Firm Size And Higher Education Graduate Employment In West Virginia 2010

Summary Results For Work Participation And Wages With Analysis By Experience, Residency, Degree, Sex, And Area Of Concentration

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By

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Executive Summary

West Virginia workers are employed by businesses which engage in a wide variety of activities and which also have very different employment levels. Since firms with different employment levels may have different human capital requirements, the employment of graduates and the wages that they earn may vary significantly across firms by employment size.

This report examines the employment of West Virginia public higher education graduates in the state in 2010 by firm employment size. Summary statistics are provided for three firm employment sizes: small (firms with less than 50 employees), medium (firms in the 50-499 employment range), and large (firms with 500 or more employees). Specifically, the data include graduates during the 1996-1997 to 2008-2009 period that worked for at least one quarter during 2010 at an establishment located in the state. Results for graduates are disaggregated by experience, residency for fee purposes, summary degree, sex, and area of concentration.

Selected highlights of this report include:

Summary Results

- West Virginia public higher education graduates that worked in the state in 2010 were concentrated in relatively large firms. Indeed, 42.5 percent of graduates worked at firms employing 500 or more workers in 2010, compared to 24.7 percent of graduates that worked at firms with less than 50 employees.
- This concentration of graduates at larger firms was driven by graduate employment at state and local governments. The distribution of graduates by firm employment size was more equal for private sector workers.
- Graduate wages increased with firm employment size in 2010. Annualized wages earned by graduates at firms with 500 or more employees were $39,032 in 2010, compared to $36,399 for graduates working at firms in the 50-499 employment range, and $32,233 for graduates working at firms with less than 50 employees.

Results By Experience

- As graduates gain experience, they become more likely to work at large firms. For instance, 40.4 percent of graduates during 2008-2009 worked at firms with 500 or more employees, compared to 44.0 percent of graduates during 1996-1997.
- Annualized wages tended to rise with experience for graduates working at small, medium, and large firms. Annualized wages for recent graduates tended to be higher at larger firms, but the gap gradually closed as graduates gained experience.

Results By Residency

- Graduate employment shares by firm size tended to be similar for in-state and out-of-state students. For in-state graduates, 24.8 percent worked at firms with fewer than 50 employees, compared to 25.1 percent for out-of-state graduates. Likewise, 42.3 percent of in-state graduates worked for large firms (those employing 500 or more), compared to 42.9 percent of out-of-state graduates.
- Annualized wages in 2010 were higher for in-state graduates than for out-of-state graduates. The difference was largest for firms in the 50-499 range, where in-state graduates earned $3,243 more than out-of-state graduates.
Results By Degree

- Large firms accounted for the biggest shares of graduates for Doctoral and Master’s degrees, at 60.4 percent and 55.5 percent, respectively. These large employment shares likely reflect the concentration of educators with Master’s and Doctoral degrees. Employment shares at large firms were similar for Associate’s, Bachelor’s, and First Professional graduates, at 39.0 percent, 38.5 percent, and 38.0 percent, respectively. First Professional graduates include lawyers and medical doctors.
- Annualized wages tended to rise with firm size for most degrees. This was most evident for the Associate’s degree, where graduates working at large firms earned $12,782 more than graduates working at small firms. In contrast, First Professional graduates earned the highest wages at medium sized firms in 2010, at $110,256, followed by small firms, at $93,030, and large firms, at $82,296.

Results By Sex

- Female graduates were much more concentrated in large firms than were male graduates. Indeed, 46.0 percent of female graduates worked at firms with 500 or more employees in 2010, compared to 36.4 percent for male graduates. This was driven by the concentration of females with degrees in Education.
- Wages varied much more by firm employment size for women than for men. Indeed, females earned $10,863 more at large firms than at small firms. In contrast, males earned $1,403 more at large firms than at small firms.

Results By Area Of Concentration

- Within areas of concentration, employment shares varied significantly by firm employment size. For instance, graduates tended to be very concentrated in large firms for Education, Health Professions, Math and Statistics, Foreign Languages, and Public Administration. In contrast, graduates tended to be very concentrated in small firms for Legal Professions, Agriculture, Mechanic and Repair Technologies, Natural Resources and Conservation, and Communications Technologies.
- Wages for graduates in Precision Production were $24,540 higher at large firms than at small firms in 2010. Likewise, wages were much higher at large firms for graduates in Mechanic and Repair Technologies, Education, Engineering Technologies, and Science Technologies. In contrast, wages were lower at large firms than small firms for graduates in Legal Professions, Computer Sciences, Communications Technologies, and Parks and Recreation.

The Data

The data analyzed in this study come from the matching of demographic information on graduates from West Virginia public institutions of higher education with employment records maintained by WorkForce West Virginia. Graduates reflect the highest degree earned during the 1996-1997 to 2008-2009 period. The self-employed, student workers, most church workers, and unpaid family workers are generally not covered by this data. **For this report, we do not include civilian federal government employment and wages due to recent administrative problems with the FEDES match.**

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Employment And Annual Wages By West Virginia Firm Employment Size

West Virginia workers are employed by businesses which engage in a wide variety of activities and which also have very different employment levels. Data on the characteristics of businesses are usually organized along at least two dimensions: establishments and firms. An establishment is a single physical location at which business is conducted. A firm is composed of one or more establishments under the same ownership.

