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From Higher Education to Work in West Virginia, 2015

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Executive summary

In this report we provide a comprehensive analysis of employment and income outcomes for men and women who graduated from a West Virginia public higher educational institution and who stayed to work in the state after graduation. We cover graduates from the academic years between 2004-2005 and 2013-2014 and who worked in the state in 2015. Key findings of this research are as follows:

Overview

- Of the 127,978 students who graduated from public higher education in West Virginia in the last decade, 59,726 were working in West Virginia in 2015, which translates into a work participation rate of 46.7 percent.
- Though the work participation rate in 2015 was similar to that in 2014, an increase in the number of graduates meant that approximately 1,000 more students were working in West Virginia, which represents a nearly 1.7% increase.
- Graduates who work in the state earned an average income of $44,270 in 2015. Average income tends to rise as the time since graduation increases, likely as the result of increased experience.
- In-state students were far more likely to work in the state after graduation than out-of-state students. Nearly 62 percent of in-state students continued to work in West Virginia after graduation.

Degree Earned and Area of Concentration

- Graduates who earned an associate's degree were most likely to work in West Virginia after graduation with a work participation rate of roughly 65 percent. Work participation rates for those earning a bachelor's, master's, or doctoral professional practice degrees were in the 40 percent range.
- Income for associate's degree graduates was lowest among all the degree categories ($36,174). Income for bachelor's degree holders was only slightly above that of associate's degree holders ($39,101), but rose more quickly as graduates gained experience. Income was significantly higher for master's degree recipients ($53,579) and even more so for graduates with doctoral professional practice degrees ($114,297).
- Health professions was the largest area of concentration in this year's study, with 21,365 graduates, constituting about 16 percent of total graduates. This area of concentration constituted about half of the growth in local graduate employment in this year's study, rising by almost 500 graduates.
- More than half of all graduates (55 percent) concentrated in just four fields: health professions; business, management, and marketing; education; and liberal arts.
- Work participation and income vary significantly based on area of concentration with some of the highest participation rates coming in skilled trades.

Personal Characteristics: Gender, Age, and Race

- Women represent the majority (56.7 percent) of public higher education graduates in West Virginia over the past decade, and women exhibit a significantly higher work participation rate (51.3 percent for women compared with 40.6 percent for men).

- Once women start working in West Virginia, they tend to stay. Work participation rates for women are quite consistent as time since graduation increases, while male work participation rates tend to fall over time.
- There exists a significant income gap between men and women graduates who work in the state: Men who work in the state earn approximately 30 percent more than women on average, and this wage gap exists to varying degrees for almost every area of concentration.
- Work participation is generally higher for those who were between the ages of 35 and 55 when they earned their last degree, compared to those who were outside of that range.
- Work participation and income vary significantly across racial categories, with white graduates showing higher work participation than non-whites in general.

Academic Achievement

- Graduates with higher ACT scores exhibit significantly lower work participation rates than those with lower ACT scores. This may be because those with higher ACT scores when entering college go on to earn higher degrees, which have lower work participation rates.
- Work participation exhibits a modest tendency to rise with college GPA.
- Income tends to rise with academic achievement: higher ACT scores and GPAs are associated with higher incomes broadly.
- The disparity in earnings between graduates with higher ACT scores and lower ACT scores can at least partially be explained by the types of degrees these graduates earned. Those earning associate's degrees were more likely to have lower ACT scores than graduates earning bachelor's or master's degrees.

Tuition Assistance

- Work participation rates for graduates who received a PROMISE scholarship (56.9 percent) or need-based grants from the Higher Education Grant Program (65.2 percent) were significantly higher than the overall rate of 46.7 percent.
- Low-income students who received federal Pell grants had an overall work participation rate of 55.9 percent, also well above the overall rate.
- Income after graduation for PROMISE, HEGP, and Pell grant recipients tended to be lower than the overall average.

Industry

- Among all graduates of the state's public higher education institutions, just under half were employed in health care and social assistance (27.7 percent of all graduates) and educational services (22.1 percent).
- Graduates were less likely than overall workers statewide to be employed in retail trade; accommodations and food services; construction; manufacturing; transportation; and mining.
- Graduates with associate's degrees were clustered heavily in the health care field. Educational services was by far the top industry for graduates with a master's degree, while graduates with bachelor's degrees worked in a wider variety of industries.
- Graduates working in mining earned the highest income, averaging $76,673 annually. Utilities; management; manufacturing; and wholesale trade round out the top five income categories.

- The lowest paid industries included arts, entertainment and recreation; accommodation and food services; retail trade; other services; and administration and waste services.

County and Metropolitan Area

- Graduates were highly concentrated in Kanawha, Monongalia, and Cabell counties. About 36 percent of graduates worked in these three counties.
- Counties with larger shares of total employment and population attracted larger numbers of graduates. Graduates were over-represented in counties with larger metropolitan areas and institutions of higher education.
- Metropolitan counties attracted the largest numbers of graduates and had higher wages overall than nonmetropolitan counties. Of the graduates employed in the state in 2015, 69 percent worked in counties that were part of a Metropolitan Statistical Area.
- The Charleston MSA employed the largest number of graduates with 17.6 percent of graduates employed in the state. The Charleston MSA also had the 2nd highest average annual income, at $37,538. Bluefield Micropolitan Statistical Area had the highest at $37,893.

1 Introduction and Overview

Human capital development is fundamental to long-run economic growth and prosperity, and so it is vital for policymakers to understand the ways in which publicly provided higher education prepares men and women for the workforce. It is also crucial for policymakers to understand the factors that relate to a state's retention of its graduates of institutions of higher education. To these ends, in this report we provide a comprehensive analysis of employment and income outcomes for men and women who graduated from a public higher education institution in West Virginia and who stay within the state to work after graduation.

This report covers all of the men and women who graduated between the 2004-2005 and the 2013-2014 academic years who worked in West Virginia in 2015. All data were provided by the West Virginia Higher Education Policy Commission (HEPC) in conjunction with WorkForce West Virginia.[1] The analysis is organized based on the following employment outcomes measures: original residency, degree earned, area of concentration, and a number of demographic and socioeconomic characteristics. We also report detailed statistics on which industries graduates are working in, as well as where those jobs are located within the state.

In Table 1 we report in-state work participation and wage outcomes for all West Virginia public college and university graduates for the past 10 academic years. As illustrated, 127,978 men and women in total graduated from West Virginia's public higher educational institutions over the past decade, with 16,221 graduates in the 2013-2014 academic year. This number of graduates has increased every year over the time period analyzed, rising by approximately 50 percent overall from the 2004-2005 academic year to the 2013-2014 academic year.

[1] See the Appendix for more detail on the data used in this report.

Table 1: Work participation and income by year of graduation

Graduation Year	Total Graduates	Graduates Working in West Virginia in 2015	WV Work Participation Rate (%)	Average Annual Income ($)
2004-2005	10,799	4,558	42.2	55,973
2005-2006	11,073	4,745	42.9	54,197
2006-2007	11,489	4,939	43.0	53,235
2007-2008	11,875	5,186	43.7	50,401
2008-2009	11,838	5,324	45.0	48,026
2009-2010	12,387	5,684	45.9	46,337
2010-2011	13,049	6,051	46.4	43,532
2011-2012	14,287	6,860	48.0	39,630
2012-2013	14,960	7,572	50.6	36,259
2013-2014	16,221	8,807	54.3	31,633
Total	**127,978**	**59,726**	**46.7**	**44,270**

Of the total 127,978 graduates reported in Table 1, 59,726, or 46.7 percent, were working in West Virginia in 2015. The work participation rate falls consistently as the time from graduation increases. In 2015, 54.3 percent of the 2013-2014 graduating class was working in the state, while the figure diminishes to 42.2 percent for those who graduated a decade ago. There are a number of potential reasons why the work participation rate might fall over time: As graduates gain more work experience,[2] they become more marketable and thus have a greater ability to acquire employment outside the state. Workers also are more likely to become self-employed as they gain more experience. Since these data only include employees on payroll at establishments in the state, self-employed people are not reflected in the figures. Lastly, workers may be more likely to drop out of the workforce as they get older and life circumstances change; for example, a worker may become a stay-at-home parent.

The overall work participation rate in this year's report is down about 0.5 percent from last year's data.[3] However, because the state is graduating more students overall, the number of graduates employed from the 10-year cohort in this study was somewhat larger than in last-year's study. About 1,000 additional students were working in West Virginia in 2015 compared with in 2014, an increase of nearly 1.7 percent.

Overall graduates of the last decade who worked in West Virginia earned $44,270 on average in 2015. Annual income consistently increases as time from graduation rises, most likely because those earlier graduates tend to have more experience in the workplace. Average annual wages grew from $31,633 for the most recent graduates to $55,973 for those graduating one decade earlier who are likely to be the

[2] Time since graduation is not necessarily an indication of work experience. Graduates could have less experience if they were unemployed or not in the labor force since graduation. Also graduates could have more experience if they worked prior to entering school.

[3] See Bowen, Eric, John Deskins, and John Mezsaros. 2016. "From Higher Education to Work in West Virginia, 2014." http://busecon.wvu.edu/bber/pdfs/BBER-2016-06.pdf.

most experienced in the sample. These figures represent a gain of nearly $2,434 (about 6.6 percent per year) on average for each year of experience.

2 Residency Upon Entering College

Whether graduates lived in West Virginia when entering higher education in the state appears to be a significant determinant of whether they work in the state after graduation. Unsurprisingly, in-state students were much more likely to work in the state after graduation than out-of-state students.[4] As reported in Table 2, in all, 61.5 percent of in-state students worked in the state in 2015, compared with only 9.5 percent of out-of-state students. Students who were classified as "other" report a work participation rate of 24.9 percent.

Work participation for all residency classifications tends to decline as time since graduation increases, in a similar pattern to that reported in Table 1. For in-state students, work participation decreases steadily over time, falling from 70.4 percent for the most recent graduates to 54 percent for graduates from one decade earlier. Out-of-state graduates' work participation stands at 15.3 percent for the most recent graduates, falls rapidly over the first three years, then declines at a slower rate, reaching 7.1 percent for the 2004-2005 graduating class. West Virginia retained a lower share of recent out-of-state graduates in 2015 than in 2014. The work participation rate for out-of-state students in the most recent graduating class was 15.3 percent, compared with 16.7 percent for the most recent class in our 2014 report.

[4] In-state versus out-of-state status is identified based on fees paid while enrolled in a higher education institution. Graduates who are classified as "other" include those participating in the SREB Academic Common Market, Reciprocity Agreement, Metro Agreement, and Disaster Relief (includes out-of-state students receiving a special tuition and fee rate as a result of a disaster in their state of legal residence).

Table 2: Work participation and average annual wages by residency

Graduation Year	In-State		Out-of-State		Other	
	Work Participation (%)	Average Income ($)	Work Participation (%)	Average Income ($)	Work Participation (%)	Average Income ($)
2004-2005	54.0	55,770	7.1	61,628	25.6	55,024
2005-2006	55.5	53,790	7.3	65,066	19.4	51,836
2006-2007	56.6	53,128	7.4	59,543	22.3	44,877
2007-2008	58.1	50,209	6.9	57,108	23.0	46,558
2008-2009	60.5	47,936	7.1	49,224	22.5	49,798
2009-2010	61.6	46,312	8.3	49,654	24.3	40,127
2010-2011	62.5	43,508	8.9	43,449	23.9	44,687
2011-2012	64.4	39,628	10.0	41,670	23.8	35,067
2012-2013	66.0	36,273	13.0	37,389	27.0	32,759
2013-2014	70.4	31,754	15.3	30,656	32.1	30,296
Total	**61.5**	**44,323**	**9.5**	**44,870**	**24.9**	**40,859**

Annual income is slightly higher for out-of-state students than for in-state students working in the state. Overall, in-state students earn $44,323 on average, compared with $44,870 for out-of-state students, representing a 1.2 percent premium for out-of-state students. With a few exceptions, graduates in all residency classifications generally receive higher incomes as the time from graduation increases.

