Winter 2014

Rick Snyder, Governor
Department of Technology, Management & Budget
Bureau of Labor Market Information & Strategic Initiatives
www.michigan.gov/lmi

Michigan Economic and Workforce Indicators and Insights

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Preface

Dear Reader,

Recent data has shown that Michigan is continuing its journey as the "Comeback State." Consistent monthly gains in jobs and employment along with recent increases in labor force participation and advances in vehicle production and sales, all signal a turnaround from the devastating impact of the Great Recession.

This edition of the *Michigan Economic and Workforce Indicators and Insight* publication provides a critical analysis of a diverse set of workforce measures. Examples include labor force participation and unemployment, labor underutilization, occupational and industry employment, educational attainment, as well as valuable information on Michigan's Gross Domestic Product, patents, and venture capital.

In addition, this issue has a focus on youth in the Michigan economy and labor market, including pages on industry employment for youth, and the migration of the young knowledge population. Also included is a section titled "What's New from LMISI?" which provide access to more subjects of interest which can be found on the Labor Market Information and Strategic Initiatives website at www.michigan.gov/lmi.

As the reinvention of Michigan continues, the Bureau of Labor Market Information and Strategic Initiative's goal is to provide accurate, objective, relevant, timely, and accessible labor market information and analysis. Our commitment remains to produce the data and analysis necessary to guide various data users in making informed decisions and gauge the condition of Michigan's labor market.

Michael Williams

Acting Director
Bureau of Labor Market Information & Strategic Initiatives (LMISI)
Michigan Department of Technology, Management and Budget

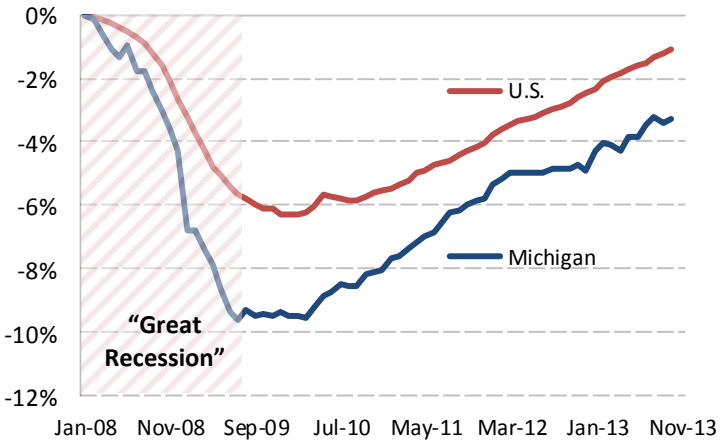
Michigan Job Trends

Jeffrey Aula

There are two government surveys that measure the state of the labor market: the Current Employment Statistics (CES) program, a monthly survey of nonfarm **business establishments**, and the Current Population Survey (CPS), a monthly survey of **households**. The establishment survey is the primary source used to generate monthly estimates of payroll jobs in Michigan, while the household survey is combined with other indicators to estimate total employed in Michigan, including the self-employed and agricultural workers.

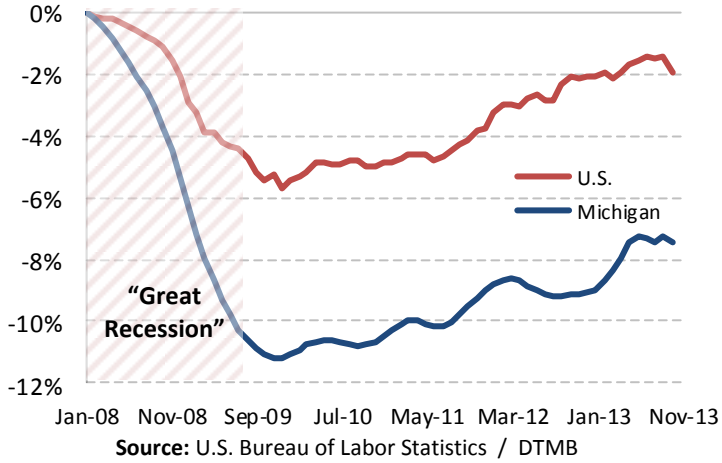
- Total Michigan nonfarm employment has grown by 1.6 percent during the 11-month period ending in November 2103, averaging 5,900 jobs per month. This is similar to the 1.5 percent job gain nationally during this period.
- Payroll jobs in Michigan expanded by 7.1 percent, or by 272,400 since the recessionary low in July 2009. This outpaced the 4.9 percent growth nationally during this period.
- These job gains were widespread in Michigan and have been notably strong in *Manufacturing* (+25.0 percent) and *Professional and business services* (+21.5 percent).
- Employment levels have declined since July 2009, however, in *Information* (-5.6 percent), *Government* (-5.5 percent), and *Other services* (-0.2 percent).
- The *household survey* for Michigan also shows evidence of strong expansion in total employment in the state. From November 2012 to November 2013, Michigan employment rose by 69,000 or 1.6 percent, which was double the U.S. employment growth rate over this period. Employment peaked so far during 2013 in September at 4,312,000, the highest level since February 2009.

Nonfarm Payroll Jobs, % Change Since January 2008



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

Household Employment, % Change Since January 2008



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

- Despite these recent gains, total employment in Michigan remains well below pre-recessionary levels and the former employment peaks. As the chart shows, Michigan employment in November 2013 remains about 7.6 percent, or about 355,000, below January 2008 levels. Employment in Michigan peaked in the year 2000, and employment in 2013 averaged 13.5 percent or 667,000 below the 2000 peak.
- The University of Michigan, Research Seminar in Quantitative Economics (RSQE) most recent forecasts predict both total Michigan employment and payroll jobs to expand by over 3 percent from 2013 to 2015.

Payroll Jobs by Industry

Jeffrey Aula

Payroll job estimates come from a monthly survey of business establishments and government agencies nationwide known as the Current Employment Statistics (CES) program. This survey helps to produce monthly estimates of nonfarm jobs by detailed industry (except self-employed) for the nation, states, and metro areas.

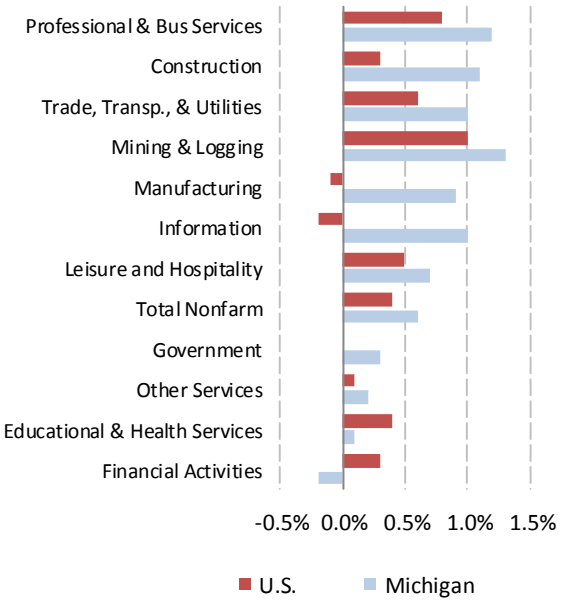
- Payroll job growth in Michigan (+1.6 percent) has essentially kept pace with the growth nationally (+1.7 percent) over the past year. Solid employment gains occurred in just over half of the state's major industries but was notably strong in the *Manufacturing* sector (+3.1 percent).
- Other industry sectors in Michigan with above average job growth over the year include *Leisure and hospitality*, *Professional and business services*, and *Mining and logging*.
- Michigan sectors significantly lagging the U.S. in job performance over the year (through 3rd Quarter 2013) included *Information* and *Financial activities*.
- On a quarterly basis, Michigan payroll employment has increased for 14 consecutive quarters, adding 261,000 jobs (+6.8 percent). This exceeded the 5.2 percent job gain nationally during this period.

