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Greater Wheeling Regional Plan

WORKFORCE AND EDUCATION
ASSESSMENT



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Executive Summary

Human capital is a crucial element of any regional economic growth plan, as companies looking to locate or grow in a region require a skilled workforce to meet the demands of their businesses. In this report, we examine human capital in the Wheeling Metropolitan Statistical Area, focusing on occupational and educational requirements to support the region’s growth over the next five years. Some highlights of this research are as follows:

- We predict that the region will have job openings of more than 1,400 workers per year over the next five years.
- During the same period, we predict that the region will have more than 1,300 residents graduating with high school diploma, more than 700 residents with some years of college education and an associate’s degree, and more than 1,000 with a bachelor’s degree or higher.
- Overall, the number of Wheeling residents entering the labor market will likely exceed the demand, creating an excess supply of workers.

As shown in Table 1, the largest excess supply in the region will be in the market for workers with a high school degree, followed by the excess supply in the market for workers with a bachelor’s degree or higher, and then for workers with some years of college or an associate’s degree. While the overall labor market is in excess supply, it does not guarantee it will always satisfy the demand for every occupation because there may be cases where specific occupations require degrees from very specific majors not supplied in the region.

Considering the oversupply condition, the challenge for the region to facilitate labor mobility for its residents, allowing them to earn income outside of the region, which will allow the region’s labor market to match workers and companies efficiently. At the same time, the region can market the oversupply condition as one of its strengths in that it shows the region’s capability in providing a sufficient supply of skilled workers.

Table 1: Predicted Supply and Demand of Workers by Educational Attainment

Educational Attainment	Demand	Supply	Supply-Demand
High School Degree	495	1,307	812
Some College/Associate's Degree	504	721	217
Bachelor's Degree or Higher	438	1,037	599
Total	1,437	3,065	1,628

Source: Authors’ calculations

1 Introduction

Human capital is a crucial element of any regional economic growth plan, as companies looking to locate or grow in a region require a skilled workforce to meet the demands of their businesses. In this report, we examine human capital in the Wheeling region, focusing on occupational and educational requirements to support the region's growth over the next five years. First, we estimate the additional workers needed to satisfy the demand that is driven by business growth. We estimate workers based on the occupational skills, which we define in five broad occupational categories. We then examine the level of education needed for these occupations and assess whether the region's education system produces enough number of graduates that have skills needed by businesses.

2 Workforce Supply and Demand Analysis

In this section, we first look at the composition of the region's occupation and educational attainment, assess their earnings, and then examine the types of occupation and educations that the region needs to support its expected economic growth. For this study we utilize data from the 2017 US Census American Community Survey, which is the most recent data available on regional occupational composition. This occupational data is highly aggregated at the county level,¹ and so we classify occupations into five major categories:

- Management, business, science, and arts
- Natural resources, construction, and maintenance
- Production, transportation, and material moving
- Sales and office
- Services

Among the five occupational categories, occupations in management, business, science, and arts tend to have the highest earnings,² followed by occupations in natural resources, construction, and maintenance. In third place in terms of earnings are production, transportation, and material moving occupations. Sales and office occupations, on the other hand, tend to have the lowest earnings. This pattern is evident in the US, West Virginia, and Wheeling in 2018 (Figure 1). It is also important to note that the median earnings for the natural resource, construction, and maintenance occupations in Wheeling is more than \$56,000, which is \$6,000 more than earnings of the same occupations in the state, or \$14,000 more than earnings of the same occupation in the US. Earnings for the other occupations in Wheeling region are comparable to those in the state but are lower than those in the US.

