IDENTIFYING INDUSTRIAL CLUSTERS FOR TARGETED ECONOMIC DEVELOPMENT IN WEST VIRGINIA

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West Virginia University
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Executive Summary

One of the most prominent strategies followed by economic development officials is to identify industrial activities in which the region already excels and work to enhance these strengths through identifying complimentary business opportunities. Given the highly competitive nature of economic development efforts, building on a region’s comparative advantages is typically far more effective compared to a strategy that ignores a region’s existing industrial structure and pursues a more generic approach.

To identify industry clusters in West Virginia, we follow a four-part process: 1) Identify the existing industrial clusters in the region. 2) Identify emerging clusters that may not currently have sizable employment in the region but are growing in importance. 3) Rank the existing and emerging clusters according to their potential for economic impact in the region. 4) Identify industries within these impact clusters that may have the potential to substitute local suppliers for imported inputs. A summary of our results is shown in Figure 1.

Figure 1: Top Impact Clusters by Region

![Figure 1: Top Impact Clusters by Region](image)
ADVANTAGE VALLEY REGION

- The Advantage Valley region has three impact clusters that provide the greatest potential for economic development: Oil and Gas Production and Transportation; Upstream Chemical Products; and Automotive.
- Health Services is the largest cluster in the region, with more than 32,000 employees.
- Coal Mining is the most heavily concentrated, with a location quotient (LQ) more than 24 times the national average.

BECKLEY METROPOLITAN AREA

- We identified four impact clusters in the Beckley region: Food Processing and Manufacturing; Health Services; Business Services; and Hospitality and Tourism.
- The Coal Mining cluster has an LQ of 129.5, making it one of the highest concentrations of coal mining employment in the state.
- Hospitality and Tourism is expected to remain an important cluster in the region as the Summit Bechtel National Scout Reserve continues to expand and bring in adventure tourists from across the country.

EASTERN PANHANDLE REGION

- Information Technology and Downstream Chemical Products top the list of impact clusters for economic development in the Eastern Panhandle region, followed by Education and Knowledge Creation; and Food Processing and Manufacturing.
- The Eastern Panhandle’s largest existing cluster is Hospitality and Tourism (3,102 jobs), followed closely by Distribution and Electronic Commerce (3,034 jobs).
- The Performing Arts Cluster is the largest emerging cluster in the region, which has a thriving arts scene with big draws such as Contemporary American Theater Festival at Shepherd University.

NORTH CENTRAL REGION

- Growth in the North Central region is the result of a diverse economy including Health Care, Aerospace, and the burgeoning Oil and Gas sectors.
- Aerospace Vehicles and Defense leads the list of impact clusters in the region. Other impact clusters include: Oil and Gas Production; Electric Power Generation; Biopharmaceuticals; Information Technology; and Education and Knowledge Creation.
- The highest concentration of jobs in the region was in Coal Mining, with a location quotient more than 37 times the national average.

PARKERSBURG METROPOLITAN AREA

- The Plastics cluster had the highest LQ of any cluster in the region at 12.4, indicating its share of plastics and polymers jobs was more than 12 times the national average.
- The Parkersburg region is home to the Hino Motors Manufacturing Plant, which anchors an increasingly important Automotive cluster in the region.
- Oil and Gas Production stands out as an impact cluster in the Parkersburg region. Other impact clusters include: Automotive; Water Transportation; and Food Processing and Manufacturing.

WHEELING METROPOLITAN AREA

- Three clusters stand out as impact clusters for economic development: Oil and Gas Production and Transportation; Marketing, Design, and Publishing; and Health Services.
- The region’s energy sector has been a major source of instability with coal job declines offset by a booming natural gas industry.
- Wheeling is well positioned to capitalize on economic benefits of the Oil and Gas cluster and related downstream industries as greater cracking and refining capacity become more available in the region.
1 Introduction

One of the most prominent strategies followed by economic development officials is to identify industrial activities in which the region already excels and work to enhance these strengths through identifying and developing complimentary business opportunities. Given the highly competitive nature of economic development efforts, building on a region’s comparative advantages is typically far more effective compared to a strategy that ignores a region’s existing industrial structure and advantages and pursues a more generic approach.

In this report, we identify the industry clusters that are present in West Virginia’s six metropolitan regions and provide tools to assess the most promising clusters for economic development targeting. An Industrial Cluster Analysis examines the supplier relationships of companies in a geographic region in order to identify gaps and opportunities related to its industrial structure that could attract new businesses. This type of cluster analysis has become an increasingly important way for regions to understand their local economic structure and more effectively develop strategies to promote economic growth.

Once a region identifies which clusters are most competitive, policy makers can employ a development strategy of import substitution to identify gaps in the local supply chains for these impact clusters. Under this approach, development officers look for areas where the impact clusters may be able to substitute local suppliers for production inputs that they are currently purchasing from outside the study region. Depending on value of these input purchases, import substitution may be an opportunity for local companies to have a competitive advantage over outside firms.

As an example of the cluster strategy, suppose a region has identified that automotive manufacturing is a prominent cluster in the area. The region may have one or more large anchor manufacturing plants but lacks key suppliers that produce tires or engine parts, so they are being imported from outside the area. It may make sense for local economic development officials to spend resources to try to attract these suppliers to the area, which would lower transportation costs for the anchor companies and provide another source of economic activity for the local region.

2 Methodology

To identify industry clusters in West Virginia, we follow a four-part process based on the approach taken by the Regional Economic Development Research Laboratory (REDRL) at Clemson University. First we identify the existing industrial clusters in the region. Existing clusters are those that have a large amount of employment in the region relative to the national average and have a significant number of supporting companies in the region. Second, we identify emerging clusters that may not currently have sizable employment in the region but are growing in importance. Third, after these clusters are

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identified, we then rank them according to their potential for economic impact within the region to assess which clusters may be a priority for economic development efforts. Fourth and last, within each of these impact clusters we identify individual industries that may have the potential to grow their supply chains into the region to substitute local suppliers for imports. The following subsections describe each of these steps in more detail.