Over the Year Job Change (%), Michigan & U.S.
(3rd Qtr. 2012—3rd Qtr. 2013)

Industry Sectors	Michigan	U.S.
Total Nonfarm	1.6%	1.7%
Mining and Logging	2.6%	3.3%
Construction	0.4%	3.2%
Manufacturing	3.1%	0.1%
Trade, Transportation, and Utilities	2.0%	2.0%
Information	-2.4%	0.3%
Financial Activities	-0.3%	1.4%
Professional and Business Services	2.5%	3.5%
Educational and Health Services	1.4%	1.7%
Leisure and Hospitality	2.9%	3.1%
Other Services	0.4%	0.8%
Government	0.1%	-0.3%

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

Over the Quarter Job Change (%)
(2nd Qtr. 2013 - 3rd Qtr. 2013)



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

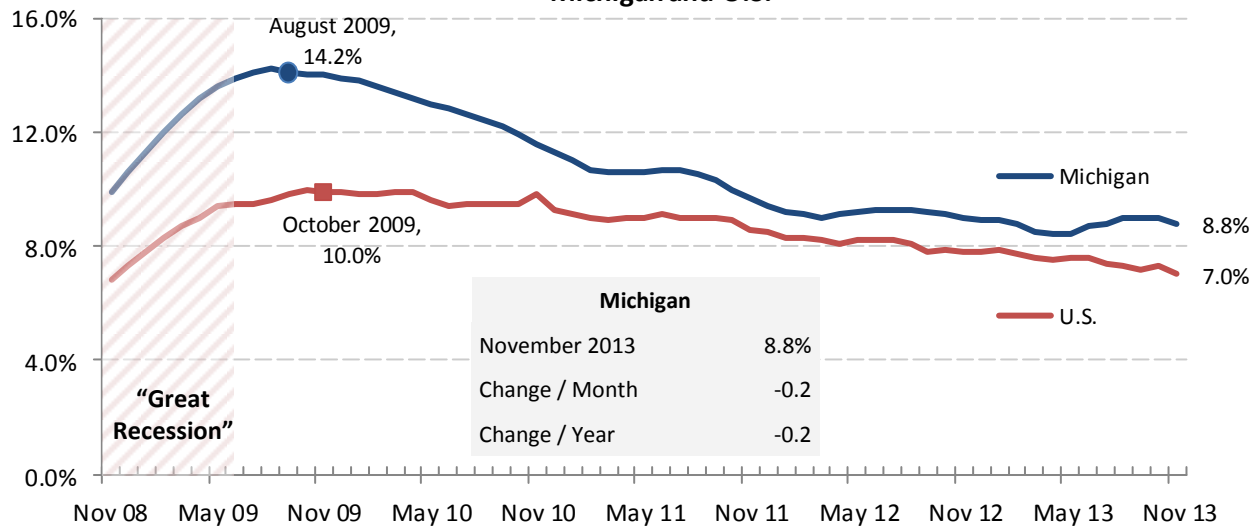
- Employment growth in Michigan's *Manufacturing* sector (+0.9 percent) was driven by job gains in the state's key *Transportation equipment manufacturing* industry (+3.0 percent) during the 3rd Quarter. Nationally, manufacturing jobs edged down by 0.1 percent. Starting with the 3rd Quarter of 2009, manufacturing job levels in Michigan have increased in every quarter since and have been primarily concentrated in *Transportation equipment manufacturing*.
- Employment levels have advanced in 14 of the past 16 quarters in *Professional and business services*, and this sector has been a primary source of job creation in Michigan. Employment gains in *Retail trade* (+1.2 percent) accounted for 75 percent of the jobs added in *Trade, transportation and utilities* during the quarter.
- Michigan jobs in *Financial activities* fell during the quarter as rising interest rates began to curtail refinancing activity.
- *Government* jobs in Michigan have stabilized over the past year at the lowest levels since at least 1990.

Unemployment Rate

Mark Reffitt

The unemployment rate is a key economic indicator and because it is a measure of the relative labor market success of the population, it is widely publicized and followed. It is defined as the ratio of the number of unemployed persons to all of those active in the workforce. To be considered unemployed, persons must have no earnings from work in a given month, be actively seeking a job, and be able to accept a job if offered.

Monthly Unemployment Rates (Seasonally Adjusted), Michigan and U.S.



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

- Michigan's seasonally adjusted monthly jobless rate has been relatively steady since June 2013, reaching 8.8 percent in November 2013. The Michigan jobless rate has also recorded only minor change over the past year. Employment expanded significantly by 1.6 percent since November 2012, however, the state labor force recorded a similar rate of gain, which kept the state unemployment rate relatively flat.
- Michigan's jobless rate ranked among the highest in the nation in October, although the gap between the Michigan and U.S. rates has narrowed significantly since the recession. Michigan's rate was 4.2 percentage points higher than the nation's in August 2009, before drawing to within under a point of the U.S. in the 1st Quarter 2013. Though the gap has widened a bit by November 2013, this was largely due to a rapid increase in labor force in Michigan since early 2013.
- Since the recent peak in August 2009, the number of unemployed in Michigan fell substantially by 40 percent, representing about 272,000 fewer jobless persons in the state since that time.
- Based on data through November 2013, it appears Michigan will register a 4th consecutive year of unemployment rate reductions in 2013.
- Michigan's jobless rate has yet to match the pre-recessionary 2007 jobless rate of 7.1 percent. However, the University of Michigan's RSQE released a forecast indicating a 2014 Michigan jobless rate of 8.2 percent, and a rate of 7.3 percent in 2015.

Annual Jobless Rate—Michigan

Year	Jobless Rate	Annual Trend
2013 (YTD)	8.7	↓
2012	9.1	↓
2011	10.4	↓
2010	12.7	↓
2009	13.4	↑
2008	8.3	↑

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

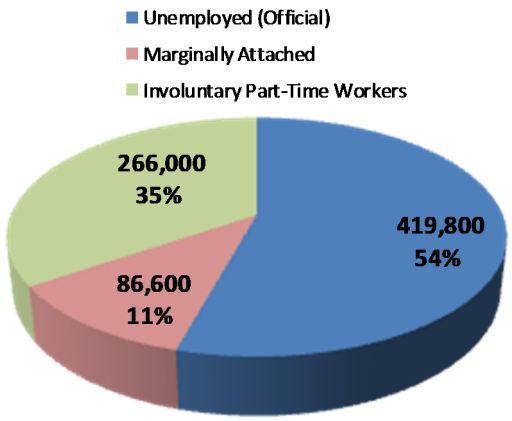
An Alternative Measure of Labor Underutilization (U-6)

Jason Palmer and Abbey Babb

Although the official unemployment rate (the "U-3") is the most commonly cited, the Bureau of Labor Statistics produces five "alternative measures of labor underutilization." These alternative measures range from narrow and less inclusive (the "U-1") to broad and more inclusive (the "U-6"). The broadest measure, the U-6, includes those officially counted as unemployed as well as two additional categories: those who are working part time for economic reasons and those marginally attached to the labor market.

- More than half (419,800) of those included in the U-6 were also counted in the official unemployment rate. In addition, the U-6 counts 266,000 Michiganders working part-time for economic reasons and an additional 86,600 marginally attached to the labor market (those who have looked for work in the last year but not in the last month).
- The distribution of Michiganders in the three categories of the U-6 has changed only slightly from the peak of the recession. A reduction in unemployment, generally, saw those officially counted as unemployed slide from 60 percent of the U-6 count in 2008 to its current level of 54 percent, resulting in offsetting share increases in the remaining two categories.

