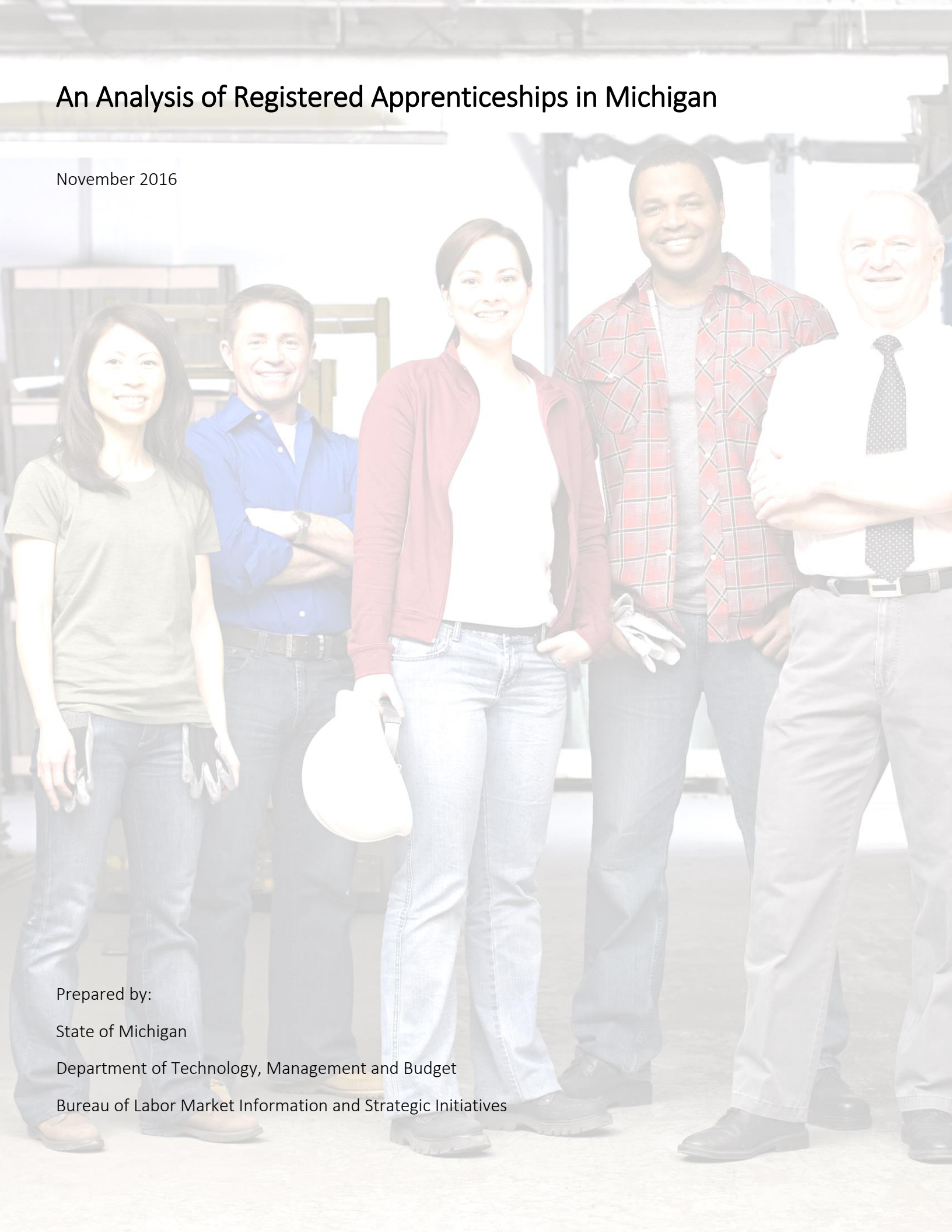
An Analysis of Registered Apprenticeships in Michigan

November 2016



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BOX 1: KEY FINDINGS

	Registered Apprentices FY2008 – FY2015	Percentage
Total Observations	**25,814**	**100%**
Men	24,171	93.6%
Women	1,642	6.4%
Median Age	27	N/A
Race		
White	18,043	69.9%
Black or African American	2,325	9.0%
All Other	422	1.6%
Unknown	5,024	19.5%
Veteran Status		
Veteran	1,673	6.5%
Not a Veteran	24,008	93.0%
Union Status		
Union Member	16,751	64.9%
Not a Union Member	9,063	35.1%
Education Level		
Less than High School	962	3.7%
GED	1,765	6.8%
High School Graduate	18,220	70.6%
Post-Secondary or Technical Training	3,392	13.1%
Unknown	1,475	5.7%
Top Occupations		
Electricians	6,381	24.7%
Construction Laborers	4,507	17.5%
Plumbers, Pipefitters and Steamfitters	1,944	7.5%
Carpenters	1,569	6.1%
Tool and Die Makers	1,079	4.2%
Average Starting Wage (2015 Registrants)	**$14.51**	N/A
Average Exit Wage (2015 Completers)	**$25.21**	N/A

Box 1 represents newly registered apprentices in Michigan for FY2008-FY2015

EXECUTIVE SUMMARY

- Registered Apprenticeships – work-based and post-secondary on-the-job learning positions – are an important and growing source of talent in Michigan's workforce. These programs not only train skilled workers for the Michigan labor market, but they also offer Michigan workers high-wage, high-demand job opportunities that do not require a bachelor's degree.