The cluster definitions we use for this analysis are based on the US Cluster Mapping Project from Harvard Business School’s Institute for Strategy and Competitiveness. In general, each cluster groups together one or more primary industries with related industries that are part of its supply chain. US Cluster Mapping identifies 67 different clusters with between one and 62 industry members. The clusters are divided into two categories: traded and local. The 51 traded clusters involve industries that are primarily export-based, meaning that the products they produce are largely sold outside the region. These clusters bring income into the local area from outside the region and thus grow the local economy. For example, automobile manufacturing would produce output at a factory, and then sell its product nationally or internationally. The 16 local clusters include industries that primarily sell to the local market. A car wash is an example of a local industry as its customer base is typically restricted to local residents. While local clusters are important sources of economic activity, they largely draw income from local business or residents and do not bring in additional funds from outside the region.

Our analysis here focuses only on traded clusters, as these are the clusters that are likely to bring additional economic growth to the region. Local clusters are typically believed to expand naturally in a robust region because the output demand is present in that local area and do not depend on large-scale economic development efforts. Rather it is traded clusters that depend on these development efforts, because their location decision is independent of their output market. Though Health Care is considered a local cluster by the US Cluster Mapping Project, we make an exception and include it as an export cluster. This is because the advanced specialty care provided by large health care centers in some WV metropolitan areas draw patients from a wide area.

One limitation of this analysis is that that timeframe covers only those jobs observed in the data prior to 2017. This period leaves out some new companies that have located across the state since that year. Some of these projects include large employers like N3 and Kelly Connect in the Advantage Valley region, Procter and Gamble in the Eastern Panhandle, and continued expansion at Hino Motors in the Parkersburg region and Toyota in the Advantage Valley region. While a single employer does not constitute a cluster, large employers such as these can provide the basis for the emergence of a significant cluster in the future.

2.1 Existing Clusters

Our first step is identifying those clusters that have a large existing presence in each metropolitan region. These clusters have had a historical competitive advantage that allowed for widespread development in the region over time.

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Following the REDRL approach, we utilize three criteria for determining if a cluster has a significant existing presence in a region. First, in order for a cluster to be considered to have a significant presence in the region, it must have a large employment base. This ensures that the cluster has a sufficient workforce to support additional companies moving to the region. Second, the cluster must have at least five existing establishments in the region. This criterion ensures that the supply chains for the anchor companies are spread throughout the local economy. Last, the cluster must have a location quotient (LQ) of 1 or above. Location quotient is calculated as the ratio of the share of local employment in the cluster relative to the share nationally. An LQ above 1 means that the cluster constitutes a greater share of employment in the local region than in the national labor market. The criteria for existing clusters are shown in Table 1.

**Table 1: Criteria for Existing Clusters**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster Employment</td>
<td>Greater than 500 jobs</td>
</tr>
<tr>
<td>Number of Establishments</td>
<td>Greater than or equal to 5</td>
</tr>
<tr>
<td>Location Quotient</td>
<td>Greater than 1</td>
</tr>
</tbody>
</table>

### 2.2 Emerging Clusters

After identifying existing clusters, we then classify clusters that are emerging in importance in the region. These clusters are not currently highly concentrated in the region but have significant potential to grow in importance as the supplier relationships between industries become more specialized and highly concentrated in each region. They also indicate that the emerging cluster is growing over time and has an increasing competitive advantage relative to other clusters both in the region and nation.

To identify emerging clusters, we apply four criteria to clusters that do not meet our definition of existing clusters. First, a cluster must have an employment level above 100 jobs, ensuring that the cluster has a significant existing presence in the region. Second, emerging clusters must have positive local employment growth, which indicates that the cluster is growing in the area. Third, the location quotient must be increasing over the 10-year study window. This ensures that the cluster is growing in concentration over the study period. Fourth, the cluster must exhibit growth in the number of jobs in the competitive component of the region’s shift-share analysis. Shift-share analysis is a method for decomposing a region’s job growth to identify what part of the growth is due to local factors vs. national factors. Strong growth in the local competitive component indicates that the region is gaining jobs relative to the national average. These four criteria are shown in Table 2.
<table>
<thead>
<tr>
<th>Description</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster Employment</td>
<td>Greater than 100 jobs</td>
</tr>
<tr>
<td>Job Growth</td>
<td>Positive job growth over 10 years</td>
</tr>
<tr>
<td>Location Quotient Growth</td>
<td>Positive LQ Change</td>
</tr>
<tr>
<td>Shift-Share</td>
<td>Competitive Component greater than zero</td>
</tr>
</tbody>
</table>

### 2.3 Identifying Impact Clusters

All the clusters identified in the first two steps of the cluster analysis have played an important role in their local economies over the last decade and have a strong foothold in the regional economy. As such, these clusters will provide significant synergies between anchor industries and their suppliers and thus provide a competitive advantage for firms locating in the state. However, some may not be as attractive for economic development efforts in the future.

In the third step of this analysis, we identify those clusters that are the most likely to provide large-scale gains to the local economy and have the most economic impact potential in the future. We rank the clusters that have the greatest potential for economic growth and will provide the largest economic impact on the region moving forward. To this end, we have chosen three indicators of growth and economic impact potential:

1. The cluster’s employment growth rate in the US between 2007 and 2017;
2. The cluster’s average establishment size nationally;
3. The average wages paid to workers in the US.

While our previous measures have all been based on local data, all the indicators in this section are measured on a national basis. This is because our goal is to understand the best prospects for economic development efforts, and national figures give a better indication of where the cluster is headed in the US overall. The US employment growth rate, for instance, provides a measure of how quickly the cluster is growing in total. It is easier to attract new companies to the region if they are growing nationally, as firms will be deciding on where to locate new establishments rather than having to relocate existing plants. Average establishment size and average wages provide an indication of the potential economic impact of each cluster. Larger establishments will have more workers employed in the region, and higher wages will provide greater economic gains from household spending.

Since each of these measures—employment growth, establishment size, and wages—have different scales, we construct an index of each of the indicators in order to be able to compare them across clusters. For each measure, we calculate the number of standard deviations that figures for a given industry are above or below the average value nationally for all traded clusters. We then add these
values together to create a summary index, with wages and employment growth weighted more heavily than establishment size.³

To depict these criteria, we use a bubble chart to indicate which existing or emerging clusters are priorities for economic development targeting. As shown in Figure 2, all of the existing and emerging clusters that were identified in steps one and two above are combined and plotted along three dimensions: average US wages (x-axis), US employment growth (y-axis), and average US establishment size (bubble size). Clusters with high average wages and high employment growth—indicated by Cluster 1—will fall in the impact quadrant at the top right. Establishment size, indicated by the diameter of the bubble, can also weight a cluster more highly, as we see with the bubble labeled Cluster 2.