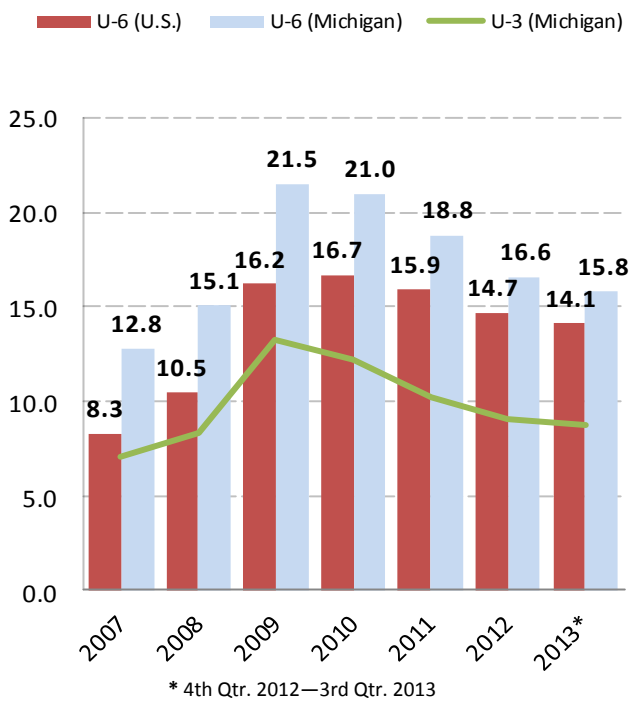
Components of U-6 in Michigan (2013*)



* 4th Qtr. 2012—3rd Qtr. 2013

Source: Current Population Survey (CPS) / DTMB

Unemployment and Underutilization (2007-2013)



* 4th Qtr. 2012—3rd Qtr. 2013

Source: Current Population Survey (CPS) / DTMB

- In the twelve months ending in the 3rd Quarter 2013, the U-6 in Michigan measured 15.8 percent, well above the national U-6, which registered 14.1 percent during the same period. Michigan's U-6 was 7.1 percentage points higher than the state's official unemployment rate, which stood at 8.7 percent during the period.
- Following the rapid rise of both the official jobless rate and the U-6 at the onset of the recession, each measure has slowly trended downwards since 2009. Today, the U-6 remains much higher, by definition, than the U-3, due to the inclusion of the additional categories discussed above.
- Both the U-6 and the official unemployment rate are noticeably lower in the United States than in Michigan, due to Michigan's well-documented job losses during the last two recessions. However, the gap between Michigan and the United States has been closing since 2009, indicating that Michigan's labor market may be recovering at a faster pace.

Michigan's Real Gross Domestic Product (GDP)

Ryan Gimarc

Real Gross Domestic Product (GDP) by state is an inflation–adjusted measure of a state's production, wherever sold, and is a useful gauge of the overall health of the state's economy. This analysis looks at the recent trend in GDP for Michigan and the United States as well as GDP by industry in Michigan. This is important in understanding which industries are driving Michigan's recent expansion, and which sectors are restraining growth.

- Michigan's level of Real GDP grew significantly by 2.2 percent in 2012 to $349.9 billion U.S. dollars (2005 chained dollars). For the first time since 2009, Michigan's growth in Real GDP lagged the national rate of gain. Between 2011 and 2012, Real GDP in the U.S. rose 2.5 percent to 13.4 trillion U.S. dollars.
- The largest industry by Real GDP, *Manufacturing*, registered significant growth in Michigan in 2012, up by 7.8 percent over 2011. This outpaced the large expansion seen nationally (+6.2 percent). This GDP gain in Michigan has been spurred by *Durable goods manufacturing*, which has recorded steady, constant growth since the 2008 Recession (GDP in this subsector rose 86 percent since 2009).
- The second, third, and fourth largest industries in Michigan by GDP all saw near flat activity, with *Real estate and rental and leasing* and *Government* declining by under 1 percent, and *Health care and social assistance* remaining basically flat with 0.1 percent growth.
- Two industries dealing with natural resources (*Agriculture, forestry, fishing, and hunting* and *Mining*) have seen the largest decline in GDP over the year. However, neither of these industries have seen a sustained decline, following similar GDP changes seen on a national level.
- Economists expect GDP growth to improve. At its 61st Annual Economic Outlook Conference in November, the University of Michigan, Research Seminar in Quantitative Economics (RSQE) called for U.S. GDP to expand in the coming years, with projected growth estimated at 2.7 percent in 2014 and 3.1 percent in 2015.

Total GDP, State and National (Millions of US$)

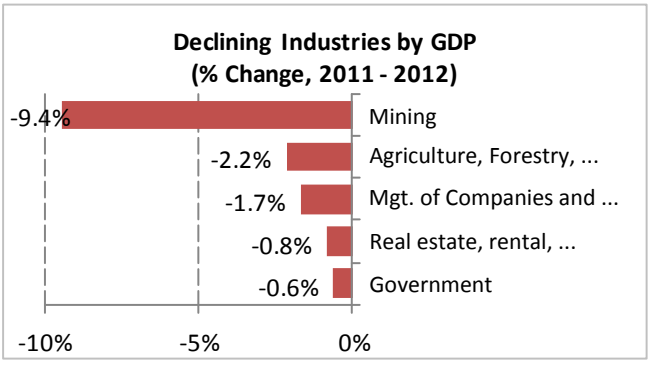
State / Nation	2011	2012	Change
Michigan	341,194	348,867	+2.2%
United States	13,108,318	13,430,576	+2.5%

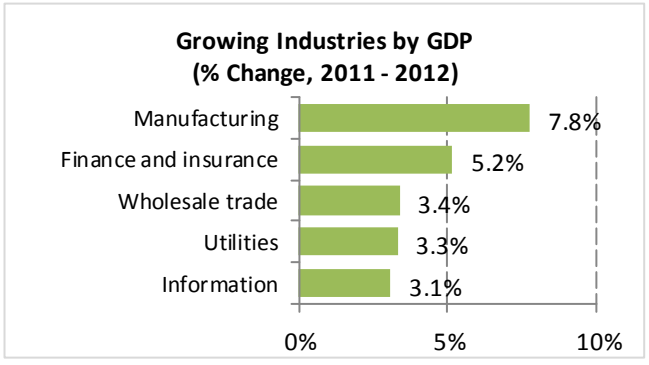
Michigan Rank (GDP Size): 13 / 50

Michigan Rank (GDP Growth): 18 / 50

Largest Michigan Industries by GDP (Million of US$)

Industry	2011	2012	MI	US
Manufacturing	59,183	63,776	+7.8%	+6.2%
Real estate and rental and leasing	41,280	40,934	-0.8%	+1.2%
Government	37,326	37,098	-0.6%	-0.3%
Health care and social assistance	29,940	29,965	+0.1%	+0.4%
Professional, scientific, and technical services	26,555	26,963	+1.5%	+1.2%





Source: U.S. Bureau of Economic Analysis

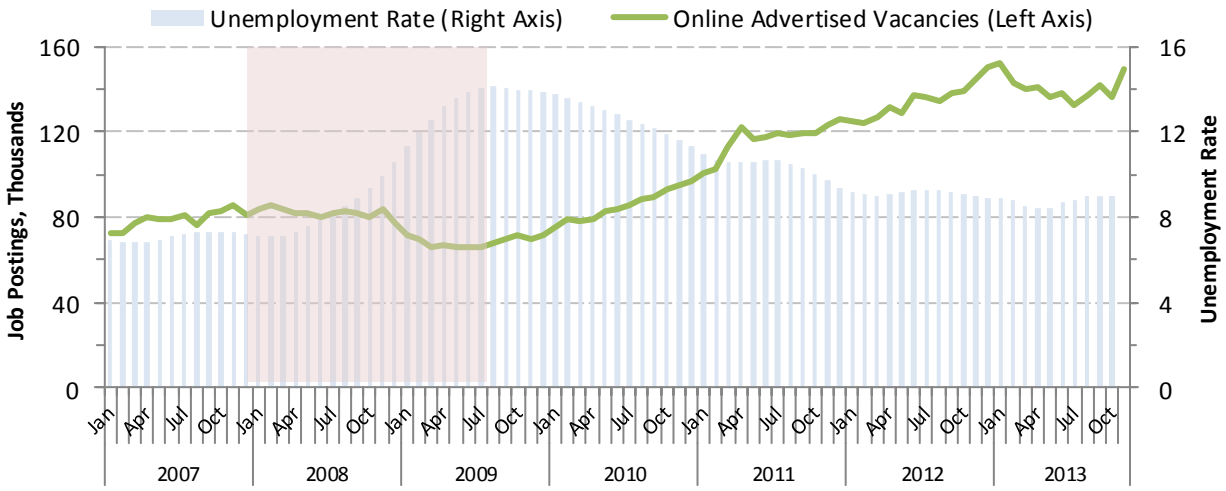
Real-Time Demand: Online Advertised Job Vacancies

Kevin Doyle

The Conference Board's Help Wanted Online (HWOL) Database provides a key measure of real-time labor demand in the state's job market. The Bureau of Labor Market Information and Strategic Initiatives, through a partnership with The Conference Board, uses the HWOL Database to supplement traditional labor market information, providing insights into the characteristics of real-time labor demand. This indicator highlights recent movements in online advertised job vacancies. In addition, this page looks at how long job ads have been posted as a potential measure of difficult to fill vacancies.