- Between fiscal year (FY) 2008 and 2015, the number of newly registered apprentices in Michigan grew from 3,132 to 5,305, demonstrating a growth rate of almost 70 percent in this supply of skilled workers.[1]

- The typical apprentice in Michigan is white, male, aged 27 years, has a high school education, and is a union member. While female participation in registered apprenticeship has recently increased, there remain multiple opportunities to increase the diversity of these programs.

- The overwhelming majority of Michigan registered apprentices are trained in the Skilled Trades. The most popular graduating (i.e., completer) apprentice occupation in Michigan each year, by a large margin, is *Electrician*. This is followed by *Plumbers, Pipefitters and Steamfitters*, and then typically either *Tool and Die Makers* or *Millwrights.*

- Overall, registered apprenticeship programs demonstrate strong wage growth and high wages upon program completion. For a newly registered apprentice in 2015, he or she made an average wage of $14.51 upon starting the program, and for completers finishing in 2015, the exit wage was $25.21.

- In 2015, most completing Michigan apprentices went into the *Construction* industry, followed by *Manufacturing* and *Utilities*.

- Apprenticeship opportunities exist throughout the state, as there are registered apprenticeship programs in every one of Michigan's ten Prosperity Regions.

INTRODUCTION

The State of Michigan and its workforce partners have long been interested in learning more about apprenticeships. By providing both classroom and on-the-job training, apprenticeship programs serve a vital role by preparing workers for critical occupations in the Michigan labor market. Until recently, however, data was not available that allowed for a complete analysis of this national interest-provoking subject. Indeed, this report on apprenticeships in Michigan, which details demographic, occupation, wage, industry and program information, is one of the first of its kind. Overall, this report presents an optimistic outlook for apprenticeships in Michigan; over time, the growing numbers of registrants, as well as the increasing diversity of people engaged in these programs, bodes well for the continuing development of middle skill jobs in Michigan's labor market.

Before examining the findings of this report, it is first useful to understand apprenticeships, and specifically, registered apprenticeships. According to the United States Department of Labor (DOL), registered apprenticeships are, "innovative work-based learning and post-secondary earn-and-learn models that meet national standards for registration with the DOL (or federally recognized State Apprenticeships Agencies)." These standards include evidence of: 1) On-the-job training; 2) Apprentice supervision by a mentor; 3) Plan for related instruction; 4) Wage progression; and 5) an Equal Employment Opportunity (EOO) pledge.

Apprenticeships are different from other types of work-based training because apprentices are hired by employers and receive a paycheck from the first day of work, with increasing wages over time. The programs can last from one to six years, and focus on connecting education and work simultaneously. Every graduate of a registered apprenticeship program receives a nationally-recognized credential: a portable qualification that signifies to employers that apprentices are fully trained for the job. These programs are additionally beneficial to employers because they help businesses develop a highly-skilled workforce, and are often found to lower the cost of recruitment, reduce turnover rates and increase productivity. According to the DOL, 91 percent of apprentices that complete an apprenticeship are still employed nine months later.

It is important to note, however, that not all apprenticeships are *registered* apprenticeships due to the voluntary registration of apprenticeship programs. Thus, this report does not represent all apprenticeships in Michigan. This report proceeds as follows: an examination of the data utilized, information on demographics, occupations, wages, industries and programs. The report concludes with a look at the future of registered apprenticeships in Michigan.

DATA AND METHODOLOGY

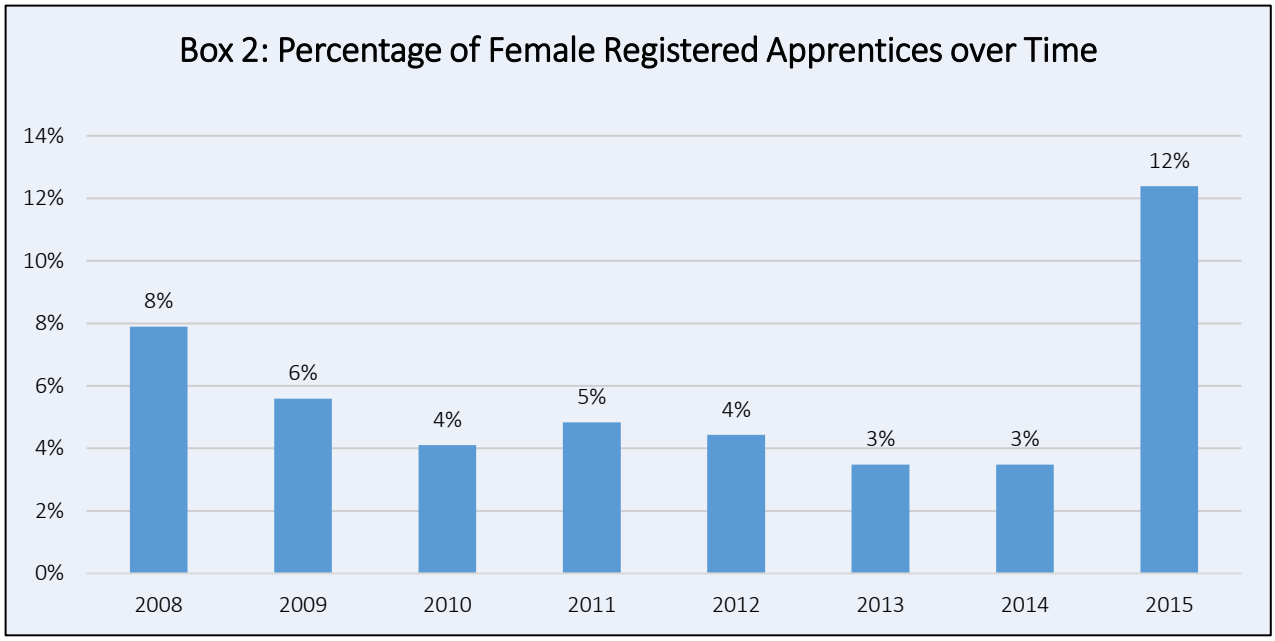
This study utilizes data from the Registered Apprenticeship Partners Information Management Data System (RAPIDS), which is managed by the DOL Office of Apprenticeship (OA). The RAPIDS database is the largest one of its kind for tabulating and analyzing apprenticeship programs, but again it is not all inclusive, since not all apprenticeships are

