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From Higher Education to Work in West Virginia, 2012

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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 118,242 students who graduated from public higher education in West Virginia in the last decade, 56,562 were working in West Virginia in 2012, which translates into a work participation rate of 47.8 percent.
- Work participation rates typically decline as the time since graduation increases.
- Graduates who work in the state earned an average income of $41,847 in 2012. 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 ($34,475). Income for bachelor's degree holders was only slightly above that of associate's degree holders ($36,499). However, income was significantly higher for master's degree recipients ($50,993) and even more so for graduates with doctoral professional practice degrees ($106,612).
- Business, management, and marketing was the largest area of concentration among all West Virginia graduates in the past decade, with 18,631 graduates. Health professions graduates were only slightly behind in number with 18,480 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 (52.6 percent for women compared with 42.2 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 more than 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 30 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.

Academic Achievement

- Work participation exhibits a modest tendency to rise with college GPA.
- Graduates with higher ACT scores exhibit significantly lower work participation rates than those with lower ACT scores.
- Income tends to rise with academic achievement: higher ACT scores and GPA are associated with higher incomes broadly.
- The income premium associated with higher ACT scores is persistent as time since graduation increases; however, the income premium associated with a higher GPA diminishes as time since graduation increases.

Tuition Assistance

- Work participation rates for graduates who received a PROMISE scholarship (59.6 percent) or need-based grants from the Higher Education Grant Program (65.5 percent) were significantly higher than the overall rate of 47.8 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, more than half were employed in just two industries: health care and social assistance (27.0 percent of all graduates); and educational services (23.4 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 $71,400 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; 39 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, nearly 65 percent worked in counties that were part of a Metropolitan Statistical Area.
- The Charleston MSA employed the largest number of graduates with 21.4 percent of graduates employed in the state. The Charleston MSA also had the highest average annual income, at $37,256.
- 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 2001-2002 and the 2010-2011 academic years who worked in West Virginia in 2012. 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 overall work participation and wage outcomes for all West Virginia public college and university graduates for the past 10 academic years. As illustrated, 118,242 men and women in total graduated from West Virginia's higher educational institutions over the past decade, with 14,616 graduates in the 2010-2011 academic year. This figure has increased every year over the time period analyzed; indeed the number of graduates increased by approximately 51 percent overall from the 2001-2001 academic year to the 2010-2011 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 2012	WV Work Participation Rate (%)	Average Annual Income ($)
2001-2002	9,701	3,944	40.6	52,184
2002-2003	10,072	4,279	42.4	53,364
2003-2004	10,386	4,508	43.4	50,404
2004-2005	10,986	5,036	45.8	48,170
2005-2006	11,347	5,273	46.4	45,768
2006-2007	11,894	5,624	47.2	43,798
2007-2008	12,538	6,056	48.3	40,294
2008-2009	12,881	6,551	50.8	36,948
2009-2010	13,821	7,277	52.6	33,891
2010-2011	14,616	8,014	54.8	30,279
Total	**118,242**	**56,562**	**47.8**	**41,847**

Of the total 118,242 graduates reported in Table 1, 56,562, or 47.8 percent, were working in West Virginia in 2012. The work participation rate falls consistently as the time from graduation increases. Indeed, 54.8 percent of 2010-2011 graduates were working in the state in 2012, while the figure diminishes to 40.6 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 $41,847 on average in 2012. 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

[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.

grew from $30,279 for the most recent graduates to $52,184 for those graduating one decade earlier who are likely to be the most experienced in the sample. These figures represent a gain of nearly $2,191 on average for each year of experience.

2 Residency Upon Entering College

Whether one lived in West Virginia when entering higher education in the state appears to be a significant determinant of whether one works 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, 61.7 percent of in-state students worked in the state in 2012, compared with only 9.6 percent of out-of-state students. Students who were classified as "other" report a work participation rate of 25.5 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 52.1 percent for graduates from one decade earlier. Out-of-state graduates' work participation stands at 15.6 percent for the most recent graduates, falls rapidly over the first two years, then declines at a slower rate.

[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 ($)
2001-2002	52.1	52,323	6.7	49,736	16.6	49,653
2002-2003	54.4	53,582	5.7	55,459	26.2	43,221
2003-2004	56.1	50,645	6.4	46,707	16.8	43,962
2004-2005	58.4	48,054	7.1	52,015	28.4	47,323
2005-2006	59.9	45,728	8.0	50,687	21.9	37,913
2006-2007	61.5	43,823	8.2	45,500	26.4	39,409
2007-2008	63.0	40,348	8.9	39,946	24.9	38,611
2008-2009	66.3	36,904	10.5	37,469	28.1	37,618
2009-2010	68.2	34,046	12.9	32,402	28.1	31,505
2010-2011	70.5	30,516	15.6	27,871	33.7	28,843
Total	61.7	42,055	9.6	39,441	25.5	38,237

Annual income is higher for in-state students than for out-of-state students working in the state. Overall, in-state students earn $42,055 on average, compared with $39,441 for out-of-state students, representing a 6.6 percent premium for in-state students. Graduates classified as other were lower than either in-state or out-of-state graduates, earning $38,237 per year on average.[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

[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).

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.

Table 3: Work participation by degree earned

Graduation Year	Associate's (%)	Bachelor's (%)	Master's (%)	Doctoral Professional Practice (%)	Doctorate (%)
2001-2002	56.6	35.9	46.6	34.5	12.8
2002-2003	60.7	36.2	47.8	46.9	12.8
2003-2004	58.7	38.4	47.1	40.1	15.3
2004-2005	63.1	40.4	48.4	44.2	12.3
2005-2006	61.7	42.4	48.9	40.2	14.0
2006-2007	66.2	42.6	47.4	41.8	22.2
2007-2008	66.7	43.6	48.9	45.0	19.5
2008-2009	68.9	46.6	50.4	44.3	20.5
2009-2010	71.6	48.0	53.4	43.7	19.3
2010-2011	70.2	52.0	52.5	39.7	25.4
Total	65.3	43.2	49.3	42.1	17.9

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 2012. The overall work participation rate is in the 40-percent range for those with a bachelor's (43.2 percent), master's (49.3 percent), and doctoral professional practice degrees (42.1 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 17.9 percent. This is perhaps unsurprising given the fact that most job markets at

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

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 $34,475 in 2012, the lowest among all of the categories. Income for associate's degree holders were among the slowest growing, as well, gaining $1,572 per year on average, translating into a 4.2 percent average annual gain.

Table 4: Average annual income by degree earned

Graduation Year	Associate's ($)	Bachelor's ($)	Master's ($)	Doctoral Professional Practice ($)	Doctorate ($)
2001-2002	41,636	47,339	58,344	136,724	69,786
2002-2003	39,639	45,666	58,799	148,829	119,911
2003-2004	39,198	43,628	56,857	146,763	79,652
2004-2005	38,262	43,214	56,323	123,113	84,457
2005-2006	36,877	40,323	51,744	136,293	75,259
2006-2007	36,798	38,423	51,624	114,617	58,174
2007-2008	34,485	35,568	49,067	92,434	68,159
2008-2009	31,864	32,626	46,530	79,011	57,222
2009-2010	30,033	28,577	46,224	72,451	54,996
2010-2011	27,485	26,185	40,739	60,823	52,272
Total	34,475	36,499	50,993	106,612	67,225

At $106,612 on average, income for doctoral professional practice degree earners was the highest for all graduates based on degree in 2012. This average income is nearly 59 percent higher than even 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 $60,823 for the most recent graduates to $136,724 for those who graduated one decade earlier, rising more than $8,400 per year on average. Graduates with doctorate degrees report the second-highest earnings, with an average annual income of $67,225 in 2012.

Master's degree recipients report an overall average annual income of $50,993 for 2012, while bachelor's degree recipients report an income of $36,499. Although a master's degree commands an overall income premium of nearly 40 percent over a bachelor's degree according to these data, income growth is slower among master's degree recipients, averaging 3.7 percent annually, compared to 6.1 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 ($34,475).