- In November 2013, there were 149,150 seasonally adjusted online advertised job vacancies in Michigan, up 12,830 or 9.4 percent over October. This was the greatest monthly increase in job ads of the year, and brought the number of ads near the record high of 152,380 seen earlier this year in January.
- The number of seasonally adjusted job postings has fallen by 3,220 or 2.1 percent since January of this year, making 2013 the first year since the end of the "Great Recession" without a double-digit percentage increase in job ads over the year.

Online Advertised Job Vacancies and Unemployment Rates (2007 - Present)



Source: The Conference Board, Help Wanted Online (HWOL) / DTMB

- The age of a job ad is one indicator of how difficult to fill a particular vacancy may be. While most job ads are active for less than 60 days, some jobs are advertised for much longer. Overall, nearly three in four job ads in Michigan are less than 60 days old while 11 percent of ads are older than 120 days. Importantly, ad age varies significantly by occupation and by location.
- *Health care* occupations rank last in the share of total ads that are less than 60 days old and rank first in the share of ads that are older than 120 days. Among the reasons for many long-running advertisements in *Health care* occupations are the advanced and particularized skills demanded by many employers, causing vacancies to stay posted longer to attract qualified candidates.
- Conversely, about 83 percent of all ads for *Service* occupations are less than 60 days old. Illustrating this, about 85 percent of all job ads for *Food preparation and serving related* occupations, the largest group within the broad *Service* category, are less than 60 days old. Typically, these occupations require fewer skills and employers have an easier time finding qualified workers to fill these vacancies.

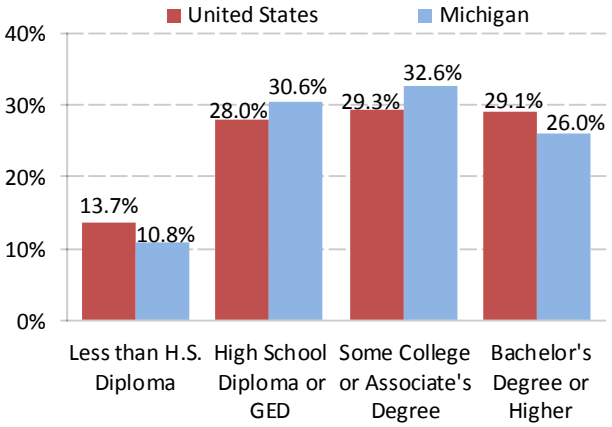
Educational Attainment

Mark Reffitt

Data on educational attainment is a key element in understanding the skills and knowledge of Michigan's population and potential labor pool. The U.S. Census Bureau's American Community Survey provides annual estimates of the educational attainment of the population across a number of geographic locations.

- The statewide share of persons 25 years and older with a bachelor's degree or higher (BA+) remained well below the national average in 2012, at 26.0 percent versus 29.1 percent nationally. This ranked 37th in the U.S. compared to all other states.
- Despite this lag, Michigan's share of population with a BA+ degree improved in the past five years. The 2012 share was 1.3 percentage points higher than it was five years ago in 2007.
- The population 25 and over in the BA+ category grew by 4.0 percent to over 1.7 million between 2010 and 2012, an increase of almost 66,000 people. One in five of this gain came in the 25-34 year-old category, which is generally considered the youngest broad group of the post-college-age workforce.

Educational Attainment of the 25+ Population, 2012



Source: U.S. Census Bureau, American Community Survey (2012)

Bachelor's Degrees and Higher by Age in Michigan

Mark Reffitt

In addition to providing information on the population overall, the American Community Survey also contains more detailed demographic information, allowing for comparisons of educational attainment by age, sex, poverty status, and other factors. This issue highlights advanced degrees by age in Michigan.

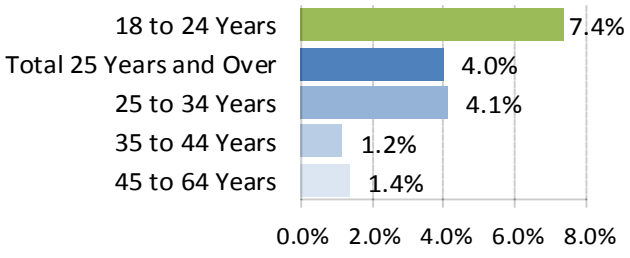
- In Michigan, over 29 percent of 25-34 year-olds held a bachelor's degree or higher in 2012, led only by the 35-44 age group with 31 percent of persons in the highest educational category. 25-34 year-olds comprised 20 percent of all bachelor's degree holders in the Michigan 25+ population in 2012.
- Michigan lags the U.S. in the share of young adults (ages 18-24) with a bachelor's degree and above.

% Persons with a Bachelor's Degree or Higher, 2012

Age Group	U.S. (Percent)	Michigan (Percent)	Michigan (Number)
18 to 24	**9.4**	**8.4**	**83,556**
Total, 25+	**29.1**	**26.0**	**1,721,465**
25 to 34	32.2	29.2	342,308
35 to 44	32.6	30.9	378,644
45 to 64	28.9	25.6	711,864
65+	23.2	20.2	291,410

Source: U.S. Census Bureau, American Community Survey (2012)

Growth of Michigan Population with BA+ for Primary Labor Force Ages, 2010-2012



Source: U.S. Census Bureau, American Community Survey (2012)

- However, since 2010, Michigan young adults (ages 18-24) with a BA+ rose by 5,700, or 7.4 percent over this period. By comparison, persons ages 25 and over with at least a bachelor's advanced by 4.0 percent, largely due to 25-34 year-olds which expanded by 13,400. In this group, women with advanced degrees outpaced men, growing by 4.9 percent versus 2.9 percent for men.

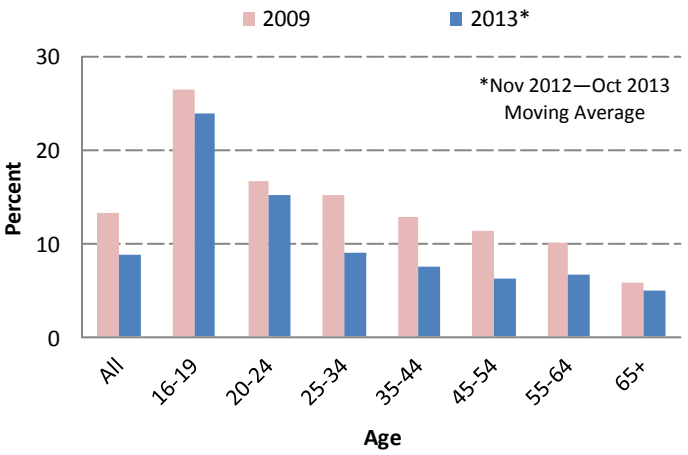
Unemployment Rates and Labor Force Participation

Jim Rhein

Four years after the worst year of the great recession, Michigan's unemployment rate has declined significantly. However, the state's rate remains relatively high in 2013. Michigan's unemployment recovery has been uneven, for example, among various age categories. However, jobless rates do not tell the whole story. Also important is the Labor Force Participation Rate (LFPR), which is the number of employed plus the number of those actively seeking employment (unemployed) as a ratio of the civilian non-institutionalized working age population. Although jobless rate declines generally indicate an improved labor market, decreasing LFPRs can point to continued weakness (or discouragement) in specific segments of the labor market.