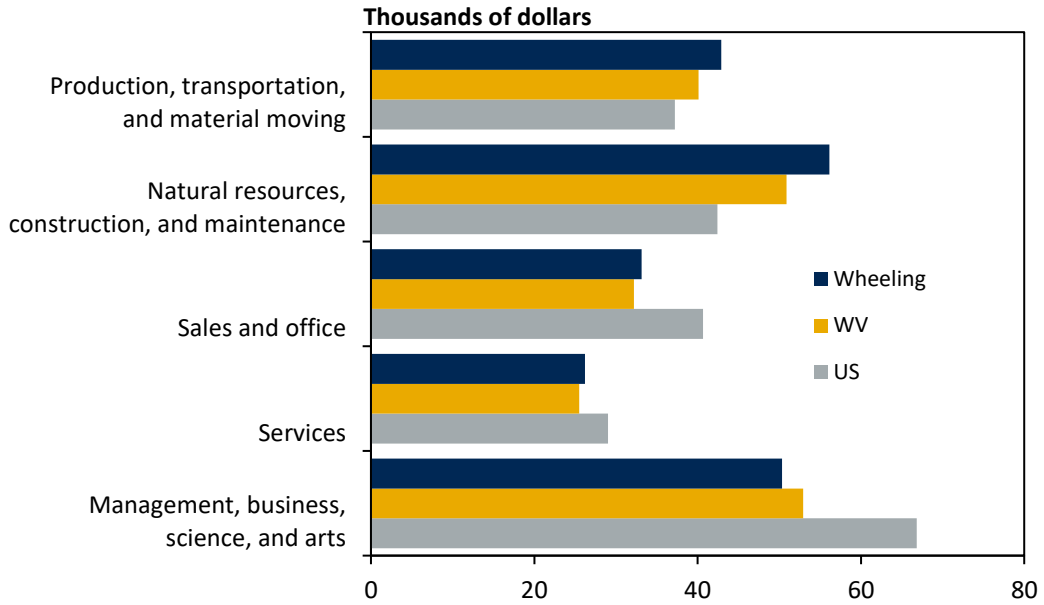
In terms of the distribution of occupations, Wheeling is only slightly different from the state and US. In general, Wheeling has a slightly smaller share of management, business, science, and arts occupations,

¹ Occupational categories are originally based on the Bureau of Labor Statistics' Standard Occupational Classification (SOC). However, the county level data only allows the occupations to be broken down into these five major categories. More detailed occupational classifications are not available at the county level.

² Median earnings for each sector are calculated as the average of the median earnings in the three counties in the Wheeling Metropolitan Area.

but slightly larger shares of services occupations; and natural resource, construction, and maintenance occupations (Figure 2).

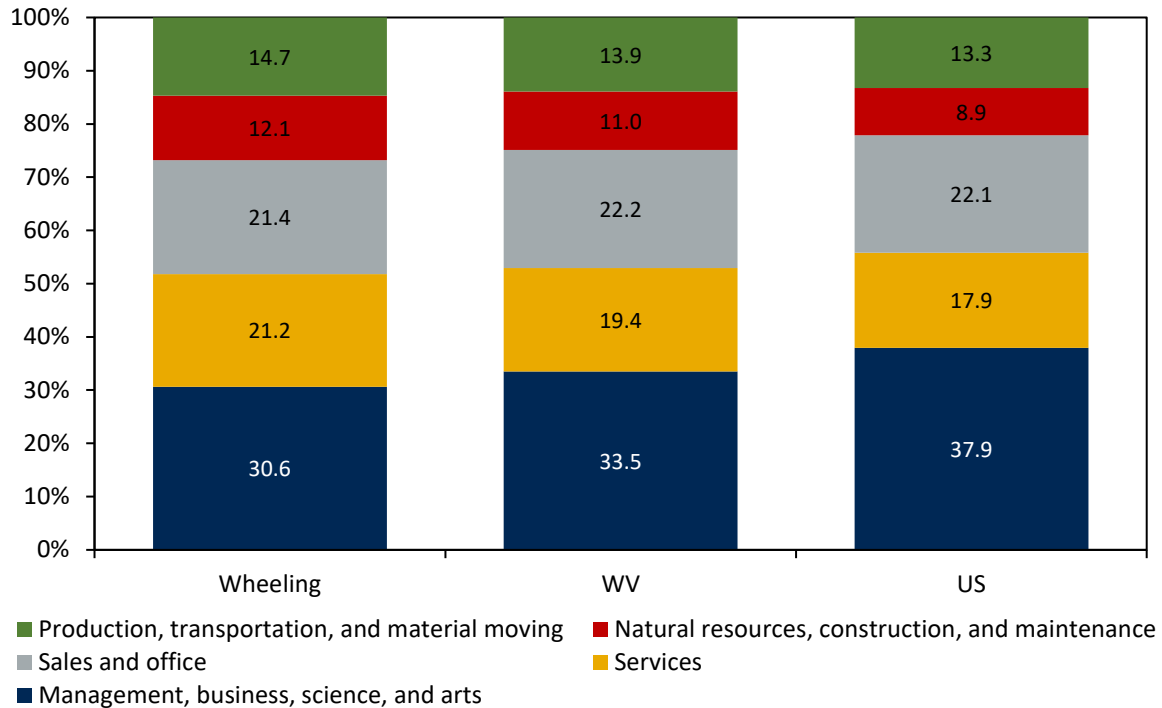
Figure 1: Median Annual Earnings by Occupation



Source: 2018 American Community Survey, 5-Year Estimates

Note: Median earnings for Potomac Highlands region is calculated as the weighted average of the median earnings in the region's five counties.