**Figure 2: Cluster Classifications**

![Figure 2: Cluster Classifications](image)

**2.4 Supply Gaps and Disconnects**

Having identified the impact clusters in each region, we last pinpoint specific industries that may provide the greatest opportunities for targeted economic development. Using a methodology from Deller

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³ Weights are as follows: Average wage, 45 percent; employment growth, 33 percent; establishment size, 22 percent.
(2009), we employ an economic development strategy of import substitution to identify gaps in the local supply chains for these impact clusters. As mentioned above, this approach looks for areas where the impact clusters may be able to substitute local suppliers for production inputs that they are currently purchasing from outside the study region. As an example, suppose a region is importing $500 million from the basic organic chemicals industry. If a local firm or several firms can capture half of this amount, it would increase local economic activity by $250 million and provide synergies with anchor producers.

We also examine the potential for so-called “disconnects” between what local companies are producing and the needs of the region’s large clusters. For this process, we find those industries where the impact clusters have large imports, but the region also has large exports in the same industry. Local suppliers may be able to retool their production processes to better serve the anchor industries in the region, which keeps more of the economic value of these products within the region. However, this may not always be possible, as sometimes the local suppliers are producing products that may not fit the needs of the larger clusters.

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3 Advantage Valley Region

With the largest employment base in the state, the Advantage Valley Region—consisting of Cabell, Kanawha, and Putnam counties—contains several large-scale industrial clusters in a wide range of industrial areas. The region has long been a center for mining and chemical products but has more recently become known for its automotive and health care industries.

3.1 Existing Clusters

Using the criteria described above, we have identified nine existing clusters in the region with varying degrees of concentration. As shown in Table 3, the largest cluster in the Advantage Valley region in terms of employment is Health Services, with more than 32,000 employees. This cluster covers a wide range of activities, from hospitals and local doctor’s offices, to nursing homes and pharmacies. CAMC Health System is the top employer in Kanawha County, and a top-five employer in Putnam County. Mountain Health Network is also the top employer in Cabell County, with University Physicians & Surgeons coming in fourth in the county in terms of total employment.

The Advantage Valley Region has a relatively high concentration of health care jobs compared with the national average. The cluster’s location quotient is 1.7, indicating that the share of regional jobs in health care is about 70 percent higher in the region relative to the national average. Health Services also had the largest number of establishments, with just over 1,100 locations. A single establishment can be as large as a hospital or as small as a dentist office. The large number of establishments indicates that health care is spread widely throughout the local economy.

Though Health Services is the largest cluster by employment, the cluster with the highest location quotient is Coal Mining. Though cluster has approximately 1,400 employees, which is small relative to health care, the concentration of these jobs was substantially higher than the national average. The cluster’s LQ score of 24.5 indicates that the share of regional employment in Coal Mining is more than 24 times the national average.
### Table 3: Advantage Valley Primary Existing Clusters

<table>
<thead>
<tr>
<th></th>
<th>Employment</th>
<th>Establishments</th>
<th>Location Quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Services</td>
<td>32,451</td>
<td>1,105</td>
<td>1.7</td>
</tr>
<tr>
<td>Insurance Services</td>
<td>4,526</td>
<td>285</td>
<td>1.4</td>
</tr>
<tr>
<td>Oil and Gas Production</td>
<td>3,824</td>
<td>85</td>
<td>2.7</td>
</tr>
<tr>
<td>Automotive</td>
<td>2,844</td>
<td>12</td>
<td>2.5</td>
</tr>
<tr>
<td>Upstream Metal Manufacturing</td>
<td>1,474</td>
<td>5</td>
<td>3.3</td>
</tr>
<tr>
<td>Coal Mining</td>
<td>1,446</td>
<td>14</td>
<td>24.5</td>
</tr>
<tr>
<td>Upstream Chemical Products</td>
<td>1,270</td>
<td>19</td>
<td>7.5</td>
</tr>
<tr>
<td>Electric Power Generation</td>
<td>876</td>
<td>24</td>
<td>1.9</td>
</tr>
<tr>
<td>Medical Devices</td>
<td>735</td>
<td>8</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Note: Impact clusters are in bold.

#### 3.2 Emerging Clusters

The Advantage Valley region also has a relatively large number of emerging clusters, as defined by our criteria above. The seven emerging clusters include Hospitality and Tourism, Metalworking Technology, and Forestry, among others.

As shown in Table 4, Hospitality and Tourism has the largest level of employment, with more than 4,300 jobs. The cluster grew at a rate of 6.1 percent over the 2007-2017 period and had the largest job growth in the competitive portion of the shift-share analysis. This cluster includes large employers such as the Mardi Gras Casino and Resort, as well as several hotels that support tourism in the region.
Table 4: Advantage Valley Emerging Clusters

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitality and Tourism</td>
<td>4,316</td>
<td>6.1</td>
<td>0.16</td>
<td>166</td>
</tr>
<tr>
<td>Agricultural Inputs and Services</td>
<td>1,014</td>
<td>12.1</td>
<td>0.07</td>
<td>145</td>
</tr>
<tr>
<td>Food Processing and Manufacturing</td>
<td>787</td>
<td>52.4</td>
<td>0.09</td>
<td>52</td>
</tr>
<tr>
<td>Metalworking Technology</td>
<td>228</td>
<td>13.1</td>
<td>0.13</td>
<td>32</td>
</tr>
<tr>
<td>Vulcanized and Fired Materials</td>
<td>105</td>
<td>22.4</td>
<td>0.12</td>
<td>27</td>
</tr>
<tr>
<td>Forestry</td>
<td>103</td>
<td>1.0</td>
<td>0.15</td>
<td>11</td>
</tr>
</tbody>
</table>

3.3 Impact Clusters

Of the 16 clusters identified as either existing or emerging in the Advantage Valley region, we have identified three that provide the greatest potential for economic impact: Oil and Gas Production and Transportation; Upstream Chemical Products; and Automotive. The first two of these clusters both have high wages and high employment growth nationally over the 2007-2017 period. Automotive grew more slowly, but is characterized by large establishment size, which represents a bigger employment base per location and thus a larger economic impact. These clusters are shown in green in Figure 3. Though the analysis identified Electric Power Generation as a potential target for development efforts, we have excluded this from the impact list due to declining demand for coal-fired power generation nationally.
3.4 Supply Gaps and Disconnects

Within these four impact clusters are several individual industries that lend themselves to economic development targeting efforts based on the concept of import substitution. In Figure 4, we show the top 10 industries across our four identified clusters by the amount of their imports, exports and the share of inputs met by imports. As mentioned above, these industries require large amounts of production inputs that are sourced from outside the region, and thus may be able to substitute local suppliers for these inputs.

