



Bureau of Business and Economic Research

From Higher Education to Work in West Virginia, 2013

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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 public higher educational institution in West Virginia and who stay within the state to work after graduation. Key findings of this research are as follows:

Overview

- Of the 118,832 students who graduated from public higher education in West Virginia in the last decade, 56,201 were working in West Virginia in 2013, which translates into a work participation rate of 47.3 percent.
- Work participation rates typically decline as the time since graduation increases.
- Graduates who work in the state earned an average income of \$43,221 in 2013. Average income tends to rise as the time since graduation increases.
- In-state students, identified by their residency for fee purposes, were far more likely to work in the state after graduation than out-of-state students.

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 65.3 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 degree categories (\$35,428). Income for bachelor's degree holders was only slightly above that of associate's degree holders (\$37,515). However, income was significantly higher for master's degree recipients (\$52,037) and even more so for graduates with doctoral professional practice degrees (\$111,577).
- Health professions became the largest area of concentration in this year's study, with 19,018 graduates. Business, management, and marketing was a close second with 18,380 graduates.
- Work participation and income vary significantly based on area of concentration.

Personal Characteristics: Gender, Age, and Race

- Women represent the majority (57 percent) of public higher education graduates in West Virginia over the past decade, and women exhibit a significantly higher work participation rate (51.8 percent for women compared with 41.4 percent for men).
- There exists a significant income gap between men and women graduates who work in the state: Men who work in the state earn 30 percent more than women, and this wage gap exists for virtually 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.

Academic Achievement

- Graduates with higher ACT scores exhibit significantly lower work participation rates than those with lower ACT scores.
- Work participation exhibits a modest tendency to rise with college GPA.

- Income tends to rise with academic achievement: higher ACT scores and GPA 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.

Tuition Assistance

- Work participation rates for graduates who received a PROMISE scholarship (58.1 percent) or need-based grants from the Higher Education Grant Program (65.5 percent) were significantly higher than the overall rate of 47.3 percent.
- Low-income students who received federal Pell grants had an overall work participation rate of 56.2, also well above the overall rate.
- Income for PROMISE, HEGP graduates, and Pell grant recipients tends 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 (26.9 percent of all graduates); and educational services (22.8 percent).
- Graduates were less likely than overall workers statewide to be employed in retail trade; accommodations and food services; construction; manufacturing; 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 much wider variety of industries.
- Graduates working in mining earned the highest income, averaging \$75,622 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; administration and waste services; retail trade; and other services.

County and Metropolitan Area

- Graduates were highly concentrated in Kanawha, Monongalia, and Cabell counties; 36.7 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 2012, more than 68 percent worked in counties that were part of a Metropolitan Statistical Area.
- The Charleston MSA employed the largest number of graduates with 17.9 percent of graduates employed in the state. The Charleston MSA also had the highest average annual income, at \$37,291.
- The average annual income for micropolitan counties nearly equaled that of metropolitan counties, while incomes in nonmetropolitan counties were lower.

1 Introduction and Overview

Given the fundamental importance of human capital development to long-run economic growth and prosperity, it is vital for policymakers to understand the ways in which publicly provided higher education prepares men and women for the workforce broadly. 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 educational 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 2002-2003 and the 2011-2012 academic years who worked in West Virginia in 2013. All data were provided by the West Virginia Higher Education Policy Commission (HEPC).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, 118,832 men and women in total graduated from West Virginia's public higher educational institutions over the past decade, with 14,875 graduates in the 2011-2012 academic year. This figure has increased every year over the time period analyzed; indeed the number of graduates increased by approximately 49 percent overall from the 2002-2003 academic year to the 2011-2012 academic year.

Table 1: Work participation and income by year of graduation

Graduation Year	Total Graduates	Graduates Working in West Virginia in 2013	WV Work Participation Rate (%)	Average Annual Income (\$)
2002-2003	10,003	4,199	42.0	55,677
2003-2004	10,264	4,357	42.5	53,068
2004-2005	10,783	4,792	44.4	51,476
2005-2006	11,112	5,023	45.2	48,843
2006-2007	11,568	5,267	45.5	47,269
2007-2008	11,987	5,570	46.5	43,740
2008-2009	12,019	5,794	48.2	41,402
2009-2010	12,698	6,248	49.2	38,672
2010-2011	13,523	6,925	51.2	34,985
2011-2012	14,875	8,026	54.0	31,847
Total	118,832	56,201	47.3	43,221

Of the total 118,832 graduates reported in Table 1, 56,201, or 47.3 percent, were working in West Virginia in 2013. The work participation rate falls consistently as the time from graduation increases. In

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

2013, 54.0 percent of the 2011-2012 graduating class was working in the state, while the figure diminishes to 42.0 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.

Overall graduates of the last decade who worked in West Virginia earned \$43,221 on average in 2013. 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 \$31,847 for the most recent graduates to \$55,677 for those graduating one decade earlier who are likely to be the most experienced in the sample. These figures represent a gain of nearly \$2,648 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.³ As reported in Table 2, in all, 61.8 percent of in-state students worked in the state in 2013, compared with only 9.3 percent of out-of-state students. Students who were classified as “other” report a work participation rate of 25.2 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 70.5 percent for the most recent graduates to 53.8 percent for graduates from one decade earlier. Out-of-state graduates’ work participation stands at 15.2 percent for the most recent graduates, falls rapidly over the first three years, then declines at a slower rate, reaching 5.9 percent for the 2002-2003 graduating class.

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 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 (\$)
2002-2003	53.8	55,955	5.9	56,010	25.7	45,344
2003-2004	55.0	53,233	6.4	51,326	17.1	48,499
2004-2005	56.9	51,231	6.8	58,399	27.7	51,175
2005-2006	58.6	48,721	7.8	55,327	20.4	41,388
2006-2007	59.8	47,326	7.7	48,965	24.8	41,476
2007-2008	61.3	43,705	8.0	46,201	25.2	40,488
2008-2009	64.2	41,459	8.4	40,701	26.0	40,361
2009-2010	65.0	38,819	10.5	37,838	26.7	34,579
2010-2011	67.5	35,060	12.0	33,668	28.6	35,491
2011-2012	70.5	32,104	15.2	29,149	27.7	30,525
Total	61.8	43,406	9.3	41,314	25.2	39,744

Annual income is higher for in-state students than for out-of-state students working in the state. Overall, in-state students earn \$43,406 on average, compared with \$41,314 for out-of-state students, representing a 5.1 percent premium for in-state students. The wage premium for in-state students is particularly strong in the first year after graduation, when in-state students earn 10 percent more than their out-of-state counterparts. But the earnings differential falls over time, with graduates from 2002-2003 earning approximately the same. Graduates classified as other earned less on average than either in-state or out-of-state graduates, earning \$39,744 per year.⁴ Graduates of all residency classifications receive higher incomes as the time from graduation increases, repeating the pattern discussed earlier.

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.

⁴ Other graduates 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).

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 (%)
2002-2003	60.0	35.7	47.7	44.7	12.8
2003-2004	58.5	37.3	46.2	38.3	16.1
2004-2005	62.0	38.7	47.2	43.0	12.3
2005-2006	61.0	40.9	47.6	39.5	14.0
2006-2007	64.4	40.5	47.1	39.5	22.2
2007-2008	64.9	41.7	47.1	43.3	20.1
2008-2009	67.6	43.2	49.0	43.1	19.1
2009-2010	69.6	43.7	51.6	43.2	20.1
2010-2011	68.8	47.9	50.7	36.5	22.5
2011-2012	70.4	50.4	51.1	47.3	23.3
Total	65.3	42.5	48.6	41.9	18.6

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, 65.3 percent were working in West Virginia in 2013. The overall work participation rate is above 40 percent for those with a bachelor’s (42.5 percent), master’s (48.6 percent), and doctoral professional practice degrees (41.9 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 18.6 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 generally present in each degree category with the exception of doctorate professional practice. The trend of falling work participation is perhaps most pronounced in the bachelor’s degree category. While the trend is present in the associate’s degree category as well, the lowest associate’s degree work force participation rate is still higher than the highest rate for any other degree category. The trend is also present in the master’s degree category, but is much less pronounced there.

As reported in Table 4, average annual income for graduates whose highest degree is an associate’s degree was \$35,428 in 2013, 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 2002-2003 graduating class were approximately \$5,047 higher than the recent graduates, a difference of 14 percent.

Table 4: Average annual income by degree earned

Graduation Year	Associate's (\$)	Bachelor's (\$)	Master's (\$)	Doctoral Professional Practice (\$)	Doctorate (\$)
2002-2003	40,475	48,456	60,087	157,580	138,990
2003-2004	40,579	46,112	59,737	156,762	90,829
2004-2005	40,227	46,233	60,122	133,938	88,427
2005-2006	38,600	42,872	54,674	150,701	89,411
2006-2007	39,106	41,432	53,016	135,910	59,958
2007-2008	35,995	38,530	51,508	113,405	73,395
2008-2009	34,693	36,592	49,110	99,310	60,464
2009-2010	33,808	32,408	50,047	84,156	54,201
2010-2011	30,705	30,836	45,299	66,015	59,077
2011-2012	28,633	27,140	41,935	70,506	52,950
Total	35,428	37,515	52,037	111,577	70,664

Graduates with doctoral professional practice degrees earned the highest income in 2013, at \$111,577 on average. This average income is nearly 58 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 \$70,506 for the most recent graduates to \$157,580 for those who graduated one decade earlier, a gain of nearly \$9,700 per year on average. Graduates with doctorate degrees report the second-highest earnings, with an average annual income of \$70,664 in 2013.