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]

Business, management, and marketing was the largest area of concentration among West Virginia graduates. In all, 18,631 people graduated with degrees in this area, the majority graduating with bachelor's degrees (12,026). Master's and associate's degrees were also common in this area of concentration. Health Professions was just behind business as the second most common degree with 18,480 graduates, followed by education with 17,157. Liberal arts, with 11,999 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	1,298	74	892	299	0	33
Architecture and related services	266	0	266	0	0	0
Biological and biomedical sciences	3,291	0	2,694	377	0	220
Business, management, marketing	18,631	2,904	12,026	3,446	0	72
Communications, journalism	5,395	78	4,134	1,176	0	7
Communications technologies/technicians	248	75	170	0	0	0
Computer and information sciences	2,119	611	942	462	0	23
Education	17,157	176	7,528	8,916	421	0
Engineering	4,926	20	3,262	1,390	0	254
Engineering technologies and engineering-related fields	2,125	873	1,093	123	0	0
English language and literature/letters	1,620	0	1,183	408	0	29
Family and consumer/human sciences	1,322	177	1,094	51	0	0
Foreign languages, literatures, and linguistics	643	69	263	299	0	0
Health professions and related programs	18,480	6,680	4,867	2,520	3,676	77
History	1,442	0	1,255	134	0	53
Homeland security, law enforcement, firefighting and related protective services	3,478	851	2,229	266	0	0
Legal professions and studies	1,701	274	0	50	1,357	0
Liberal arts and sciences, general studies and humanities	11,999	3,547	8,385	48	0	0
Library science	4	1	0	0	0	0
Mathematics and statistics	562	0	295	238	0	29
Mechanic and repair technologies/technicians	280	262	0	0	0	0
Multi/interdisciplinary studies	2,564	737	1,776	47	0	0
Natural resources and conservation	1,235	77	856	217	0	85
Parks, recreation, leisure, and fitness	1,878	0	1,666	194	0	18
Personal and culinary services	201	192	0	0	0	0
Philosophy and religious studies	97	0	97	0	0	0
Physical sciences	1,286	6	938	220	0	122
Precision production	205	171	0	0	0	0
Psychology	3,526	0	2,817	390	25	168
Public administration and social service	2,293	132	841	1,319	0	0
Science technologies/technicians	721	487	0	0	0	0
Social sciences	4,452	0	4,010	368	0	74
Transportation and materials moving	2	2	0	0	0	0
Visual and performing arts	2,795	105	2,293	339	0	58
Total	118,242	18,581	67,872	23,297	5,479	1,322

The level of degree earned varies considerably across areas of concentration. Health professions dominates the associate's degree category, while business had the largest number of graduates who earned bachelor's degrees. Master's degree graduates are highly concentrated in education, which constituted 38.3 percent of all master's degrees earned. Doctoral professional practice degrees are exclusively in education, health professions, legal professions, and psychology. Doctorates are heavily concentrated in biological sciences, engineering, physical sciences, and public administration.

Many of the skilled trade degrees exhibit the highest rates of work participation. Precision production had the highest work participation rate with 75.6 percent, as shown in Table 6, followed by science technologies; mechanic and repair technologies; 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 60.8 percent of graduates working in the state, as did engineering technologies and health professions.

Architecture had the lowest work participation rate with only 18.1 percent of graduates working in the state. The next four lowest areas in terms of work participation were parks, recreation, leisure, and fitness studies; foreign languages, literatures, and linguistics; 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 $70,004, which is approximately 67 percent above the overall average of $41,847. Wages in legal professions, health professions, and engineering technologies fields range from 27 percent to 48 percent above the overall average. Wages were lowest for personal and culinary services; visual and performing arts; foreign languages, literatures, and linguistics; and family and consumer sciences. These areas all report average incomes in the low-$20-thousand range, which is around 50 to 60 percent of the overall average.

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

Area of Concentration	Work Participation (%)	Average Annual Income ($)
Agriculture, agriculture operations	36.8	36,036
Architecture and related services	18.1	43,074
Biological and biomedical sciences	35.3	36,656
Business, management, marketing	46.4	41,760
Communications, journalism	34.9	35,767
Communications technologies/technicians	54.8	27,720
Computer and information sciences	46.9	44,277
Education	60.8	39,616
Engineering	28.4	70,004
Engineering technologies and engineering-related fields	58.8	53,304
English language and literature/letters	37.7	26,936
Family and consumer sciences/human sciences	34.9	25,216
Foreign languages, literatures, and linguistics	28.2	25,904
Health professions and related programs	57.3	56,937
History	39.3	26,453
Homeland security, law enforcement, firefighting, related services	53.8	33,271
Legal professions and studies	54.8	62,010
Liberal arts and sciences, general studies and humanities	50.8	32,305
Library science	n/d	n/d
Mathematics and statistics	28.5	39,159
Mechanic and repair technologies/technicians	69.6	43,197
Multi/interdisciplinary studies	42.9	30,714
Natural resources and conservation	39.7	41,815
Parks, recreation, leisure, and fitness studies	27.5	30,339
Personal and culinary services	57.7	22,277
Philosophy and religious studies	36.1	26,082
Physical sciences	31.8	43,763
Precision production	75.6	40,043
Psychology	41.8	29,275
Public administration and social service professions	53.4	34,271
Science technologies/technicians	68.4	36,061
Social sciences	35.4	29,724
Transportation and materials moving	n/d	n/d
Visual and performing arts	32.2	24,800
Total	**47.8**	**41,847**

n/d: For privacy reasons we do not disclose work participation and income data for areas 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; natural resources and conservation; mechanic and repair technologies; and health professions fields. 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; mechanic and repair technologies; natural resources and conservation; precision production; science technologies; and health professions, which all had income above $40,000 per year. The lowest incomes were in public administration and social service; education; agriculture; family and consumer sciences; and communications and journalism.

Among bachelor's degree holders, work participation rates were highest for education; health professions; communications technologies; 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; communications and journalism; and family and consumer sciences, which all had rates lower than 30 percent.

Income for graduates with bachelor's degrees was highest in engineering; engineering technologies; computer and information sciences; and health professions, each of which were higher than $45,000 per year on average. The lowest wages were found in the fields of visual and performing arts; English language and literature; psychology; history; and philosophy and religious studies. Graduates in each of these fields were paid about $26,000 per year or less on average in 2012.

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; 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 less than $35,000 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. Among doctorate degree holders, the work participation rate was highest in parks, recreation, leisure, and fitness, where the work participation rate was 50 percent. All other work participation rates among doctoral degree earners are low in comparison to the overall population of graduates.

For doctoral professional practice graduates, 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.

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

Area of Concentration	Assoc. (%)	Bach. (%)	Mast. (%)	Doct. Prof. Practice (%)	Doct. (%)
Agriculture, agriculture operations	47.3	35.0	42.8	.	9.1
Architecture and related services	.	18.1	.	.	.
Biological and biomedical sciences	.	37.7	27.6	.	19.1
Business, management, marketing	63.1	44.2	39.8	.	6.9
Communication, journalism	59.0	29.3	53.2	.	28.6
Communications technologies/technicians	54.7	55.3	.	.	.
Computer and information sciences	62.4	43.3	34.6	.	17.4
Education	58.5	59.5	62.4	49.4	.
Engineering	30.0	31.9	22.7	.	15.0
Engineering technologies and engineering-related fields	69.5	53.4	30.9	.	.
English language and literature/letters	.	39.1	34.8	.	20.7
Family and consumer sciences/human sciences	66.1	29.1	51.0	.	.
Foreign languages, literatures, and linguistics	53.6	32.7	17.1	.	.
Health professions and related programs	70.2	56.4	53.2	37.3	24.7
History	.	38.6	49.3	.	32.1
Homeland security, law enforcement, firefighting and related protective services	67.5	49.4	30.5	.	.
Legal professions and studies	63.1	.	64.0	52.8	.
Liberal arts and sciences, general studies and humanities	58.7	47.3	72.9	.	.
Library science	n/d	n/d	n/d	n/d	n/d
Mathematics and statistics	.	35.9	21.9	.	6.9
Mechanic and repair technologies/technicians	71.4	.	.	.	.
Multi/interdisciplinary studies	62.8	34.2	57.5	.	.
Natural resources and conservation	72.7	40.1	30.9	.	28.2
Parks, recreation, leisure, and fitness studies	.	26.5	34.5	.	50.0
Personal and culinary services	58.3	.	.	.	.
Philosophy and religious studies	.	36.1	.	.	.
Physical sciences	n/d	34.7	25.0	.	21.3
Precision production	77.8	.	.	.	.
Psychology	.	41.8	54.4	48.0	8.9
Public administration and social service	57.6	52.3	53.7	.	.
Science technologies/technicians	68.0	.	.	.	.
Social sciences	.	36.3	28.0	.	18.9
Transportation and materials moving	.	n/d	n/d	n/d	n/d
Visual and performing arts	50.5	31.8	32.5	.	17.2
Total	65.3	43.2	49.3	42.1	17.9

