

# ON THE MONEY

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## The Nature of Ohio Employment Growth in the Expansion

An ongoing focus of these articles is tracking employment growth in Ohio and its regions over the course of the expansion. This issue of *On the Money* explores this employment growth in a different way. It looks at the growth and decline of classes of jobs between 2010 and 2018 and changes in the wages and salaries earned by those holding these jobs.

These articles typically analyze employment by industry – where one works regardless of what one does. In contrast, this article focuses on employment by occupation – what one does regardless of where one works. Occupational employment and wages are available from the Bureau of Labor Statistics, but only annually and only for May. However, with the recently-released statistics for May 2018, we can explore statewide changes in employment and pay over the past eight years.<sup>1</sup>

### Classifying Occupational Employment

The more than 800 identified occupations are classified by the federal government's Standard Occupational Classification (SOC) system into 23 broad occupational groups. These are:

- 11-0000: Management occupations
- 13-0000: Business and financial operations occupations
- 15-0000: Computer and mathematical science occupations
- 17-0000: Architecture and engineering occupations
- 19-0000: Life, physical, and social science occupations
- 21-0000: Community and social services occupations
- 23-0000: Legal occupations
- 25-0000: Education, training, and library occupations
- 27-0000: Arts, design, entertainment, sports, and media occupations
- 29-0000: Healthcare practitioners and technical occupations
- 31-0000: Healthcare support occupations
- 33-0000: Protective service occupations

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<sup>1</sup> Occupational data are available not only for the U.S. and states, but also for metropolitan and nonmetropolitan regions. These cannot be analyzed here, however. Changes in the delineation of metropolitan areas in 2013 makes statistics for earlier years not comparable to those for later years. A cross-sectional look at differences in occupational employment and wages among Ohio's local areas would be a worthwhile focus for a future article.

- 35-0000: Food preparation and serving related occupations
- 37-0000: Building and grounds cleaning and maintenance occupations
- 39-0000: Personal care and service occupations
- 41-0000: Sales and related occupations
- 43-0000: Office and administrative support occupations
- 45-0000: Farming, fishing, and forestry occupations
- 47-0000: Construction and extraction occupations
- 49-0000: Installation, maintenance, and repair occupations
- 51-0000: Production occupations
- 53-0000: Transportation and material moving occupations
- 55-0000: Military specific occupations

The database used in this analysis does not include farm or military employment, so group 45 includes only fishing, forestry, and natural resources occupations and group 55 is not included.

## Employment and Wage Growth

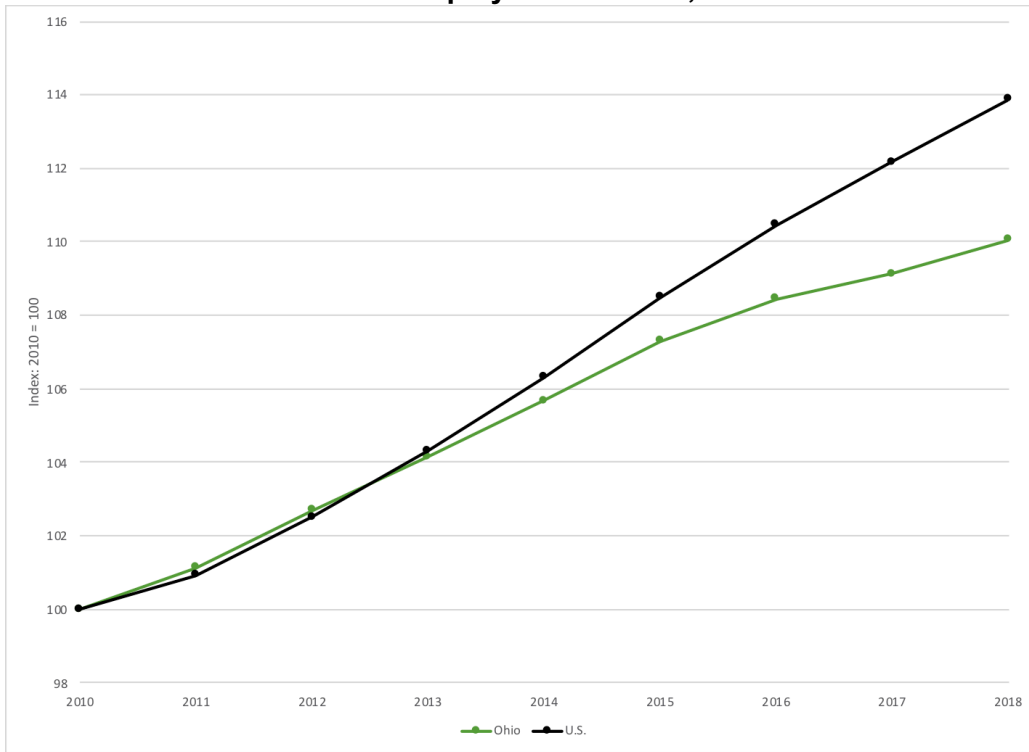
Following the end of the recession in June 2009, employment growth resumed around the beginning of 2010. Accordingly, Figure 1 tracks employment growth nationally and in Ohio beginning in 2010. This shows a pattern familiar to readers of these articles: Ohio employment growth slightly higher than the U.S. average early in the expansion followed by a substantial slowing of growth after 2012. Over this period, Ohio employment increased 10.1 percent compared to an increase of 13.9 percent nationwide.