3 Degree Earned

The type of degree earned also appears to be an important determinant of employment outcomes for the state's graduates. Graduates earn degrees in five categories, ranging from two-year associate's degrees to doctoral degrees.[5] The doctoral professional practice category includes professional doctorate degrees that are designed to lead to careers in areas such as medicine, law, dentistry, pharmacy, nursing, and education. The doctorate category represents degrees that are designed primarily for conducting research. This category includes degrees such as doctorate of philosophy (PhD) and doctorate of business administration (DBA), among others.

[5] Graduates can also receive non-degree certificates, but these classifications are not detailed in this report.

Table 3: Work participation by degree earned

Graduation Year	Associate's (%)	Bachelor's (%)	Master's (%)	Doctoral Professional Practice (%)	Doctorate (%)
2004-2005	58.7	37.2	44.8	37.3	12.3
2005-2006	57.5	38.5	46.3	37.6	12.5
2006-2007	61.4	37.7	45.4	37.5	19.8
2007-2008	61.2	38.9	44.5	43.3	21.4
2008-2009	64.7	39.8	46.0	39.4	15.9
2009-2010	65.2	40.2	49.4	40.8	19.4
2010-2011	64.8	42.5	46.4	35.0	18.9
2011-2012	65.5	43.5	47.3	43.8	18.4
2012-2013	68.0	46.0	50.0	42.3	18.6
2013-2014	71.4	49.7	52.2	41.0	16.2
Total	**64.6**	**41.9**	**47.3**	**39.9**	**17.5**

As reported in Table 3, graduates who earned an associate's degree were far more likely to work in the state after graduation than those who graduated with other degrees. Of those graduates earning an associate's degree over the past decade, 64.6 percent were working in West Virginia in 2015. The overall work participation rate is above 40 percent for those with bachelor's (41.9 percent) and master's (47.3 percent) degrees. Those with doctoral professional practice degrees stand just below 40 percent (39.9 percent). Among these three categories, the relatively high work participation rate among master's degree recipients may be largely explained by the fact that the majority of master's degree recipients who earned education degrees most likely remain in the state to teach in primary and secondary schools. Those earning a doctorate degree exhibit the lowest West Virginia work participation rate overall of 17.5 percent. This is perhaps unsurprising given the fact that most job markets at this degree level are national markets, with very few jobs being typically available in any one location.

The trend that was observed above of falling work participation rates as time from graduation increases is present in each degree category. The trend of falling work participation is most pronounced in the bachelor's degree category. While the trend is also present in the associate's degree category, the lowest associate's degree work force participation rate is still higher than the highest rate for any other degree category. The trend is present in the master's degree category, but is weaker.

As reported in Table 4, average annual income for graduates whose highest degree is an associate's degree was $36,174 in 2015, the lowest among all of the categories. Associate's degree holders had the smallest difference in income between recent graduates and older graduates, as well. Wages for the 2004-2005 graduating class were approximately $15,291 higher than the recent graduates from the 2013-2014 class, a difference of approximately 55 percent.

Table 4: Average annual income by degree earned

Graduation Year	Associate's ($)	Bachelor's ($)	Master's ($)	Doctoral Professional Practice ($)	Doctorate ($)
2004-2005	43,228	51,412	63,769	149,414	101,741
2005-2006	41,993	48,111	58,608	172,171	103,108
2006-2007	42,862	47,192	57,829	157,514	72,579
2007-2008	39,958	44,031	56,931	145,867	79,196
2008-2009	39,294	42,732	54,686	126,523	79,980
2009-2010	38,055	39,535	55,836	115,436	62,526
2010-2011	36,528	38,693	51,800	102,604	67,086
2011-2012	33,905	35,093	48,316	88,172	65,143
2012-2013	31,418	32,219	47,161	73,740	60,266
2013-2014	27,937	27,837	45,102	69,642	44,478
Total	**36,174**	**39,101**	**53,579**	**114,297**	**70,792**

Graduates with doctoral professional practice degrees earned the highest income in 2014, at $114,297 on average. This average income is around 60 percent higher than the second-highest paid category (doctorate), and is nearly triple the average earnings for those graduating with a bachelor's degree. Wages grew rapidly in this group, rising from $69,642 for the most recent graduates to $149,414 for those who graduated one decade earlier, a gain of nearly $8,863 per year on average. Graduates with doctorate degrees report the second-highest earnings, with an average annual income of $70,792 in 2015.

Master's degree recipients report an overall average annual income of $53,579 for 2015, while bachelor's degree recipients report an income of $39,101. Although a master's degree commands an overall income premium of around 37 percent over a bachelor's degree according to these data, income growth is slower among master's degree recipients, averaging 4 percent annually, compared to 7 percent annually for bachelor's degree recipients. Similar to previous years' data, average annual income for bachelor's degree recipients comes in only slightly higher (8.1 percent) than that of associate's degree recipients ($36,174). Average income for first-year bachelor's degree holders grew faster than income for graduates with associate's degrees.

4 Area of Concentration

The primary area of study while at college or university also appears to play an important role in West Virginia employment outcomes after graduation. In Table 5 we report data on graduates by degree and by area of concentration.[6]

The health professions remained the largest area of concentration among recent college graduates in this year's study. In all, 21,365 people graduated with degrees in this area, with the largest number graduating with associate's degrees (7,547) and bachelor's degrees (5,591). Health professions were also by far the largest area of concentration for graduates with doctoral professional practice degrees at 4,443 graduates. Business, management, and marketing was a close second with 18,600 graduates, followed by education with 16,679 graduates. Liberal arts, with 14,274 graduates, is the only other category with more than 10,000 graduates. Communications and journalism, engineering, and social sciences come in next with around 5,000 graduates each. These seven degrees constituted more than two-thirds of all degrees earned in West Virginia over the past decade.

[6] Areas of concentration are defined by two-digit Classification of Instructional Program (CIP) codes that correspond to groups of individual majors.

Table 5: Number of graduates by area of concentration and degree earned

Area of Concentration	Total	Assoc.	Bach.	Mast.	Doct. Prof. Practice	Doct.
Agriculture, agriculture operations	1,509	95	1,069	312		33
Architecture and related services	267		261	4		
Biological and biomedical sciences	3,610	1	3,028	369		212
Business, management, marketing	18,600	2,782	11,907	3,631		85
Communication, journalism	5,825	68	4,350	1,392		15
Communications technologies/technicians	215	44	166			
Computer and information sciences	2,216	735	910	432		30
Construction trades	30	26				
Education	16,679	267	6,848	9,053	395	8
Engineering	5,390	21	3,747	1,346		276
Engineering technologies and engineering-related fields	2,204	783	1,210	105		
English language and literature/letters	1,742		1,263	450		29
Family and consumer sciences/human sciences	1,165	200	943	20		
Foreign languages, literatures, and linguistics	727	65	323	327		
Health professions and related programs	21,365	7,547	5,591	2,826	4,443	105
History	1,610		1,372	191		47
Homeland security, law enforcement, firefighting and related protective services	3,810	1,051	2,312	309		
Legal professions and studies	1,768	301		92	1,353	
Liberal arts and sciences, general studies, and humanities	14,274	4,595	9,441	43		
Library science	26	19				
Mathematics and statistics	605		297	276		32
Mechanic and repair technologies/technicians	357	331				
Multi/interdisciplinary studies	3,146	620	2,497	26		
Natural resources and conservation	1,386	68	985	237		96
Parks, recreation, leisure, and fitness studies	2,231		2,003	195		30
Personal and culinary services	302	288				
Philosophy and religious studies	123		123			
Physical sciences	1,437	6	1,048	237		146
Precision production	206	176				
Psychology	3,698	2	2,968	390	54	165
Public administration and social service	2,348	150	898	1,299		
Science technologies/technicians	1,057	652				
Social sciences	4,893		4,434	375		84
Transportation and materials moving	14	1	13			
Visual and performing arts	3,143	109	2,636	329		69
Total	**127,978**	**21,003**	**72,643**	**24,266**	**6,245**	**1,462**

The level of degree earned varies considerably across areas of concentration. Health professions dominate the associate's degree category, while the largest number of bachelor's degrees were in business (16.4 percent). Master's degree graduates are highly concentrated in education, which constituted 37.3 percent of all master's degrees earned. Doctoral professional practice degrees are primarily in health professions, with smaller numbers in legal professions, education, and psychology. Doctorates are heavily concentrated in engineering, biological sciences, psychology, and physical sciences.

Many of the skilled trade degrees exhibit the highest rates of work participation,[7] as shown in Table 6. Mechanic and repair technologies/technicians had the highest work participation rate with 70 percent, followed by precision production, and library science. As shown above in Table 5, most of the graduates in these fields earned associate's degrees. Science technologies/technicians and education also exhibited very high work participation rates, with 69.1 percent and 61.3 percent of graduates working in the state, respectively. Architecture had the lowest work participation rate with only 16.9 percent of graduates working in the state. The next four lowest areas in terms of work participation were mathematics and statistics, engineering, parks and recreation, foreign languages, and physical sciences. Each of these areas exhibit work participation rates in the upper-20 percent to low-30 percent range.

Graduates earning the highest annual incomes earned degrees in the engineering, legal professions, health professions, and engineering technologies fields. Engineering graduates earned an average annual income of $74,044, which is approximately 67 percent above the overall average of $44,270. Wages in legal professions, health professions, and engineering technologies fields range from 34 percent to 42.7 percent above the overall average. Wages were lowest for library science, personal and culinary services, visual and performing arts, and family and consumer sciences. These fields report average incomes in the mid-$20 thousand range or lower, which is around 40 to 60 percent lower than the overall average.

[7] For privacy reasons we do not disclose work participation and income data for categories with fewer than 10 graduates. All statistics in this and later sections refer only to those graduates whose information can be disclosed.

Table 6: Work participation and average annual wages by area of concentration

Area of Concentration	Work Participation (%)	Average Annual Income ($)
Agriculture, agriculture operations	35.6	35,724
Architecture and related services	16.9	50,203
Biological and biomedical sciences	33.6	38,464
Business, management, marketing	43.5	45,153
Communication, journalism	32.1	37,565
Communications technologies/technicians	59.1	29,725
Computer and information sciences	47.3	46,965
Construction trades	56.7	56,514
Education	61.3	42,170
Engineering	26.4	74,044
Engineering technologies and engineering-related fields	59.1	58,380
English language and literature/letters	38.6	30,076
Family and consumer sciences/human sciences	39.7	27,054
Foreign languages, literatures, and linguistics	30.3	28,494
Health professions and related programs	56.0	59,605
History	38.0	30,721
Homeland security, law enforcement, firefighting and related protective services	52.2	35,823
Legal professions and studies	52.6	61,155
Liberal arts and sciences, general studies, and humanities	51.3	32,826
Library science	69.2	18,641
Mathematics and statistics	26.1	41,599
Mechanic and repair technologies/technicians	70.0	50,382
Multi/interdisciplinary studies	34.7	34,828
Natural resources and conservation	36.8	46,768
Parks, recreation, leisure, and fitness studies	29.0	31,783
Personal and culinary services	58.9	23,005
Philosophy and religious studies	31.7	34,444
Physical sciences	31.4	45,422
Precision production	69.9	48,841
Psychology	41.9	31,437
Public administration and social service	54.1	35,531
Science technologies/technicians	69.1	36,960
Social sciences	33.1	32,684
Transportation and materials moving		
Visual and performing arts	32.1	26,182
Total	46.7	44,270

In Table 7 we turn back to a focus on the degree earned by reporting work participation rates by graduates' area of concentration and degree earned. Also, in Table 8, we focus on income earned by graduates' area of concentration and degree earned.