Figure 2: Working Residents by Occupation



Source: 2018 US Census American Community Survey, 5-Year Estimates

To project the future composition of occupations in the Wheeling region, we use two sets of information: a sector-occupation matrix drawn from the US Census American Community Survey,³ and a forecast of the region’s industrial growth from the WVU BBER Econometric Model. The sector-occupation matrix shows the composition of occupations that typically exists within each sector. Though this composition changes over time, it changes slowly and should not vary significantly in the next five years. We use the ACS data in order to derive the occupational composition specific to the Wheeling region, which we believe is more accurate than a state-level or national-level matrix published by the Bureau of Labor Statistics.

The matrix we use in this analysis is reproduced in Table 2. As shown, two sectors in the region—agriculture, forestry, fishing, hunting, and mining; and construction—require a large number of natural resource, construction, and maintenance occupations (68 percent and 74 percent, respectively). Much of this pattern is affected by the strong presence of the growing oil and gas industry, with its associated pipeline construction activities.

The manufacturing sector and the transportation, warehousing, and utilities sector require a large number of production-transportation occupations (63 percent and 60 percent, respectively). Likewise, two other major industries, education, healthcare, and social assistance industries and professional, scientific, and management services industries require high level of workers in management, business,

³ This matrix is informed by the sector-occupation matrix produced by the US Bureau of Labor Statistics but allows us to derive a matrix tailored to the Potomac Highlands region.

science, and arts occupations (62 percent and 44 percent, respectively), while the arts, entertainment, recreation, accommodation and food services need plenty of services occupations (70 percent).