The most notable industry for the Advantage Valley Region is Petrochemicals. The region is currently importing more than $1 billion of petrochemical products while simultaneously exporting a similar amount of products in the same industry. Presumably, these imports are of a different kind of chemical than is produced in the region, but it may be possible for exporters to re-tool or enhance their outputs to meet local demand. Though on a smaller scale, a similar disconnect exists in Other Basic Organic Chemicals. The region is also importing more than 90 percent of production inputs in the industries of Iron and Steel Products; Other Engine Equipment; and Other Motor Vehicle Parts. Though total imports are lower in these industries, they may provide an opening for local suppliers.
Figure 4: Advantage Valley Import Substitution

Source: Author Calculations. Bubble size represents the share of total inputs that are met with imports.
4 Beckley Region

The Beckley Metropolitan Statistical Area—consisting of Fayette and Raleigh counties—is a relatively small metropolitan area in the state with employment of approximately 53,000 workers. As such, the region has a diminished ability to support large clusters compared to the larger MSAs in the state. The metropolitan area is also highly dependent on the coal industry for its employment base. Despite these challenges, the Beckley region does have several clusters that are growing in the region and can be seen as emerging clusters.

4.1 Existing Clusters

The largest cluster in the Beckley region is Health Services, with nearly 7,500 employees—with Raleigh General Hospital and associated LifePoint Health network representing the largest employers in this cluster. The cluster has more than 400 establishments and a location quotient of 1.6, which indicates the percentage of regional jobs in health care is about 60 percent higher in the region relative to the national average.

As mentioned above, the coal industry has long had significant presence in the Beckley region, with several large mines, such as Coronado Coal, and Bluestone Coal. The Coal Mining cluster has a location quotient of 129.5, making it one of the highest concentrations of coal mining employment in the state. This dependence on coal employment has been a challenge for the region as mining has declined over the last decade, but as of 2017 the region still maintained a significant employment base in coal mining.

The last existing cluster in the region is Hospitality and Tourism. The Beckley area has long been known for its whitewater rafting trips and other outdoor recreation. The establishment of the Summit Bechtel National Scout Reserve along the border of Fayette and Raleigh counties has further solidified the region’s reputation as a destination for adventure tourism.

Table 5: Beckley Primary Existing Clusters

<table>
<thead>
<tr>
<th></th>
<th>Employment</th>
<th>Establishments</th>
<th>Location Quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Services</td>
<td>7,485</td>
<td>414</td>
<td>1.6</td>
</tr>
<tr>
<td>Coal Mining</td>
<td>1,880</td>
<td>28</td>
<td>129.5</td>
</tr>
<tr>
<td>Hospitality and Tourism</td>
<td>1,424</td>
<td>95</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Note: Impact clusters are in bold.

4.2 Emerging Clusters

In comparison to its relatively small number of existing clusters, the Beckley region has several emerging clusters. As shown in Table 6, the Business Services cluster is the largest emerging cluster in the region. This broad cluster covers a wide range of service industries necessary for running a business, including taxis and other ground transportation; architectural and engineering services; computer programming; and human resources. The companies in this cluster serve the needs of not only businesses within Beckley but also those in areas outside the metropolitan area.
The fastest growing cluster in the region is Food Processing and Manufacturing. This cluster had nearly 450 percent growth, though from a small base of employment. As indicated by the competitive portion of the cluster’s shift-share, much of this growth was due to improved performance in the local market.

The Downstream Metal Products cluster also grew rapidly during the 2007-2017 period, gaining nearly 175 jobs for growth of 332 percent. The cluster now has an LQ of 1.3, a gain of 1.1 over the 10-year period, which indicates it is now more heavily concentrated in the region than the nation.

### Table 6: Beckley Emerging Clusters

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Services</td>
<td>2,812</td>
<td>14.6</td>
<td>0.1</td>
<td>43</td>
</tr>
<tr>
<td>Agricultural Services</td>
<td>602</td>
<td>29.2</td>
<td>0.3</td>
<td>155</td>
</tr>
<tr>
<td>Downstream Metal Products</td>
<td>226</td>
<td>332.0</td>
<td>1.1</td>
<td>178</td>
</tr>
<tr>
<td>Production Technology and Heavy Machinery</td>
<td>171</td>
<td>0.1</td>
<td>0.2</td>
<td>12</td>
</tr>
<tr>
<td>Electric Power Generation and Transmission</td>
<td>128</td>
<td>35.3</td>
<td>0.4</td>
<td>29</td>
</tr>
<tr>
<td>Environmental Services</td>
<td>120</td>
<td>87.5</td>
<td>0.5</td>
<td>44</td>
</tr>
<tr>
<td><strong>Food Processing and Manufacturing</strong></td>
<td><strong>110</strong></td>
<td><strong>448.0</strong></td>
<td><strong>0.2</strong></td>
<td><strong>81</strong></td>
</tr>
</tbody>
</table>

Note: Impact clusters are in bold.

### 4.3 Impact Clusters

Most of the clusters identified for the Beckley region had average wages below the national average. However, there were several clusters where employment was growing at a relatively rapid pace, and thus may be potential targets for economic development efforts.

Though currently relatively small in the Beckley region, the Food Processing and Manufacturing cluster grew rapidly both regionally and nationally. Though wages tend to be below the national average in this cluster, establishment sizes are high compared with the national average, thus providing large amounts of direct employment in each firm. Prominent employers in this cluster include Coca Cola Bottling Co. Consolidated (CCBCC) in Beckley and United Dairy in Beaver.

Health Services and Business Services are both important employers in the Beckley region and will continue to be in the near future. Both of these clusters are experiencing above-average growth nationally and locally. Finally, Hospitality and Tourism is expected to remain an important cluster in the region as the Summit Bechtel continues to expand and bring in adventure tourists from across the country.
Though the cluster analysis identified Electric Power Generation as a potential target for development efforts, we have excluded this from the impact list. Power generation nationally has been growing, but primarily the growth has been confined to renewable and natural gas generation. Power generation in Beckley is exclusively coal-based, which has been declining precipitously in the US as coal-fired power plants retire. Without ready supplies of natural gas, as in the North Central or Northern Panhandle regions, it is unlikely that Beckley will see much growth in this cluster.