For graduates with an associate's degree, who post the highest rate of work participation overall, as discussed above, work participation rates were highest in the biological and biomedical sciences, library science, mechanic and repair technologies, health professions, precision production, and engineering technologies. All of these had work participation rates above 70 percent. In areas where work participation rates were relatively low for associate's degree earners, rates still ranked high in comparison to other degree earners.

Income was highest among associate's degree holders in engineering technologies, precision production, mechanic and repair technologies, natural resources and conservation, science technologies and health professions, which all had incomes above $40,000 per year. The lowest incomes were in family and consumer sciences, agriculture, public administration, and biological and biomedical sciences.

Among bachelor's degree holders, work participation rates were highest for education, communications technologies, health professions, engineering technologies, and public administration. All of these had work participation rates above 50 percent. The lowest work participation rates were in philosophy and religious studies, communications and journalism, parks and recreation studies, and architecture, which all had work participation rates of less than 30 percent.

Income for graduates with bachelor's degrees was highest in engineering, engineering technologies, and computer and information sciences, each of which were higher than $50,000 per year on average. The lowest wages were found in the fields of foreign languages, literatures, and linguistics, and visual and performing arts. Graduates in these fields were paid less than $26,000 per year on average in 2014.

Master's degree graduates who majored in liberal arts and sciences, legal professions, and education had work participation rates above 60 percent. The lowest rates were found in the fields of foreign languages, literatures, and linguistics; mathematics and statistics; and engineering. Each of these fields had work participation rates in the low 20-percent range or below.

Income was highest among master's degree holders in the fields of engineering; health professions; computer and information sciences; engineering technologies; and business, management, and marketing. Each of these areas had incomes above $70,000 per year. The lowest incomes for master's degree holders were found in history and foreign languages. Graduates in these area earned around $35,000 or less per year on average.

Work participation rates for doctoral professional practice graduates are only reported in four areas and range from the high 30-percent range to the low 50-percent range. Education had the highest work participation rate at 51.7 percent. The lowest, health professions, was 36.3 percent. Average wages were highest among the health fields, and psychology came in lowest.

Among doctorate degree holders, work participation rates were below 35 percent for all areas of concentration except for education, which had a work participation rate of 60 percent. Wages for this degree averaged $69,848, with wide variation depending on the area of concentration.

Table 7: Work participation by area of concentration and degree earned

Area of Concentration	Assoc. (%)	Bach. (%)	Mast. (%)	Doct. Prof. Practice (%)	Doct. (%)
Agriculture, agriculture operations	54.7	33.7	38.5		n/d
Architecture and related services		16.1	n/d		
Biological and biomedical sciences	n/d	35.9	22		21.2
Business, management, marketing	61.9	41.3	36.7		n/d
Communication, journalism	57.4	28.2	43.2		n/d
Communications technologies/technicians	52.3	60.8			
Computer and information sciences	61.8	42.4	32.6		n/d
Construction trades	50				
Education	56.6	61.2	61.7	52.9	n/d
Engineering	n/d	29.9	19.2		13
Engineering technologies and engineering-related fields	71.4	52.6	33.3		
English language and literature/letters		39.8	36		n/d
Family and consumer sciences/human sciences	67.5	33.8	n/d		
Foreign languages, literatures, and linguistics	69.2	33.4	19.3		
Health professions and related programs	70.3	55	50.5	35.5	27.6
History		38.8	36.7		21.3
Homeland security, law enforcement, firefighting and related protective services	64.6	47.2	32.7		
Legal professions and studies	60.5		58.7	50.5	
Liberal arts and sciences, general studies, and humanities	58.3	47.8	62.8		
Library science	84.2				
Mathematics and statistics		34	19.9		n/d
Mechanic and repair technologies/technicians	71.9				
Multi/interdisciplinary studies	55.1	29.2	61.5		
Natural resources and conservation	61.8	37.7	32.5		20.8
Parks, recreation, leisure, and fitness studies		28.4	34.4		n/d
Personal and culinary services	59				
Philosophy and religious studies		31.7			
Physical sciences	n/d	35	21.9		19.9
Precision production	69.9				
Psychology	n/d	41.9	53.6	44.4	10.3
Public administration and social service	61.3	51	55.4		
Science technologies/technicians	68.6				
Social sciences		33.7	29.1		19.1
Transportation and materials moving					
Visual and performing arts	48.6	32	30.7		18.8
Total	64.6	41.9	47.3	39.9	17.5

n/d: For privacy reasons we do not disclose work participation and income data for categories with fewer than 10 graduates.

Table 8: Income by area of concentration and degree earned

Area of Concentration	Assoc. ($)	Bach. ($)	Mast. ($)	Doct. Prof. Practice ($)	Doct. ($)
Agriculture, agriculture operations	16,865	36,283	41,365		n/d
Architecture and related services		50,677	n/d		
Biological and biomedical sciences	n/d	36,728	44,541		69,797
Business, management, marketing	28,460	43,123	75,862		n/d
Communication, journalism	19,639	32,650	48,699		n/d
Communications technologies/technicians	21,591	32,010			
Computer and information sciences	32,658	55,047	76,402		n/d
Construction trades	64,986				
Education	20,104	36,539	45,846	73,947	n/d
Engineering	n/d	70,767	87,365		88,647
Engineering technologies and engineering-related fields	53,119	62,669	68,653		
English language and literature/letters		26,908	38,142		n/d
Family and consumer sciences/human sciences	18,868	30,056	n/d		
Foreign languages, literatures, and linguistics	28,064	26,192	33,451		
Health professions and related programs	42,037	48,384	73,820	139,041	81,473
History		30,200	33,621		38,148
Homeland security, law enforcement, firefighting and related protective services	34,766	34,666	42,945		
Legal professions and studies	27,251		57,462	71,003	
Liberal arts and sciences, general studies, and humanities	28,770	35,503	39,330		
Library science	19,072				
Mathematics and statistics		37,782	48,164		n/d
Mechanic and repair technologies/technicians	50,783				
Multi/interdisciplinary studies	33,289	35,147	52,907		
Natural resources and conservation	48,607	43,588	57,134		61,995
Parks, recreation, leisure, and fitness studies		30,176	43,062		n/d
Personal and culinary services	22,936				
Philosophy and religious studies		34,444			
Physical sciences	n/d	42,660	50,711		73,522
Precision production	49,802				
Psychology	n/d	28,418	36,150	70,845	71,342
Public administration and social service	19,536	28,971	41,748		
Science technologies/technicians	43,800				
Social sciences		31,621	42,226		67,039
Transportation and materials moving					
Visual and performing arts	27,929	25,027	34,336		30,590
Total	36,174	39,101	53,579	114,297	70,792

n/d: Data not disclosed

5 Gender

Women represent the majority of public higher education graduates in West Virginia, as reported in Table 9. Of the nearly 128 thousand West Virginia graduates in the past decade, nearly 57 percent are women, and this ratio has been stable over the past decade. Women graduates are also more likely to be found in the West Virginia workforce. The work participation rate for women is 51.3 percent overall for graduates of the past decade, significantly higher than the 40.6 percent for men. However, despite the fact that women exhibit higher work participation rates, the income for working men exceeds that of working women by almost $12,000, or approximately 30 percent. The income premium for men increases as time since graduation increases.

Table 9: Work participation and income by gender

		Female		Male	
Graduation Year	**Female Share of Total (%)**	**Work Participation (%)**	**Average Annual Income ($)**	**Work Participation (%)**	**Average Annual Income ($)**
2004-2005	56.8	45.7	48,498	37.6	67,934
2005-2006	57.6	46.7	46,593	37.7	66,979
2006-2007	56.5	47.4	46,345	37.3	64,571
2007-2008	56.9	47.5	44,012	38.6	60,805
2008-2009	56.3	49.9	43,025	38.6	56,350
2009-2010	56.7	50.7	41,885	39.6	53,794
2010-2011	55.6	50.4	39,626	41.4	49,487
2011-2012	56.0	53.5	36,429	41.1	44,930
2012-2013	57.1	55.9	33,823	43.5	40,428
2013-2014	57.6	59.9	30,184	46.6	34,161
Total	**56.7**	**51.3**	**39,771**	**40.6**	**51,731**

In Table 10 we report work participation and annual income by gender for area of concentration. These data reveal several important findings: Women are most heavily concentrated in health professions, education; business, management, and marketing; and liberal arts and sciences/humanities. Health professions and education comprise around 39 percent of total women graduates, while these four areas altogether comprise roughly 62 percent of female graduates. Men were most heavily concentrated in business, management, and marketing; liberal arts and sciences/humanities; education; health professions; and engineering. These five areas comprise roughly 55 percent of male graduates.

Women were more highly concentrated in their top fields. Health professions constituted 22.7 percent of the total, and the top three fields garnered nearly 51 percent of all women graduates. Men were more dispersed among fields. Their top three fields constituted only 38 percent of total graduates. The health professions attracted more than three times as many women as men, and twice as many women graduated with education degrees than men.

Men's work participation rates were highest in the fields of precision production, mechanic and repair technologies, science technologies, personal and culinary services, and communication technologies. These areas of concentration had work participation rates above 60 percent. Architecture and related services had the lowest work participation among men at 17.2 percent. Communications/journalism,

social sciences, engineering, mathematics and statistics, multidisciplinary studies, parks and recreation studies, and foreign languages all had work participation rates below 30 percent.

For women, work participation rates were highest in science technologies, library science, and education, all of which were above 60 percent. Work participation in mathematics and statistics, philosophy and religious studies, engineering, and architecture and related services were the lowest, and all below 30 percent.

Incomes for men were highest in the health professions, averaging $86,992. Men also had high salaries in engineering and legal professions. The lowest wages for men were in visual and performing arts, personal and culinary services, and library science. All of these were below $30,000 per year on average.

For women, the highest paying field was engineering, which paid $64,463 on average per year. Other high paying jobs for women were in legal professions and health professions. The lowest paying jobs for women were in philosophy and religious studies, personal and culinary services, and library science, which paid roughly $25,000 per year or less.

