group are considered skilled trades, and they had a median hourly wage of $22.17, over four dollars higher than the statewide median, and about one dollar higher than the national median of $20.91. This category consists of most of the construction occupations in Michigan (82 percent), with employment of 110,850. However, the Michigan share of jobs in this category is below the national concentration.

This group is comprised of 27 occupations that range in employment from 50 (*Paperhangers*) to 22,780 (*Electricians*) employees. Median hourly wages vary from $15.00 (*Floor layers, except carpet, wood, and hard tiles*) to $34.61 (*Pile-driver operators*). Figure 3-4 displays the top five jobs in this group by employment.

Of the large occupations in Figure 3-4, *Electricians* was the only one with a location quotient above 1.0. So, despite these skilled trades occupations providing good earning potential, they are less concentrated in Michigan than the rest of the country.

ENGINEERS

Engineers is one of the strongest occupational groups in Michigan in terms of both employment and wages. It differs from the previous two categories in that all the occupations in this group require at least a bachelor's degree. Because of this, its median hourly wage was about double the other two groups at $41.60, although this wage was slightly below the national median of $44.34. *Engineers* had a Michigan employment level of 110,460, which was 2.6 percent of all jobs in Michigan, over double the national concentration of 1.2 percent.

This group consists of 16 occupations that range in job count from 90 (*Mining and geological engineers*) to 44,680 (*Mechanical engineers*). Engineer hourly wage rates range from $34.82 (*Biomedical Engineers*) to $49.34 (*Petroleum engineers*). Figure 3-5 lists the top jobs in this group sorted by employment.

The top two jobs by employment, *Mechanical engineers* and *Industrial engineers,* also have higher location quotients in Michigan than anywhere in the nation, and *Electrical engineers* in Michigan have the second highest location quotient. This shows just how important engineering jobs are to Michigan, with these three occupations comprising a much higher-than-average share of total jobs.

PRESCHOOL, PRIMARY, SECONDARY, AND SPECIAL EDUCATION SCHOOL TEACHERS

Preschool, primary, secondary, and special education school teachers is another group that typically requires a bachelor's degree, but unlike *Engineers* the job concentration is low in Michigan. There were 92,330 employees in this group, which was 2.2 percent of all employment in Michigan, but this lags well behind the 2.9 percent this group made up nationally. There is not any one occupation that accounts for this difference as all the occupations in this group were slightly behind the national job share. Of all the states, Michigan ranked second to last in job concentration for this group, ahead of only Nevada. However, the median wage for this category was $59,500 (there is no hourly wage, because of the nature of the

FIGURE 3-3. Top Metal and Plastic Workers by Employment

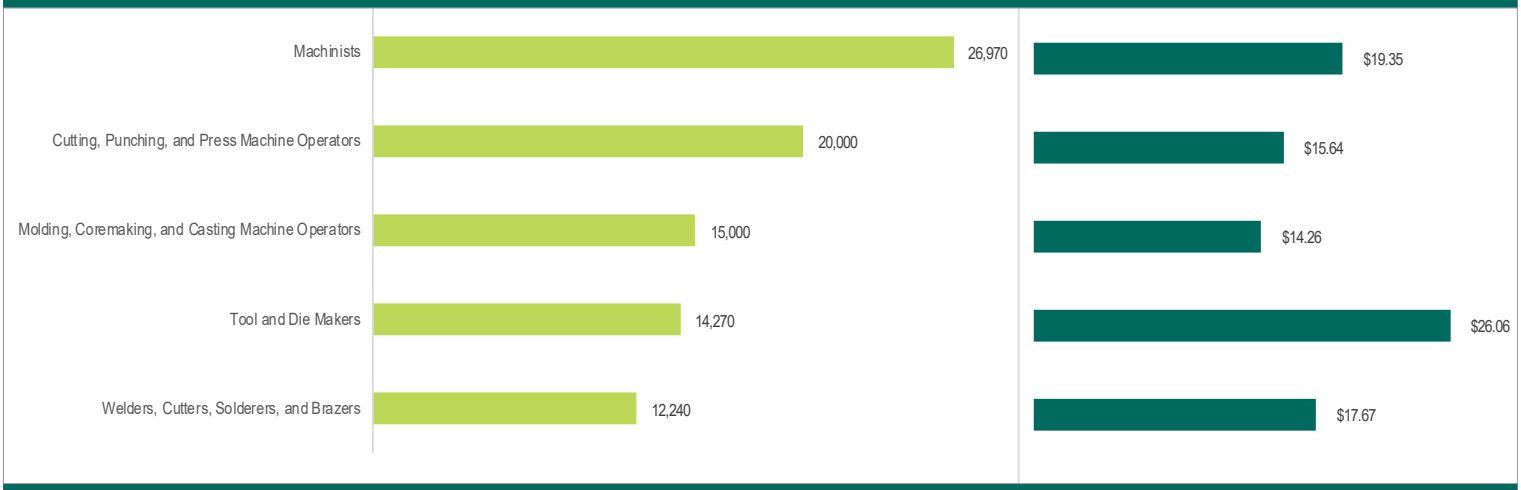
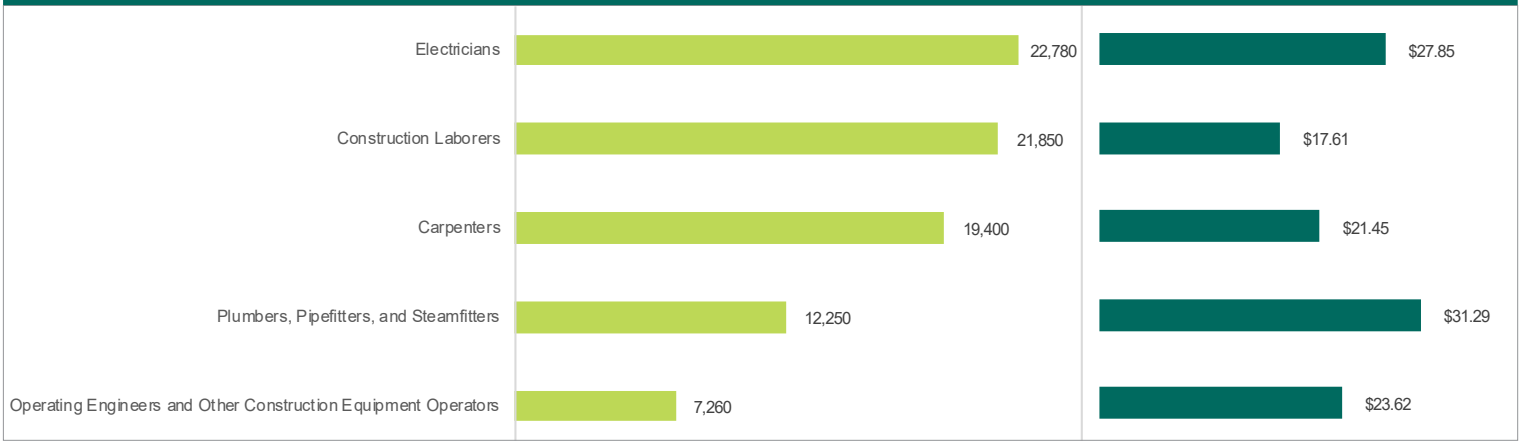


FIGURE 3-4. Top Construction Trade Workers by Employment



Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics

schedules for most occupations in this group), slightly ahead of the national median wage of $55,790. There are 12 detailed occupations in this category, with job levels ranging from 140 (*Career/technical education teachers, middle school*) to 38,080 (*Elementary school teachers, except special education*), and wages ranging widely from $28,990 (*Preschool teachers, except special education*) to $71,800 (*Special education teachers, all other*). Figure 3-6 contains the top five occupations in this category by employment. There is not much variation in the wages of the top five jobs, with the exception of *Preschool teachers,* the only occupation in the group not requiring at least a bachelor's degree.

Educational Attainment and Other Special Categories

EDUCATION

The BLS releases a list of the typical education requirements for each of the 800+ detailed occupations. Data on wages by education clearly demonstrate that occupations requiring higher educational attainment receive higher average wage rates. Occupations that require a bachelor's degree or above have higher median wages, higher starting wages, and much higher experienced wages, which demonstrates their earning potential. Compared to occupations requiring just a high school diploma, those requiring an associate's degree had median hourly wages about eight dollars higher, and those requiring a bachelor's were seventeen dollars higher. Looking at the top of the wage range, jobs requiring an associate's degree earned wages about six dollars per hour higher, while occupations requiring a bachelor's degree earned a significant thirty dollars per hour higher.

The most common educational requirements for jobs in Michigan were a high school diploma and no formal educational credential. Occupations with these two requirements accounted for over 63 percent of all jobs in Michigan. Occupations requiring a bachelor's degree were the third most prevalent. These concentrations were very similar at the national level, with Michigan having a slightly higher share of occupations requiring a high school diploma, and slightly less requiring a bachelor's degree or having no formal requirement. There were more occupations in Michigan requiring a bachelor's degree than all other postsecondary awards combined.

Nationally, Michigan ranked 21st among states and territories in the U.S. in the concentration of occupations requiring a bachelor's degree. Three metro areas that stood out in Michigan for the share of jobs requiring a bachelor's degree were Ann Arbor, Lansing, and Detroit, with Ann Arbor ranking 9th (28.9 percent), Lansing ranking 33rd (24.7 percent), and Detroit ranking 44th (23.9 percent) among 395 metro areas tracked in the U.S. All three of these areas had over 50,000 jobs requiring bachelor's degrees, with Detroit having over 400,000.

FIGURE 3-5. Top Engineering Jobs by Employment

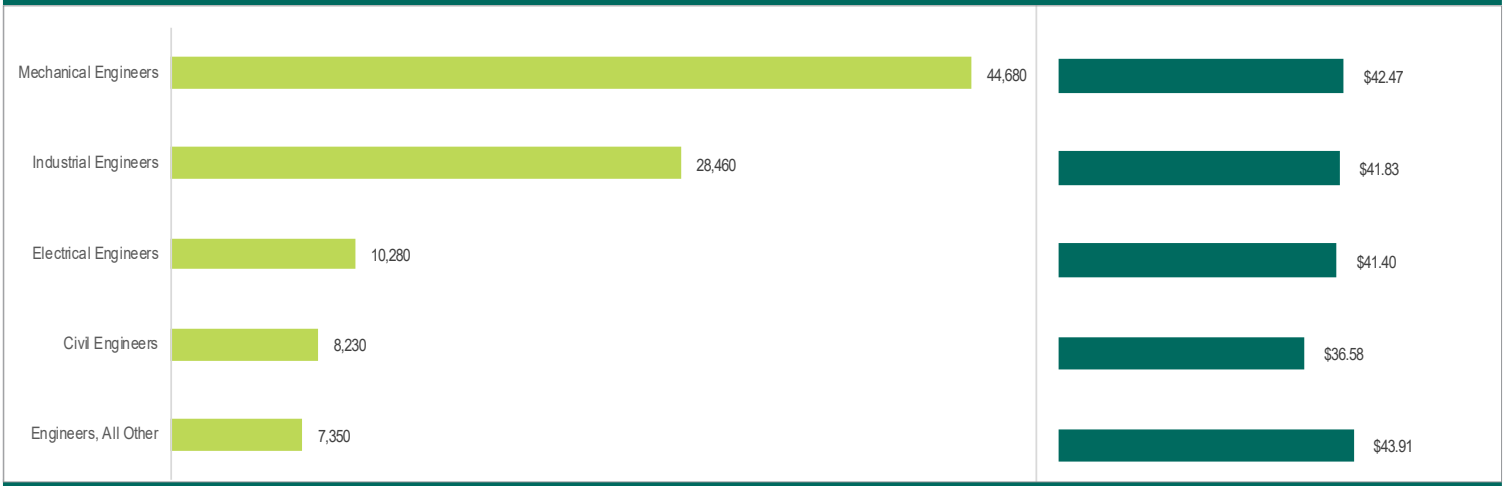
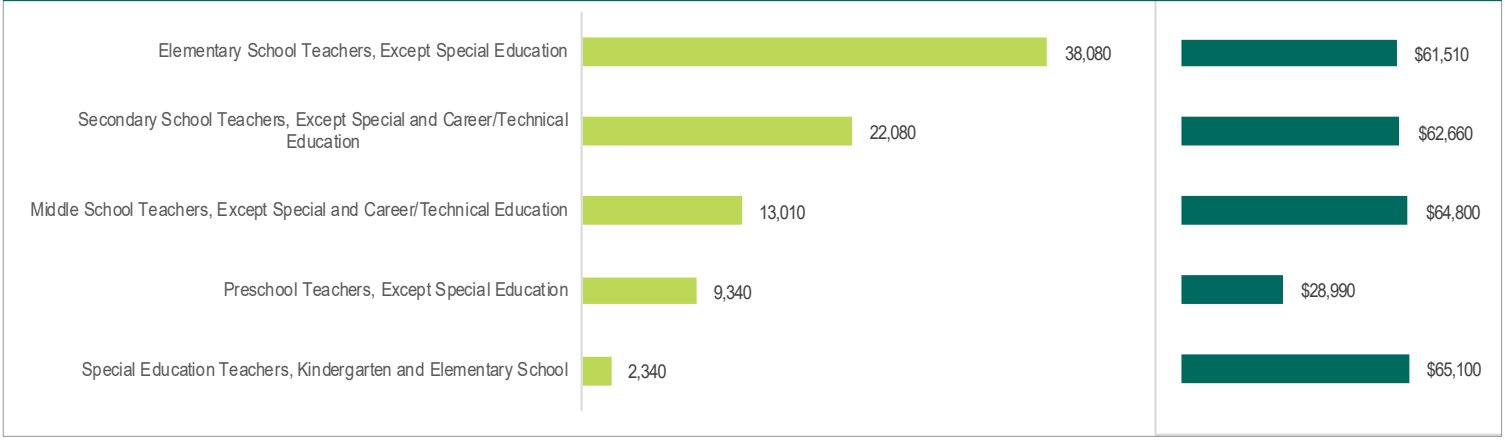