For example, think of a national fast food restaurant chain with 10 restaurants located in the state. Each of the 10 individual locations would be classified as an establishment in West Virginia, but the chain as a whole would be classified as one firm in the state. Keep in mind that a national (or global) firm with many employees nationwide (or globally) but only a few in the state would be classified as a small firm in West Virginia.

Figure 1 shows the distribution of firms in the state by firm employment size.¹ Keep in mind that sales are often also used to classify the size of a business. We do not use that measure here because sales are not included in the data. Further, this report summarizes results for firms with at least one employee on the payroll on average for the calendar year 2010.

As the figure shows, the majority of firms in the state in 2010 were small, with 54.8 percent in the 1-4 employment range. Indeed, 94.0 percent of firms in the state employed less than 50 workers in 2010, 5.5 percent were in the 50-499 employment range, and 0.5 percent employed 500 or more workers.

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¹ Federal government workers are excluded, in order to maintain comparability with information available for state public higher education graduates.
Figure 2 shows the distribution of workers on the payrolls of establishments located in the state during 2010 by firm employment size. As the figure shows, while the majority of firms in the state employ 1-4 workers, workers are much more evenly spread across small, medium, and large firms. Indeed, the largest firms (those with 1,000 or more employees in the state) accounted for the largest share of workers, at 20.5 percent.

Small firms remain major employers in the state, with 32.3 percent of workers employed by firms with less than 50 employees. Firms with 50-499 workers accounted for 35.6 percent of state workers, while firms with 500 or more employees accounted for 32.1 percent of state employment.

![Figure 2: Share Of West Virginia Workers By Firm Employment Size In 2010](image)

The share of workers by firm employment size tended to vary significantly by the ownership of the firm. In particular, employment shares by firm employment size tended to differ across state government, local government, and private employers in 2010. As Figure 3 shows, private sector employment shares were fairly similar by firm employment size, while state and local government workers were much more likely to work for larger firms. Indeed, 68.5 percent of state government workers were employed by firms with 500 or more employees in 2010, compared to 58.6 percent for local government workers, and 25.6 percent of private sector workers.
In addition, annual wages differ significantly across firms by employment size. As Figure 4 shows, annual wages in 2010 were highest for firms in the 250-499 employment range, at $40,455, followed by those with 1,000 or more workers, with $40,311. Annual wages were lowest for firms with 1-4 workers, at $29,034.

Overall, wages tended to rise with employment size in 2010. For instance, workers at firms with fewer than 50 employees earned $32,040, compared to $38,194 for workers at firms in the 50-499 employment range, and workers at firms with 500 or more employees earned $39,260.
Annual wages by firm employment size also varied significantly by firm ownership, as Figure 5 shows. For firms with less than 50 employees in 2010, annual wages were highest for state government workers, at $39,587, followed by private sector workers, at $32,364, and local government employees, at $23,162. In contrast, private sector employees earned the highest wages at mid-sized firms (those in the 50-499 range), at $39,148, while state government workers again earned the highest wages at firms with 500 or more workers, earning $40,830 in 2010. For workers at firms in each ownership classification, wages were higher for workers at firms with 500 or more employees than for workers at firms with less than 50 employees.

![Figure 5: Average Annualized Wages For All Workers By Ownership And Firm Employment Size In 2010](image)

With this background and perspective for all West Virginia workers, we now turn to an analysis of the employment of West Virginia public higher education graduates by the size of the firm at which they work. Keep in mind that graduates employed by the federal government in West Virginia are not included in this analysis.

Figure 6 shows the distribution of state public higher education graduates working in West Virginia by firm employment size. As the figure shows, graduates worked at establishments of all sizes in 2010. However, firms with 1,000 or more workers employed the largest share of graduates at 28.8 percent.

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Overall, graduates tended to work at larger firms. Indeed, 42.5 percent of graduates worked at firms with 500 or more employees, compared to 32.7 percent working at firms with employment in the 50-499 range and 24.7 percent working at firms with fewer than 50 employees.

In addition, the distribution of graduates by firm employment size differed significantly from the distribution of all workers, with graduates more concentrated in larger firms. Indeed, in 2010 the employment share of graduates at firms with 500 or more workers was 10.4 percentage points higher than the comparable employment share for all workers.

Similar to results for all workers, the share of graduates by firm employment size differed significantly by firm ownership. As Figure 7 shows, graduates working for both state and local government were more likely to work at large firms. Indeed, 71.7 percent of graduates working for state government worked at firms with 500 or more employees. Likewise, 72.0 percent of graduates working for local government worked at firms with 500 or more employees. Private sector employees were much more evenly distributed across firms by employment size.