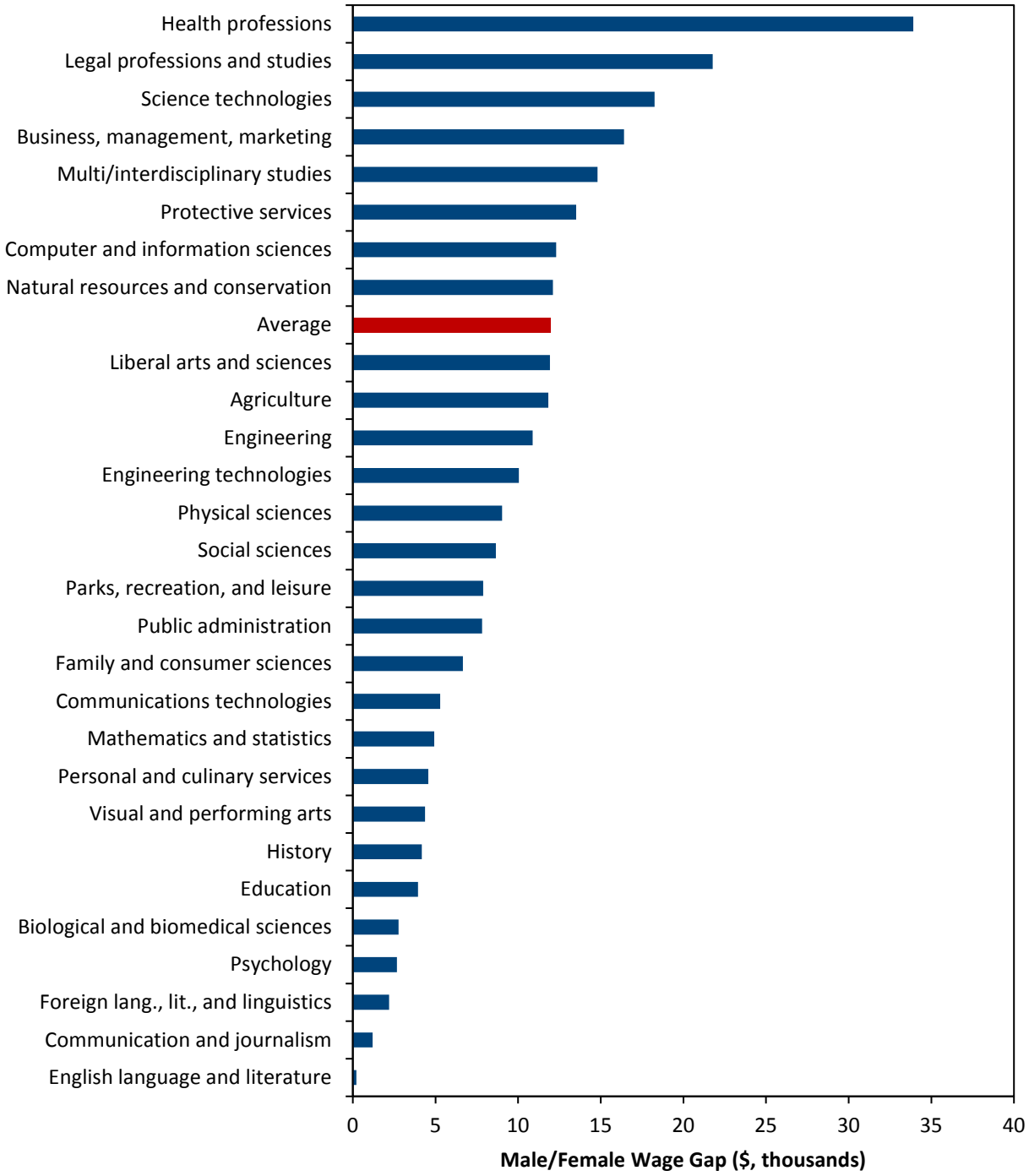
In Figure 1 we depict the specific areas of concentration that drive the male-female wage gap. The wage gap is present in every area of concentration. The wage gap is largest in health professions, legal professions, and science technologies. The wage gap is generally smallest in foreign languages, communications/journalism, and English language and literature studies.

Table 10: Work participation and income by area of concentration and gender

Area of Concentration	Female			Male		
	Total	Work Part. (%)	Average Annual Income ($)	Total	Work Part. (%)	Average Annual Income ($)
Agriculture, agriculture operations	858	37.4	30,968	651	33.2	42,791
Architecture and related services	58	n/d	n/d	209	17.2	53,756
Biological and biomedical sciences	2,030	34.7	37,308	1,580	32.2	40,069
Business, management, marketing	8,628	49.1	37,338	9,972	38.7	53,739
Communication, journalism	3,609	33.5	37,145	2,216	29.7	38,337
Communications technologies/technicians	89	57.3	26,560	126	60.3	31,850
Computer and information sciences	465	46.9	37,222	1,751	47.3	49,527
Construction trades	2	n/d	n/d	28	n/d	n/d
Education	11,785	65.8	41,215	4,894	50.6	45,160
Engineering	811	20.8	64,463	4,579	27.3	75,338
Engineering technologies and engineering-related fields	183	56.3	49,134	2,021	59.3	59,174
English language and literature/letters	1,140	39.0	30,003	602	37.9	30,218
Family and consumer/human sciences	1,120	39.8	26,810	45	37.8	33,463
Foreign languages, literatures, and linguistics	513	32.9	27,985	214	23.8	30,179
Health professions and related programs	16,497	58.6	53,090	4,868	47.2	86,992
History	563	41.2	28,132	1,047	36.3	32,302
Homeland security, law enforcement, firefighting and related protective services	1,935	48.3	28,665	1,875	56.2	42,178
Legal professions and studies	925	52.3	50,729	843	52.8	72,494
Liberal arts and sciences, general studies and humanities	8,275	55.8	28,422	5,999	45.1	40,345
Library science	25	68.0	18,494	1	n/d	n/d
Mathematics and statistics	266	24.8	38,729	339	27.1	43,658
Mechanic and repair technologies/technicians	3	n/d	n/d	354	70.1	50,344
Multi/interdisciplinary studies	1,381	45.3	28,515	1,765	26.4	43,314
Natural resources and conservation	347	31.7	37,274	1,039	38.5	49,379
Parks, recreation, leisure, and fitness	878	33.4	27,475	1,353	26.1	35,358
Personal and culinary services	196	58.2	21,366	106	60.4	25,924
Philosophy and religious studies	37	n/d	n/d	86	34.9	37,241
Physical sciences	519	33.9	39,917	918	30.0	48,945
Precision production	6	n/d	n/d	200	70.0	49,476
Psychology	2,772	42.2	30,779	926	41.3	33,452
Public administration and social service professions	1,924	55.0	34,232	424	49.8	42,049
Science technologies/technicians	519	72.5	28,111	538	65.8	46,360
Social sciences	2,252	37.9	28,587	2,641	29.0	37,241
Transportation and materials moving	1	n/d	n/d	13		
Visual and performing arts	1,974	31.6	24,506	1,169	33.1	28,879
Total	**72,586**	**51.3**	**39,771**	**55,392**	**40.6**	**51,731**

n/d: data not disclosed

Figure 1: Male-female income gap



Note: Wage gaps have been withheld for privacy reasons for the following industries: architecture, construction trades, library science, mechanic and repair technologies, philosophy and religious studies, precision production, and transportation and materials moving.
Source: Author calculations

6 Age

A worker's age at graduation may also be an important determinant of work participation outcomes. Table 11 details work participation for graduates by age at graduation and degree earned. In general work participation is largest in the middle of the age distribution. Work participation is, in general, above 60 percent for students who are between the ages of 35 and 54 when they graduate. But work participation is lower in younger and older graduates. Work participation for all graduates younger than 24 and older than 60 are both between 39 and 42 percent. This trend of higher participation among middle-age-range graduates may indicate that these graduates were already working and/or had work experience before returning to higher education to advance their careers.

Table 11: Work Participation by age at graduation and degree

Age at Graduation	All Graduates (%)	Associate's (%)	Bachelor's (%)	Master's (%)	Doctoral Professional Practice (%)	Doctorate (%)
Age 24 or less	41.4	66.6	36.7	38.8	54.0	
Age 25-29	45.8	66.3	46.7	40.9	38.4	16.2
Age 30-34	53.0	63.5	55.2	52.1	35.2	12.8
Age 35-39	59.6	66.7	59.1	60.2	44.4	16.4
Age 40-44	60.7	63.8	60.5	61.3	46.6	22.7
Age 45-49	62.1	63.5	60.2	66.8	48.3	28.8
Age 50-54	59.8	59.9	56.8	64.6	64.2	32.5
Age 55-59	52.9	47.9	51.6	57.4	63.2	67.9
Age 60+	39.2	39.3	34.5	45.0	37.8	n/d
Total	**46.7**	**64.6**	**41.9**	**47.3**	**39.9**	**17.5**

n/d: Data not disclosed

The overall age trend holds true for graduates with bachelor's and master's degrees. Both of these degree types have the highest work participation rates in the middle of the age distribution. The trend is particularly pronounced for master's degree graduates, whose work participation rises from almost 39 percent for graduates under the age of 24 to almost 67 percent for graduates ages 45-49.

For associate's degree holders, work participation stays relatively constant for graduates up until age 55, with rates above or very close to 60 percent. Work participation rates are smaller for older graduates, falling to under 40 percent for graduates who are 60 years or older at graduation. For graduates with doctorate degrees, work participation tends to rise as age at graduation increases. Aside from the under-24 category, for which there is a small sample size, work participation rates are below 20 percent for graduates who earn their degrees when they are younger than 40. The work participation rate rises to about 68 percent for doctoral graduates who are older than 55 at the time of graduation. Finally, the work participation for doctoral professional practice graduates starts off relatively high for graduates under the age of 24, then falls through the age group 30-34. The highest work participation rates for this degree type are for graduates who are 50 and older, where work participation rates are above 64 percent.

Table 12: Income by age at graduation and degree

Age at Graduation	All Graduates ($)	Associate's ($)	Bachelor's ($)	Master's ($)	Doctoral Professional Practice ($)	Doctorate ($)
Age 24 or less	38,293	32,826	39,104	47,151	104,678	
Age 25-29	49,364	36,879	37,778	50,261	116,696	69,499
Age 30-34	48,497	39,089	39,239	56,795	118,631	83,522
Age 35-39	47,761	39,896	40,568	58,272	120,232	58,981
Age 40-44	47,829	39,184	42,178	62,725	97,054	66,051
Age 45-49	47,108	39,071	42,064	59,384	98,585	62,215
Age 50-54	46,923	38,612	43,211	56,004	99,304	82,684
Age 55-59	42,533	34,396	36,525	48,455	94,676	56,055
Age 60+	33,114	23,588	29,695	39,851	62,192	n/d
Total	**44,270**	**36,174**	**39,101**	**53,579**	**114,297**	**70,792**

n/d: Data not disclosed

The trend in income levels by age vary depending on the degree earned. For three of the degree categories reported—associate's, bachelor's, and master's degrees—income starts lower for younger graduates and rises into the middle of the age distribution before falling again for older graduates. Master's degree graduates have the most pronounced trend with income rising from about $47,000 to over $62,000 in the middle of the age distribution.

For doctoral professional practice and doctorate degrees, however, income tends to fall with age at graduation. Younger workers who earn these degrees tend to have higher incomes than graduates who are older when they receive these degrees, although the relationship is weaker for doctorate earners. Graduates who earn doctoral professional practice degrees when they are under the age of 40 earn more than $100,000 per year on average, while income falls to less than $100,000 for the oldest graduates in the sample. This disparity is a result of the area of concentration for these graduates. Professional degrees awarded to younger graduates are largely in the health and legal professions, which have higher incomes in general. Older graduates who earn professional degrees tend to concentrate in education, which correlates with lower salaries.

7 Race

Approximately 88 percent of graduates from West Virginia's public higher education institutions in the last decade were white, as reported in Table 13.[8] Black graduates made up the next largest share of the graduates with 4 percent of the total. Asian, Pacific Islander, or Native Hawaiian; and Hispanic make up the next largest shares with 1.6 percent and 1.3 percent, respectively.