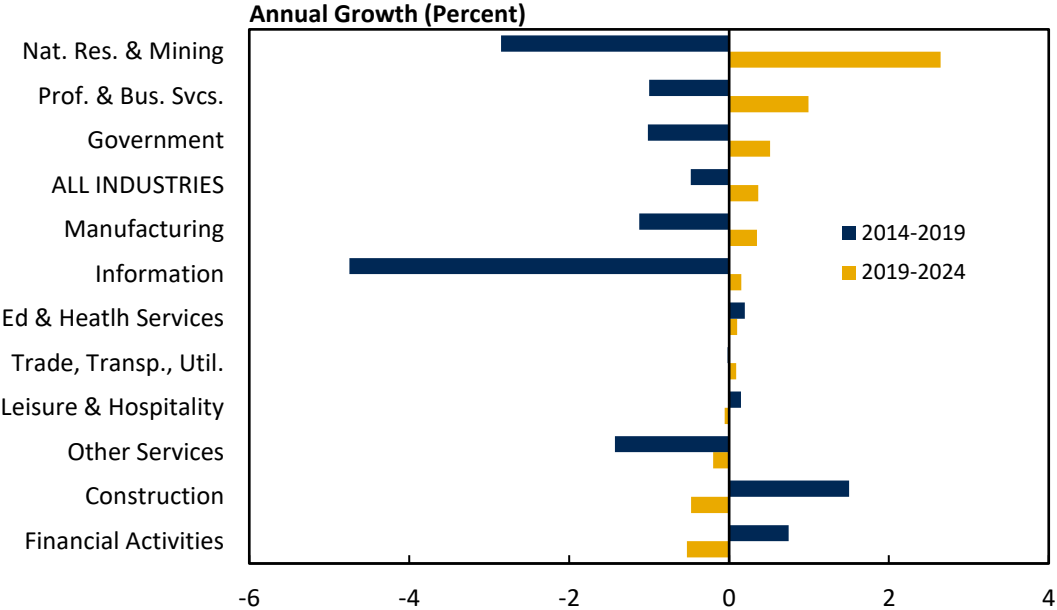
Table 2: Sector-Occupation Matrix

Employing Sector	Occupation Group (%)				
	Mgmt., Business, Science, and Arts	Services	Sales and Office	Nat. Resources, Construct. & Maintenance	Production, Transp. & Material Moving
Ag., Forestry, Fishing-Hunting, & Mining	14.0	2.7	3.1	67.6	12.6
Construction	10.7	1.1	6.3	74.5	7.5
Manufacturing	14.1	3.3	10.0	9.9	62.8
Wholesale trade	16.2	2.4	34.9	4.8	41.8
Retail trade	10.6	6.3	58.6	3.6	20.9
Transp., Warehousing, & Utilities	9.4	0.6	16.6	13.3	60.1
Information	43.8	5.3	35.4	9.2	6.3
Finance, Ins., Real Estate & Leasing	32.1	6.5	57.8	3.0	0.6
Prof., Scientific, & Mgmt Services	43.9	28.9	20.2	0.9	6.1
Educ. Services, Health Care & Social Assist.	61.7	23.7	11.4	0.7	2.4
Arts, Ent., Rec., & Acc. & Food Services	13.1	69.8	11.7	1.7	3.6
Other Services, except Public Adm.	20.5	32.9	19.5	19.4	7.7
Public Administration	34.9	37.1	21.6	3.6	2.9
All Sectors	30.6	21.2	21.4	12.1	14.7

Source: 2018 American Community Survey, 5-Year Estimates. Totals may not add up to 100 percent due to rounding.

The second component needed to project the Wheeling’s occupational composition in the next five years is the region’s employment forecast by sector. We draw from the WVU BBER Econometric Model, which forecasts the Wheeling region will experience an annual employment growth of 0.4 percent from 2019 through 2024. This is better than the -0.5 percent annual job growth it experienced in the previous five years between 2014 and 2019. Job growth in the construction sector changes from a strong 1.5 percent annually in the previous five years to -0.5 percent annually in the next five years. This large swing in the construction sector is caused by, among others, the completion of pipeline construction projects by the end of 2019. Between 2019 and 2024, the natural resource and mining sector is expected to grow the strongest at 2.6 percent per year, followed by the professional and business services sector at 1.0 percent, the government sector at 0.5 percent, and manufacturing sector at 0.4 percent (Figure 3).

Figure 3: Employment Forecast by Sector



Source: Bureau of Labor Statistics and WVU Bureau of Business and Economic Research

We use the above forecast to estimate the projected employment by sector through 2024. Applying the sector-occupation matrix depicted in Table 2 to the projected employment by sector yields the composition of occupations the region need to support its industrial growth through 2024. This composition represents the region’s demand for new jobs by occupation through 2024.

The estimated job growth above represents only a part of the region’s source of job openings. The other sources of job openings come from the need to replace workers who exit the labor force (due to any reason, such as death, retirement, or going back to school) or workers who transfer to different occupations. The rates of labor force exit and transfer differ by occupation. We apply average national exit rates and transfer rates to each occupation category, giving us an estimate of total job openings associated with labor force exits and job transfers.

Combining job openings from job growth, labor force exits, and job transfers, we estimate that approximately more than 1,600 job openings per year will be available in the region through 2024 (Table 3). The biggest job openings exist in the services occupation at 390 jobs per year, followed by the management, business, science, and arts occupations at about 380 per year and sales-office occupations at nearly 380 jobs per year through 2024. The natural resource, construction, and maintenance occupations pose the biggest job openings associated with job growth, but the fewest openings associated with labor force exits and job transfers, resulting in a total job opening of nearly 240 per year through 2024.

Table 3: Estimated Job Openings by Occupation

Occupation	Employment		Annual:			
	2019	2024	Job Growth	Exit	Transfer	Total Job Openings
Mgmt., Business, Science, and Arts	18,410	18,724	63	91	226	380
Services	14,857	15,037	36	151	203	390
Sales and Office	13,938	14,057	24	143	212	378
Nat. Res., Construct. & Maintenance	7,117	7,512	79	47	112	239
Production, Transp. & Material Moving	8,248	8,397	30	72	130	231
Total	62,570	63,728	232	504	882	1,618

Source: Authors’ calculations

Our next step is use the above estimated demand for occupations to estimate the region’s demand for education. We apply an occupation-education matrix to the estimated job openings by occupation. This matrix (Table 4: Occupation-Educational Attainment Matrix) shows the typical composition of educational attainment needed for each occupation. For instance, management, business, and science occupations require many more people with a bachelor’s degree or higher than typical production, transportation, and material moving occupations. More specifically, on average, of all people holding management, business, and science occupations, nearly 50 percent have a bachelor’s degree or higher. In comparison, of all workers holding the production, transportation, and material-moving occupations, only 6.7 percent have a bachelor’s degree or higher, and as many as nearly 70 percent have only a high-school degree or less. Overall, about 30 percent of all types of occupations require some college education or an associate’s degree.