In addition, higher education graduates working for local government tended to be more concentrated in large firms than were all workers. This likely reflected the classification of teachers as local government employees. The distribution of graduates by firm size was more similar to all workers for state government and the private sector, but there remained a tendency for graduates to work at large firms.
Figure 7

Figure 8 shows annualized wages for graduates in 2010, disaggregated by firm employment size. As the figure shows, wages tended to rise with firm employment size. Indeed, annualized wages for graduates working at firms with less than 50 employees were $33,233, compared to $36,399 for graduates working at firms with employment in the 50-499 range, and $39,032 for graduates working at firms with 500 or more workers. However, the difference in wages between firms with fewer than 50 employees and firms with 500 or more employees was larger for all workers, at $7,220, than for graduates, at $5,799.
Graduate wages by firm employment size tended to vary by firm ownership, as Figure 9 shows. Wages for higher education graduates working in the state in 2010 for local government and private sector firms tended to rise with firm employment size. The pattern was a bit different for state government workers, with graduates working at firms with less than 50 employees earning $37,852, which exceeded wages earned by graduates at firms with 50-499 employees and wages earned by graduates at firms with 500 or more employees.

Figure 9
Average Annualized Wages For Public Higher Education Graduates By Ownership And Firm Employment Size In 2010

Overall, public higher education graduates working in the state tended to work at relatively large firms. Specifically, they tended to be more concentrated in firms with 500 or more employees than was the case for all workers in the state. This arises in part because a larger share of graduates worked in state and local government in 2010. Indeed, in 2010 32.8 percent of graduates working in the state worked for state and local government. In contrast, 17.7 percent of West Virginia workers were employed by state and local government enterprises. In addition, graduates also tended to be concentrated in relatively large state and local government firms.

Annualized wages for graduates working in the state increased with firm employment size, which was similar to results for all workers. The same pattern emerged for local government and private sector workers, but graduates working for state government firms posted the highest wages at firms with less than 50 employees.

This report now turns to an analysis of graduate characteristics by experience, residency for fee purposes, degree, sex, and area of concentration. This analysis disaggregates firms by their employment size in 2010, with a focus on firms in three categories: firms with 1-49 employees, firms with 50-499 employees, and firms with 500 or more employees.

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2 We calculate this by dividing state and local government in 2010 by total employment less federal government workers, using QCEW data. This makes the result comparable to the graduate data, which does not include federal workers.
Work Participation By Experience, Residency, Degree, Sex, And Area Of Concentration

Experience
Figure 10 shows the share of graduates working in the state by graduation year and firm employment size. Time since graduation is an indicator of workplace experience. However, this is not a perfect measure of experience, since graduates may endure periods of unemployment after graduation or may be employed during their years as students.

As graduates gain experience, they become a bit more likely to work at large firms. For instance, 40.4 percent of graduates during 2008-2009 worked at firms with 500 or more employees, compared to 44.0 percent of graduates during 1996-1997. The data show the opposite trend for smaller employers, with 33.6 percent of graduates during 2008-2009 working at firms in the 50-499 range, compared to 31.6 percent for graduates during 1996-1997. Finally, 26.0 percent of graduates during 2008-2009 worked at firms with fewer than 50 employees, compared to 24.4 percent for graduates during 1996-1997.

Residency For Fee Purposes
Figure 11 shows graduate employment shares by residency for fee purposes and by firm employment size. As the figure shows, graduate employment shares by firm size tended to be similar for in-state and out-of-state students. For in-state graduates, 24.8 percent worked at firms with fewer than 50 employees, compared to 25.1 percent for out-of-state graduates. Likewise, 42.3 percent of in-state graduates worked for large firms (those employing 500 or more), compared to 42.9 percent of out-of-state graduates.
In 2010, large firms accounted for the largest shares of working graduates for all summary degrees. As Figure 12 shows, large firms accounted for the biggest shares of graduates for Doctoral and Master’s degrees, at 60.4 percent and 55.5 percent, respectively. These large employment shares likely reflect the large concentration of educators with Master’s and Doctoral degrees. This occurred because educators, especially those with Doctoral degrees, tended to work at large firms. Employment shares at large firms were similar for Associate’s, Bachelor’s, and First Professional graduates, at 39.0 percent, 38.5 percent, and 38.0 percent, respectively. First Professional graduates include lawyers and medical doctors.

As the figure also shows, the share of graduates working at small firms was lowest for Doctoral graduates, at 12.2 percent, and largest for First Professional graduates, at 32.5 percent. The relatively large share of First Professional graduates working at small firms reflects the smaller organization size preferred by many firms in the legal sector.
Sex
Graduate employment shares by sex also differed by firm employment size. As Figure 13 shows, female graduates were much more concentrated in large firms than were male graduates. Indeed, 46.0 percent of female graduates worked at firms with 500 or more employees in 2010, compared to 36.4 percent for male graduates. In contrast, 23.1 percent of female graduates worked at small firms, compared to 27.5 percent for males. This likely reflects the fact that many graduates in the Education area of concentration were female.
Area Of Concentration
Table 1 summarizes graduate employment shares by area of concentration and firm employment size. As the table shows, graduate employment shares at large firms were highest for Education, Health Professions, Foreign Languages, Physical Sciences, and Public Administration. Employment shares at large firms were lowest for Legal Professions, Mechanic and Repair Technologies, Science Technologies, Natural Resources and Conservation, and Communications Technologies.

