



UPPER SHORE

— OF MARYLAND —

REGIONAL LABOR MARKET & TARGET INDUSTRY ANALYSIS



UPPER SHORE
Regional Council

 **Emsi**

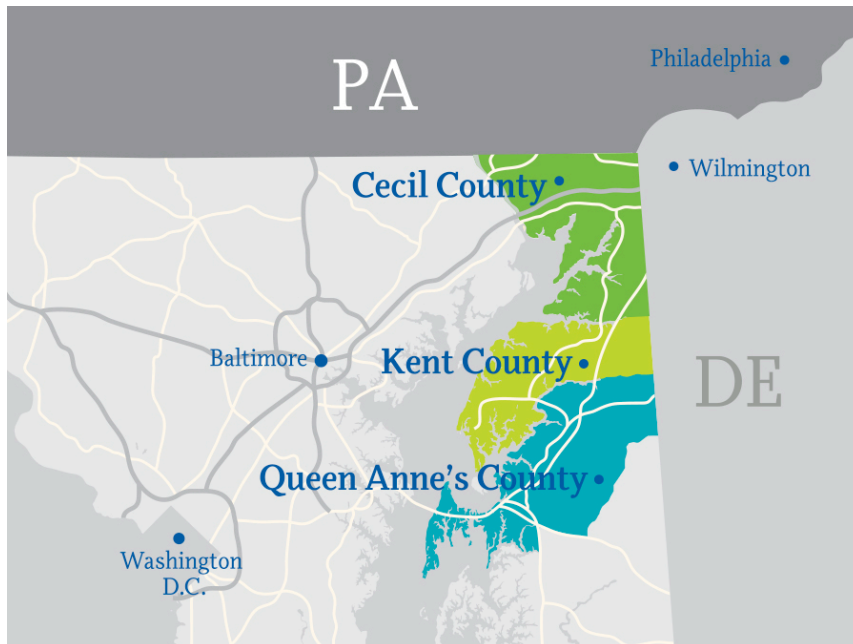
Contents

Introduction.....	3
Regional Economy Overview.....	4
Commuting Data	9
Net Commuting.....	12
Labor Force and Unemployment	15
Industry	22
Industry Clusters	23
Supply Chain Analysis.....	31
Top Occupations.....	35

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Map of the Upper Shore of Maryland



Introduction

The Upper Shore region consists of Cecil, Kent, and Queen Anne's counties on Maryland's Eastern Shore. The Upper Shore Regional Council (USRC) fosters planning and development across these three counties. USRC affords federal, state, county and local governments a regional forum to identify issues and opportunities.

USRC commissioned this report to better understand the regional economy while also identifying the unique strengths and opportunities present in each county. The USRC intends to leverage the findings of this report to better plan and implement programs that will improve the quality of life in the Upper Shore Region of Maryland.

While traditionally agriculture and tourism have been predominant drivers of the regional economy, increased employment and business in other sectors reflect the strengths, opportunities, and diversity of the Upper Shore. With its picturesque landscapes and proximity to major metros such as Baltimore, Washington D.C., Wilmington, and Philadelphia, the Upper Shore presents exciting opportunities for businesses to grow.

The substantial resident workforce represents one of the greatest assets for the Upper Shore. Approximately 29,000 residents commute outside the region for work daily. The types of jobs these residents have run the gamut of the economy, including administrative, business, hospitality, health care, and education. The region can leverage its impressive resident worker base to demonstrate the abundance of an available workforce to prospective employers.

In addition to its resident workforce, this report found that the Upper Shore has strong growth in numerous industry clusters that are inclusive of many different sectors. Research demonstrates that a diversified economy results in a resilient economy. More diverse economies tend to have lower unemployment rates and recover quicker from recessions compared to less diverse economies. A cluster strategy that encompasses legacy, growth, and emerging industries can result in long-term benefits for a regional economy, particularly stability. The clusters identified in the Upper Shore include:

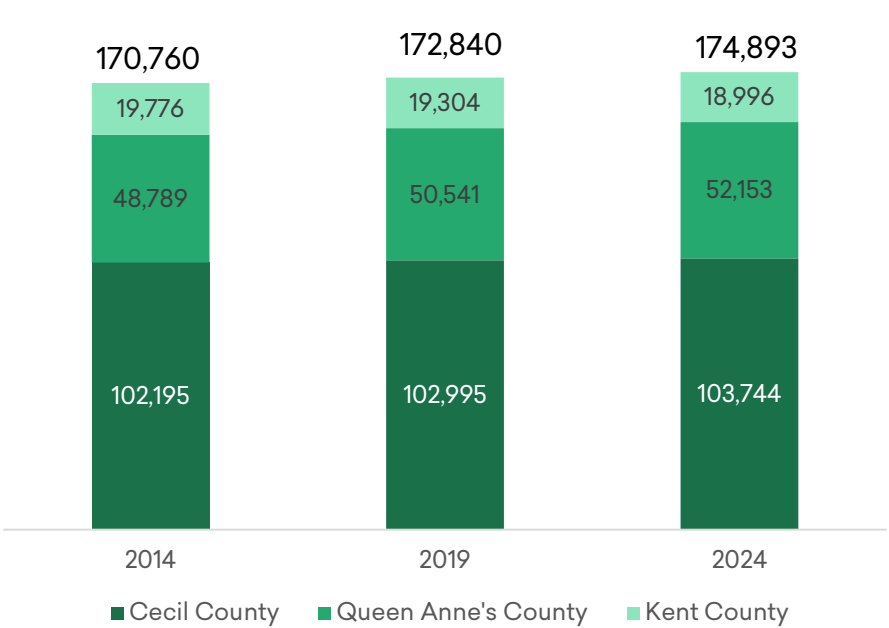
- Plastics, including Plastics Manufacturing
- Distribution and Electronic Commerce
- Manufacturing
- Hospitality and Entertainment
- Business and Professional Services
- Agriculture
- Transportation

Emphasizing business retention, expansion, and recruitment in these key clusters will ensure long-term prosperity for the Upper Shore economy.

Regional Economy Overview

Population and Demographic Trends

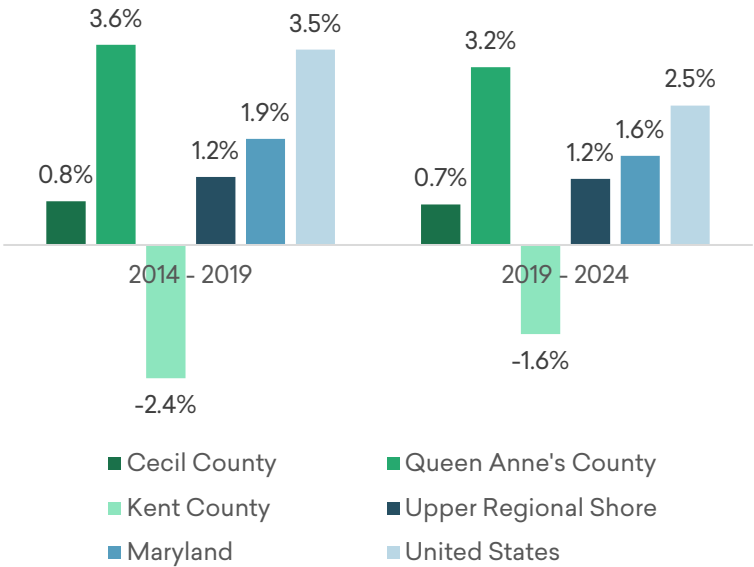
Figure 1) Population trends for the Upper Shore 2014 – 2024



The combined population of the three counties that comprise the Upper Shore has experienced steady growth in recent years, adding approximately 2,000 people between 2014 and 2019. The region is expected to grow by an additional 2,000 individuals through 2024.

Source: Emsi

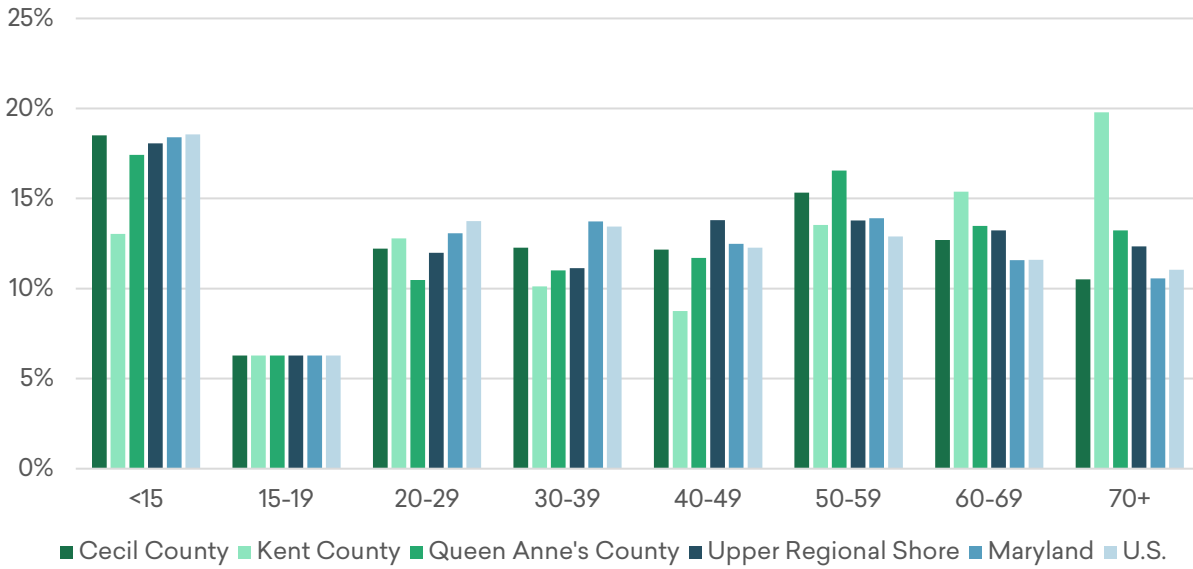
Figure 2) Population Growth Percentage for the Upper Shore, Maryland, and U.S. 2014- 2024



While the Upper Shore has overall experienced growth, the individual counties have experienced different growth rates. Most notably, Kent County has lost 2.4 percent of its population between 2014 and 2019. The decline is expected to slow to 1.6 percent between 2019 and 2024. Overall, the U.S. population has increased 3.5 percent since 2014, on par with growth in Queen Anne's County over the same time period.