FIGURE 3-6. Top Teaching Jobs by Employment



Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics

STEM JOBS

An important subset of occupations that require at least a bachelor's degree are STEM (science, technology, engineering, and math) jobs. These occupations are typically high-wage, in-demand positions. Michigan is very strong in STEM occupations, ranking 9th in the U.S. in terms of concentration, with 7.3 percent of all occupations falling in STEM fields. Michigan's strength in STEM is due to the abundance of engineering and engineering-related occupations. Figure 3-9 shows that *Engineers* was the largest group of Michigan STEM occupations, and *Engineering technicians* were also high on the list. This contrasts with the national concentration where computer occupations were overwhelmingly the largest STEM group with more than double the concentration of engineering occupations.

In Michigan, STEM occupations had a median hourly wage of $37.83, much higher than the statewide median of $17.62 and the non-STEM median wage of $16.69. The median hourly wage for the STEM sub-groups ranged from $20.27 (*Life and physical science technicians*) to $58.65 (*Stem-related management*), with the largest groups in Michigan having median wages of $41.60 (*Engineers*), $36.31 (*Computer occupations*), and $24.85 (*Drafters, engineering technicians, and mapping technicians*). The overall median wage for STEM, and the medians for *Engineers and Computer occupations*, were also all higher than the median wage for occupations requiring a bachelor's degree of $34.00.

Michigan also had several metro areas that were strong in STEM concentration, and unsurprisingly these were areas that also ranked highly in having occupations that require a bachelor's degree. Ann Arbor and Detroit both ranked in the top 20 in the U.S. Ann Arbor was 18th with 10.1 percent of jobs being in STEM fields, and Detroit was 20th with 9.6 percent. However, there was a vast difference in the employment levels with Ann Arbor only having about 21,000 STEM jobs, while Detroit had around 188,000. Grand Rapids had the second most STEM jobs in Michigan with about 30,000, but had a lower concentration at 5.5 percent.

INFORMATION TECHNOLOGY

Information Technology (IT) is a subset of STEM jobs that is increasingly vital to the Michigan economy. We identify IT jobs as those falling in the *Computer occupations* minor group combined with *Computer and Information systems managers* and *Computer hardware engineers.* The total Michigan employment for this group was 118,540, and the median hourly wage was $37.77. This was near the wage for STEM and above the overall wage for occupations requiring a bachelor's degree.

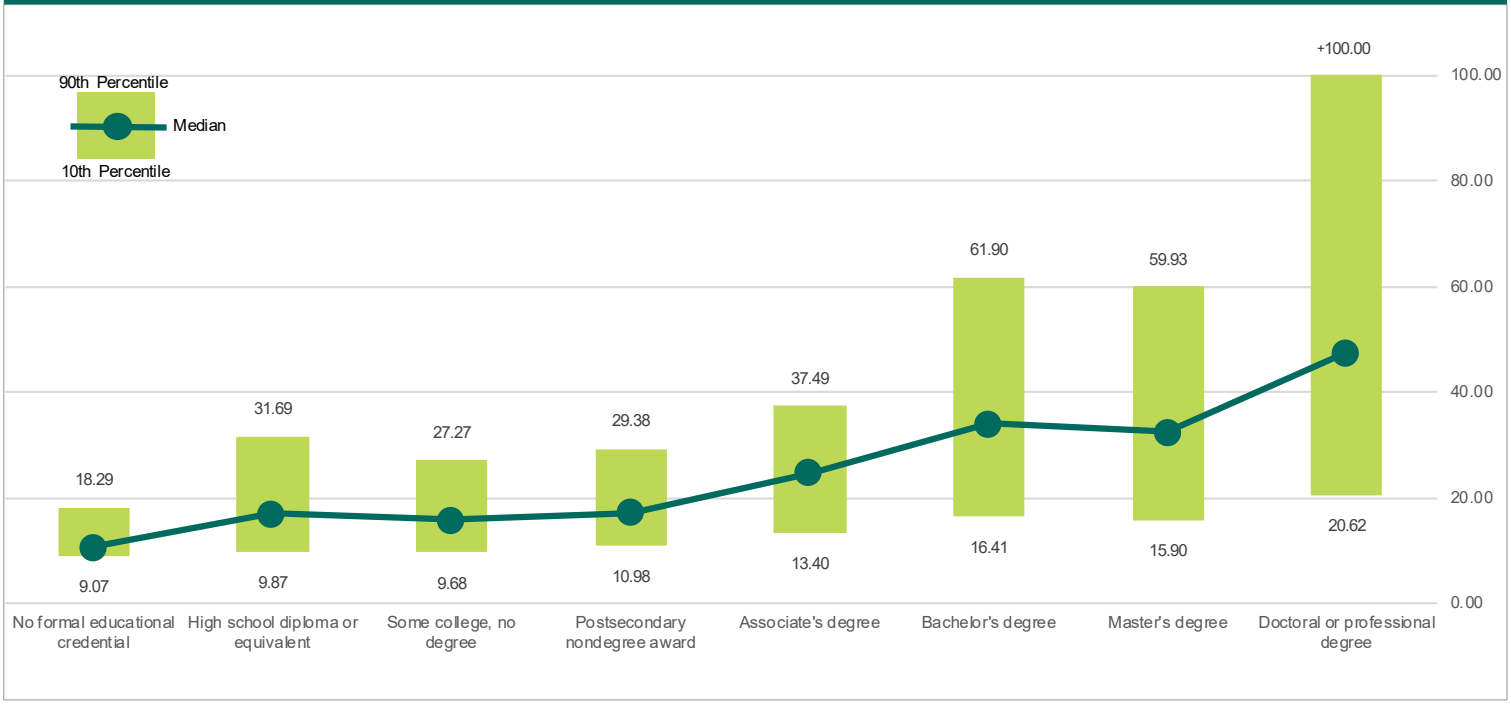
There are 17 occupations in this group; all of them are considered STEM occupations, and four are considered *Professional Trades*. Every occupation in this group makes at least five dollars per hour more than the statewide median, with the lowest wage occupation, *Computer user support specialists,* earning $22.75 per hour. All but three occupations in the group earn over $34.00, the median for all occupations requiring a bachelor's degree. Figure 3-10 shows the top occupations by employment in this group.

IT is a field that provides opportunities for high wages; there are no occupations in this group with low wages, and most of the occupations have a median wage that is at least double the statewide median. One thing to note is the high employment for the occupation *Computer occupations, all other.* This is a residual occupation that consists of several computer occupations that do not have their own designation. The OES program has been working to keep up with the rapid growth in IT jobs, and the 2018 SOC structure to be released next year will add new detailed occupations that will help in providing analysis of this group.

PROFESSIONAL TRADES

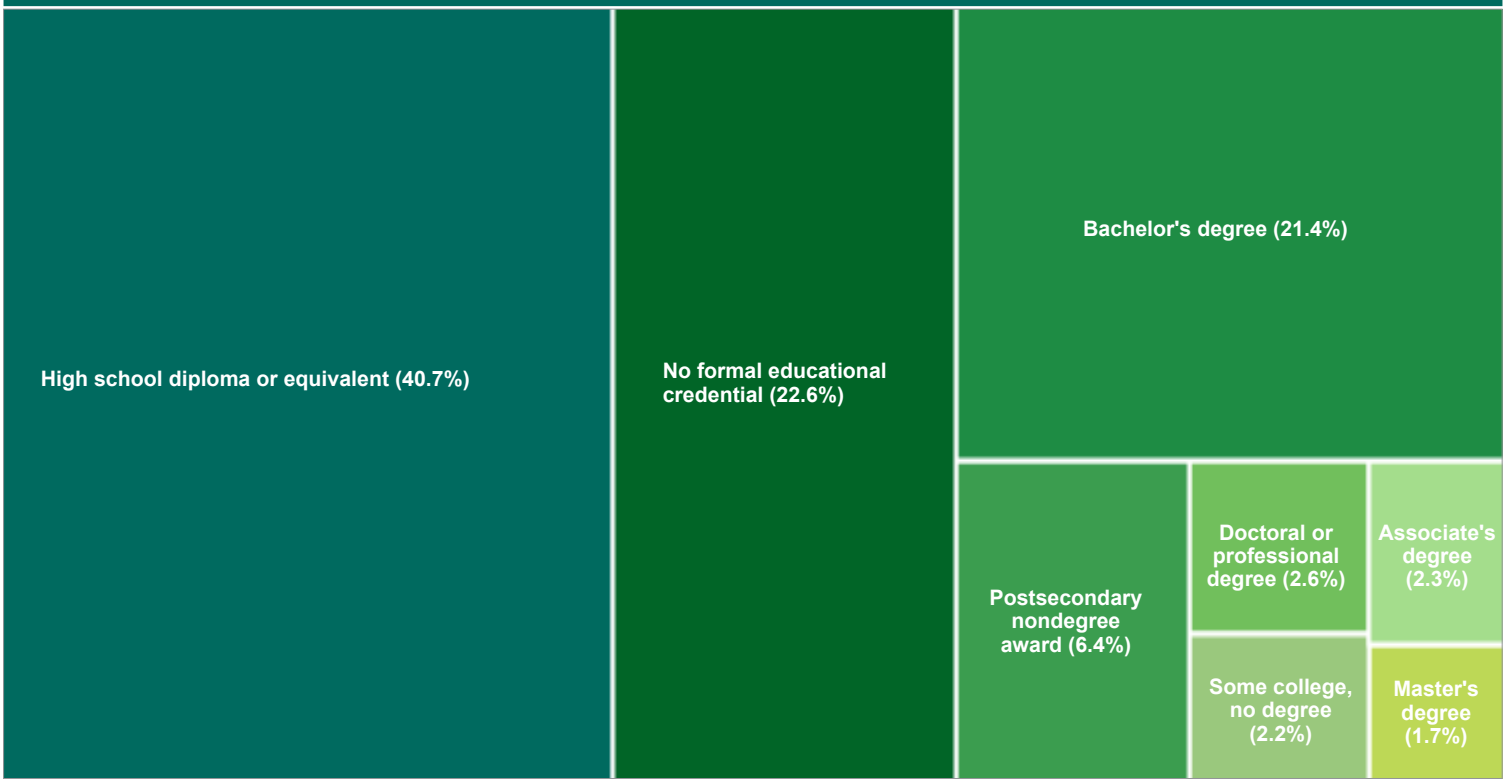
Like STEM occupations, *Professional Trades* is a group of occupations that requires postsecondary training and typically has higher pay than the statewide median. Although STEM occupations typically require a bachelor's degree or higher, *Professional Trades* tend to require on-the-job training, an apprenticeship, or a postsecondary nondegree award. *Professional Trades* occupations had a median hourly wage of $25.50,