. : data not available for this area of concentration
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	16,433	36,758	39,372	.	47,275
Architecture and related services	.	43,074	.	.	.
Biological and biomedical sciences	.	33,896	42,849	.	88,040
Business, management, marketing	28,015	39,772	69,771	.	53,026
Communication, journalism	18,491	30,564	47,046	.	56,643
Communications technologies/technicians	26,093	28,559	.	.	.
Computer and information sciences	29,573	49,049	71,430	.	82,792
Education	16,282	33,212	43,935	69,116	.
Engineering	32,984	67,416	78,527	.	76,020
Engineering technologies and engineering-related fields	49,307	57,433	58,173	.	.
English language and literature/letters	.	25,361	31,371	.	43,318
Family and consumer sciences/human sciences	17,194	26,958	40,009	.	.
Foreign languages, literatures, and linguistics	17,058	27,993	30,323	.	.
Health professions and related programs	40,362	46,368	71,070	131,043	78,268
History	.	26,009	27,240	.	36,030
Homeland security, law enforcement, firefighting and related protective services	31,685	32,747	38,497	.	.
Legal professions and studies	26,256	.	51,151	71,693	.
Liberal arts and sciences, general studies and humanities	27,866	34,605	38,523	.	.
Library science	n/d	.	.	.	.
Mathematics and statistics	.	36,056	44,008	.	77,526
Mechanic and repair technologies/technicians	44,049	.	.	.	.
Multi/interdisciplinary studies	30,141	30,614	44,581	.	.
Natural resources and conservation	42,129	38,739	53,085	.	53,592
Parks, recreation, leisure, and fitness studies	.	27,948	44,742	.	40,294
Personal and culinary services	21,978	.	.	.	.
Philosophy and religious studies	.	26,082	.	.	.
Physical sciences	n/d	38,738	60,261	.	74,463
Precision production	41,638	.	.	.	.
Psychology	.	25,992	39,254	46,807	61,914
Public administration and social service professions	14,810	27,971	40,275	.	.
Science technologies/technicians	41,212	.	.	.	.
Social sciences	.	28,759	37,964	.	69,532
Transportation and materials moving	.	.	.	.	.
Visual and performing arts	28,796	23,048	32,857	.	42,559
Total	**34,475**	**36,499**	**50,993**	**106,612**	**67,225**

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 52.2 percent overall for graduates of the past decade, significantly higher than 42.1 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 $10,000, or approximately 30.6 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 ($)	Work Participation (%)	Average Annual Income ($)
2001-2002	55.6	44.1	44,047	36.4	64,552
2002-2003	56.6	45.9	44,650	38.0	67,057
2003-2004	57.9	47.1	42,833	38.3	63,234
2004-2005	57.0	49.8	42,947	40.6	56,675
2005-2006	57.9	50.8	40,555	40.6	54,731
2006-2007	56.9	52.1	39,439	41.0	51,102
2007-2008	57.2	53.2	36,374	41.8	46,949
2008-2009	56.7	55.9	34,799	44.3	40,496
2009-2010	57.1	57.7	32,269	45.9	36,605
2010-2011	56.4	59.3	28,455	49.1	33,136
Total	56.9	52.2	37,501	42.1	48,978

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; engineering; and health professions. These five areas comprise 55 percent of male graduates.

Women were more highly concentrated in their top fields. Health professions constituted 21.3 percent of the total, and the top three fields garnered 52.8 percent of all women graduates. Men were more dispersed among fields. Their top three fields constituted only 38.9 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 65 percent. Architecture and related services had the lowest work participation among men at 19.1 percent. Parks, recreation, leisure, and fitness studies; foreign languages, literatures, and linguistics; engineering; and mathematics and statistics all had work participation rates below 30 percent.

For women, work participation rates were highest in the mechanic and repair technologies; science technologies; education; and precision production, which were all above 60 percent. Work participation in architecture and related services; engineering; mathematics and statistics; and foreign languages were the lowest, and all below 30 percent.

Income for men were highest in the health professions, averaging $86,688. Men also had high salaries in the legal professions, and engineering. The lowest wages for men were in personal and culinary services; history; English language and literature; and visual and performing arts. All of these were below $30,000 per year on average.

For women, the highest paying field was engineering, which paid $60,918 on average per year. Other high paying jobs for women were in mechanic and repair technologies; and legal professions. The lowest paying jobs for women were in philosophy and religious studies; personal and culinary services; and precision production, all of which paid less than $22,000 per year on average.

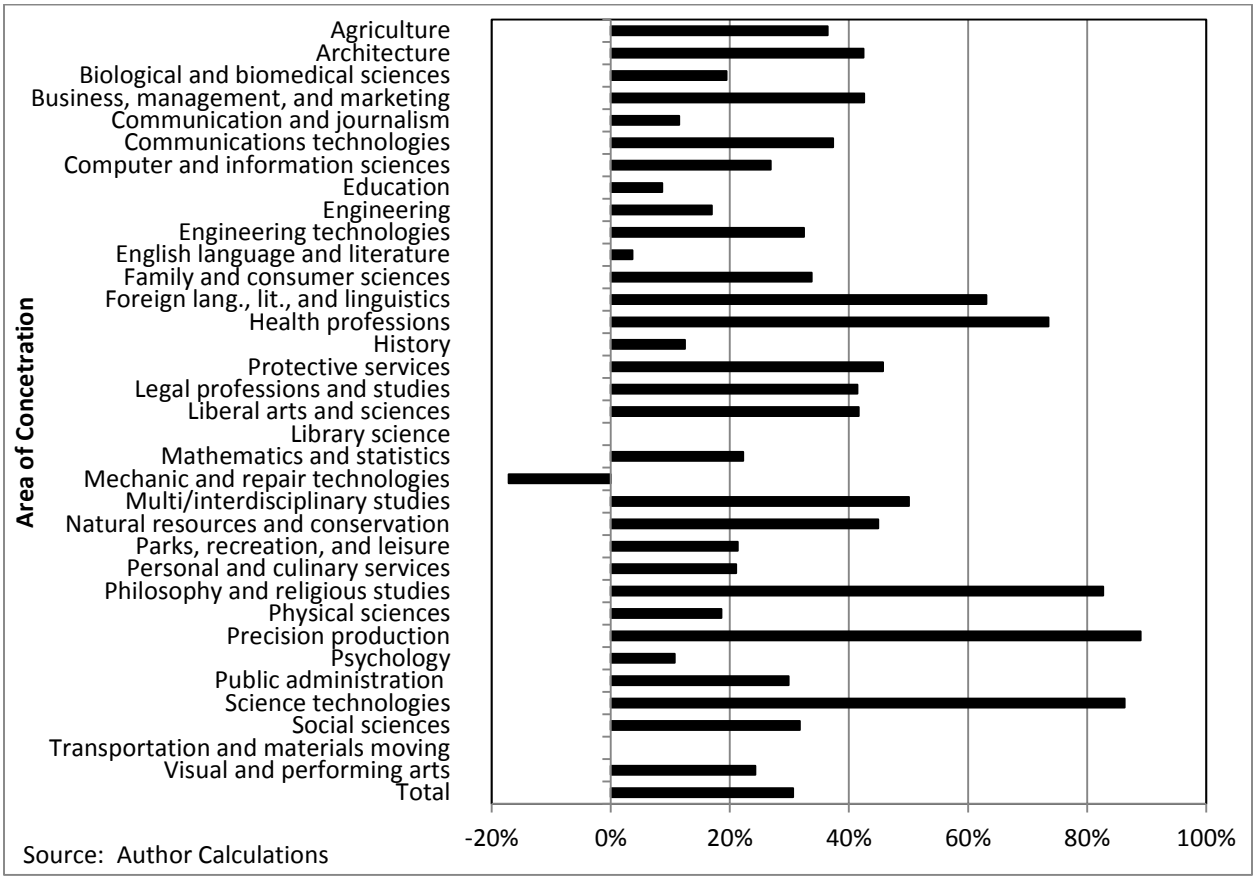
Table 10: Work participation and income by area of concentration and gender

