Economic Structure in Appalachia's Urban Regions

How-to Use Resource Guide

This report provides information about the industrial make-up of micro- and metropolitan areas wholly within the Appalachian Region. While the findings are not designed to be prescriptive—i.e., support x and y industries and growth will follow—they can be used in support of planning and development efforts. Some broad questions this research seeks to answer—for each micro and metro area within the Region—are as follows:

- Which industries are dominant? Which are growing, and which are declining?
- Is the industrial base more or less specialized than other micro and metro areas in the Region?
- How well are the area's anchor industries supported by other industries within the same area?
- In which industries could further development help support the area's anchor industries?

Local conditions and context—numerous and wide-ranging and not captured here—will ultimately determine whether these resources can be applied successfully to a given region, but these findings will nevertheless be useful in terms of thinking through and even justifying targeted economic development efforts. Given the complexity of the underlying research, this how-to document was created to aid readers in both (1) understanding its findings, and (2) quickly navigating to the information most relevant to them.

Where do I go to find information about data sources and methodology?

If you'd like to learn more about the details of this research, including the mathematical formulas and a complete list of all 17 clusters and 181 industries included in the analysis, please check out the main report, linked below. Also included in the main report is an appendix with high-level statistics for each of the micro and metro areas in Appalachia, which allows for quick comparison across the 120 study regions.

Regional Overview and Methodology

Where do I go to find information about my micro or metro area?

Due to the number of micro and metro areas within the Region (120), area-specific findings are broken up into four documents, linked below, organized alphabetically by the name of the micro or metro area.

Albertsville, AL – Corinth, MS

Cornelia, GA – Jamestown-Dunkirk-Fredonia, NY

Johnson City, TN – Portsmouth, OH

Pottsville, PA – Zanesville, OH

What information is most useful to me once I navigate to my micro or metro area?

That depends! As noted earlier, how relevant and meaningful these findings are will depend on local conditions and context. To illustrate how someone might best work through and process the available information for each micro- and metropolitan area, consider the following example of the Cumberland, MD-WV metropolitan area, which begins on page 46 of the second supplement document.

The **Study Area Overview** contains basic information about the micro or metro area (hereinafter referred to as "study region"), including square mileage, population, and the three largest industries in the study region (Food Services and Drinking Places; Government and Unclassified; Hospitals), as well as the percent of total employment in the study region these three industries make up (22.77%). The coefficient of specialization for the study region (35.06) provides a simplistic but useful way of thinking about the specialization (or diversity) of the area's economy; in the case of Cumberland, MD-WV, it is *less* specialized (or *more* diverse) than the average micro or metro area fully within Appalachia (37.73).

Table 1, seen below, shows the ten industries that saw the largest employment growth in the study region from 2005 to 2018. Let's consider the first industry below: Aerospace Product and Parts Manufacturing. Over the time period, employment increased by 506 employees. Of this total, 447 of those jobs were due to region-specific factors (RS)—*not* trends related to national employment growth or industry-specific growth—which indicates that the study region has a relative advantage in this industry. Additionally, the location quotient (LQ) of 8.76 means that this industry is 8.76 times more specialized in the study region than in the country overall.

Let's next consider Junior Colleges, Colleges, Universities, and Professional Schools. What does it mean that employment change is positive (+366) but the regional shift value is negative (-7)? Basically, if employment in this sector had followed national employment and industry-specific growth trends, the study region would have seen 373 additional jobs. But due to some regional factors, employment growth was actually less than that: seven jobs less. Important to note here, however, is the LQ of 4.53, which means the industry is still much more specialized in the study region than elsewhere in the country. (In fact, it is perhaps *because* of this already high specialization of employment in the industry that the industry did not experience the growth that would have been expected based on national employment growth and industry-specific trends, though other interpretations exist.)

Table 1. Top Ten Growth Industries

Industry #	Industry Name	Employment Change	RS	LQ
82	Aerospace Product and Parts Manufacturing	506	447	8.76
155	Individual and Family Services	490	156	1.40
156	Community and Vocational Rehabilitation Services	433	437	6.74
144	Junior Colleges, Colleges, Universities, and Professional Schools	366	-7	4.53
167	Food Services and Drinking Places	255	-623	1.15
129	Management, Scientific, and Technical Consulting Services	241	223	0.69
42	Plastics Product Manufacturing	238	254	3.47
152	Other Ambulatory Health Care Services	217	183	3.70
86	Household and Institutional Furniture and Kitchen Cabinet Manufacturing, Excluding Wood TV, Radio and Sewing Machine Cabinet Manufacturing	214	289	6.85
113	Data Processing, Hosting, and Related Services	174	121	4.95