**Figure 5: Beckley Cluster Growth Potential**

Supply Gaps and Disconnects

Because of the metropolitan area’s small size, Beckley’s impact clusters have limited imports, as shown in Figure 6. The impact clusters identified above import nearly all their needs for insurance, a market valued at approximately $35 million in the Beckley region. This may present an opportunity for local companies to provide this service to the anchor clusters. The region also imports about 35 percent of its real estate services with nearly $25 million of these services imported.

Though the Beckley region imports a smaller share of services such as Legal and Management Consulting, these services are also highly exported. This may indicate that local suppliers of these services could do better in providing the needed services to local companies.
Figure 6: Beckley Import Substitution

Source: Author Calculations. Bubble size represents the share of total inputs that are met with imports.
5 Eastern Panhandle Region

The Eastern Panhandle region—consisting of Berkeley and Jefferson counties—has a relatively diverse economy with a large group of residents who commute to the Washington DC area. The region also has the fastest population growth in the state. The region has a large tourism industry, as well as a variety of wholesaling companies and education organizations.

5.1 Existing Clusters

The Eastern Panhandle’s largest existing cluster is Hospitality and Tourism (3,102 jobs), followed closely by Distribution and Electronic Commerce (3,034 jobs), as shown in Table 7. The region’s tourism industry is well established with highlights such as the Hollywood Casino at Charles Town Races and outdoor recreational activities. Distribution and Electronic Commerce includes a wide range of small- to medium-sized wholesale distributors and transportation services. The Eastern Panhandle is also home to Shepherd University, which anchors the Education and Knowledge Creation cluster in the region, contributing to an employment level of more than 2,400 jobs in the cluster.

Hospitality and Tourism also tops the list of clusters with the most establishments in the region, at 132. However, Construction Products and Services also has a large number of locations in the two-county region at 121.

Printing Services has the highest LQ in the region, coming in at 2.7 times the national average. This cluster has a relatively small employment compared to the other existing clusters. Distribution and Electronic Commerce cluster also has an LQ of 2.4, indicating a concentration of jobs more than twice the national average. This cluster is characterized in the region by several medium- to large-sized companies, such as Orgill in Berkeley County and Randox Laboratories in Jefferson County.

Table 7: Eastern Panhandle Primary Existing Clusters

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Employment</th>
<th>Establishments</th>
<th>Location Quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitality and Tourism</td>
<td>3,102</td>
<td>132</td>
<td>2.0</td>
</tr>
<tr>
<td>Distribution and Electronic Commerce</td>
<td>3,034</td>
<td>77</td>
<td>2.4</td>
</tr>
<tr>
<td>Education and Knowledge Creation</td>
<td>2,424</td>
<td>44</td>
<td>1.3</td>
</tr>
<tr>
<td>Agricultural Inputs and Services</td>
<td>1,575</td>
<td>29</td>
<td>1.3</td>
</tr>
<tr>
<td>Construction Products and Services</td>
<td>1,435</td>
<td>121</td>
<td>1.0</td>
</tr>
<tr>
<td>Marketing, Design, and Publishing</td>
<td>880</td>
<td>24</td>
<td>1.4</td>
</tr>
<tr>
<td>Printing Services</td>
<td>561</td>
<td>9</td>
<td>2.7</td>
</tr>
</tbody>
</table>

Note: Impact clusters are in bold.
5.2 Emerging Clusters

We identified seven emerging clusters in the Eastern Panhandle region, listed in Table 8. The largest in terms of employment is the Performing Arts cluster. The Eastern Panhandle has a thriving arts scene with big draws to the region, particularly the Contemporary American Theater Festival at Shepherd University. The cluster also had high employment growth, at 78.5 percent over the 10-year study period.

Information Technology had the most rapid employment growth in the region between 2007 and 2017. At 65 jobs, the cluster had relatively small employment in 2007, but it rose to more than 181 jobs in 2017 for an overall growth rate of nearly 180 percent. Production Technology and Heavy Machinery also experienced rapid growth of more than 160 percent.

The cluster with the highest LQ growth is Downstream Chemical Products. This is largely due to the construction of the Procter & Gamble manufacturing plant in Berkeley County, which continued to grow past the end of our study period. By the end of 2017, the cluster had an LQ of more than 4 times the national average.

Table 8: Eastern Panhandle Emerging Clusters

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Performing Arts</td>
<td>651</td>
<td>78.5</td>
<td>0.0</td>
<td>23</td>
</tr>
<tr>
<td>Insurance Services</td>
<td>494</td>
<td>48.2</td>
<td>0.1</td>
<td>143</td>
</tr>
<tr>
<td>Downstream Chemical Products</td>
<td>405</td>
<td>136.8</td>
<td>2.4</td>
<td>236</td>
</tr>
<tr>
<td>Production Technology and Heavy Machinery</td>
<td>352</td>
<td>161.1</td>
<td>0.6</td>
<td>227</td>
</tr>
<tr>
<td>Food Processing and Manufacturing</td>
<td>246</td>
<td>117.9</td>
<td>0.2</td>
<td>85</td>
</tr>
<tr>
<td>Information Technology and Analytical Instruments</td>
<td>181</td>
<td>179.8</td>
<td>0.3</td>
<td>117</td>
</tr>
<tr>
<td>Communications Equipment and Services</td>
<td>123</td>
<td>1.0</td>
<td>0.3</td>
<td>49</td>
</tr>
</tbody>
</table>

Note: Impact clusters are in bold.

5.3 Impact Clusters

As shown in Figure 7, Information Technology and Downstream Chemical Products top the list of impact clusters for economic development in the Eastern Panhandle region. Though these clusters saw small employment declines over the 2007-2017 period, they both have very high average wages nationally, with nearly average establishment sizes.
The other two clusters earmarked for impact cluster status are Education and Knowledge Creation, and Food Processing and Manufacturing. These two clusters both have above average establishment size and employment growth, though wages are somewhat lower than the national average.

**Figure 7: Eastern Panhandle Cluster Growth Potential**

![Figure 7: Eastern Panhandle Cluster Growth Potential](image)

Source: Author Calculations. Bubble size depicts the average establishment size in 2017. Green bubbles are impact clusters.