Source: Emsi

Figure 3) Share of population by age group for the Upper Shore, Maryland, and U.S. 2019



Source: Emsi

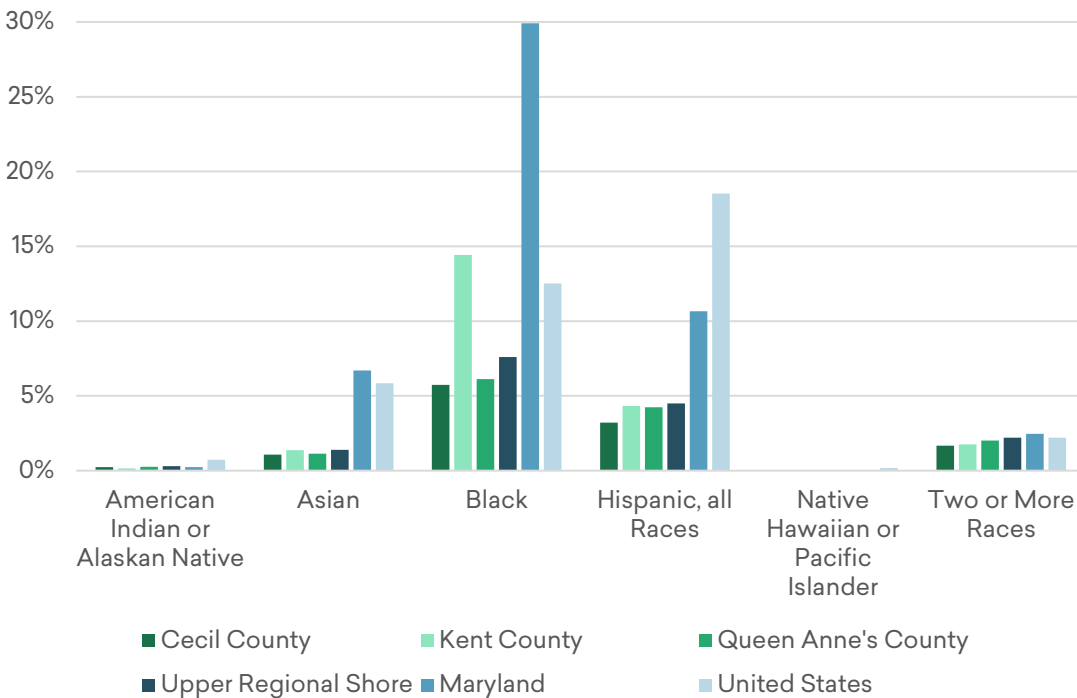
Table 1) Median age for the Upper Shore Counties, Maryland, and U.S. 2019

Region	Median Age
Cecil County	40
Kent County	47
Queen Anne's County	44
Maryland	39
United States	38

The Upper Shore population trends older than Maryland and the U.S, particularly from the age groups 40 and above. Approximately 53 percent of the region’s population is over the age of 40, compared to just 48 percent for both Maryland and the U.S. Consequently, the median average ages in the counties that comprise the region are older than state and national averages.

Source: ACS 2017 1-year estimates

Figure 4) Share of population, non-white races, the Upper Shore, Maryland, and United States



Source: Emsi

The Upper Shore population is overwhelmingly White, non-Hispanic compared to Maryland and the U.S. As Table 2 below shows, however, the population has been diversifying over the last decade. People of color increased their share of the regional population by 2.5 percentage points between 2009 and 2019.

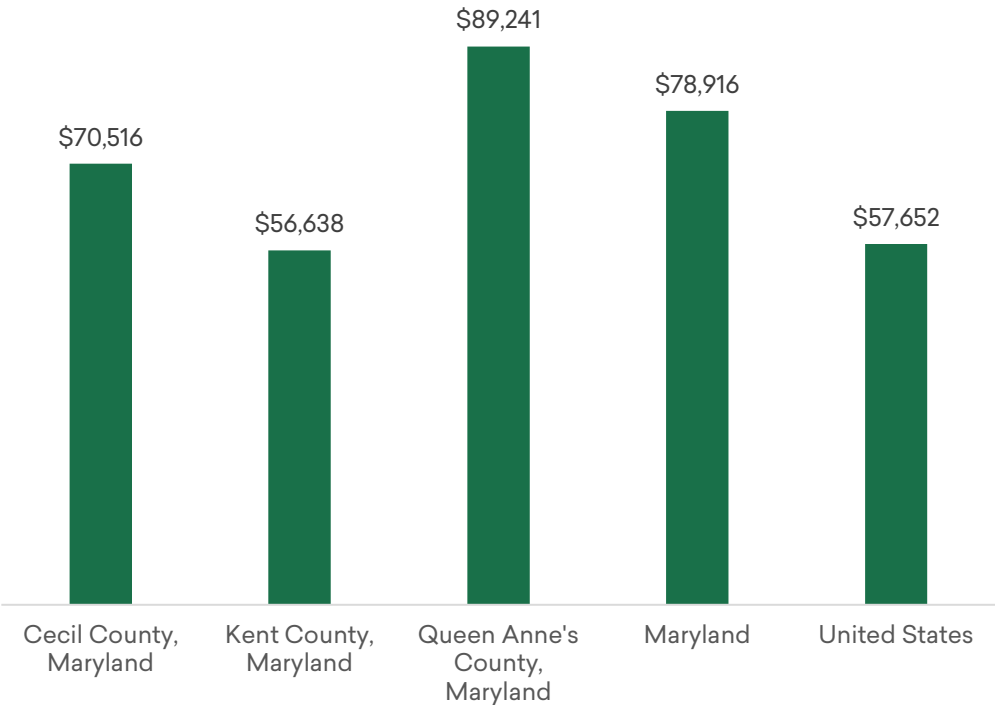
Kent County has nearly double the share of population that is Black compared to the region as a whole—roughly two percentage points higher than the U.S. but still considerably less than Maryland’s share (30 percent).

Table 2) Population share by race/ethnicity for the Upper Shore 2019

Race/Ethnicity	2009	2019	Change
American Indian or Alaskan Native	0.2%	0.3%	0.02%
Asian	1.0%	1.4%	0.35%
Black	7.3%	7.6%	0.26%
Hispanic, all Races	3.3%	4.5%	1.25%
Native Hawaiian or Pacific Islander	0.0%	0.0%	0.01%
Two or More Races	1.6%	2.2%	0.56%
White	86.6%	84.1%	-2.45%

Source: Emsi

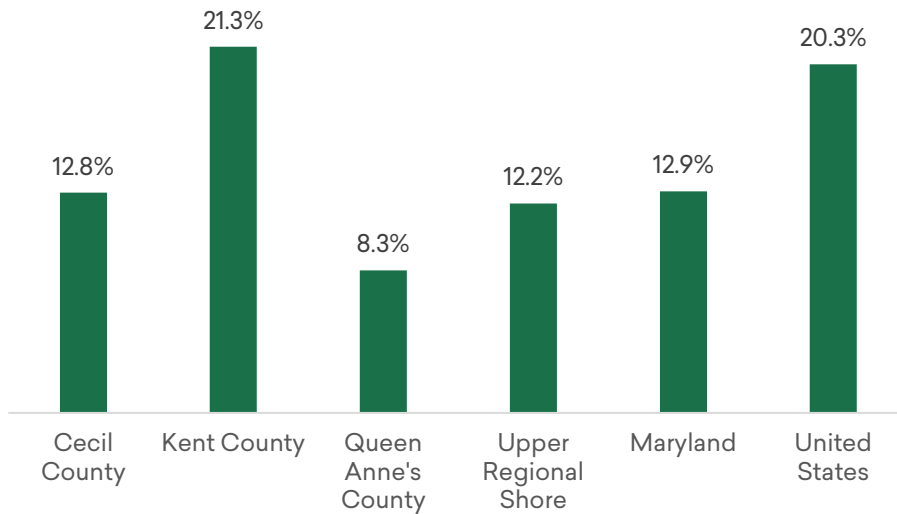
Figure 5) Median Household income for Counties that comprise the Upper Shore, Maryland, and U.S., 2017



Source: ACS 2017 1-year estimates

Maryland has one of the highest median household incomes across the U.S. at over \$78,900 as of the most recent 5-year Census estimates in 2017. Queen Anne's County has an even higher average household income at \$89,200. Cecil County is lower than Maryland but above the U.S. average at \$70,500 per household. Kent County, meanwhile, has median household income roughly on par with the U.S., falling \$1,000 short at an estimated \$56,600.

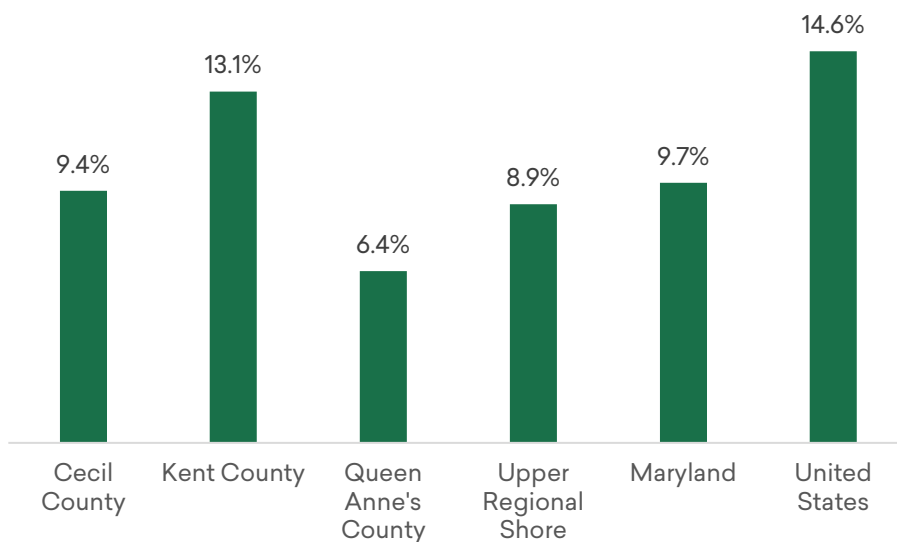
Figure 6) Share of children in poverty, the Upper Shore, Maryland, and U.S., 2017



Like Maryland, the Upper Shore has substantially lower poverty rates for children (under age 18). Kent County has a higher rate; however, it is roughly on par with the U.S. poverty rate of 20 percent.