Area of Concentration	Female			Male		
	Total	Work Part. (%)	Average Annual Income ($)	Total	Work Part. (%)	Average Annual Income ($)
Agriculture, agriculture operations	679	36.8	30,699	619	36.8	41,888
Architecture and related services	57	14.0	31,818	209	19.1	45,325
Biological and biomedical sciences	1,841	36.1	33,844	1,450	34.2	40,427
Business, management, marketing	9,042	51.2	34,877	9,589	41.8	49,722
Communication, journalism	3,354	37.4	34,446	2,041	30.8	38,401
Communications technologies/technicians	104	50.0	22,522	144	58.3	30,938
Computer and information sciences	466	45.1	36,541	1,653	47.4	46,351
Education	12,167	64.8	38,797	4,990	51.1	42,151
Engineering	737	23.1	60,918	4,189	29.3	71,261
Engineering technologies and engineering-related fields	217	52.1	41,156	1,908	59.6	54,512
English language and literature/letters	1,067	37.6	26,605	553	37.8	27,571
Family and consumer/human sciences	1,268	34.6	24,816	54	40.7	33,191
Foreign languages, literatures, and linguistics	466	28.8	22,257	177	26.6	36,301
Health professions and related programs	14,325	59.8	49,963	4,155	48.4	86,688
History	472	40.9	24,448	970	38.6	27,487
Homeland security, law enforcement, firefighting and related protective services	1,693	52.3	26,808	1,785	55.2	39,072
Legal professions and studies	903	56.6	52,233	798	52.8	73,878
Liberal arts and sciences, general studies and humanities	6,778	55.3	27,840	5,221	44.9	39,434
Library science	n/d	n/d	n/d	n/d	n/d	n/d
Mathematics and statistics	247	27.1	34,676	315	29.5	42,388
Mechanic and repair technologies/technicians	n/d	n/d	n/d	275	69.1	42,969
Multi/interdisciplinary studies	1,239	52.2	25,458	1,325	34.3	38,204
Natural resources and conservation	287	33.1	30,701	948	41.7	44,488
Parks, recreation, leisure, and fitness	677	30.4	26,892	1,201	25.9	32,623
Personal and culinary services	106	56.6	20,222	95	59.0	24,480
Philosophy and religious studies	30	36.7	16,642	67	35.8	30,408
Physical sciences	470	33.4	39,266	816	30.9	46,565
Precision production	n/d	n/d	n/d	197	76.1	40,660
Psychology	2,626	42.3	28,525	900	40.1	31,585
Public administration and social service professions	1,865	54.3	32,593	428	49.3	42,328
Science technologies/technicians	375	71.5	25,870	346	65.0	48,200
Social sciences	2,060	40.4	25,855	2,392	31.0	34,061
Transportation and materials moving	n/d	n/d	n/d	n/d	n/d	n/d
Visual and performing arts	1,682	32.1	22,602	1,113	32.4	28,088
Total	67,317	52.2	37,501	50,925	42.1	48,978

n/d: data not disclosed

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 precision production; science technologies; and philosophy and religious studies concentrations where the wage gap is more than 80 percent. The gap also exceeds 50 percent in health professions and foreign languages, literatures, and linguistics. The wage gap is generally smallest in English language and literature; education; psychology; and communications and journalism. The wage gap is negative in the mechanic and repair technologies concentration (i.e., women earn more income than men in that field), but there the sample size is very small for women that we deem this statistic unreliable for use as a measure of a broad trend.

Figure 1: Male-female income gap



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	42.5	66.6	38.0	40.0	53.1	n/d
Age 25-29	46.9	66.8	48.2	41.3	41.6	15.6
Age 30-34	54.3	64.5	56.5	54.6	33.0	13.9
Age 35-39	60.6	68.3	60.5	62.0	46.6	16.7
Age 40-44	62.5	66.7	61.6	64.3	45.7	22.7
Age 45-49	63.1	63.0	59.3	71.6	44.8	23.7
Age 50-54	62.1	60.3	57.8	68.6	63.3	38.5
Age 55-59	56.1	50.3	53.8	63.6	59.1	53.6
Age 60+	42.2	36.7	36.7	51.8	46.9	n/d
Total	47.8	65.3	43.2	49.3	42.1	17.9

n/d: data not disclosed

The overall age trend holds true for most degree types. Graduates holding bachelor's, master's, and doctoral professional practice degrees all 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 40 percent for graduates under the age of 24 to nearly 72 percent for graduates age 45-49.

Two degree categories do not follow the general trend. For associate's degree holders, work participation stays relatively constant for graduates up until age 55. These younger graduates have work participation rates above 60 percent, but work participation begins to fall for older

graduates. The work participation rate for graduates who are 60 years or older at graduation is just 37 percent. Work participation for graduates with doctorate degrees 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 more than 50 percent for doctorate graduates who are older than 55 at the time of graduation.

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	35,664	31,329	35,990	43,790	105,937	n/d
Age 25-29	46,349	35,516	35,365	46,998	110,083	71,257
Age 30-34	45,869	37,138	37,615	53,833	110,985	76,765
Age 35-39	45,882	37,553	39,695	55,190	102,476	60,329
Age 40-44	45,396	36,636	39,739	59,113	79,052	61,973
Age 45-49	46,667	37,324	41,166	57,572	84,597	62,529
Age 50-54	47,469	38,335	41,355	56,902	85,811	63,622
Age 55-59	42,323	30,149	36,975	48,876	88,029	53,519
Age 60+	38,325	32,507	28,340	46,551	58,507	50,781
Total	41,847	34,475	36,499	50,993	106,612	n/d

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 $44,000 to almost $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 $60,000 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 be in education, which has 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.[7] Black graduates made up the next largest share of the graduates with just over 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 2011, with 50.5 percent. American Indian or Alaska Native, and multi-racial graduates exhibit work participation rates that are in the 40-percent range, while work participation falls to the 30-percent range for Black graduates and Asian, Pacific Islander, or Native Hawaiian graduates. The work participation rate for Hispanic graduates is relatively low, with a rate just under 30 percent.

Asian, Pacific Islander, or Native Hawaiian graduates report the highest annual wages, with an average annual wage of $45,587, which exceeds the overall average by nearly 9 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 amount to 69.5 percent and 75.7 percent of the overall average, respectively.

[7] Race is not reported for approximately 4 percent of graduates.

Table 13: Work participation and income by race

Race	Number	Work Participation (%)	Average Annual Wage ($)
American Indian or Alaska Native	390	46.9	40,903
Asian, Pacific Islander, Native Hawaiian	1,931	30.4	45,587
Black	4,524	36.5	31,692
Hispanic	1,216	29.7	37,614
Multi-Racial	285	41.1	29,086
White	105,193	50.5	42,214
Total	118,242	47.8	41,847

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 51,373 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)[8] 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.

Students with lower ACT scores were also less likely to leave the state as they gained more experience. Work participation for graduates with ACT scores in the first quintile fell from 76.1

[8] 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.

percent for 2010-2011 graduates to 54 percent for 2001-2002 graduates, a reduction of 3.7 percent per year on average. For the highest ACT quintile, work participation fell from 61.2 percent to 39.4 percent from the most recent graduates to the earliest in the study, a drop of 4.8 percent 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 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 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.

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 ($)
2001-2002	54.0	41,803	50.3	45,655	48.1	45,727	45.0	52,162	39.4	60,864
2002-2003	55.3	38,669	50.8	46,817	50.8	43,216	51.4	52,649	47.2	65,146
2003-2004	52.6	39,755	54.7	42,277	52.5	46,936	50.6	47,076	46.3	59,516
2004-2005	60.8	38,500	55.6	41,526	54.5	47,472	53.6	45,946	46.8	59,776
2005-2006	63.2	36,521	58.0	40,776	59.2	41,236	54.4	44,537	49.0	53,190
2006-2007	64.4	36,596	60.1	38,666	60.6	40,351	56.3	41,537	48.6	52,380
2007-2008	67.7	31,666	64.4	37,398	63.3	37,580	58.6	38,127	51.2	46,549
2008-2009	72.3	29,473	71.2	32,699	68.0	33,624	62.4	34,341	53.6	40,685
2009-2010	72.5	26,850	71.2	30,715	68.8	31,412	65.0	32,285	57.5	35,421
2010-2011	76.1	26,052	75.4	26,202	71.8	27,454	68.3	29,072	61.2	31,368
Total	**64.6**	**33,490**	**62.2**	**36,671**	**61.2**	**37,659**	**58.6**	**38,651**	**51.9**	**45,705**

Table 15 summarizes work participation and income for the 99,529 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 nearly 50 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 38 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 2001-2002 graduation year earned only 24 percent more than their lower-quintile counterparts.

Table 15: 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 ($)
2001-2002	39.4	45,589	39.3	49,929	41.1	53,178	41.9	56,588	43.6	56,468
2002-2003	38.6	45,826	41.4	48,331	39.5	53,913	38.8	59,489	48.0	58,090
2003-2004	40.6	41,384	40.6	46,117	41.2	51,395	42.0	56,489	48.6	56,030
2004-2005	45.2	41,840	45.2	43,300	43.9	49,189	44.8	50,847	50.4	54,232
2005-2006	44.8	37,333	46.9	42,352	45.8	45,174	44.8	47,791	49.6	49,845
2006-2007	45.5	36,147	46.4	39,988	47.3	42,458	46.1	45,981	49.5	50,319
2007-2008	47.8	34,762	48.6	35,858	47.0	39,658	48.2	41,506	48.6	47,591
2008-2009	52.4	30,948	51.8	32,481	50.5	36,292	48.2	39,923	51.2	44,002
2009-2010	53.4	27,387	53.7	30,129	53.1	32,738	52.7	35,939	52.6	42,100
2010-2011	58.1	24,841	59.2	27,171	56.4	28,630	53.5	32,476	51.5	38,934
Total	**46.9**	**35,411**	**48.1**	**37,710**	**47.6**	**40,706**	**46.9**	**44,161**	**49.6**	**48,733**

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.[9] 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 16 shows, the overall work participation rate for PROMISE graduates was just shy of 60 percent, which is slightly below the work participation rate for in-state students overall (61.7 percent). Since our results above provide suggestive evidence that in-state graduates are more likely to work in state, it is not surprising that PROMISE scholarship holders would also work in state at higher rates compared to the overall average. The slightly lower work participation rate for PROMISE scholarship recipients in comparison to in-state graduates overall may be because those graduates are more likely to attend graduate school, but further research is needed to verify that hypothesis. PROMISE scholarship graduates were less likely to work in the state than those receiving HEGP grants. HEGP recipients, who also must be in-state students, had a work participation rate of 65.5 percent. 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 five years. The figure falls from 65.7 percent for graduates from the 2010-2011 academic year to 51.6 percent for graduates of the 2006-2007 academic

[9] 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 one year, there is a potential for some of these students to be in the 2010-2011 graduating class.

year. However, the figure begins to rise again with the 2005-2006 academic year, reaching 80.0 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, as before, this hypothesis requires further research. Work participation rates show consistent decline over time for HGP and Pell grant recipients.

