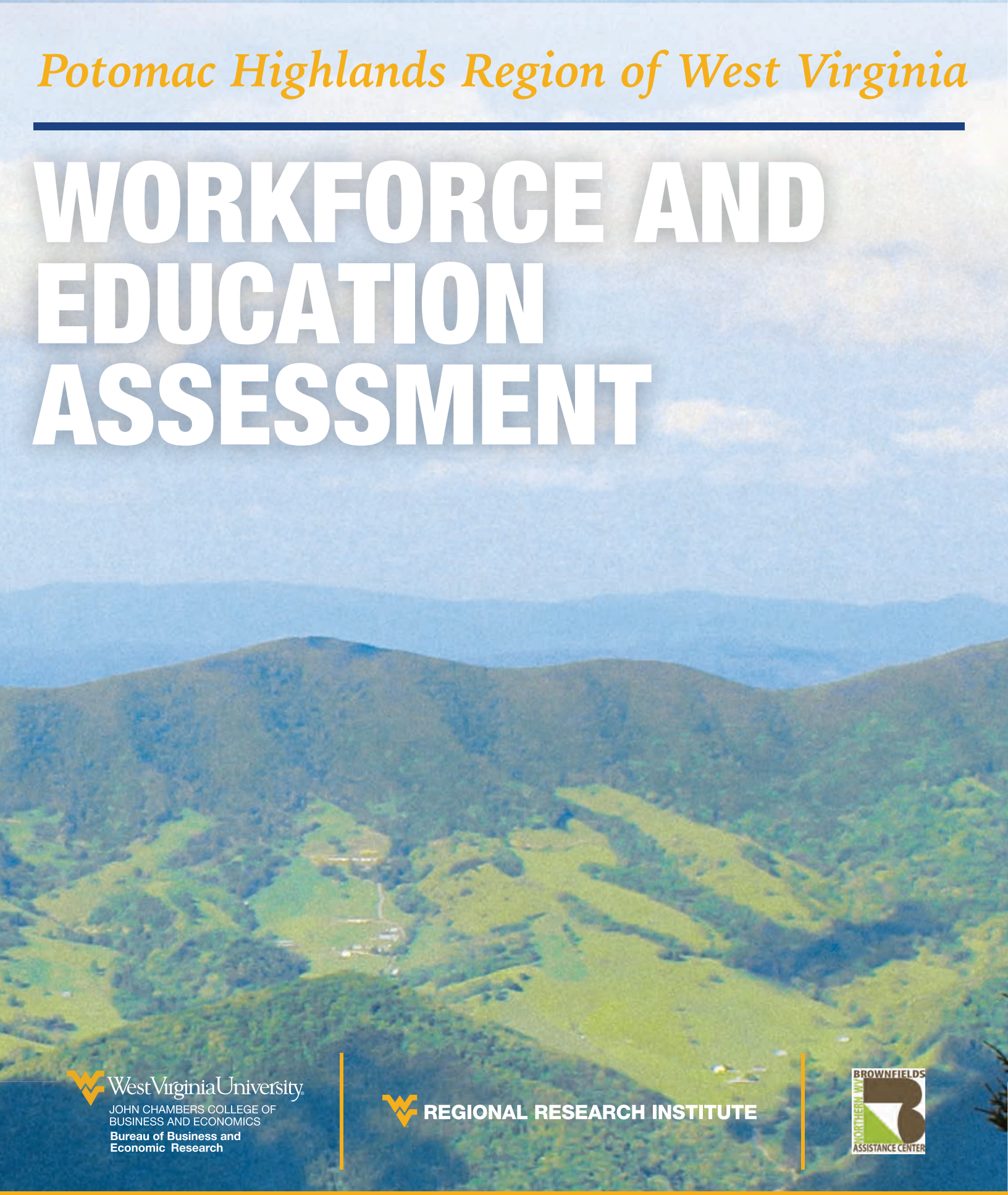
Potomac Highlands Region of West Virginia

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 Potomac Highlands region, focusing on occupational and educational requirements to support the region's growth over the next five years. Some highlights of this research is as follows:

- We predict that the region will have annual job openings of more than 900 workers over the next five years. In that same period, nearly 1,300 workers will enter the workforce.
- Though the number of residents entering the workforce will exceed the demand, we predict that the region will have an excess supply in the market of workers with lower level education and a shortage in the market of workers with higher education levels.