Within areas of concentration, employment shares varied significantly by firm employment size. For instance, graduates tended to be very concentrated in large firms for Education, Health Professions, Math and Statistics, Foreign Languages, and Public Administration. In contrast, graduates tended to be very concentrated in small firms for Legal Professions, Agriculture, Mechanic and Repair Technologies, Natural Resources and Conservation, and Communications Technologies.

Table 1
West Virginia Public Higher Education Graduate Work Participation By Area Of Concentration And Firm Employment Size In 2010

<table>
<thead>
<tr>
<th>Area Of Concentration</th>
<th>Work Participation By Firm Employment Size</th>
<th>Work Participation Rank By Firm Employment Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-49</td>
<td>50-499</td>
</tr>
<tr>
<td>Agriculture, Agriculture Operations</td>
<td>40.1</td>
<td>30.9</td>
</tr>
<tr>
<td>Architecture and Related Services</td>
<td>61.8</td>
<td>21.8</td>
</tr>
<tr>
<td>Biological and Biomedical Sciences</td>
<td>32.5</td>
<td>30.1</td>
</tr>
<tr>
<td>Business, Management, Marketing, and Related</td>
<td>32.9</td>
<td>39.3</td>
</tr>
<tr>
<td>Communication, Journalism, and Related Programs</td>
<td>28.2</td>
<td>35.9</td>
</tr>
<tr>
<td>Communications Technologies</td>
<td>35.5</td>
<td>36.8</td>
</tr>
<tr>
<td>Computer and Information Sciences</td>
<td>28.1</td>
<td>43.3</td>
</tr>
<tr>
<td>Education</td>
<td>11.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Engineering</td>
<td>31.7</td>
<td>37.1</td>
</tr>
<tr>
<td>Engineering Technologies/Technicians</td>
<td>32.4</td>
<td>38.6</td>
</tr>
<tr>
<td>English Language and Literature/Letters</td>
<td>27.7</td>
<td>39.7</td>
</tr>
<tr>
<td>Family and Consumer Sciences/Human Sciences</td>
<td>32.2</td>
<td>36.6</td>
</tr>
<tr>
<td>Foreign Languages, Literatures, and Linguistics</td>
<td>23.0</td>
<td>29.9</td>
</tr>
<tr>
<td>Health Professions and Related Clinical Sciences</td>
<td>21.4</td>
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<td>History</td>
<td>32.0</td>
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<td>Legal Professions and Studies</td>
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<td>40.1</td>
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<td>35.5</td>
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<td>Library Science</td>
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<td>n/a</td>
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<tr>
<td>Mathematics and Statistics</td>
<td>15.1</td>
<td>44.2</td>
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<tr>
<td>Mechanic and Repair Technologies/Technicians</td>
<td>27.8</td>
<td>54.6</td>
</tr>
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<td>Multi/Interdisciplinary Studies</td>
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<td>42.4</td>
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<td>Natural Resources and Conservation</td>
<td>33.8</td>
<td>40.8</td>
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<tr>
<td>Parks, Recreation, Leisure and Fitness Studies</td>
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<td>34.6</td>
</tr>
<tr>
<td>Personal and Culinary Services</td>
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<td>37.0</td>
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<td>Philosophy and Religious Studies</td>
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<td>Physical Sciences</td>
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<td>Precision Production</td>
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<td>43.1</td>
</tr>
<tr>
<td>Psychology</td>
<td>25.9</td>
<td>35.4</td>
</tr>
<tr>
<td>Public Administration and Social Service Prof</td>
<td>20.1</td>
<td>39.1</td>
</tr>
<tr>
<td>Science Technologies/Technicians</td>
<td>27.0</td>
<td>49.0</td>
</tr>
<tr>
<td>Security and Protective Services</td>
<td>22.9</td>
<td>39.7</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>29.1</td>
<td>39.6</td>
</tr>
<tr>
<td>Transportation and Materials Moving</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Visual and Performing Arts</td>
<td>32.3</td>
<td>33.3</td>
</tr>
</tbody>
</table>

n/a: data not available for this area of concentration
Annualized Wages By Experience, Residency, Degree, Sex, And Area Of Concentration

Experience
Figure 14 shows annualized wages by experience and firm employment size. As the figure shows, wages rise with experience for graduates working at small, medium, and large firms. Annualized wages for recent graduates tended to be higher at larger firms, but the gap gradually closed as graduates gained experience. Indeed, for graduates during 2008-2009 annualized wages were $27,743 in 2010 at firms with 500 or more employees, compared to $21,469 for graduates working at firms in the 50-499 range, and $17,446 for graduates working at firms with less than 50 employees. Thus, graduates during 2008-2009 working at large firms earned $10,297 more than graduates at small firms. In contrast, graduates during 1996-1997 that worked at large firms earned $49,115, compared to $49,309 for graduates working at firms in the 50-499 range, and $46,543 for graduates at small firms. In other words, for graduates with 13 years of experience, the wage gap between large and small firms was $2,572.