Master's degree recipients report an overall average annual income of \$52,037 for 2013, while bachelor's degree recipients report an income of \$37,515. Although a master's degree commands an overall income premium of nearly 39 percent over a bachelor's degree according to these data, income growth is slower among master's degree recipients, averaging 4.0 percent annually, compared to 6.7 percent annually for bachelor's degree recipients. Surprisingly, average annual income for bachelor's degree recipients comes in at only 5.9 percent above that of associate's degree recipients (\$35,428). First-year bachelor's degree holders earned less than their associate's degree counterparts, but income grew faster for these graduates.

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 took over as the largest area of concentration among recent college graduates in this year's study. In all, 19,018 people graduated with degrees in this area, with the largest number graduating with associate's degrees (6,800) and bachelor's degrees (4,968). Health professions was also by far the largest area of concentration for graduates with doctoral professional practice degrees at 3,924 graduates. Last year's leader – business, management, and marketing – was a close second with 18,380 graduates, followed by education with 16,786. Liberal arts, with 12,311 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	1,341	60	940	306		35
Architecture and related services	269		269			
Biological and biomedical sciences	3,206		2,621	359		226
Business, management, marketing	18,380	2,761	11,830	3,537		80
Communications, journalism	5,458	71	4,129	1,249		9
Communications technologies/technicians	232	57	172			
Computer and information sciences	2,136	619	929	471		26
Construction trades	3	3				
Education	16,786	190	7,013	9,063	416	4
Engineering	5,000	15	3,335	1,390		260
Engineering technologies and engineering-related fields	2,109	785	1,149	121		
English language and literature/letters	1,613		1,160	423		30
Family and consumer/human sciences	1,215	156	1,025	34		
Foreign languages, literatures, and linguistics	645	67	263	303		
Health professions and related programs	19,018	6,800	4,968	2,565	3,924	88
History	1,463		1,257	160		46
Homeland security, law enforcement, firefighting and related protective services	3,435	875	2,156	273		
Legal professions and studies	1,732	283		64	1,367	
Liberal arts and sciences, general studies and humanities	12,311	3,548	8,696	49		
Library science	6	2				
Mathematics and statistics	554	.	281	246		27
Mechanic and repair technologies/technicians	329	307				
Multi/interdisciplinary studies	2,703	661	1,995	45		
Natural resources and conservation	1,241	68	855	226		92
Parks, recreation, leisure, and fitness	1,907		1,687	199		21
Personal and culinary services	223	210				
Philosophy and religious studies	105		105			
Physical sciences	1,296	6	926	237		127
Precision production	207	178				
Psychology	3,471		2,772	363	35	169
Public administration and social service	2,264	131	817	1,316		
Science technologies/technicians	783	538				
Social sciences	4,506		4,056	369		81
Transportation and materials moving	2	2				
Visual and performing arts	2,883	105	2,383	335		60
Total	118,832	18,498	67,789	23,703	5,742	1,381

The level of degree earned varies considerably across areas of concentration. Health professions dominates the associate's degree category, while the largest number of bachelor's degrees were in

business (17.5 percent). Master's degree graduates are highly concentrated in education, which constituted 38.2 percent of all master's degrees earned. Doctoral professional practice degrees are primarily in health professions, 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. Precision production had the highest work participation rate with 77.3 percent, followed by mechanic and repair technologies; science technologies; construction trades, and personal and culinary services. As shown above in Table 5, most of the graduates in these fields earned associate's degrees. Education also exhibited a very high work participation rate, with 60.6 percent of graduates working in the state, as did communications technologies, engineering technologies, and health professions.

Architecture had the lowest work participation rate with only 17.8 percent of graduates working in the state. The next four lowest areas in terms of work participation were foreign languages, literatures, and linguistics; parks, recreation, leisure, and fitness studies; engineering; and mathematics and statistics. Each of these areas exhibit work participation rates in the upper-20-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 \$70,701, which is approximately 63.6 percent above the overall average of \$43,221. Wages in legal professions, health professions, and engineering technologies fields range from 29 percent to 45 percent above the overall average. Wages were lowest for personal and culinary services; visual and performing arts; and foreign languages, literatures, and linguistics. These areas all report average incomes in the low-\$20-thousand range, which is around 50 to 60 percent of 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	35.3	36,268
Architecture and related services	17.8	45,149
Biological and biomedical sciences	33.8	38,050
Business, management, marketing	45.5	43,247
Communications, journalism	33.6	36,213
Communications technologies/technicians	60.3	28,660
Computer and information sciences	46.3	45,385
Construction trades	n/d	n/d
Education	60.6	40,966
Engineering	27.5	70,701
Engineering technologies and engineering-related fields	58.6	55,885
English language and literature/letters	36.7	27,840
Family and consumer sciences/human sciences	32.8	25,836
Foreign languages, literatures, and linguistics	26.7	25,466
Health professions and related programs	57.1	58,864
History	39.7	26,300
Homeland security, law enforcement, firefighting, related services	53.6	34,494
Legal professions and studies	54.3	62,518
Liberal arts and sciences, general studies and humanities	50.5	32,749
Library science	n/d	n/d
Mathematics and statistics	28.2	39,389
Mechanic and repair technologies/technicians	69.0	47,330
Multi/interdisciplinary studies	38.4	32,721
Natural resources and conservation	40.3	44,054
Parks, recreation, leisure, and fitness studies	27.4	32,093
Personal and culinary services	63.2	23,179
Philosophy and religious studies	31.4	26,349
Physical sciences	31.0	44,935
Precision production	77.3	44,865
Psychology	41.7	30,165
Public administration and social service professions	54.3	34,801
Science technologies/technicians	68.1	37,923
Social sciences	34.3	30,824
Transportation and materials moving	n/d	n/d
Visual and performing arts	32.9	24,966
Total	47.3	43,221

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

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 precision production; health professions fields; mechanic and repair technologies; and natural resources and conservation. All of these had work participation rates near or 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; mechanic and repair technologies; precision production; science technologies; natural resources and conservation; and health professions, which all had income above \$40,000 per year. The lowest incomes were in engineering; agriculture; public administration and social service; family and consumer sciences; and education.

Among bachelor's degree holders, work participation rates were highest for communications technologies; education; health professions; engineering technologies; and public administration and social service professions. All of these had work participation rates above 50 percent. The lowest work participation rates were in architecture; parks, recreation, leisure, and fitness studies; family and consumer sciences; and communications and journalism, which all had rates lower 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 visual and performing arts; English language and literature; foreign languages, literatures, and linguistics; and history. Graduates in each of these fields were paid about \$26,000 per year or less on average in 2013.

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, which 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; foreign languages, literatures, and linguistics; English language and literature; and visual and performing arts. 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. The legal professions had the highest work participation rate at 53.0 percent. The lowest, health professions, was still relatively high at 37.3 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. Wages for this degree averaged \$70,664, 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	43.3	33.7	41.2		n/d
Architecture and related services		17.8			
Biological and biomedical sciences		35.9	26.7		21.2
Business, management, marketing	63.3	43.5	38.5		n/d
Communication, journalism	57.8	28.5	49.2		n/d
Communications technologies/technicians	63.2	59.3			
Computer and information sciences	61.9	41.9	34.2		n/d
Construction trades	n/d	n/d	n/d	n/d	n/d
Education	56.3	59.1	62.1	49.3	n/d
Engineering	n/d	31.4	20.5		14.6
Engineering technologies and engineering-related fields	68.9	53.7	35.5		
English language and literature/letters		38.3	33.8		n/d
Family and consumer sciences/human sciences	60.9	28	47.1		
Foreign languages, literatures, and linguistics	59.7	29.7	15.8		
Health professions and related programs	70.7	56	52.9	37.6	28.4
History		39.9	40		34.8
Homeland security, law enforcement, firefighting and related protective services	65.1	49.4	33		
Legal professions and studies	63.6		65.6	51.9	
Liberal arts and sciences, general studies and humanities	58.6	47.2	69.4		
Library science	n/d	n/d	n/d	n/d	n/d
Mathematics and statistics		37.4	19.5		n/d
Mechanic and repair technologies/technicians	70				
Multi/interdisciplinary studies	59.3	31.1	55.6		
Natural resources and conservation	69.1	41.2	33.2		28.3
Parks, recreation, leisure, and fitness studies		26.4	34.7		n/d
Personal and culinary services	63.8				
Philosophy and religious studies		31.4			
Physical sciences	n/d	34.3	23.2		20.5
Precision production	77				
Psychology		41.7	53.7	42.9	8.9
Public administration and social service	62.6	51.3	55.3		
Science technologies/technicians	66.7				
Social sciences		34.9	30.9		19.8
Transportation and materials moving	n/d	n/d	n/d	n/d	n/d
Visual and performing arts	52.4	32.7	31		18.3
Total	65.3	42.5	48.6	41.9	18.6