As shown in Table 1, overall this study indicates that the Potomac Highlands region is likely to have an oversupply of lower-skilled workers entering the labor market each year, and an undersupply of workers with higher skills. The region's labor challenge over the next five years is thus twofold: providing enough jobs for lower-skilled workers while at the same time attracting workers with the necessary education to fill higher-skilled job openings.

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

Educational Attainment	Demand	Supply	Supply-Demand
High School Degree	402	871	469
Some College/Associate's Degree	330	397	67
Bachelor's Degree	142	21	-121
Graduate/Professional Degree	64	0	-64
Total	**938**	**1,289**	**351**

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 Potomac Highlands 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 during this time period in five broad occupational categories, and examine the level of education needed for these occupations. We then follow this with a discussion of how the region needs to draw from a wide geographical region to meet the new demands on its workforce.

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:

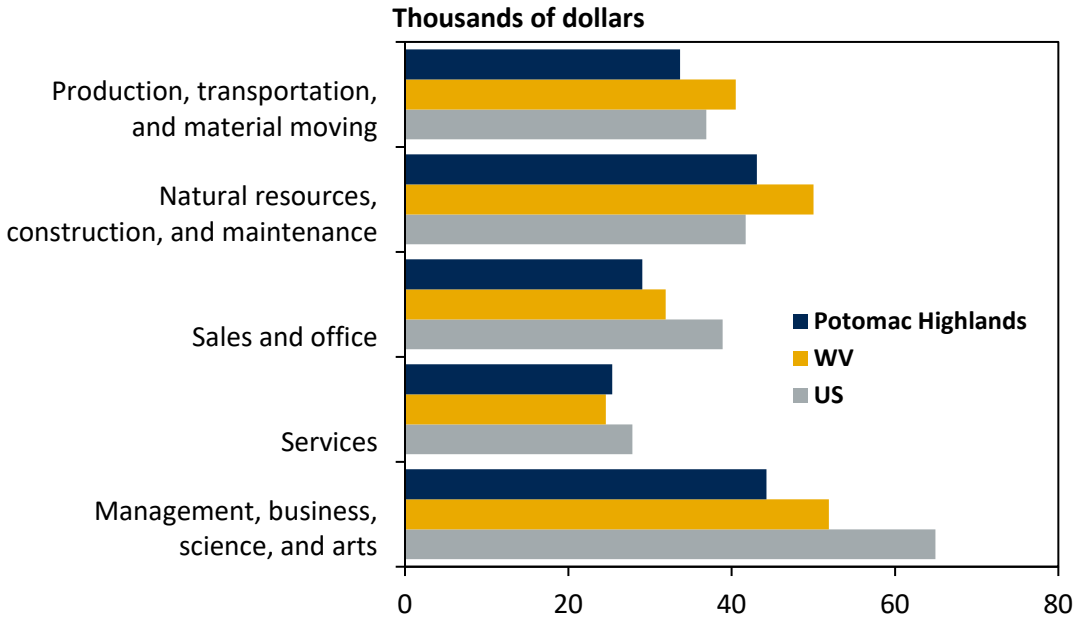
- Management, business, science, and arts
- Natural resources, construction, and maintenance
- Production, transportation, and material moving
- Sales and office
- Services

Among the five occupational categories, occupations in management, business, science, and arts tend to have the highest incomes, 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 the have the lowest income. This pattern is evident in the US, West Virginia, and Potomac Highlands in 2017 (Figure 1).

As shown in Figure 2, occupations in the management, business, science, and arts make up 22.5 percent of all jobs that Potomac Highlands residents held in 2017. This is well below the shares in West Virginia and the United States of 30.7 percent and 35.7 percent, respectively. On the other hand, production, transportation, and material moving occupations, ranked third in terms of earnings, make up 23.5 percent of all jobs held by the Potomac Highlands residents, well above the shares in West Virginia (13.4 percent) and the US (12.2 percent).