### 5.4 Supply Gaps and Disconnects

Management of Companies services stands out as a cluster that may have significant potential for import substitution in the Eastern Panhandle region (see Figure 8). The impact clusters in the region import more than $29 million of management services, more than 81 percent of total needs in the industry. The impact clusters also import nearly all of their inputs in the Paperboard Containers industry. This may be an industry that could supply the burgeoning consumer chemical industry at the Procter & Gamble plant. Lastly, the region both imports and exports products in Soaps and Other Detergents. Local firms in this industry may able to re-tool to better fit the needs of regional companies.
Figure 8: Eastern Panhandle Import Substitution

Source: Author Calculations. Bubble size represents the share of total inputs that are met with imports.
6 North Central Region

The North-Central Region of West Virginia—consisting of Monongalia, Preston, Marion, and Harrison counties—is one of the fastest growth regions in the state. Prior to the effects of the recent Covid-19 shutdown, employment grew about half a percent on average between 2014 and 2019, compared with a decline of approximately the same percentage in the state as a whole. The region has traditionally been a center for coal mining and electric power generation. The North Central region also has a large aerospace industry and is a center for health care and education in the state.

6.1 Existing Clusters

Growth in the North Central region is the result of a diverse economy including Health Care, Aerospace, and the burgeoning Oil and Gas sectors. The largest existing cluster is in Health Services, led by WVU Medicine, which is the largest health care provider in the state (see Table 9). The cluster has more than 21,000 jobs across the four-county region with 625 different establishments. Oil and Gas Production is the second largest with more than 3,900 jobs, followed closely by Construction Products and Services.

The North Central region has also traditionally been a center for Coal Mining, which has the highest LQ among the existing clusters. The share of coal mining jobs in the North Central region is more than 37 times the national average. Oil and Gas Production and Electric Power Generation also have high LQs at 3.6 and 3.5 respectively. The latter represents the presence of several large-scale coal-fired power plants, including the Harrison Power Station in Harrison County, and the Longview Power Plant in Monongalia County.

<table>
<thead>
<tr>
<th>Table 9: North Central Primary Existing Clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Services</td>
</tr>
<tr>
<td>Oil and Gas Production</td>
</tr>
<tr>
<td>Construction Products and Services</td>
</tr>
<tr>
<td>Coal Mining</td>
</tr>
<tr>
<td>Electric Power Generation</td>
</tr>
<tr>
<td>Aerospace Vehicles and Defense</td>
</tr>
<tr>
<td>Environmental Services</td>
</tr>
</tbody>
</table>

Note: Impact clusters are in bold.

6.2 Emerging Clusters

With more than 12,000 employees, Business Services tops the list of emerging clusters in the North Central Region, as shown in Table 10. The cluster grew by nearly 20 percent over the 10-year study period, though the LQ for the cluster didn’t change significantly. Education and Knowledge Creation was the next-largest emerging cluster in the region. Employment in the cluster was approximately 3,100
jobs, with employment growth of nearly 84 percent over 10 years, the largest percent change among the emerging clusters.

Information Technology was the second-fastest growth cluster during the 2007-2017 period, with a percent change of nearly 78 percent. The cluster started from a low base of 91 jobs and grew to more than 152 over the 10-year study window.

Led by growth at Mylan Pharmaceuticals, the Biopharmaceuticals cluster also grew rapidly, with employment gaining more than 66 percent over 10 years. The cluster also led in LQ growth, moving from 4.7 to just over 10 for a gain of 5.3, indicating the cluster’s employment concentration is now more than 10 times the national average. The cluster’s competitive portion of the shift-share analysis also gained rapidly, rising by more than 1,100 jobs.

Table 10: North Central Emerging Clusters

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Services</td>
<td>12,058</td>
<td>18.6</td>
<td>0.0</td>
<td>634</td>
</tr>
<tr>
<td><strong>Education and Knowledge Creation</strong></td>
<td><strong>3,092</strong></td>
<td><strong>83.5</strong></td>
<td>0.0</td>
<td>92</td>
</tr>
<tr>
<td>Agricultural Inputs and Services</td>
<td>2,811</td>
<td>19.1</td>
<td>0.2</td>
<td>535</td>
</tr>
<tr>
<td>Hospitality and Tourism</td>
<td>2,746</td>
<td>57.6</td>
<td>0.1</td>
<td>263</td>
</tr>
<tr>
<td>Financial Services</td>
<td>2,631</td>
<td>34.4</td>
<td>0.0</td>
<td>108</td>
</tr>
<tr>
<td>Transportation and Logistics</td>
<td>2,542</td>
<td>12.8</td>
<td>0.2</td>
<td>631</td>
</tr>
<tr>
<td><strong>Biopharmaceuticals</strong></td>
<td><strong>2,062</strong></td>
<td><strong>66.5</strong></td>
<td><strong>5.3</strong></td>
<td><strong>1,115</strong></td>
</tr>
<tr>
<td>Marketing, Design, and Publishing</td>
<td>608</td>
<td>4.6</td>
<td>0.2</td>
<td>246</td>
</tr>
<tr>
<td><strong>Information Technology</strong></td>
<td><strong>152</strong></td>
<td><strong>77.6</strong></td>
<td><strong>0.1</strong></td>
<td><strong>62</strong></td>
</tr>
<tr>
<td>Lighting and Electrical Equipment</td>
<td>143</td>
<td>46.1</td>
<td>0.0</td>
<td>14</td>
</tr>
</tbody>
</table>

* Does not include West Virginia University. Note: Impact clusters are in bold.

---

5 As a state agency, West Virginia University employment is included in government employment.
6.3 Impact Clusters

Five of the North Central region’s impact clusters have average wages well above the national average, as shown in Figure 9. Aerospace Vehicles and Defense leads the list at more than $131,000 per worker. The Aerospace cluster also has an extremely large establishment size, which averaged more than 145 workers per location. While Biopharmaceuticals and Information Technology grew more slowly than the average cluster in the US, their high wages make up for the job losses in our analysis.