Source: ACS 2017 1-year estimates

Figure 7) Share of total population in poverty, the Upper Shore, Maryland, and U.S., 2017



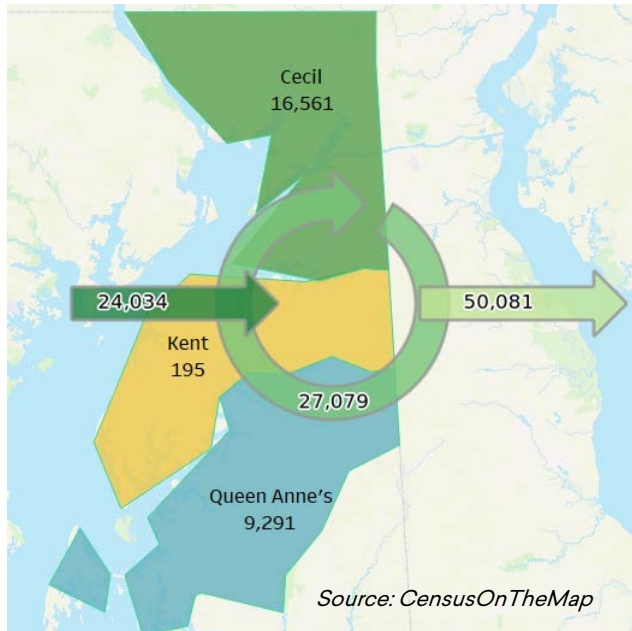
The Upper Shore also has exceptionally low poverty rates compared to the nation. The 8.9 percent poverty rate for the region is 0.8 percentage points lower than Maryland's rate which ranks as the second lowest state in the nation.

Source: ACS 2017 1-year estimates

Commuting Data

Figure 8) Inflow/Outflow commutes for the Upper Shore, 2017

Net outflow by County below County name

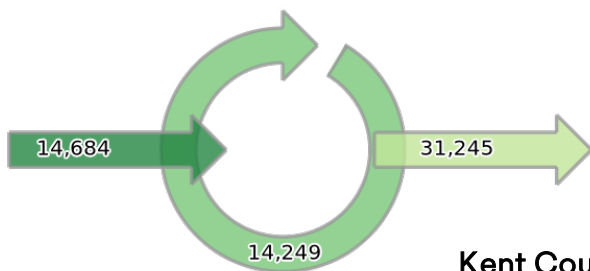


Commuting data allow development investors to understand what proportion of the workforce lives in the place of which they work and what proportion commute outside the region for other employment opportunities. According to Census' Longitudinal Employer-Household Dynamics (LEHD) OnTheMap program, over 24,000 (47%) of workers employed within the Upper Shore live outside the region. The remaining 27,000 (53%) both live and work in Cecil, Kent, or Queen Anne's County.

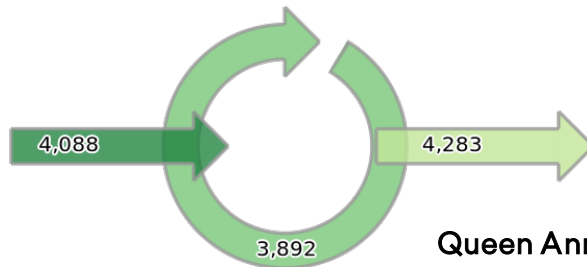
Meanwhile, over 50,000 Upper Shore residents commute outside the region for work—representing two-thirds of the region's working residents. As the figures show at the bottom of page 9, Cecil and Queen Anne's County have substantial shares of residents leaving to work elsewhere.

Meanwhile, Kent County has more balance in terms of inflow and outflow commutes.

Cecil County



Kent County



Queen Anne's County

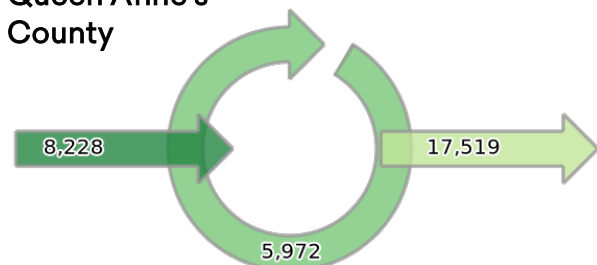
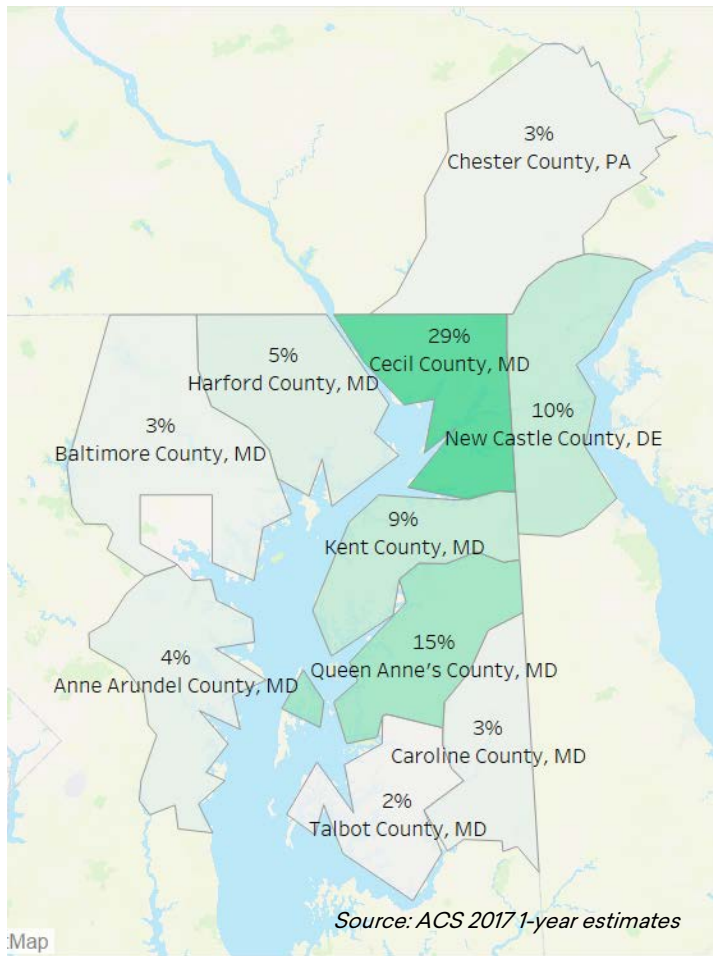


Figure 9) Where workers employed in the Upper Shore live



Workers who are employed by Upper Shore employers primarily live in the ten counties highlighted to the left. These ten counties are home to approximately 82 percent of all regional workers. The other 18 percent live in counties not listed.

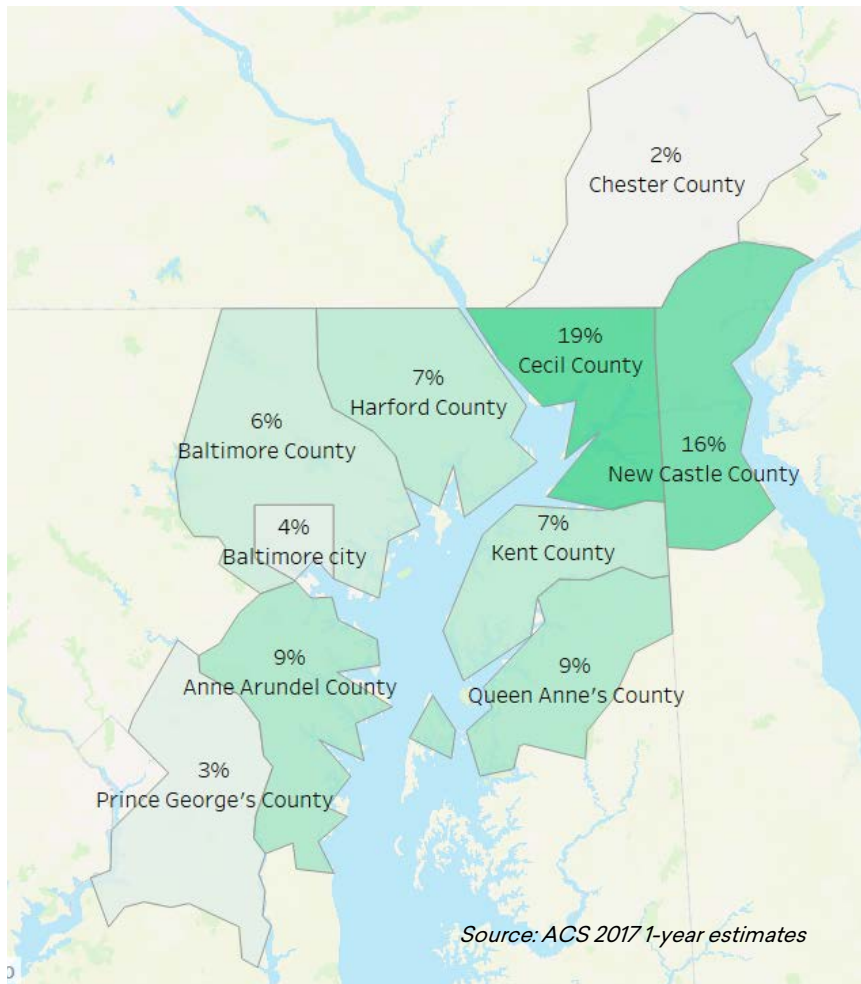
Based on these data, the majority (53 percent) of those employed both work and live in the region. New Castle County in Delaware has the third highest share of Upper Shore workers as residents.

In addition to the roughly three percent of Upper Shore workers (1,459) that reside in Baltimore County, an additional one percent (633) travel to the region for work from Baltimore City.

Destination of home	Count	Share
Cecil County, MD	14,696	28.8%
Queen Anne's County, MD	7,588	14.8%
New Castle County, DE	4,891	9.6%
Kent County, MD	4,795	9.4%
Harford County, MD	2,565	5.0%
Anne Arundel County, MD	1,883	3.7%
Caroline County, MD	1,553	3.0%
Baltimore County, MD	1,459	2.9%
Chester County, PA	1,301	2.5%
Talbot County, MD	1,025	2.0%
All Other Locations	9,357	18.3%
Total	51,113	100%

Source: ACS 2017 1-year estimates

Figure 10) Where Upper Shore residents work



According to Census commuting data, just over one-third of working Upper Shore residents are employed within the region. The other two-thirds travel to other counties for work—primarily across the border into New Castle County, Delaware (16 percent), Anne Arundel County (9 percent), and Baltimore County and city (10 percent combined).