FIGURE 3-7. Wage Ranges by Education



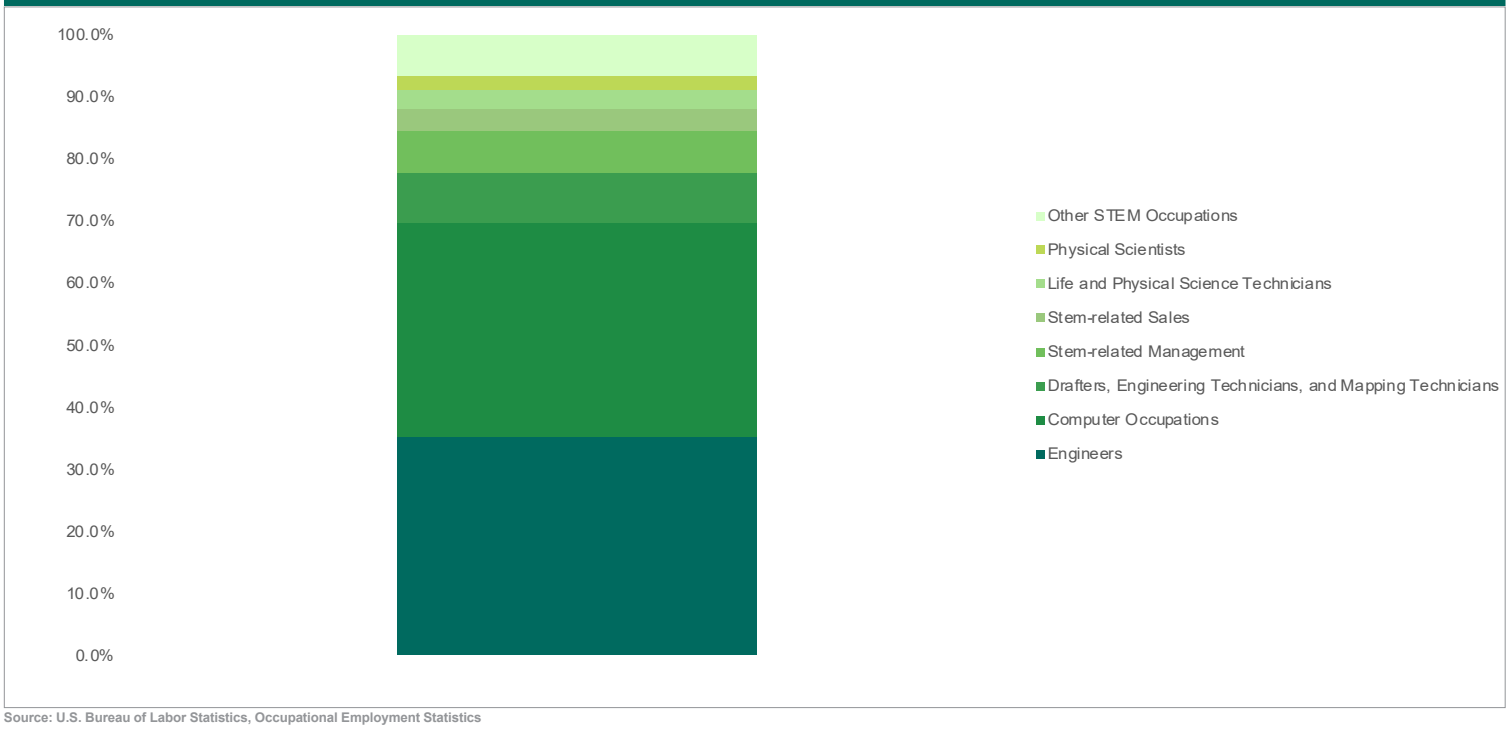
Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics

FIGURE 3-8. Concentration by Educational Attainment



Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics

FIGURE 3-9. Concentration of STEM Employment by Occupation Groups



Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics

which while not as high as STEM or occupations requiring a bachelor's degree, was much higher than the statewide median of $17.62. *Professional Trades* accounted for 469,930 jobs in Michigan, or 11 percent of all employment.

There are 63 occupations that make up the *Professional Trades* group, and of those only two make under the statewide median hourly wage. The wages ranged from $16.67 (*Dental laboratory technicians*) to $42.00 (*Elevator installers and repairers*). Figure 3-11 shows the top occupations by employment in this group. The strong pay and high concentration of jobs in Michigan make this a viable alternative for people not interested in pursuing a college degree.

Trends to Watch

Michigan's statewide median hourly wage increased slightly in 2017, up to $17.62 from $17.32, but was holding steady at 24th in the U.S. when compared to other states. While there was no change from the previous year, Michigan's national wage rank is down over the long run. Prior to the recession, Michigan typically had one of the 15 highest median wages in the nation. The question remains whether Michigan wages will be able to recover to that level, or continue at the recent modest ranking.

Michigan continues to rely heavily on *Manufacturing* as all top jobs by location quotient were either production workers or engineers/designers. Michigan also had very high concentrations of *Metal workers and plastic workers*, and *Engineers* compared to the U.S. These two groups had three of the top five occupations by location quotient in Michigan (*Model makers metal and plastic, Tool and die makers,* and *Mechanical Engineers*), and all three had location quotients increase in 2017, showing that Michigan's reliance on these types of occupations is strong.

While Michigan only ranked 21st in the U.S. for the share of occupations requiring a bachelor's degree, the state's ranking was much higher in the subcategory of STEM jobs, at 9th overall. This was largely due to the strength of the *Engineers* group in Michigan, which vastly outpaced the national concentration. This is a good sign for Michigan since STEM jobs tend to pay better wages on average than non-STEM jobs that also require a bachelor's degree.

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Economic Specialist

FIGURE 3-10. Top IT Jobs by Employment

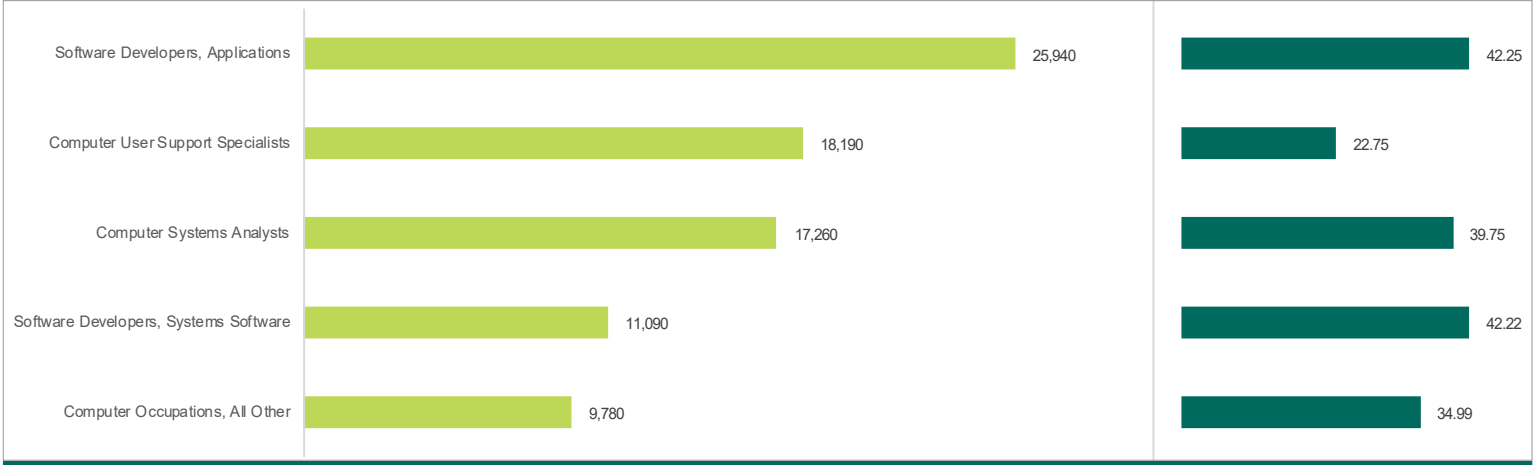
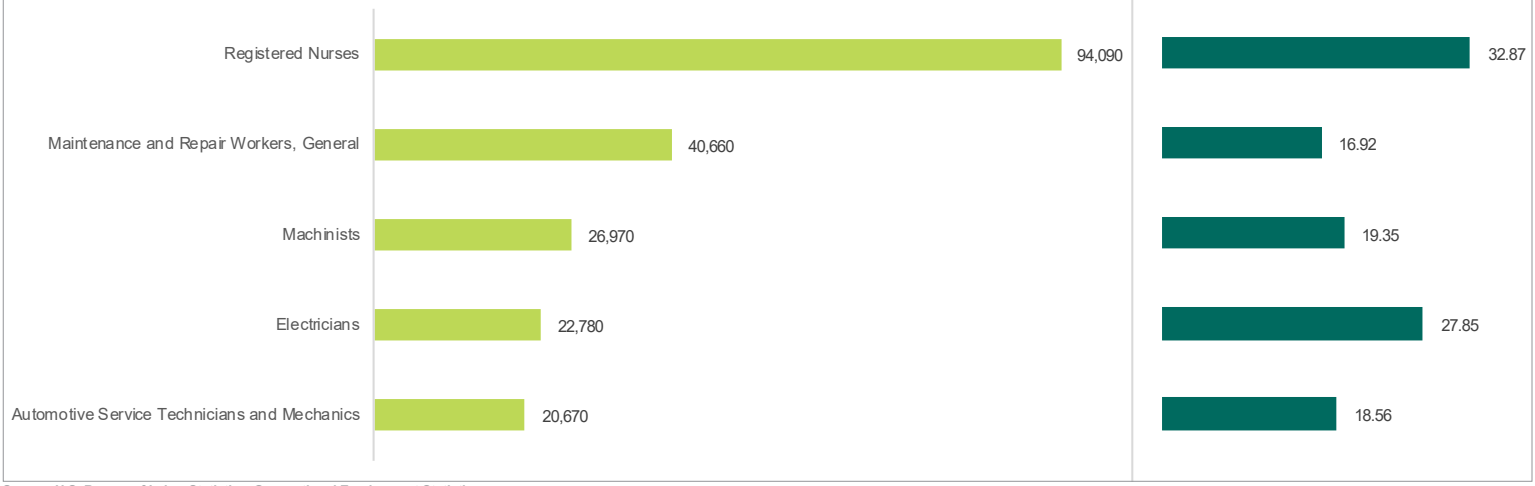


FIGURE 3-11. Top Professional Trades Occupations by Employment



Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics

DEMOGRAPHIC WORKFORCE TRENDS IN MICHIGAN

Michigan has recorded relative stability in population levels over the last ten years. Generally, the state has seen decade-to-decade increases in population, though there have been individual years where populations have declined. The period between 2000 and 2010 was the first time the state experienced a decennial census-to-census loss in population. Since the turn of the 21st century the state has seen more frequent and varied fluctuations in population.

The state's population rose throughout the 1990s and into the following decade, but growth began to slow and eventually reverse when the effects of significant economic issues began to take a toll on the state. As seen in Figure 4-1, Michigan's population reached a high point in 2004 at just over 10 million and then began to fall for the balance of the decade. The state's population then registered six years of small population increases. A highlight of 2017's Michigan's population trend was a gain greater than the state's natural change, pointing to positive net migration, which will be discussed later.

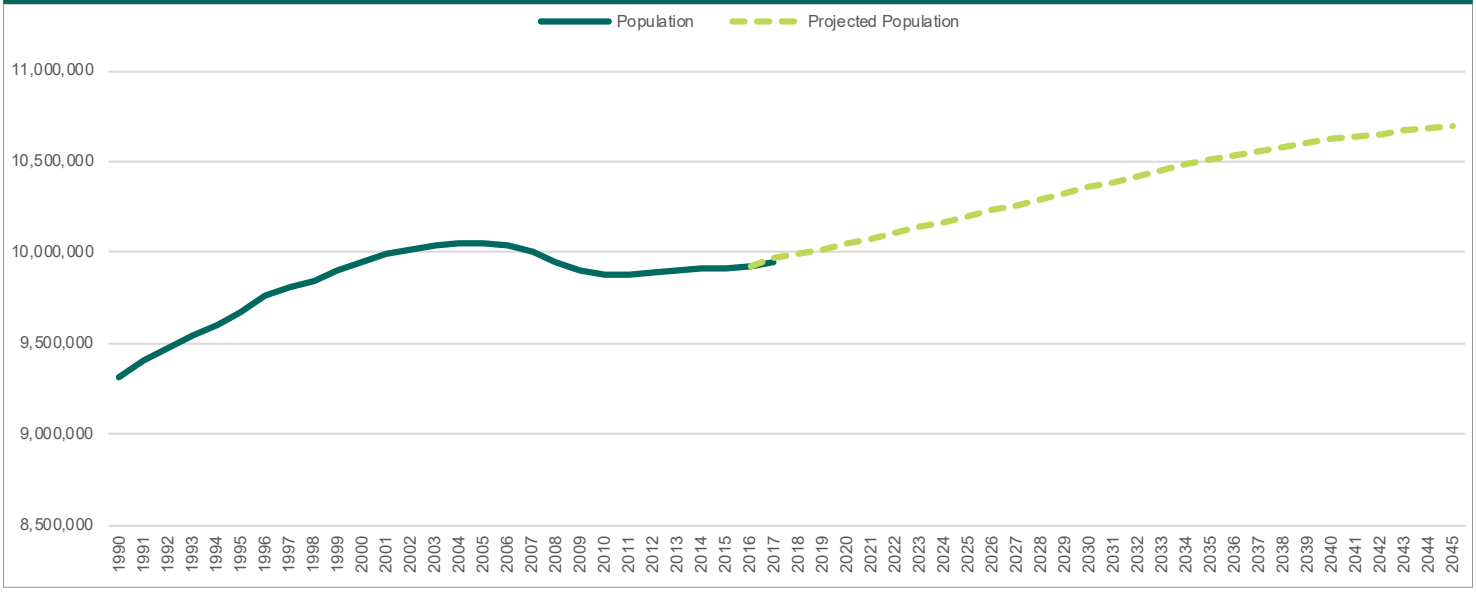
Population Projections and Components of Change

With current trends in place, Michigan's population is expected to advance to about 10 million residents around 2020 and may possibly surpass the peak population observed in 2004, sometime during the next decade.