Residency For Fee Purposes
Annualized wages in 2010 were higher for in-state graduates than for out-of-state graduates. As Figure 15 shows, that was true for graduates working at small, medium, and large firms. The difference was largest for firms in the 50-499 range, where in-state graduates earned $3,243 more than out-of-state graduates. In-state graduates working at large firms earned $2,277 more than out-of-state graduates, while in-state graduates working at small firms earned $1,059 more than out-of-state graduates in 2010.
Degree
Annualized wages varied significantly by degree in 2010, with First Professional graduates earning the highest wages and Associate’s degree graduates earning the lowest wages. As Figure 16 shows, annualized wages tended to rise with firm size for most degrees. This was most evident for the Associate’s degree, where graduates working at large firms earned $12,782 more than graduates working at small firms. Bachelor’s and Doctoral graduates also earned more at large firms than small firms in 2010, with gaps of $4,209 and $7,190, respectively. Wages were similar across all three firm sizes for Master’s degree graduates. In contrast, First Professional graduates earned the highest wages at medium sized firms in 2010, at $110,256, followed by small firms, at $93,030, and large firms, at $82,296.
Sex
Annualized wages were higher for male graduates than for female graduates in 2010. As Figure 17 shows, wages varied much more by firm employment size for women than for men. Indeed, female graduates working at small firms earned $25,142 in 2010, compared to $29,807 for those working at medium size firms, and $36,005 for those working at large firms. Thus, the wage gap between small and large firms was $10,863 for females. In contrast, the wage gap between small and large firms was $1,403 for males.

![Figure 17](image)

**Figure 17**
**Average Annualized Wages For Public Higher Education Graduates Working In W.Va. By Sex And Firm Employment Size In 2010**

![Bar Chart]

**Source:** author calculations

Area Of Concentration
Table 2 shows annualized wages in 2010 by firm employment size and area of concentration. Graduates in Engineering, Engineering Technologies, Health Professions, Precision Production, and Mechanic and Repair Technologies earned the highest wages in 2010 among those working at large firms. Wages at large firms in 2010 were lowest in English, History, Communications Technologies, Foreign Languages, and Family and Consumer Sciences.

Overall, wages within area of concentration tended to be similar by firm size, so that if wages were relatively high (low) for large firms they were also relatively high (low) for small and medium size firms as well. However, there were some notable exceptions. For instance, wages for graduates in Precision Production were $24,540 higher at large firms than at small firms in 2010. Likewise, wages were much higher at large firms for graduates in Mechanic and Repair Technologies, Education, Engineering Technologies, and Science Technologies. In contrast, wages were lower at large firms than small firms for graduates in Legal Professions, Computer Sciences, Communications Technologies, and Parks and Recreation.
<table>
<thead>
<tr>
<th>Area Of Concentration</th>
<th>Annualized Wages By Firm Employment Size</th>
<th>Annualized Wage Rank By Firm Employment Size</th>
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</thead>
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<td></td>
<td>1-49</td>
<td>50-499</td>
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<tr>
<td>Agriculture, Agriculture Operations</td>
<td>26,847</td>
<td>31,433</td>
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<td>Architecture and Related Services</td>
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<td>Biological and Biomedical Sciences</td>
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<td>Liberal Arts and Sci., Gen. Std., and Humanities</td>
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<td>26,577</td>
</tr>
<tr>
<td>Library Science</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Mathematics and Statistics</td>
<td>32,917</td>
<td>36,853</td>
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<tr>
<td>Mechanic and Repair Technologies/Technicians</td>
<td>26,367</td>
<td>43,128</td>
</tr>
<tr>
<td>Multi/Interdisciplinary Studies</td>
<td>24,893</td>
<td>25,653</td>
</tr>
<tr>
<td>Natural Resources and Conservation</td>
<td>32,629</td>
<td>37,134</td>
</tr>
<tr>
<td>Parks, Recreation, Leisure and Fitness Studies</td>
<td>27,701</td>
<td>25,296</td>
</tr>
<tr>
<td>Personal and Culinary Services</td>
<td>17,316</td>
<td>17,369</td>
</tr>
<tr>
<td>Philosophy and Religious Studies</td>
<td>n/a</td>
<td>20,300</td>
</tr>
<tr>
<td>Physical Sciences</td>
<td>38,514</td>
<td>42,884</td>
</tr>
<tr>
<td>Precision Production</td>
<td>22,908</td>
<td>32,426</td>
</tr>
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<td>Psychology</td>
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<td>24,787</td>
</tr>
<tr>
<td>Public Administration and Social Service Prof</td>
<td>24,186</td>
<td>28,687</td>
</tr>
<tr>
<td>Science Technologies/Technicians</td>
<td>20,605</td>
<td>29,853</td>
</tr>
<tr>
<td>Security and Protective Services</td>
<td>21,605</td>
<td>27,962</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>21,005</td>
<td>25,380</td>
</tr>
<tr>
<td>Transportation and Materials Moving</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Visual and Performing Arts</td>
<td>15,893</td>
<td>18,739</td>
</tr>
</tbody>
</table>

n/a: data not available for this area of concentration
Conclusion And Directions For Future Research

This report examined graduate employment and wages in West Virginia by firm employment size. The analysis disaggregated the results by experience, residency for fee purposes, degree, sex, and area of concentration. It showed that graduates worked at firms of all sizes in 2010, ranging from small firms with 1-4 employees up to firms with 1,000 or more employees.