n/d: data not disclosed

Table 8: Income by area of concentration and degree earned

Area of Concentration	Assoc. (\$)	Bach. (\$)	Mast. (\$)	Doct. Prof. Practice (\$)	Doct. (\$)
Agriculture, agriculture operations	16,660	36,515	39,083		n/d
Architecture and related services		45,149			
Biological and biomedical sciences		34,276	49,473		89,096
Business, management, marketing	28,430	41,361	70,923		n/d
Communication, journalism	20,075	30,303	48,480		n/d
Communications technologies/technicians	25,391	30,098			
Computer and information sciences	30,644	51,807	71,328		n/d
Construction trades	n/d	n/d	n/d	n/d	n/d
Education	17,916	34,752	44,769	71,909	n/d
Engineering	n/d	67,363	82,098		n/d
Engineering technologies and engineering-related fields	51,435	59,183	71,219		
English language and literature/letters		25,175	35,342		n/d
Family and consumer sciences/human sciences	17,422	27,434	47,134		
Foreign languages, literatures, and linguistics	20,351	25,753	30,305		
Health professions and related programs	40,922	46,904	73,220	136,165	78,669
History		25,960	27,130		33,615
Homeland security, law enforcement, firefighting and related protective services	33,120	33,622	38,156		
Legal professions and studies	26,579		51,096	72,818	
Liberal arts and sciences, general studies and humanities	28,192	35,035	37,813		
Library science	n/d	n/d	n/d	n/d	n/d
Mathematics and statistics		34,551	48,560		n/d
Mechanic and repair technologies/technicians	48,418				
Multi/interdisciplinary studies	32,648	32,067	50,063		
Natural resources and conservation	42,601	40,839	54,431		60,270
Parks, recreation, leisure, and fitness studies		29,834	44,917		n/d
Personal and culinary services	23,222				
Philosophy and religious studies		26,349			
Physical sciences	n/d	40,788	53,922		79,264
Precision production	46,280				
Psychology		26,920	38,543	70,506	62,582
Public administration and social service professions	16,800	29,208	40,047		
Science technologies/technicians	43,348				
Social sciences		29,827	38,149		66,994
Transportation and materials moving	n/d	n/d	n/d	n/d	n/d
Visual and performing arts	27,079	23,177	35,410		42,120
Total	35,428	37,515	52,037	111,577	70,664

∴ Data not available for this area of concentration

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 118 thousand-plus West Virginia graduates in the past decade, nearly 57 percent are women; 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 51.8 percent overall for graduates of the past decade, significantly higher than 41.4 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 more than \$11,000, or approximately 30 percent. The income premium for men increases as time since graduation increases.

Table 9: Work participation and income by gender

Graduation Year	Female			Male	
	Female Share of Total (%)	Work Participation (%)	Average Annual Income (\$)	Work Participation (%)	Average Annual Income (\$)
2002-2003	56.3	45.2	46,692	37.8	69,570
2003-2004	57.8	46.4	44,953	37.0	67,073
2004-2005	56.8	48.3	45,688	39.4	60,804
2005-2006	57.6	49.4	42,664	39.5	59,324
2006-2007	56.6	50.3	42,214	39.3	55,709
2007-2008	57.0	51.0	38,890	40.5	51,840
2008-2009	56.4	53.5	38,394	41.4	46,425
2009-2010	56.9	54.4	36,070	42.3	43,083
2010-2011	55.9	55.2	32,674	46.1	38,491
2011-2012	56.3	59.4	30,142	46.9	34,628
Total	56.7	51.8	38,810	41.4	50,449

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; liberal arts and sciences/humanities; and communications and journalism. Health professions and education comprise nearly 40 percent of total women graduates, while these top five areas altogether comprise over two-thirds 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 55 percent of male graduates.

Women were more highly concentrated in their top fields. Health professions constituted 21.8 percent of the total, and the top three fields garnered 52.5 percent of all women graduates. Men were more dispersed among fields. Their top three fields constituted only 38.7 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; and science technologies. These areas of concentration had work participation rates above 64 percent. Architecture and related services had the lowest work participation among men at 18.9

percent. Parks, recreation, leisure, and fitness studies; foreign languages, literatures, and linguistics; engineering; and physical sciences all had work participation rates below 30 percent.

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

Income for men were highest in the health professions, averaging \$89,361. Men also had high salaries in the legal professions, and engineering. The lowest wages for men were in history; personal and culinary services; visual and performing arts; and English language and literature. All of these were below \$30,000 per year on average.

For women, the highest paying field was engineering, which paid \$61,488 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 precision production, all of which paid about \$20,000 per year or less.

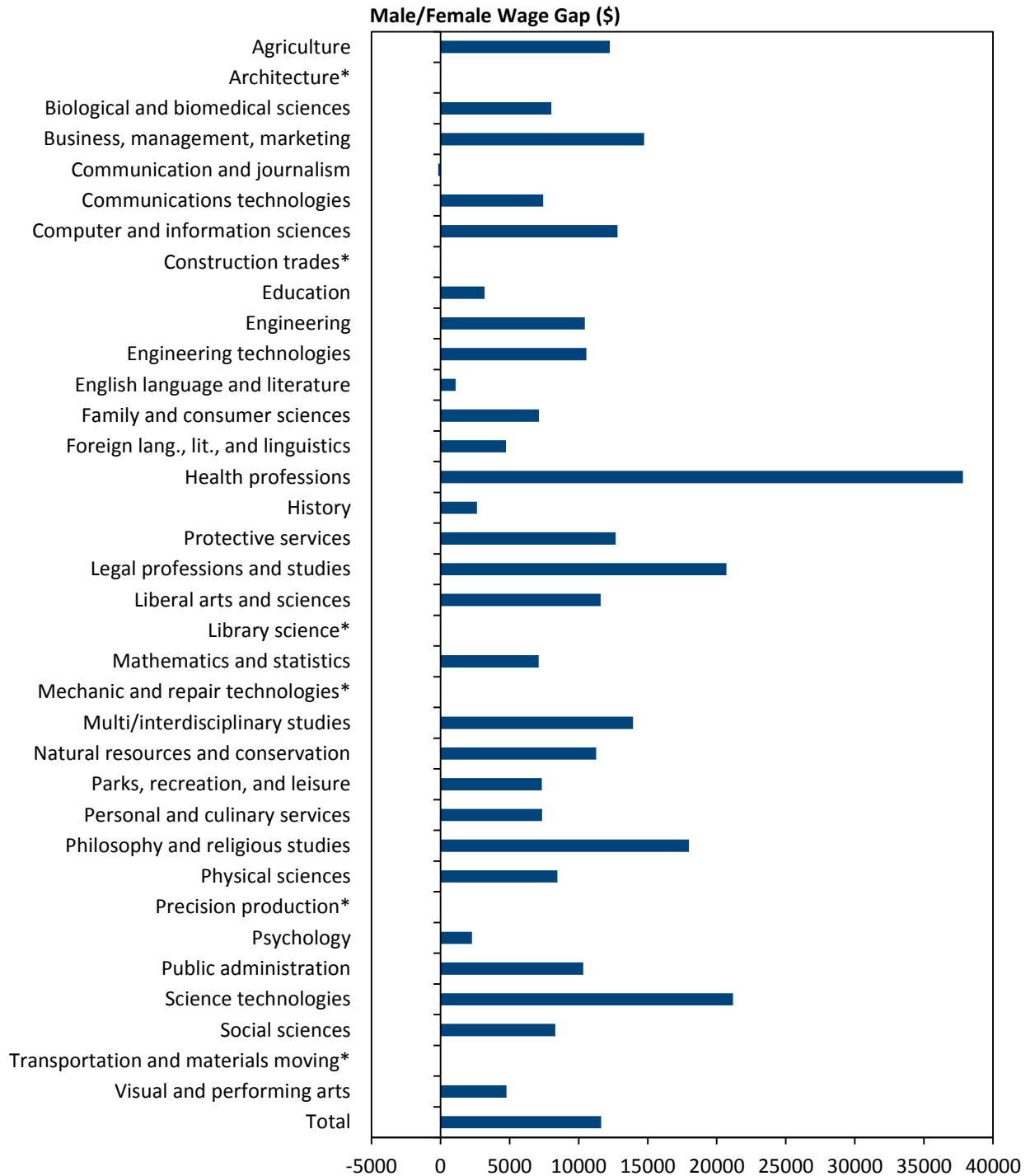
In Figure 1 we depict the specific areas of concentration that drive the male-female wage gap. The wage gap is present in virtually every area of concentration. The wage gap is extremely pronounced in philosophy and religious studies, where the gap is greater than 140 percent. The gap also is near or exceeds 50 percent in health professions; science technologies; and multi/interdisciplinary studies. The wage gap is generally smallest in English language and literature; psychology; and education, where the wage gap is less than 10 percent. In communication and journalism, women earn more than men on average by a small margin.