Population change can only be attributed to two components: the interaction of natural change (births minus deaths) and net migration. Given the projected increase in the number of older persons and decreasing birth rates, Michigan's future population growth will be primarily attributed to migration and not natural change.

While migration is expected to be the primary driver of the population gains expected over the next couple of decades, one factor helping to explain this is related to the age structure of the population as shown in Figure 4-3. Retirements resulting from the large proportion of the population that has and will be exceeding the age of 65 over the projection period are expected to create job openings in a variety of positions.

FIGURE 4-1. Population Projections to 2045



Source: U.S Census Bureau, 2000 & 2010 Intercensal Estimages, 2017 Population Estimates; MDOT and U-M's Institute for Research on Labor, Employment, and the Economy (IRLEE)

As those workers retire, they will need to be replaced, and with current low unemployment, these job openings could remain unfilled as employers are met with potential labor shortages.

It is reasonable to expect that these openings will be filled by persons in the 25-44 year age groups that are now proportionally lower in Michigan than the nation. Employers will seek permanent replacements for retiring workers in the coming years. This process of bringing in younger workers should have a moderating effect on the increasing median age and declining raw birth numbers, but it will not change the long-term fertility patterns that have been trending downward for decades.

Vital statistics clearly show that any Michigan population shifts by natural change (births minus deaths) will not be a major contributor to growth in the population, as can be seen in Figure 4-2.

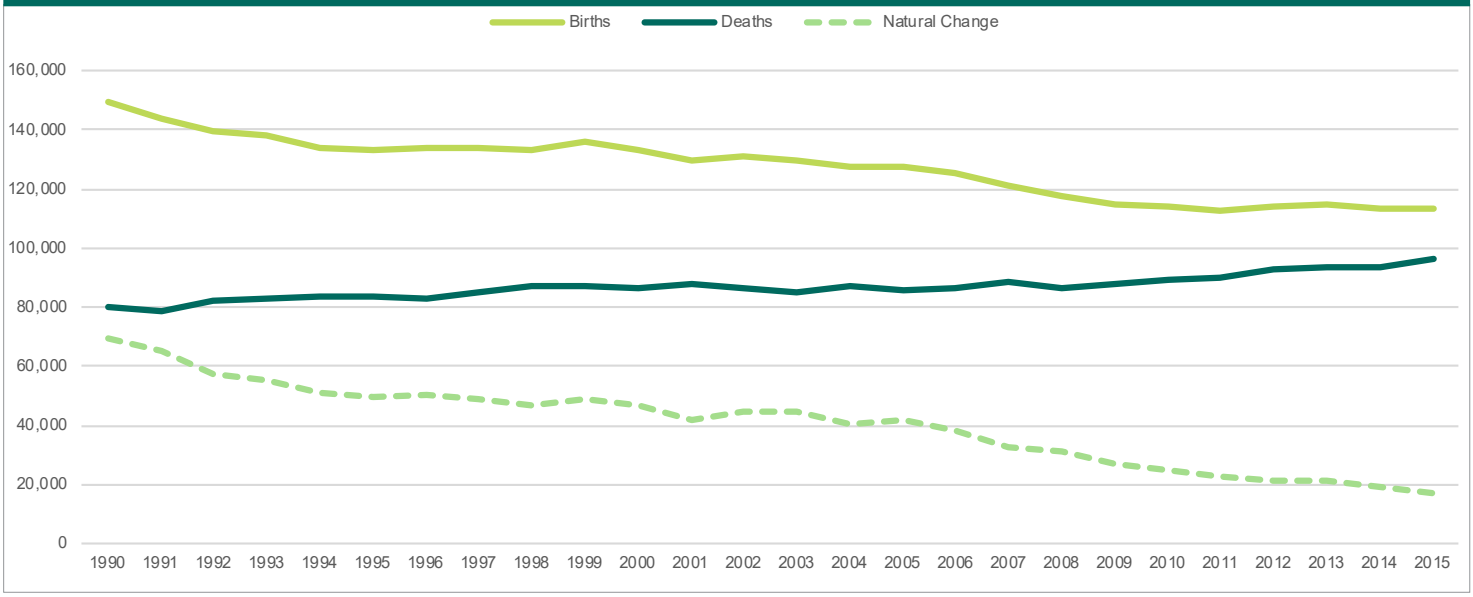
Births have continued the decades-long decline, and fertility for the Millennial Generation is projected to peak at a level lower than the previous two generations. Additionally, as the population ages, a larger proportion of the population will be subject to potential mortality. These two factors in combination will continue to bring down the natural change in the population, which is already at its lowest point since the early part of the last century during a period in which Michigan's population was considerably lower.

It is clear that migration will be the component of population change that will be most critical in determining rates of state population growth in the decades to come.

Population Structure

The age structure of the population in Michigan and the nation have bulges that represent the two largest generations, the Baby Boomers (roughly 50-70 years old) and the Millennials (early 20s to mid-30s). As seen in Figure 4-3, both the nation and the state have these bulges, though the populations represented by those parts of the graph are different in Michigan than in the nation. In Michigan, there are proportionally more Baby Boomers than there are in the nation, and these higher proportions are present in all age groups over 50 years.

FIGURE 4-2. Michigan Vital Statistics 1990 to 2016



Source: Michigan Department of Health and Human Services

When considering Millennials, it is apparent that the state has proportionally more of the younger portion of this group, but this drops off sharply around age 25. This points to the attractiveness of Michigan's top tier colleges and universities, but it also shows that there is a potential issue with retention where young people leave the state at about the age they would be completing a post-secondary education. This will be explored further in a discussion on the migration of the young knowledge population.

Trends among the 25-45 year age groups are important from a workforce standpoint, as these are persons in the state's early and mid-career age ranges. The reductions seen in these groups are among persons that have migrated at various points either in their early career, just post college/graduate school, or past high school. One of the issues is the way in which any post-high-school migration and early-career migration is masked to some extent by the draw of the state's top tier post-secondary educational institutions. The persons migrating in for college may mask or replace the persons leaving, but these replacement residents are usually only temporary residents who do not necessarily intend to stay in Michigan after completing their education. This dynamic can be best seen in the sharp decline in the population share between the 20-24 and 25-29 age groups.

Beyond the reduction in the 25-44 age group, a significant aspect of the state's age structure is the large proportion of the population in the 50 and over age groups. The elevated levels in these age groups serve to raise the state's median age, making it nearly two years higher than the nation's overall, and this older population will have a rate of increase in Michigan that is higher than the nation's. The combination of the reduced levels of the 25-44 age group and elevated 55+ group helps explain the projected increases that are expected moving forward, which will be discussed in further detail in the next section.

Beyond raising the median age for the state, the higher proportional share of older persons will have a significant effect on how the state will need to allocate resources and provide services in the near and longer terms. For example, an increase in the proportion of the Michigan population in the older age groups will mean additional funds may be needed for geriatric care.

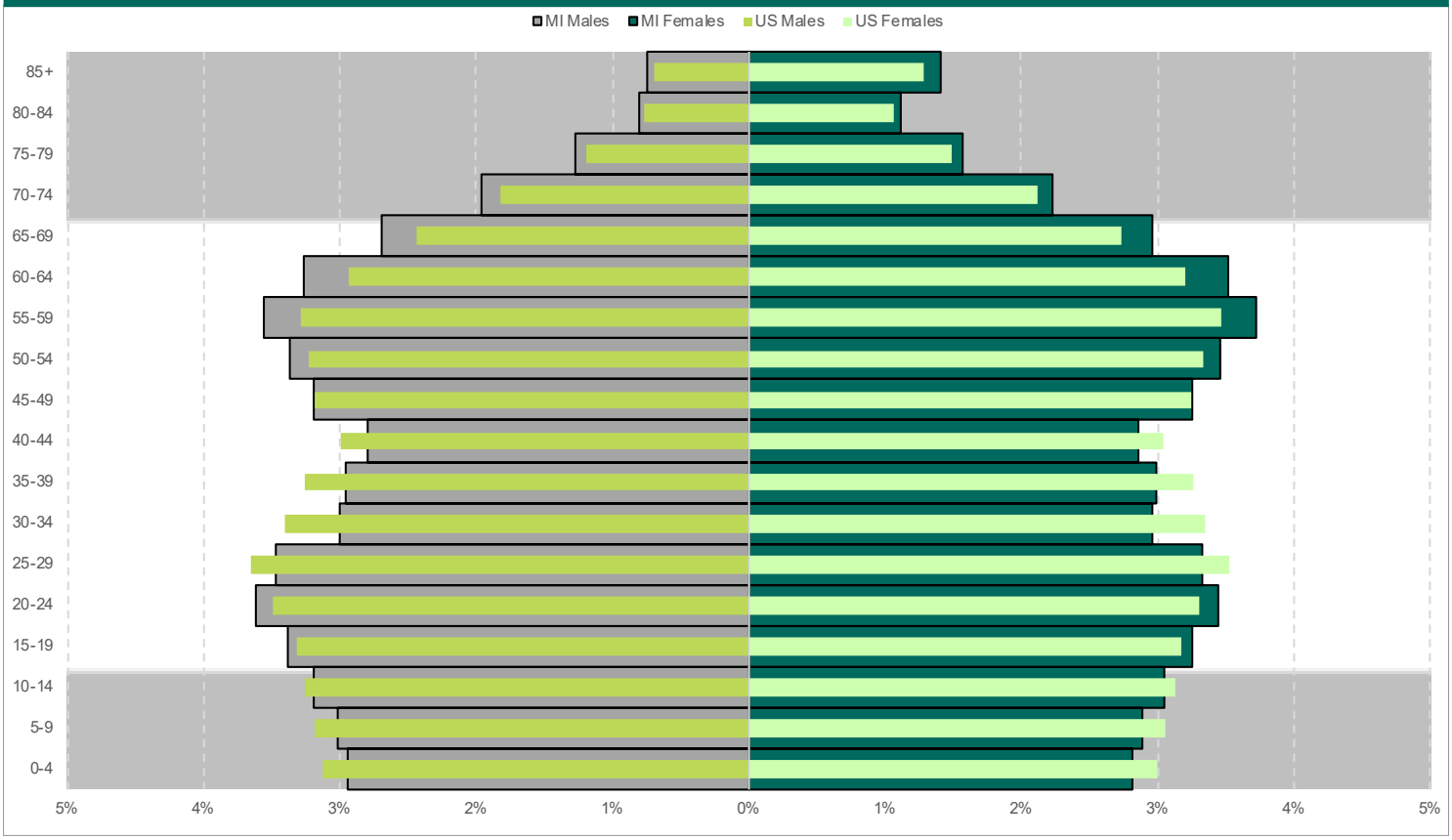
Migration of the Young Knowledge Population

Migration of young persons, defined here as those between 25 and 34 years with a bachelor's degree or higher, has been a topic of concern for Michigan for a number of years. This is an important group to watch as they will form the basis of the next generation of workers needed to fill the high-tech and high-skill jobs that are part of the new knowledge economy. Additionally, given the concerns about the imminent retirement of the Baby Boomers, retention of this group is of even higher importance, as they will need to fill many of the high-skill jobs that will become vacant in coming years.