The report also showed that public higher education graduates tended to be concentrated in large firms, those with 500 or more employees in 2010. This was driven, in part, by graduates working at jobs in state and local government. In addition, the report showed that wages tended to rise with firm size and that this was particularly true for graduates with less experience.

This report summarized the analysis of the West Virginia employment and wages of state public higher education graduates. As noted above, the data includes graduates that worked at establishments located in the state. It would be very useful to develop data that would allow the analysis of graduates by place of residence. This matters because local labor markets often spill across the state’s boundaries. Indeed, there are 10 metropolitan statistical areas with counties in West Virginia, but only two of those are completely contained within the state. This suggests that many state residents commute across West Virginia’s borders to work and thus are not currently reflected in the data.

In addition, it will be important to continue to track the employment of graduates in the state, particularly as the state and national economy struggle to generate strong job growth. Continuing analysis will allow policymakers and state residents to follow trends in graduate employment as they develop and to compare them to trends for residents with lower levels of educational attainment.

It would also be useful to match data for state public higher education graduates to work in all 50 states and the District of Columbia. Further, it would be informative to expand the measure of income beyond wages from work, to include asset income (dividends, interest, rent) and transfer income. This would be possible through a program administered by the Internal Revenue Service, Statistics of Income, Joint Statistical Research Program. This data would also allow the analysis of graduate work and income in a panel data setting. This program is also administered in a way that carefully maintains the confidentiality of the data.

Finally, it would also be useful to develop a system to forecast the demand for and supply of college graduates in West Virginia. Demand-side projections would be driven by state occupational projections (using the standard occupational classification (SOC) system). These demand-side occupational projections would then be matched to groups of instructional programs using the Perkins IV Crosswalk. This would allow more detail in the projections than is present in forecasts of summary degree demand, such as those available in Carnevale et al. (2010).

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Appendix I: Detailed Description Of Employment Data

The West Virginia data analyzed in this study come from the matching of demographic information on graduates from West Virginia institutions of higher education (compiled by the HEPC) with employment records maintained by WorkForce West Virginia. Graduates reflect the highest degree earned at the time of measurement (during the 1996-1997 to 2008-2009 period).

The employment data come from West Virginia unemployment compensation records. This is a well-known dataset which measures employment by place of work. It covers jobs and wages reported by firms participating in the West Virginia Unemployment Compensation system. 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.

Covered employment counts 692,305 jobs at establishments in West Virginia in 2010. As Figure 18 shows, this measure of employment is lower than two other major measures of employment: employment measured by the U.S. Bureau of Economic Analysis (BEA) and employment measured by the U.S. Bureau of Labor Statistics (BLS) household survey. Differences arise because of the treatment of the self-employed, who are excluded from covered jobs but are included in the BEA measure and in the BLS household survey, as well as the exclusion of student workers, most church workers, and unpaid family members from the measure of covered jobs. Further, BLS household employment is measured by place of residence, which includes state residents working out of state.

Finally, the wages documented in the report are an important source of compensation, but they are not the only source. Data on wage income is readily available, well understood, and is useful in the evaluation of returns to work of state higher education graduates. However, wage data does not include fringe benefits provided by firms, particularly employer-paid pension and health insurance. This source of income has accounted for an increasing share of work compensation during the last 30 years. Indeed, the share of private other labor income to gross earnings by place of work has risen from 6.3 percent in 1969 to 14.4 percent by 2010 for West Virginia.

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4 We would like to thank Rob Anderson and Larry Ponder of the WVHEPC for providing the bulk of the data used in this study.
5 Federal government jobs are added in separately for completeness.
Figure 18
Three Measures Of West Virginia Employment

[Graph showing three measures of West Virginia employment over the years 1990 to 2010. The measures are BLS Covered Jobs, BEA Employment, and BLS Household Survey.]
Appendix II: List Of Institutions, Degrees, And Areas Of Concentration

Public Higher Education Institutions
Bluefield State College
Community and Technical College at WVU Tech
Community and Technical College of Shepherd
Concord University
Fairmont State University
Eastern West Virginia Community and Technical College
Fairmont State Community and Technical College
Glenville State College
Marshall Community and Technical College
Marshall University
New River Community and Technical College
Potomac State College of West Virginia University
Shepherd University
Southern West Virginia Community & Tech College
West Liberty State College
West Virginia Northern Community College
West Virginia School of Osteopathic Medicine
West Virginia State Community and Technical College
West Virginia State University
West Virginia University
West Virginia University Institute of Technology
West Virginia University at Parkersburg

Degrees
Undergraduate Certificate
Associate’s Degree
Bachelor’s Degree
First Professional
Master’s Degree
Post-Master’s Certificate
Doctoral Degree
Areas Of Concentration And Majors

Agriculture, Agriculture Operations, and Related Sciences
- Agricultural Economics
- Agriculture, Agriculture Operations, and Related Sciences, Other.
- Agriculture, General
- Animal Sciences, General
- Aquaculture
- Plant Sciences, Other.