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	725	34.3	30,461	616	36.4	42,723
Architecture and related services	57	n/d	n/d	212	18.9	46,255
Biological and biomedical sciences	1,785	34.7	34,610	1,421	32.7	42,628
Business, management, marketing	8,795	51.1	36,422	9,585	40.4	51,157
Communication, journalism	3,383	35.4	36,270	2,075	30.8	36,106
Communications technologies/technicians	91	55.0	23,882	141	63.8	31,314
Computer and information sciences	481	48.0	35,566	1,655	45.8	48,378
Construction trades	1	n/d	n/d	2	n/d	n/d
Education	11,884	64.7	40,187	4,902	50.5	43,387
Engineering	749	21.8	61,488	4,251	28.5	71,942
Engineering technologies and engineering-related fields	201	54.2	46,261	1,908	59.1	56,816
English language and literature/letters	1,064	36.3	27,461	549	37.5	28,550
Family and consumer/human sciences	1,166	32.5	25,496	49	38.8	32,627
Foreign languages, literatures, and linguistics	457	27.1	24,142	188	25.5	28,886
Health professions and related programs	14,683	59.6	51,537	4,335	48.5	89,361
History	492	43.7	24,638	971	37.7	27,275
Homeland security, law enforcement, firefighting and related protective services	1,721	51.2	27,881	1,714	56.0	40,568
Legal professions and studies	910	55.4	52,907	822	53.2	73,603
Liberal arts and sciences, general studies and humanities	6,921	55.1	28,260	5,390	44.7	39,862
Library science	6	n/d	n/d			
Mathematics and statistics	254	25.6	35,239	300	30.3	42,354
Mechanic and repair technologies/technicians	6	n/d	n/d	323	68.4	47,103
Multi/interdisciplinary studies	1,229	48.2	26,735	1,474	30.3	40,667
Natural resources and conservation	299	33.8	35,064	942	42.4	46,329
Parks, recreation, leisure, and fitness	713	31.1	27,872	1,194	25.1	35,216
Personal and culinary services	129	64.3	20,149	94	61.7	27,513
Philosophy and religious studies	31	n/d	n/d	74	33.8	30,711
Physical sciences	479	33.8	39,879	817	29.4	48,347
Precision production	6	n/d	n/d	201	77.6	45,484
Psychology	2,588	41.6	29,581	883	41.8	31,867
Public administration and social service professions	1,840	55.7	33,086	424	48.1	43,418
Science technologies/technicians	400	71.8	28,152	383	64.2	49,322
Social sciences	2,093	39.4	26,940	2,413	30.0	35,251
Transportation and materials moving				2	n/d	n/d
Visual and performing arts	1,768	32.6	23,091	1,115	33.4	27,869
Total	67,407	51.8	38,810	51,425	41.4	50,449

n/d: data not disclosed

Figure 1: Male-female income gap



* Not disclosed for privacy reasons.
 Source: Author calculations

6 Age

The age at which one graduates may also be an important determinant of one's work participation outcomes. Table 11 details the work participation for graduates by the degree earned. In general work participation is largest in the middle of the age distribution. Work participation is above 60 percent for graduates between the ages of 35 and 54. But work participation is lower in younger and older graduates. Work participation for graduates younger than 24 and older than 60 are both approximately 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	66.1	37.0	39.8	52.2	n/d
Age 25-29	46.5	66.4	47.7	41.1	41.3	17.2
Age 30-34	53.9	65.3	55.7	53.6	33.5	14.2
Age 35-39	61.1	68.7	61.4	61.2	48.4	17.1
Age 40-44	62.7	66.6	61.5	64.7	44.4	25.2
Age 45-49	63.6	64.6	60.1	71.2	45.0	26.2
Age 50-54	61.9	61.7	57.5	67.7	62.5	39.5
Age 55-59	54.5	49.4	52.4	61.5	60.0	50.0
Age 60+	41.7	41.5	36.4	48.9	44.1	n/d
Unavailable	20.3	37.5	18.5	2.4		
Total	47.3	65.3	42.5	48.6	41.9	18.6

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 40 percent for graduates under the age of 24 to over 70 percent for graduates age 45-49.

For associate's degree holders, work participation stays relatively constant for graduates up until age 55, with rates above 60 percent. Work participation rates are smaller for older graduates, falling to under 42 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 50 percent for doctorate 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 in their 50s, where work participation rates are 60 percent and above.

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	36,790	32,507	37,001	45,443	101,774	n/d
Age 25-29	48,326	36,090	36,754	48,376	115,169	70,097
Age 30-34	46,931	38,273	37,996	54,266	116,609	85,283
Age 35-39	47,010	38,640	39,945	57,319	108,125	62,253
Age 40-44	46,812	37,694	40,877	60,849	88,603	62,578
Age 45-49	46,842	37,143	41,607	58,009	94,449	58,666
Age 50-54	46,943	38,001	41,302	56,863	91,014	63,640
Age 55-59	42,627	30,858	36,826	47,954	93,211	66,072
Age 60+	36,223	27,562	28,106	44,731	66,518	n/d
Unavailable	54,275	47,745	59,876	37,351		
Total	43,221	35,428	37,515	52,037	111,577	70,664

n/d: data not disclosed

Income levels by age follow a similar trend as work participation. In general income starts lower for younger graduates and rises into the middle of the age distribution before falling again for older graduates. This trend holds true for three of the degree categories reported: associate's, bachelor's, and master's degrees. Master's degree graduates again have the most pronounced trend with income rising from less than \$46,000 to over \$60,000 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. 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 \$70,000 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

Almost 90 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 almost 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 percent, respectively.

White graduates also had the highest work participation rates among all of the graduates working in the state in 2013, with 50.1 percent. American Indian or Alaska Native, and multi-racial graduates exhibit

⁸ Race is not reported for approximately 4 percent of graduates.

work participation rates that are in the 40-percent range. Work participation falls to 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 \$47,536, which exceeds the overall average by nearly 10 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 about 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	395	46.8	43,170
Asian, Pacific Islander, Native Hawaiian	1,936	29.1	47,536
Black	4,626	36.1	32,694
Hispanic	1,332	30.4	36,606
Multi-Racial	407	42.8	31,573
Unknown	5,100	12.4	40,936
White	105,036	50.1	43,627
Total	118,832	47.3	43,221

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 52,106 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)⁹ had a work participation rate of nearly 65 percent, while those with ACT scores in the highest quintile (25 and above) had a work participation rate of less than 52 percent.

However, students with higher ACT scores were less likely to leave the state as they gained more experience than graduates in other quintiles. Work participation for graduates with ACT scores in the top two quintiles fell about 2.8 percent per year on average between the 2011-2012 graduating class to the 2002-2003 graduating class. The most rapid decline in work participation was in quintile 2, where the work participation rate dropped from 72.8 percent for the 2011-2012 graduating class to 50.0 percent for the 2002-2003 graduating class, a drop of about 4.1 percent per year on average.

⁹ Quintiles are calculated based on all of the scores of graduates from West Virginia colleges and universities. This division does not consider ACT scores nationally.

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 more than 37 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 20 percent more than the bottom quintile; for graduates in the 2001-2002 academic year, the top quintile earned 46 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 more than 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 for ACT score. Within each degree, however, income was still positively associated with ACT score for both associate's degree and master's degree holders, but not for bachelor's degree holders.

Table 14: Work participation and income by ACT score

Graduation Year	Quintile 1 (Less than 18)		Quintile 2 (18-19)		Quintile 3 (20-21)		Quintile 4 (22-24)		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 (\$)
2002-2003	55.8	41,121	50.0	55,228	48.4	47,148	50.4	54,189	45.1	67,702
2003-2004	53.1	42,467	53.5	44,167	51.7	47,672	48.3	50,192	46.8	61,445
2004-2005	58.4	40,587	53.9	44,540	55.6	49,615	51.3	48,362	44.8	63,633
2005-2006	61.6	38,376	56.6	43,219	58.4	43,382	53.8	49,074	47.3	57,916
2006-2007	63.9	38,517	58.1	41,493	57.7	44,358	53.9	46,255	47.4	58,768
2007-2008	63.7	34,030	61.9	38,777	61.3	41,251	56.7	41,253	51.1	52,294
2008-2009	69.2	32,625	66.7	37,119	63.6	36,835	59.7	38,808	50.8	48,283
2009-2010	69.1	31,725	66.6	35,215	65.0	36,838	63.0	37,068	52.5	42,042
2010-2011	72.8	29,233	70.2	30,970	67.8	32,287	64.1	34,187	57.4	37,270
2011-2012	74.2	26,938	72.8	28,189	70.4	29,962	65.5	31,444	58.4	32,229
Total	64.6	34,726	61.7	38,387	60.9	39,493	58.1	40,657	51.5	47,705

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

Graduation Year	Quintile 1 (Less than 18)		Quintile 2 (18-19)		Quintile 3 (20-21)		Quintile 4 (22-24)		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	1,952	31,826	1,340	34,436	1,208	36,263	1,080	36,460	434	37,056
Bachelor's	3,073	35,535	3,396	37,724	3,819	37,173	4,808	37,016	3,662	37,327
Master's	465	43,368	681	46,292	961	47,618	1,191	46,769	1,097	50,391

Table 16 summarizes work participation and income for the 100,200 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 2.78), was about 47 percent, compared with about 49 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 was higher than for the third and fourth quintiles. Also, there was little consistency in work participation rates from one graduation year to the next.