Annual income for PROMISE graduates and Pell grant recipients tended to be lower than for HEGP graduates. On average PROMISE graduates earned $35,109 per year, and Pell grant recipients earned $35,692, while HEGP graduates earned $37,633. The lower wages for PROMISE graduates may reflect the fact that they were in general younger and less experienced than HEGP graduates. Another reason wages for PROMISE graduates may be lower is that they may be more likely to pursue graduate school, and thus would be more likely to be working part-time. Examining incomes by year indicates that PROMISE and HEGP recipients with similar levels of experience earn about the same income. Pell grant recipients, however, tended to have lower incomes than the other grant recipients within each year. All three tended to earn lower income than the average for all graduates.

Table 16: Work participation and income based on scholarship assistance and low-income status

	PROMISE Recipient		HEGP Recipient		Pell Grant Recipients	
Graduation Year	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)	Work Participation (%)	Average Annual Income ($)
2001-2002	.	.	54.7	46,945	45.3	43,607
2002-2003	.	.	57.0	47,120	48.3	44,636
2003-2004	80.0	44,794	59.4	44,921	50.5	41,829
2004-2005	63.5	33,136	61.1	44,302	51.8	41,030
2005-2006	52.4	41,726	63.4	41,642	54.6	38,879
2006-2007	51.6	39,698	63.9	40,585	55.6	38,273
2007-2008	56.1	39,105	68.0	36,906	58.3	34,740
2008-2009	58.8	35,894	71.0	33,059	61.2	32,272
2009-2010	62.9	33,581	71.6	31,006	62.1	29,852
2010-2011	65.7	29,876	73.7	27,927	64.4	27,480
Total	59.6	35,109	65.5	37,633	56.2	35,692

.: data not available

10 Industry

Graduates from West Virginia's public higher education institutions worked in all major sectors in 2012. Table 17 reports graduate employment and income by two-digit NAICS industry.[10]

Among all graduates of the state's public higher education institutions, more than half were employed in just two industries: health care and social assistance, and educational services. In all, 27.0 percent of graduates were employed in health care, and another 23.4 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 21.1 percent of jobs held by graduates.

Agriculture, forestry, fishing and hunting; management of companies and enterprises; real estate and rental and leasing; utilities; and transportation and warehousing attracted the fewest graduates. Each of these industries employed less than 1 percent of graduates in 2011.

[10] The North American Industry Classification System (NAICS) classifies jobs into 21 major sectors by work type.

Table 17: Employment and income by industry[11]

NAICS	Sector	Total Graduates	Share of Total Graduates (%)	Average Annual Income ($)	State Industry Share (%)
72	**Accommodation and food services**	3,845	5.3	11,750	9.4
56	**Administrative and waste services**	3,009	4.1	23,225	4.7
11	**Agriculture, forestry, fishing and hunting**	71	0.1	27,751	0.2
71	**Arts, entertainment, and recreation**	762	1.0	10,183	1.1
23	**Construction**	1,300	1.8	34,718	5.6
61	**Educational services**	17,077	23.4	33,026	9.4
52	**Finance and insurance**	2,224	3.0	35,909	2.7
62	**Health care and social assistance**	19,774	27.0	38,837	18.5
51	**Information**	1,135	1.6	34,067	1.5
55	**Management of companies and enterprises**	330	0.5	53,288	0.9
31-33	**Manufacturing**	2,358	3.2	52,025	6.9
21	**Mining**	1,133	1.6	71,400	4.6
81	**Other services, except public administration**	1,381	1.9	21,930	3.0
54	**Professional and technical services**	5,073	6.9	43,965	3.7
92	**Public Administration**	4,676	6.4	32,464	7.0
53	**Real estate and rental and leasing**	536	0.7	33,992	0.9
44-45	**Retail Trade**	5,705	7.8	23,632	12.4
48-49	**Transportation and warehousing**	545	0.8	43,256	2.9
99	**Unclassified establishments**	165	0.2	34,925	0.1
22	**Utilities**	543	0.7	69,511	1.1
42	**Wholesale trade**	1,505	2.1	50,702	3.3
	Total	73,147	100.0	34,767	100.0

[11] The number of jobs in this table exceeds the number of graduates employed in West Virginia in 2012 because graduates who worked in more than one industry were counted for each industry in which they worked.

Figure 2: Graduate employment versus overall employment differential

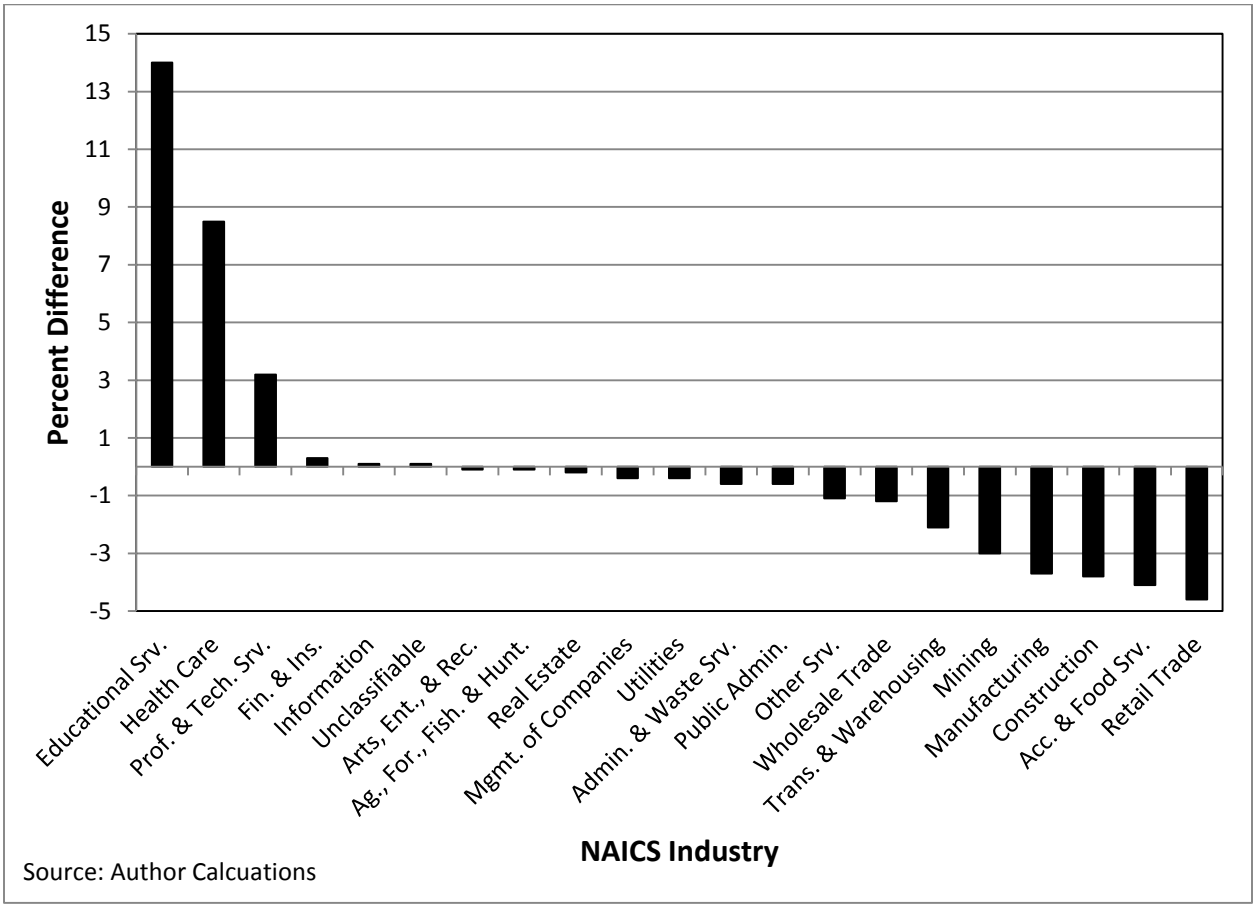
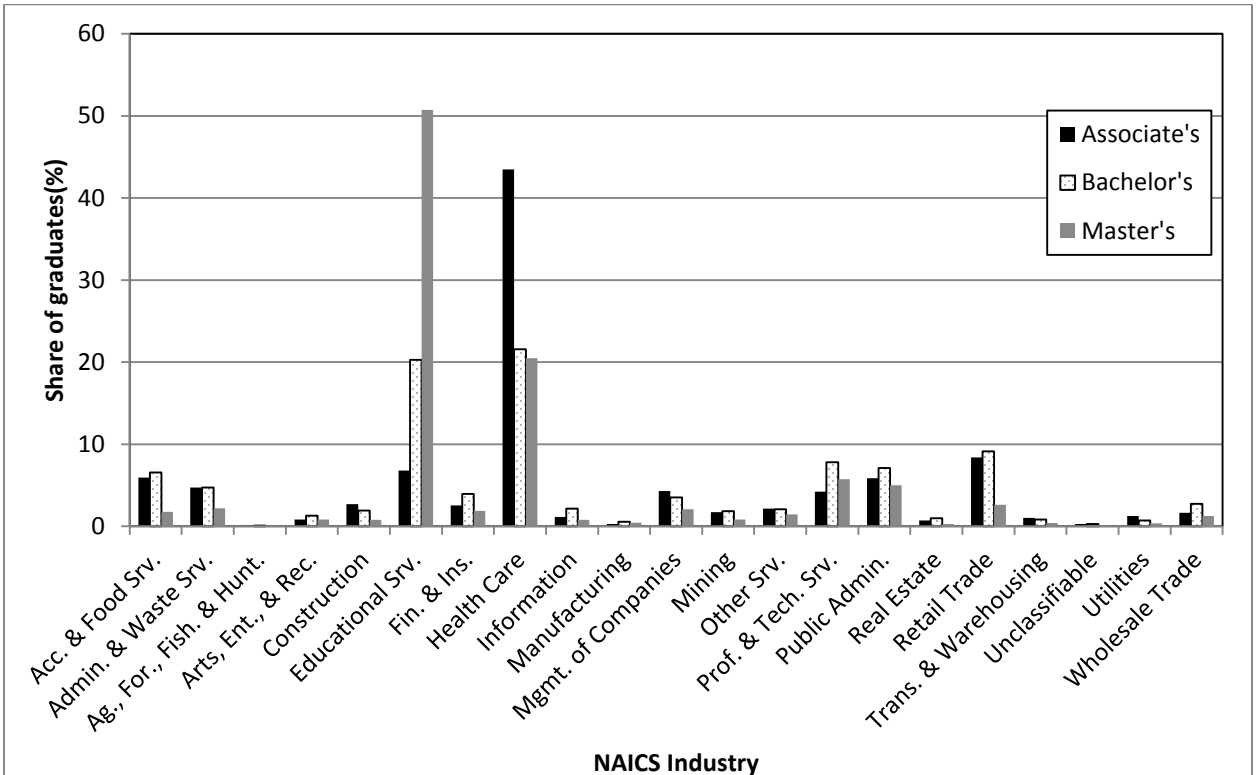