Out-migration in this group has largely occurred in Michigan from 2005 to 2016, with the exception of small net in-migration in 2014 and 2016. The degree of loss has varied annually, as would be expected, but the reduction has ranged between one and two percent per year. The proportional loss in this group has generally been higher for those with a bachelor's degree or higher than it was for members of this age group with lower levels of educational attainment.

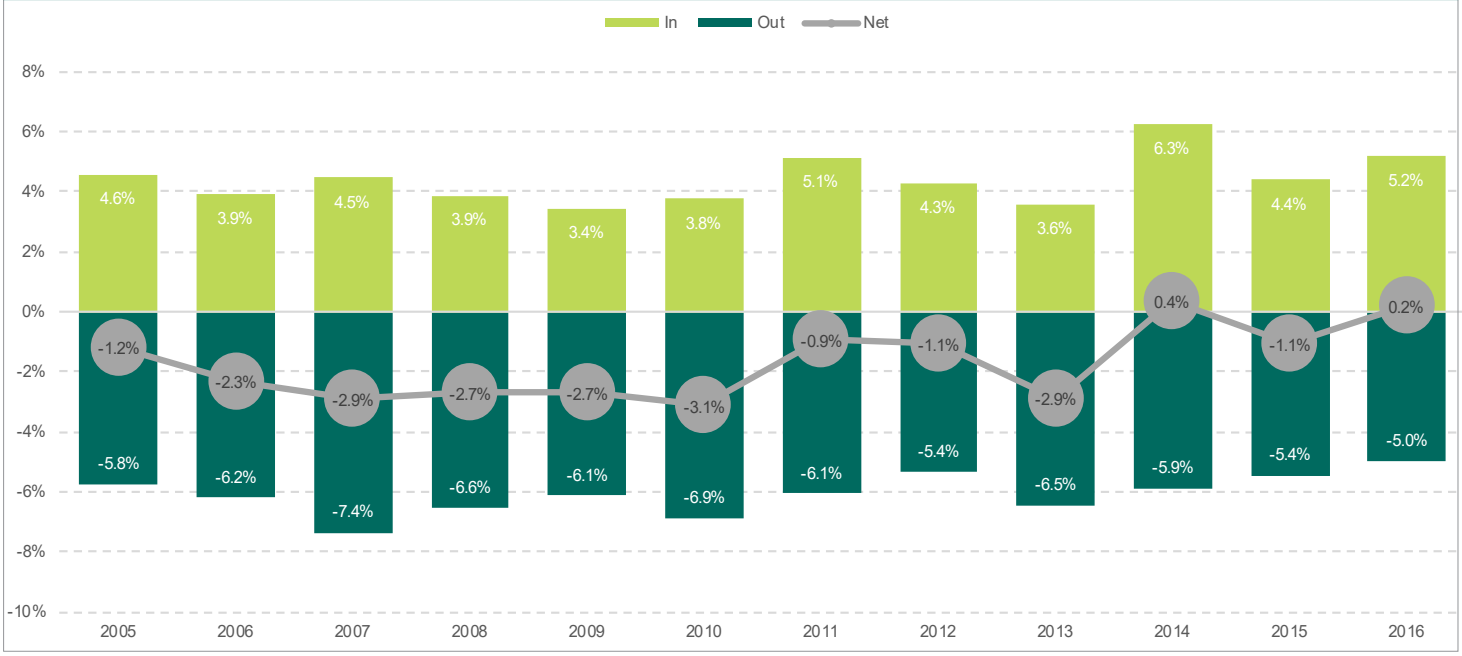
It is a positive sign that the state has now seen two of the past three years register positive net migration among this group, but caution is warranted considering the proportional loss in 2015 was larger than the combined gains in 2014 and 2016. With that caution in mind, these recent data may be an early indicator of future gains in this population. The trend towards a balanced net migration would mark an improvement considering the sizable proportional losses experienced between 2005 and 2010.

FIGURE 4-3. Michigan and U.S. Population Structure, 2017



Source: U.S. Census Bureau, 2016 Population Estimates

FIGURE 4-4. Migration of Young Knowledge Population in Michigan, Ages 25-34 with Bachelor's Degree or Higher



Source: U.S Census Bureau, 2005-2016 American Community Survey, 1-Year PUMS

Attracting this group is important to the future population outlook as seen in Figure 4-1, but it is also important when considering the labor force outcomes of this group. According to data from the U.S. Census Bureau, persons in this age group with a bachelor's degree or higher participate in the labor force at a much higher rate than those with lower levels of educational attainment, 89.7 percent versus 78.2 percent, respectively. Similarly, this group has a considerably lower unemployment rate (2.3 percent) than do persons in the same age group with lower levels of educational attainment (9.1 percent for those with less than a bachelor's degree). The higher levels of educational attainment also allow this group to command higher salaries with a median annual wage that is considerably higher than persons with lower levels of educational attainment, $43,500 versus $24,000.

Poverty

Poverty is distributed across the state in varying degrees. Poverty levels that warrant particular attention begin around the 20 percent mark.

There is some disagreement in the literature as to exactly where poverty levels become sufficient to warrant the description of being an area of concentrated poverty. Some start at 20 percent and others advocate for a much higher level, 40 percent. While this disagreement exists, it is well documented that inter-tract effects of poverty begin around the 20 percent mark and increase up to the 40 percent point, where they generally plateau.

When discussing the inter-tract effects that are markers of concentrated poverty, examples include increased crime rates, social isolation, decreased political involvement, high unemployment, and many others. The dynamic is experienced as tracts that neighbor a census tract with concentrated poverty begin to see negative socioeconomic conditions.

Figure 4-6 shows the census tracts in the state and the respective percentages of individuals in poverty. While some may disagree with calling a tract with 20 percent poverty an area of concentrated poverty, there is general agreement that these represent low-income areas. There are many areas of the state that meet this definition, additionally there are areas between 20 and 40 percent across the state.

While not exclusively so, many if not most of the census tracts that can be described as definitely experiencing concentrated poverty, as marked by a percent of poverty at or above 40 percent,

FIGURE 4-5. Michigan Net Migration

Source: Michigan Department of Health and Human Services, U.S. Census Bureau, 2000 & 2010 Intercensal Estimates, 2017 Population Estiamtes

tend to be in the state's cities, as seen in Figure 4-6.

When looking at Figure 4-6, it should be noted that tracts that contain colleges and universities may appear to be experiencing concentrated poverty, but this is more due to definitional problems with the measurement of poverty than the actual socioeconomic conditions of those tracts. Poverty is a family measure and often college and university students live in nonfamily households. Additionally, students may not be working, or may not earn enough money to rise above poverty level income, regardless of their actual economic conditions.

Examining areas of concentrated poverty is important, due to the impacts on individuals and families, and due to the wider impacts on communities.

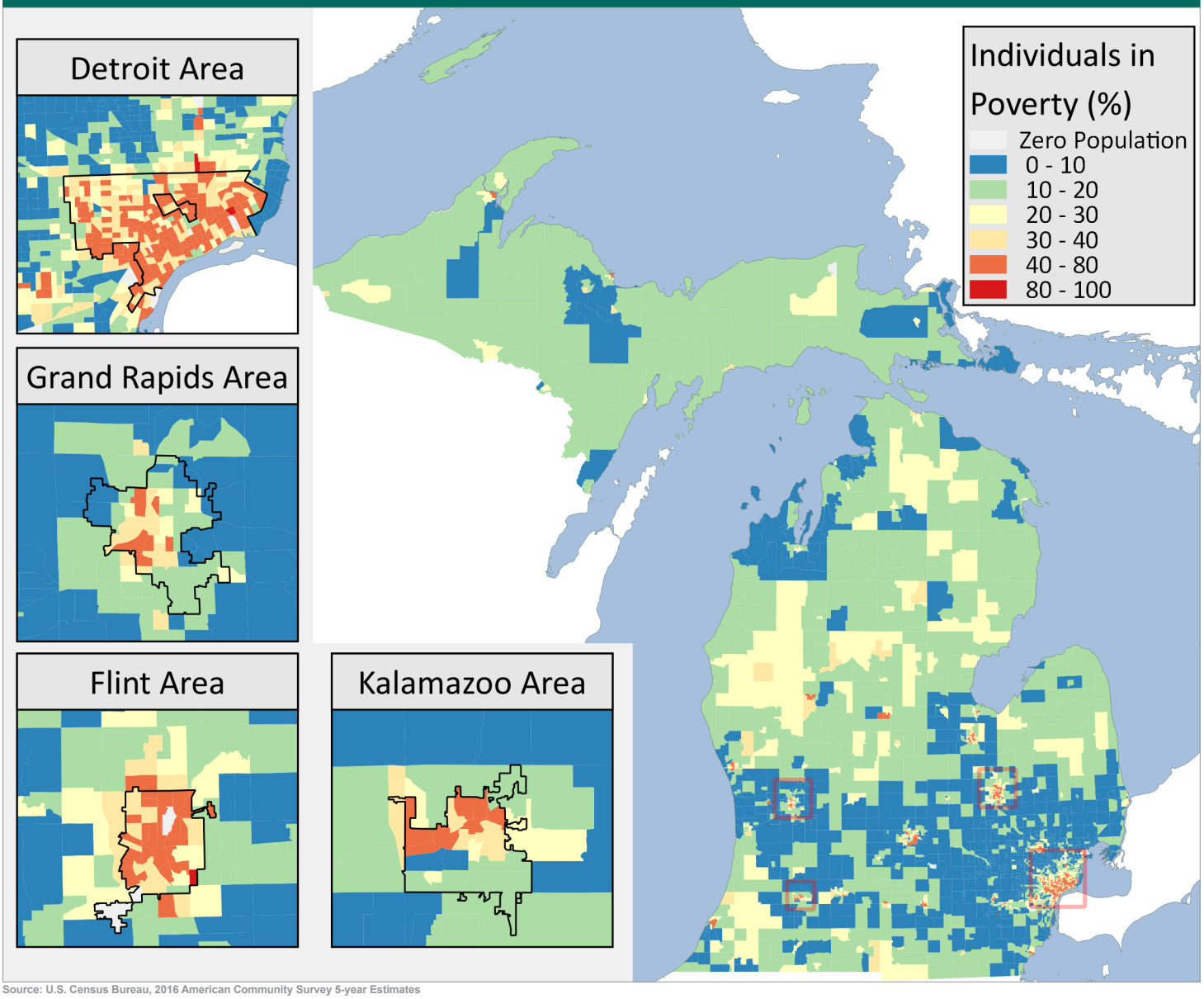
Trends to Watch

As mentioned in previous sections, migration will be very important to any population changes in the state over the coming decades. Projected population increases will depend on the migration of individuals and families to the state to fill job vacancies that will be created by the retirement of the Baby Boomers. Similarly, the large Baby Boom Generation will bring the natural change of the state to near zero, if not below, as the generation begins to feel the increased effects of mortality.

As seen in Figure 4-5, Michigan's net migration has been negative for nearly the entirety of this century. Net migration has been trending upwards since it reached its nadir between 2007 and 2008. The most recent set of population estimates indicate that net migration has finally turned positive. While this is certainly good news, a single year of positive migration statistics do not necessarily mean that the new trend will be positive migration. This will definitely be a trend to watch for the state in the next several years.

ERIC GUTHRIE
State Demographer

FIGURE 4-6. Percent of Individuals in Poverty at the Census Tract Level



Source: U.S. Census Bureau, 2016 American Community Survey 5-year Estimates

MICHIGAN'S LABOR SUPPLY

An examination of the number of Michigan students attaining college degrees or completing certificate programs and information on the educational attainment of Michigan workers provides valuable insights into the skill profile of Michigan's incoming and current labor supply.

HIGH SCHOOL GRADUATES AND COLLEGE ENROLLMENT

High school graduation levels provide some basic information regarding the supply of potential workers who may be entering the labor force shortly and/or pursuing additional post-secondary education.

Figure 5-1 demonstrates the number of public high school graduates in Michigan for the past ten years. The data was collected through the Michigan Center for Educational Performance and Information, or CEPI. For the 2016-2017 school year, there was an uptick in graduates from the prior year, with nearly 500 more students advancing. The trends in total graduates are consistent with population characteristics in the state; as the number of teens in Michigan has been declining over the past several years.

Females have made up slightly larger portions of graduating students for the past ten years. The largest discrepancy occurred during the 2010-2011 school year, with 51.4 percent of graduating seniors being female while only 48.6 percent were male. Data from the American Community Survey, however, demonstrates that males in the 15-18 years of age cohort make up slightly larger percentages of Michigan's population than females.