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 almost 39 percent more each year than the 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 GPAs. Top-quintile graduates in the 2002-2003 graduation year earned only 26 percent more than their lower-quintile counterparts.

Table 16: Work participation and income by GPA

Graduation Year	Quintile 1 (Less than 2.78)		Quintile 2 (2.78-3.12)		Quintile 3 (3.13-3.43)		Quintile 4 (3.44-3.77)		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 (\$)
2002-2003	38.2	48,102	40.6	52,956	38.5	57,774	38.7	59,379	47.4	60,642
2003-2004	39.6	44,210	38.9	48,168	40.3	54,116	41.2	59,740	47.2	58,731
2004-2005	44.0	44,077	43.1	47,793	43.0	52,127	43.4	54,284	48.7	57,496
2005-2006	43.7	40,434	45.2	45,066	44.9	47,058	42.9	51,265	48.3	52,365
2006-2007	43.7	38,834	44.0	43,110	45.0	46,190	44.2	50,230	49.2	52,254
2007-2008	46.0	36,527	46.2	39,475	45.0	43,500	46.2	45,185	47.9	50,491
2008-2009	49.9	34,714	48.4	36,080	46.8	41,050	45.7	44,185	49.2	48,703
2009-2010	49.5	31,264	49.5	34,034	49.7	36,480	48.6	41,059	49.8	47,915
2010-2011	54.3	28,391	54.8	31,806	52.1	33,115	49.0	38,153	50.2	43,643
2011-2012	54.3	26,048	57.4	28,655	55.5	30,257	53.6	33,978	52.2	39,127
Total	46.7	36,116	47.5	38,960	47.0	41,731	46.1	45,543	49.2	50,139

9 Tuition Assistance and Low Income Status

Among 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.¹⁰ 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 over 58 percent, which is somewhat below the work participation rate for in-state students overall (61.8 percent). A recent study from the WVU BBER¹¹ provides evidence that PROMISE scholarships are helping to keep graduates in the state to work. The study finds that after controlling for a number of factors, individuals who receive the PROMISE scholarship are between 1.5 and 3.1 percent more likely to work in the state than graduates who didn't receive the PROMISE. HEGP recipients, who also must be in-state students, had a work participation rate of 65.5 percent. The BBER study also finds that HEGP grant recipients are between 4.7 and 5.2 percent more likely to work in the state than non-recipients. Pell grant recipients had an overall work participation rate of 56.2, which was above average for all graduates.

PROMISE scholarship recipients exhibit lower work participation rates as the time from graduation increases through the first six years. The figure falls from 65.4 percent for graduates from the 2011-2012 academic year to 49.3 percent for graduates of the 2006-2007 academic year. However, the figure begins to rise again with the 2005-2006 academic year, reaching 73.5 percent for graduates of the 2003-2004 academic year. This trend may be due to a higher tendency of PROMISE recipients to attend graduate school, which would reduce their work participation rates in early years, but which would then rise again after they have finished graduate school. However, this hypothesis requires further research. Work participation rates show consistent decline over time for HEGP and Pell grant recipients.

Average annual income for PROMISE graduates is similar to earnings for HEGP graduates, with Pell grant recipients tending to have lower incomes on average. PROMISE graduates earned an average of \$38,239 per year, slightly lower than HEGP recipients, who earned \$38,808. Pell grant recipients earned \$36,910. The lower wages for PROMISE graduates are limited to the first few recipient classes, however. The five most recent graduating classes who received PROMISE scholarships had earnings 7 to 12 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 income than the average for all graduates.

¹⁰ Beginning January 1, 2010, new PROMISE recipients received a block grant of \$4,750 per semester, or full tuition and fees, whichever was less. While it is unlikely that these recipients would have graduated in two years, there is a potential for some of these students to be in the 2011-2012 graduating class.

¹¹ Ruseski, Jane, Eric Bowen, Patrick Manzi. "To Stay or Not to Stay: Determinants of Working in West Virginia after Graduation." West Virginia University Bureau of Business and Economic Research. Forthcoming.

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 (\$)
2002-2003			55.6	49,525	48.0	46,718
2003-2004	73.5	47,900	58.2	47,311	49.2	43,967
2004-2005	61.3	35,854	59.4	47,193	50.1	43,557
2005-2006	50.3	44,293	62.0	43,888	53.1	41,354
2006-2007	49.3	43,753	62.0	43,840	53.3	41,372
2007-2008	54.6	42,810	66.6	39,999	56.5	37,519
2008-2009	55.9	40,829	68.2	37,117	58.5	36,023
2009-2010	58.5	39,582	69.2	35,482	59.0	33,690
2010-2011	60.8	35,302	71.5	31,783	61.8	31,281
2011-2012	65.4	32,150	73.0	29,181	64.0	28,466
Total	58.1	38,239	65.5	38,809	56.2	36,910

(blank): data not available

10 Industry

Table 18 reports graduate employment and income by two-digit NAICS industry.¹² This year's results represent a slight reversal of a trend toward greater concentration of graduates in the educational services and health care sectors. Among all graduates of the state's public higher education institutions, approximately 49.7 percent were employed in these two industries, compared with 50.4 percent in last year's study. In all, 26.9 percent of graduates were employed in health care, and another 22.8 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 21 percent of jobs held by graduates.

Agriculture, forestry, fishing and hunting; management of companies and enterprises; utilities; real estate and rental and leasing; and transportation and warehousing attracted the fewest graduates. Each of these industries employed less than 1 percent of graduates in 2013.

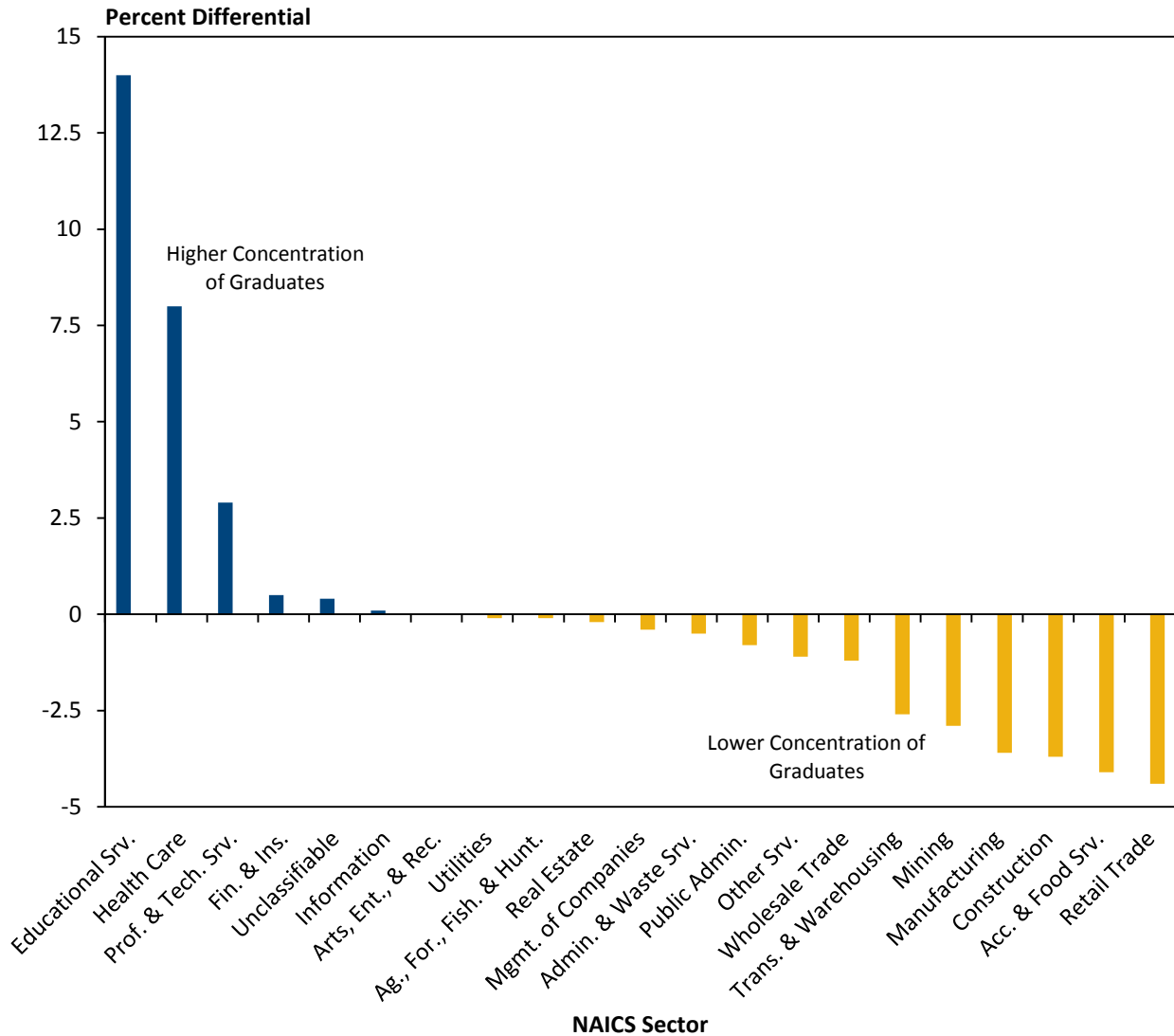
¹² The North American Industry Classification System (NAICS) classifies jobs into 21 major sectors by work type. Jobs in the growing Oil and Gas industry are included under the Mining sector, but may be under-represented in the report, as the available data do not include independent contractors.