Architecture and Related Services
- Landscape Architecture

Biological and Biomedical Sciences
- Anatomy
- Biochemistry
- Biochemistry, Biophysics and Molecular Biology, Other
- Biological and Biomedical Sciences, Other.
- Biology/Biological Sciences, General
- Botany/Plant Biology
- Exercise Physiology
- Genetics, General
- Medical Microbiology and Bacteriology
- Microbiological Sciences and Immunology, Other
- Pharmacology and Toxicology
- Physiology, General
- Reproductive Biology
- Zoology/Animal Biology

Business, Management, Marketing, and Related Support Services
- Accounting
- Accounting Technology/Technician and Bookkeeping
- Administrative Assistant and Secretarial Science, General
- Business Administration and Management, General
- Business Administration, Management and Operations, Other
- Business, Management, Marketing, and Related Support Services, Other
- Business/Commerce, General
- Business/Managerial Economics
- Business/Office Automation/Technology/Data Entry
- Entrepreneurship/Entrepreneurial Studies
- Executive Assistant/Executive Secretary
- Fashion Merchandising
- Finance, General
- Hospitality Administration/Management, General
Hospitality Administration/Management, Other
Hotel/Motel Administration/Management
Information Resources Management/CIO Training.
Labor and Industrial Relations
Management Information Systems, General
Marketing/Marketing Management, General
Office Management and Supervision
Operations Management and Supervision
Retailing and Retail Operations.
Sales, Distribution, and Marketing Operations, General
Tourism and Travel Services Marketing

Communication, Journalism, and Related Programs
Communication Studies/Speech Communication and Rhetoric.
Communication, Journalism, and Related Programs, Other.
Journalism

Communications Technologies/Technicians and Support Services
Graphic and Printing Equipment Operator, General Production.
Printing Press Operator.
Graphic Communications, Other.
Communications Technologies/Technicians and Support Services, Other

Computer and Information Sciences and Support
Computer and Information Sciences and Support Services, Other.
Computer and Information Sciences,
Computer and Information Sciences, General.
Computer Programming, Specific Applications.
Computer Programming/Programmer, General.
Computer Science.
Information Science/Studies.

Education
Adult and Continuing Education and Teaching
Agricultural Teacher Education
Business Teacher Education
Counselor Education/School Counseling and Guidance Services.
Curriculum and Instruction.
Early Childhood Education and Teaching.
Education, General.
Educational Administration and Supervision, Other.
Educational Leadership and Administration, General.
Educational Psychology. (Moved, Report Under 42.18 series)
Educational/Instructional Media Design.
Elementary Education and Teaching
Junior High/Intermediate/Middle School Education and Teaching
Kindergarten/Preschool Education and Teaching
Physical Education Teaching and Coaching
Reading Teacher Education
Secondary Education and Teaching
Special Education and Teaching, General
Teacher Assistant/Aide.
Teacher Education and Professional Development, Specific Levels and Methods, Other
Technical Teacher Education.
Trade and Industrial Teacher Education

Engineering

Aerospace, Aeronautical and Astronautical Engineering
Chemical Engineering.
Civil Engineering, General
Computer Engineering, General.
Computer Software Engineering.
Electrical, Electronics and Communications Engineering
Engineering Physics
Engineering Science
Engineering, General.
Engineering, Other
Environmental/Environmental Health Engineering
Industrial Engineering.
Mechanical Engineering.
Mining and Mineral Engineering
Petroleum Engineering.
Systems Engineering.

Engineering Technologies/Technicians

Aeronautical/Aerospace Engineering Technology/Technician
Architectural Drafting and Architectural CAD/CADD
Architectural Engineering Technology/Technician
Automotive Engineering Technology/Technician
Civil Engineering Technology/Technician
Computer Engineering Technology/Technician
Computer Technology/Computer Systems Technology
Drafting and Design Technology/Technician, General
Electrical, Electronic and Communications Engineering Technology/Technician
Electromechanical Technology/Electromechanical Engineering Technology
Energy Management and Systems Technology/Technician
Engineering Technologies/Technicians, Other
Engineering/Industrial Management
Environmental Engineering Technology/Environmental Technology
Industrial Production Technologies/Technicians, Other
Industrial Technology/Technician
Manufacturing Technology/Technician
Mechanical Drafting and Mechanical Drafting CAD/CADD.
Mechanical Engineering Related Technologies/Technicians, Other
Mechanical Engineering/Mechanical Technology/Technician
Mining Technology/Technician.
Occupational Safety and Health Technology/Technician
Petroleum Technology/Technician
Surveying Technology/Surveying.

**English Language and Literature/Letters**
Creative Writing.
English Language and Literature, General.
Speech and Rhetorical Studies.

**Family and Consumer Sciences/Human Sciences**
Child Care and Support Services Management.
Family and Consumer Sciences/Human Sciences, General
Housing and Human Environments, Other.