Oil and Gas Production has experienced both high job growth during the 2007-2017 period, as well as high wages. These two combined make it a cluster with high economic impact potential. Closely tied to the natural gas boom is the Electric Power Production cluster. While the cluster is currently characterized by coal-fired power plants in the North Central region, high natural gas production is expected to provide the basis for diversification into natural gas-based generation. For example, Longview Power announced in the Fall of 2019 that it plans to build a 1,200-megawatt natural gas plant at its facility in Monongalia County. ESC Harrison also has plans for a 625-megawatt plant in Harrison County.

Lastly, Education and Knowledge Creation is expected to continue to be an important cluster in the region, which is the home of West Virginia University, Fairmont State University, and other smaller colleges and educational institutions.

Figure 9: North Central Cluster Growth Potential

Source: Author Calculations. Bubble size depicts the average establishment size in 2017. Green bubbles are impact clusters.
### 6.4 Supply Gaps and Disconnects

Impact clusters in the North Central region are importing more than $340 million of Management of Companies services, as shown in Figure 10. Though this figure represents only 62 percent of total needs for this industry, the large amount of imports may indicate this area may have significant potential for import substitution. The impact clusters in the region are also importing significant amounts from the Coal and Oil and Gas industries, for total imports of almost $315 million. Except for petroleum products, local suppliers may be able to produce inputs needed for the impact clusters in these areas.

The Aerospace Vehicles and Defense cluster is importing nearly all of its inputs in the Aircraft Engines and Parts and the Other Aircraft Parts industries, demand for which totaled nearly $285 million in 2017. However, this may be a difficult industry to substitute local suppliers, as capital requirements for building aircraft engines may be prohibitive for local companies to match.

**Figure 10: North Central Import Substitution**

![Diagram showing import substitution for various sectors in the North Central region.](image)

Source: Author Calculations. Bubble size represents the share of total inputs that are met with imports.
7 Parkersburg Region

The Parkersburg region—defined by Wirt and Wood counties—has long been a center for the chemical and polymers industries in the state. DuPont opened its Washington Works plant near Parkersburg in 1948. The plant now operates under the Chemours Company, but DuPont maintains a large presence in the region. Also, several related businesses are currently in operation there as well, including the rubber manufacturer Mustang Survival Mfg.

7.1 Existing Clusters

Because of the large employers in chemicals and polymers, the Plastics cluster had the highest LQ of any cluster in the region at 12.4, indicating its share of plastics jobs was more than 12 times the national average. Oil and Gas Production has also become an important cluster in the Parkersburg region between 2007 and 2017. Employment in the cluster grew from just under 225 jobs to nearly 875 jobs during this 10-year period, a growth rate of almost 15 percent annually. At 2.8, the cluster now has the second highest LQ in the region as well.

Total employment in the region has been volatile over the last decade. The region has lost nearly 10 percent of its total jobs between 2007 and 2017, falling from just under 53,000 to about 49,000. Health Services was the largest existing cluster in the region with nearly 5,500 jobs and 234 establishments. However, the health cluster declined at about the same pace as the overall economy during the 10-year period studied, falling about 10 percent from nearly 6,100 jobs in 2007. The Plastics cluster, which includes polymers and resins, performed better over this period despite the overall job losses. The cluster gained more than 100 jobs between 2007 and 2017, moving from 1,950 to 2,064, a gain of about half a percent on average per year. Other primary existing clusters include Distribution and Electronic Commerce; and Insurance Services.

Table 11: Parkersburg Primary Existing Clusters

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Employment</th>
<th>Establishments</th>
<th>Location Quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Services</td>
<td>5,471</td>
<td>234</td>
<td>1.3</td>
</tr>
<tr>
<td>Plastics</td>
<td>2,064</td>
<td>8</td>
<td>12.4</td>
</tr>
<tr>
<td>Distribution and Electronic Commerce</td>
<td>1,131</td>
<td>80</td>
<td>1.3</td>
</tr>
<tr>
<td>Insurance Services</td>
<td>898</td>
<td>52</td>
<td>1.2</td>
</tr>
<tr>
<td>Oil and Gas Production</td>
<td>874</td>
<td>21</td>
<td>2.8</td>
</tr>
</tbody>
</table>

Note: Impact clusters are in bold.

7.2 Emerging Clusters

We identified seven emerging clusters in the Parkersburg region, as shown in Table 12. Business Services is the largest emerging cluster with employment close to 2,700 jobs. The cluster experienced growth of about 13 percent between 2007 and 2017, which was somewhat slower than other emerging clusters in the region. Agricultural Inputs and Services had a rapid LQ growth, rising 0.4 relative to the national
average over this 10-year period. It also has the highest growth in the competitive portion of the shift-
share, indicating that this cluster performed well against other businesses nationally. The fastest
growing cluster in the region was Water Transportation, moving from about 20 jobs to more than 100,
for a greater than 400 percent increase.

One cluster that did not appear in the emerging cluster analysis is Automotive manufacturing. Wood
County is home to Toyota subsidiary Hino Motors Manufacturing’s plant in Mineral Wells, which opened
in 2007 and has been rapidly expanding since that time. Unfortunately, direct data is not available for
employment at this facility, though news accounts indicate the plant employs more than 500 workers.6
Also, as of 2017 it does not appear that additional suppliers for this plant have been locating in the
Parkersburg area. Despite these limitations, we have chosen to include Automotive as an emerging
cluster as it has potential to become a more substantial cluster in the future.

Table 12: Parkersburg Emerging Clusters

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Services</td>
<td>2,667</td>
<td>13.3</td>
<td>0.1</td>
<td>9</td>
</tr>
<tr>
<td>Agricultural Inputs and Services</td>
<td>905</td>
<td>25.0</td>
<td>0.4</td>
<td>210</td>
</tr>
<tr>
<td>Marketing, Design, and Publishing</td>
<td>218</td>
<td>40.0</td>
<td>0.2</td>
<td>53</td>
</tr>
<tr>
<td>Food Processing and Manufacturing</td>
<td>162</td>
<td>98.4</td>
<td>0.2</td>
<td>46</td>
</tr>
<tr>
<td>Water Transportation</td>
<td>105</td>
<td>410.5</td>
<td>1.7</td>
<td>83</td>
</tr>
<tr>
<td>Automotive</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

* Data for the Automotive Cluster is unavailable. Note: Impact clusters are in bold.

7.3 Impact Clusters

Oil and Gas Production stands out as a cluster with high potential economic impact in the Parkersburg
region, as shown in Figure 11. The cluster is both growing rapidly in the US and has exceptionally high
wages relative to the national average. Food Processing and Manufacturing has also experienced high
growth nationally, rising 40 percent over the 2007-2017 period. Though wages in this cluster are
somewhat lower than average, it is characterized by large establishment size.