Table 18: Employment and income by industry¹³

NAICS	Sector	Total Graduates	Share of Total Graduates (%)	Average Annual Income (\$)	State Industry Share (%)
72	Accommodation and food services	3,938	5.4	12,389	9.5
56	Administrative and waste services	3,093	4.2	22,861	4.7
11	Agriculture, forestry, fishing and hunting	67	0.1	25,232	0.2
71	Arts, entertainment, and recreation	801	1.1	10,715	1.1
23	Construction	1,343	1.8	36,558	5.5
61	Educational services	16,769	22.8	34,088	8.8
52	Finance and insurance	2,376	3.2	35,824	2.7
62	Health care and social assistance	19,758	26.9	40,044	18.9
51	Information	1,190	1.6	34,571	1.5
55	Management of companies and enterprises	335	0.5	52,997	0.9
31-33	Manufacturing	2,426	3.3	52,482	6.9
21	Mining	1,084	1.5	75,622	4.4
81	Other services, except public administration	1,376	1.9	22,503	3
54	Professional and technical services	4,931	6.7	45,380	3.8
92	Public Administration	4,523	6.2	33,543	7
53	Real estate and rental and leasing	547	0.7	33,352	0.9
44-45	Retail Trade	5,958	8.1	23,095	12.5
48-49	Transportation and warehousing	683	0.9	38,307	3.5
99	Unclassified establishments	348	0.5	35,777	0.1
22	Utilities	411	0.6	64,321	0.7
42	Wholesale trade	1,545	2.1	49,820	3.3
	Total	73,502	100	35,364	100

¹³ The number of jobs in this table exceeds the number of graduates employed in West Virginia in 2013 because graduates who worked in more than one industry were counted for each industry in which they worked.

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

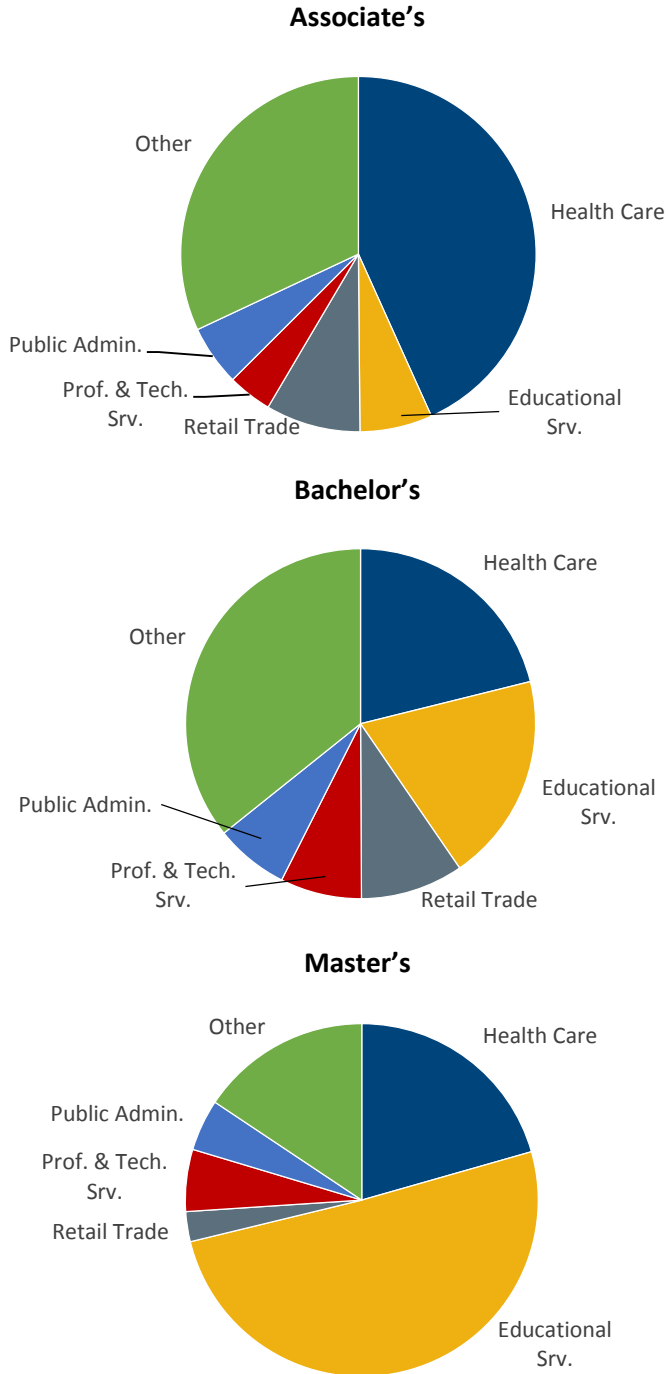


Source: Author calculations

Figure 2 illustrates the difference between the industry share for public higher education graduates versus 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 less likely to be employed in retail trade; accommodations and food services; construction; manufacturing; and mining. This result likely reflects the lower educational requirements of these industries.

Figure 3: Graduate industry share by degree



Source: Author Calculations

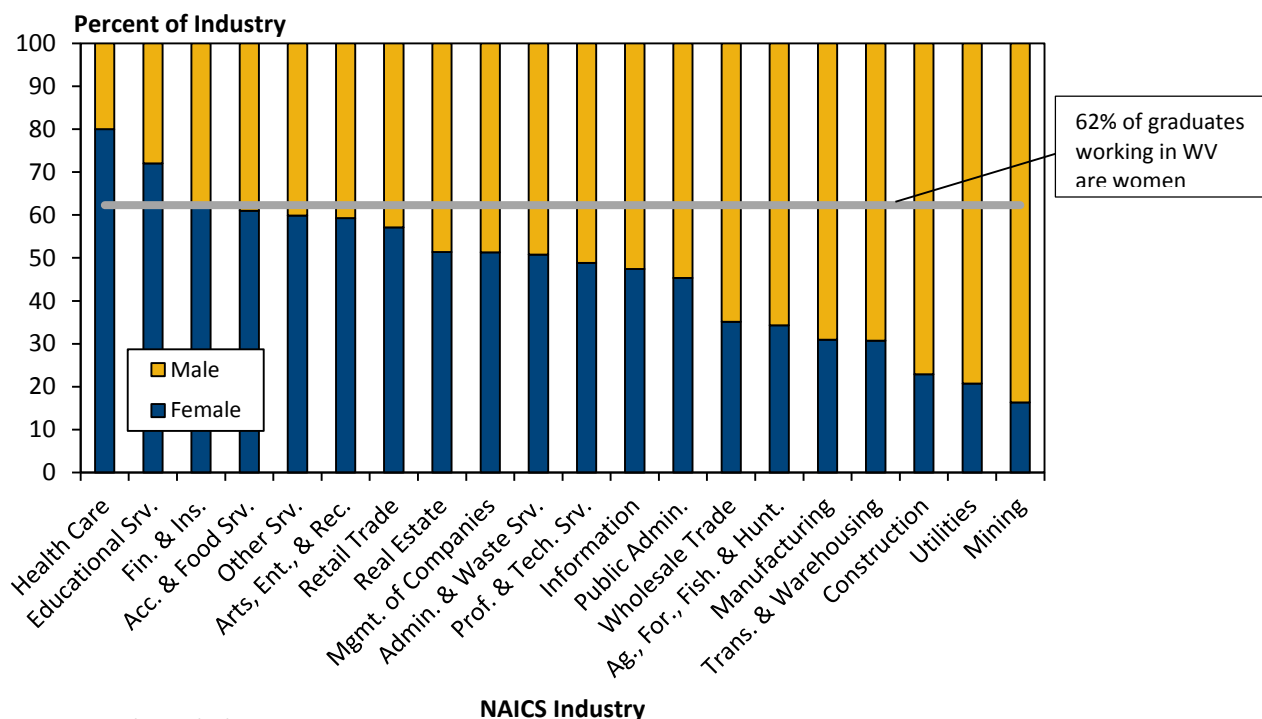
The degree graduates earned had a great deal of influence over the industries in which they worked. As Figure 3 illustrates, associate's degree graduates were clustered heavily in the health care fields. Over 43

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 21.1 percent of graduates with bachelor’s degrees working in that industry. However, it was closely matched by educational services, which comprised 19.3 percent of bachelor’s degree graduates. Other major industries for bachelor’s degree graduates were retail trade; professional and technical services; public administration; and accommodations and food 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. More than half of all graduates with a master’s worked in education. Health care was a distant second with 20.6 percent of graduates, followed by professional and technical services, and public administration, both of which had about 5 percent. Graduates with master’s degree were least likely to work in agricultural fields; utilities; real estate and rental leasing; and transportation.