At nearly 50 percent, work participation rates for white graduates were also the highest work among all of the graduates working in the state in 2015. American Indian or Alaska Native, and multi-racial graduates exhibit work participation rates that are in the 40-percent range. Work participation falls to

[8] Race is not reported for approximately 4.5 percent of graduates.

the 30-percent range and below for graduates who are Black; Hispanic; or Asian, Pacific Islander, or Native Hawaiian.

Asian, Pacific Islander, or Native Hawaiian graduates report the highest annual wages, with an average annual wage of $52,580, which exceeds the overall average by nearly 19 percent. White graduates also reported an average income that was just above the overall average. Multi-racial and Black graduates report the lowest incomes, with income levels that are roughly 25 percent below the average.

Table 13: Work participation and income by race

Race	Number	Work Participation (%)	Average Annual Wage ($)
American Indian or Alaska Native	391	47.6	45,309
Asian, Pacific Islander, Native Hawaiian	2,102	28.1	52,580
Black	5,163	35.6	33,196
Hispanic	1,678	28.9	38,314
Multi-Racial	790	41.1	34,567
White	112,032	49.5	44,682
Total[9]	**127,978**	**46.7**	**44,270**

8 Academic Achievement

Academic achievement has a theoretically ambiguous effect on work outcomes after graduation. Graduates who enjoyed higher levels of academic achievement might receive more job opportunities within the state and could therefore exhibit higher rates of work participation within the state given the wider array of opportunities. Alternatively, higher academic achievement could also mean that those graduates might have more economic opportunities broadly and could be induced to leave the state to pursue such opportunities elsewhere. This section examines work participation and income for graduates based on incoming ACT score and college GPA. The ACT is a common standardized test taken before entry into college, while the GPA measures one's academic performance while in college.

Table 14 summarizes work participation and income for the graduates who submitted ACT scores to the school they attended. In general students with higher ACT scores when entering college have lower work participation rates than those with lower scores. Graduates in the lowest quintile (those with ACT scores below 18)[10] had a work participation rate of roughly 65 percent, while those with ACT scores in the highest quintile (25 and above) had a work participation rate of approximately 51 percent.

Work participation for graduates with ACT scores in quintile 5 fell around 2.1 percentage points per year and quintile 4 graduates work participation decreased about 2 percentage points per year on average between the 2013-2014 graduating class to the 2004-2005 graduating class. The most rapid decline in work participation was in quintile 2, where the work participation rate dropped from the low 70s for the

[9] Includes graduates whose race was not reported.

[10] Quintiles are calculated based on all of the scores of graduates from West Virginia colleges and universities rather than the distribution nationally.

2013-2014 graduating classes to the low 50s for the 2004-2005 graduating class, a drop of a little over 2.3 percentage points per year on average.

Income tended to rise with higher ACT scores. Overall, graduates with the highest ACT scores enjoyed an average annual income that exceeded that of those with ACT scores in the bottom quintile by a little more than 36 percent. Further, this premium for higher ACT scores does not appear to diminish as time since graduation increases, but rather it increases over time. For the most recent graduates, the top ACT quintile earned nearly 21 percent more than the bottom quintile; for graduates in the 2004-2005 academic year, the top quintile earned roughly 55 percent more on average than the bottom quintile.

This disparity in earnings between graduates with higher ACT scores and lower ACT scores can at least partially be explained by the types of degrees these graduates earned. Table 15 shows the number of graduates and average annual income by degree type and ACT score quintile. Graduates who earned associate's degrees were almost 4 times as likely to have an ACT score from the bottom quintile as from the top quintile. In contrast, graduates who earned master's degrees were more heavily concentrated in the top two quintiles of ACT scores. Within each degree, however, income was still positively associated with ACT score for associate's, bachelors, and master's degree holders.

Table 14: Work participation and income by ACT score

Graduation Year	Quintile 1 (Less than 18)		Quintile 2 (18-20)		Quintile 3 (20-22)		Quintile 4 (22-25)		Quintile 5 (25+)	
	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)
2004-2005	57.0	44,897	52.5	48,492	53.0	55,108	48.9	55,167	40.9	69,531
2005-2006	59.8	42,177	53.8	47,700	54.5	48,300	51.1	55,990	46.1	65,718
2006-2007	59.9	43,353	55.9	46,250	56.0	48,838	49.9	52,574	43.7	66,676
2007-2008	58.4	39,430	60.5	43,956	59.3	46,120	52.6	47,757	47.3	63,804
2008-2009	63.9	38,246	61.1	43,449	59.5	44,272	55.6	44,686	50.5	58,954
2009-2010	65.4	37,308	62.1	41,468	62.2	43,026	58.7	45,667	50.7	52,779
2010-2011	66.3	36,050	66.3	38,021	61.4	38,956	58.9	43,687	52.8	48,796
2011-2012	71.0	32,289	65.0	35,167	63.9	37,028	58.0	40,506	53.6	43,687
2012-2013	71.0	31,505	67.3	33,386	65.8	34,794	63.6	35,588	53.6	38,966
2013-2014	75.7	27,456	73.0	28,883	68.5	30,508	66.9	31,626	59.5	33,269
Total	**65.2**	**36,420**	**62.3**	**39,433**	**60.9**	**41,406**	**57.6**	**42,924**	**51.2**	**49,665**

Table 15: Number of graduates and average annual income by degree type and ACT score

Degree Earned	Quintile 1 (Less than 18)		Quintile 2 (18-20)		Quintile 3 (20-22)		Quintile 4 (22-25)		Quintile 5 (25+)	
	Number of Graduates	Average Annual Income ($)	Number of Graduates	Average Annual Income ($)	Number of Graduates	Average Annual Income ($)	Number of Graduates	Average Annual Income ($)	Number of Graduates	Average Annual Income ($)
Associate's	2,105	33,232	1,546	35,797	1,335	37,089	1,298	36,368	548	36,745
Bachelor's	3,130	37,125	3,521	38,322	3,933	38,941	5,364	39,215	4,333	39,894
Master's	517	47,722	776	48,885	1,094	50,788	1,412	49,929	1,277	51,866

Table 16 summarizes work participation and income for the graduates for whom GPA is available. On average, students with higher GPAs tended to work in the state at higher rates than those with lower GPAs, though there appears to be only a weak correlation between these variables. The average work participation rate for graduates in the lowest GPA quintile (Less than 2.79), was 46.1 percent, compared with 47.3 percent for those in the highest quintile (GPA above 3.78). However, the work participation rate did not show a consistent trend upward. Work participation in the second quintile, on average, was higher than for the fourth quintile.

Unlike work participation, college GPA does have a significant positive association with annual income. Income levels consistently rise as graduates' GPA move from the bottom to the top quintile. Top GPA graduates earned roughly 37 percent more each year than bottom-quintile graduates. However, here the income premium diminishes over time. For the most recent graduation year, top-quintile graduates earned more than 50 percent higher annual incomes than the lowest GPA graduates. However, top-quintile graduates in the 2004-2005 graduation year earned only about 26 percent more than their lower-quintile counterparts.

Table 16: Work participation and income by GPA

Graduation Year	Quintile 1 (Less than 2.79)		Quintile 2 (2.79-3.15)		Quintile 3 (3.15-3.45)		Quintile 4 (3.45-3.78)		Quintile 5 (3.78+)	
	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)
2004-2005	41.6	48,733	42.1	52,544	41.1	58,836	40.5	57,739	45.8	61,277
2005-2006	42.4	44,972	42.2	51,172	41.9	52,656	41.1	55,093	45.9	55,048
2006-2007	41.7	44,295	43.0	48,365	41.4	52,161	40.8	57,197	46.5	56,597
2007-2008	43.1	41,646	43.5	44,760	43.0	49,942	42.9	51,271	44.9	56,952
2008-2009	45.7	40,167	45.3	43,799	44.5	47,655	41.8	50,777	46.7	53,363
2009-2010	44.5	37,408	46.1	41,039	45.7	44,823	47.2	47,724	48.1	53,772
2010-2011	47.9	35,659	48.4	38,777	47.0	42,365	44.8	46,913	46.6	51,293
2011-2012	48.3	31,980	49.8	37,243	49.2	38,503	47.3	42,883	47.0	45,628
2012-2013	48.9	30,278	51.4	33,870	54.1	36,115	50.7	37,641	48.8	43,355
2013-2014	53.6	26,431	53.2	29,364	58.4	31,418	55.6	34,504	50.8	39,747
Total	**46.1**	**37,087**	**46.9**	**40,724**	**47.4**	**43,297**	**46.1**	**46,030**	**47.3**	**50,648**

9 Tuition Assistance and Low Income Status

One of the goals of the state's tuition assistance programs is to entice graduates to remain in the state after graduation. It is also useful to examine the outcomes of students who entered college from low-income households. This section examines work participation and income for those receiving the PROMISE scholarship, the state's Higher Education Grant Program (HEGP) scholarship, and federal Pell Grants. The merit-based PROMISE scholarship pays full tuition and fees for in-state students who met the program's academic requirements.[11] The first students with PROMISE scholarships graduated in 2003. HEGP and Pell grants are based on need and may not cover all tuition costs. Both PROMISE and HEGP are programs for students who are West Virginia residents, while the Pell grant program is nationwide. There may be considerable overlap between these three programs.

As Table 17 shows, the overall work participation rate for PROMISE graduates was just under 57 percent, which is somewhat below the work participation rate for in-state students overall (61.8 percent). Work participation rates started relatively high for the 2004-2005 class who received PROMISE scholarships with participation rates near 56 percent. The remaining cohorts exhibit lower work participation rates as the time from graduation increases. The figure falls from 66.7 percent for graduates from the 2013-2014 academic year to 45.8 percent for graduates of the 2006-2007 academic year. Work participation rates show consistent decline over time for HEGP and Pell grant recipients.

PROMISE graduates earned an average of $43,036 per year, somewhat higher than HEGP recipients, who earned $39,330. Pell grant recipients earned $38,052 per year. The five most recent graduating classes who received PROMISE scholarships had earnings 14 to 18 percent higher than their HEGP counterparts. Pell grant recipients, tended to have the lowest incomes among the three tuition assistance programs within each year. All three tended to earn lower incomes than the average for all graduates.

[11] Beginning January 1, 2010, new PROMISE recipients received a block grant of $4,750 per year, or full tuition and fees, whichever was less.

Table 17: Work participation and income based on scholarship assistance and low-income status

Graduation Year	PROMISE Recipient		HEGP Recipient		Pell Grant Recipients	
	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)
2004-2005	55.7	36,998	57.0	51,689	47.8	48,357
2005-2006	47.6	49,069	58.7	48,727	49.9	46,370
2006-2007	45.8	50,706	58.7	48,293	50.4	45,869
2007-2008	50.7	49,775	63.3	45,151	53.1	42,376
2008-2009	52.7	48,311	63.8	42,486	54.6	41,402
2009-2010	57.1	47,994	65.4	42,048	54.9	40,146
2010-2011	56.0	46,905	65.4	39,592	56.2	38,668
2011-2012	58.3	42,796	66.8	36,172	57.4	35,119
2012-2013	60.1	37,997	68.7	32,756	60.2	32,139
2013-2014	66.7	32,935	73.3	28,664	64.5	28,329
Total	**56.9**	**43,036**	**65.2**	**39,330**	**55.9**	**38,052**

10 Industry

Table 18 reports graduate employment and income by two-digit NAICS industry.[12] This year's results show that the concentration of graduates in the educational services and health care sectors is holding steady. Among all graduates of the state's public higher education institutions, approximately 49.8 percent were employed in these two industries, compared with 49.9 percent in last year's study. In all, 27.7 percent of graduates were employed in health care, and another 22.1 percent were employed in education. Other sectors that attracted large number of graduates include retail trade, professional and technical services, and public administration, which together accounted for 20.8 percent of jobs held by graduates.