---

As mentioned above, the Automotive cluster is also growing in the area. Though the cluster overall is declining in employment in the US, workers in the cluster earn above-average wages, and auto manufacturing plants tend to have extremely large employment per establishment.

Figure 11: Parkersburg Cluster Growth Potential

7.4 Supply Gaps and Disconnects

As shown in Figure 12, the Automotive cluster is importing the large majority of parts for assembly from outside the Parkersburg region. Imports in the Other Engine Equipment; Motor Vehicle Transmission Parts; and Motor Vehicle Steering Parts have combined imports of more than $210 million. The impact clusters in the region are also importing more than $102 million in refined petroleum products.

While the Oil and Gas Production cluster has become an important sector in the region, regional firms still import more than 80 percent of their inputs for Natural Gas and Crude Petroleum. The region also exports large amounts of Oil and Gas. Since the data do not separate out needs for oil products from natural gas products, it may be that this is simply a mismatch of inputs with the region exporting natural gas while importing oil.
Figure 12: Parkersburg Import Substitution

Source: Author Calculations. Bubble size represents the share of total inputs that are met with imports.
8 Wheeling Region

The Wheeling Metropolitan Area—consisting of Marshall and Ohio counties in West Virginia, and Belmont County, Ohio—has experienced a volatile economy over the past decade with significant swings in employment across multiple sectors. The region has traditionally been a center for coal mining, but other energy sectors, such as Oil and Gas have been growing more rapidly in recent years. The area also is a regional center for health services.

8.1 Existing Clusters

The region’s Health Services cluster remains the largest cluster in the Wheeling region with close to 11,000 jobs and more than 400 establishments, as shown in Table 13. This cluster continues to face difficulties, however, such as the closure of Eastern Ohio Memorial Hospital and Ohio Valley Medical Center in 2019, resulting in the loss of more than 1,000 jobs. These job losses may make health care a difficult sector for economic targeting in the future.

The region’s energy sector has been a major source of instability with coal job declines offset by a booming natural gas industry. The region also gained several thousand construction and engineering jobs due to major pipeline construction projects. However, as these pipeline projects have completed, these jobs have begun to decline again. Coal Mining has by far the highest LQ of any cluster in the region with a score of 72.3. The cluster had almost 1,900 jobs as of 2017 and has been stable in the two years since.

Meanwhile, the Oil and Gas Production cluster has grown significantly over the 10-year study period. Belmont County, in particular, has seen dramatic increases in natural gas production and employment between 2007 and 2017, leading to a high concentration of jobs in this area. Employment in the cluster grew from about 700 jobs in 2007 to nearly 2,300 in 2017, a gain of more than 12 percent on average each year.

Table 13: Wheeling Primary Existing Clusters

<table>
<thead>
<tr>
<th>Cluster</th>
<th>Employment</th>
<th>Establishments</th>
<th>Location Quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Services</td>
<td>10,740</td>
<td>432</td>
<td>1.2</td>
</tr>
<tr>
<td>Oil and Gas Production</td>
<td>2,270</td>
<td>53</td>
<td>3.6</td>
</tr>
<tr>
<td>Construction Products and Services</td>
<td>2,086</td>
<td>121</td>
<td>1.1</td>
</tr>
<tr>
<td>Coal Mining</td>
<td>1,892</td>
<td>23</td>
<td>72.3</td>
</tr>
</tbody>
</table>

Note: Impact clusters are in bold.
8.2 Emerging Clusters

As shown in Table 14, we find two clusters that meet the definition of emerging clusters in the Wheeling region. Marketing, Design, and Publishing is the largest emerging cluster, with nearly 450 employees. The fastest growing sector is Video Production and Distribution, which grew more than 11 percent per year on average between 2007 and 2017. This cluster also had the highest growth in location quotient and competitive shift-share. However, Video Production and Distribution started from a low base, and it still represents a relatively small cluster in the region.

Table 14: Wheeling Emerging Clusters

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing, Design, and Publishing</td>
<td>448</td>
<td>0.2</td>
<td>0.0</td>
<td>46</td>
</tr>
<tr>
<td>Video Production and Distribution</td>
<td>157</td>
<td>1.9</td>
<td>0.4</td>
<td>98</td>
</tr>
</tbody>
</table>

Note: Impact clusters are in bold.

8.3 Impact Clusters

Of the six existing and emerging clusters identified in the Wheeling region, three stand out as high impact clusters for economic development: Oil and Gas Production and Transportation; Marketing, Design, and Publishing; and Health Services.

As shown in Figure 13, Oil and Gas Production is the most notable cluster for future targeted economic development efforts in Wheeling. The cluster is characterized by both high wages and high growth in the US over the previous 10 years. While this analysis identified Oil and Gas as a rising cluster in the area, it is largely a backward-looking snapshot of recent development in a sector that is relatively new to the region. Because of this, our analysis cannot consider the potential for future downstream development from this cluster in those industries that rely on natural gas as an input to their production processes. Wheeling is uniquely positioned to capitalize on economic benefits of these downstream industries as greater cracking and refining capacity become more readily available in the region due to the planned PTTGC America Natural Gas cracker facility in Belmont County.

Aside from Oil and Gas, Wheeling may also want to support Health Services and Marketing, Design, and Publishing. Though Health Services did take a hit when the Eastern Ohio Memorial Hospital and Ohio Valley Medical Center closed, the area is still an important regional hub for medical services. Wheeling may also be able to capitalize on an expanding Marketing cluster.
8.4 Supply Gaps and Disconnects

Because of its large Health Services cluster, Wheeling imports a large portion of its needs for Pharmaceuticals, Surgical and Medical Instruments, and Surgical Appliance and Supplies. However, these industries are globally sourced commodities, which, given Wheeling’s total market size for these three industries is less than $54 million, may pose a challenge to bringing in local suppliers. Wheeling also imports a significant amount of Real Estate Services.

One area where there seems to be a supply mismatch is in Support Activities for Oil and Gas. The impact clusters in the Wheeling region import more than $11 million in these services, while at the same time exporting almost $70 million in the same industry.
Figure 14: Wheeling Import Substitution

Source: Author Calculations. Bubble size represents the share of total inputs that are met with imports.
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