Figure 2 compares Ohio and U.S. annual pay levels and growth over this period. This chart graphs two different averages, the mean and the median. The mean is the average as it is typically understood: the sum of all annual wages and salaries divided by total employment. The median is the 50<sup>th</sup> percentile. Given that half of workers earn less than the median and half earn more, the median is the pay earned by the typical worker. The difference between the mean and the median arises from the presence of unusually high salaries. An extremely high wage can have a large effect on the mean, but because a high wage counts as only one observation greater than the 50<sup>th</sup> percentile, it has a much smaller impact on the median. For this reason and because most wage distributions include extreme values, the median is generally preferred. For one of the later analyses in this article, however, it is necessary to use the mean.

Growth in pay over the course of the expansion has been minimal, but Ohio's growth has been slightly better than average. Median annual pay (adjusted for inflation) has increased 0.9 percent in Ohio, compared to a decline of 0.8 percent nationally. Although the median remains lower than average in Ohio, the more favorable growth has narrowed the disparity somewhat. Median annual pay in Ohio was 5 percent less than the national median in 2010; by 2018, the difference had narrowed to 3.3 percent. Note, however, that the bulk of the annual pay growth occurred in 2015 and 2016. Excluding these two years, the averages were flat.

The difference between the mean and the median indicates the influence of extreme pay levels. Percentage differences between the mean and median have increased slightly over time for both Ohio and the U.S., but Ohio's 2018 mean was 29 percent greater than the Ohio median, while the U.S. mean was 34.5 percent greater than the U.S. median. This suggests that extremely high salaries are somewhat less common in Ohio than they are elsewhere.

