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Rick Snyder, Governor

Department of Technology, Management & Budget  
Bureau of Labor Market Information & Strategic Initiatives

# Michigan Economic and Workforce Indicators

## Preface

The nation's economy is struggling to gain momentum as outside influences continue to generate risk and uncertainty. Michigan's economy is influenced by these national trends as we begin to close the gaps experienced during our one-state recession. But how has Michigan's labor market changed in recent months and years and in what areas of the economy has the state made advancements?

These and other insightful questions are addressed in this edition of *Michigan Economic and Workforce Indicators*. In this report, we take an in-depth look at two key industries that have been major contributors to the economic strength of Michigan's economy. The Automotive and Defense industries provide high-skill jobs in Michigan and encourage investment in research and development.

Also included in this publication are findings from a recent study titled *Driving Change – Greening the Automotive Workforce*, a tri-state assessment of the dynamic changes occurring in the auto industry and its impact on the workforces of Michigan, Ohio and Indiana.

The evolving environment of our state influences the need for information on a continuing basis. Our intent is to provide timely and insightful data and analysis to assist in guiding program development, measuring its impact and providing a foundation for maintaining Michigan as a leader.

Richard Waclawek, Director  
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Michigan Department of Technology, Management and Budget

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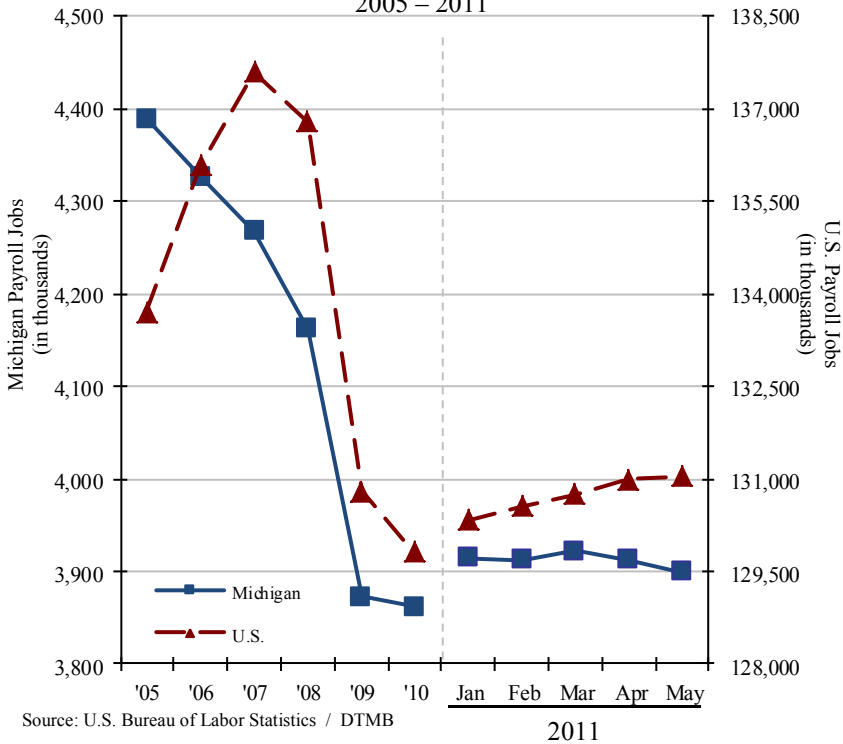
## **Special Workforce Report**

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# Michigan Job Trends

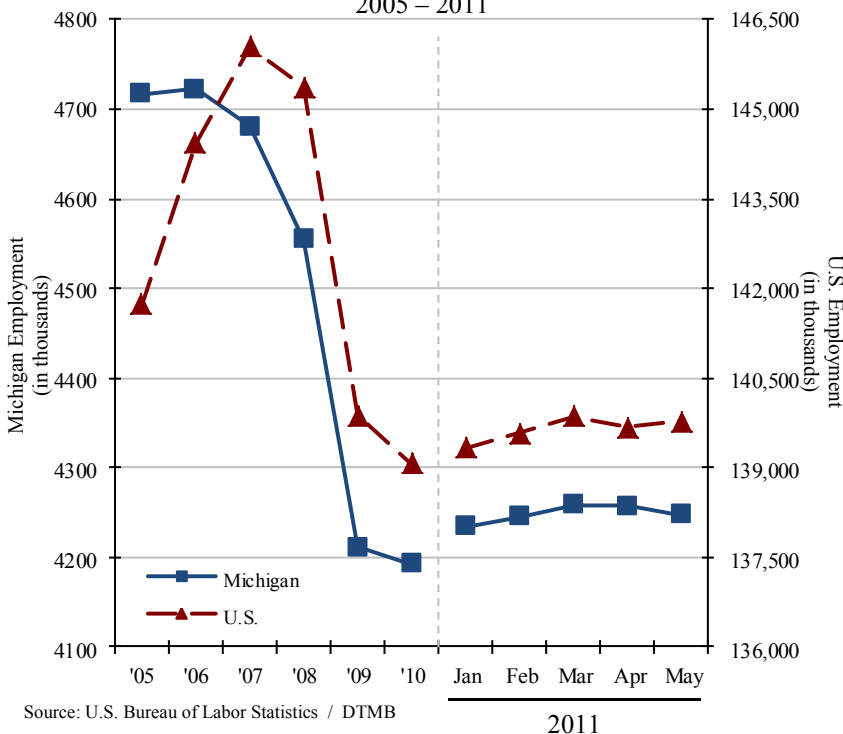
## Nonfarm Payroll Jobs

Michigan vs. U.S. Total Payroll Jobs  
2005 – 2011



## Household Employment

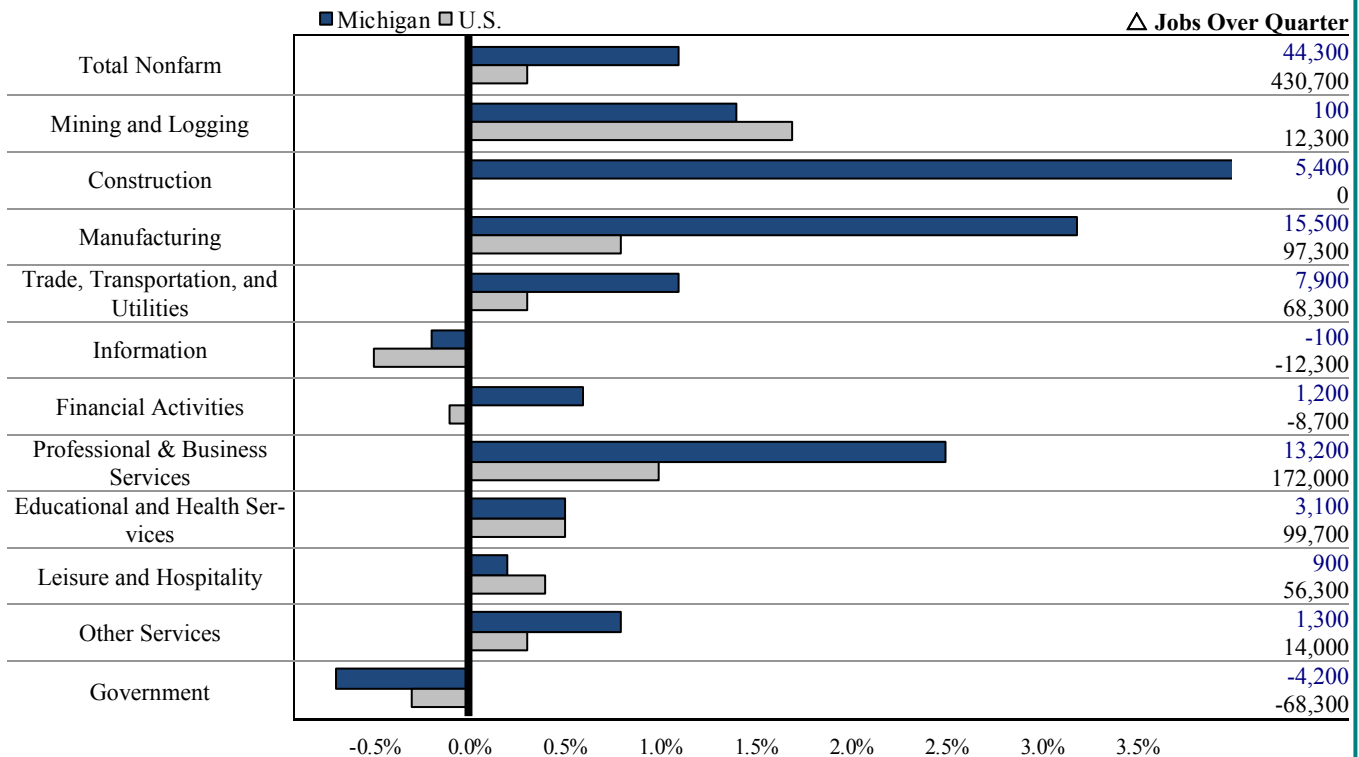
Michigan vs. U.S. Total Household Employment  
2005 – 2011



- There are two government surveys that measure the state of the labor market. Both surveys show higher 2011 employment levels than in 2010 in Michigan and nationally, as the labor market slowly recovers.
- The *nonfarm payroll or establishment* survey measures the total number of jobs supplied by businesses in the state and its metro areas. This survey excludes the self-employed and agriculture.
- Since Michigan hit an employment low point in December 2009, nonfarm payrolls have rebounded by 68,300 jobs through May 2011.
- Since the end of the recession in June 2009, Michigan has added 59,200 jobs or about 15 percent of the 404,000 jobs lost during that recession. However, since January 2011, Michigan payroll jobs have edged down by 15,000 while the U.S. has added 715,000 jobs.
- Through May, the nation has averaged a gain of 24,000 jobs per month since the end of the recession in June 2009. Even though May experienced moderate growth of only 54,000 positions, it still represented the eighth consecutive month of job gains.
- The *household survey* measures the number of Michigan residents who are employed. This survey is more comprehensive than the payroll survey, including all segments of employment including the self-employed.
- Total employment in Michigan plunged by 470,000 from 2007–2009, as the state experienced a record pace of job loss in the manufacturing sector and throughout the economy.
- Employment levels began to stabilize in Michigan during 2010. Employment rose slowly throughout the year, advancing by an average of about 5,000 per month during 2010. Despite these initial signs of improvement, employment averaged only 4,193,000 during 2010, which was the lowest average employment level recorded in Michigan since 1991.
- Household survey employment gains in Michigan have been modest in the first five months of 2011, rising by just 30,000 from December 2010 to May 2011.
- Nationally, employment from the household survey declined in 2009 by 3.8 percent, about half the pace of employment loss in Michigan. However, from December 2009 to May 2011, Michigan employment growth (+2.4 percent) has slightly outpaced the national rate of gain (+1.3 percent).