registered apprenticeships.[2] This analysis focuses on apprentices and their sponsoring programs. When the OA counts "active" apprentices, they include those that are registered, suspended and reinstated.[3] Similarly, active apprenticeship programs include registered and reinstated programs, which must have had activity in the last 12 months. Finally, analyzing "completers" requires looking at those whose completion occurred in the fiscal year of analysis. In each of the above cases, we follow the methodology set out by the OA in order to achieve comparable results. See Box A in the appendix for more information on apprentices by year.

DEMOGRAPHICS

Sex

- While men form the largest group of registered apprentices, the number of new female registrants saw a substantial jump in 2015 (Box 2). This is due to the re-instatement of two programs in 2012, *Pharmacy Technicians* and *First Line Supervisors of Retail Sales Workers*, which both have a high concentration of female apprentices. Interestingly, the dropoff observed in the percentage of female registrants in 2008 was due to the suspension of these programs.
- In addition to these two programs, there are large numbers of female apprentices in *Electricians* and *Construction Laborers* programs.
- Women tend to be slightly older upon registration for a registered apprenticeship, with a median age of 30 for women registering between 2008 and 2015, while for men it was 27. Within each year of analysis (2008-2015), women were, on average, about five years older than men.



- Other interesting characteristics include that almost two-thirds (64.9 percent) of new registrants between 2008 and 2015 were unionized, and 6.5 percent of new registrants identified as veterans. Breaking down these groups by sex, we see that a higher percentage of men are unionized compared to women (66.5 to 40.1 percent). The same is true of veterans, where 6.7 percent of men identified as veterans compared to only 2.2 percent of women.

Education

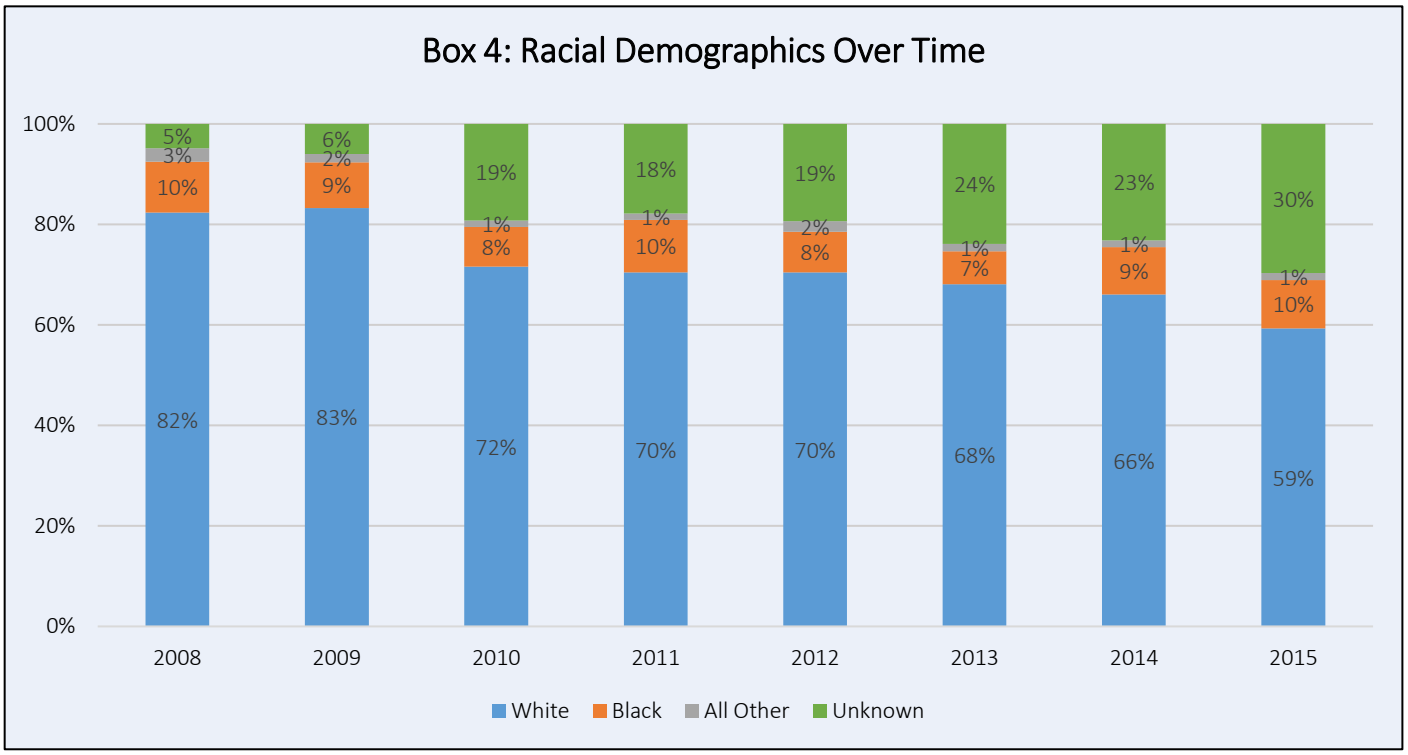
- Registered apprenticeship programs provide an important pathway to middle skill job opportunities for most apprentices, as more than 81 percent of registrants have no education or training beyond high school.
- Looking in more detail, the majority of apprentices (70.6 percent) had a high school diploma, followed by those with post-secondary or technical training, a distant second at 13.1 percent. Additionally, 6.8 percent had a GED and 3.7 percent had less than a high school education. (Approximately 5.7 percent are unknown.)
- When breaking down education by sex, newly registered women were actually slightly higher educated than men (Box 3). Over 76 percent of women received a high school diploma, compared to only 70.2 percent of men. In addition, a higher percentage of women also received education beyond high school.
- Newly registered women between 2008 and 2013 had a 38.7 percent completion rate (within two years of the expected end date for their programs), while men had a 34.2 percent completion rate. Again, a small percentage were unknown.