**Figure 1**  
Ohio and U.S. Employment Growth, 2010-2018



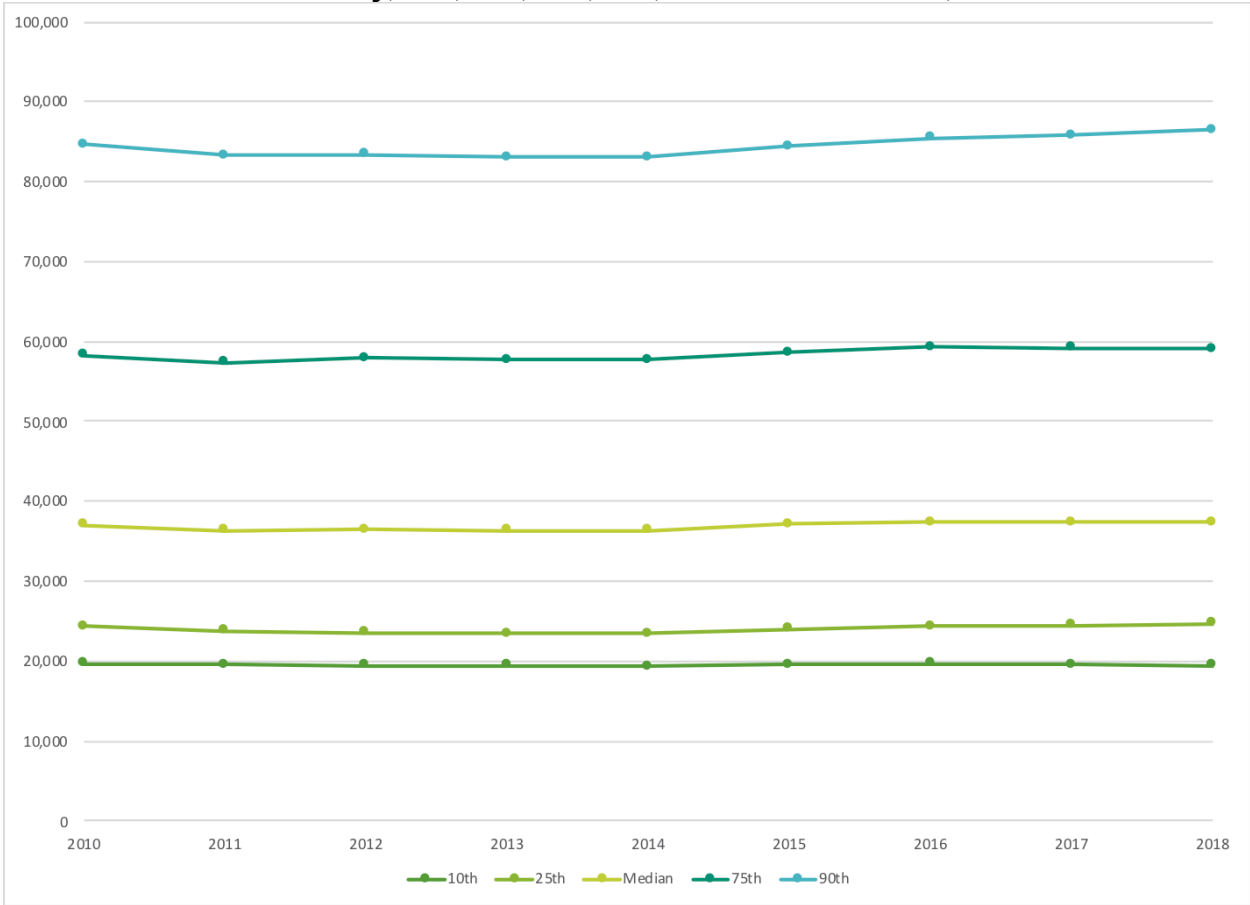
**Figure 2**  
Ohio and U.S. Mean and Median Annual Pay, 2010-2018



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

Along with the median annual pay, the Occupational Employment Statistics present values for the 10<sup>th</sup>, 25<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentiles. For example, 10 percent of jobs earn the 10<sup>th</sup> percentile or less annually. These percentiles are graphed annually for Ohio in Figure 3. The percentile values have been relatively stable over the course of the expansion when adjusted for inflation. It is worth noting, though, that one-quarter of Ohio jobs paid less than \$24,750 per year in 2018 and half paid less than \$37,360. According to the Massachusetts Institute of Technology’s Living Wage Calculator, a household with two adults and one child in Ohio needs at least \$43,746 per year to meet basic necessities if one adult is working and \$52,013 if both adults work. The difference is primarily due to the cost of daycare. This suggests that the vast majority of many households’ income must be devoted to these necessities, with little chance to save for emergencies and retirement.

**Figure 3**  
**Ohio Annual Pay, 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> Percentiles, 2010-2018**



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

**Employment and Earnings by Occupational Group**

Table 1 details Ohio employment and earnings changes by occupational group. There were wide disparities among groups in both employment and pay. Employment in management and personal care and service occupations increased more than 30 percent, while business and financial occupational employment rose more than 29 percent. In contrast, sales and office occupations saw no growth, and healthcare support occupational employment declined nearly 7 percent.

It might be expected that the fastest-growing occupational groups would also enjoy the largest pay increases, but such was not the case. Median pay in management and business and financial occupations each declined. The decline was more than 5 percent in life, physical, and social science occupations, legal occupations, and protective service occupations. Pay in farming, fishing, and forestry occupations increased 3.9 percent, but the small employment in these occupations makes the potential estimation error large. However, the much larger sales, office and administrative support, and transportation and material moving occupational groups also outperformed average pay growth.