Communities or regions that tend to have larger outflows than inflows, such as Upper Shore, are commonly referred to as “bedroom communities.” Many people of working age live in the area, however, they travel to surrounding areas for work.

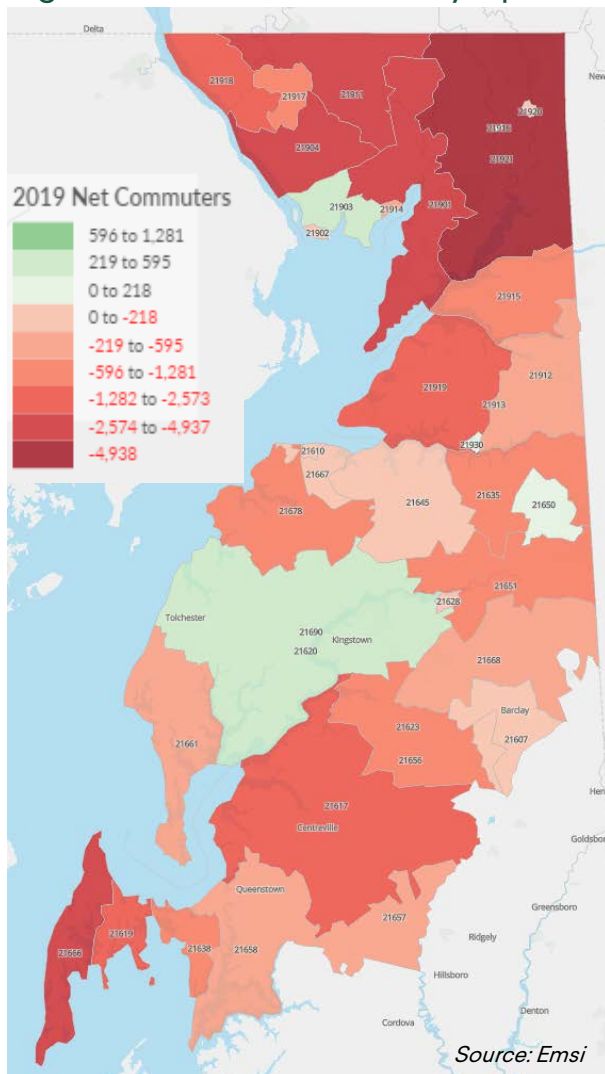
Destination of work	Count	Share
Cecil County, MD	14,663	19.0%
New Castle County, DE	12,161	15.8%
Anne Arundel County, MD	6,893	8.9%
Queen Anne's County, MD	6,800	8.8%
Harford County, MD	5,750	7.5%
Kent County, MD	5,616	7.3%
Baltimore County, MD	4,328	5.6%
Baltimore city, MD	2,917	3.8%
Prince George's County, MD	2,564	3.3%
Chester County, PA	1,563	2.0%
All Other Locations	13,905	18.0%
Total	77,160	100%

Source: ACS 2017 1-year estimates

Net Commuting

Net Commuters is the difference between the occupational residents in a region and the occupational employment in a region. For a region in which more workers live than there are jobs in the region, net commuting is negative (i.e. the net result is that workers commute out of the region for work). For a region in which there are more jobs than there are resident workers, net commuting is positive (i.e. the net result is that workers commute into the region for work).

Figure 11) Net commuters by zip code, the Upper Shore, 2019



*The Elkton zip code 21922 below represents the County seat, and is home to the administration building, hosting primarily public-sector jobs.

ZIP	ZIP Name	2019 Net Commuters
21922	Elkton*	1,057
21903	Perryville	329
21620	Chestertown	298
21930	Georgetown	86
21650	Massey	20
21645	Kennedyville	(33)
21607	Barclay	(55)
21644	Ingleside	(61)
21902	Perry Point	(66)
21667	Still Pond	(80)
21920	Elk Mills	(131)
21610	Betterton	(147)
21628	Crumpton	(158)
21913	Cecilton	(211)
21668	Sudlersville	(253)
21661	Rock Hall	(268)
21912	Warwick	(282)
21914	Charlestown	(308)
21658	Queenstown	(311)
21657	Queen Anne	(498)
21917	Colora	(594)
21915	Chesapeake City	(657)
21678	Worton	(780)
21635	Galena	(805)
21638	Grasonville	(891)
21651	Millington	(925)
21623	Church Hill	(1,021)
21919	Earleville	(1,271)
21617	Centreville	(1,452)
21918	Conowingo	(1,524)
21619	Chester	(1,709)
21666	Stevensville	(2,610)
21904	Port Deposit	(2,724)
21901	North East	(2,974)
21911	Rising Sun	(3,035)
21921	Elkton	(5,023)
	Upper Shore Total	(29,067)

The Upper Shore has a high share of negative net commuters. Of the 37 zip codes in the region, net commuting is negative in 31 (84 percent). Combined, over 29,000 regional residents travel elsewhere for work.

As an area that has a plethora of residents traveling elsewhere for work, the Upper Shore is well positioned to grow and attract a variety of business. When combining the negative amount of net commuters and total number of jobs in the region, the end result is the number of resident workers. Resident workers can showcase to potential and current businesses within the Upper Shore the total available workforce present in the area, rather than just workers (number of jobs).

For example, Figure 12 below shows that an estimated 8,300 office and administrative support occupations jobs in the region. A total of 12,650 Upper Shore residents, however, are employed in this broad occupation group. Consequently, the difference between resident workers and jobs in the region indicates that an estimated 4,300 residents are employed in these occupations outside the region. The Upper Shore can leverage its resident worker count to demonstrate the abundance of an available workforce beyond just those employed in the region.

Other top occupation groups with large negative shares of net commuters include sales (-2,600), business and financial operations (-2,300), and healthcare practitioners (-1,850). The farming, fishing, and forestry occupation group is the only group in the region with a positive share of net commuters, albeit relatively small with just +112.

Figure 12) Jobs, Resident Workers, and Net Commuters by broad occupation group, the Upper Shore 2019

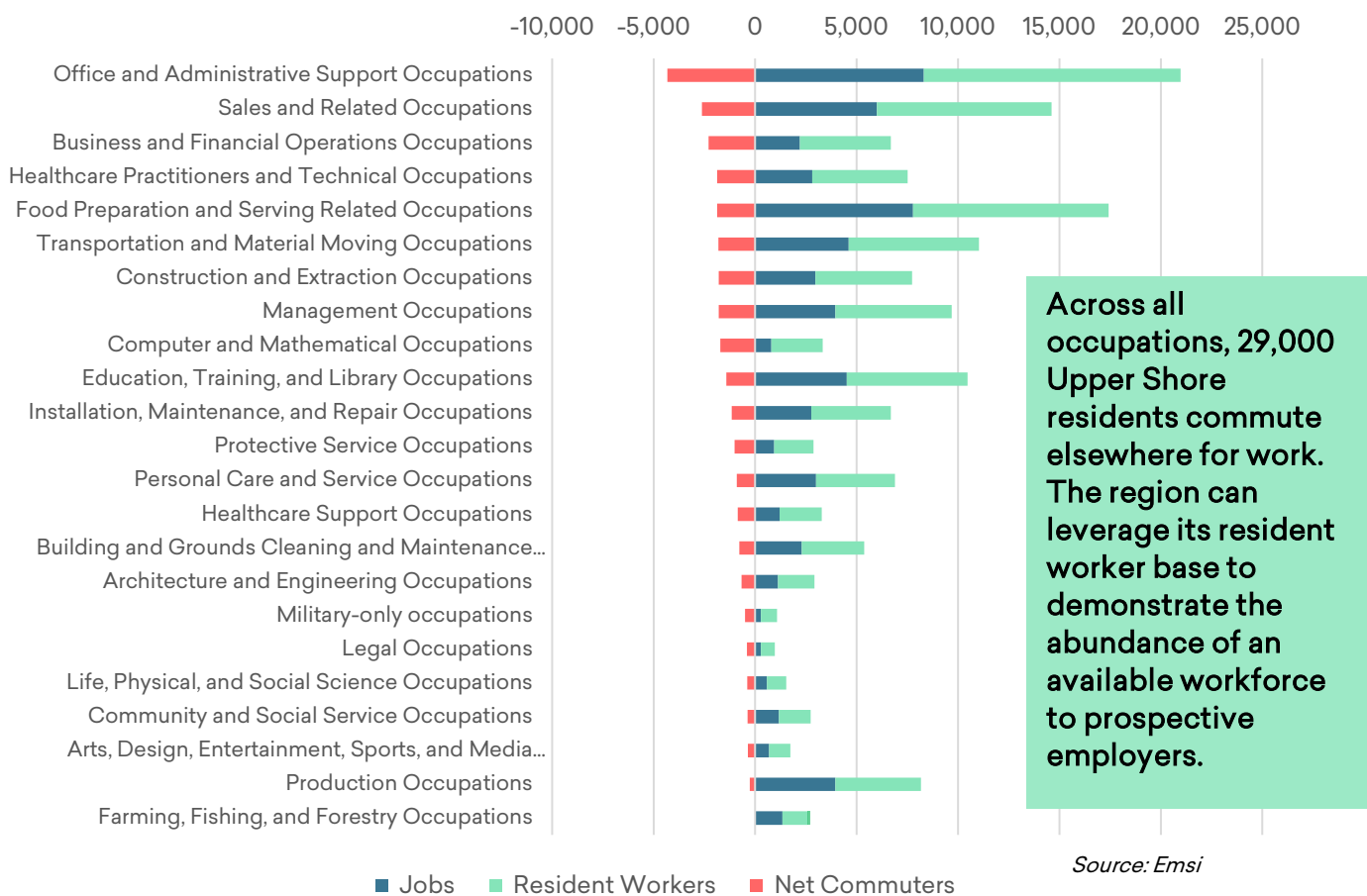
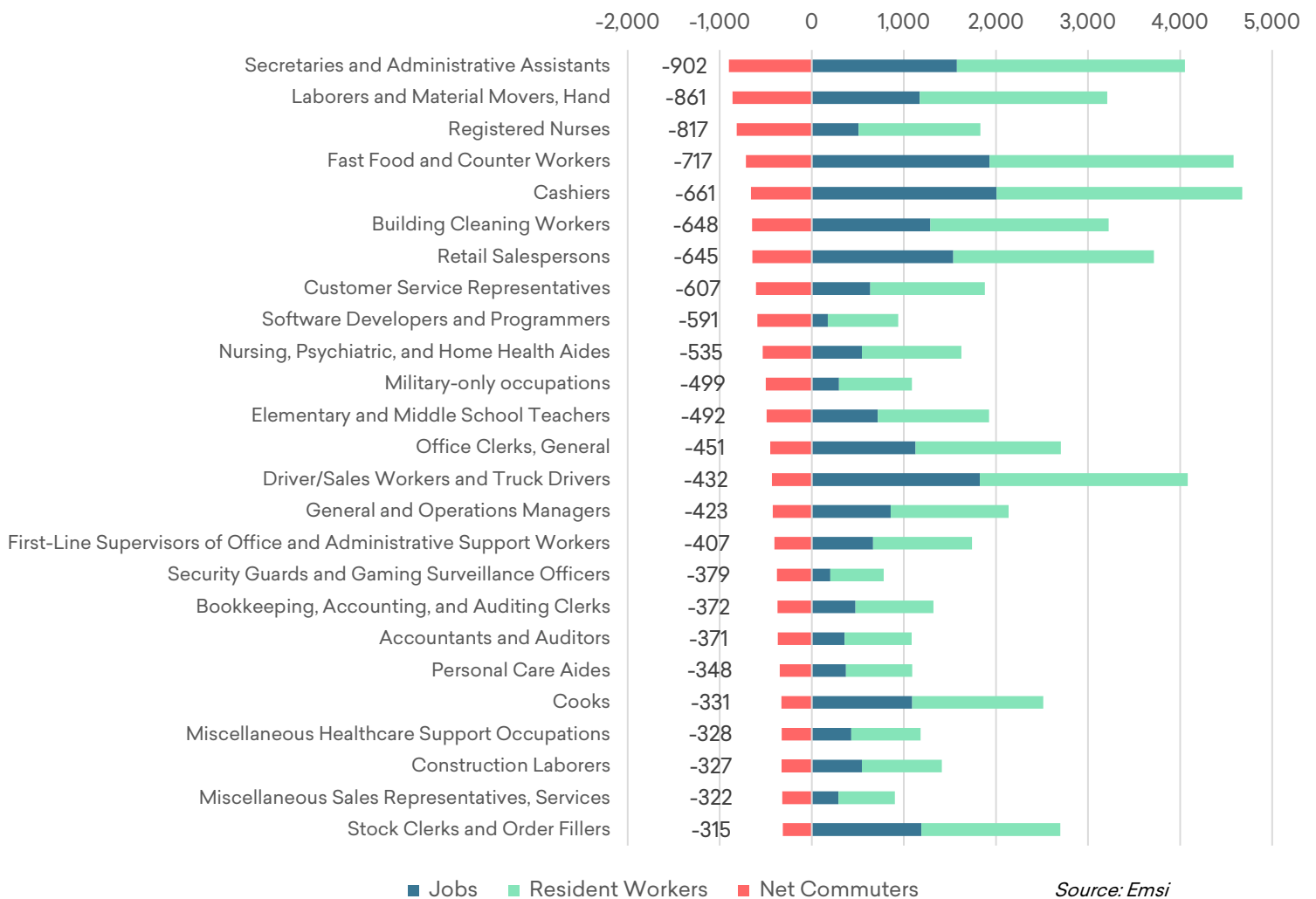