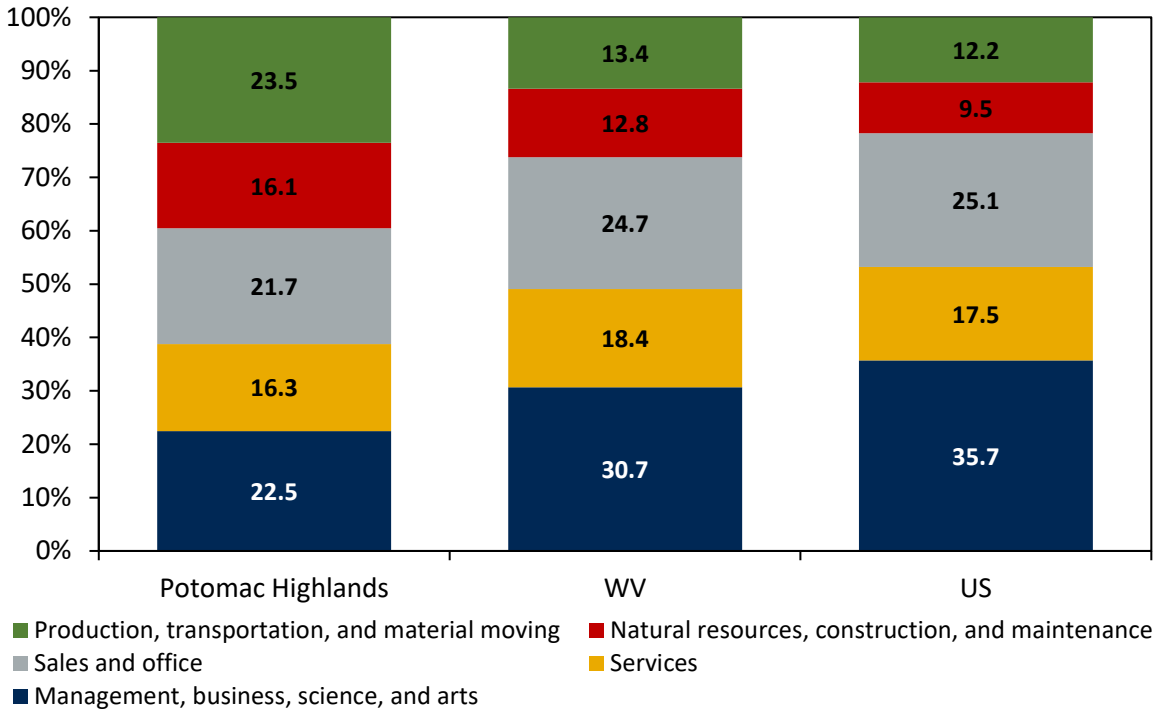
[1] Occupational categories are originally based on the Bureau of Labor Statistics' Standard Occupational Classification (SOC). However, the county level data only allows the occupations broken down into these five major categories. More detailed classification of occupations is not available at the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

Figure 1: Median Annual Earnings by Occupation



Source: 2017 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: 2017 US Census American Community Survey, 5-Year Estimates

To project the future composition of occupations in the Potomac Highlands, we use two sets of information: an industry-occupation matrix drawn from the US Census American Community Survey,[2] and a forecast of the region's industrial growth from the WVU BBER Econometric Model. The industry-occupation matrix shows the composition of occupations that typically exists within each industry. We use the ACS data in order to derive the occupational composition specific to the Potomac Highlands 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 indicated, manufacturing industries tend to require large numbers of production-transportation occupations (73 percent) while the education, health care, and social assistance industries require workers in management, business, science, and arts occupations (47 percent). Likewise, finance, insurance, and real-estate industries require high levels of workers in sales and office occupations (68 percent), while the information industry requires zero service occupations, etc.