## Payroll Jobs by Industry Sector

Michigan vs. U.S.  
Percent change, 4th Quarter 2010 – 1st Quarter 2011  
(Seasonally Adjusted)

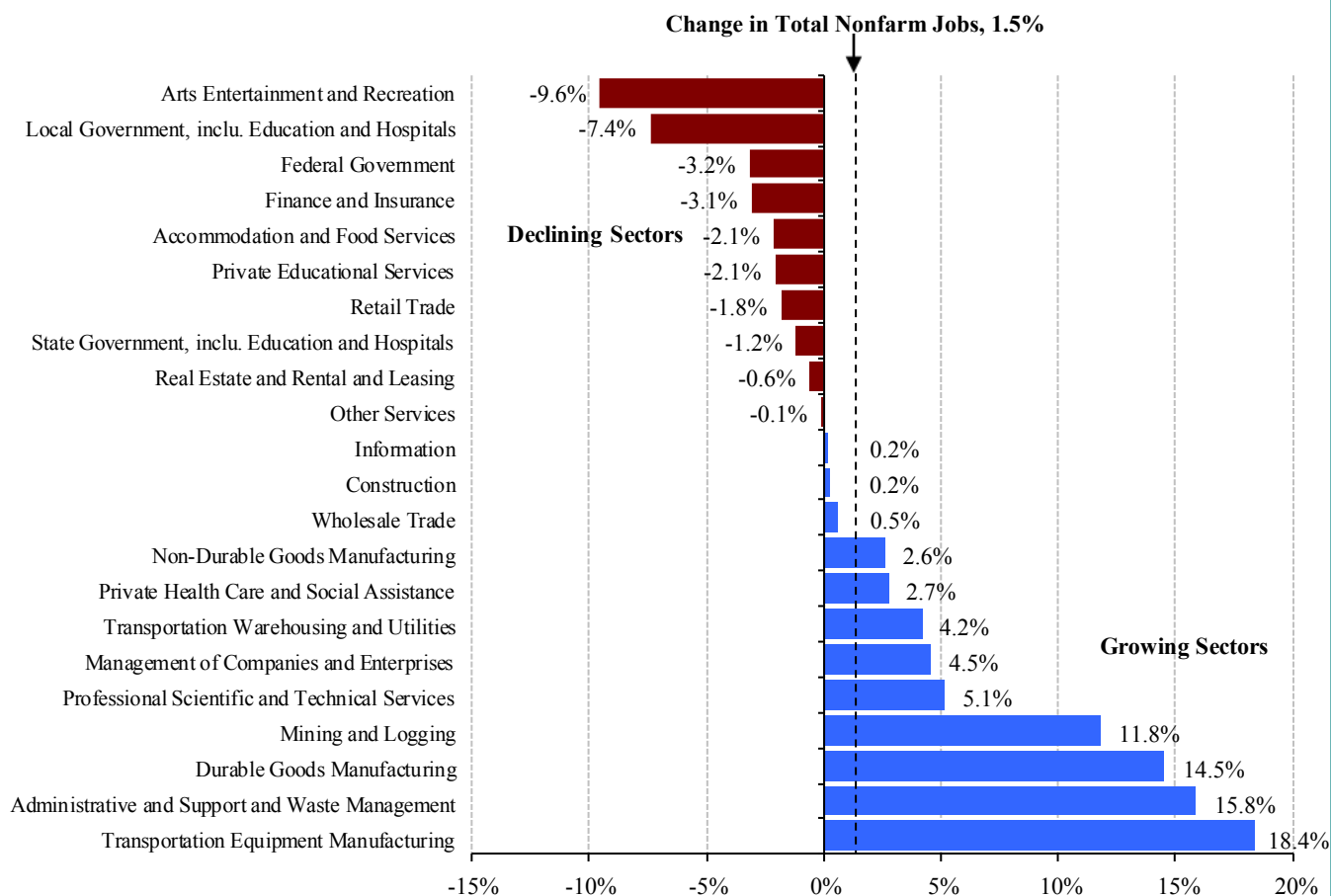


Source: U.S. Bureau of Labor Statistics / DTMB

- Most industries added jobs over the quarter as both Michigan and the U.S. increased employment. The average quarterly job gain for Michigan rose from 0.2 percent in the 4th quarter 2010 to 1.1 percent in the 1st quarter 2011. For the nation, 1st quarter 2011 job levels were flat, posting a gain of 0.3 percent, little changed from the 4th quarter job addition of just 0.2 percent. As the economy recovers from one of the worst recessions in recent history, Michigan outperformed the nation in early 2011 in all categories, except the following three: *Mining and logging*, *Leisure and hospitality* and *Government*.
- The goods producing sector accounted for nearly half (47 percent) of the 1st quarter advance in total Michigan nonfarm jobs. U.S. job change in the goods producing sector improved from a loss of 0.8 percent in the 1st quarter 2010 to a gain of 1.8 percent in the 4th quarter. However, U.S. goods producing job growth was less robust in the 1st quarter 2011, increasing by only 0.6 percent.
- Over the year (1st quarter 2010 to 1st quarter 2011), Michigan's *Manufacturing* sector increased by 31,400 jobs or 6.8 percent. This was the largest increase of any state and can be attributed to heightened demand for vehicles made by the Detroit Three automakers. They produced 218,000 more vehicles in the 1st quarter 2011 than in the 1st quarter 2010, and are projected to continue to increase production through 2012. (Wards.com)
- Most private service producing industries in Michigan showed strong job increases over the quarter. *Real estate rental & leasing*, *Professional scientific & technical services*, and *Arts entertainment & recreation* had the largest job expansion, each with gains of greater than 2.5 percent. This is the largest quarterly increase seen in these industries in over 10 years. Nationally, private service producing industries added 385,000 jobs (+0.4 percent) during the 1st quarter 2011.
- The nation's economy grew by 2.6 percent in 2010. The one prominent sector that helped stimulate real Gross Domestic Product (GDP) was *Durable goods manufacturing*. Expansion in this sector added percentage points to GDP in 29 states. *Retail trade* and *Finance and insurance* were also major contributors to the increase in real GDP. Progress was evident in all but one industry, and that was *Construction*. This industry's GDP contraction was -0.14 percentage points.
- In 2010 Michigan's economy rose 2.9 percent, ending two years of losses. Its GDP growth ranked fifteenth in the nation and third in the Great Lakes Region. The GDP gains stemmed from *Durable goods manufacturing* (+1.5 percent) which accounted for nearly all of the increase. *Real estate, rental and leasing* was the weakest sector, with a GDP reduction of 0.2 percent.

## Michigan Jobs Lost and Gained Since End of the Recession

Percent Change in Michigan Payroll Jobs by Sector, June 2009 through May 2011

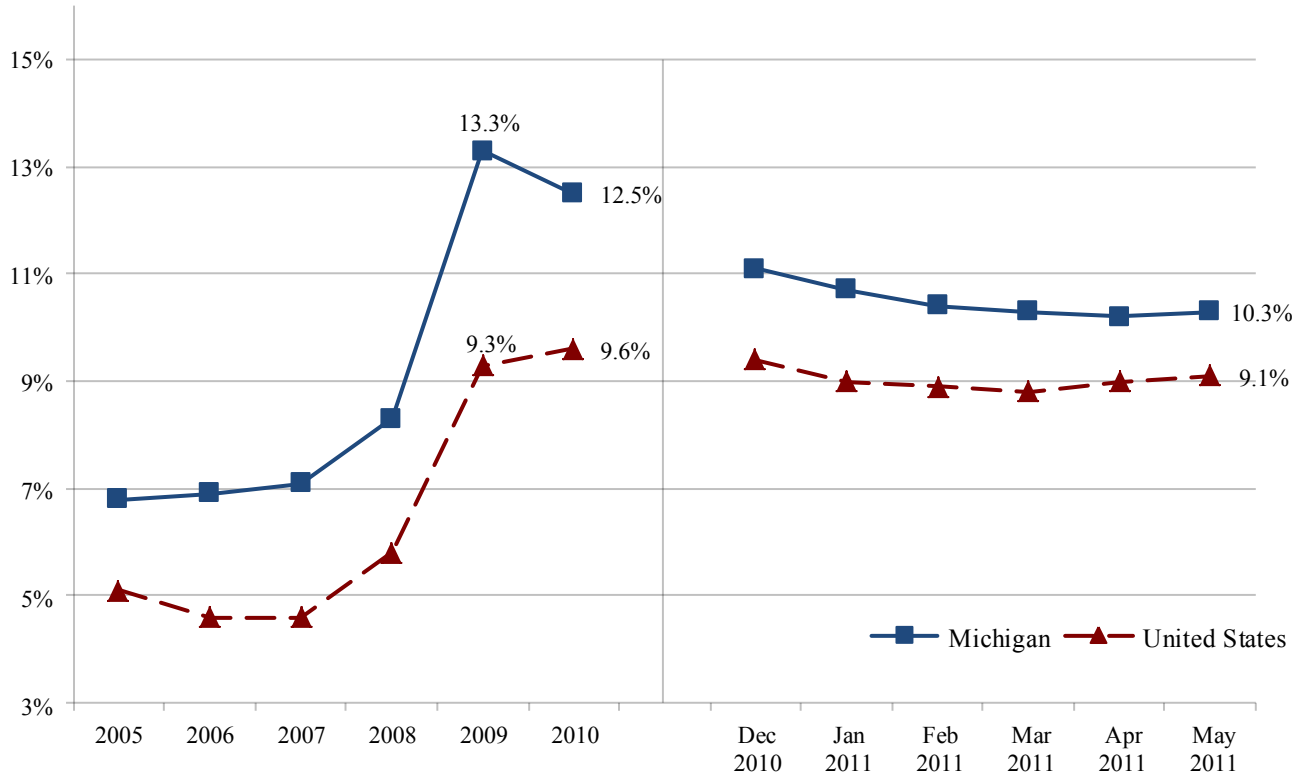


Source: U.S. Bureau of Labor Statistics / DTMB

- The nation lost nearly 7.5 million jobs during the Great Recession lasting from December 2007 to June 2009, a contraction of over 5 percent. Michigan's economy lost over 400,000 jobs and shrank by almost 10 percent, accounting for one in every 20 jobs lost nationwide during that time. Since the end of the national recessionary period however, Michigan has outpaced the U.S. in terms of employment growth, increasing by 1.5 percent from June 2009 to May 2011 compared to the nation's 0.4 percent gain. During this more recent period, Michigan accounted for over 10 percent of the nation's 550,000 job increase, or roughly one in ten new jobs nationally.
- *Transportation equipment manufacturing*, which had been the leading job loser during Michigan's recessionary struggles, showed the largest percent gain of any key industry sector since June 2009. The 18.4 percent job advance in the auto sector represented roughly one-third of the state's overall gain during this time, and was the driving force behind the addition of 47,000 durable goods manufacturing jobs statewide.
- Among the state's other primary sectors, many also showed job gains since the end of the most recent national recession. *Administrative and support services* grew by over 15 percent and added over 35,000 jobs, primarily due to significant job gains among temporary help agencies and employment services firms. The *Professional and scientific services* sector ramped up employment by 11,400 since June 2009, reflecting job additions in engineering services and information technology. Although *Healthcare and social assistance* only grew by 2.7 percent, it accounted for 14,500 new jobs.
- *Arts, entertainment and recreation* (-4,800) and *Retail* (-8,300) continued to show job losses, though the magnitude of these reductions have lessened recently. The biggest job cuts in Michigan since June 2009 occurred in the *Government* sector, with job loss exceeding 5 percent or almost 35,000 jobs, nine in ten of which were recorded in local units of government and K-12 school districts.