Table 4: Occupation-Educational Attainment Matrix

Occupation	Educational Attainment (%)			
	High School Degree or Less	Some-College / Associate's Degree	Bachelor's Degree	Graduate / Professional Degree
Mgmt., Business, Science, and Arts	14.2	27.3	37.2	21.3
Services	41.6	30.1	16.5	11.7
Sales and Office	40.4	39.5	16.8	3.4
Nat. Resources, Construction, & Maintenance	63.5	30.4	5.2	1.0
Production, Transp. & Material Moving	67.2	26.1	5.6	1.1

Source: Authors’ calculations of the “Educational attainment for workers 25 years and older by detailed occupation,” US Bureau of Labor Statistics (<https://www.bls.gov/emp/tables/educational-attainment.htm>).

Applying this matrix to the estimated number of job openings by occupation gives us the region's estimated demand for workers with each level of educational attainment. We then compare this demand with the estimated region's supply of workers with each level of educational attainment. We estimate the region's supply based on the number of students graduating from high school or college and the degrees they earn. Between 2014 and 2018 the Wheeling region annually produced approximately 1,300 high school graduates, 720 workers with some amount of college or an associate's degree, and more than 1,000 graduates with a bachelor's degree (Table 5).⁴ This gives us a total supply of more than 3,000 graduates per year.

Table 5: Wheeling High School and Post-Secondary Graduates per Year by Degree

Schools and Degree Attained	Academic Year					5-Year Avg.
	2013-14	2014-15	2015-16	2016-17	2017-18	
High School Degree	1,281	1,256	1,323	1,326	1,349	1,307
High Schools in Marshall and Ohio counties, WV	660	685	711	744	677	695
High Schools in Belmont County, OH	621	571	612	582	672	612
Some Colleges or Associate's Degree	742	712	705	720	NA	721
Belmont Technical College, OH	305	271	307	255	NA	285
Northern Community College, WV	377	384	360	412	385	384
Ohio University Eastern Campus, OH	28	23	16	17	NA	21
West Liberty University, WV	33	34	22	36	33	31
Bachelor's Degree or Higher	1,020	1,122	1,103	950	990	1,037
Bethany College, WV	143	132	134	111	141	132
Wheeling (Jesuit) University, WV	382	452	392	32	313	380
West Liberty University, WV	495	538	577	477	536	525

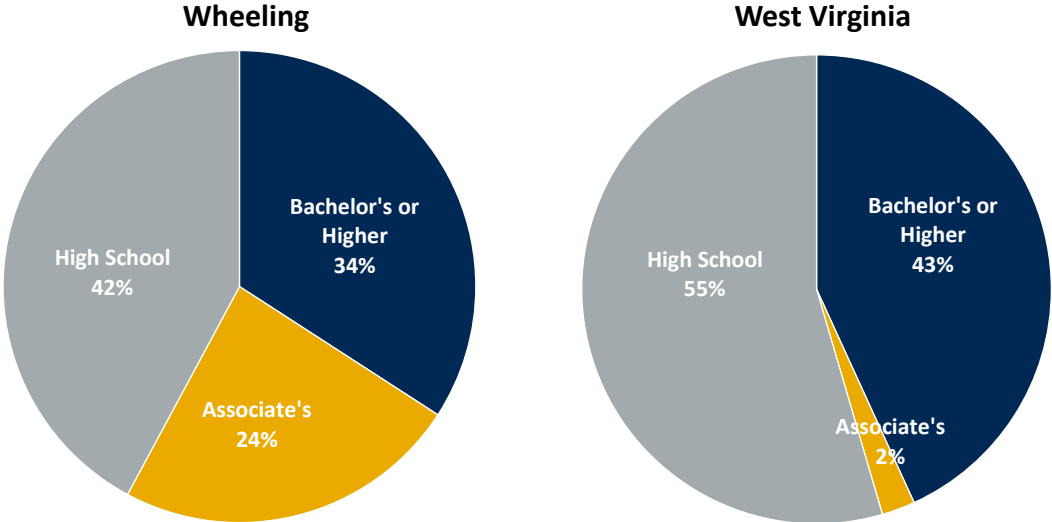
Source: Ohio Department of Education, West Virginia Department of Education, and Authors' calculations

Note: The supply estimates may slightly be lower than the true supply in the region, mainly for two reasons. Some numbers for the high school graduates do not include graduates from private high schools because data are not available. Similarly, numbers for graduates with some colleges or an associate's degree do not include graduates from three small private colleges including the West Virginia Business College, Wheeling, and the West Virginia Junior College, Bridgeport, WV.