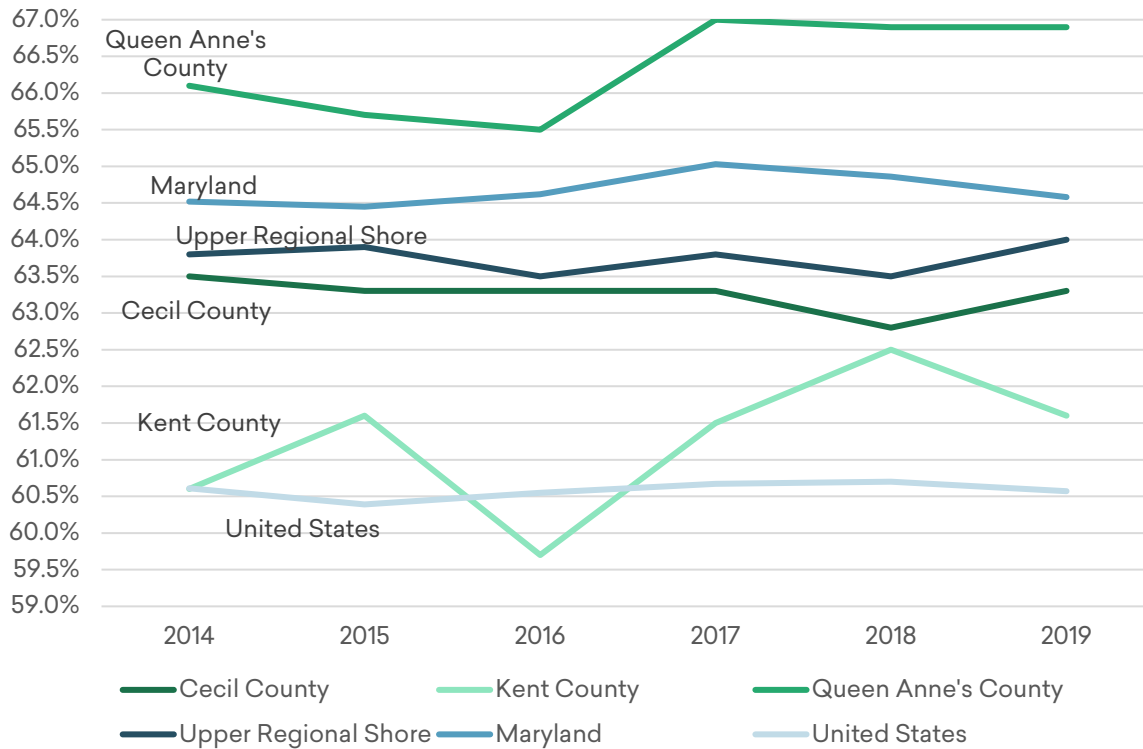
Figure 13 below highlights occupations and net commuters at a more detailed level than figure 12. Secretaries have the highest share with an estimated of 900 Upper Shore residents commuting elsewhere for work. These highlighted occupations are diverse both in where they are found throughout the economy and varying skill levels. From lower-skilled, entry-level occupations like cashiers and retail sales, to middle-skilled jobs like construction laborers and customer service reps, to high-skill, high-paying jobs like registered nurses and software developers.

Figure 13) Jobs, Resident Workers, and Net Commuters for detailed occupations, the Upper Shore 2019



Labor Force and Unemployment

Figure 14) Labor force participation rate for the Upper Shore, Maryland, and U.S., 2014 – 2019

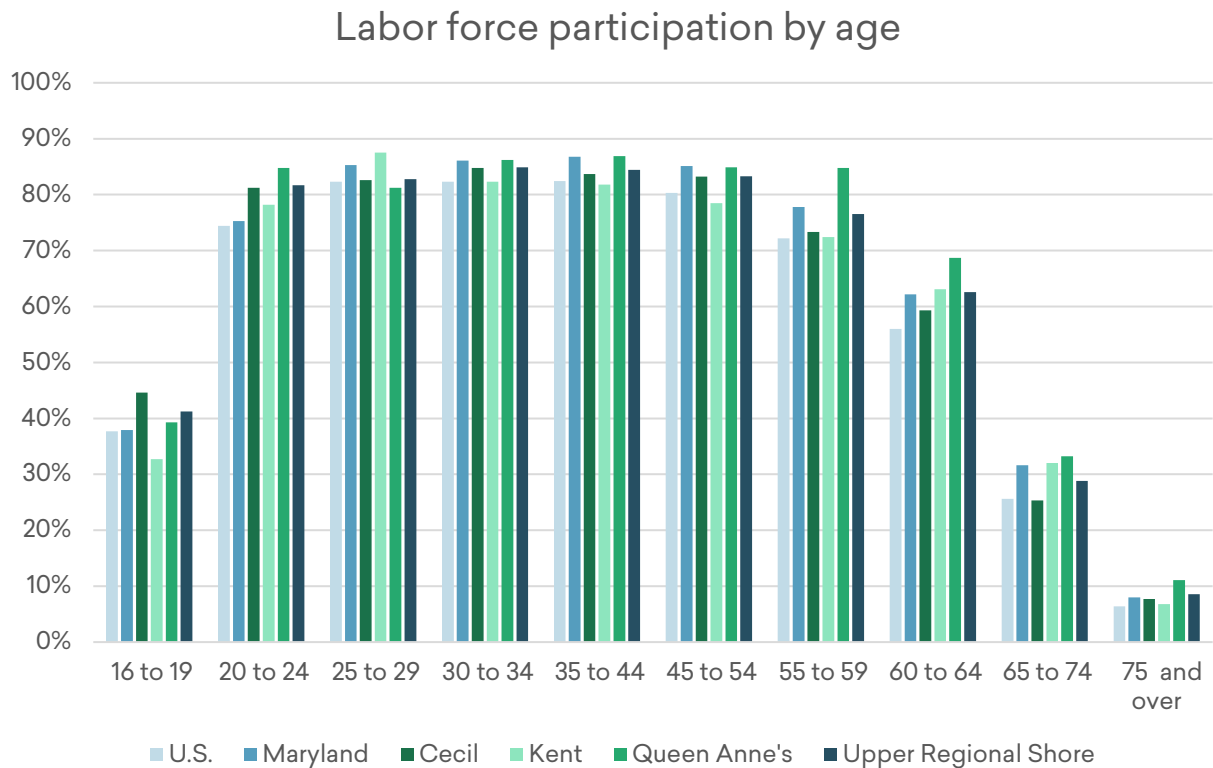


Source: Emsi and Maryland Department of Labor

Across the U.S., the labor force participation rate has been steadily declining for nearly two decades. Most recently, it has remained relatively stagnant since 2014 and 2019 (both 60.6 percent). Maryland has a stronger participation rate than the nation, and the same holds true for the entire Upper Shore. Queen Anne's County boasts an impressively high participation rate of nearly 67 percent through 2019. Meanwhile, Kent County has recovered from a participation rate low of less than 60 percent in 2016, to roughly 61.6 percent in 2019.