Real estate, and rental and leasing; utilities; management of companies and enterprises; and agriculture, forestry, fishing, and hunting attracted the fewest graduates. Each of these industries employed less than 1 percent of graduates in 2015.

[12] The North American Industry Classification System (NAICS) classifies jobs into 21 major sectors by work type. Jobs in the Oil and Gas industry are included under the Mining sector, but may be under-represented in the report, as the available data do not include independent contractors.

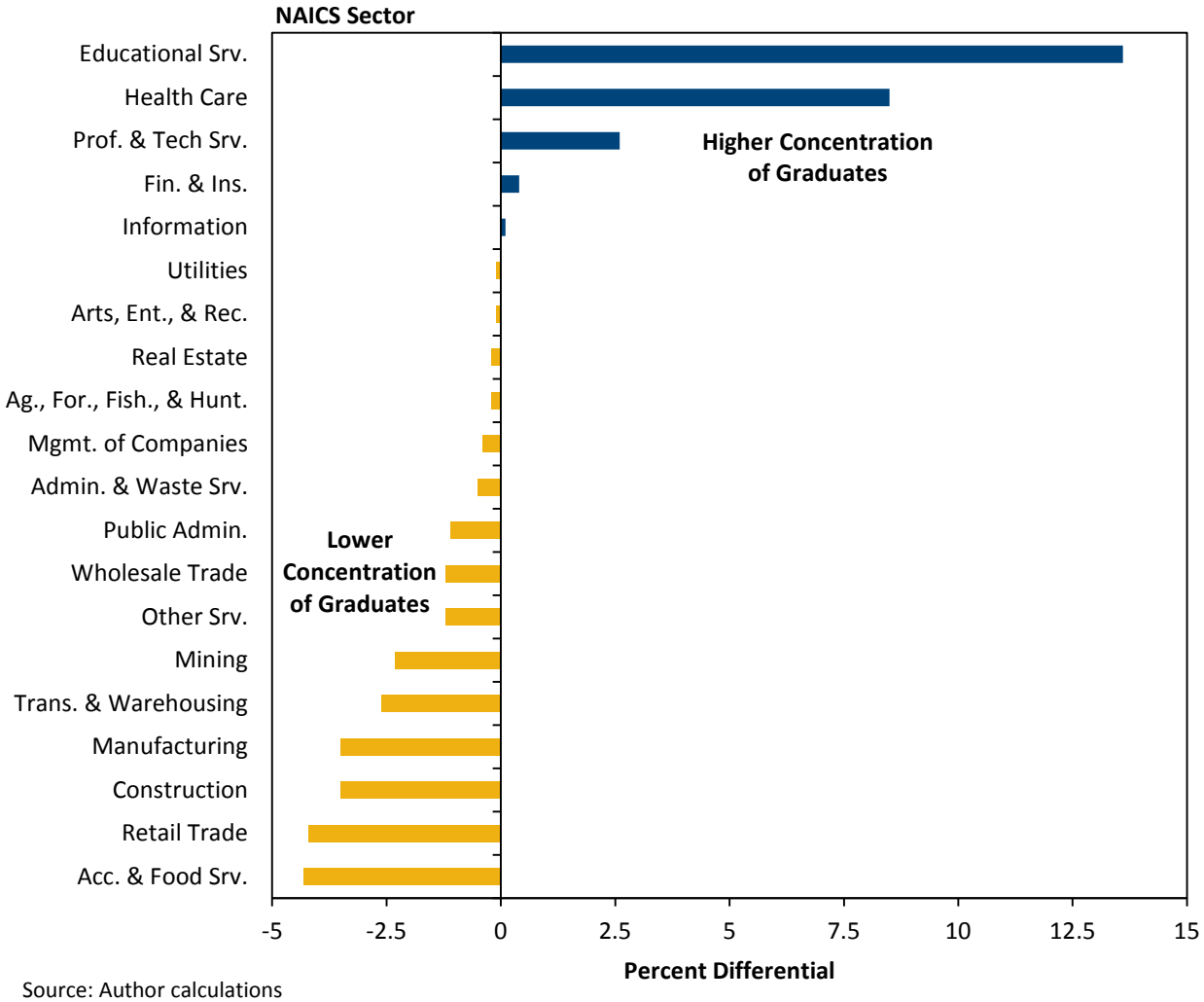
Table 18: Employment and income by industry[13]

NAICS	Sector	Total Graduates	Share of Total Graduates (%)	Average Annual Income ($)	State Industry Share (%)
72	Accommodation and food services	4,207	5.3	12,665	9.7
56	Administrative and waste services	3,691	4.7	24,475	5.2
11	Agriculture, forestry, fishing and hunting	71	0.1	23,283	0.3
71	Arts, entertainment, and recreation	781	1.0	11,593	1.1
23	Construction	1,368	1.7	37,593	5.2
61	Educational services	17,437	22.1	35,209	8.6
52	Finance and insurance	2,346	3.0	38,057	2.6
62	Health care and social assistance	21,815	27.7	40,791	19.2
51	Information	1,288	1.6	33,875	1.6
55	Management of companies and enterprises	379	0.5	56,722	0.9
31-33	Manufacturing	2,634	3.3	55,246	6.9
21	Mining	1,065	1.4	76,673	3.6
81	Other services, except public administration	1,423	1.8	23,696	3.0
54	Professional and technical services	5,087	6.5	44,676	3.8
92	Public Administration	4,692	6.0	34,611	7.0
53	Real estate and rental and leasing	613	0.8	34,319	1.0
44-45	Retail Trade	6,566	8.3	23,511	12.5
48-49	Transportation and warehousing	989	1.3	39,473	3.8
22	Utilities	492	0.6	65,204	0.7
42	Wholesale trade	1,558	2.0	53,015	3.2
	Total[14]	**78,736**	**100.0**	**36,210**	**100.0**

[13] The number of jobs in this table exceeds the number of graduates employed in West Virginia in 2015 because graduates who worked in more than one industry were counted for each industry in which they worked.

[14] Includes 234 unclassified establishments.

Figure 2: Industry concentration of graduates vs. overall employment distribution

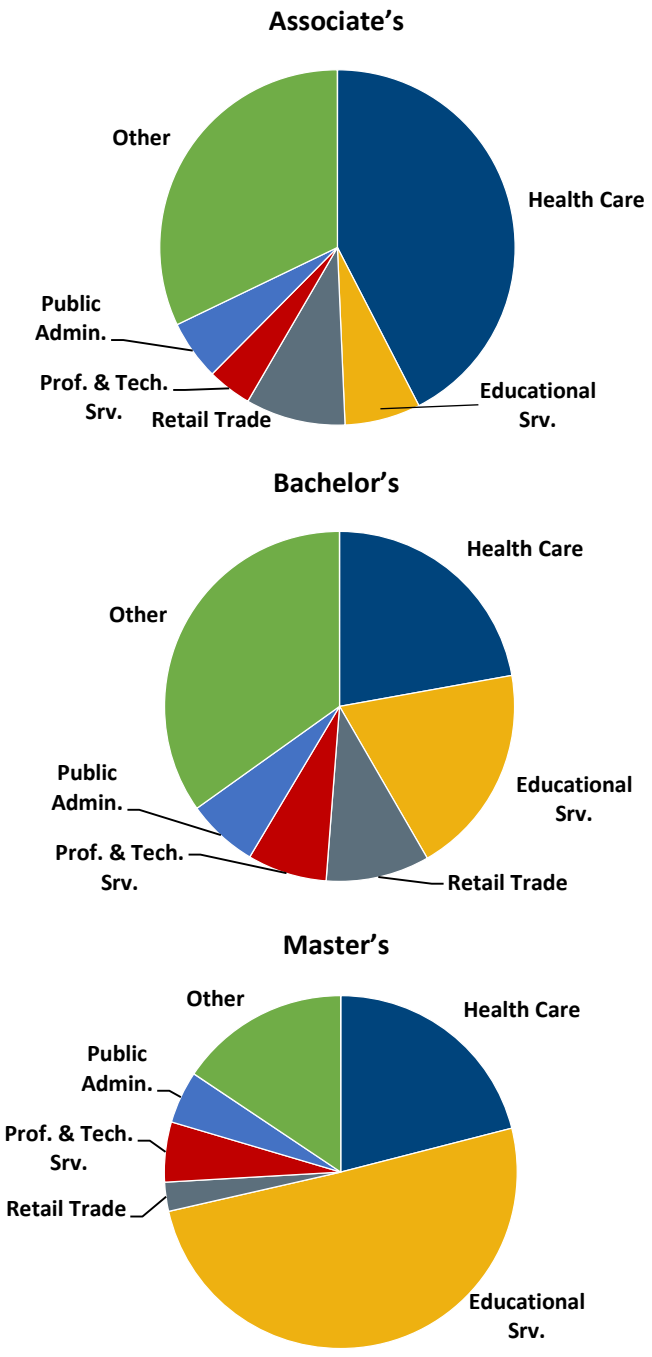


Source: Author calculations

Figure 2 illustrates the difference between the industry share for public higher education graduates and the share of workers in the state as a whole. As illustrated, graduates are far more likely to be employed in education and health care services than workers overall. The professional and technical services; finance and insurance; and information industries also attracted a greater share of educated workers than the economy as a whole.

Graduates were least likely to be employed in accommodations and food services; retail trade; construction; manufacturing; and transportation and warehousing compared with the share in the overall economy. This result likely reflects the lower educational requirements of these industries.

Figure 3: Graduate industry share by degree



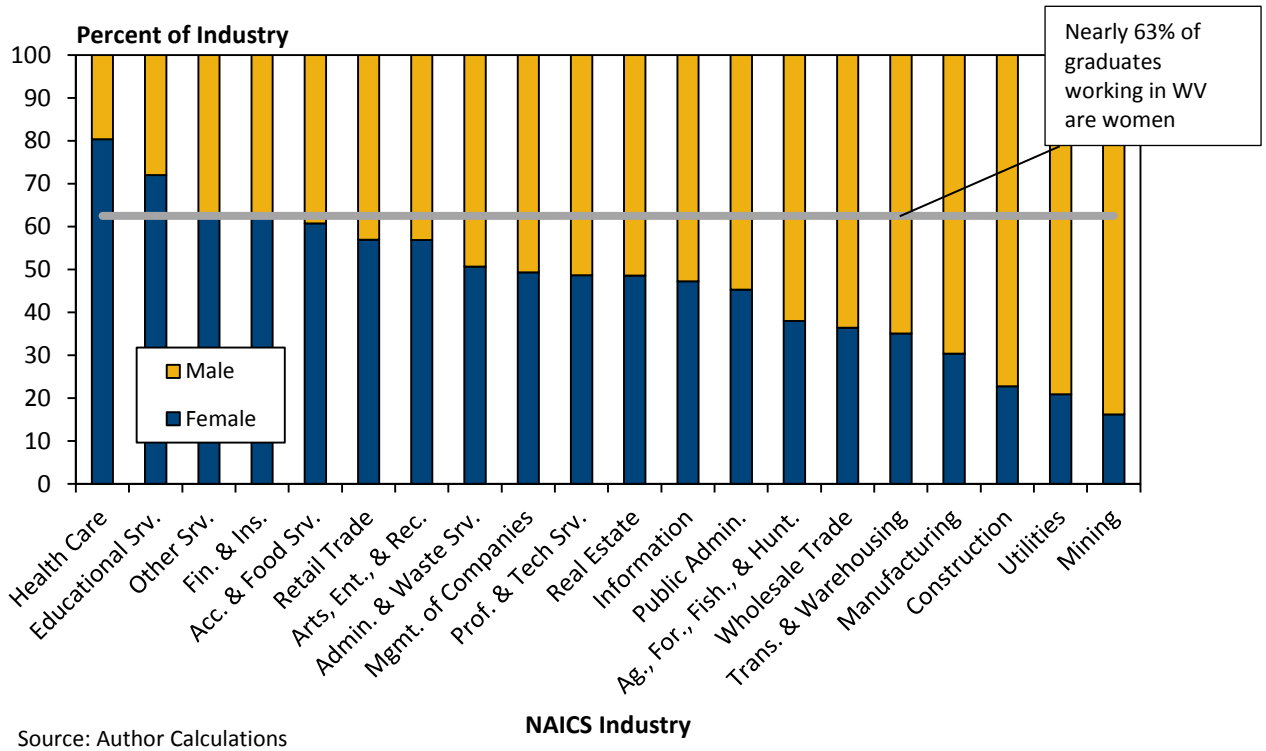
Source: Author Calculations

The degree graduates earned had a great deal of influence over the industries in which they worked. As Figure 3 illustrates, associate's degree graduates were clustered heavily in the health care fields. Almost 43 percent of associate's degree graduates worked in this one field. Associate's degree graduates also worked heavily in retail trade, educational services, and accommodation and food services.