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

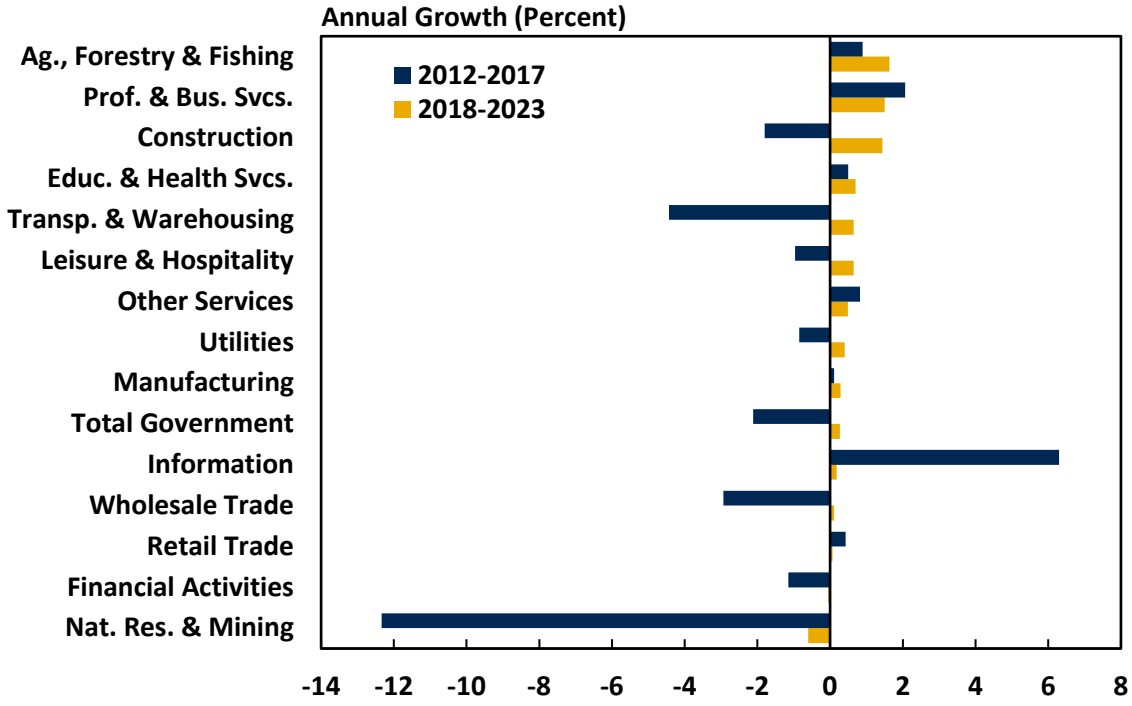
Table 2: Industry-Occupation Matrix

Industry	Occupation (%)				
	Mgmt, Business, Science, and Arts	Services	Sales and Office	Nat. Resources, Construct. & Maintenance	Production, Transp. & Material Moving
Ag., Forestry, Fishing-Hunting, & Mining	39.6	2.7	4.2	42.6	10.8
Construction	10.0	0.8	4.0	77.4	7.8
Manufacturing	9.0	3.2	7.0	7.4	73.3
Wholesale trade	12.7	6.1	19.0	22.4	39.9
Retail trade	6.9	4.8	70.7	4.5	13.1
Transp., Warehousing, & Utilities	8.9	2.4	16.9	17.1	54.8
Information	32.1	0.0	43.3	22.0	2.6
Finance, Ins., Real Estate & Leasing	20.4	8.6	68.1	2.5	0.3
Prof., Scientific, & Mgmt Services	37.5	14.4	28.5	1.8	17.8
Educ. Services, Health Care & Social Assist.	46.6	34.6	14.7	1.1	3.0
Arts, Ent., Rec., & Acc. & Food Services	12.2	73.1	12.0	0.6	2.0
Other Services, except Public Adm.	22.6	32.6	17.5	21.8	5.6
Public Administration	32.7	18.0	37.5	8.3	3.5
All Industries	**22.5**	**16.3**	**21.7**	**16.1**	**23.5**

Source: 2017 American Community Survey, 5-Year Estimates

The second component needed to project the region's occupational composition in the next five years is the region's employment forecast by industry. For this, we draw from the WVU BBER Econometric Model, which forecasts the Potomac Highlands will experience an annual employment growth of 0.4 percent between 2018 through 2023. This is better than the -0.7 percent annual growth rate the region experienced between 2012 and 2017. The agriculture, forestry, and fishing industry is expected to grow the strongest at an annual rate of 1.6 percent, followed by professional and business services, and construction at 1.5 percent and 1.4 percent, respectively (Figure 3).