⁴ Numbers for high school graduates include graduates from the following high schools: Potomac State College, Eastern West Virginia Community and Technical College, and all high schools in the Potomac Highlands region.

Before analyzing the supply versus demand, we first compare the share of workers in each educational category in Wheeling with state to how the region fares in preparing its workforce. As Figure 4 shows, of the Wheeling residents who graduate with a degree on any level in a given year, about 42 percent earn a high school degree and 58 percent earn a post-secondary degree (associate’s degree or higher). West Virginia, on the other hand, has a much larger share of graduates who earn only a high school degree (55 percent) and a smaller share with a post-secondary degree (45 percent). These graduation rates indicate that the region fares well in comparison with the state in preparing its workforce with skills needed to support its economic growth.

Figure 4: Graduates by Degrees Earned (2014-2018 Annual Average)



Source: West Virginia Higher Education Report 2018, HEPC and WV Department of Education

Finally, we now can compare total supply and demand for workers in the Wheeling region. We estimate that the total demand for workers in the region, excluding those with less than a high-school degree, is 1,437,⁵ and the total supply is 3,065. A straightforward comparison tells that total supply is about twice of total demand, implying there is an excess supply of more than 1,600 graduates on average per year through 2024.

Looking further at the supply-demand comparison by degree shows that the Wheeling region indeed has an excess supply in each degree type. The biggest excess supply exists in the market of workers with lower level education—a high school degree—at more than 800, followed by the market for workers with a bachelor’s degree or higher at nearly 600, and those with an associate’s degree at nearly 220 (Table 6). The patterns show that overall the Wheeling region has sufficient capacity to produce skilled workers needed to support the region’s economic growth.

Table 6: Supply and Demand of Workers by Educational Attainment

Educational Attainment	Demand	Supply	Supply-Demand
High School Degree	495	1,307	812
Some College/Associate's Degree	504	721	217
Bachelor's Degree or Higher	438	1,037	599
Total	1,437	3,065	1,628

Source: Authors’ calculations

3 Conclusion

It is important to interpret these patterns with caution. We conduct the supply-demand analysis at broad level of occupations and education that county-level data allows. In other words, we do not examine more detailed occupations or degree majors. While the supply of graduates exceeds the demand for workers in total, in practice it does not guarantee the region will always satisfy demand for every occupation. For example, there may be cases where specific occupations require degrees from very specific majors that are not offered by colleges in the region, or the colleges may not produce enough of certain majors that are highly sought after in the labor force.

Another aspect to consider is that a labor market area is highly affected by migration. In the case of West Virginia, out-migration tends to outnumber in-migration, and the gap tends to increase as the education level increases. A previous BBER study of West Virginia public colleges and universities’ graduates⁶ found that out of all graduates with a bachelor’s degree or higher only about 50 percent stay

⁵ For the supply-demand analysis, people with less than a high-school degree are excluded.

⁶ *From Higher Education to Work in West Virginia, 2015*, Eric Bowen et al., 2017, Bureau of Business and Economic Research, West Virginia University (<http://busecon.wvu.edu/bber/pdfs/BBER-2017-02.pdf>). Note that even if we apply this 50% outmigration rate, the Wheeling region’s supply of workers with a bachelor’s degree or higher (519) still exceeds the demand (435).

and work in West Virginia one year after graduation. In other words, assuming free labor mobility, the region's excess supply is in practice not as big as shown in Table 6.

Overall, this study indicates that the Wheeling region is likely to have an oversupply of workers in each type of education degree. It is important for the Wheeling region to facilitate labor mobility for its residents, allowing them to earn income outside of the region (and *vice versa*), which will allow the region's labor market to match workers and companies efficiently. At the same time, the region can market the oversupply condition as one of its strengths in that it shows the region's capability in providing a sufficient supply of skilled workers.

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