Figure 4: Industry composition by gender

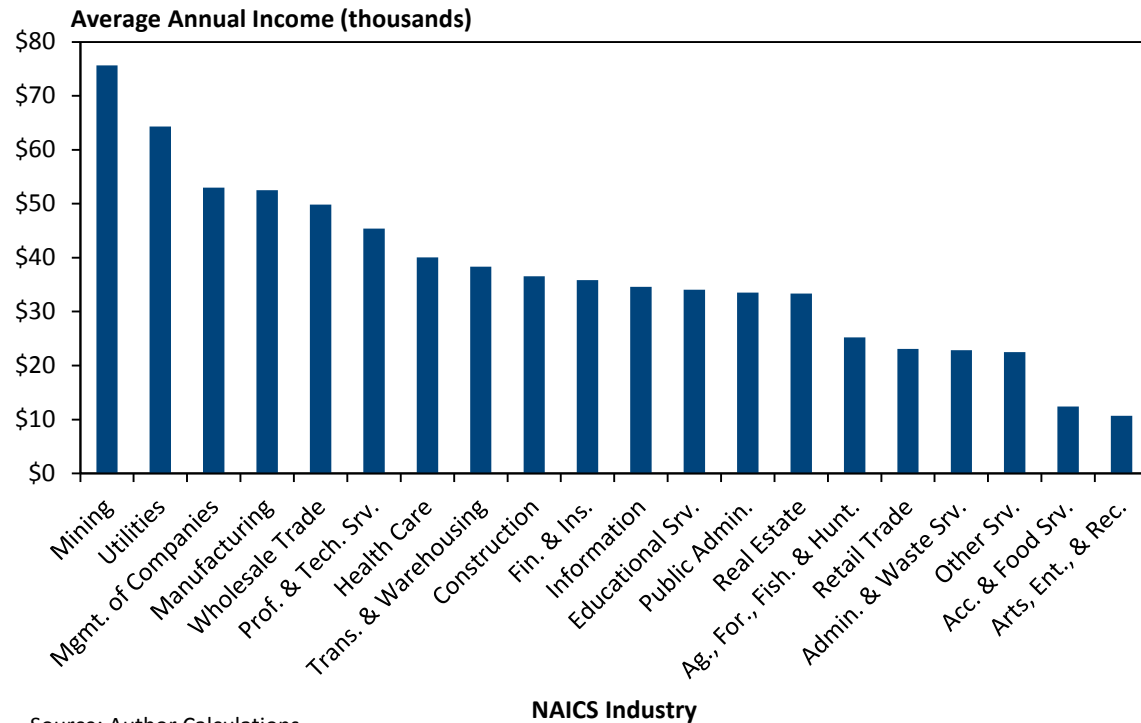


Source: Author Calculations

Figure 4 shows the ratio of men to women graduates in the major industries. Overall, women graduates held more than 62 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. In relation to this overall average, women are overrepresented in two industries: health care, and educational services. More than 80 percent of health care workers 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 70 percent male.

Figure 5: Income by industry



Source: Author Calculations

As Figure 5 shows, average annual income varied significantly by industry in 2013. Graduates working in mining earned the highest income, averaging nearly \$76 thousand per year. Utilities; management of companies; and manufacturing also paid high incomes, with each above \$50 thousand per year. The lowest paid industries included arts, entertainment and recreation; accommodation and food services; other services; administration and waste services; and retail trade, each of which paid less than \$25 thousand per year.

11 County Statistics¹⁴

Graduates of West Virginia public higher education institutions worked in every county in the state in 2013. 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. Nearly 37 percent of the graduates were working in these three counties in 2013, with 16.6 percent in Kanawha, 10.1 percent in Monongalia,¹⁵ and 10.0 percent in Cabell. Harrison and Berkeley counties each contained more than 4 percent of graduates. The counties with the lowest number of graduates were Wirt, Pendleton, and Doddridge, which all employed less than 0.2 percent of graduates.

¹⁴ Statistics in the county section and metropolitan area section have been modified to eliminate outliers in the data.

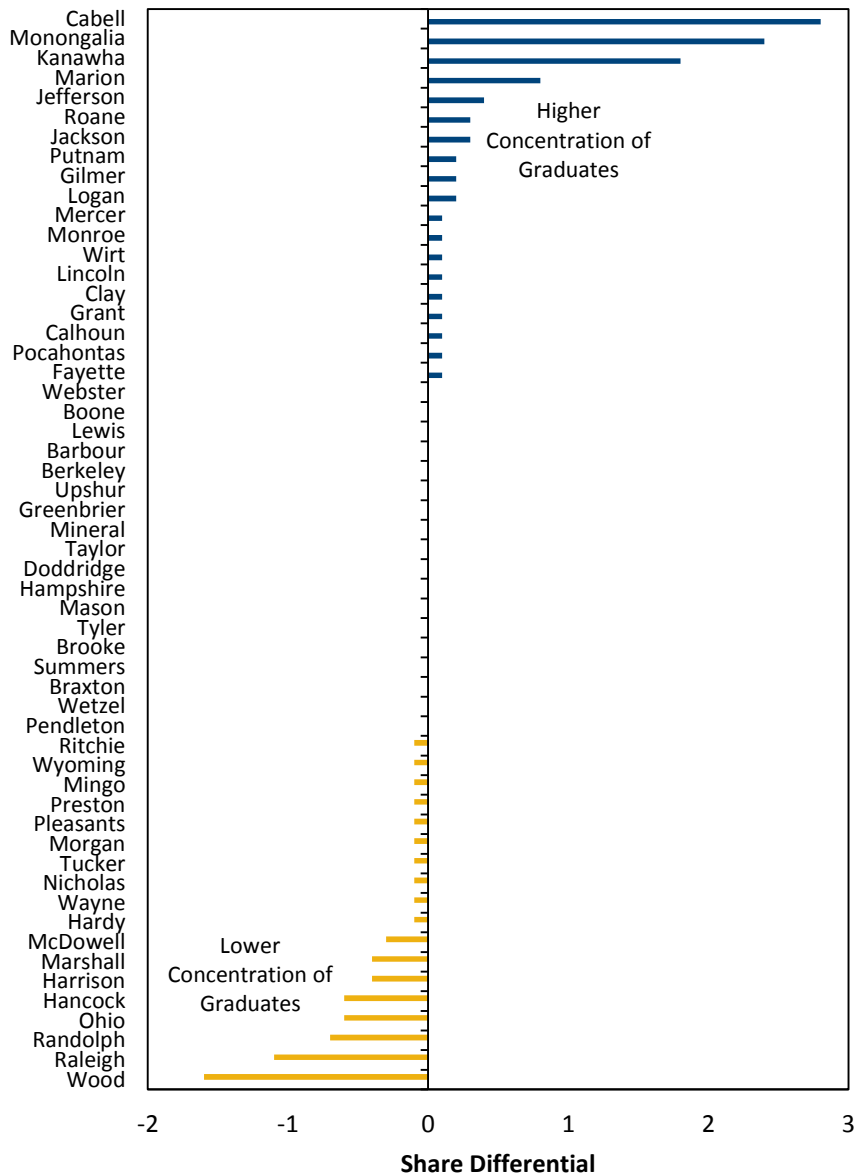
¹⁵ The share of workers in Monongalia County fell to 10.1 percent in this year's report from 12.2 percent in last year's report. This drop was apparently due to reclassification of some of the county's workers as being part of multi-county workplaces.

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 (%)	County Share of State Population (%)
Barbour	196	0.5	35,209	0.5	0.9
Berkeley	1,927	4.4	34,439	4.4	5.9
Boone	423	1.0	38,977	1.0	1.3
Braxton	199	0.5	29,280	0.5	0.8
Brooke	457	1.1	30,628	1.1	1.3
Cabell	4,343	10.0	36,394	7.2	5.2
Calhoun	118	0.3	28,562	0.2	0.4
Clay	147	0.3	35,592	0.2	0.5
Doddridge	94	0.2	32,736	0.2	0.4
Fayette	748	1.7	33,056	1.6	2.5
Gilmer	232	0.5	28,521	0.3	0.5
Grant	252	0.6	31,074	0.5	0.6
Greenbrier	843	1.9	34,367	1.9	1.9
Hampshire	242	0.6	32,372	0.6	1.3
Hancock	390	0.9	30,910	1.5	1.6
Hardy	314	0.7	25,429	0.8	0.8
Harrison	1,997	4.6	35,880	5.0	3.7
Jackson	602	1.4	33,709	1.1	1.6
Jefferson	1,106	2.5	32,287	2.1	3.0
Kanawha	7,185	16.6	37,226	14.8	10.3
Lewis	422	1.0	35,564	1.0	0.9
Lincoln	259	0.6	36,604	0.5	1.2
Logan	763	1.8	33,655	1.6	1.9
Marion	227	0.5	39,882	0.8	1.1
Marshall	1,620	3.7	34,644	2.9	3.1
Mason	534	1.2	39,669	1.6	1.8
McDowell	399	0.9	32,336	0.9	1.5
Mercer	1,320	3.0	36,240	2.9	3.3
Mineral	464	1.1	33,772	1.1	1.5
Mingo	375	0.9	35,174	1.0	1.4
Monongalia	4,382	10.1	35,040	7.7	5.5
Monroe	169	0.4	32,963	0.3	0.7
Morgan	138	0.3	33,541	0.4	0.9
Nicholas	450	1.0	40,474	1.1	1.4
Ohio	1,558	3.6	29,336	4.2	2.4
Pendleton	80	0.2	27,970	0.2	0.4
Pleasants	142	0.3	37,187	0.4	0.4
Pocahontas	199	0.5	22,623	0.4	0.5
Preston	408	0.9	34,984	1.0	1.8
Putnam	1,284	3.0	36,238	2.8	3.1
Raleigh	1,554	3.6	37,427	4.7	4.3
Randolph	371	0.9	29,964	1.6	1.6
Ritchie	157	0.4	39,453	0.5	0.5
Roane	289	0.7	26,992	0.4	0.8
Summers	112	0.3	30,388	0.3	0.7
Taylor	203	0.5	33,507	0.5	0.9
Tucker	132	0.3	19,031	0.4	0.4
Tyler	137	0.3	31,701	0.3	0.5
Upshur	498	1.1	34,421	1.1	1.3
Wayne	499	1.2	34,500	1.3	2.2
Webster	121	0.3	40,021	0.3	0.5
Wetzel	295	0.7	28,245	0.7	0.9
Wirt	66	0.2	28,244	0.1	0.3
Wood	1,664	3.8	33,057	5.4	4.7
Wyoming	268	0.6	37,036	0.7	1.2
Total	43,374	100.0	34,853	100.0	100.0