Figure 3: Employment Forecast by Industry



Source: Bureau of Business and Economic Research, West Virginia University

Applying the above industry-occupation matrix to the projected employment by industry yields the composition of occupations the region need to support its industrial growth through 2023. This composition represents the region's demand for new jobs by occupation through 2023. As shown in Table 3, the natural resource, construction, and maintenance occupations are expected to grow the fastest, increasing from 2,304 in 2017 to 3,727 in 2023, or a total of 1,423 increase in six years, or about 237 per year. This means, the region will need to acquire 237 new natural resource, construction, and maintenance workers per year through 2013. On the contrary, sales and office occupations are expected to decline significantly by nearly 1,000 during the same period, or about 166 per year. Overall, the region is expected to acquire, in net, nearly 700 new jobs through 2023, or about 116 new jobs per year.

The above estimated number of new jobs needed by the region represents only a part of the region's overall job openings. The other part of job openings comes from the need to replace workers who exit the labor force due to any reasons such as death, retirement, or going back to school. Applying the national exit rate to each occupation category gives an estimate of about 990 jobs that will be left opened per year through 2023. Combining both the number of new jobs the region needs to meet the increased demand and the number of jobs left opened because of labor force exits, we get about 1,105 job openings per year available in the region through 2023 (Figure 12). The largest job opening is in the natural resource, construction, and maintenance occupations at nearly 350 per year, followed by production, transportation, and material moving occupations at nearly 300 per year through 2023.

Table 3: Estimated Job Openings by Occupation

Occupation	Employment			Annual Labor Force Exits	Annual Job Openings
	2017	2023	Average Annual Change		
Mgmt, Business, Science, and Arts	5,167	5,216	8	136	144
Services	3,891	3,787	-17	207	190
Sales and Office	6,023	5,025	-166	299	133
Nat. Resources, Construct. & Maintenance	2,304	3,727	237	105	343
Production, Transp. & Material Moving	5,128	5,454	54	241	295
Total	**22,513**	**23,209**	**116**	**989**	**1,105**

Source: Authors' calculations

The final step is to 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 (Figure 13) 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 hold a bachelor's degree or higher. On the contrary, of all the production, transportation, and material-moving occupations, only 6.7 percent hold a bachelor's degree or higher, and as many as nearly 70 percent only hold a high-school degree or less. Overall, around 30 percent of all types of occupations require some college education or an associate's degree. 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 students graduating with these degrees and assess of any educational gap that may exist in the region through 2023.

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

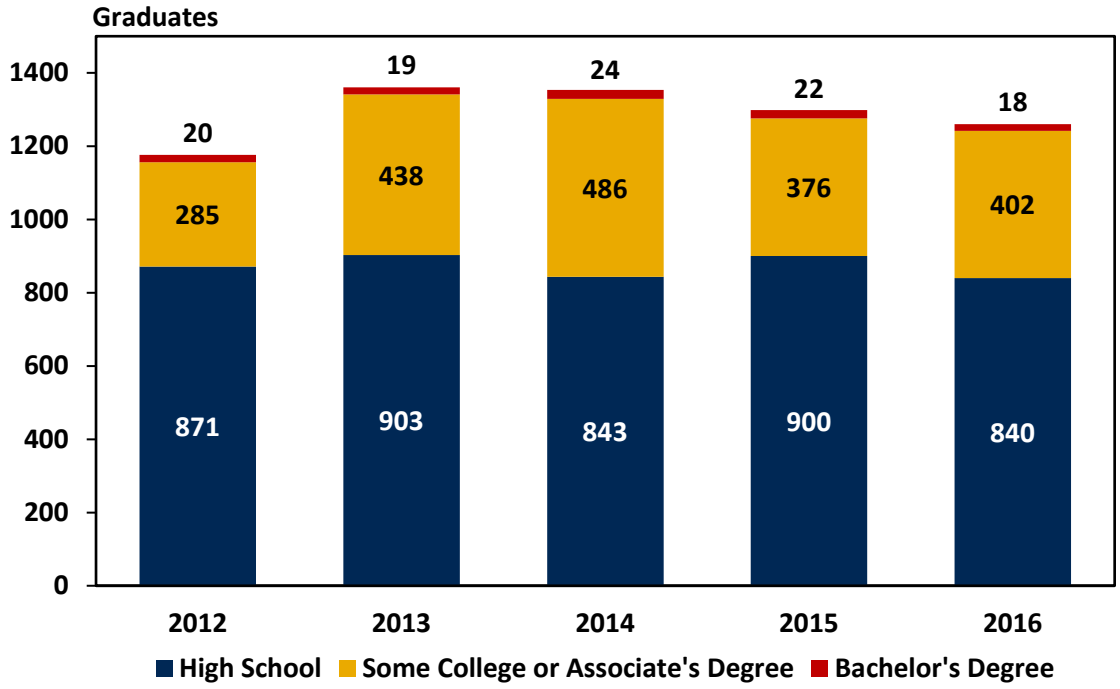
Source: Authors' calculations
Note: Matrix is generated by applying the US Occupation-Educational Attainment matrix to the Potomac Highlands employment data.