A growing participation rate in the region is an encouraging sign—growth indicates that workers who may have previously been discouraged or disengaged are now re-entering the labor force. Greater participation from prime-age workers (25-55) is vital to maintain current participation rates with an aging workforce and retiring Baby Boomers.

Figure 15) Labor force participation rate by age for the Upper Shore, Maryland, and U.S., 2017

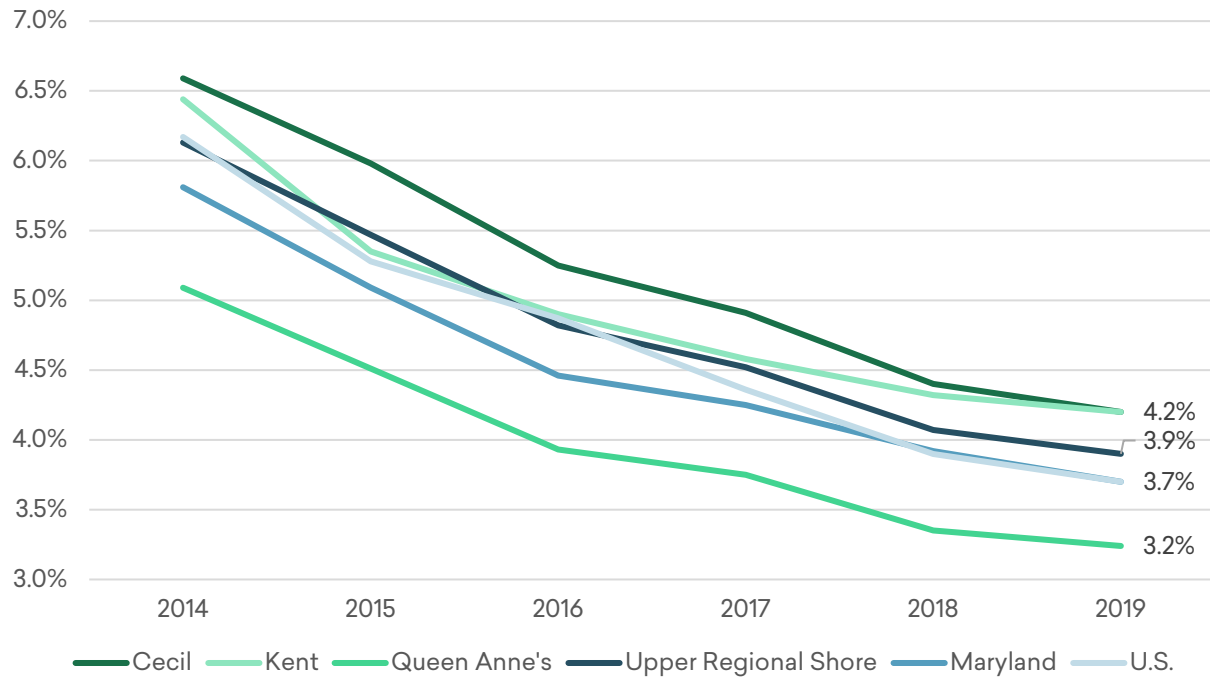


Source: 2017 ACS 1-year Estimates

Understanding the labor force participation rate by age sheds light on the health of a regional economy. Traditionally, the youngest and oldest age groups tend to have lower rates of participation. The ages 16-24 tend to have lower participation rates because of schooling while from 55 onward participation dips as individuals retire from the workforce.

The Upper Shore and its counties uniformly have higher participation rates in all age groups compared to the nation. This is especially important from ages 25-54 which makes up the prime working ages of the labor force. High levels of participation in this age group indicates a strong regional economy that encourages individuals to find work more than nationally.

Figure 16) Unemployment rates for the Upper Shore, Maryland, and U.S., 2014 - 2019



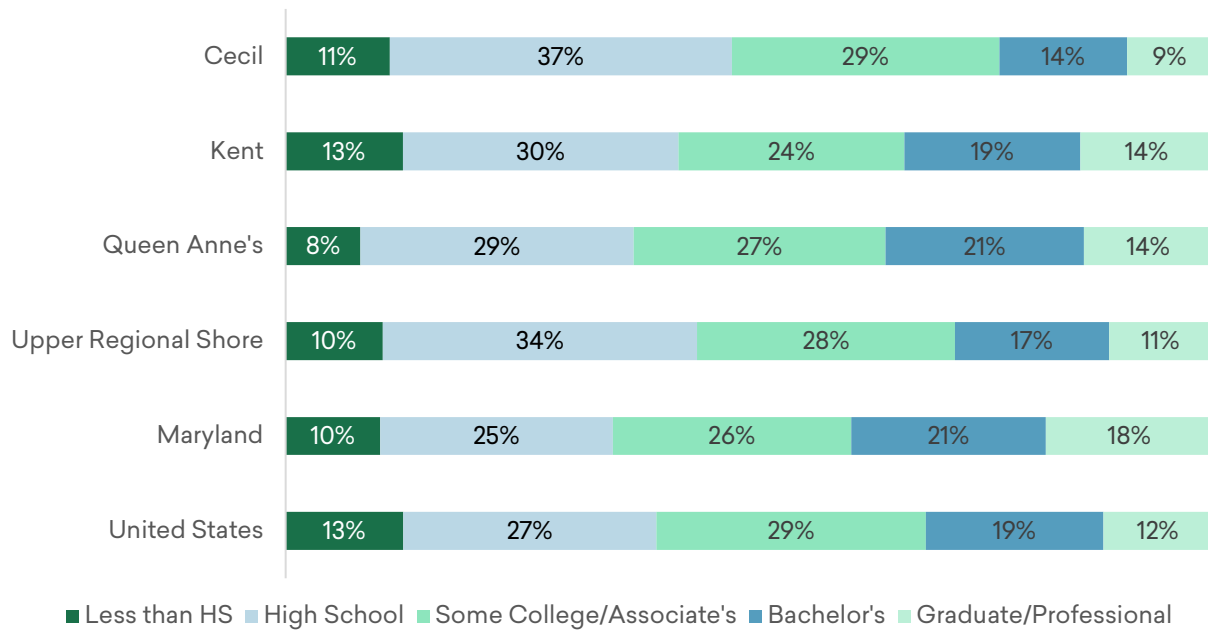
Source: Emsi and Maryland Department of Labor

A robust economic recovery following the Great Recession has resulted in unemployment rates decreasing substantially across the U.S. The current U.S. unemployment rate is roughly four percent—this is generally considered full employment as unemployment rates have remained steady in 2019.

Overall, the Upper Shore has an unemployment rate roughly the same as the U.S. at 4.2 percent as of July 2019. A slightly higher unemployment rate is not necessarily a poor indicator, especially with unemployment rates generally being so slow. The slight uptick in the unemployment rate from 2018 through 2019 could be an encouraging sign that previously discouraged workers are now returning to the labor force and seeking work. While the unemployment rate slightly goes up as they search for work, ultimately workers returning to the labor force provides workers that Upper Shore businesses desperately need.

Queen Anne's County has an especially low unemployment rate at 3.2 percent.

Figure 17) Educational attainment for the Upper Shore, Maryland, and U.S., 2014 - 2019



Source: Emsi

Overall, the Upper Shore population’s educational attainment is roughly on par with the U.S. The region has a lower share of residents that do not have a high school degree or equivalent but a higher share with just a high school diploma and no post-secondary education. Nationally, 31 percent of people have a bachelor’s or more—this share is slightly lower in the Upper Shore at 28 percent.

Educational attainment differences also exist within the three counties that comprise the region. Kent and Queen Anne’s Counties have higher shares of residents with at least a bachelor’s as compared to the nation. Meanwhile, just 23 percent of Cecil County residents have at least a bachelor’s—16 and 8 percentage points lower than Maryland and the U.S., respectively.

Figure 18) Map of higher-education institutions in the Upper Shore



According to data from the Intermediary Postsecondary Education System (IPEDS), three higher education institutions exist in the Upper Shore.

Cecil College is in Cecil County and offers a variety of certificates and degrees two years or less. In 2018 the college had 545 completions, primarily associate degrees.

Washington College in Kent County is a private, independent liberal arts school. In 2018 a total of 368 bachelors degrees were earned.

Chesapeake College, in Wye Mills (bordering Queen Anne's and Talbot Counties) serves five of the Mid-Shore counties: Caroline, Dorchester, Kent, Queen Anne's and Talbot. Chesapeake College offers certificates and associates—in 2018 329 students completed a program.

While not located directly in the Upper Shore region, local employers

leverage the presence of the University of Delaware just across the border from Cecil County in Newark, Delaware. The state university offers degrees ranging from associates to doctors with 6,253 completions in 2018.

Table 3 on the following page provides detailed data for completions in the region by award level and field of study. At Washington College, most bachelors earned were in business, and social and biomedical sciences. Meanwhile, the top fields of study for students earning an associate from Cecil College includes the liberal and performing arts, business, and health professions.

Similarly, an overwhelming majority of certificates and associates earned at Chesapeake college are in the liberal arts, and health professions and related programs. At the University of Delaware, the top programs of study include business, health, engineering, social sciences, and education.

The two-year colleges within the Upper Shore have strong relationships with other higher-education institutions, including four-year universities, which allows students to transfer credits.