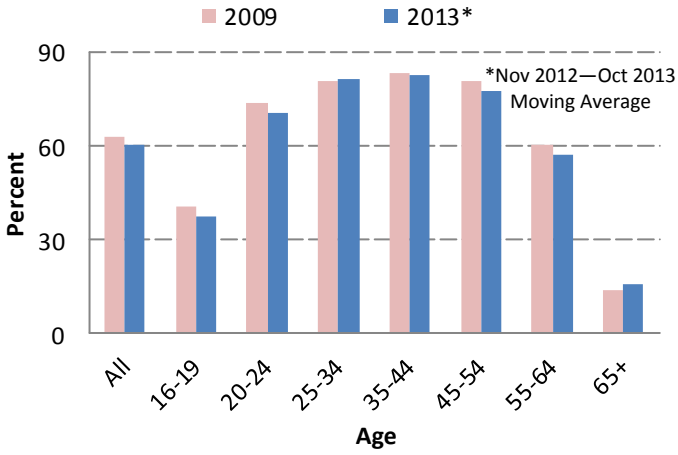
- Unemployment rate reductions from 2009 to 2013 were widespread throughout every age group.
- Jobless rates declined the least since 2009 in the 65+ (-0.9), 20-24 (-1.6), and 16-19 (-2.5) age brackets. The 65+ group's rates remained low throughout this period, while the 16-19 and 20-24 group's rates remained very high over this time frame. These two age groups recorded only marginal recovery since 2009.
- Unemployment rates from 2009 to 2013 fell primarily due to job growth, but a contributing factor was fewer state residents active in the labor force.
- Participation rates for four of the seven age groups have fallen significantly since 2009. The LFPR fell over this period in the 45-54 (-3.3), 20-24 (-2.9), 16-19 (-2.9), and 55-64 (-2.9) age groups. Youth (16-19) LFPR rates have been in decline for decades.
- The state as a whole recorded a 2.6 percentage point reduction in LFPR since 2009. However, three age groups have sustained or improved their labor force participation from 2009 to 2013; the 35-44, 25-34, and 65+.

Michigan Jobless Rates



Source: Current Population Survey (CPS) / DTMB

Michigan Labor Force Participation Rates



Source: Current Population Survey (CPS) / DTMB

- 2013 may have marked a turning point for Michigan's labor force and participation rates. Michigan in 2013 will record its first annual labor force growth since 2006. From 2012 to 2013, participation rates rose significantly in the 20-24, 35-44, 55-64, and 65+ groups. However two groups, the 16-19 and 45-54 year olds, continued to record declines in participation rates from 2012 to 2013.

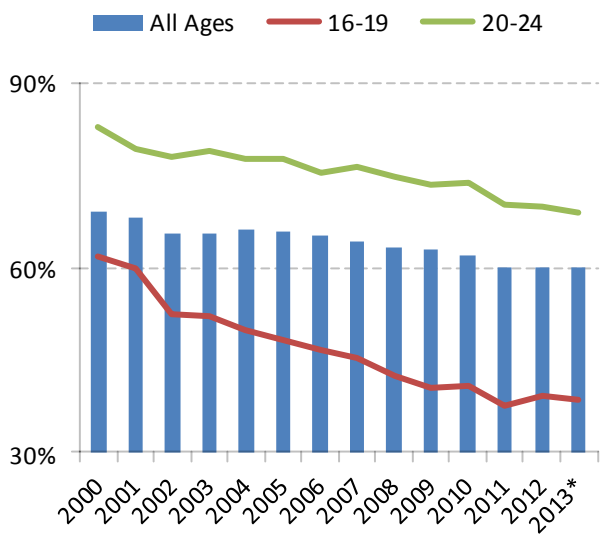
Youth Unemployment and Labor Force Participation

Jason Palmer and Abbey Babb

The subject of youth in the Michigan labor market has been a topic of particular interest for many people. As noted in the preceding page, youth aged 16 to 19 and 20 to 24 have experienced some troubling trends in recent years, seeing record low labor force participation rates and record high unemployment rates. This page will take a closer look at youth participation and unemployment in Michigan.

- While youth labor force participation nationally has been slipping for decades, record declines have been seen in Michigan in recent years. Today, Michigan's overall participation rate stands at 60 percent, with youth participation at around 40 percent for the 16-19 cohort and 70 percent for the 20-24 cohort.
- While participation rates have trended downward, generally, the decline in youth participation has been more pronounced. Since 2011, overall participation rates have leveled off, but have continued to fall for young people.
- Lower participation for youth can be attributed to two themes: economy and education. Due to slack economic conditions and increased competition from older workers, youth face a difficult job market. In response, education and related activities are especially attractive alternatives, nudging otherwise interested participants out of the labor market to pursue these alternative activities.

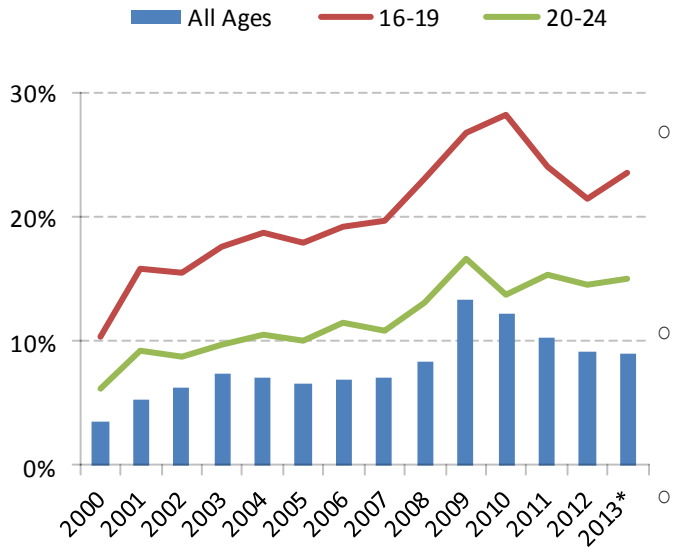
Labor Force Participation Rates



* 4th Qtr. 2012—3rd Qtr. 2013

Source: Current Population Survey (CPS) / DTMB

Unemployment Rates



* 4th Qtr. 2012—3rd Qtr. 2013

Source: Current Population Survey (CPS) / DTMB

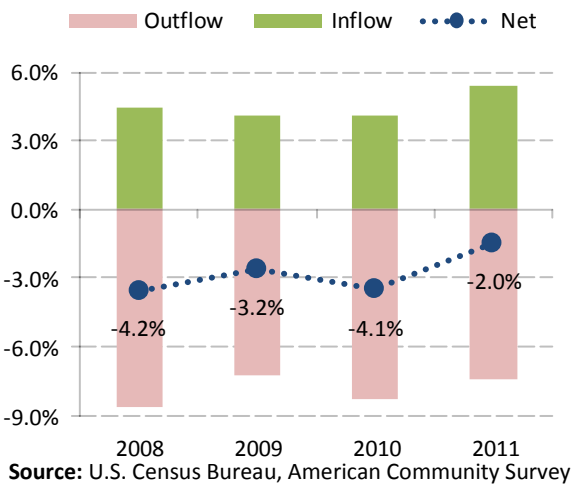
- Despite young adults 20-24 having higher labor force participation rates than average, unemployment rates for this group are also above average. Youth 16-19 have both lower participation and higher unemployment when compared to other cohorts.
- Youth have experienced a sharp increase in unemployment during the last two recessions, and rates remain elevated today. Among the reasons: deep and widespread job losses along with increased competition and crowding-out from older workers.
- During the recovery, unemployment rates have posted some improvement, yet joblessness for both youth cohorts remain elevated and well above pre-recession levels.
- On a positive note, youth are less likely to have dropped-out of the labor force due to discouragement. Additionally, youth see shorter periods of unemployment compared to other age groups.

Migration of Michigan's Young Knowledge Population

Ryan Gimarc

The migration of young, educated individuals has recently become a commanding issue in labor economics because of the long-term economic benefits seen in cities with a high young knowledge population and, conversely, the consequences of mass departure of these individuals (known colloquially as "brain drain"). Michigan has had a difficult recent history of attracting and retaining young knowledge talent.