Table 2, seen below, shows information related to the the 17 clusters examined as part of this research, ordered by employment within the study region. In this case, Biomedical/Biotechnical (Life Sciences) was the cluster accounting for the highest employment in 2018 (6,070). We also see that the cluster became less specialized in the study region relative to the country as a whole from 2005 to 2018, with its cluster location quotient (CLQ) dropping from 1.88 to 1.58; still, it remains above the national average of 1.0 (remember: a CLQ above 1.0 means that a cluster or industry is more specialized in that study region than in the country as a whole; a CLQ less than 1.0 means the opposite).

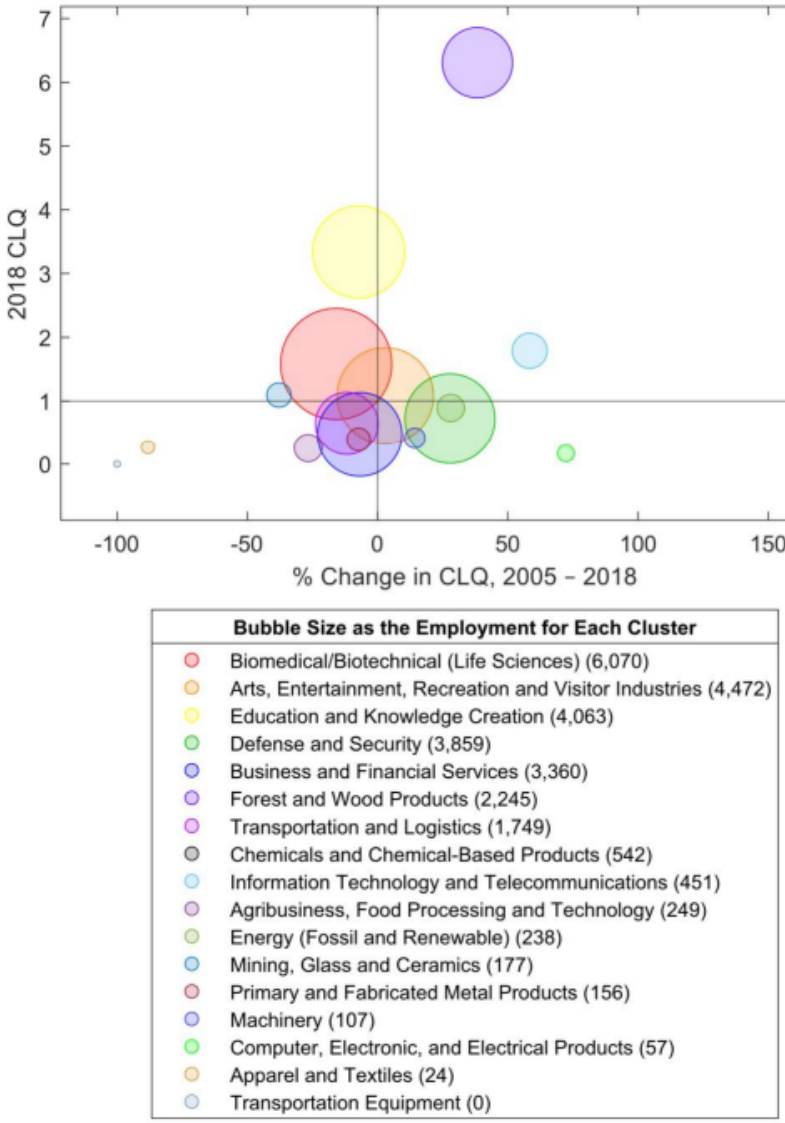
Table 2. Cluster Concentrations, 2005 and 2018

Cluster #	Cluster Name	2005 CLQ	2018 CLQ	Employment
4	Biomedical/Biotechnical (Life Sciences)	1.88	1.58	6,070
3	Arts, Entertainment, Recreation and Visitor Industries	1.05	1.08	4,472
9	Education and Knowledge Creation	3.60	3.34	4,063
8	Defense and Security	0.56	0.72	3,859
5	Business and Financial Services	0.51	0.47	3,360
11	Forest and Wood Products	4.56	6.31	2,245
16	Transportation and Logistics	0.73	0.65	1,749
6	Chemicals and Chemical-Based Products	0.56	1.50	542
12	Information Technology and Telecommunications	1.13	1.79	451
1	Agribusiness, Food Processing and Technology	0.35	0.26	249
10	Energy (Fossil and Renewable)	0.70	0.89	238
14	Mining, Glass and Ceramics	1.76	1.10	177
15	Primary and Fabricated Metal Products	0.42	0.39	156
13	Machinery	0.36	0.41	107
7	Computer, Electronic, and Electrical Products	0.10	0.17	57
2	Apparel and Textiles	2.26	0.27	24
17	Transportation Equipment	0.72	0.00	0

Note: Increasing cluster concentrations are highlighted in blue.