Table 3) Completions by field of study at higher-education institutions in the Upper Shore, 2014 – 2018 average

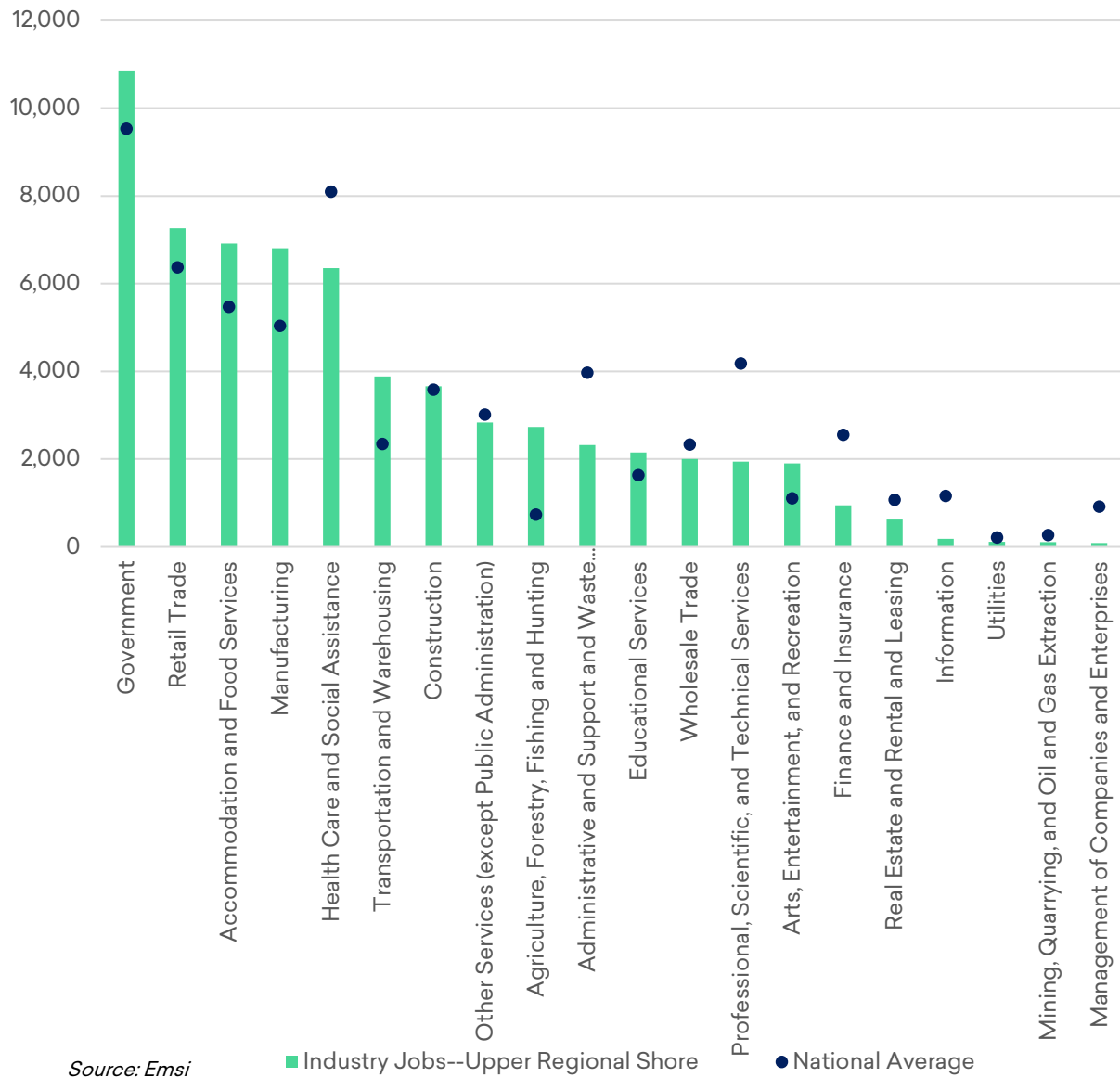
Description	Award of less than 1 academic year	Award of at least 1 but less than 2 academic years	Associate's Degree	Bachelor's Degree	Master's Degree	Doctoral Degree
HEALTH PROFESSIONS AND RELATED PROGRAMS	20	17	123	475	82	43
LIBERAL ARTS AND SCIENCES, GENERAL STUDIES AND HUMANITIES	19		535	25	2	
VISUAL AND PERFORMING ARTS	22	11	36	127	38	4
PERSONAL AND CULINARY SERVICES	1					
FAMILY AND CONSUMER SCIENCES/HUMAN SCIENCES	1	1	6	94	12	3
HOMELAND SECURITY, LAW ENFORCEMENT, FIREFIGHTING AND RELATED PROTECTIVE SERVICES	1		17		4	2
COMMUNICATION, JOURNALISM, AND RELATED PROGRAMS				132	7	
COMMUNICATIONS TECHNOLOGIES/TECHNICIANS AND SUPPORT SERVICES	8	4	2			
COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES	1	1	10	75	44	9
ENGINEERING TECHNOLOGIES AND ENGINEERING-RELATED FIELDS			1	3	3	10
AGRICULTURE, AGRICULTURE OPERATIONS, AND RELATED SCIENCES	2		5	93	18	6
PSYCHOLOGY			1	201	15	9
SOCIAL SCIENCES				572	55	23
PHYSICAL SCIENCES			1	78	19	41
PUBLIC ADMINISTRATION AND SOCIAL SERVICE PROFESSIONS			1	134	18	
TRANSPORTATION AND MATERIALS MOVING				1		
BUSINESS, MANAGEMENT, MARKETING, AND RELATED SUPPORT SERVICES	21	8	93	997	253	
HISTORY				88	13	6
PHILOSOPHY AND RELIGIOUS STUDIES				18		
ARCHITECTURE AND RELATED SERVICES				5		

Description	Award of less than 1 academic year	Award of at least 1 but less than 2 academic years	Associate's Degree	Bachelor's Degree	Master's Degree	Doctoral Degree
AREA, ETHNIC, CULTURAL, GENDER, AND GROUP STUDIES				38	8	
EDUCATION			40	290	64	24
ENGINEERING			5	432	97	60
FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS			0	77	25	4
LEGAL PROFESSIONS AND STUDIES		2	4			
ENGLISH LANGUAGE AND LITERATURE/LETTERS				139	9	4
BIOLOGICAL AND BIOMEDICAL SCIENCES			1	270	51	29
MATHEMATICS AND STATISTICS			5	55	40	8
MULTI/INTERDISCIPLINARY STUDIES				81	14	1
PARKS, RECREATION, LEISURE, AND FITNESS STUDIES	1		3	223	9	
NATURAL RESOURCES AND CONSERVATION			2	126	11	6
Grand Total	99	43	891	4,850	913	291

Source: Emsi

Industry

Figure 19) Concentration of broad industries in the Upper Shore economy compared to national averages, 2019



The top five industries by number of jobs in the region reflect the top five industries across the United States. The Upper Shore has a particularly high concentration of jobs in government, retail trade, accommodation, and manufacturing. In contrast, fewer jobs exist in health care in the region compared to the national average for a comparable region.

Other broad industry groups that have a heavier concentration in the region include transportation and warehousing and agriculture.

Industry Clusters

Industry clusters comprise a group of industries and businesses that share commonalities among technologies utilized, markets purchased from or sold to, and workforce needs. A cluster can benefit from its proximity to shared resources, ranging from infrastructure to specialized suppliers. Additionally, local specialization provides a strong base of sophisticated knowledge for a cluster that is unique to a region. Clusters also benefit from the presence of industries outside their cluster because of economic integration and interdependency across clusters. An industry cluster analysis can highlight the strengths and weaknesses within a region, ultimately highlight where priorities can be placed to encourage future growth.

A location quotient (or LQ) can help identify the strength of an industry cluster. The LQ for a specific industry or cluster benchmarks its share of regional employment compared to the share of employment nationally. The base rate, or national rate for a LQ is 1.0. If an industry or cluster has a LQ of 2.0, then that is an indication that it has twice the share of employment regionally than it would nationally. Conversely, a LQ below 1.0 indicates that the share of employment is less than the national average. Industries with a high LQ are considered specialized in a region.

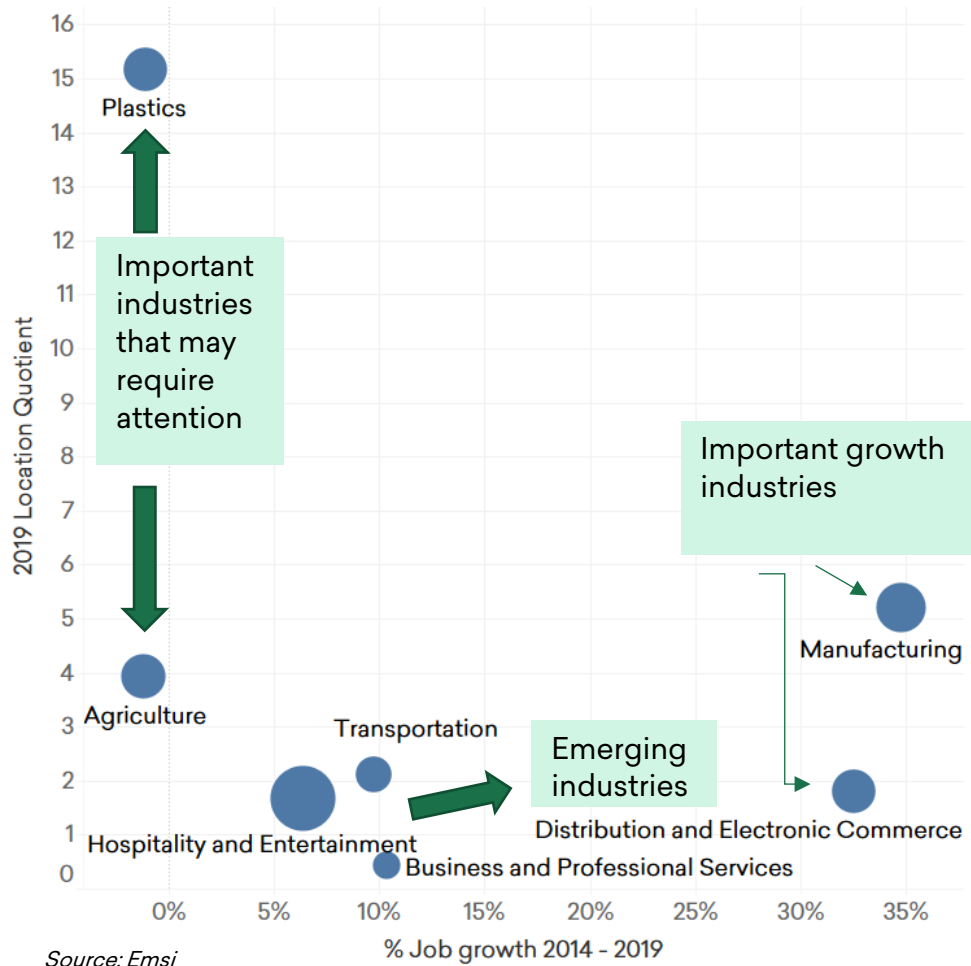
Figure 20 on the following page showcases the clusters identified that represent both the strengths and opportunities present in Upper Shore. The vertical axis shows the aforementioned LQ for each cluster while the horizontal axis shows percent job growth from 2014 through 2019. The identified clusters reflect the diverse economy present in the region and present a variety of strengths and opportunities across all three counties.