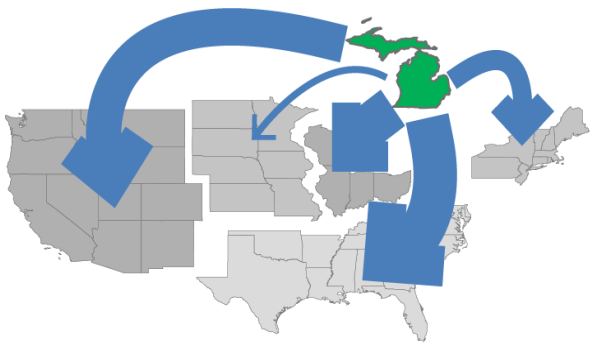
Migration of Michigan's Young Knowledge Population (2008-2011)



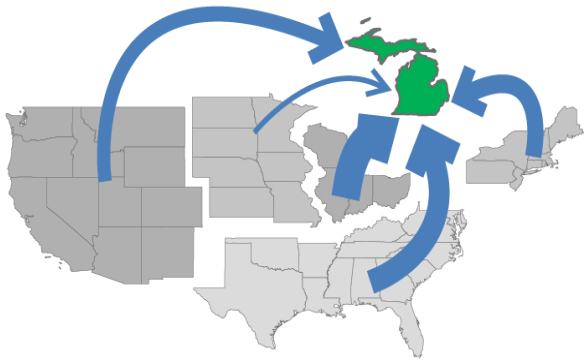
Source: U.S. Census Bureau, American Community Survey

- Since the 2008 Financial Crisis, the net migration of the college-educated population aged 22-34 has shown some improvement in Michigan. The most recent data (2011) shows a -2.0 percent net migration rate, improved from a net -4.2 percent rate in 2008.
- Over a third of the young knowledge population migrating to Michigan since 2007 were born in Michigan (36 percent) and are now moving back, showing the strong pull that family and community have on this younger demographic.
- The foremost destination for the young knowledge migrant from Michigan is no surprise; Chicago attracts more young talent from Michigan than any other metro area. Concurrently, Illinois is the top state destination for those leaving Michigan, pulling approximately 1 in 8 young college-educated residents.
- Despite the prominence of large cities in the Northeast United States, young knowledge migrants leaving Michigan tend to migrate to the South, East-Midwest (WI, IL, IN, OH), and West, in that order. These three regions of the country account for over 80 percent of outflow.
- The outflow of young knowledge migrants to Chicago also has a "boomerang" effect; while over 18,000 in this demographic moved from Michigan to Chicago from 2007 to 2011, there were over 11,000 who migrated in the reverse direction over this same time frame.
- Young knowledge individuals are predominantly coming to the large metropolitan areas of Michigan, in order: Detroit, Ann Arbor, Grand Rapids, and Lansing-East Lansing. Two of these areas, Ann Arbor and Lansing-East Lansing, stand out in the data because they exhibit a larger proportion of young knowledge workers migrating to Michigan who are employed at college and universities, as well as young knowledge migrants in those areas showing lower labor force participation (likely due to college enrollment).

Outflow of Young Knowledge Population (2007-2011)



Inflow of Young Knowledge Population (2007-2011)



Source: U.S. Census Bureau, American Community Survey (2011)

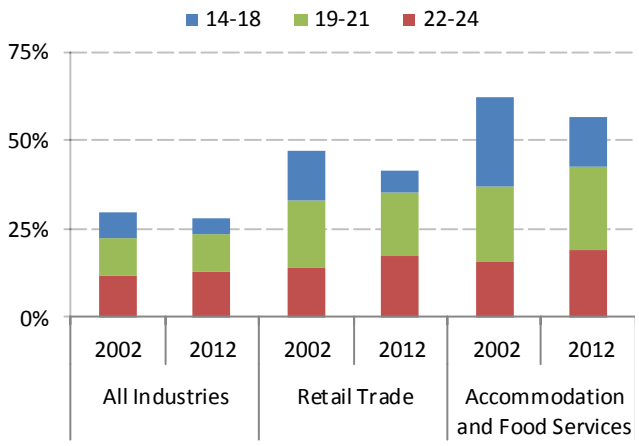
Workforce Dynamics: Michigan Youth Employment

Kevin Doyle and Ryan Gimarc

The Local Employment and Household Dynamics (LEHD) program is a state-federal partnership between state agencies, like the Bureau of Labor Market Information and Strategic Initiatives and the U.S. Census Bureau. The program combines administrative records from state agencies with demographic and socioeconomic information from the Census Bureau allowing for an enhanced demographic and economic analysis of the workforce. This indicator looks at industry employment and turnover for youth ages 14-24.

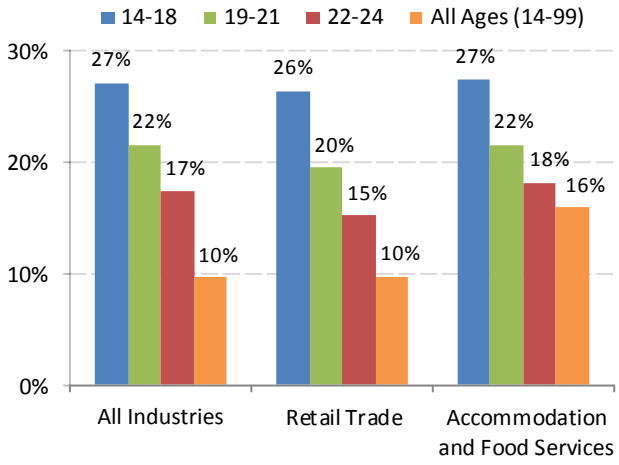
- In 2002, youth ages 14-24 comprised 30 percent of all industry employment in Michigan. By 2012, the youth employment share had fallen to 28 percent, down by 2 percent over ten years.
- Employed youth are concentrated in two industries: *Accommodation and food services* and *Retail trade*. Together these industries employ 46 percent of all youth workers ages 14-24.
- Since 2002, youth employment across all industries fell by nearly 20 percent, outpacing the drop for all ages of 14.6 percent. Both *Accommodation and food services* and *Retail trade* registered a loss of youth over the period. In both industries, teens ages 14-18 took the brunt of job losses while older youth cohorts (19-21 and 22-24) saw more tempered losses.

Age Composition of All Industries and Key Youth Industries in Michigan



Source: U.S. Census Bureau / LEHD

Job Turnover by Age, All Industries and Key Youth Industries in Michigan (3rd Qtr. 2011—2nd Qtr. 2012)



Source: U.S. Census Bureau / LEHD

- In addition to higher job losses than other age cohorts, youth also record higher job turnover. In the four quarters ending with the 2nd Quarter 2012, turnover in all groups measured 9.6 percent, while teens 14-18 saw the highest turnover rates at 27.2 followed by youth 19-21 and 22-24 with turnover at 21.6 and 17.4, respectively. (A turnover rate of 9.6 percent means that nearly 10 percent of job holders at the start of the quarter were not on the payroll at the end of the quarter.)
- Turnover is an important measure of volatility and can lend insight into the employment churn in particular industries. In both *Retail trade* and in *Accommodation and food services*, youth see high turnover, a trend especially true for teens ages 14-18, the group most associated with part-time, temporary, and seasonal work.
- Between 2002 and 2012, job turnover rates have held relatively steady in most industries, climbing incrementally higher from 9.3 percent to 9.6 percent. Like other age cohorts, turnover rates for youth have been mostly flat since 2002.

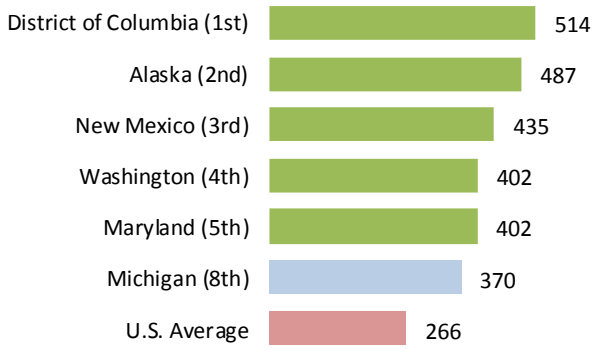
Scientific and Engineering Occupations

Leonidas Murembya, PhD

For the analysis below, Scientific and Engineering occupations are defined to include engineers and engineering technicians, as well as architects, drafters and surveyors. Also included are scientists and professionals engaged in life, physical, and social science research. Examples include chemists, biologists, medical scientists, market research analysts, psychologists, and others. The share of jobs in this group is a barometer of the skills of the Michigan workforce, and is key to future Michigan innovation and technological development.