# Unemployment Rate

Average Annual & Monthly Jobless Rates, Michigan and U.S.



Source: U.S. Bureau of Labor Statistics / DTMB

- During the past six months, Michigan’s unemployment rate has edged down slowly by about one percentage point to 10.3 percent in May 2011. During most of 2010, however, Michigan led the nation in the largest percentage point jobless rate reduction, dropping by a significant 2.5 percentage points since May 2010.
- Michigan’s labor market trends have outperformed the U.S. over the past year, as the national jobless rate has edged down by just 0.5 percentage points since May 2010. Despite these improvements, Michigan’s jobless rate remains high, as only four states in the nation have higher unemployment rates.
- Michigan’s jobless rate reduction over the past year reflects two primary dynamics:
  - Significant job gains in selected industries, such as business services, manufacturing, and health care
  - A decline in the state workforce, which can result in a lower unemployment rate if workers leave the state or are hesitant to enter a difficult job market
- The gap between the U.S. and Michigan jobless rates has narrowed in recent quarters, from 3.8 percentage points in early 2010 to just 1.6 percentage points in the 1st Quarter 2011. The University of Michigan (RSQE) forecasts the Michigan unemployment rate at 10.0 percent in 2011, declining to 9.4 percent in 2012 and 9.0 percent in 2013.

Jobless Rates By Quarter

| Month                   | Michigan    | U.S.       | Gap        |
|-------------------------|-------------|------------|------------|
| January                 | 10.7        | 9.0        | 1.7        |
| February                | 10.4        | 8.9        | 1.5        |
| March                   | 10.3        | 8.8        | 1.5        |
| <b>1st Quarter 2011</b> | <b>10.5</b> | <b>8.9</b> | <b>1.6</b> |
| October                 | 11.6        | 9.7        | 1.9        |
| November                | 11.4        | 9.8        | 1.6        |
| December                | 11.1        | 9.4        | 1.7        |
| <b>4th Quarter 2010</b> | <b>11.4</b> | <b>9.6</b> | <b>1.8</b> |
| January                 | 13.7        | 9.7        | 4.0        |
| February                | 13.5        | 9.7        | 3.8        |
| March                   | 13.3        | 9.7        | 3.6        |
| <b>1st Quarter 2010</b> | <b>13.5</b> | <b>9.7</b> | <b>3.8</b> |

Quarterly Rate Movements

|                               | Michigan | U.S. |
|-------------------------------|----------|------|
| 1st Quarter 2011 Average Rate | 10.5     | 8.9  |
| Change Since Prior Quarter    | -0.9     | -0.7 |
| Change Since 1st Quarter 2010 | -3.0     | -0.8 |

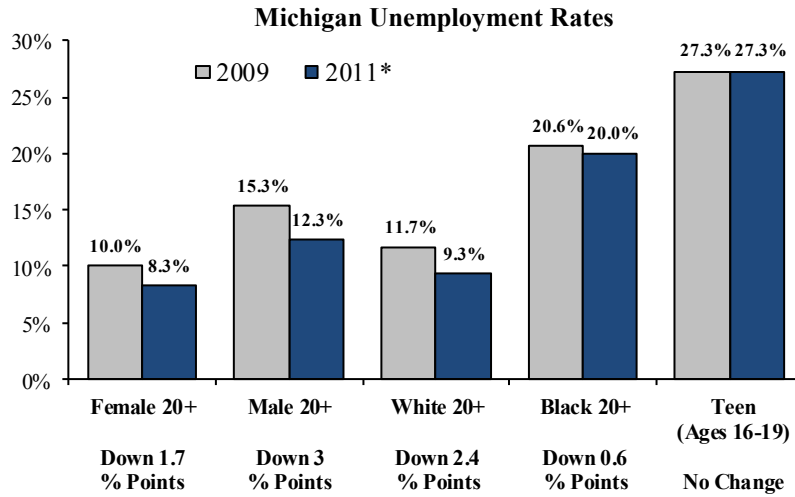
Source: U.S. Bureau of Labor Statistics / DTMB

# Labor Market Demographics

## Unemployment in Michigan Drops Since 2009, But Not Evenly Across Demographic Groups

From the depths of the 2009 recession through mid-2011\*, Michigan's unemployment rate has fallen. However, over this period the extent of jobless rate reductions have differed by demographic group.

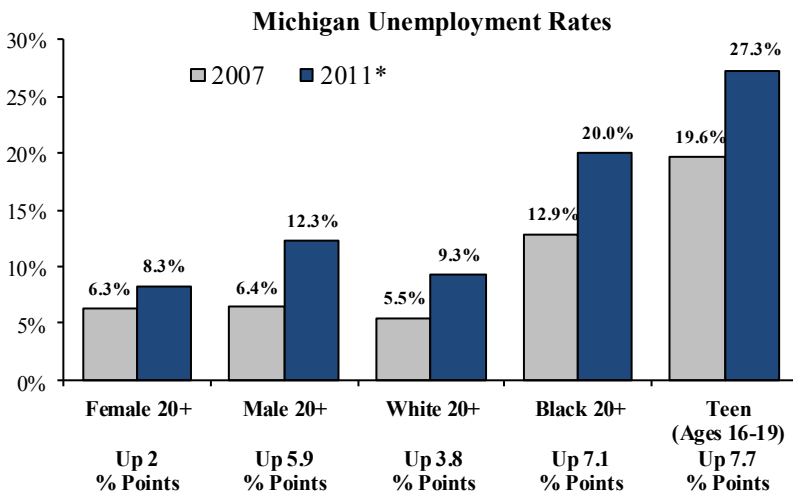
Unemployment rates by demographic group can be drawn from the Current Population Survey, a survey conducted by the U.S. Census Bureau for the U.S. Bureau of Labor Statistics. 60,000 households nationally and over 1,700 households in Michigan are surveyed monthly to produce detailed information on labor market trends by workforce characteristic.



\* Data for 2011 represents the 12-month average from June 2010-May 2011  
Source: U.S. Bureau of Labor Statistics / DTMB

- From 2009 to 2011, adult males in Michigan recorded the largest drop in unemployment rates. A partial factor in this improvement was the gain in manufacturing jobs and the stabilization in construction jobs in 2010 and 2011. These are industry sectors that are traditionally male-oriented.
- In this period, adult females also registered a jobless rate decline, but at a lesser pace than adult males.
- Job gains did occur over this period, but that was only partially responsible for the lower jobless rates. Labor force withdrawal also contributed to the drop in the Michigan jobless rate. Due to the harshness of the recession and the slow recovery, many unemployed individuals stopped actively seeking employment in Michigan. From 2009 to 2011, there was a 3.8 percent decline in the adult male labor force, and a 2.9 percent drop in the adult female workforce.
- From 2009 to 2011, unemployment rates remained largely unchanged for both adult blacks and teens (aged 16-19). Teens were squeezed out of a very competitive labor market. Regardless of the year, adult black unemployment rates are generally double that of adult whites, and this period was no exception.

## Jobless Rates in Michigan Remain Above Pre-Recession Levels



\* Data for 2011 represents the 12-month average from June 2010-May 2011  
Source: U.S. Bureau of Labor Statistics / DTMB

- Despite recent reductions, jobless rates in 2011 remain elevated in all major demographic groups relative to pre-recessionary 2007 rates.
- From 2007 to 2011, jobless rates for adult males nearly doubled. Although male dominated industry sectors have rebounded somewhat since 2009, manufacturing and construction jobs remain well below 2007 levels.
- Jobless rates for adult females increased from 2007 to 2011, however at only a third the pace of adult males.
- Unemployment rates statewide for both adult blacks and teens recorded substantial increases of 7.1 and 7.7 percentage points respectively. As noted above, there has been virtually no improvement in jobless rates for these groups since 2009.

- From 2007 to 2011, labor force levels fell for all demographic groups in Michigan. Over this period, work force levels for adult males and females fell by nearly 5.0 percent and 6.0 percent, respectively. Adult blacks and teens recorded the largest drop in labor force participation (-7.5 percent).
- Another significant impact on the Michigan workforce since the recession is the availability of full-time jobs. From 2007-2010, part-time workers rose from one-fifth to one-quarter of all Michigan employed. The sharpest employment gain over this period was among workers who indicated they were working part-time only because they could not find a full-time job.



# Industry Highlights: Michigan's Defense Sector

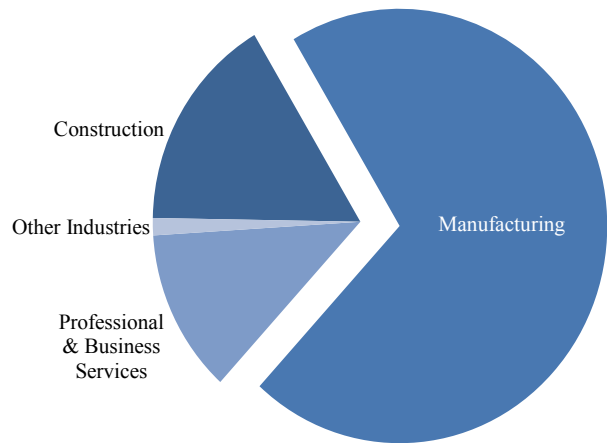
## Defense Industry: Contribution to the Michigan Economy

Defense spending is a major contributor to the economic strength of the Michigan economy. The infusion of defense funds generates contractor activity that helps stabilize and create jobs as well as encourage investment in R&D. Though the contracts are subject to volatility and budgetary constraints, increased defense contract activity since 2007 has helped to moderate steep recessionary job declines in certain sectors of the Michigan economy. From 2000 to 2010, Michigan ranked fourth among Great Lakes States in the dollar value of defense contracts awarded. Defense related jobs can be high-tech and require a skilled workforce, which explains why the strong Michigan auto-related skill base has attracted defense dollars. Special programs have been developed in local community colleges to transition laid off auto workers and small businesses to this sector through special federal grants. In fact, the top five defense contractors in 3 counties were clearly small businesses (less than 30 employees in Oakland, less than 100 in Macomb, and less than 190 in Wayne county).