**Table 1**  
**Ohio Employment and Annual Pay by Occupational Group, 2010 and 2018**

SOC	Occupational group	Employment			Median annual pay*		
		2010	2018	Chng.	2010	2018	Chng.
00-0000	All Occupations	4,921,690	5,416,810	10.1%	37,023	37,360	0.9%
11-0000	Management Occupations	183,760	240,570	30.9%	101,511	96,620	-4.8%
13-0000	Business and Financial Operations Occupations	217,470	281,060	29.2%	65,283	63,630	-2.5%
15-0000	Computer and Mathematical Occupations	119,540	150,790	26.1%	78,261	77,940	-0.4%
17-0000	Architecture and Engineering Occupations	80,770	96,100	19.0%	74,898	75,030	0.2%
19-0000	Life, Physical, and Social Science Occupations	29,630	36,250	22.3%	64,361	60,290	-6.3%
21-0000	Community and Social Service Occupations	72,360	79,140	9.4%	45,061	43,050	-4.5%
23-0000	Legal Occupations	29,490	33,630	14.0%	70,718	67,030	-5.2%
25-0000	Education, Training, and Library Occupations	303,440	328,420	8.2%	52,892	52,270	-1.2%
27-0000	Arts, Design, Entertainment, Sports, and Media Occupations	54,620	62,350	14.2%	42,620	41,700	-2.2%
29-0000	Healthcare Practitioners and Technical Occupations	324,310	362,550	11.8%	62,749	61,020	-2.8%
31-0000	Healthcare Support Occupations	202,760	188,930	-6.8%	26,521	26,630	0.4%
33-0000	Protective Service Occupations	112,710	119,660	6.2%	42,815	40,500	-5.4%
35-0000	Food Preparation and Serving Related Occupations	455,340	505,450	11.0%	20,763	20,060	-3.4%
37-0000	Building and Grounds Cleaning and Maintenance Occupations	152,440	157,240	3.1%	24,736	25,370	2.6%
39-0000	Personal Care and Service Occupations	108,180	145,460	34.5%	23,423	22,680	-3.2%
41-0000	Sales and Related Occupations	515,960	515,320	-0.1%	26,601	27,020	1.6%
43-0000	Office and Administrative Support Occupations	813,290	815,630	0.3%	34,248	34,800	1.6%
45-0000	Farming, Fishing, and Forestry Occupations	4,120	5,060	22.8%	27,730	28,810	3.9%
47-0000	Construction and Extraction Occupations	153,480	187,630	22.3%	47,767	48,120	0.7%
49-0000	Installation, Maintenance, and Repair Occupations	188,650	206,510	9.5%	45,084	44,440	-1.4%
51-0000	Production Occupations	433,270	497,280	14.8%	36,758	35,950	-2.2%
53-0000	Transportation and Material Moving Occupations	366,110	401,800	9.7%	30,781	31,470	2.2%

\*Adjusted for inflation.

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

**Employment and Earnings by Educational Attainment**

The Bureau of Labor Statistics' Employment Projections database includes the level of educational attainment typically required of applicants to be hired for individual occupations. If these data are merged with the Occupational Employment Statistics, we can explore employment and earnings changes for different levels of educational attainment. This is accomplished in Table 2, which incorporates both changes in employment and possible changes in the expectation of employers for a particular credential. In contrast to Table 1, it is necessary to use mean rather than median annual pay here. It is mathematically incorrect to combine medians to produce an average across occupations.

The rewards to higher levels of educational attainment are clear. The average pay steadily increases as the required level of education increases. Nearly 24 percent of jobs in Ohio do not require even a high school diploma for entry, but these jobs are becoming increasingly scarce. The level of pay for these positions has increased slightly but remains extremely low. The number of jobs requiring a high school diploma has increased but the pay has declined. The importance of completing an educational program is underlined by the relatively low pay for jobs that require some college but not a degree. The large decline in associate degree-requiring jobs and at least some of the increase in bachelor's degree jobs as well as the pay swing is due to a change in the requirement for registered nurses from an associate degree in 2010 to a bachelor's degree in 2018. This shift aside, Table 2 dramatizes the rewards to education in terms of both income and job security.

**Table 2  
Ohio Employment and Annual Pay by Educational Attainment, 2010 and 2018**

Educational attainment	Employment			Mean annual pay*		
	2010	2018	Chng.	2010	2018	Chng.
No formal educational credential	1,431,740	1,270,570	-11.3%	25,749	26,217	1.8%
High school diploma or equivalent	1,924,220	2,191,590	13.9%	43,019	40,813	-5.1%
Postsecondary nondegree award	266,600	369,280	38.5%	45,272	39,607	-12.5%
Some college, no degree	41,350	120,410	191.2%	30,567	37,267	21.9%
Associate degree	234,910	123,230	-47.5%	62,559	53,076	-15.2%
Bachelor's degree	797,790	1,087,440	36.3%	77,878	79,698	2.3%
Master's degree	79,410	106,460	34.1%	71,859	71,906	0.1%
Doctoral or professional degree	117,120	131,910	12.6%	125,666	132,246	5.2%

\*Adjusted for inflation.

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

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