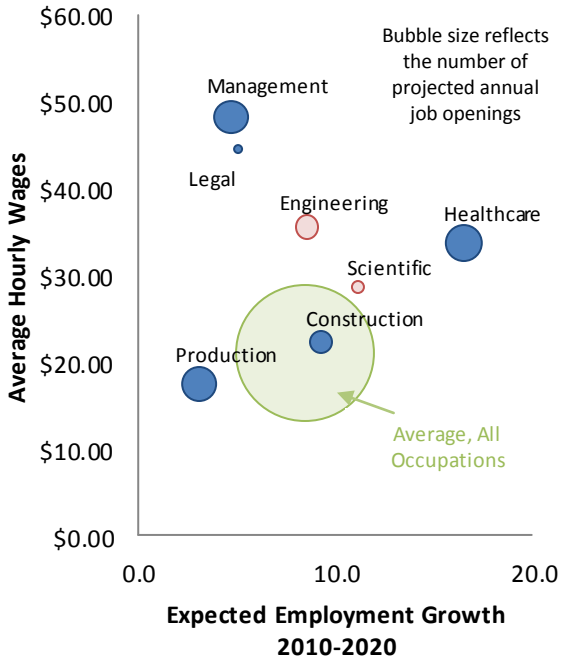
- The total number of scientific and engineering (S&E) jobs in the state rose in 2012 by 3,000 to about 145,000, for a growth rate of 1.8 percent. The state retained its U.S. rank of 4th largest in the concentration of S&E occupations, behind only California, Texas, and New York.
- Michigan's share of S&E occupations per 10,000 jobs in 2012 remained flat at 370, giving the state a rank of 8th out of the 50 states. Over the year, Michigan's ranking slipped one spot behind Massachusetts.
- In Michigan, the Architecture & Engineering group accounted for 81 percent of all S&E jobs, led by *Mechanical* and *Industrial engineers*, *Industrial technicians*, and *Civil engineers*.

Scientists and Engineers Per 10,000 Positions, May 2012



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

Wage, Job Growth, Annual Job Openings for S&E Occupations



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

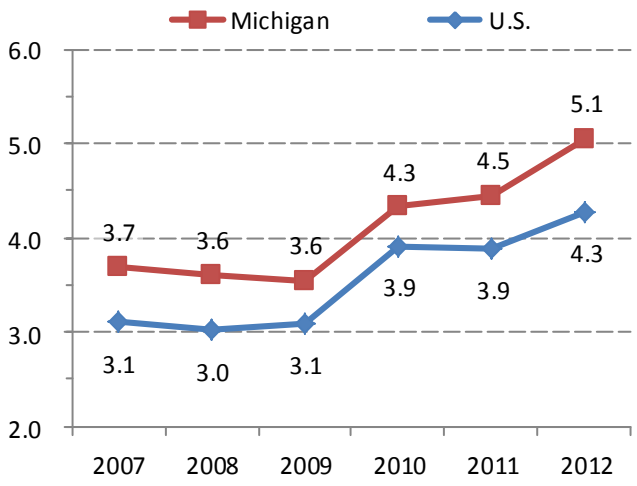
- Scientific and Engineering occupations offer above average wages at every level of work experience. For example in 2012, at the entry level, the Architecture & Engineering group paid $10 to $15 per hour higher than the all-occupation average in Michigan.
- Architecture & Engineering occupations are expected to record a job growth rate of 8.5 percent, matching the rate of expansion of all occupations, while Life, Physical, and Social Science jobs are projected to increase about three percentage points above average. About 60 percent of annual openings in these two occupational groups will come from the need to replace existing workers.
- According to the Conference Board's Help Wanted Online®, there were about 12,400 online Michigan S&E openings posted, as of mid-November 2013. This was an increase of about +2.0 percent from the mid-October level. At the top of the list of hiring companies were the "Detroit Three" automakers (Chrysler, Ford, and GM).
- A little over 90 percent of S&E ads were in Architecture & Engineering, led by job postings for *Industrial engineers* and *Mechanical engineers*.

Patents

Kevin Doyle

The number of patents issued is an important indicator of innovation and economic vitality. Through data made available by the U.S. Patent and Trademark Office, patent information is available by state, county, and metro area as well as by company of origin. This indicator provides an overview of patents issued in Michigan in 2012 and some insights into the industries in which patents were granted.

Patents Issued Per 10,000 Residents, Michigan and U.S.



Source: U.S. Patent and Trademark Office / U.S. Census Bureau

- In 2012, 4,997 new patents were granted to Michigan businesses or individuals, an increase of 600 or 13.6 percent over last year. Among all states, Michigan ranked 7th in the number of patents granted.
- With the strong rise in patents, 2012 saw the most patents granted in Michigan since at least 1977 (the oldest yearly data available).
- Michigan's sizeable 2012 increase in patents outpaced strong growth nationally. In 2012, the U.S. reported an 11.7 percent gain in patents granted.
- Michigan ranks 13th in patents issued per 10,000 residents. At 5.1 patents per 10,000, Michigan remained above the U.S. average of 4.3. Massachusetts, California, and Washington led the nation, at 9.21, 9.11, and 8.68 patents per 10,000 residents respectively.
- Among the Michigan businesses granted the most patents in 2012 were the "Detroit Three" auto manufacturers (two of the three are seen in the table below), other automobile and auto-related manufacturers, chemical and pharmaceutical manufacturers, and consumer products manufacturers.
- Individual residents ranked third in the number of patents granted in 2013. Individuals were granted 385 patents in 2013, for nearly 10 percent of the total patents in Michigan. Individuals were granted 19 more patents than in 2011, an increase of 4.9 percent.
- In 2012 Michigan's public universities were the assignees of 133 patents, up 10 percent from 2011. Leading was the University of Michigan with 91 patents, representing over two thirds of all patents granted to Michigan's public universities.
- The "Detroit Three" auto manufacturers were granted 1,659 patents in 2012. General Motors was responsible for 64 percent of the "Detroit Three" patents, followed by Ford (35 percent), and Chrysler (2 percent).

Patent Grantees, Michigan (2012)

First-Named Assignee	Patents Granted	Percent of Total
GM Global Technology Operations, Inc.	994	24.8%
Ford Global Technologies, LLC	500	12.5%
Individually Owned Patents	385	9.6%
Toyota Motor Engineering & Manufacturing North America, Inc.	115	2.9%
University of Michigan	91	2.3%

Source: U.S. Patent and Trademark Office / U.S. Census Bureau

Venture Capital

Kevin Doyle

Venture capital is money invested into early stage companies or products in which there is an element of risk. Venture capitalists invest in these companies or products in exchange for a percentage of future profits and often a seat on the company's board of directors. Information on these investments give researchers an idea which companies and industries in the state are receiving capital investments. The amount venture capitalists invest into companies statewide varies greatly from quarter to quarter and year to year. This indicator analyzes venture capital investments made over the previous quarter and year.

- In the 3rd Quarter of 2013, $28,573,700 was invested into Michigan companies in 15 deals. This was an increase of 6 deals and $26 million over the 2nd Quarter of the year.
- Though a large increase was seen over the quarter, the 3rd Quarter 2013 total of $28.6 million was far lower than a year ago during the 3rd Quarter 2012, when investment totaled $111.2 million through 14 deals. The 3rd Quarter of 2012 saw the highest level of investment since the 1st Quarter of 2000.
- The software industry received $12 million or 43 percent of the venture capital invested in Michigan during the 3rd Quarter 2013. This capital was invested in 7 different companies. Arbor Metrix Inc, a health care analytics firm, received the greatest share of this money at $7 million.
- Among the Great Lakes States, more venture capital was invested in Michigan than in Wisconsin and Indiana. Less venture capital was invested in Michigan than in Illinois and Ohio.
- In the four quarters from the 4th Quarter of 2012 through the 3rd Quarter of 2013, there were $96.7 million dollars of Venture Capital invested in Michigan companies.
- In the 51 deals made between Michigan companies and venture capitalists from the 4th Quarter 2012 through 3rd Quarter 2013, an average of about $1.9 million was invested per deal.
- Over one third of the venture capital invested between the 4th Quarter 2012 and 3rd Quarter 2013 was received by companies in the biotechnology industry.
- Nearly half of the $22.7 million invested in the medical devices and equipment industry over the last year was invested in the most recent quarter. During this quarter capital was invested into a single firm, Delphinus Medical Technologies, the developer of an ultrasound imaging device.
- Five industry classifications saw no investment in Michigan from the 4th Quarter 2012 through the 3rd Quarter 2013: Business products and services, Computers and peripherals, Financial services, Healthcare services, and Networking and Equipment.