### Sector Distribution of Contracts: 2007 and 2010

- Manufacturing, Construction and Professional and Business services accounted for the majority of defense spending in Michigan.
- Transportation equipment's share of manufacturing defense investment increased to 75.5 percent in 2010 from 69.7 percent in 2007, receiving more defense dollars than all other industries combined from 2008-2010. The purchase of Combat Assault and Tactical vehicles accounted for nearly half of all Department of Defense spending in Michigan over the last 4 years. This spending is concentrated in Wayne and Macomb counties, creating a hub of defense related economic activity in these areas.
- Construction's share of defense contract dollars increased to 15.8 percent in 2010 from 6.7 percent in 2007, as the Department of Defense invested in new facilities. Since overall construction jobs fell sharply in Michigan by 27 percent from 2007 and 2010, due partly to a dormant housing market, this infusion of defense related construction investment was critical in this hard-hit sector.
- Professional and Business services, which includes the professional and technical services component, dropped to third position (11.9 percent) in 2010.

Percent of Defense Dollars Awarded by Sector 2010 - Michigan



Source: Federal Procurement Data System (FPDS.org)

| Sector Industries: Top 3 in Defense Spending (\$s)  | Employment Concentration(LQ) |      |
|---|------------------------------|------|
|   | 2007                         | 2009 |
| <b>Manufacturing</b>  |                              |      |
| Military Armored Vehicle, Tank, & Tank Components   | 1.5                          | 1.6  |
| Light Truck Manufacturing   | 5.0                          | 3.8  |
| Office Furniture (except Wood)  | 11.1                         | 12.9 |
| <b>Professional &amp; Business Services</b>   |                              |      |
| Engineering Services  | 1.4                          | 1.3  |
| Research and Development in the Physical, Engineering, and Life Sciences (except Biotechnology) | 1.3                          | 1.1  |
| Advertising Agencies  | 1.3                          | 1.3  |
| <b>Construction</b>   |                              |      |
| Commercial and Institutional Building Construction  | 0.68                         | 0.64 |
| Other Heavy and Civil Engineering Construction  | 0.27                         | 0.32 |
| All Other Specialty Trade Contractors   | 0.64                         | 0.68 |

### Employment Concentration Relative to the Nation in the Top 3 industries

- Michigan has a high level of specialization (LQ>1) in defense related industries in the Manufacturing and Professional & Business Services sectors compared to the nation as shown by Location Quotients (LQ).
- Michigan recorded a strong job concentration advance in the office furniture sector from 2007-2009, as jobs fell in Michigan at a lesser pace than nationally.
- The only industry to show a decrease in concentration between 2007 and 2009 was light truck manufacturing. This reflects the bankruptcy related closures in the automotive industry outside of defense.

### High Growth Occupations in the Defense Sector

#### Engineering and Design

Manufacturing Engineers  
 Mechanical Engineers  
 CAD/CAE/CAM (Mechanical Drafter)

#### Manufacturing

Machinists & CNC Machinists  
 Multi-skilled Technicians (a.k.a. Mechatronics Technicians)  
 CAD/CAE/CAM Programmers  
 CNC Programmers

#### Business Management and Contracts

Cost Estimators (government contracts)  
 Program Managers  
 Project Managers  
 Sales Representatives (technical and scientific)  
 Marketing Managers

Source: Macomb Community College and New Economy Initiative Research

Note: A Location Quotient > 1 indicates a greater share of total jobs in an industry in Michigan than in the U.S.  
 Source: Federal Procurement Data System (FPDS.org) / U.S. Bureau of Labor Statistics

## Business Employment Dynamics

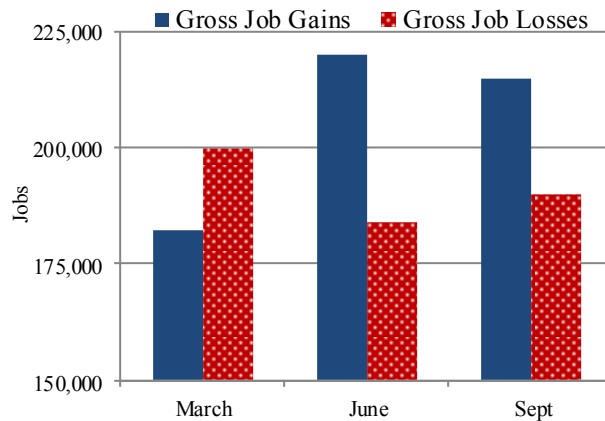
The Business Employment Dynamics (BED) data series includes gross job gains and gross job losses at the establishment level by 13 major industry sectors for Michigan. Gross job gains are the sum of employment increases from expansions at existing establishments and the addition of new jobs at opening establishments. Gross job losses are the result of contractions in employment at existing establishments and the loss of jobs at closing establishments. The difference is the net change in employment.

BED statistics track these employment changes at private business units from the third month of one quarter to the third month of the next. Gross job gain and loss data do not include government employees, private households, and establishments with zero employment.

### Seasonally adjusted data for the periods ending June 2010 and September 2010 revealed:

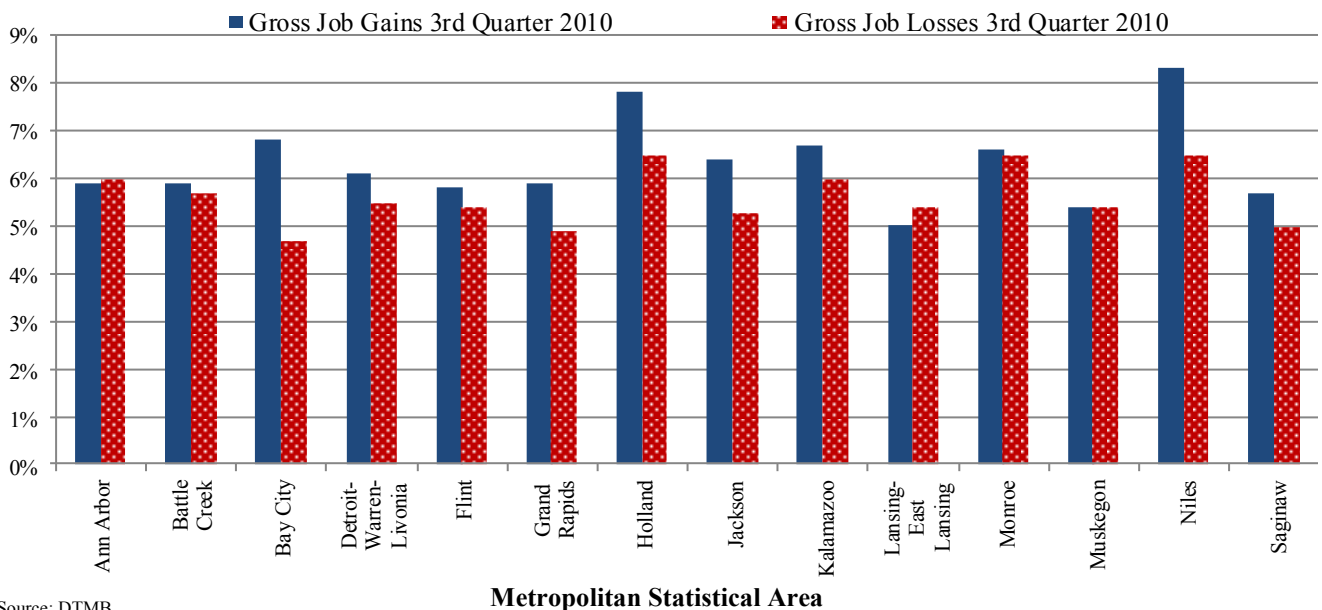
- For the second consecutive quarter, Michigan’s Gross Job Gains exceeded Gross Job Losses. The 2nd and 3rd quarter 2010 data revealed the state registered Gross Job Gains of 220,000 and 214,800. These additions were offset by quarterly Gross Job Losses of 184,000 and 189,900, for the 2nd and 3rd quarters, respectively.
- The result of Gross Job Gains outpacing Gross Job Losses provided a net increase of 36,000 jobs for the 2nd quarter followed by a net gain of 25,000 during the 3rd quarter. This was the first successive increase since the second and 3rd quarters of 2005 and was also the largest net job advance since March 2000. Michigan’s 3rd quarter 2010 total net job gains were second in the nation to Texas.
- The Construction, Manufacturing, Wholesale trade, Professional and Business Services, and Information industry sectors mirrored the state trend of registering consecutive quarters where gross job gains surpassed gross job losses. In contrast, gross job losses outstripped gross job gains in the Financial Activities and Utilities sectors for both the 2nd and 3rd quarters of 2010.
- The 14 Metropolitan Statistical Areas (MSA), which comprise 26 of the state’s 83 counties, accounted for 78 percent and 68 percent of the net job increases for the 2nd and 3rd quarters, respectively. The largest MSA, Detroit-Warren-Livonia was responsible for half of the net job gains during the 2nd quarter 2010 and 37 percent in the 3rd quarter 2010. The Ann Arbor, Lansing-East Lansing, and Saginaw MSAs were the only areas in which gross job losses surpassed gross job gains during the 2nd and 3rd quarters. Saginaw experienced a decline of 300 jobs during the 2nd quarter while Ann Arbor and Lansing-East Lansing registered net decreases of 100 and 500, respectively, in the 3rd quarter.

**Michigan Gross Job Gains/Losses 2010**



Source: U.S. Bureau of Labor Statistics / DTMB

**Gross Job Gains and Losses as a Percent of Private Employment**

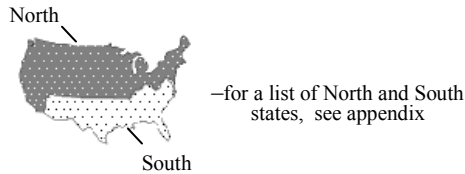


Source: DTMB

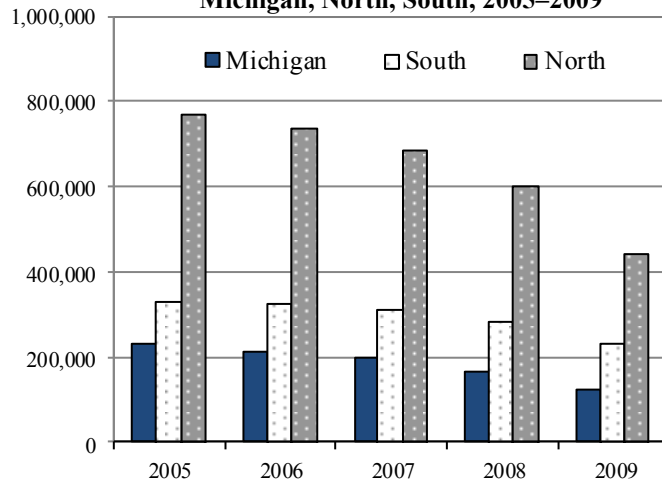
# Motor Vehicle Employment

This employment analysis compares Motor Vehicle Manufacturing; Motor Vehicle Body and Trailer Manufacturing; and Motor Vehicle Parts Manufacturing (NAICS 3361-63, hereafter referred to as automotive production) across two regions of the U.S. Also presented is a comprehensive look at total auto industry employment in Michigan, which includes automotive production employment as well as jobs related to manufacturing of materials, tooling and parts, and the non-manufacturing activity associated with vehicle design, engineering, and company management.