Figure 2 illustrates the difference between the industry share for public higher education graduates versus workers in the state as a whole. As illustrated, graduates are far more likely to be employed in education and health care services than workers overall. The professional and technical services;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

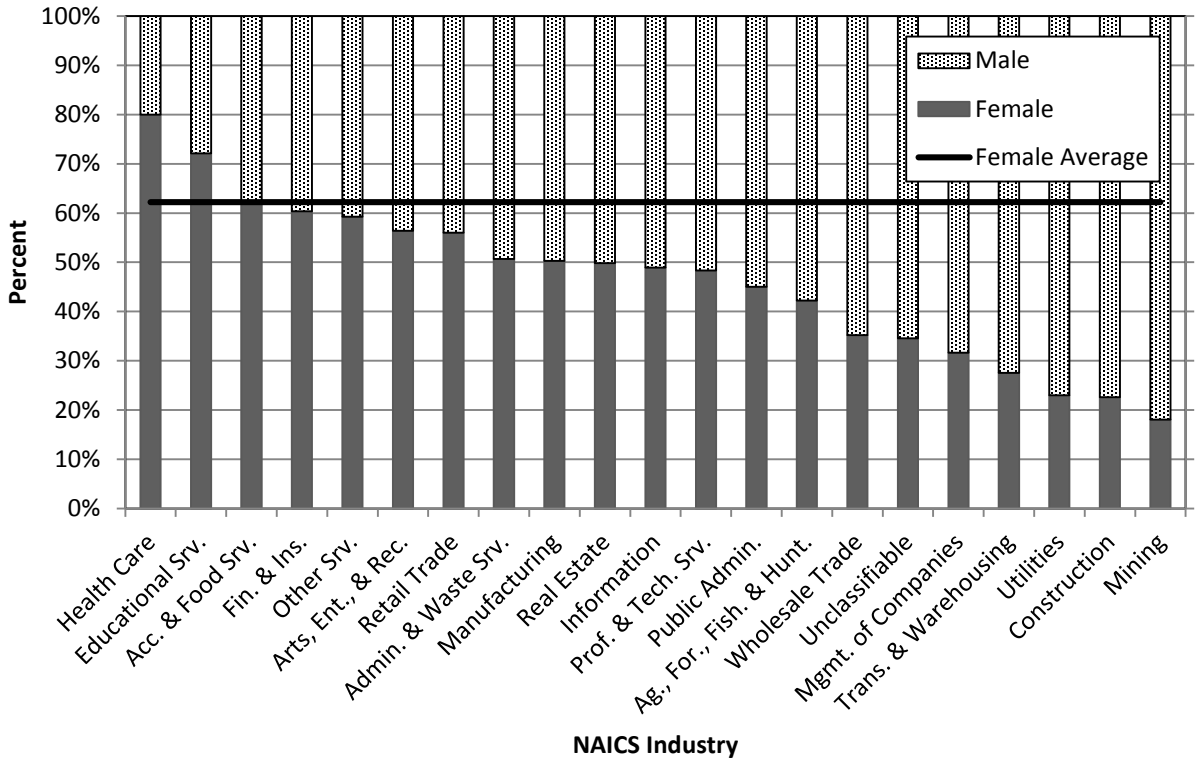
The degree graduates earned had a great deal of influence over the industries in which they worked. As Figure 3 illustrates, associate's degree graduates were clustered heavily in the health care fields. Over 43 percent of associate's degree graduates worked in this one field. Associate's degree graduates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

Bachelor's degree graduates were more spread out among the different industries in the state. Health care services was still the top industry, with 21.6 percent of graduates with bachelor's degrees working in that industry. However it was closely matched by educational services, which comprised more than 20 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

20.5 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; real estate and rental leasing; utilities; and transportation.