**Foreign Languages, Literatures, and Linguistics**
Foreign Languages and Literatures, General
French Language and Literature.
Sign Language Interpretation and Translation.

**Health Professions and Related Clinical Sciences**
Athletic Training/Trainer
Audiology/Audiologist and Speech-Language Pathology/Pathologist.
Clinical Laboratory Science/Medical Technology/Technologist
Clinical/Medical Laboratory Science and Allied Professions, Other
Clinical/Medical Laboratory Technician
Community Health Services/Liaison/Counseling
Cytotechnology/Cytotechnologist
Dental Clinical Sciences, General
Dental Hygiene/Hygienist
Dental Laboratory Technology/Technician
Dentistry (DDS, DMD).
Dietetics/Dietitian (RD).
Emergency Medical Technology/Technician (EMT Paramedic).
Health Information/Medical Records Technology/Technician
Health Professions and Related Clinical Sciences, Other
Health/Health Care Administration/Management
Medical Administrative/Executive Assistant and Medical Secretary
Medical Radiologic Technology/Science – Radiation Therapist
Medical Transcription/Transcriptionist
Medical/Clinical Assistant
Medicine (MD).
Nuclear Medical Technology/Technologist
Nurse/Nursing Assistant/Aide and Patient Care Assistant
Nursing, Other
Nursing/Registered Nurse (RN, ASN, BSN, MSN)
Occupational Therapy/Therapist
Osteopathic Medicine/Osteopathy (DO).
Pharmaceutics and Drug Design.
Pharmacy (PharmD [USA], PharmD or BS/BPharm [Canada])
Pharmacy Technician/Assistant
Physical Therapist Assistant
Physical Therapy/Therapist
Psychiatric/Mental Health Services Technician
Public Health, General (MPH, DPH).
Respiratory Care Therapy/Therapist
Speech-Language Pathology/Pathologist
Surgical Technology/Technologist
Veterinary/Animal Health Technology/Technician and Veterinary Assistant
Vocational Rehabilitation Counseling/Counselor

History
History, General

Legal Professions and Studies
Law (LL.B., J.D.).
Legal Administrative Assistant/Secretary.
Legal Assistant/Paralegal.
Legal Professions and Studies, Other.

Liberal Arts and Sciences, General Studies and Humanities
General Studies
Humanities/Humanistic Studies.
Liberal Arts and Sciences, General Studies and Humanities, Other
Liberal Arts and Sciences/Liberal Studies

Library Science
Library Science/Librarianship

Mathematics and Statistics
Mathematics, General.
Statistics, General

Mechanic and Repair Technologies/Technicians
Avionics Maintenance Technology/Technician
Heating, Ventilation, AC and Refrigeration Maintenance Technology (HAC(R), HVAC(R)).
Heavy/Industrial Equipment Maintenance Technologies, Other
Mechanic and Repair Technologies/Technicians, Other

Multi/Interdisciplinary Studies
Biological and Physical Sciences
Gerontology
Multi-/Interdisciplinary Studies, Other
Science, Technology and Society
Systems Science and Theory

Natural Resources and Conservation
Environmental Studies.
Forest Management/Forest Resources Management.
Forest Sciences and Biology.
Forest Technology/Technician.
Forestry, General.
Natural Resource Economics.
Natural Resources Management and Policy, Other.
Wildlife and Wildlands Science and Management.
Wood Science and Wood Products/Pulp and Paper Technology.

Parks, Recreation, Leisure and Fitness Studies
Health and Physical Education, General
Kinesiology and Exercise Science
Parks, Recreation and Leisure Facilities Management
Parks, Recreation and Leisure Studies

Personal and Culinary Services
Culinary Arts/Chef Training.
Food Preparation/Professional Cooking/Kitchen Assistant.
Institutional Food Workers
Restaurant, Culinary, and Catering Management/Manager

Philosophy and Religious Studies
Philosophy

Physical Sciences
Chemistry, General.
Geology/Earth Science, General
Physical Sciences.
Physics, General.

Precision Production
Machine Shop Technology/Assistant
Welding Technology/Welder
Precision Metal Working, Other

Psychology
Counseling Psychology
Educational Psychology
Psychology, General
School Psychology

Public Administration and Social Service Prof
Community Organization and Advocacy
Public Administration
Social Work

Sciences Technologies/Technicians
Chemical Technology/Technician
Science Technologies/Technicians, Other

Security and Protective Services
Corrections
Criminal Justice/Police Science
Criminal Justice/Safety Studies
Criminalistics and Criminal Science
Fire Protection and Safety Technology/Technician
Forensic Science and Technology
Security and Protective Services, Other

Social Sciences
Economics, General
Geography
International Relations and Affairs
Political Science and Government, General.
Social Sciences, General.
Social Sciences, Other.
Sociology

Visual and Performing Arts
Art/Art Studies, General
Commercial and Advertising Art
Design and Visual Communications, General
Drama and Dramatics/Theatre Arts, General
Drawing
Graphic Design
Interior Design
Music, General
Visual and Performing Arts, General
Visual and Performing Arts, Other