## Michigan Automotive Production Employment



**Automotive Production Employment Michigan, North, South, 2005–2009**

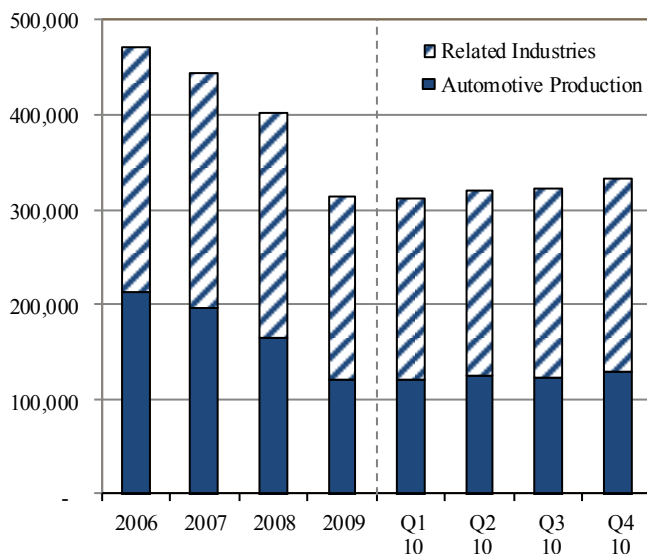


Source: U.S. Bureau of Labor Statistics / DTMB (NAICS 3361-3363)  
 Note: 3361 Employment estimated: Delaware, Kansas, Louisiana, Mississippi, South Carolina, Tennessee, Virginia, Wisconsin

- Nearly one in five (18 percent) of the nation’s automotive industry workers still worked in Michigan in 2009. That share was down less than one percent since 2008. This is a significant departure, however, from the 23.6 percent employment share that Michigan enjoyed as recently as 2003.
- Northern auto producing states lost an estimated 158,000 auto jobs (-23.2 percent) between 2008 and 2009, with Michigan accounting for an estimated 28 percent of those reductions. Southern states shed 49,500 auto jobs (-16.0 percent) over the year. As this analysis presents annual averages for 2009, it does not reflect the impact of the stabilization and growth witnessed in the industry in the aftermath of the most recent recession. In 2010, auto industry jobs throughout the U.S. steadied in response to increased vehicle sales and expansive restructuring efforts by domestic automakers.

## Michigan Automotive Industry Employment

### Michigan Automotive Industry Employment 2006 – 2010



Source: DTMB, Quarterly Census of Employment and Wages

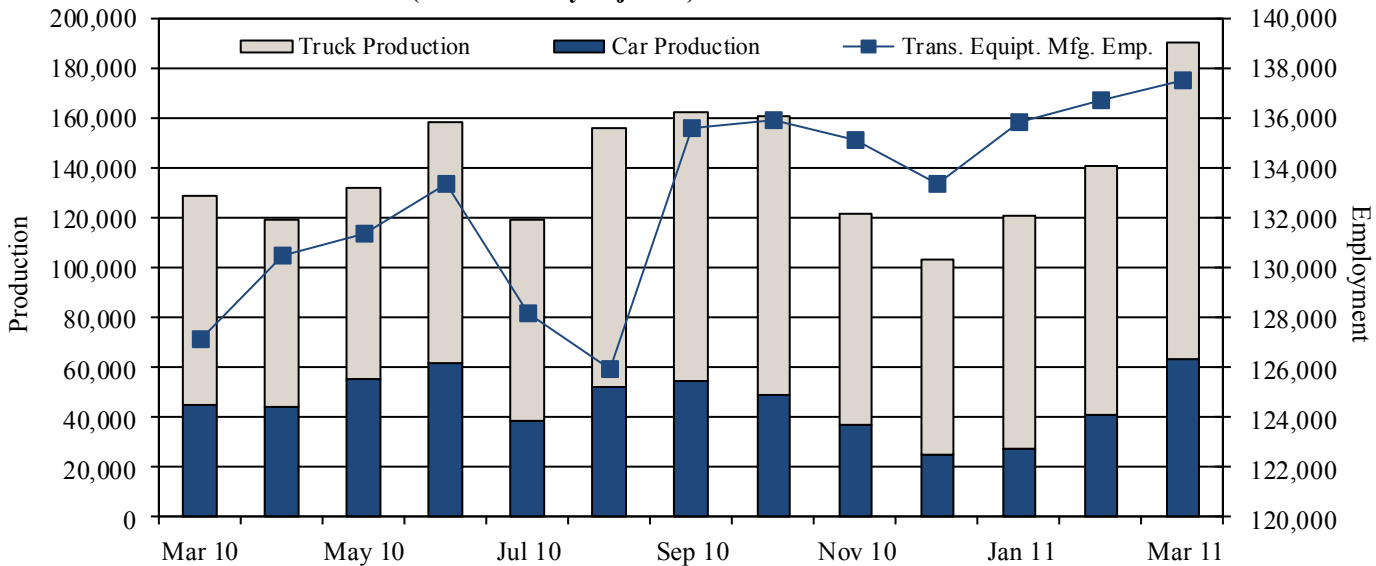
- After bottoming in the 2nd quarter of 2009, automotive production and related industries began a rebound that extended through 4th quarter 2010, accounting for an estimated 333,000 jobs in Michigan by that time. Automotive production industries generated 129,200 of those jobs, while related industry sectors accounted for the remaining 203,800.
- Michigan’s automotive production and related industries expanded 2.6 percent, on an annual basis, between 2009 and 2010. Total private employment in Michigan declined 0.3 percent, or 9,300 jobs, over the same period.
- Automotive and related industries jobs grew as a share of total private employment between 2009 and 2010. The share of total employment supplied by automotive or related industries edged up by 0.3 percentage points to 10.2 percent. For point of reference, in 2002, the first year this data was tabulated, automotive production and related industries held a 15.0 percent share of the Michigan workforce.
- Job gains in 2010 were distributed roughly evenly between automotive production industries (+3,942, or 3.3 percent), and related industries (+4,100, or 2.1 percent).

- The employment recovery in the automotive production sector was led by motor vehicle parts manufacturing, which added 4,000 jobs over the year. The motor vehicle metal stamping industry, alone, tallied 1,200 in job gains. Related industries, like special die and tool, die set, jig, and fixture manufacturing (up 1,000 jobs), testing laboratories (up 2,200 jobs), and engineering services (up 1,000 jobs) also contributed to the automotive rebound. Each of the industries noted had experienced employment losses between 2008 and 2009.

## Motor Vehicle Production

- Between March 2010 and March 2011, U.S. sales of light vehicles rose 16.8 percent, evidencing increased stability and growth after a choppy handful of years for the domestic auto market. These steadying sales trends produced a 61,400 unit increase in production of cars and light trucks in Michigan, a 47.6 percent expansion from March 2010. As a result, employment in Michigan’s transportation equipment manufacturing industry grew by 10,400 (+8.2 percent) over the year.
- Market share for the Detroit Three (Chrysler, Ford, General Motors) has steadied following their restructuring efforts, rising from a low of 41.2 percent in August 2009 to 43.2 percent in March 2011. This is a 0.3 percent increase over the prior year.

**Michigan Automotive Production & Transportation Equipment Manufacturing Employment**  
(Not seasonally adjusted) March 2010 – March 2011

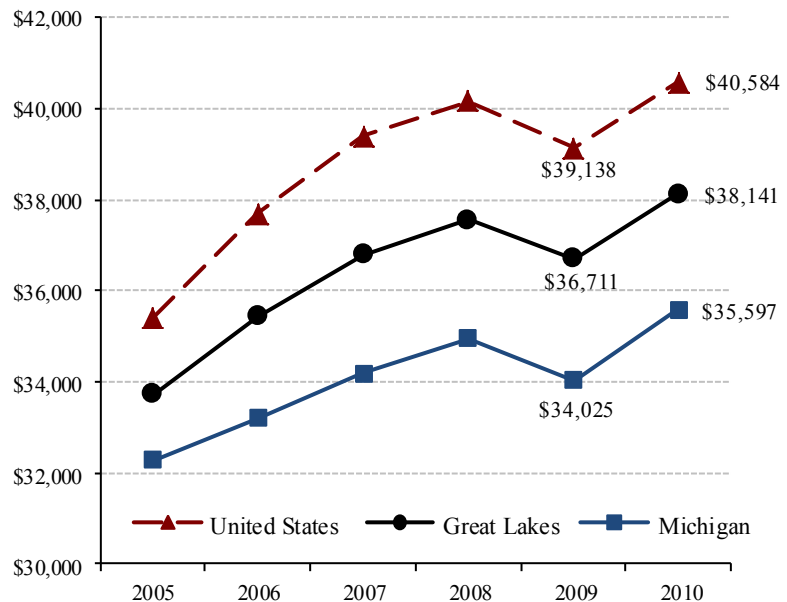


Sources: Michigan Department of Treasury, DTMB

## Per Capita Personal Income

- Personal income and per capita personal income (not adjusted for inflation) rose in 2010 following state, regional and national declines in 2009. Total personal income advanced in Michigan by 2.8 percent versus the national gain of 3.0 percent in 2010. However, Michigan’s per capita income growth (+4.6 percent) outpaced the national gain over this period, and was good for 11th nationally. Michigan’s per capita income rise in 2010 was partially due to economic improvements and in part due to continued population decline.
- Michigan’s per capita income rank nationally remained mostly unchanged in 2010, registering 37th. This was compared to a rank of 38th in 2009. In spite of the above-average percent growth from 2009–2010, the state’s per capita income (\$35,600) remains below the U.S. (\$40,600) and Great Lakes region (\$38,100).
- Since 2005, Michigan’s per capita income gains (+10.3 percent) have failed to keep pace with national trends. Michigan’s rate of per capita income growth exceeded only three other states over this period. However, Michigan’s per capita income ranking has only fallen slightly since 2005, when it ranked 32nd nationally.