Box 3: Education by Sex

	Men		Women	
Education	Count	Percentage	Count	Percentage
Less Than High School	923	3.8%	39	2.4%
GED	1,695	7.0%	70	4.3%
High School Graduate	16,965	70.2%	1,255	76.4%
Post-Secondary	3,145	13.0%	247	15.0%
Unknown	1,443	6.0%	31	1.9%

Race

- Like sex, race represents an opportunity for increased diversity in apprenticeship programs, as minority participation was less than 11 percent between 2008 and 2015.
- The racial demographic with the highest percentage among newly registered apprentices between 2008 and 2015 was whites at 69.9 percent.
- The proportion of minorities in apprenticeship programs has been fairly steady since 2008 (Box 4). Blacks represented 9.0 percent of newly registered apprentices, while all other races represented 1.6 percent. In addition, the number of apprentices with an unknown racial background has grown.



- Across occupations, the racial demographics mostly mirror the results of the dataset over all, that is to say, most are majority white. One exception, however, is *Pharmacy Technicians*, where the results are evenly split between blacks and whites.

OCCUPATIONS

- Looking at newly registered apprentices, the top ten occupations are almost all Skilled Trades, with the exception of *Pharmacy Technicians* (Box 5). While this concentration in traditional fields is not unexpected, it also represents an opportunity to expand registered apprenticeship into other occupations, such as those in healthcare and information technology.
- In 2008 and 2009, *Construction Laborers* was the most popular occupation for an apprentice among new registrants, but beginning in 2010, a shift occurred and *Electricians* became the top occupation.
- Also notable is that with the exception of the recession in 2009 and 2010, the total number of newly registered apprentices among the top ten occupations remained relatively steady, and then grew in the last two years.

Box 5: New Registrants Over Time								
Occupation	2008	2009	2010	2011	2012	2013	2014	2015
Carpenters	245	127	100	211	220	145	183	338
Construction Laborers	752	518	356	435	501	535	618	792
Electricians	381	278	744	1,184	896	925	859	1,114
Millwrights	67	71	77	72	86	56	107	121
Pharmacy Technicians	117	22	6	42	33	N/A	N/A	126
Plumbers, Pipefitters, and Steamfitters	270	229	145	137	119	120	181	255
Power Distributors and Dispatchers	110	N/A	25	6	N/A	27	10	N/A
Roofers	118	115	96	123	170	119	89	161
Sheet Metal Workers	72	80	64	69	72	91	101	136
Tool and Die Makers	85	59	46	75	141	158	238	277
Total	**2,217**	**1,499**	**1,659**	**2,354**	**2,238**	**2,176**	**2,386**	**3,320**

- Given the large volume of current and projected demand for many apprenticed occupations, examining the number of registered apprentices that complete their programs provides crucial insight into the supply of skilled workers for the Michigan labor market. While the number of new registrants in the top ten occupations has been climbing (especially over the last two years), occupations with the top completers each year have actually gone down (Box 6).
- This drop could be due to a delayed effect of the previously discussed reduced registrations during the Great Recession, as most apprentices take an average of four to six years to complete a program. In addition, this could also be due to an influx of reinstated programs that have yet to produce completers, e.g. *First Line Supervisors of Retail Sales Workers* and *Pharmacy Technicians*.