Bachelor's degree graduates were more spread out among the different industries in the state. Health care services was still the top industry, with about 22 percent of graduates with bachelor's degrees working in that industry. However, it was closely matched by educational services, which comprised 19.5 percent of bachelor's degree graduates. Other major industries for bachelor's degree graduates were retail trade; professional and technical services; public administration; accommodations and food services; and administration and waste services, all of which employed more than 5 percent of bachelor's degree graduates.

Educational services was by far the top industry for graduates with a master's degree. Slightly over half of all graduates with a master's worked in education. Health care was a distant second with 21 percent of graduates, followed by professional and technical services, and public administration, both of which employed roughly 5 percent of graduates.

Figure 4: Industry composition by gender



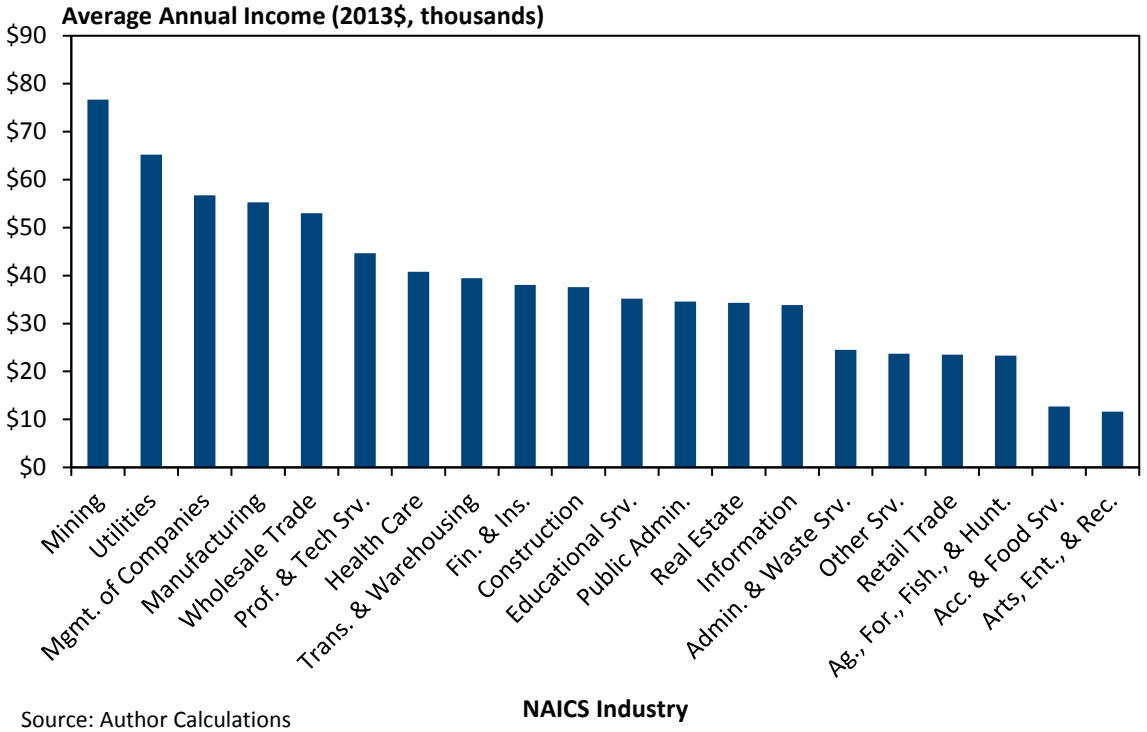
Source: Author Calculations

Figure 4 shows the ratio of men to women graduates in the major industries. Overall, women graduates held almost 63 percent of jobs in all industries. This is likely a result of women having graduated in larger numbers than men in the last decade, and higher work participation rates among women. In relation to this overall average, women are overrepresented in three industries: health care, educational services, and other services. More than 80 percent of graduates working in health care were women, as were 72

percent of education workers. As mentioned above, these two industries also constitute by far the largest share of employment for the state's college graduates. Women also held a large share of jobs in finance and insurance; and accommodations and food services, both of which were more than 60 percent women.

In relation to their share of the graduate workforce, men are over-represented in every industry except health care and education. This disparity is particularly pronounced in mining where men held nearly 84 percent of jobs. Male graduates also held a large share of jobs in utilities and construction, both of which were more than 77 percent male.

Figure 5: Income by industry



Source: Author Calculations

As Figure 5 shows, average annual income varied significantly by industry in 2015. Graduates working in mining earned the highest income, averaging over $76 thousand per year. Utilities; management of companies; manufacturing; and wholesale trade also paid high incomes, with each above $50 thousand per year. The lowest paid industries included administrative and waste services; other services; retail trade; agriculture and forestry; accommodation and food services; and arts, entertainment, and recreation, each of which paid less than $25 thousand per year on average.

11 County Statistics

Graduates of West Virginia public higher education institutions worked in every county in the state in 2015. Table 19 shows the number of graduates and average annual income for graduates in all of West Virginia's 55 counties. It also includes the distribution of overall employment and population in the state.

Graduates were highly concentrated in Kanawha, Monongalia, and Cabell counties. Over 35 percent of the graduates were working in these three counties in 2015, with 16.4 percent in Kanawha, 10.6 percent in Monongalia, and 8.6 percent in Cabell. Also, Berkeley, Harrison, Ohio, and Wood counties each contained 4 percent or more of graduates.

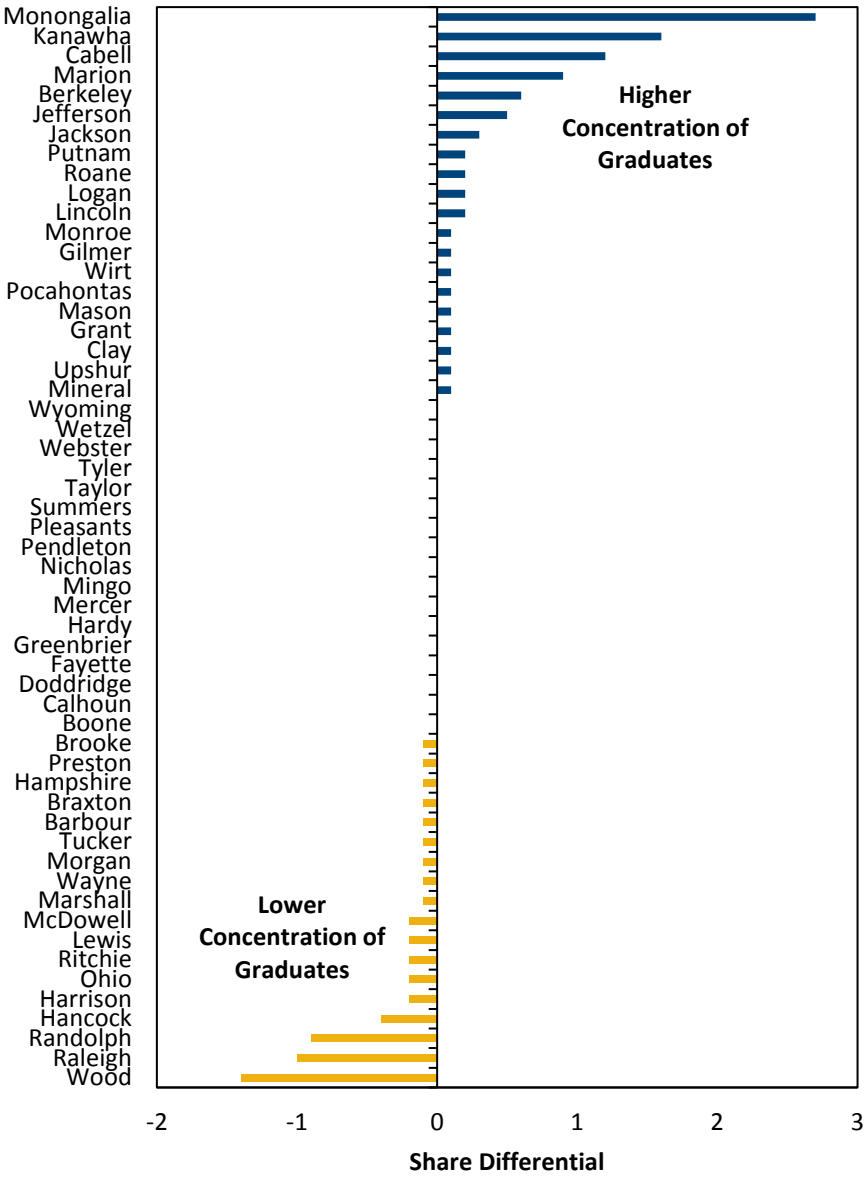
Table 19: Employment and income by county of work