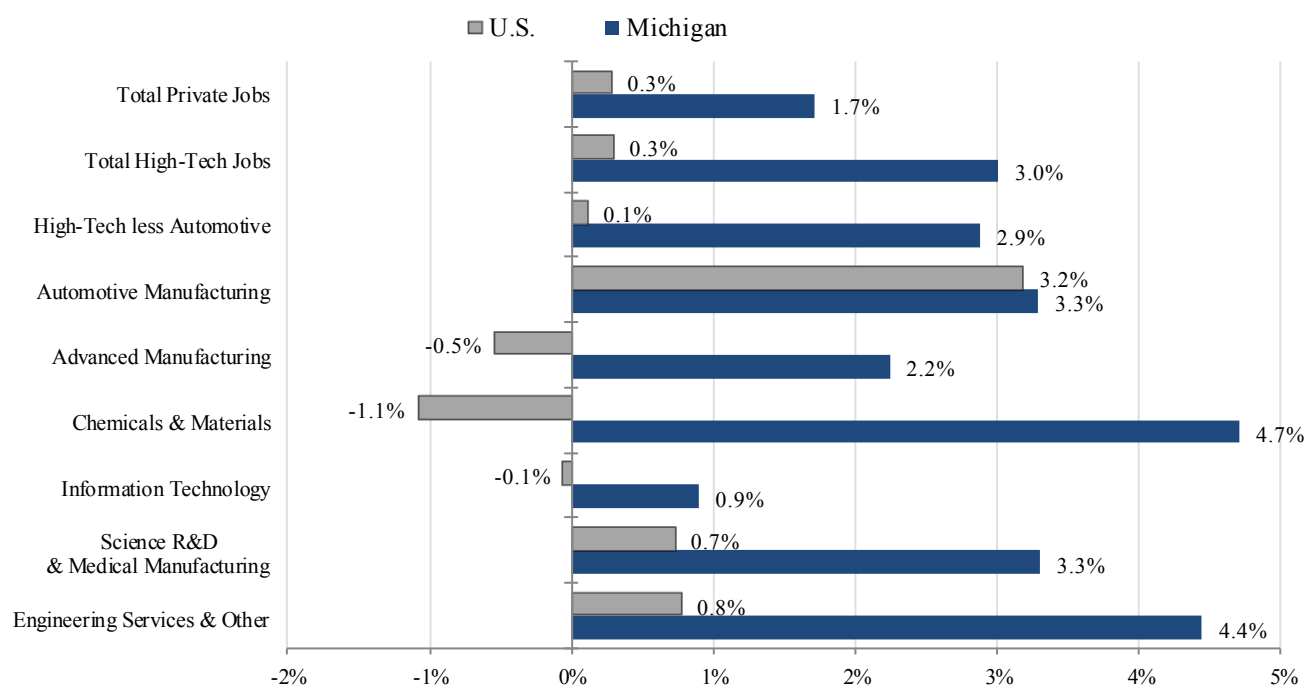
**Per Capita Personal Income, 2005 to 2010**



Source: U.S. Bureau of Economic Analysis, Regional Economic Information System

## Jobs in High-Tech Industries

Percent Change in Payroll Jobs 3rd Quarter 2009 to 3rd Quarter 2010



Michigan Job Levels in High-Tech Industries

| Period        | Total Private Jobs | Total High-Tech Jobs | High-Tech less Automotive | Automotive Manufacturing | Advanced Manufacturing | Chemicals & Materials | Information Technology | Science R&D & Medical Manufacturing | Engineering Services & Other |
|---------------|--------------------|----------------------|---------------------------|--------------------------|------------------------|-----------------------|------------------------|-------------------------------------|------------------------------|
| 2009 3rd Qtr. | 3,165,300          | 380,100              | 259,500                   | 120,500                  | 42,200                 | 14,800                | 77,900                 | 35,900                              | 88,700                       |
| 2010 3rd Qtr. | 3,219,800          | 391,500              | 267,000                   | 124,500                  | 43,200                 | 15,500                | 78,600                 | 37,100                              | 92,700                       |
| Change        | 54,500             | 11,400               | 7,500                     | 4,000                    | 1,000                  | 700                   | 700                    | 1,200                               | 4,000                        |
| Percent       | 1.7%               | 3.0%                 | 2.9%                      | 3.3%                     | 2.2%                   | 4.7%                  | 0.9%                   | 3.3%                                | 4.4%                         |

Source: DTMB, Quarterly Census of Employment & Wages

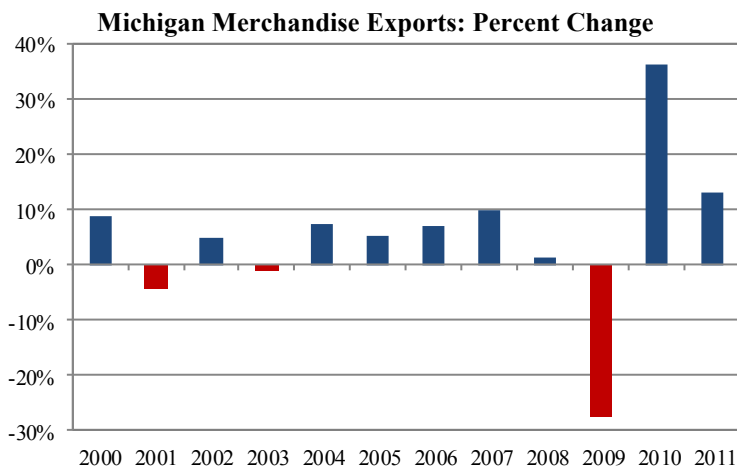
Note: Please see the Appendix for the detailed industry definition of the above clusters

- While the state and nation each experienced job loss in high-tech industries between 2007 and 2009, a slight upturn in jobs occurred in these sectors from 2009 to 2010. Michigan's high-technology industries supplied over 391,000 jobs in the 3rd quarter 2010, and accounted for nearly 13 percent of the state's private industry jobs. High-tech industries in Michigan also recorded a healthy employment growth rate of 3.0 percent in 2010, outpacing the very small 0.3 percent gain nationally. These technology-intensive industry clusters added 11,400 jobs to the Michigan economy from the 3rd quarter 2009 to the 3rd quarter 2010.
- Michigan outpaced the nation in the rate of job growth in each of six high-tech industry clusters. Rates of employment expansion ranged from +4.7 percent in *Chemicals & Materials* to +0.9 percent in *Information Technology*.
- *Automotive Manufacturing* is a major source of high-tech employment in Michigan, providing jobs for engineers, designers, technicians, and skilled trades workers. Although jobs in this industry fell dramatically in Michigan over the past decade, employment did edge up over the past year by 4,000 or 3.3 percent.
- High-tech job growth in Michigan actually outpaced the rate of gain in overall private jobs, which expanded at only about half the rate of the high-tech sector during this time. This is partly due to the fact that the job recovery in Michigan in 2010 was concentrated in the manufacturing, professional, and engineering services sectors that supply large numbers of high-tech jobs.
- The *Engineering Services* cluster added a significant number of jobs over the past year (+4,000), accounting for over a third of new high-tech jobs statewide in Michigan. This reflected job additions in business, logistics, and technical consulting firms; firms providing civil, environmental, and mechanical engineering services; as well as testing labs. Also notable were gains in *Scientific R&D and Medical Manufacturing*, led by job additions in engineering and life science research and surgical appliance and supply manufacturers.

## Globalization Indicator: Exports

In 2010, Michigan’s merchandise exports recovered fully from the decline in trade resulting from the global recession (2008–2009) and recorded higher levels of growth than for the nation as a whole. Export growth is an important contributor to job creation and stabilization. In Michigan, export supported jobs linked to manufacturing accounted for an estimated 7.6 percent of private sector jobs (based on the most current 2008 survey). More than a quarter of total manufacturing jobs were export related in Michigan, which ranked 5th highest among 50 States. Exports also support the small and medium size business sector (less than 500 employees) who were 90 percent of the total exporting firms (2008 survey). Factors that fuel export growth are a decline in the value of the dollar, more competitive wages and growth in emerging markets.

### Michigan Export Growth in Current Dollar Value (2000–2011)



- Michigan ranked first in the Great Lakes region and fifth nationwide in the percent growth of merchandise exports between 2009 and 2010.
- Michigan's exports in current dollars grew to an all time high in 2010 with Michigan's exports (excluding services) increasing by 36.3 percent (from 32.7 billion to 44.5 billion) in 2010. This advance followed a 27.7 percent decline between 2008 and 2009, reflecting the global recession. U.S. commodity exports rose by 21 percent between 2009 and 2010.
- Export growth continued into the first quarter 2011 (March year-to-date), recording a 13 percent increase over the same period last year.

Source: WISERTrade, from U.S. Census Bureau, International Trade Administration

### Profile of Michigan’s Top Manufactured Exports (\$s)

- The value of Michigan manufactured exports recovered fully after the 26 percent drop recorded in 2009 and are continuing to grow in 2011 March year to date. Transportation and equipment manufacturing accounted for half the value of manufactured exports.

| Industry<br>(More than \$1 million) | Michigan Exports 2010 (millions) | Percent Change |            |                        |
|-------------------------------------|----------------------------------|----------------|------------|------------------------|
|                                     |                                  | 2008- 2009     | 2009- 2010 | 2010-2011 (Yr to date) |
| <b>All Manufacturing</b>            | \$41,820                         | -26            | 39         | 14                     |
| Transportation Equipment            | \$21,864                         | -33            | 55         | 16                     |
| Chemicals                           | \$4,110                          | -14            | 19         | -2                     |
| Machinery, Except Electrical        | \$3,806                          | -25            | 20         | 26                     |
| Primary Metal Manufacturing         | \$2,925                          | -12            | 38         | -1                     |
| Computer And Electronic Products    | \$2,185                          | -3             | 29         | 31                     |
| Fabricated Metal Products           | \$1,362                          | -31            | 36         | 18                     |

Source: WISERTrade, from U.S. Census Bureau, International Trade Administration

- In 2010, 59 percent of transportation equipment exports and 41 percent of machinery purchases went to Canada.
- 33 percent of the total computer and electronics product exports went to Mexico.
- 50 percent of primary metal exports went to Canada, 12 percent to China, and Japan and Germany together bought 19 percent of the exports.
- Mexico bought 27 percent of Chemical exports.