Figure 1, seen below, offers a graphical representation of the CLQ data shown in Table 2, and it also includes how the CLQ has changed from 2005 to 2018 (in terms of percent). Consider the medium-sized purple bubble towards the top of the graph: Forest and Wood Products had the highest CLQ in the study region in 2018, at 6.31 times the national average. And since it's to the right of the vertical line representing zero on the x-axis, this means the cluster increased in its specialization in the study region from 2005 to 2018, from 4.56 to 6.31, which equates to a 38% increase. The cluster that saw the most growth in its CLQ is the gray bubble on the far right of the graph: Chemicals and Chemical-Based Products, which saw its CLQ increase from 0.56 to 1.50, an increase of 168%. Generally, the most interestesting elements of this graph are the outliers: Which clusters have recently experienced the most significant changes? Which saw fast growth? Which saw steep declines?

Figure 1: Cluster Bubble Chart of Cumberland, MD-WV



The results of the **CADS analysis**—the heart of this research—make their first appearance below in **Table 3**. This table identifies the anchor industries for the study region, as well as the clusters they belong to. In the case of Cumberland, MD-WV, there are six anchor industries across five clusters.

Table 3. Anchors, Clusters, and Employment

Cluster #	Cluster Name	Anchor #	Anchor Industry Name	Anchor Emp. 2005	Anchor Emp. 2018
8	Defense and Security	82	Aerospace Product and Parts Manufacturing	522	1,028
12	Information Technology and Telecommunications	113	Data Processing, Hosting, and Related Services	205	380
11	Forest and Wood Products	88	Other Furniture Related Product Manufacturing	488	493
6	Chemicals and Chemical-Based Products	42	Plastics Product Manufacturing	233	472
3	Arts, Entertainment, Recreation and Visitor Industries	166	Accommodation	634	724
11	Forest and Wood Products	86	Household and Institutional Furniture and Kitchen Cabinet Manufacturing, Excluding Wood TV, Radio and Sewing Machine Cabinet Manufacturing	218	432

We could discuss at length the process behind identifying these anchor industries—but that is what the main report is for. (Linked again here.) The table below provides a brief overview of the conditions necessary for an industry to qualify as an anchor industry. In broad terms, this means the industry is growing faster in the study region than in the country as a whole, is more specialized in the study region than in the country as a whole, and makes up a meaningful share of the study region's total employment.

Anchor Industry Constraint Variables	Condition	Interpretation/Use
Anchor Dominance	no minimum	Primary anchor candidate selection criterion
Location Quotient	> 1.2	Some specialization
Regional Shift	> 0	Regional growth rate > national industry growth rate
Growth Rate	((4/3) * grRi) > grN	Greater than 75% of national average growth
Employment Size	> 99	At least 100 employees
Employment Share	> 1%	Larger than 1% of regional employment
Eligibility	by Assignment	Determined by conceptual justifications
Anchor Strength	no minimum	Regional supply chain requirement support

Table 4 includes some data for each of the study region's anchor industries, used to support (some of) the eight conditions noted above.

Table 4. Anchors, Location Quotients, Regional Shift, and Growth Rates

Anchor #	Anchor Industry Name	LQ	RS	Industry Growth Rate (%) National	Industry Growth Rate (%) Regional	AS	AD
82	Aerospace Product and Parts Manufacturing	8.76	447	11.31	97.02	0.66	0.09
113	Data Processing, Hosting, and Related Services	4.95	121	25.87	84.89	0.84	0.04
88	Other Furniture Related Product Manufacturing	59.97	159	-31.49	1.08	0.72	0.04
42	Plastics Product Manufacturing	3.47	254	-6.65	102.22	0.69	0.04
166	Accommodation	1.53	24	10.44	14.18	0.87	0.02
86	Household and Institutional Furniture and Kitchen Cabinet Manufacturing, Excluding Wood TV, Radio and Sewing Machine Cabinet Manufacturing	6.85	289	-34.24	98.42	0.69	0.01