Box 6: Completers Over Time								
Occupation	2008	2009	2010	2011	2012	2013	2014	2015
Carpenters	95	85	98	93	52	53	51	33
Electrical Power Line Installers and Repairers	42	38	57	43	41	19	34	24
Electricians	242	176	235	250	272	236	157	186
Elevator Installers and Repairers	26	5	16	12	11	6	5	23
Industrial Machinery Mechanics	84	48	51	24	39	19	31	44
Millwrights	73	61	58	74	66	71	11	40
Plumbers, Pipefitters, and Steamfitters	120	136	145	192	191	203	118	92
Sheet Metal Workers	37	50	58	44	75	59	43	37
Structural Iron and Steel Workers	20	19	49	34	19	14	10	26
Tool and Die Makers	87	57	50	28	64	32	48	70
Total	**826**	**675**	**817**	**794**	**830**	**712**	**508**	**575**

- The highest number of registrants and completers are trained for many similar occupations, namely, *Electricians*, *Plumbers, Pipefitters and Steamfitters* and *Tool and Die Makers*.
- Overall, the two lists (registrants and completers) have six overlapping occupations: *Carpenters*, *Electricians*, *Millwrights*, *Plumbers, Pipefitters and Steamfitters*, *Sheet Metal Workers* and *Tool and Die Makers*.

Finally, while the number of registrants and completers in occupations provides an important picture of which occupations are drawing apprentices, it is necessary to look at the completion rate of programs, in order to determine from where some of the best success stories are coming.

- Analyzing registrants between 2008 and 2013, Box 7 displays programs with the highest percentage rate of individuals who completed their chosen apprentice program within two years of their expected completion date. Programs for *Power Distributors and Dispatchers* and *Electrical and Electronics Repairers* both completed almost every registered apprentice at a rate of 99 percent.
- In Box 8, the completion rates for the top enrolled occupations (from Box 5) are listed. The highest enrolled occupations complete at rates between 4 percent (*Construction Laborers*) and 57 percent (*Tool and Die Makers*). [4]

Box 7: Top Completion Rates		Box 8: Completion Rates for Top Occupations	
Occupation	Rate	Occupation	Rate
Power Distributors and Dispatchers	99%	Electricians	33%
Electrical and Electronics Repairers, Powerhouse, Substation, and Relay	99%	Construction Laborers	4%
Computer Occupations, All Other	87%	Carpenters	27%
Network and Computer Systems Administrators	86%	Tool and Die Makers	57%
Electrical Power Line Installers and Repairers	77%	Plumbers, Pipefitters and Steamfitters	54%

WAGES

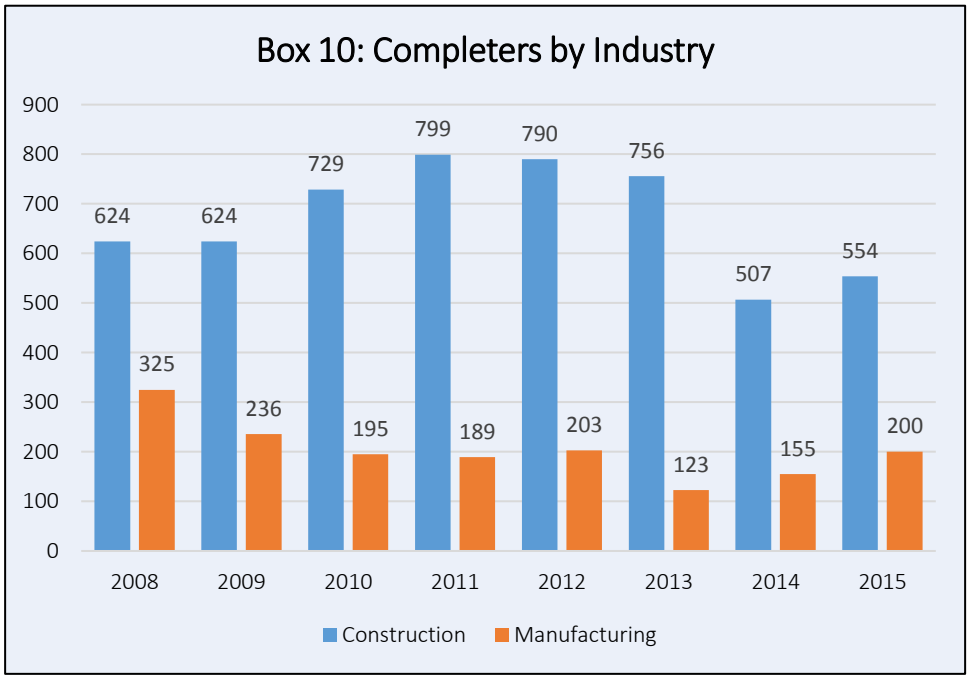
At the beginning of this report, the average hourly wage for 2015 registrants was reported as $14.51, while the wage for 2015 completers was listed as $25.21. In order to get a better picture of how wages change for those engaged in a registered apprenticeship, looking at several cohorts of completers is a slightly more informative option, since it is possible to learn just how much wages increased once someone fully finishes a program, i.e., as they progress through the program. Box 9 does this, by looking at the change in wages for the ten most completed occupations from Box 6.

Box 9: Wages for Completers				
Occupation	Starting Wage	Exit Wage	Difference	Percentage Change
Carpenters	$11.54	$22.04	$10.50	91.0%
Electrical Power Line Installers and Repairers	$18.54	$31.98	$13.44	72.5%
Electricians	$15.71	$24.78	$9.07	57.7%
Elevator Installers and Repairers	$25.78	$41.33	$15.55	60.3%
Industrial Machinery Mechanics	$18.13	$22.50	$4.36	24.0%
Millwrights	$18.74	$26.62	$7.89	42.1%
Plumbers, Pipefitters, and Steamfitters	$20.97	$28.79	$7.82	37.3%
Sheet Metal Workers	$14.05	$27.10	$13.04	92.8%
Structural Iron and Steel Workers	$15.62	$26.34	$10.72	68.6%
Tool and Die Makers	$13.41	$18.64	$5.24	39.1%

- Completing a registered apprenticeship program tends to reap large rewards in terms of wages for many occupations, particularly those considered to be Skilled Trades. Upon program completion, every occupation in Box 9 pays an hourly wage above the statewide median ($17.02).
- The wages for those completing a registered apprenticeship program between 2010 and 2015, on average, increased by $5.90, or 38.6 percent.
- The greatest wage percentage increase among completer occupations is seen in *Sheet Metal Workers*, whose wages increased by almost 93 percent, while *Elevator Installers and Repairers* had the highest absolute increase at $15.55.