On the supply side, between 2012 and 2016 the Potomac Highlands produced approximately 870 high school graduates, nearly 400 graduates with some college or an associate's degree, and only about 20 graduates with a bachelor's degree per year (Figure 4).[3] This gives us a total supply of 1,289 graduates per year. The total demand for workers in the region, excluding those with less than a high-school degree, is 938. [4] A straightforward comparison shows that total supply outnumbers total demand, which creates an excess supply of 350 on average per year through 2023.

[3] Numbers include graduates from the Potomac State College, Eastern West Virginia Community and Technical College, and all high schools in the Potomac Highlands region.

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

Figure 4: Potomac Highlands High School and Post-Secondary Graduates by Degree



Source: West Virginia Department of Education and West Virginia Higher Education Policy Commission

Table 5: Supply and Demand of Workers by Educational Attainment

Educational Attainment	Demand	Supply	Supply-Demand
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Graduate/Professional Degree	64	0	-64
Total	**938**	**1,289**	**351**

Source: Authors' calculations

While overall total supply outnumbers total demand, it is not necessarily the case if we compare the supply and demand by education degree. In fact, as shown in Table 5, the region tends to see an excess supply in the market of workers with lower level education and a shortage in the market of workers with higher education levels. More specifically, the region has an excess supply of 469 graduates with a high school degree and 67 graduates that have some college or an associate's degree on average per year through 2023. On the contrary, the region has a shortage of 185 graduates with a bachelor's degree or higher.

However, we need to interpret these numbers with caution. This is because a region's labor supply and demand 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' graduates[5] found that out of all graduates with a bachelor's degree or higher only about 50 percent stay and work in West Virginia one year after graduation. The share is higher—around 70 percent—for graduates with an undergraduate certificate or an associate's degree. In any case, taking this migration pattern into account, we will see that the region's supply of people with at least some years of college will be significantly smaller than what is shown in Table 5. Consequently, in practice, the Potomac Highlands region more likely has an even bigger shortage of people with a bachelor's degree or higher, and a shortage, instead of an excess, of people with some years of college or an associate's degree.

3 Conclusion

Overall this study indicates that the Potomac Highlands region is likely to have an oversupply of lower-skilled workers entering the labor market each year, and an undersupply of workers with higher skills. The region's labor challenge over the next five years is thus twofold: providing enough jobs for lower-skilled workers while at the same time attracting workers with the necessary education to fill higher-skilled job openings.

These trends emphasize the importance for the region to have access to bigger labor markets in metropolitan areas outside of the region as it will help its residents find jobs with higher wages. Another option for the region is increase the production of graduates with at least a college certificate or degree. This could be done by, among others, making the Potomac State College bigger and possibly a four-year college, or promoting or improving access for the residents to sign up for college education. Keep in mind that successfully closing the educational gap that exists in the region will increase economic productivity, which help the region's economy to grow.

Lastly, attracting more highly skilled workers may depend on increasing earnings potential and providing a good quality of life in the Potomac Highlands region. Addressing the infrastructure challenges outlined in previous reports—particularly broadband and cellular phone service—becomes an important factor in providing the quality of life that many higher-skilled workers expect.

[5] *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).

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