Venture Capital Invested in Michigan Companies by Industry Classification 4th Qtr. 2012—3rd Qtr. 2013

Industry*	Amount	Deals
Biotechnology	$36,175,200	10
Software	$23,780,000	16
Medical Devices and Equipment	$22,664,100	4
Semiconductors	$4,000,000	1
Media and Entertainment	$3,199,800	2
IT Services	$1,975,100	3
Industrial/Energy	$1,960,000	7
Telecommunications	$1,505,000	3
Electronics/Instrumentation	$1,000,000	2
Retailing/Distribution	$505,000	1
Consumer Products and Services	$10,000	2

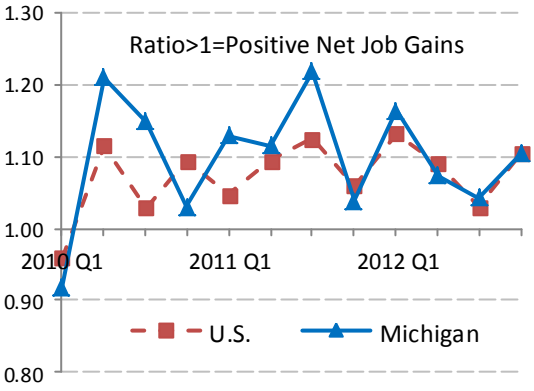
Source: Pricewaterhouse Coopers (PWC)
*PWC Industry Classification. https://www.pwcmoneytree.com/

Business Employment Dynamics: Job Replacement Ratios

Aneesa I. Rashid, PhD

The data collected by the Bureau of Labor Statistics under the Business Employment Dynamics (BED) program sheds light on the components of net employment changes: gross job gains and gross job losses. Gross job gains result from existing business expansions and business openings. Gross job losses result from existing business contractions and business closings. Another measure of labor market activity that can be obtained from this data is the job replacement ratio, derived by dividing gross job gains by gross job losses. This analysis looks at these ratios for the U.S. and Michigan and its MSAs to see how fast lost jobs are being replaced in the post recession period. BED data looks at employment changes at the establishment level between the third month of the reference quarter and the previous quarter.

Job Replacement Ratios: MI & U.S.
1st Qtr. 2010 - 4th Qtr. 2012



Source: Bureau of Labor Statistics / BED

- It is also possible to examine job replacement ratios for the 14 Michigan MSAs, which comprise 26 of the state's 83 counties. The components of gross job gains and losses are broken down to see which dynamic (business expansion/contraction ratio or business opening to closing ratio) is influencing net job changes.

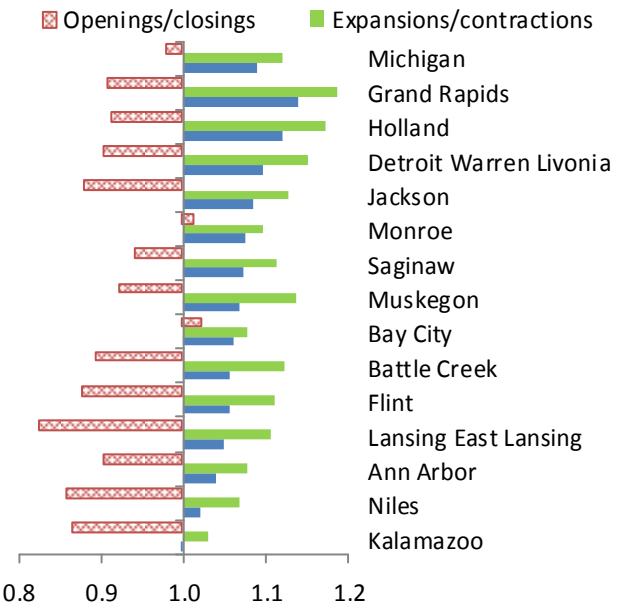
- All the MSAs have a Gains/loss ratio greater than one except Kalamazoo, which means that businesses are replacing lost jobs at a positive rate leading to net job gains. The Grand Rapids, Holland and Detroit-Warren-Livonia MSAs have slightly higher replacement rates than Michigan.

- Stronger job gains from business expansions and fewer job losses from business contractions is the main dynamic for net job gains. The weakness in the labor market stems from the fact that job losses from business closings still outpace job gains from business openings (the ratio is less than one for most MSAs).

- During the 2nd quarter 2010, the ratio of gross job gains to gross job losses for Michigan and the U.S. were greater than one, reflecting positive net job gains. Michigan's job replacement ratios were highest in the 2nd quarter 2010 and 3rd Quarter 2011, when the economy was creating 12 jobs for every 10 jobs eliminated. However, the pace of job creation has slowed to track more closely with the U.S. ratio of 11 jobs created for every 10 eliminated.

- This measure illustrates the slow pace with which businesses are replacing lost jobs and highlights the lack of dynamism in the post recession labor market.

Job Replacement Ratios for MSA's
(December 2009-December 2012)

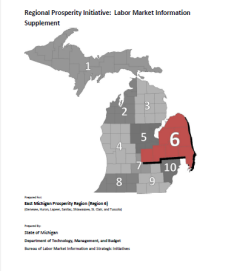


Source: Bureau of Labor Statistics/BED

What's New from LMISI?

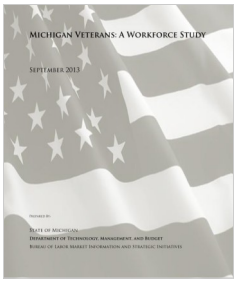
The *Michigan Economic and Workforce Indicators and Insights* report is just one of the many publications by the Bureau of Labor Market Information and Strategic Initiatives. Serving a diverse group of customers, our products range from workforce data to customized products and publications. Highlighted below are some of our more recent projects. These and more can be found on our website at: www.michigan.gov/lmi.

Regional Prosperity Initiative: Labor Market Information Supplement



The profiles below provide labor market information to support the Regional Prosperity Initiative. Included is information and analysis on the topics of population and demographics, labor force, employment, and unemployment, commuting patterns, industry employment and job trends, occupational employment and wages, and occupational demand, both real-time and forecasted.

Michigan Veterans: A Workforce Study

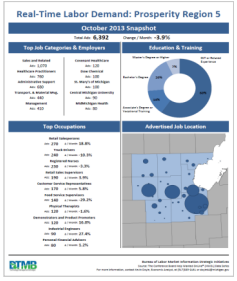


This report draws on information from the Census Bureau and the Bureau of Labor Market Information and Strategic Initiatives to provide those interested in workforce issues with some general information about veterans in the state's labor market. The study includes sections on population and demographics, labor force and labor force participation, unemployment, and employment.

Key Labor Market and Economic Metrics

Updated monthly, this reference provides current and historical data on several metrics related to the labor market, including: labor force, employment, unemployment, and industry jobs, as well as metrics related to the broader economy, including: motor vehicle sales, retail sales, and oil prices.

Regional Prosperity Initiative: Real-Time Labor Demand Snapshots



Published for the State's 10 Prosperity Regions, these monthly reports use The Conference Board Help Wanted OnLine® (HWOL) Data Series to provide a high-level overview of in-demand occupations, top advertising employers, education and training requirements, and the location of advertised vacancies for each of Michigan's 10 Prosperity Regions.

What's New from LMISI?

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