INDUSTRY

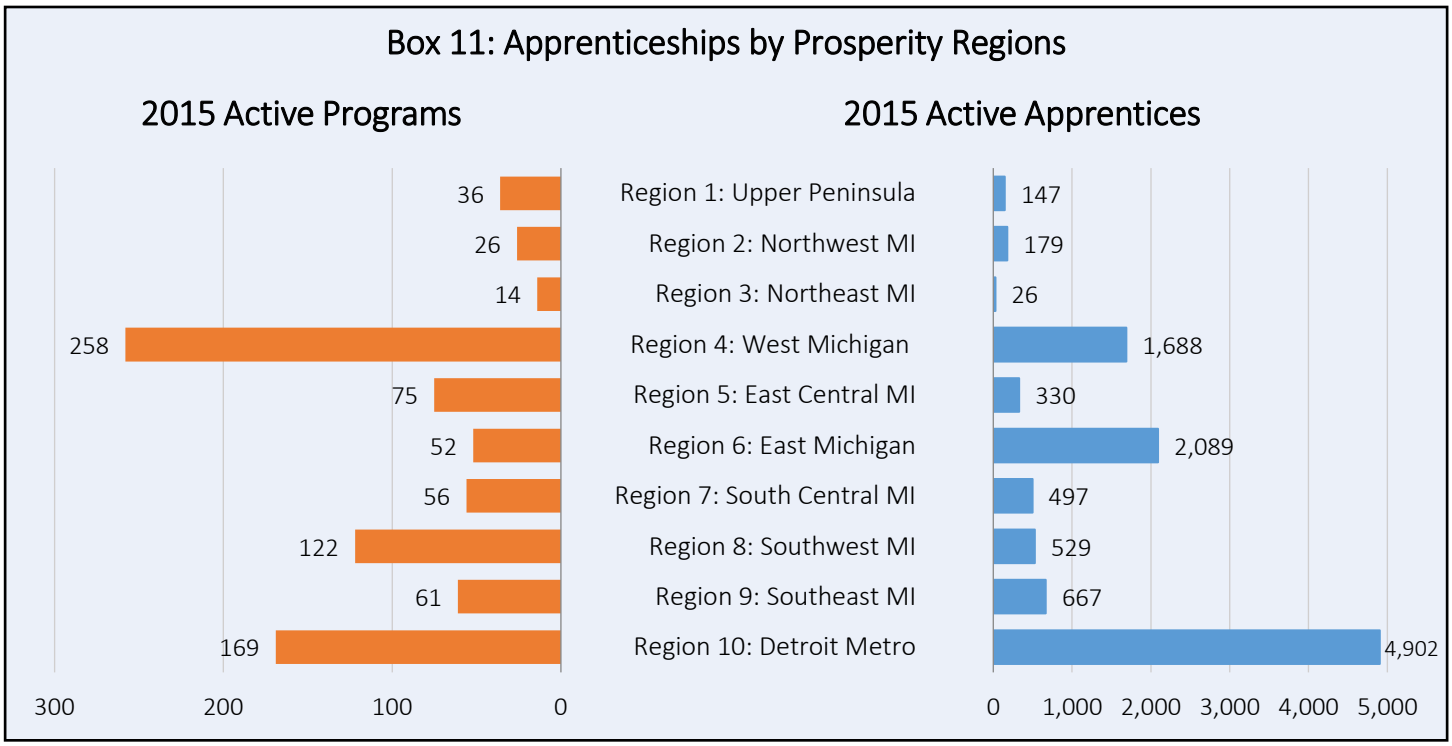
While there are many apprentices in occupations such as *Carpenters* and *Electricians*, understanding what industry in which they fit is key to getting a full picture of the direction in which Michigan's apprenticeship programs are heading. Here, again, completers over time are assessed, since knowing the industry of graduating registered apprentices is more analytically useful than just those registering.