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. Cabell County, home to Marshall University, had the largest difference between its share of graduate employment (10.0 percent) and share of overall state employment (7.2 percent). Graduates were also over-represented in Monongalia County, which is home to West Virginia University, and Kanawha County, both of which had large differentials between their share of overall employment and share of graduate employment.

Figure 6: Graduate and state employment share differential

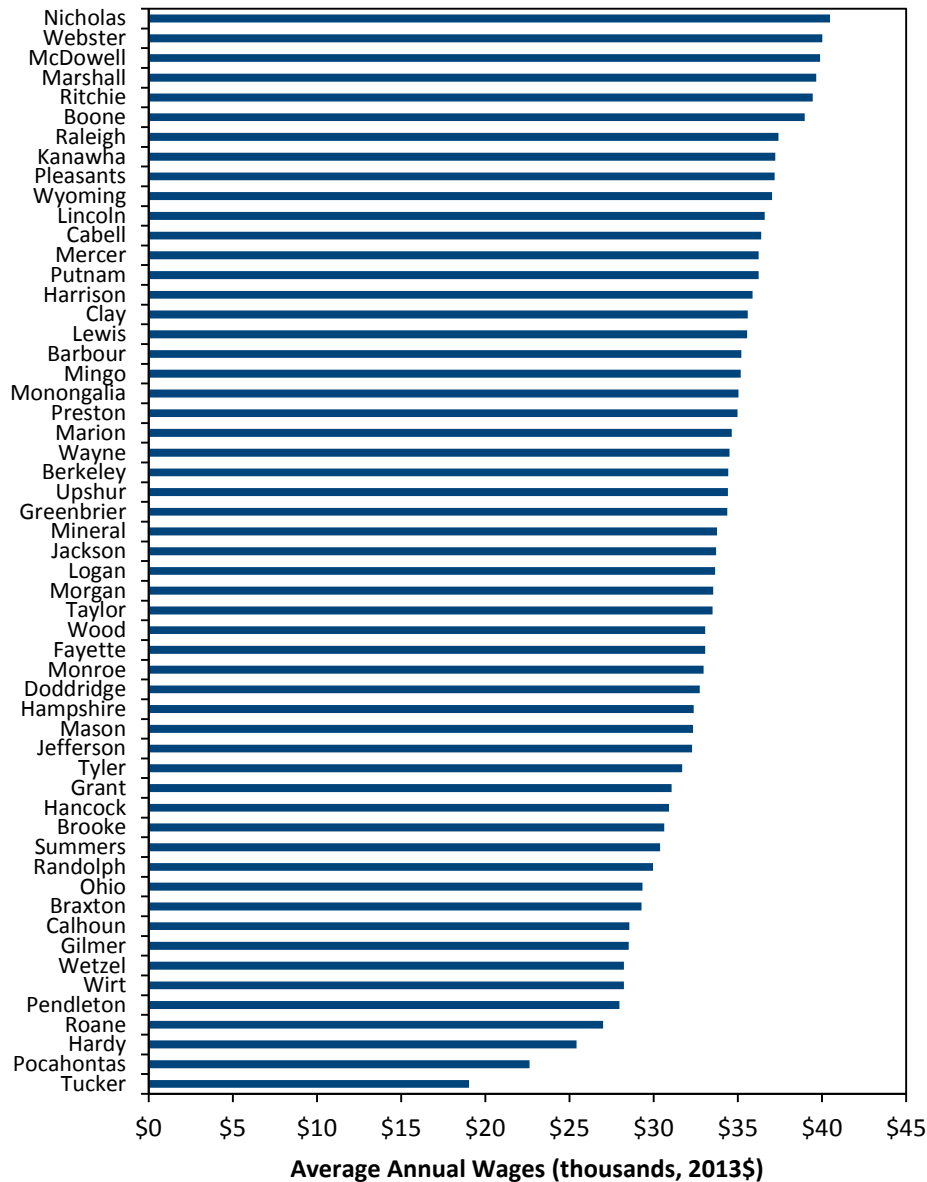


Source: Author Calculations

Income for graduates was more evenly distributed across the state than workers (Figure 7). The majority of the average income figures were between \$30 thousand and \$40 thousand annually. Nicholas and Webster counties had the highest average annual incomes, both of which were over \$40 thousand.

The lowest average income was in Tucker County, where average annual income was \$19,031. Pocahontas, Hardy, and Roane 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 Statistics¹⁶

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 2013, more than 68 percent worked in counties that were part of a Metropolitan Statistical Area (MSA), compared with less than 65 percent of all state workers. The US Census Bureau published new Core Based Statistical Area boundaries in 2013. Under these new boundaries, Putnam and Lincoln counties were moved from the Charleston MSA to the Huntington-Ashland MSA. Secondly, Fayette and Raleigh counties combined to become the Beckley MSA. Because of these boundary changes, the share of graduates in the Charleston MSA fell to 17.9 percent from 21.4 percent in last year's report. The Huntington MSA moved into second place with 14.7 percent of graduates, followed by the Morgantown MSA with 11.0 percent of graduates. Among metropolitan areas, the Winchester MSA had the lowest percentage of graduates at 0.6 percent.

Micropolitan counties accounted for 15.6 percent of all graduate employment in 2013. The Clarksburg micro-SA had the largest share of graduates in this category, with 5.3 percent of all graduates. The next largest micro-SAs were Fairmont and Bluefield, with 3.7 percent and 3.0 percent respectively. Nonmetropolitan areas employed 16.1 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, considerably above the average of \$33 thousand for non-metropolitan counties.

The Charleston MSA had the highest average annual income, at \$37,291. Average annual income in the Bluefield micro-SA was next at \$36,240, followed by the Huntington-Ashland MSA at \$36,223. The lowest incomes were found in the Elkins micro-SA, at \$29,964, followed by the Weirton-Steubenville MSA (\$30,758) and the Wheeling MSA (\$31,973).

¹⁶ 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 area¹⁷

	Number of Graduates	Share of Graduates (%)	Average Annual Income (\$)	Share of State Employment (%)	Share of State Population (%)
Metropolitan Areas	29,640	68.3	35,309	64.9	61.5
Beckley MSA	2,302	5.3	36,007	6.3	6.7
Charleston MSA	7,755	17.9	37,291	16.0	12.1
Cumberland MSA	464	1.1	33,772	1.1	1.5
Hagerstown-Martinsburg MSA	1,927	4.4	34,439	4.4	5.9
Huntington-Ashland MSA	6,385	14.7	36,223	11.8	11.7
Morgantown MSA	4,790	11.0	35,036	8.6	7.3
Parkersburg-Vienna MSA	1,730	4.0	32,874	5.5	5.0
Washington MSA	1,106	2.5	32,287	2.1	3.0
Weirton-Steubenville MSA	847	2.0	30,758	2.6	2.9
Wheeling MSA	2,092	4.8	31,973	5.8	4.1
Winchester MSA	242	0.6	32,372	0.6	1.3
Micropolitan Areas	6,767	15.6	34,755	15.5	16.5
Bluefield MicroSA	1,320	3.0	36,240	2.9	3.3
Clarksburg MicroSA	2,294	5.3	35,541	5.6	5.1
Elkins MicroSA	371	0.9	29,964	1.6	1.6
Fairmont MicroSA	1,620	3.7	34,644	2.9	3.1
Logan MicroSA	763	1.8	33,655	1.6	1.9
Point Pleasant MicroSA	399	0.9	32,336	0.9	1.5
Nonmetropolitan	6,967	16.1	33,009	16.3	22.1
Total	43,374	100.0	34,853	100.0	100.0

¹⁷ This table uses the US Census Bureau's Core Based Statistical Area definitions in place in 2013. 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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