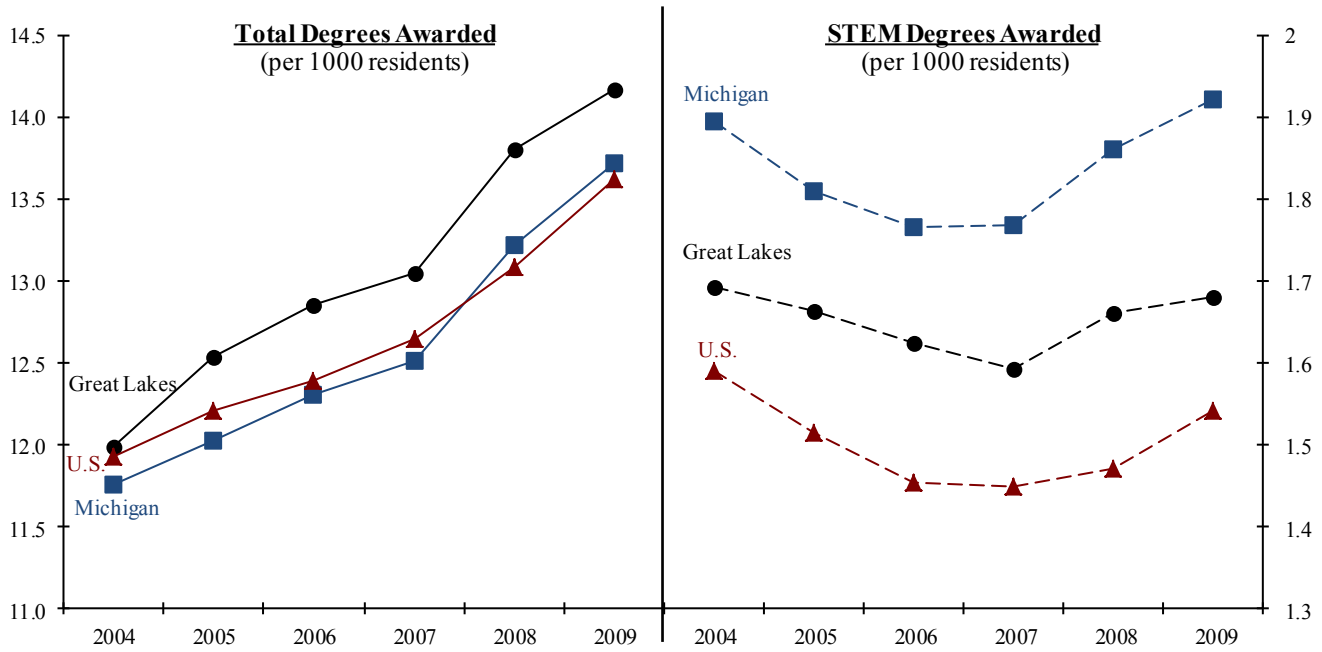
### Who is buying our Manufactured Exports: Our Trading Partners

| Countries<br>(More than \$1 million) | Michigan Exports 2010 (millions) | MI % Change |           | U.S. % Change |           |
|--------------------------------------|----------------------------------|-------------|-----------|---------------|-----------|
|                                      |                                  | 2008-2009   | 2009-2010 | 2008-2009     | 2009-2010 |
| <b>All Countries</b>                 | \$41,820                         | -26         | 39        | -22           | 21        |
| Canada                               | \$19,530                         | -31         | 42        | -28           | 21        |
| Mexico                               | \$7,349                          | -19         | 43        | -17           | 27        |
| China                                | \$2,070                          | 7           | 69        | 0             | 32        |
| Germany                              | \$1,469                          | -21         | 20        | -26           | 11        |
| Japan                                | \$1,203                          | -15         | 0         | -27           | 18        |
| Saudi Arabia                         | \$1,111                          | -32         | 96        | -16           | 7         |

Source: WISERTrade, from U.S. Census Bureau, International Trade Administration

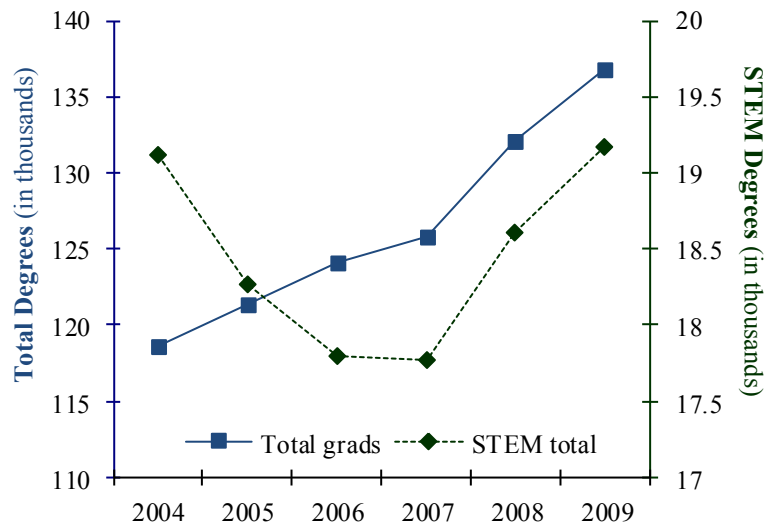
- In 2010, 78 percent of Michigan’s manufacturing exports went to six countries, with Canada accounting for 47 percent of the trade.
- The largest growth in manufacturing trade came from Saudi Arabia (+96 percent due to transportation and equipment exports) and China (+69 percent).
- Michigan’s exports grew at a faster rate than the U.S. with all the countries except Japan.

## College Graduates / Tech Degrees



- In 2009, Michigan had another year that saw more graduates than the previous year, and the state remained 9th in the nation in the number of post high school degrees and certificates conferred. In terms of degrees awarded per 1,000 residents, Michigan continues to lag behind the Great Lakes states but remained above the U.S. average for the second straight year. The gap between the Great Lakes average and Michigan has remained relatively consistent since 2005.
- Michigan again ranked 7th in the United States in the number of Science, Technology, Engineering and Math (STEM) degrees conferred with nearly 19,200 in 2009. Of those, 16,800 graduated with an associate’s, bachelor’s, master’s, or doctorate degree. This was up slightly from 16,550 in 2008. From 2003–2006 Michigan STEM degrees declined annually. From 2006–2009 that number has leveled off and begun to rise.
- Between the school years 2000–2001 and 2008–2009, the number of graduates in Michigan with a STEM degree rose a respectable 16.6 percent. While not among the highest in the nation, this is above the national average of 12.4 percent. Total graduates in Michigan also increased over this period (+29.6 percent), trailing the national growth rate of 35.6 percent.
- Women are still more likely than men to earn a post high school degree, but are much less likely to earn a degree in a STEM discipline. In 2009 women accounted for 60 percent of the total degrees awarded, yet comprised just over one in four STEM graduates.
- At all degree levels, engineering and engineering technologies remain the most male dominated fields of study, where less than one in 5 graduates is female.

**Michigan Graduates, Total and STEM**



Source: IPEDS from U.S. Department of Education, U.S. Census Bureau

<sup>1</sup> In the 2008 report this was defined as “college graduates”. A change in methodology has caused the data for the previous years to change from our earlier study.

# Executive Summary



Even before the Great Recession, the auto industry in Indiana, Michigan and Ohio was in the throes of restructuring. They were already applying new technologies and production efficiencies, reducing costs, and modifying product lines to equal or beat global competitors. All of this was accompanied by an extended period of downsizing. The Great Recession just compounded the challenges the industry was already facing.

This report is a reality check, accepting that the regional economy is at a fundamentally different place and cannot return. As the auto sector works toward its revival, there are significant workforce issues that must be addressed.

## Finding New Careers for the Displaced

To more effectively serve the large numbers of dislocated auto industry workers, the work of the Driving Change consortium was based on four overarching goals:

1. **Chronicle the transformation** from the old auto industry to a new, more efficient auto industry, especially focusing on the new skill and training requirements of the auto workforce.
2. **Identify the effects** of this structural transformation on the auto parts supply chain workforce.
3. **Find green job opportunities** now and in the future as alternative career pathways for displaced workers.
4. **Identify the skills gap** and the required educational and technical training needed for dislocated workers to transition into new occupations.

## Technology Drives Change

The pace of vehicle technology change is accelerating. Vehicles are changing in response to consumer taste and expectations, higher safety standards, and the drive toward a low-carbon future. When considering changes in automotive technology that support the “greening” of automotive transportation, most people think first about advanced powertrains, materials and electronics. These three technology sectors play a significant role in the transformation of the new auto industry:

**Powertrain:** The most noteworthy change is the re-emergence of the electric vehicle. The development of alternative forms of energy storage (primarily batteries) is rapidly progressing. As powertrain technologies advance, the locations of powertrain production and employment may shift. It is possible that new propulsion systems will be produced outside the region or require fewer workers to produce the same number of propulsion systems. In either event (or both), a large-scale displacement of traditional engine production by alternative technologies puts the tri-state region’s powertrain employment at risk.

**Materials:** The need to make vehicles lighter for improved fuel economy is a major driver in the development of automotive materials forming. The U.S. workforce’s strength is in steel, but less so in alternative materials. While there are only a few domestic metallurgy programs focused on lightweight materials, Europe and Asia have much more experience in this field.

**Electronics, software and controls:** Technology in vehicles will continue to increase at a rapid rate. Today, electronics accounts for 25 percent of a vehicle’s value—tomorrow, 40 percent. Yes, the tri-state region is poised to benefit from the research and development, design, engineering,

and systems integration side of the electronics used in vehicles, but the area may lose jobs to other automotive regions that are stronger in electronics manufacturing, particularly producers in Europe and Asia.



## Executive Summary continued



### Workforce Implications

Several practical responses emerged from this research:

- The need for ongoing access to capital for the supplier network is critical to the stabilization of this sector.
- Emerging green and cross-functional systems approaches to design, manufacturing, equipment maintenance and building construction will demand corresponding changes in the training of workers from the design center to the shop floor.
- Strategic training for managers that emphasizes long-term planning, worker training benefits and the need to integrate complex investments could improve acceptance of the associated investment costs.
- Current differences among definitions of green jobs and inconsistent use of occupational coding systems frustrate and complicate research efforts aimed at identifying and quantifying these jobs and identifying training opportunities.
- Many of the workers displaced from the auto sector who will need to transition to alternate occupations are starting with limited education (high school or less). These workers will be especially challenged in finding acceptable replacements for their old jobs and will need support throughout that process.

upon all workers. Our fieldwork found examples of firms that are thriving because they adopted an agile production model—a variety of products for a variety of industries delivered quickly. They use advanced equipment enhanced with cutting-edge information technology; but in addition to changing their product and operations strategies, they have also transformed their human resource policies.

### Workforce Implications

Today's auto industry workers need systems thinking. That means that individuals must possess the soft skills that enable cross-cultural communication, collaboration and teamwork. Production and skilled-trades workers must adapt to an increasingly fast cadence of new product, process and technology introductions.

Fortunately, the tri-state region has the educational infrastructure to meet these challenges and prepare the workforce for the occupations and careers of the future. Out of nearly 900 accredited postsecondary institutions in the region, more than one-third offer programs relevant to the engineering, design, production and maintenance of automobiles.