High school students enrolled in college six months after graduation for the past five years are displayed in Figure 5-2. Over half of graduating seniors consistently choose to enroll in postsecondary education after high school. For the 2016-2017 school year, nearly 61 percent of graduating seniors were enrolled in college six months after graduation, down slightly from the prior year, in which nearly 65 percent of high school graduates were enrolled in college soon after school completion. In the past five years, the highest enrollment rate occurred in the 2012-2013 school year (65.8 percent), while the lowest occurred during the 2016-2017 year (60.8 percent). Indeed, college enrollment rates have been slightly declining every year since 2012, possibly due to improved job prospects and training opportunities for young workers nearly ten years after the peak of the recession.

CAREER AND TECHNICAL EDUCATION (CTE)

Career and Technical Education programs are short-term programs designed to prepare participants for a wide range of in-demand careers. CTE programs provide a certificate, college credit, or other form of industry-recognized credential to program completers.

FIGURE 5-1. Total Michigan High School Graduates (2007-2017)

SCHOOL YEAR	TOTAL GRADUATES	MALE	FEMALE	PERCENT MALE	PERCENT FEMALE
2016-17	102,334	50,508	51,826	49.4%	50.6%
2015-16	101,835	50,355	51,480	49.4%	50.6%
2014-15	102,998	50,631	52,367	49.2%	50.8%
2013-14	103,002	50,251	52,751	48.8%	51.2%
2012-13	104,209	51,452	52,757	49.4%	50.6%
2011-12	105,399	51,883	53,516	49.2%	50.8%
2010-11	106,017	51,532	54,485	48.6%	51.4%
2009-10	110,663	54,447	56,216	49.2%	50.8%
2008-09	112,736	55,080	57,656	48.9%	51.1%
2007-08	117,487	57,535	59,952	49.0%	51.0%

Source: Michigan Center for Educational Performance and Information (CEPI)

The data for enrollees in Michigan's various CTE programs is collected through CEPI.

Figure 5-3 displays the total number of enrollees for CTE programs in Michigan from 2012 to 2016. Though enrollees were consistently declining from 2012 to 2015, a rebound occurred in 2016, with nearly 4,000 more participants than in the prior year. It is possible that some high school graduates choosing not to enroll in college immediately after graduation chose to enroll in a CTE program after high school instead.

An examination of data from Michigan's CTE website reveals that the most popular field of study for CTE training in 2016 was in the field of *Business, Management, and Administration,* followed closely by *Information Technology*, with roughly ten percent of all enrollees in each program category.

APPRENTICESHIPS

The Department of Labor's Registered Apprenticeship programs provide technical instruction as well as on-the-job learning for a variety of high-wage and high-demand job opportunities which do not require a bachelor's degree. Many apprenticeships are designed for positions in the *Construction* and *Manufacturing* industries, but other programs provide training and development in emerging industries such as *Healthcare* and *Homeland security.*

According to the Department of Labor's Employment and Training Administration, the top occupations for active apprentices in the U.S in 2017 were *Electrician, Carpenter,* and *Construction craft laborer.* Active apprenticeships include registered, suspended, and reinstated apprentices. Michigan has consistently been ranked in the top 15 states for active apprenticeships in the U.S for the past five years.

In 2017, Michigan had 17,731 active apprentices, thus numerically ranking third in the U.S (behind California and Ohio).

Michigan ranked 13th in 2017 in terms of the number of apprenticeship program completers, with 1,440 apprenticeship completions for the year.

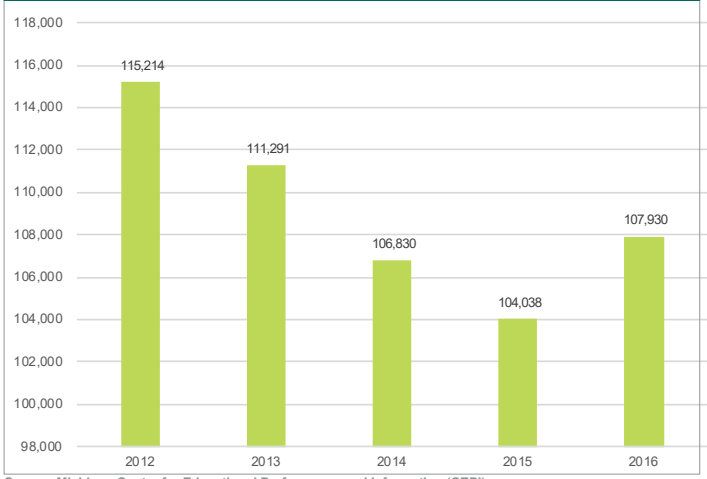
COMMUNITY COLLEGE GRADUATES

Community colleges are a source of incoming labor supply that tends to be a more cost-effective option for residents who cannot afford the expenses associated with longer degree programs at larger colleges and universities. They also allow more flexibility in scheduling, and thus are a particularly good option for non-traditional students. Community colleges are primarily two-year public institutions which grant certificates and associate's degrees. After graduating from a community college, some

FIGURE 5-2. High School Graduates Enrolled in College Six Months after Graduation

Source: Michigan Center for Educational Performance and Information (CEPI)

FIGURE 5-3. Total Career Technical Education Enrollees in Michigan (2012-2016)



Source: Michigan Center for Educational Performance and Information (CEPI)

students transfer to a four-year college or university to complete their bachelor's degree. However, several community colleges also offer bachelor's degrees. According to the Michigan Center for Educational Performance and Information, there are currently 28 community colleges in the state. Out of those, four institutions awarded bachelor's degrees in 2017, with Northwestern Michigan College awarding the most (52 degrees).

In Michigan, community college graduate degrees made up 24 percent of total completions in 2017, a total slightly less than those seen in prior years. The schools with the largest number of completions were Oakland Community College (3,655), Washtenaw Community College (3,530), and Macomb Community College (2,981).

Michigan community colleges have consistently awarded more than half of certificate credentials for the past five years of all types (certificates less than 1 year, more than 1 but less than 2 years, and more than 2 but less than 4 years).

Community colleges also led the way in the issuance of associate's degrees from 2012-2016, accounting for about 80 percent of associate's degrees awarded for the past five years.

Among community colleges, Oakland Community College produced the most associate's degree completions in 2017 with 3,051 degrees awarded, followed by Macomb Community College (2,590) and Wayne County Community College District (1,589).

PROGRAM COMPLETERS

The incoming supply of skilled Michigan workers is supported by those completing postsecondary education. Information from the National Center for Educational Statistics' Integrated Postsecondary Education Data System (IPEDS) reveals the characteristics and types of programs completed by Michigan students in 2017.

The data reveals that the top degree awarded for a certificate of less than four years was *Medical/clinical assistant.* The top associate's degree awarded was in *Liberal arts and sciences/liberal studies*, accounting for over twenty percent of total associate's degrees awarded. The primary bachelor's and master's degree awarded was in *Business administration and management, general;* and the top doctoral degree awarded in the state was in *Law.*

An examination by gender reveals that women earned a significant share (57 percent) of program completions in Michigan in 2017. Women were awarded nearly 80,000 awards and degrees, compared to almost 59,000 for men. Healthcare related completions were a major concentration for women, with *Medical/clinical assistant* leading in awards for women and *Registered nursing* leading for bachelor's degrees. *Business administration and management* degrees were popular for both men and women.

FIGURE 5-4. Michigan Community College Completions

YEAR	CERTIFICATES LESS THAN 1 YEAR	CERTIFICATES >1 BUT LESS THAN 2 YEARS	CERTIFICATES OF 2 BUT LESS THAN 4 YEARS	ASSOCIATE'S	BACHELOR'S	TOTAL COMMUNITY COLLEGE COMPLETIONS
2017*	4,119	4,971	27	23,981	56	33,154
2016	3,952	5,058	29	25,039	51	34,129
2015	4,739	4,444	56	26,754	34	36,027
2014	5,925	4,745	51	26,388	31	37,140
2013	5,745	5,506	85	27,302	-	38,638

**Preliminary Data*

Source: Michigan Center for Educational Performance and Information (CEPI) and Integrated Postsecondary Education Data System (IPEDS)

FIGURE 5-5. Top Program Completions by Degree Level*

DEGREE TYPE	1	NUMBER OF COMPLETIONS	2	NUMBER OF COMPLETIONS	3	NUMBER OF COMPLETIONS
Award of less than 4 years	Medical/Clinical Assistant	2,064	Cosmetology/ Cosmetologist, General	1,733	General Studies	1,126
Associate's	Liberal Arts and Sciences/ Liberal Studies	6,633	General Studies	4,965	Registered Nursing/ Registered Nurse	2,360
Bachelor's	Business Administration and Management, General	3,418	Registered Nursing/ Registered Nurse	3,211	Psychology, General	2,557
Master's	Business Administration and Management, General	2,624	Social Work	1,238	Mechanical Engineering	724
Doctoral	Law	1,182	Medicine	780	Pharmacy	320

**Preliminary Data*

Source: Integrated Postsecondary Education Data System (IPEDS)

POSTSECONDARY EDUCATIONAL ATTAINMENT OF RECENT GRADUATES

Figure 5-7 demonstrates a breakdown of the postsecondary graduates in Michigan by degree type for the past five years.

Bachelor's degrees were overwhelmingly the largest type of degree awarded since 2013, with slight increases in completions every year, culminating in a total of 61,654 completions in 2017. The next largest category was associate's degrees, with approximately 28,300 completions in 2017. Doctoral degrees have been declining slightly, as the 2017 total of 5,640 completions was down nearly 7 percent since 2013.

Figure 5-8 reveals the top three colleges and universities with the most degree completions in 2017.

Oakland Community College had the most associate's degree completions in 2017, and Michigan State University led in the awarding of bachelor's degrees. The University of Michigan had the most completions of master's and doctorate degrees.

Overall, the university awarding the largest number of degrees in 2017 was University of Michigan-Ann Arbor, with 13,235 completions.

EDUCATIONAL ATTAINMENT OF MICHIGAN RESIDENTS

The current labor supply in Michigan is composed of workers with a wide variety of ages, skill levels, and races, in addition to differing levels of schooling. This section seeks to examine the educational characteristics of the Michigan population, using data from the American Community Survey (ACS).

Although educational attainment provides one measure of the quality of the Michigan labor pool, it does not tell the whole story. Many Michigan workers have attained key workplace skills through apprenticeships, career technical training, and on the job training.

A comparison of the educational attainment of Michigan's current population over 24 years of age and the U.S shows that Michigan continues to lag behind the nation in the share of persons with a bachelor's degree or higher. Only 28 percent of Michigan residents over age 24 have a bachelor's degree or higher compared to 31 percent for the nation. Instead, Michigan has a higher share of persons (one-third) who have completed some college or attained an associate's degree. Michigan also slightly surpasses the U.S in terms of the share of the adult population with just a high school diploma. Nearly ten percent of Michigan's population 25 years and up have less than a high school education, as compared to 12.5 percent for the nation.