County of Work	Total Graduates	County Share of Graduates (%)	Average Annual Income ($)	County Share of State Employment (%)
Barbour	181	0.4	37,322	0.5
Berkeley	2,398	5.2	32,574	4.6
Boone	400	0.9	37,426	0.9
Braxton	221	0.5	30,126	0.6
Brooke	518	1.1	32,914	1.2
Cabell	3,959	8.6	34,388	7.4
Calhoun	105	0.2	32,139	0.2
Clay	116	0.3	34,302	0.2
Doddridge	93	0.2	39,494	0.2
Fayette	720	1.6	32,511	1.6
Gilmer	198	0.4	30,975	0.3
Grant	265	0.6	33,500	0.5
Greenbrier	863	1.9	36,831	1.9
Hampshire	244	0.5	33,738	0.6
Hancock	444	1.0	32,035	1.4
Hardy	380	0.8	26,042	0.8
Harrison	2,194	4.8	37,864	5.0
Jackson	639	1.4	36,024	1.1
Jefferson	1,250	2.7	32,752	2.2
Kanawha	7,560	16.4	37,593	14.8
Lewis	351	0.8	32,353	1.0
Lincoln	271	0.6	34,643	0.4
Logan	766	1.7	33,480	1.5
Marion	1,651	3.6	34,684	2.7
Marshall	625	1.4	35,364	1.5
Mason	415	0.9	33,820	0.8
McDowell	239	0.5	40,644	0.7
Mercer	1,298	2.8	37,893	2.8
Mineral	536	1.2	32,621	1.1
Mingo	374	0.8	34,898	0.8
Monongalia	4,891	10.6	37,127	7.9
Monroe	169	0.4	33,104	0.3
Morgan	156	0.3	34,172	0.4
Nicholas	488	1.1	34,165	1.1
Ohio	1,830	4.0	31,513	4.2
Pendleton	86	0.2	25,454	0.2
Pleasants	175	0.4	37,226	0.4
Pocahontas	209	0.5	25,379	0.4
Preston	436	0.9	36,122	1.0
Putnam	1,402	3.1	36,481	2.9
Raleigh	1,647	3.6	35,662	4.6
Randolph	338	0.7	30,748	1.6
Ritchie	142	0.3	38,121	0.5
Roane	270	0.6	27,490	0.4
Summers	131	0.3	31,034	0.3
Taylor	238	0.5	35,247	0.5
Tucker	147	0.3	24,865	0.4
Tyler	146	0.3	36,927	0.3
Upshur	556	1.2	39,389	1.1
Wayne	563	1.2	32,966	1.3
Webster	128	0.3	45,579	0.3
Wetzel	310	0.7	29,596	0.7
Wirt	69	0.2	29,699	0.1
Wood	1,842	4.0	33,586	5.4
Wyoming	323	0.7	38,299	0.7
Total	**45,966**	**100.0**	**35,172**	**96.3***

*** County location unknown for remaining 3.7 percent of workers.**

Counties with larger shares of total employment and population attracted larger numbers of graduates, and graduates were over-represented in counties with larger metropolitan areas and institutions of higher education. Figure 6 depicts the difference in each county's share of graduate employment and its share of the state's overall employment. At 2.7 percentage points, Monongalia County, which is home to WVU's main campus, had the largest difference between its share of graduate employment and share of overall state employment. Graduates were also over-represented in Kanawha County and Cabell County, which is home to Marshall University; and Marion County, where Fairmont State University is located, all of which had differentials near or greater than 1.

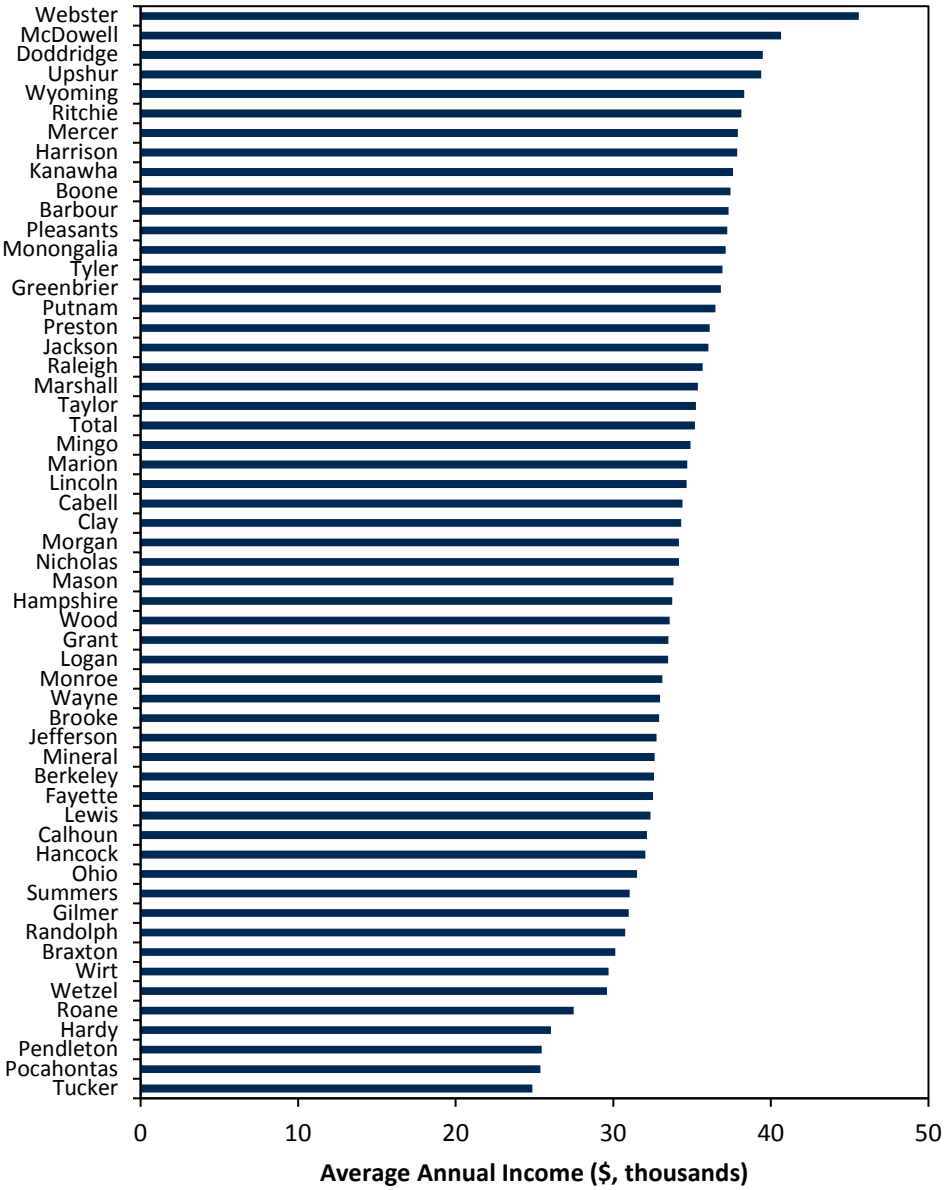
Figure 6: Graduate and state employment share differential



Source: Author Calculations

Income for graduates was more evenly distributed across the state than workers (Figure 7). The majority of graduates were earning between $30 thousand and $40 thousand annually on average. Webster, McDowell, Doddridge, and Upshur counties had the highest average annual incomes, all of which were over $39 thousand. The lowest average income was in Tucker County, where average annual income was $24,865. Pocahontas, Pendleton, and Hardy counties all had average annual incomes below $27,000.

Figure 7: Average annual income for West Virginia graduates by county



Source: Author Calculations

12 Metropolitan Area Statistics[15]

As Table 20 shows, metropolitan counties attracted the largest numbers of graduates and had higher wages overall than nonmetropolitan counties. Of the graduates employed in the state in 2015, about 69 percent worked in counties that were part of a Metropolitan Statistical Area (MSA), compared with slightly more than 65 percent of all state workers. The MSA with the largest share of graduates, the Charleston MSA, increased to 17.6 percent of graduates from 17.2 percent in last year's report. The Huntington MSA stayed in second place with 13.5 percent of graduates, followed by the Morgantown MSA with 11.6 percent of graduates. Among metropolitan areas, the Winchester MSA had the lowest percentage of graduates at 0.5 percent.

Micropolitan counties accounted for 15.2 percent of all graduate employment in 2015. The Clarksburg micro-SA had the largest share of graduates in this category, with 5.5 percent of all graduates. The next largest micro-SAs were Fairmont and Bluefield, with 3.6 percent and 2.8 percent respectively. Nonmetropolitan areas employed 15.8 percent of graduates.

Average annual income in metropolitan and micropolitan counties were also higher than in nonmetropolitan areas. The average annual incomes in metropolitan and micropolitan areas were both above $35 thousand, which was about $1,100 more per year than graduates in non-metropolitan counties earned. The wage premium in an average metropolitan area versus a nonmetropolitan area was roughly 3.2 percent.

The Bluefield micro-MSA had the highest average annual income, at $37,893. Average annual income in the Clarksburg micro-SA was next highest at $37,677, followed by the Charleston MSA at $37,538. The lowest incomes were found in the Elkins micro-SA, at $30,748, followed by the Wheeling MSA ($32,494) and the Weirton-Steubenville MSA ($32,509).

[15] The data in this section reflect the number of jobs in each category, not the number of graduates. See the Appendix for more information.

Table 20: Employment and income by metropolitan area[16]

	Number of Graduates	Share of Graduates (%)	Average Annual Income ($)	Share of State Employment (%)
Metropolitan Areas	31,721	69.0	35,232	65.2
Beckley MSA	2,367	5.1	34,704	6.2
Charleston MSA	8,076	17.6	37,538	15.8
Cumberland MSA	536	1.2	32,621	1.1
Hagerstown-Martinsburg MSA	2,398	5.2	32,574	4.6
Huntington-Ashland MSA	6,195	13.5	34,744	11.9
Morgantown MSA	5,327	11.6	37,045	9.0
Parkersburg-Vienna MSA	1,911	4.2	33,446	5.5
Washington MSA	1,250	2.7	32,752	2.2
Weirton-Steubenville MSA	962	2.1	32,509	2.6
Wheeling MSA	2,455	5.3	32,494	5.7
Winchester MSA	244	0.5	33,738	0.6
Micropolitan Areas	6,993	15.2	35,987	15.2
Bluefield MicroSA	1,298	2.8	37,893	2.8
Clarksburg MicroSA	2,525	5.5	37,677	5.7
Elkins MicroSA	338	0.7	30,748	1.6
Fairmont MicroSA	1,651	3.6	34,684	2.7
Logan MicroSA	766	1.7	33,480	1.5
Point Pleasant MicroSA	415	0.9	33,820	0.8
Nonmetropolitan	7,252	15.8	34,122	15.9
Total	**45,966**	**100.0**	**35,172**	**96.3***

*** Metro location unknown for remaining 3.7 percent of workers.**

[16] This table uses the US Census Bureau's Core Based Statistical Area definitions in place in 2014. It includes only the West Virginia portion of each metropolitan or micropolitan statistical area.

13 Appendix: Detailed Description of the Data in this Report

The data analyzed in this study come from the matching of demographic information on graduates from West Virginia public institutions of higher education (compiled by the HEPC) with employment records maintained by Workforce West Virginia.

Education data are gathered from HEPC records of graduates from the state's public higher education institutions. The data reflect graduates' highest degree earned at the time of measurement. Graduation years follow a July to June educational year, meaning that graduates in the last six months of one year are combined with those of the first six months of the next year.

The employment data used are gathered from West Virginia unemployment compensation records. This is a well-known dataset that measures employment by place of work. It covers jobs and wages reported by firms participating in the West Virginia Unemployment Compensation system and is often referred to as covered employment. As a general rule, any firm which employs one or more workers for some part of a day in at least 20 different weeks of a calendar year is required to contribute to the state's unemployment insurance system. Major exceptions are railroad companies and the federal government, which contribute to separate systems. The self-employed, student workers, most church workers, and unpaid family workers are also generally not covered. Additional employment data come from WorkForce West Virginia.

The data in the industry, county, and metropolitan area sections reflect the number of jobs in each category, not the number of graduates. Graduates who work at multiple jobs in different locations will be counted twice. This has the effect of lowering the average annual wage, because the wages are spread across multiple jobs and divided by a larger number of people.

Finally, the county of employment cannot be identified for a number of employed graduates. This can occur due to the administrative nature of the data. For instance, for a firm with multiple establishments located in multiple states, the unemployment insurance contact information (and thus the geographic identifier) is sometimes only available for a centralized payroll processing center that happens to be located out of the state. Thus, for some graduates, we know they are employed in the state, but we cannot narrow the location further. These graduates are not included in sections of this report that address employment by county or metropolitan area.

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