Figure 4: Industry composition by gender

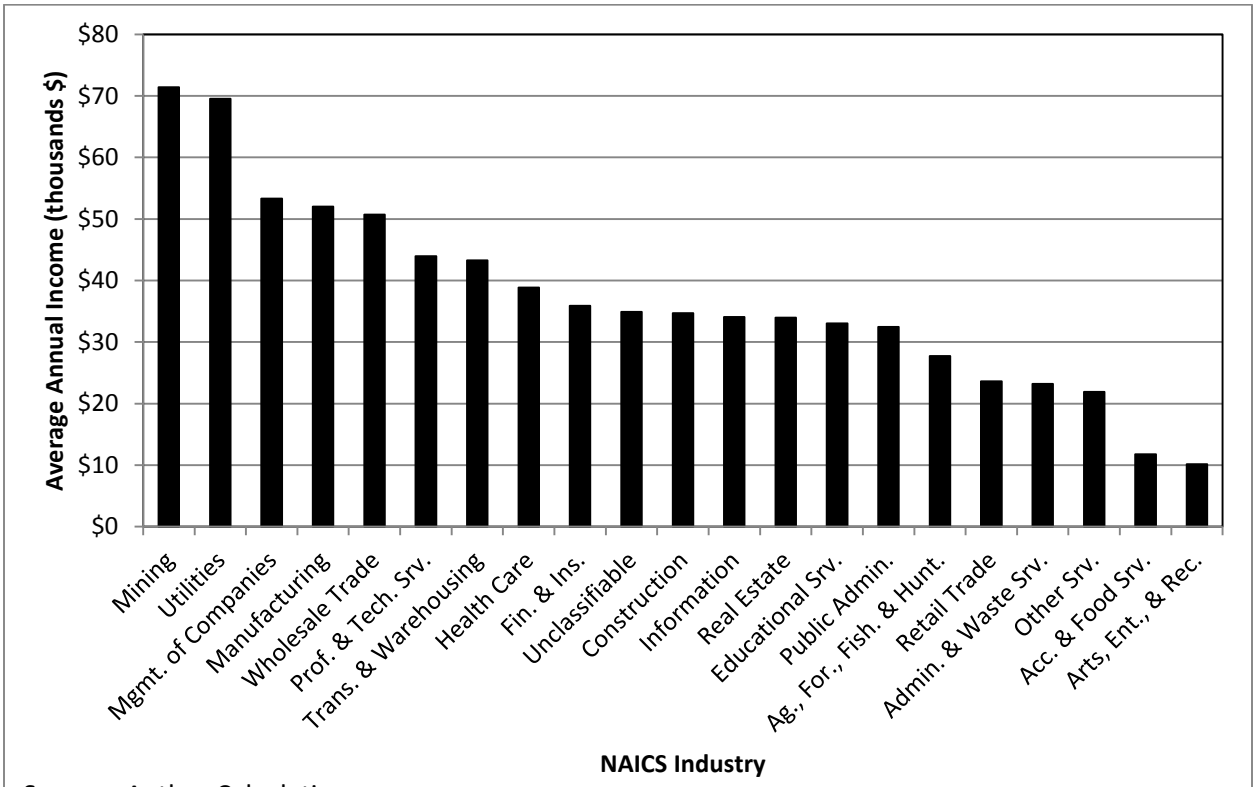


Source: Author Calculations

Figure 4 shows the ratio of men to women graduates in the major industries. Overall women graduates held 62 percent of jobs in all industries. This is not surprising given that women have graduated in larger numbers than men in the last decade, and that their work participation is higher than men. 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 accommodations and food services; and finance and insurance, both of which had more than 60 percent women.

In relation to their share of the workforce, men are over-represented in most industries. However, this disparity is particularly pronounced in mining where men held more than 82 percent of jobs. Male graduates also held a large share of jobs in construction; utilities; and transportation and warehousing, each 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 2011. Graduates working in mining earned the highest income, averaging more than $71 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 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 Statistics

Graduates of West Virginia public higher education institutions worked in every county in the state in 2012. Table 18 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.

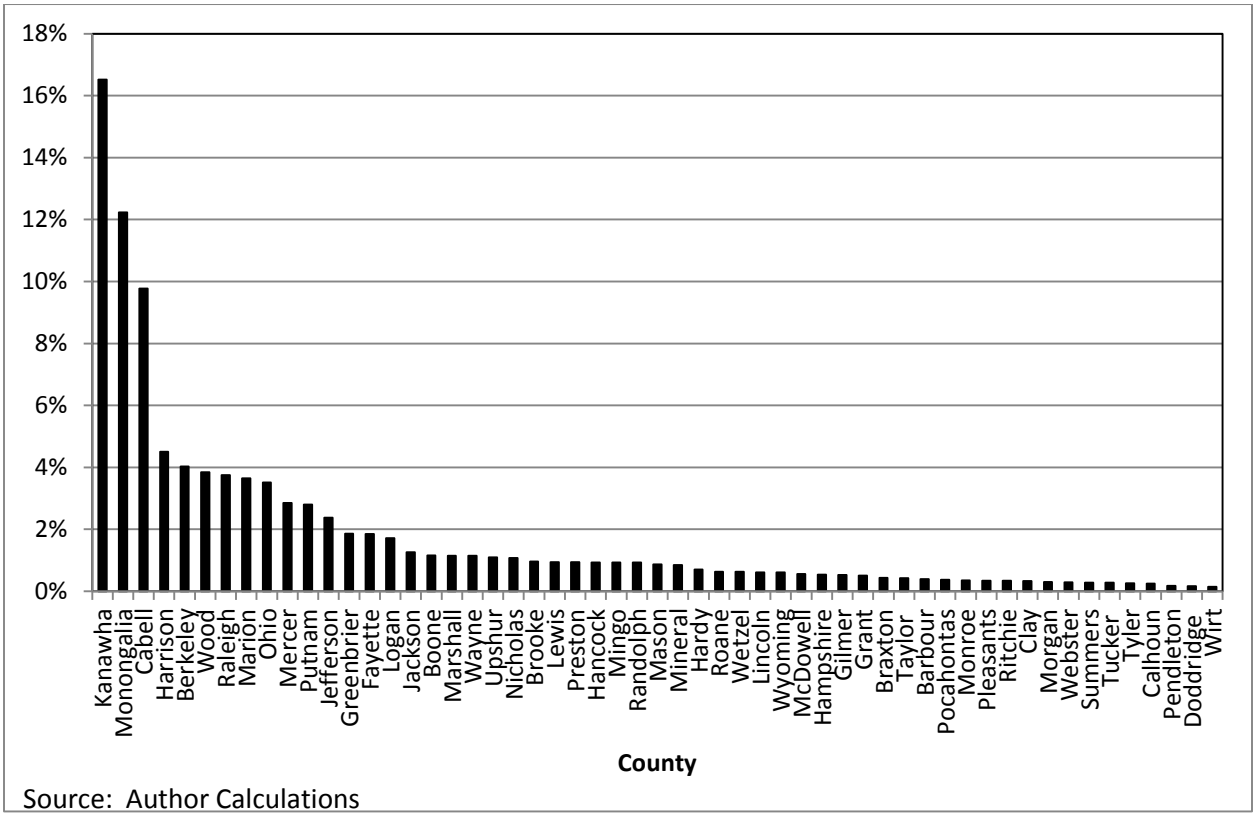
Graduates were highly concentrated in Kanawha, Monongalia, and Cabell counties. Indeed, 39 percent of the graduates were working in these three counties in 2012, with 16.5 percent in Kanawha, 12.2 percent in Monongalia, and 9.8 percent in Cabell. Harrison and Berkeley counties each contained more than 4 percent of graduates. The counties with the lowest number of graduates were Wirt, Doddridge, and Pendleton, which all employed less than 0.2 percent of graduates.

Table 18: Employment and income by county of work

County of Work	Total Graduates	County Share of Graduates (%)	Average Annual Income ($)	County Share of State Population (%)	County Share of State Employment (%)
Barbour	176	0.4	34,666	0.9	0.5
Berkeley	1,803	4.0	34,982	5.8	4.3
Boone	519	1.2	45,275	1.3	1.1
Braxton	192	0.4	29,951	0.8	0.6
Brooke	429	1.0	30,841	1.3	1.1
Cabell	4,375	9.8	34,906	5.2	7.3
Calhoun	112	0.3	28,645	0.4	0.2
Clay	148	0.3	40,987	0.5	0.2
Doddridge	78	0.2	34,957	0.4	0.2
Fayette	826	1.9	30,756	2.5	1.7
Gilmer	237	0.5	26,063	0.5	0.3
Grant	228	0.5	34,735	0.6	0.5
Greenbrier	832	1.9	31,707	1.9	1.9
Hampshire	242	0.5	30,375	1.3	0.6
Hancock	418	0.9	29,489	1.6	1.6
Hardy	313	0.7	23,755	0.7	0.8
Harrison	2,015	4.5	34,240	3.7	4.9
Jackson	565	1.3	33,745	1.6	1.1
Jefferson	1,066	2.4	30,425	2.9	2.1
Kanawha	7,393	16.5	37,094	10.4	14.8
Lewis	420	0.9	30,943	0.9	1.0
Lincoln	274	0.6	34,723	1.2	0.5
Logan	771	1.7	32,876	1.9	1.7
Marion	1,633	3.7	33,201	3.1	2.9
Marshall	515	1.2	36,081	1.8	1.6
Mason	390	0.9	35,127	1.5	0.9
McDowell	251	0.6	38,563	1.1	0.9
Mercer	1,277	2.9	35,243	3.4	2.9
Mineral	379	0.9	32,589	1.5	1.1
Mingo	417	0.9	36,252	1.4	1.1
Monongalia	5,476	12.2	36,007	5.4	7.5
Monroe	158	0.4	33,521	0.7	0.3
Morgan	136	0.3	32,372	0.9	0.4
Nicholas	485	1.1	36,983	1.4	1.2
Ohio	1,572	3.5	27,235	2.4	4.1
Pendleton	80	0.2	32,964	0.4	0.2
Pleasants	151	0.3	33,289	0.4	0.4
Pocahontas	166	0.4	27,837	0.5	0.4
Preston	419	0.9	31,766	1.8	1.0
Putnam	1,255	2.8	35,004	3.0	2.8
Raleigh	1,678	3.8	36,012	4.3	4.8
Randolph	416	0.9	35,626	1.6	1.6
Ritchie	152	0.3	36,757	0.6	0.4
Roane	283	0.6	28,995	0.8	0.4
Summers	127	0.3	27,348	0.7	0.3
Taylor	187	0.4	27,174	0.9	0.4
Tucker	124	0.3	19,777	0.4	0.3
Tyler	118	0.3	27,519	0.5	0.3
Upshur	494	1.1	34,506	1.3	1.1
Wayne	516	1.2	31,778	2.2	1.3
Webster	132	0.3	38,705	0.5	0.3
Wetzel	282	0.6	25,898	0.9	0.7
Wirt	68	0.2	25,540	0.3	0.1
Wood	1,720	3.8	33,537	4.7	5.4
Wyoming	273	0.6	37,978	1.3	0.7
Total	**44,762**	**100.0**	**34,330**	**100.0**	**100.0**

Counties with larger shares of total employment and population attracted larger numbers of graduates (see Figure 6), and graduates were over-represented in counties with larger metropolitan areas and institutions of higher education. Monongalia County, which is home to West Virginia University, had 7.5 percent of total state employment, but nearly 12.2 percent of employment for graduates. Kanawha and Cabell counties also had large differentials between their share of overall employment and share of graduate employment.