### Investing in the Future

Automaker announcements since 2010 total \$4.3 billion in “green” investment in the tri-state region alone. But despite that huge investment and a rebound in sales in 2010, management appears concerned about the rebound's permanence. They continue to hesitate to expand hiring or production at the rate of previous economic recoveries. Management, it appears, continues to operate in a cost-cutting mode. Unfortunately, simple cost-cutting models of survival alone are not viable in the long run. Firms also need to build on the strengths of the knowledge, experience and skills of their workers.

One of our most important research-based conclusions: the U.S. auto supply chain could prosper by adopting a “high-road” production approach in which firms, their employees and suppliers work together to optimize investment, labor, quality and technology development.

What does this mean? That ***adopting high-road production requires everyone in the value chain be willing and able to share knowledge.***

Production will gravitate toward decentralization and increasing reliance

## Executive Summary continued



### Green Opportunities Require Worker Up-Skilling

Team assemblers and assemblers/fabricators were the two auto manufacturing occupations experiencing the largest job losses, accounting for more than 57,000 dislocated workers in the three states. **More than 60 percent of these workers have only a high school education**—a troubling statistic that does not bode well for their return to the auto industry.

Where will these displaced workers find jobs? How can they increase their training and skills in order to secure the jobs of the future? Is the green economy a viable alternative?

To answer these questions, we began by benchmarking the number of green jobs in each state and the industries of concentration. Next, each state conducted surveys of thousands of businesses and found that green jobs span a wide range of industries and occupations, but were concentrated in manufacturing and construction—the very industries most affected by the recent economic downturn. Demand for these green jobs varied across the region, based on the industry mix and employers' perceptions of green.

Automakers also stated that green products and production techniques will have a more profound effect on engineering and technical staff requirements than on the production and trades worker skill sets.

The green engineering and technology occupations with the greatest demand now and projected for the future tend to require expanded skill sets and more education and training. This trend in “up-skilling” of occupational requirements is true of green jobs as well as most other in-demand occupations.

### Alternative Career Pathways

It's obvious: many displaced autoworkers need help to find suitable career alternatives. We used a two-step pathway cluster and skills gap analyses developed specifically for this study, resulting in tools that offer valuable guidance to displaced workers charting pathways to new job opportunities.

We show the similarities and differences of worker and job characteristics and measure the degree to which worker traits such as “highly social” or “attentive to detail” make occupations more or less similar. Job transitions within a given cluster would be easier than moving from one cluster to another.

**But a worker still needs to know the relative difficulty or ease in closing the skills gap** between two occupations. Our work broke new ground in developing a skills gap model that measures the time to change from one occupation to another. We call this the trip time. This time is based on the extent of preparation required for the new job. While the trip time measure is not perfect, it is a great advance because it provides job seekers and counselors an easily understandable measure of the gap between their current occupation and a new one they may want to pursue.

Finally, this study produced a tri-state training program database for green and growing occupations as a resource to complement the trip time results. After a displaced worker generates a set of suitable alternative occupations, he or she can match those occupations with postsecondary educational, technical and vocational programs in the region. The skills gap and training program databases are available on the web at [www.drivingworkforcechange.org](http://www.drivingworkforcechange.org).

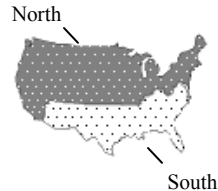
## Appendix

### State Comparison Groupings



| Great Lakes States |
|--------------------|
| Illinois           |
| Indiana            |
| Michigan           |
| Ohio               |
| Wisconsin          |

Source: DTMB



| South States: |                 |
|---------------|-----------------|
| Alabama       | North Carolina  |
| Arizona       | Oklahoma        |
| Arkansas      | South Carolina* |
| Florida       | Tennessee*      |
| Georgia       | Texas           |
| Kentucky      | Virginia*       |
| Louisiana*    | West Virginia   |
| Mississippi*  |                 |

| North States: |               |               |              |              |
|---------------|---------------|---------------|--------------|--------------|
| California    | Iowa          | Michigan      | New Jersey*  | Pennsylvania |
| Colorado      | Kansas*       | Minnesota     | New York     | South Dakota |
| Delaware*     | Maine         | Missouri      | North Dakota | Utah         |
| Illinois      | Maryland*     | Nebraska      | Ohio         | Washington   |
| Indiana       | Massachusetts | New Hampshire | Oregon       | Wisconsin*   |

Source: DTMB

\* Suppressed employment in NAICS 3361 estimated using Ward's Auto production data

### Motor Vehicle Indicators

| Automotive Manufacturing and Related Industries |  |            |   |
|---|--|------------|---|
| NAICS Code                                      | 2007 NAICS U.S. Title  | NAICS Code | 2007 NAICS U.S. Title   |
| 326121  | Unlaminated Plastics Profile Shape Manufacturing               | 335911     | * Storage Battery Manufacturing                                     |
| 326199  | All Other Plastics Product Manufacturing                       | 3361       | Motor Vehicle Manufacturing   |
| 326211  | Tire Manufacturing (except Retreading)                         | 3362       | Motor Vehicle Body and Trailer Manufacturing                        |
| 326220  | * Rubber and Plastics Hoses and Belting Manufacturing          | 3363       | Motor Vehicle Parts Manufacturing                                   |
| 326291  | Rubber Product Manufacturing for Mechanical Use                | 336992     | Military Vehicle, Tank, and Tank Component Manufacturing            |
| 327211  | Flat Glass Manufacturing                                       | 423110     | Automobile and Other Motor Vehicle Merchant Wholesalers             |
| 331111  | Iron and Steel Mills   | 423120     | Motor Vehicle Supplies and New Parts Merchant Wholesalers           |
| 331511  | Iron Foundries   | 423130     | Tire and Tube Merchant Wholesalers                                  |
| 332510  | * Hardware Manufacturing                                       | 423830     | Industrial Machinery and Equipment Merchant Wholesalers             |
| 3327  | Machine Shops; Turned Product; and Screw, Nut, and Bolt Manuf. | 425110     | * Business to Business Electronic Markets                           |
| 333511  | Industrial Mold Manufacturing                                  | 425120     | * Wholesale Trade Agents and Brokers                                |
| 333514  | Special Die and Tool, Die Set, Jig, and Fixture Manufacturing  | 541330     | Engineering Services  |
| 333515  | Cutting Tool and Machine Tool Accessory Manufacturing          | 541380     | Testing Laboratories  |
| 333618  | Other Engine Equipment Manufacturing                           | 541712     | ** R&D in Physical, Engineering, and Life Sciences (except Biotech) |
| 334514  | * Totalizing Fluid Meter & Counting Device Manufacturing       | 55111      | * Management of Companies and Enterprises                           |
| 335110  | * Electric Lamp Bulb and Part Manufacturing                    |            |   |

Notes: \* partial  
 \*\* estimated

Source: DTMB, with assistance from the Center for Automotive Research

## Appendix

### College Graduates/Tech Degrees

| <b>Science, Technology, Engineering and Math<br/>(STEM) Degrees - CIP Codes</b> |                          |
|---|--------------------------|
| Computer Science  | 11.xxxx (except 11.06xx) |
| Engineering   | 14.xxx                   |
| Engineering Technology  | 15.xxx                   |
| Biological and Medical Science  | 26.xxxx                  |
| Mathematics and Statistics  | 27.xxxx                  |
| Military Technology   | 29.0101                  |
| Physical Science  | 40.xxxx                  |
| Science Technology  | 41.xxxx                  |
| Health Professions and Related Clinical Sciences                                | 51.1401                  |
| Actuarial Science   | 52.1304                  |

Source: The National Center for Education Statistics  
Classification of Instructional Programs (CIP)

### Jobs in High-Tech Industries

| <b>High-Tech Industries:</b>             |   |  |   |
|--|---|--|---|
| NAICS Code                               | 2007 NAICS U.S. Title   | NAICS Code   | 2007 NAICS U.S. Title   |
| <b>Automotive Manufacturing Cluster</b>  |   | <b>Information Technology Cluster</b>                      |   |
| 3361                                     | Motor Vehicle Manufacturing   | 3341   | Computer and Peripheral Equipment Manufacturing                       |
| 3362                                     | Motor Vehicle Body and Trailer Manufacturing                              | 3342   | Communications Equipment Manufacturing                                |
| 3363                                     | Motor Vehicle Parts Manufacturing   | 3343   | Audio and Video Equipment Manufacturing                               |
| <b>Advanced Manufacturing Cluster</b>    |   | 3344   | Semiconductor and Other Electronic Component Manufacturing            |
| 3329                                     | Other Fabricated Metal Manufacturing                                      | 3346   | Manufacturing and Reproducing Magnetic and Optical Media              |
| 3331                                     | Agriculture, Construction and Mining Machinery Manufacturing              | 5112   | Software Publishers   |
| 3333                                     | Commercial and Service Industry Machine Manufacturing                     | 5171   | Wired Telecommunication Carriers                                      |
| 3336                                     | Engine, Turbine and Power Transmission Equipment Manufacturing            | 5172   | Wireless Telecommunication Carriers (Except Satellite)                |
| 3339                                     | Other General Purpose Machinery Manufacturing                             | 5174   | Satellite Telecommunications  |
| 3345                                     | Navigational, Measuring, Electromedical, Control Instrument Manufacturing | 5179   | Other Telecommunications  |
| 3353                                     | Electrical Equipment Manufacturing  | 5182   | Data Processing, Hosting, and Related Services                        |
| 3359                                     | Other Electrical Equipment and Compound Manufacturing                     | 51913  | Internet Publishing and Broadcasting and Web Search Portals           |
| 3364                                     | Aerospace Product and Parts Manufacturing                                 | 5415   | Computer Systems Design and Related Services                          |
| 3369                                     | Other Transportation Equipment Manufacturing                              | <b>Science R&amp;D &amp; Medical Manufacturing Cluster</b> |   |
| <b>Chemicals &amp; Materials Cluster</b> |   | 3254   | Pharmaceutical and Medicine Manufacturing                             |
| 3241                                     | Petroleum and Coal Products Manufacturing                                 | 3391   | Medical Equipment and Supplies Manufacturing                          |
| 3251                                     | Basic Chemical Manufacturing  | 5417   | Scientific Research and Development Services                          |
| 3253                                     | Pesticide, Fertilizer and Other Ag Chemical Manufacturing                 | <b>Engineering Services &amp; Other Cluster</b>            |   |
| 3255                                     | Paint, Coating and Adhesive Manufacturing                                 | 4234   | Professional and Commercial Equipment & Supplies Merchant Wholesalers |
| 3256                                     | Soap, Cleaners and Toilet Preparation Manufacturing                       | 5413   | Architectural, Engineering and Related Services                       |
| 3259                                     | Other Chemical Product and Preparation Manufacturing                      | 5416   | Management, Scientific, and Technical Consulting Services             |

Source: Michigan Bureau of Labor Market Information and Strategic Initiatives

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