Once these anchor industries are identified, supply-chain input-output analysis—basically, a mathematical process based on known linkages across industries—determines deficits in cluster support industries throughout the study region. What do we mean by deficits? Consider **Table 5** below, which shows us the difference between (A) the current level of employment in the industry versus (B) the level of employment that would be required in the industry in order to fully support the study region's anchor industries. Put another way: which industries could be strengthened to further support the study region's anchor industries? In this example, the largest deficit for Aerospace Product and Parts Manufacturing (the main anchor industry, i.e., the one with the largest regional supply-chain presence) is Semiconductor and Other Electronic Component Manufacturing. Based on this analysis, 59 jobs would need to be added in that industry to fully spport the anchor industry. Of course, as noted previously, relevance here depends upon local conditions and context, and other conditions for the success of deficit industries will also be important final decision factors.

Table 5. Phase 1 Deficits for Anchor Industry 82

Aerospace Product and Parts Manufacturing

Industry #	Industry Name	Employment
1	Crop Production	-2
26	Textile Mills and Textile Product Mills	N/A
35	Basic Chemical Manufacturing	-2
43	Rubber Product Manufacturing	-3
48	Iron and Steel Mills and Ferroalloy Manufacturing	-7
53	Forging and Stamping	-8
58	Spring and Wire Product Manufacturing	-9
60	Coating, Engraving, Heat Treating, and Allied Activities	-6
61	Other Fabricated Metal Product Manufacturing	-16
70	Communications Equipment Manufacturing	-18
72	Semiconductor and Other Electronic Component Manufacturing	-59
78	Other Electrical Equipment and Component Manufacturing	-9
81	Motor Vehicle Parts Manufacturing	-8
104	Warehousing and Storage	-0
136	Employment Services	N/A
139	Investigation and Security Services	-7

This process is repeated for each anchor industry identified in the study region (the number of these varies; in this example, there are five anchor industries). In subsequent tables, deficits in industries are combined across all anchor industries. For example, in **Table 6** below, we see that if we also consider the deficits needed to support the second identified anchor industry (i.e., the one with the second largest regional supply chain presence), Data Processing, Hosting, and Related Services, there is a need for an additional 6 jobs in the Semiconductor and Other Electronic Component Manufacturing industry. This brings the total deficit in that industry for the study region to 65 jobs.

Table 6. Phase 2 Deficits Adding Anchor Industry 113

Data Processing, Hosting, and Related Services

Industry #	Industry Name	Employment	Added to Deficit
1	Crop Production	-3	-1
26	Textile Mills and Textile Product Mills	N/A	-0
35	Basic Chemical Manufacturing	-2	-0
43	Rubber Product Manufacturing	-3	-0
48	Iron and Steel Mills and Ferroalloy Manufacturing	-7	-0
53	Forging and Stamping	-8	-1
58	Spring and Wire Product Manufacturing	-10	-0
60	Coating, Engraving, Heat Treating, and Allied Activities	-6	-0
61	Other Fabricated Metal Product Manufacturing	-17	-1
70	Communications Equipment Manufacturing	-21	-2
72	Semiconductor and Other Electronic Component Manufacturing	-65	-6
78	Other Electrical Equipment and Component Manufacturing	-10	-1
81	Motor Vehicle Parts Manufacturing	-8	-1
104	Warehousing and Storage	-6	-6
136	Employment Services	-24	-77
139	Investigation and Security Services	-17	-10

So, what next?

Again: it depends. Simply learning about a study region's industrial make-up—and particularly, the industries considered anchors—allows for a better understanding of what drives economic activity in that study region. This better understanding is helpful for any economic development practitioner seeking to improve conditions in their local communities, even if it doesn't result in any targeted efforts.

However, it's also conceivable that information contained in these reports *could* result in targeted, meaningful efforts. Economic development practitioners may be able to look at tables above and make connections between anchor industries and local businesses, which may in turn lead to discussions about challenges those businesses face—and the ways in which the economic development practitioners may help better support their communities' anchor industries. This can encompass both retention and expansion efforts, with possibilities here including job training programs, industrial recruitment, and specific infrastructure projects (and lots of other things, too).

Again, while this report is not designed to be prescriptive, when combined with knowledge about local conditions and context, the findings will prove useful to a wide range of stakeholders—from those simply seeking a better understanding of the industrial make-up of their community, to those initiating targeted economic development efforts.