Figure 6: Share of West Virginia graduates by county

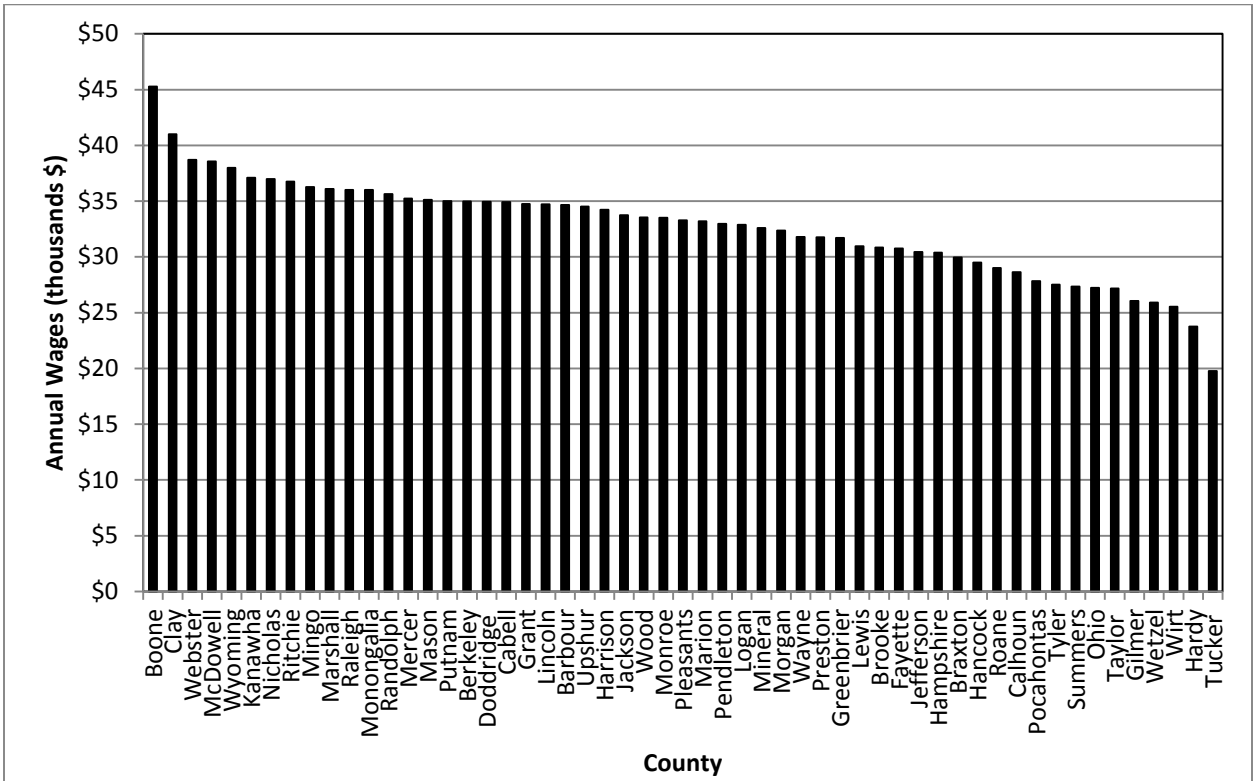


Source: Author Calculations

Income for graduates was more evenly distributed across the state than workers (Figure 7). The majority of the average income figures were between $25,000 and $35,000 annually. Graduates were paid exceptionally well in Boone and Clay counties, which had average annual incomes of $45,275 and $40,987 respectively. Webster and McDowell both had average annual income above $38,000.

The lowest average income was in Tucker County, where average annual income was $19,777. Hardy, Wetzel, and Wirt counties all had average incomes below $26,000 per year.

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



Source: Author

12 Metropolitan Area Statistics[12]

As Table 19 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 2012, nearly 65 percent worked in counties that were part of a Metropolitan Statistical Area (MSA), compared with less than 60 percent of all state workers. The metropolitan area with the largest number of graduates was the Charleston MSA with 21.4 percent of graduates employed in the state. The Morgantown MSA was next with 13.2 percent of graduates, followed by Huntington-Ashland MSA with nearly 11 percent. Hagerstown-Martinsburg MSA had the lowest percentage of graduates at 0.3 percent, followed by Winchester MSA at 0.5 percent.

[12] 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 19: Employment and income by metropolitan area[13]

	Number of Graduates	Share of Total Graduates (%)	Average Annual Income ($)	Share of State Employment (%)	Share of State Population (%)
Metropolitan Areas	28,874	64.5	34,905	59.1	55.7
Charleston MSA	9,589	21.4	37,256	19.4	16.5
Cumberland MSA	2,182	4.9	34,567	1.1	1.5
Hagerstown-Martinsburg MSA	136	0.3	32,372	4.7	6.5
Huntington-Ashland MSA	4,891	10.9	34,576	8.5	7.5
Morgantown MSA	5,895	13.2	35,706	8.5	6.9
Parkersburg-Marietta MSA	1,939	4.3	33,238	5.9	5.4
Steubenville-Weirton MSA	847	1.9	30,174	2.6	3.0
Washington MSA	1,066	2.4	30,425	2.1	2.9
Wheeling MSA	2,087	4.7	29,418	5.7	4.2
Winchester MSA	242	0.5	30,375	0.6	1.3
Micropolitan Counties	8,084	18.1	34,087	18.6	19.9
Beckley MicroSA	1,678	3.8	36,012	4.8	4.3
Bluefield MicroSA	1,277	2.9	35,243	2.9	3.4
Clarksburg MicroSA	2,280	5.1	33,685	5.4	5.1
Fairmont MicroSA	1,633	3.7	33,201	2.9	3.1
Oak Hill MicroSA	826	1.9	30,756	1.7	2.5
Point Pleasant MicroSA	390	0.9	35,127	0.9	1.5
Nonmetropolitan	7,804	17.4	32,455	22.3	24.4
Total	44,762	100.0	34,330	100.0	100.0

Micropolitan counties accounted for 18.1 percent of all graduate employment in 2011. The Clarksburg micro-SA had the largest share of graduates in this category, with 5.1 percent of all graduates. The next largest micro-SAs were Beckley and Fairmont, with 3.7 percent and 3.8 percent respectively. Nonmetropolitan areas employed 17.4 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 $34 thousand, considerably above the average of $32 thousand for non-metropolitan counties.

[13] This table uses the US Census Bureau's Core Based Statistical Area definitions in place in 2012. It includes only the West Virginia portion of each metropolitan or micropolitan statistical area.

The Charleston MSA had the highest average annual income, at $37,256. Average annual income in the Beckley micro SA was next at $36,012, followed by Morgantown MSA, at $35,706. The lowest incomes were found in Wheeling MSA ($34,330), Steubenville-Weirton MSA ($30,174), and Winchester MSA ($30,375).

13 Conclusions and Directions for Future Research

This report has examined work participation rates and wages for graduates of West Virginia's public higher education institutions. Overall, this research shows that graduates make a large contribution to the economic vitality of the state. In all 56,562 people who graduated in the last decade worked in the state in 2012. They earned a total of $2.4 billion in income, and worked in all industries and counties in the state.

As in previous reports of this kind, the results presented here illustrate that the work participation rate for graduates tends to fall as time since graduation increases. There are a variety of possible reasons for this trend. One of the most concerning for policy makers is the possibility that graduates move to other states to pursue better economic opportunities.

An important next step for this research would be to more closely examine the reasons why some graduates decide to work within West Virginia. This research presents only simple correlations among the different characteristics of graduates. A more in-depth study would attempt to reveal causal relationships between the characteristics of certain graduates and their decision to work within the state.

14 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.