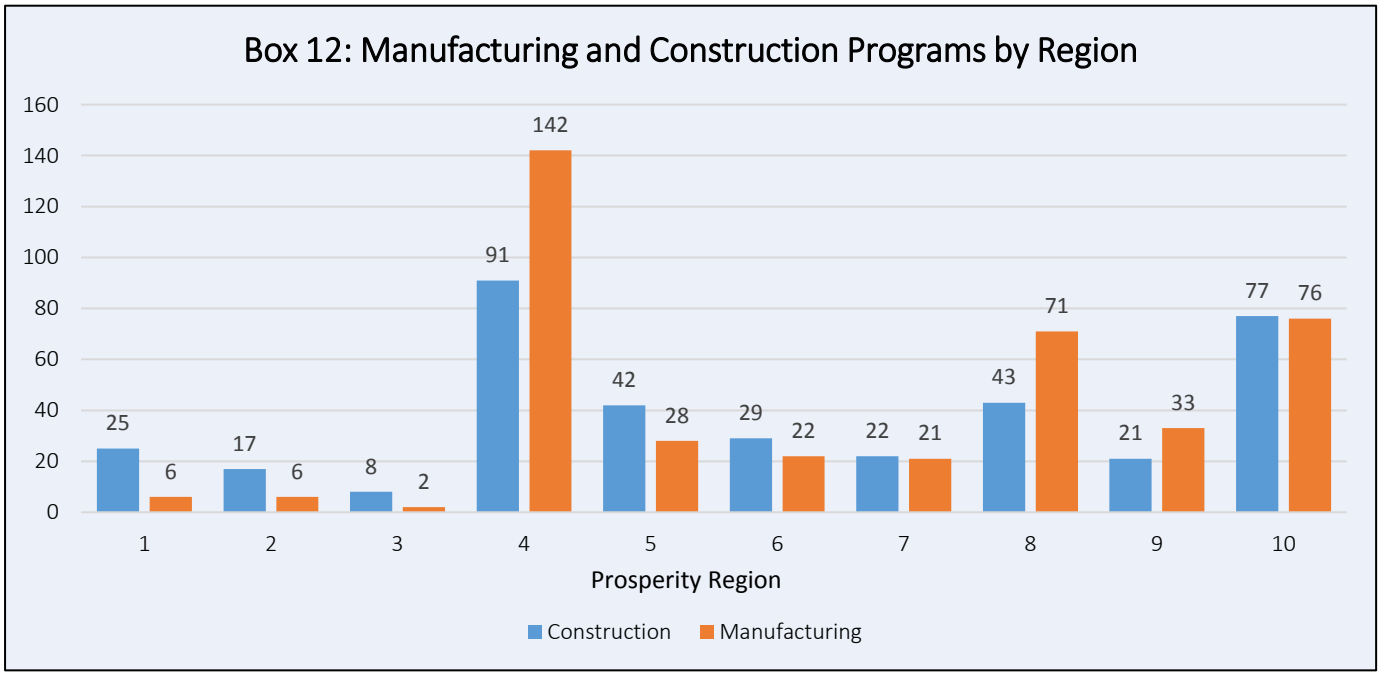
- The industry with the highest number of completing registered apprentices, each year since 2008, is *Construction*, followed by *Manufacturing*. The rest of the categories are more intermittent in their graduation of registered apprentices. However, *Utilities* and *Transportation* also have a fairly consistent number of completers over time.
- The downward trend in completers from *Construction* and *Manufacturing* follows the same reasoning regarding completion trends outlined above – fewer registrants in 2009 and 2010 produced fewer completers in 2014 and 2015.
- After several years of no completing apprentices, *Retail Trade* re-entered in 2015 with ten completers, perhaps due to the registration of such new programs like *Pharmacy Technicians* and *First Line Supervisors of Retail Sales Workers*.
- Since 2013, the industry paying the highest exit wage was *Other Services*, at around $40 an hour. In earlier years of the data available, this designation often went to *Utilities*, with around $28-$30 an hour.
- Moreover, all industry categories are dominated by men, with the exception of *Health Care and Social Assistance* and *Retail Trade*, where women outnumber men almost two to one. Given what has already been said about the breakdown of sexes in occupational categories, this categorization within industry categories also makes sense. See the appendix, Box B for more information on completers by industry.

PROGRAMS

In 2015, there were 78 new registered apprenticeship programs in Michigan, for a total of 928 active programs at the end of the period. By combining this data with zip code data on Michigan's ten Prosperity Regions, a picture of both where these programs are, and how many individuals they serve, becomes apparent.[5]



- Registered apprentice opportunities exist in all ten Michigan Prosperity Regions.
- The region with the most active programs, both in 2014 and 2015, was the West Michigan Prosperity Alliance, with a little over 250 programs in both fiscal years. However, the region with the most active apprenticeships associated with its active programs was the Detroit Metro area, growing from around 3,360 apprentices in 2014 to 4,900 in 2015.
- The area with the smallest presence in Michigan in terms of registered apprenticeships was the least populous region – the Northeast Prosperity Region. Interestingly, with under 50 programs in 2014 and 2015, both the Upper Peninsula Prosperity Alliance and the Northwest Prosperity Region had nearly (or over) 150 apprentices in their regions. See Box C, Appendix, for more information on regional program and apprentice concentration.
- It is also possible to look at which program industries are the most typical in the ten Prosperity Regions (Box 12). As indicated in the previous section, *Construction* programs tend to be the highest occurring in Michigan overall, but assessing this on a regional basis provides insight into which industries each region is specialized.
- Each region has a high concentration of *Construction* or *Manufacturing* programs, with the Detroit Metro Prosperity Region and the South Central Prosperity Region having an almost equal number of both. See Box D, Appendix for more information on a breakdown of industries by region.
- For each Prosperity Region, with the exception of East Michigan and Southeast Michigan (Regions 6 and 9, respectively), the highest occurring occupation is *Electricians*. In East Michigan, this is *Construction Laborers*, and in Southeast Michigan it is *Operating Engineers and Other Construction Operators*.



CONCLUSION

Information on registered apprenticeships in the Michigan economy has, until this point, been lacking detail. The analysis provided in this report makes a substantial contribution to our understanding of Michigan apprenticeships, giving for the first time, a detailed picture of the demographics, occupational structure, wage rates, industry concentration and program location of Michigan's registered apprentices.