An examination of educational attainment by race

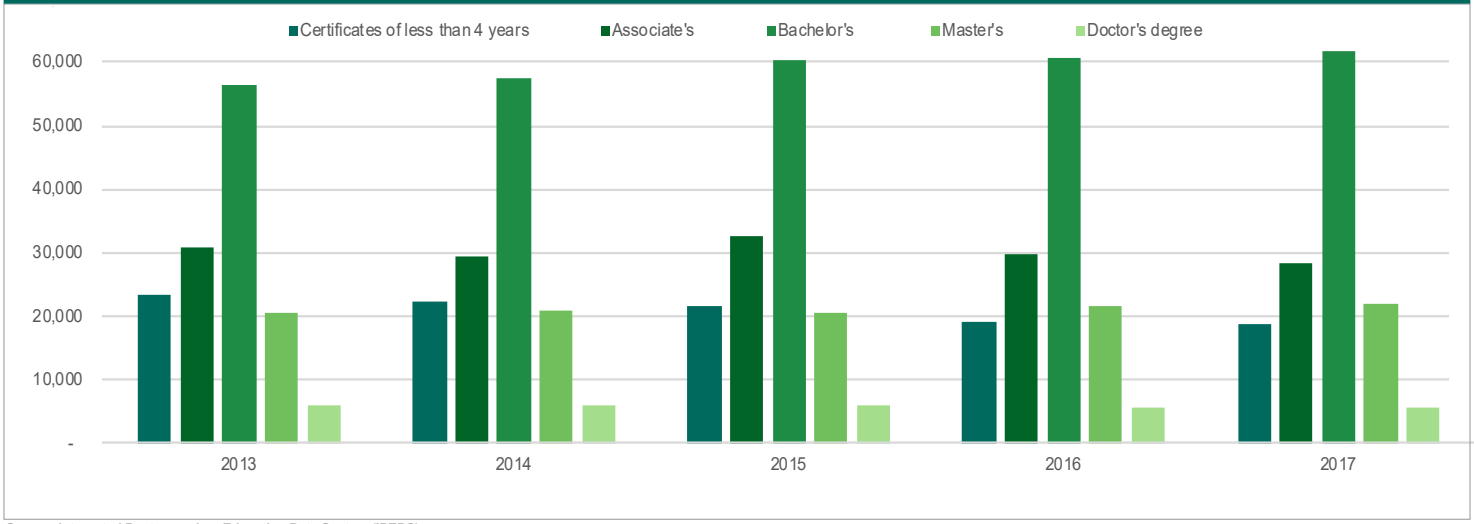
FIGURE 5-6. Top Completions by Gender, 2017*

GENDER	AWARD OF LESS THAN 4 YEARS	# OF COMPL.	ASSOCIATE'S	# OF COMPL.	BACHELOR'S	# OF COMPL.	MASTER'S	# OF COMPL.	DOCTORAL	# OF COMPL.
Male (58,906)	General Studies	492	Liberal Arts and Sciences/Liberal Studies	2,394	Bus. Admin. & Mgmt., General	1,761	Bus. Admin. & Mgmt., General	1,498	Law	599
Female (79,454)	Medical/Clinical Assistant	1,941	Liberal Arts and Sciences/Liberal Studies	4,239	Registered Nursing/Registered Nurse	2,756	Bus. Admin. & Mgmt., General	1,126	Law	583

*Preliminary Data

Source: Michigan Center for Educational Performance and Information (CEPI) and Integrated Postsecondary Education Data System (IPEDS)

FIGURE 5-7. Michigan Postsecondary Completions, 2013-2017



Source: Integrated Postsecondary Education Data System (IPEDS)

for 2016 in Michigan reveals that a high share of White residents (over 90 percent) have attained at least a high school diploma, similar to Asians with 89 percent. The Asian population in Michigan has by far the highest share of persons 25 years of age and up who have attained a bachelor's degree (63 percent). Hispanic or Latino residents have a large share of persons over age 24 that have not attained a high school diploma (29 percent). Black residents in Michigan have the second largest share of residents to have completed some college without attaining a degree, at nearly 30 percent.

A gender breakout of Michigan educational attainment for 2016 reveals that women exceed men in the share that have attained associate's and bachelor's degrees or higher. In fact, 38 percent of women over the age of 24 have attained some form of college degree, well above the 35.8 percent share for men. Over 39 percent of adult men in Michigan have a high school diploma or less, which limits their options for employment. Just over 36 percent of adult women are in these lower educational attainment categories.

Trends to Watch

An important trend to observe in the future concerning Michigan's incoming labor supply is college enrollment rates. Michigan high school graduates have increased from last year, yet the number of those enrolled in college six months after graduation has declined.

On a related note, enrollees in Career Technical Education (CTE) programs in Michigan were consistently declining from 2012-2015, but demonstrated an uptick in 2016, with nearly 4,000 more participants than in the prior year, possibly due to graduates choosing to enroll in training programs and forego a college education immediately after high school. This coincides with a recent push both in Michigan and nationwide for more skilled trade training due to a higher demand for such jobs.

Statewide projections can provide an indicator of future trends for labor demand across the state. Michigan's total employment is expected to grow 7.0 percent between 2016 and 2026, translating to an additional 320,900 jobs. The industry projected to grow the most is *Healthcare and social assistance*, with a contribution of one out of every three new jobs in the state over the projection period. This is followed by *Professional and business services*. The largest reduction in jobs between 2016 and 2026 is expected to occur in Michigan's *Manufacturing* sector, which is expected to remain relatively flat over the next decade. The profile of Michigan's labor supply will need to evolve in this way for these future job trends to become a reality.

Another future trend to watch concerns the labor supply of workers trained in IT-related fields. Michigan's *Professional, scientific, and technical services* sector is expected to add 15.8 percent to its employment base through 2026. Several subsectors in this industry require highly technical skills in order to fill positions, and will require a supply of talented Michigan workers with skills and knowledge in IT-related and STEM fields.

SHIBANI PUTATUNDA
Economic Analyst

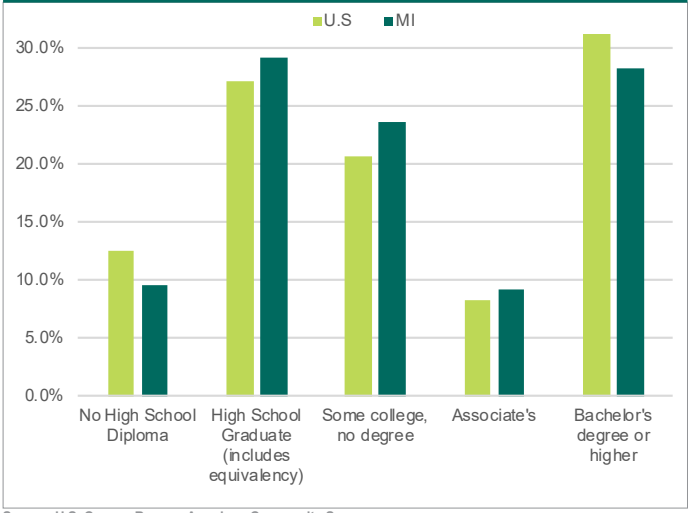
FIGURE 5-8. Top College and University Completions of 2017*

RANK	CERT. OF LESS THAN 4 YEARS	# OF COMPL.	ASSOCIATE'S	# OF COMPL.	BACHELOR'S	# OF COMPL.	MASTER'S	# OF COMPL.	DOCTORAL	# OF COMPL.
1	Washtenaw Community College	2,298	Oakland Community College	3,051	Michigan State University	9,298	University of Michigan-Ann Arbor	4,442	University of Michigan-Ann Arbor	1,515
2	Lansing Community College	1,287	Macomb Community College	2,590	University of Michigan-Ann Arbor	7,059	Michigan State University	2,270	Michigan State University	1,185
3	Wayne County Community College District	643	Baker College	2,186	Grand Valley State University	4,447	Wayne State University	2,166	Wayne State University	795

**Preliminary Data*

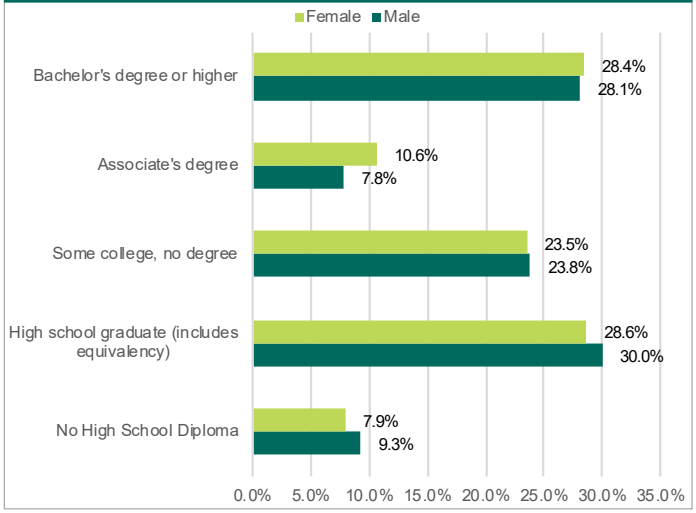
Source: Integrated Postsecondary Education Data System (IPEDS)

FIGURE 5-9. Educational Attainment, Michigan vs. U.S. (25+)



Source: U.S. Census Bureau, American Community Survey

FIGURE 5-10. 2016 Educational Attainment by Gender (25+)



Source: U.S. Census Bureau, American Community Survey

THE MICHIGAN OUTLOOK FOR JOB GROWTH TO 2026

Each July the Bureau of Labor Market Information and Strategic Initiatives releases long-term employment projections for the Michigan labor market. These projections alternate each year between statewide projections (in even-numbered years) and regional projections (in odd-numbered years). This July, the Bureau released long-term statewide projections for Michigan for the period of 2016-2026.

Industry Outlook

Overall, Michigan's total employment is expected to grow 7.0 percent from 2016 through 2026, just below the nationwide all-industry growth rate of 7.4 percent. This translates to an additional 320,900 jobs in the state over this 10-year period. The *Health care and social assistance* sector will lead the way, with more than twice the expected job gains of any other Michigan major industry sector over this period. The *Professional and business services* industry will provide the second highest number of new jobs through 2026. On the other hand, the largest numeric reduction in jobs over the 10-year period is expected to occur in the *Manufacturing* sector, despite its expectation to outperform *Manufacturing* nationally.

The leader by far among Michigan industries with projected future job gains is the *Healthcare and social assistance* sector. Led by the *Ambulatory health care services* industry, this sector will contribute one out of every three new jobs in the Michigan economy over the projection period. *Ambulatory health care services* are projected to grow by 62,330 jobs, or 30.7 percent over the period. This industry includes a wide array of outpatient medical care, such as *Offices of physicians, Offices of dentists,* and *Outpatient care centers,* and notably also includes *Home health care services*. The services in this industry are tied to an aging population, one of the main drivers behind increasing employment in the industry nationwide. Importantly, this aging-related effect on demand for health care services is expected to be stronger in Michigan than the nation as a whole over the next decade.

Professional, scientific, and technical services is another standout sector in terms of expected performance through 2026. This sector is expected to add 46,710 jobs, or 15.8 percent, to its employment base over the projections period. Expected growth in this sector is similarly high in the nationwide projections, expanding at a rate of 13.3 percent over the ten years. About half of the new jobs in this sector in Michigan are expected to come from the *Architectural, engineering, and related services* and *Computer systems design and related services* industries. Both industries require highly-trained talent to fill expected jobs, bringing to the forefront an important assumption made in all projections produced at the state and national level— an assumption that talent will be present to fill the newly-created positions within these industries. Michigan is already hard at work attracting new workers to add to its base of talent, but it is important to note that if the pool of available labor is not present, the growth projected in this data set may not materialize.

Another sector to pay close attention to over the next decade is *Manufacturing*. While employment in the sector is expected to remain relatively flat over the next decade, it remains a critical industry to the Michigan economy and one of the largest sectors in the state in terms of employment. The national *Manufacturing* sector is expected to contract through 2026, losing six percent of total jobs versus the one percent expected decline in Michigan *Manufacturing*.

There are several industries of note within the *Manufacturing* sector. *Transportation equipment manufacturing,* the historical symbol for Michigan's prosperity, is expected to remain the largest industry within the *Manufacturing* sector. Jobs in this industry are projected to be relatively flat over the decade-long period, declining by less than three percent. Two other large industries within the sector, *Food manufacturing and Plastics and rubber manufacturing* are projected to expand jobs by 11.3 percent and 5.4 percent, respectively, over the period. Job growth in these large industries is the principle reason the Michigan *Manufacturing* sector may outperform the national average.

The fastest-growing industry in the *Manufacturing* sector is expected to be *Beverage manufacturing*. Historic data points to *Breweries* being the strongest source of growth in this industry during the 2000-2016 period. This robust trend is an instance of industry growth that is exceptional for its visibility to consumers and reflects a shift in taste and consumption habits. Michigan *Breweries* have seen a twelve-fold increase in employment from 2001-2016, a period chosen to enable comparison with available data for *Wineries*, another area of strong growth within *Beverage manufacturing. Wineries* recorded a four-fold increase over the 2001-2016 period, comprising 13 percent of the industry total

employment in 2016, compared to *Breweries'* 33 percent and *Distilleries'* 3 percent. The remaining industry employment is within *Soft drink and ice manufacturing*. The strong trends noted in *Breweries*, and to a lesser degree, *Wineries*, are expected to continue driving job expansion in the industry.

Occupational Outlook

Occupational employment projections often garner the most attention due to their value to workforce developers, career planners, and students, but they are closely tied to and are built from industry employment projections. The Michigan occupational projections to the year 2026 display high expected job growth for occupational groups like *Healthcare practitioners* due to their important role in the quickly-expanding *Health care and social assistance* sector. Occupational projections can provide additional information about expected employment opportunities beyond that supplied by industry projections. In addition to the 320,910 new positions in all occupations available due to economic growth in the projection period, the projections show an additional 515,030 job openings each year due to Michigan workers who are moving on to different occupations or who are leaving the workforce entirely.