- Enrollment in registered apprenticeships in Michigan has grown over the last couple of years, and since the Great Recession, completion in registered apprenticeships in Michigan has rebounded.
- Women in Michigan's registered apprenticeships have seen huge gains in just the last year alone, thanks to the registration of new programs in *Retail Trade* and *Health Care and Social Assistance*. Often, the registration of a program is just the official confirmation of an educational process that was already in existence, so it is possible that previous years' information on women has actually been underestimating the number of apprentices in the state.
- Most apprentices in the state have a high school diploma, so the choice of a registered apprenticeship appears to be a decision to further one's education in a practical way post-high school.
- While most of both the completing and registering apprentices in Michigan are *Electricians*, certain programs, especially in electrical power disciplines, have impressive, near 100 percent completion rates.
- West Michigan and the Detroit Metro area have the highest number of programs and apprentices, respectively. Given the size and population of these regions, this is not unexpected for the state.
- *Construction* and *Manufacturing* are the densest industries for apprentices, but newer categories like *Retail Trade* promise exciting developments for the future.

APPENDIX

1. All references to years are fiscal, October 1 to September 30.

Data and Methodology

2. RAPIDS captures individual record data from 25 Office of Apprenticeship (OA) states and 9 of the 27 State Apprenticeship Agency (SAA) states/territories. For SAA states that manage their data outside of RAPIDS, information is provided in the aggregate to the United States' DOL on a quarterly basis.
3. The OA defines apprentices as falling into one of five groups: a) Registered; b) Completed; c) Cancelled; d) Suspended; and e) Reinstated.
   - *Registered* apprentices are those still actively working towards completion of their programs, and have never suspended their education; *completed* are those who have finished.
   - Apprentices falling into the *cancelled* category are those who terminated their program; *suspended* participants are those not currently working towards completion, but have an intention to resume, and *reinstated* are suspended participants are those that have resumed their progress.

Box A: Michigan Registered Apprentices Over Time			
Year	Active	Completer	Programs
2008	8,726	1,168	1,095
2009	8,006	1,191	1,038
2010	7,854	1,202	1,032
2011	8,181	1,255	1,107
2012	8,083	1,275	1,007
2013	8,539	1,034	958
2014	9,517	765	982
2015	11,802	878	927

Occupations

4. Accurate completer information is dependent on program administrators updating apprentice records in the RAPIDS data system once apprentices complete their programs. To the extent that records are not maintained, actual completion rates could be higher than those presented.

Industry

Box B: Completers by Industry								
Industry	2008	2009	2010	2011	2012	2013	2014	2015
Accommodation and Food Services	1	1	2					
Administrative and Waste Services		1		11	1		2	3
Agriculture, Forestry, Fishing and Hunting	9	1	2					4
All Other Industries	16	5	10	13	18	2	3	2
Construction	624	624	729	799	790	756	507	554
Educational Services	22	7	8	23	21	35	24	22
Finance and Insurance				2				
Health Care and Social Assistance	29	7	2	8				1
Manufacturing	325	236	195	189	203	123	155	200
Mining, Quarrying, and Oil and Gas Extra							3	1
Other Services	7	1	16	5	8	4	3	3
Professional and Technical Services	8	1	17	3	10	23	4	5
Public Administration	26	9	14	47	18	15	9	2
Retail Trade	16	107	1	46	106			10
Transportation	42	22	9	15	30	24	9	17
Utilities	42	158	191	88	67	43	43	51
Wholesale Trade	1	11	6	6	3	9	3	3

Programs

5. It is important to note that not all of the 928 active programs provide accurate zip code information, so the information listed in Box 11 is for those active programs whose identifying information is both accurate and available.

Box C: Programs by Region				
Prosperity Region	2015 Active Programs	2015 Active Apprentices	2014 Active Programs	2014 Active Apprentices
Upper Peninsula Prosperity Alliance	36	147	39	164
Northwest Prosperity Region	26	179	24	165
Northeast Prosperity Region	14	26	15	22
West Michigan Prosperity Alliance	258	1,688	259	1,387
East Central Michigan Prosperity Region	75	330	75	275
East Michigan Prosperity Region	52	2,089	51	2,011
South Central Prosperity Region	56	497	62	450
Southwest Prosperity Region	122	529	165	529
Southeast Michigan Prosperity Region	61	667	59	562
Detroit Metro Prosperity Region	169	4,902	166	3,358

Box D: Programs by Region										
	Region									
Industry	1	2	3	4	5	6	7	8	9	10
Accommodation and Food Services					2				1	1
Administrative and Waste Services				2			1			3
Agriculture, Forestry, Fishing and Hunting				1						
All Other Industries	1							1		
Construction	25	17	8	91	42	29	22	43	21	77
Educational Services				4			2	2	2	1
Health Care and Social Assistance			1	1	1		1			
Information										1
Manufacturing	6	6	2	142	28	22	21	71	33	76
Mining, Quarrying, and Oil and Gas Extra	2		1	1						
Other Services			1	2			2		1	2
Professional and Technical Services				1	1		2	1		5
Public Administration	1	1		1				1	1	2
Retail Trade		1	1	1						1
Transportation				1		1				
Utilities	1	1		3			1	1	1	4
Wholesale Trade				7	1		4	2	1	