The occupational groups with the highest expected job gains in the period ending in 2026 are *Healthcare practitioners and technical* and *Healthcare support* occupations, much like the *Health care and social assistance* sector is expected to be the fastest growing industry. These two occupational groups may see 7,190 combined openings each year just due to economic expansion, but this is only a fraction of the new employees needed each year to perform these jobs. An average of 32,830 job openings is expected to occur each year from 2016-2026 due to workers who are moving from these occupational groups to others or from workers who are leaving the workforce.

These healthcare-focused groups contain occupations that require a wide variety of education credentials, so even those without a bachelor's degree may find an opportunity to enter these job areas. Among the 70 percent of these openings that require less than a bachelor's degree, the occupations with the greatest number of openings will be *Nursing assistants, Home health aides,* and *Medical assistants.* While these occupations receive lower levels of pay than highly-skilled healthcare occupations such as *Registered nurses,* they represent occupations that will have significant demand in an industry which has historically experienced minimal effects from economic cycles.

Higher than even healthcare-related occupations, the groups with the highest number of annual job openings are expected to be *Office and administrative support, Food preparation and serving related,* and *Sales and related* occupations. The specific occupations from these three groups with the highest number of annual openings will be *Combined food preparation and serving workers, Retail salespersons,* and *Office clerks, general*. What is immediately noticeable about this set of occupations is that these are occupations available to persons with little experience or education.

Future job expansion in Michigan is also expected to vary among occupational groups with different educational requirements. The occupational group with the lowest educational requirement (a high school diploma or less) is expected to have the lowest percentage future job gain over the period at 4.9 percent. However, due to the many jobs in this category, it will record the highest sheer number of new jobs as well as the greatest number of annual openings. Occupations requiring some form of post-secondary training but less than a bachelor's degree will have significantly higher percentage job expansion, at 9.8 percent. This group will record an average of 49,500 openings per year from workers transferring occupations or leaving the labor force, and about 4,900 openings annually from growth alone.

Occupations requiring at least a bachelor's degree are expected to have the highest percentage job growth over the period at 10.9 percent, adding about 123,300 jobs over the 10-year period. Additionally, jobs requiring at least a bachelor's degree will have 88,100 openings annually stemming from the need to replace workers leaving the occupations. These high numbers of openings reflect a new methodology concerning annual openings that has been used in the 2016-2026 projections.

Methodology Changes

Some of the most-used statistics from employment projections, espeically for workforce

professionals who are assisting jobseekers, are the number of job openings that are available in occupational groups and specific occupations. This data is especially interesting in the newly-published long-term occupational projections because of a change in methodology. Starting late last year with its long-term employment projections for the nation, the federal government, and now the state governments, are employing a new methodology to estimate the number of expected job openings during a projections period. This methodology was first seen in Michigan earlier this year with the 2017 to 2019 short-term employment projections.

The new methodology represents a change from a 20-plus year-old method for estimating openings, more fully capturing the job openings that for years we've known to exist but have been heretofore unable to measure. The improved methodology utilizes models that better reflect modern paths through the workforce to capture previously-unmeasured job opportunities. Among its other advantages, this new methodology tracks more favorably with other data sources, such as the Job Openings and Labor Turnover Survey (JOLTS) from the U.S. Bureau of Labor Statistics.

Workforce professionals and researchers who are familiar with our projections data series may quickly recognize one characteristic of the new methodology: a higher number of estimated job openings. This higher number stems from the new methodology more fully capturing the number of job openings in the workforce. Although the old and new methodologies aim to capture the same metric, number of job openings from growth and occupational separation, the old methodology was designed to capture changes from a different labor market from today's: a labor market in which someone got a job, remained there for the majority of their career, and retired. The new methodology better captures all types of separations from an occupation, and, like the old methodology, still does not measure "job churn", openings created from a person moving from firm to firm but performing in the same occupational capacity.

Perhaps unsurprisingly, the occupational groups that are expected to generate the largest number of annual openings through 2026 are *Office and Administrative support, Service,* and *Sales and related occupations.* These are occupational groups which see workers filter in and out often. The *Food preparation and related services* group within *Service* occupations, for example, is often a young worker's first introduction to employment. These young workers are among the most likely groups to produce job openings both through exiting the labor force (e.g. for school) or transferring occupational groups (e.g. moving to another, similarly low-skilled occupational group or to another, higher-skilled occupation after career/technical training or higher education). These examples provide a clear illustration of the effect of the new methodology on the number of annual openings.

FIGURE 6-1. Top and Bottom Five Industry Sectors by Percent Job Growth

INDUSTRY TYPE	2016	2026	NUMERIC	PERCENT	NATIONAL % CHANGE
Total, All Industries	4,600,950	4,921,860	320,910	7.0%	7.4%
Health Care and Social Assistance	621,910	735,400	113,490	18.2%	19.9%
Professional, Scientific, and Technical Services	295,440	342,150	46,710	15.8%	13.3%
Transportation and Warehousing	116,820	130,910	14,090	12.1%	7.3%
Construction	154,660	171,090	16,430	10.6%	12.9%
Administrative & Support & Waste Management & Remediation Services	289,950	315,530	25,580	8.8%	9.3%
Information	57,160	57,240	80	0.1%	1.9%
Wholesale Trade	171,830	170,770	-1,060	-0.6%	2.5%
Manufacturing	599,840	593,640	-6,200	-1.0%	-6.0%
State Government, Excluding Education and Hospitals	46,170	45,550	-620	-1.3%	-0.2%
Mining	5,460	5,020	-440	-8.1%	14.5%

Source: Michigan DTMB, Bureau of Labor Market Information and Strategic Initiatives, 2016-2026 Employment Projections

FIGURE 6-2. Top Occupational Categories by Percent Job Growth

OCCUPATIONAL GROUP	NUMERIC GROWTH	% GROWTH	TOTAL ANNUAL OPENINGS	SHARE OF EMPLOYMENT WITH A BACHELOR'S OR HIGHER
Healthcare Support	31,360	22.7%	20,260	12%
Personal Care and Service	27,270	17.5%	27,440	22%
Community and Social Service	9,630	14.7%	8,340	71%
Computer and Mathematical	16,160	14.2%	9,530	68%
Healthcare Practitioners and Technical	40,540	14.2%	19,770	58%

Source: Michigan DTMB, Bureau of Labor Market Information and Strategic Initiatives, 2016-2026 Employment Projections

FIGURE 6-3. Top Occupational Categories by Number of Job Openings

OCCUPATIONAL GROUP	NUMERIC GROWTH	% GROWTH	TOTAL ANNUAL OPENINGS	SHARE OF EMPLOYMENT WITH A BACHELOR'S OR HIGHER
Office and Administrative Support	5,120	0.8%	74,200	22%
Food Preparation and Serving Related	35,080	9.2%	71,690	11%
Sales and Related	8,070	1.8%	62,000	30%
Production	-10,250	-2.3%	48,340	8%
Transportation and Material Moving	21,090	7.3%	37,910	8%

Source: Michigan DTMB, Bureau of Labor Market Information and Strategic Initiatives, 2016-2026 Employment Projections

Trends to Watch

From 2016 through 2026, total employment in Michigan is expected to grow by 320,910 jobs, or 7.0 percent. These gains will be driven by the *Health care and social assistance, Professional, scientific, and technical,* and *Accommodation and food services* sectors. Though jobs in *Manufacturing* are expected to be flat over the period, it remains one of the largest sectors in the state. High growth occupations will come from the *Healthcare practitioners and technical, Food preparation and serving related,* and *Healthcare support* job categories. The need to replace departing workers will drive high demand for *Office and administrative support, Food preparation and service related,* and *Sales and related occupations.*

As with all economic projections, there are a number of conditions which could greatly impact the accuracy of our employment outlook. The most dramatic example would be an external shock to the labor market.

But beyond this, there are a number of more subtle ways in which externalities can affect the projected expectations. If an insufficient supply of properly-trained skilled labor exists in Michigan, real growth will fall short of projected growth. Or, if a company with numerous locations throughout the state decides to accelerate an automation effort, such as substituting large-format ordering screens for cashiers in restaurants, there will be fewer jobs to fill than previously expected. In the opposite direction, the magnitude of the skilled labor needed in fast-growing IT occupations, such as *Information security analysts,* may simply have not been foreseen when creating previous projections, making projected growth for the occupation fall far short of observed growth in recent years. Factors such as these should always be kept in mind when evaluating and acting on any economic projection, including the 2016-2026 Michigan industry and occupational projections.

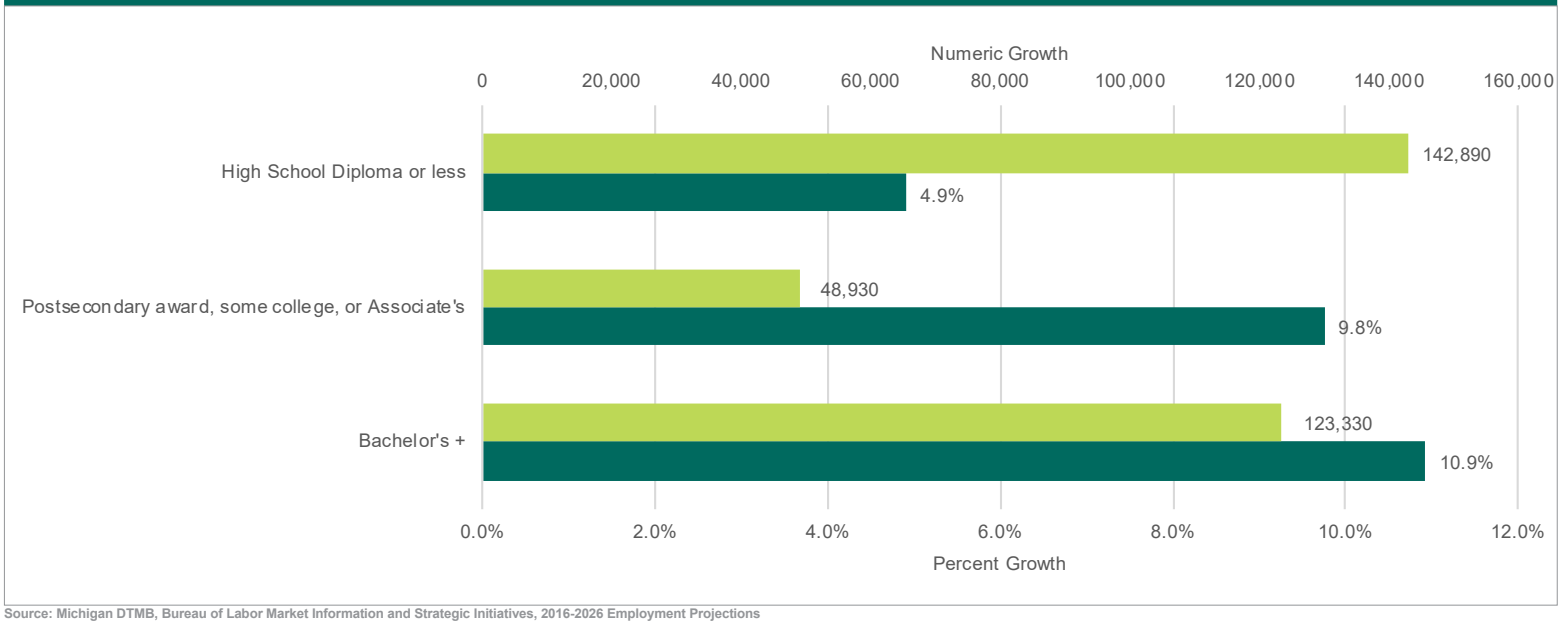
Additionally, readers should be on the lookout for the *Michigan's Hot 50 Jobs* publication. This publication, which follows each new set of statewide employment projections, is a useful tool for workforce developers, educators, and state and local decision-makers. The *Hot 50 Jobs* publication uses statewide occupational employment projections in conjunction with Occupational Employment Statistics (OES) wage data to rank and list occupations that show favorable long-term job growth, expected annual openings, and above-average wages statewide. This publication can serve as a guide for students and jobseekers who are seeking training or postsecondary education paths towards promising careers.

KEVIN DOYLE
Projections Specialist

FIGURE 6-4. New Michigan Jobs by Supersector, 2016-2026

Source: Michigan DTMB, Bureau of Labor Market Information and Strategic Initiatives, 2016-2026 Employment Projections

FIGURE 6-5. Numeric and Percent Projected Michigan Job Growth by Education Requirements, 2016-2026



Source: Michigan DTMB, Bureau of Labor Market Information and Strategic Initiatives, 2016-2026 Employment Projections

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