Plastics, which includes plastic manufacturing, has an enormous presence in the region with a LQ of over 15. The cluster has experienced negative growth in recent years, however, and so may need to be monitored. Shedding more jobs in this important cluster could hinder economic growth. Agriculture is another cluster that faces the same obstacles as Plastics.

For the supply chain analysis that follows, the following identified clusters were considered:

- Plastics
- Agriculture
- Hospitality and Entertainment (includes tourism)
- Transportation
- Business and Professional Services
- Distribution and Electronic Commerce
- Manufacturing, including these sub clusters:
 - Food
 - Chemical
 - Concrete
 - Metal, machinery, computer, and electronic
 - Transportation
 - Miscellaneous including furniture, medical, and musical

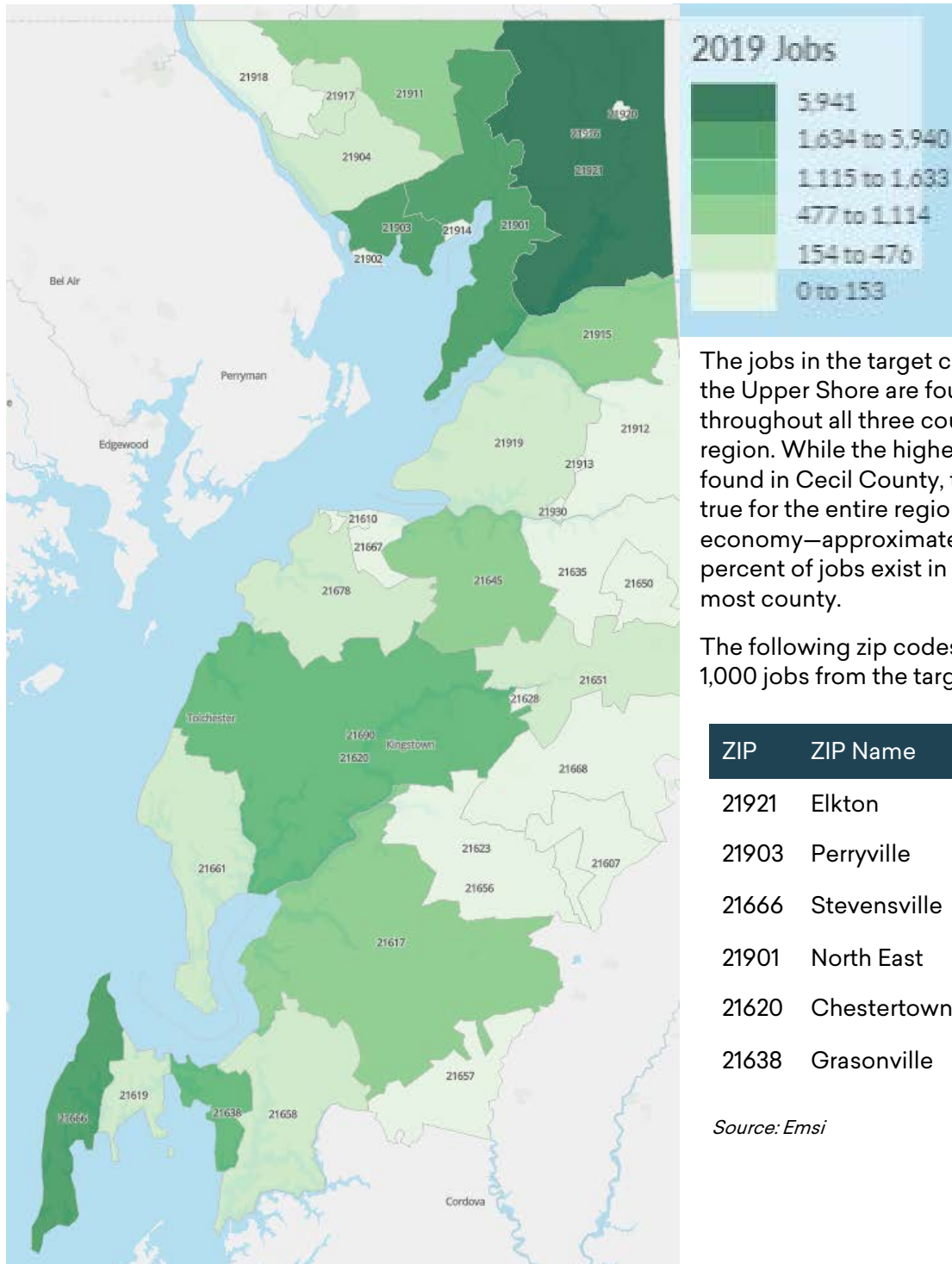
Figure 20) Identified clusters for the Upper Shore economy, 2019 Location Quotient and job growth 2014 – 2019 (Bubble size represents total jobs in 2019)



In addition to Plastics, the other six clusters present an opportunity to continue supporting existing industries while also helping fuel growth in emerging industries. For example, Manufacturing and its components not only already have an established presence based on a LQ of greater than five, but also have experienced over 35 percent growth in the past five years. The Distribution and Electronic Commerce cluster also has a strong presence and has also seen impressive growth since 2014.

Meanwhile, the Business and Professional Services cluster has a small presence currently with a LQ below one, however, has experienced double digit percent growth. Strong continued growth in this sector would result in a higher LQ in the future. Supporting existing and attracting new businesses in this cluster would help diversify the Upper Shore economy.

Figure 21) Count of jobs in identified clusters for the Upper Shore economy by zip code, 2019



The jobs in the target clusters for the Upper Shore are found throughout all three counties of the region. While the highest share are found in Cecil County, the same is true for the entire region's economy—approximately 57 percent of jobs exist in the northern most county.

The following zip codes have over 1,000 jobs from the target clusters:

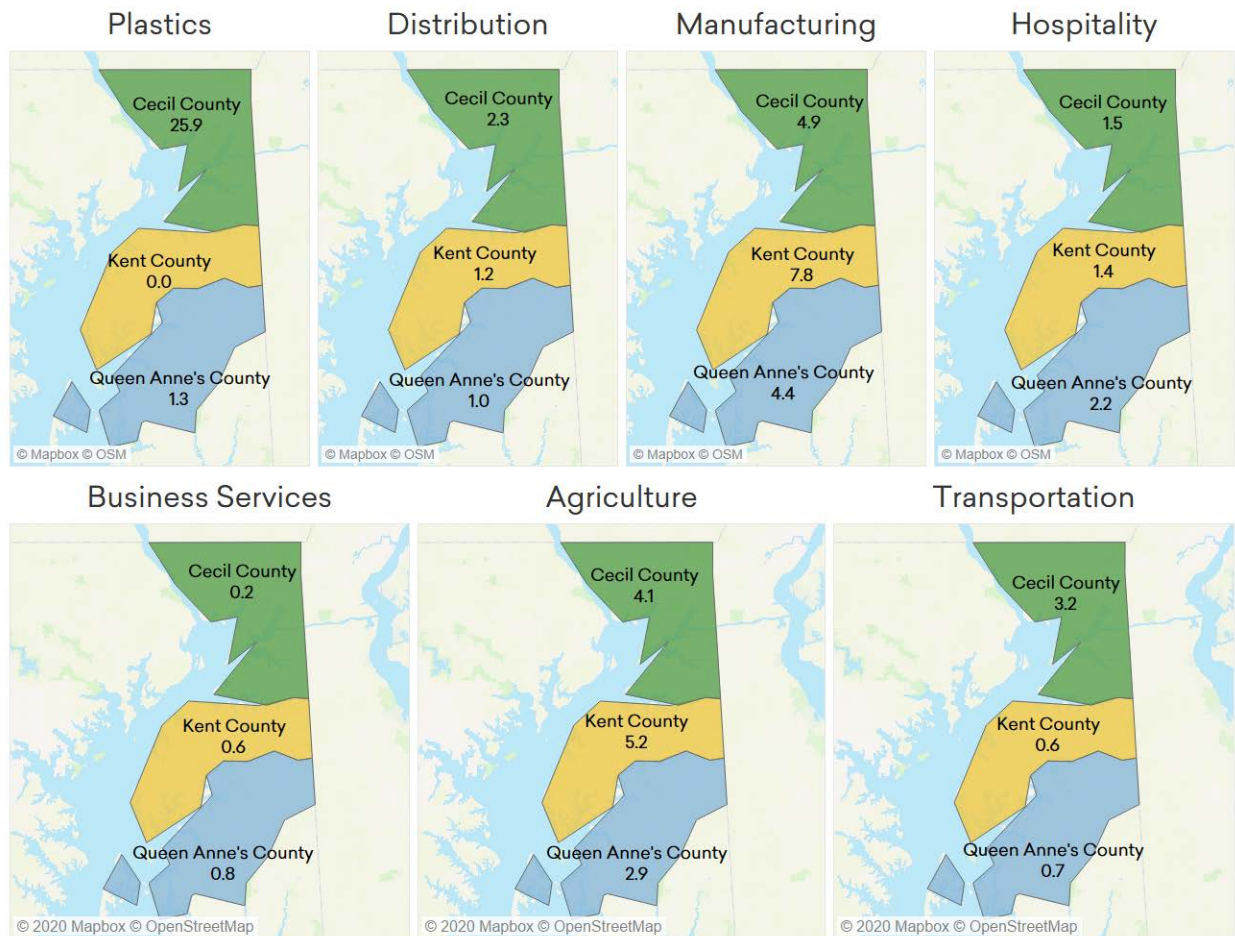
ZIP	ZIP Name	Counties	2019 Jobs
21921	Elkton	Cecil	5,941
21903	Perryville	Cecil	2,062
21666	Stevensville	Queen Anne's	1,817
21901	North East	Cecil	1,634
21620	Chestertown	Kent	1,391
21638	Grasonville	Queen Anne's	1,115

Source: Emsi

In addition to having employment well distributed throughout the counties, figure 22 below demonstrates that the identified clusters represent the diverse economy present in the Upper Shore. As mentioned on page 23, a location quotient (or LQ) can help identify the strength of an industry cluster. For a more detailed description of LQ's and industry clusters see page 23.

Each map provides the concentration or location quotient (LQ) for the seven target clusters by county. For example, Plastics, which include plastic manufacturing, is heavily concentrated in Cecil County with a small presence in Queen Anne's and none in Kent County. Meanwhile, the general Manufacturing cluster has high concentration throughout the whole region and especially in Kent County, with a LQ of 7.8.

Figure 22) Location Quotients for target clusters Upper Shore Counties 2019

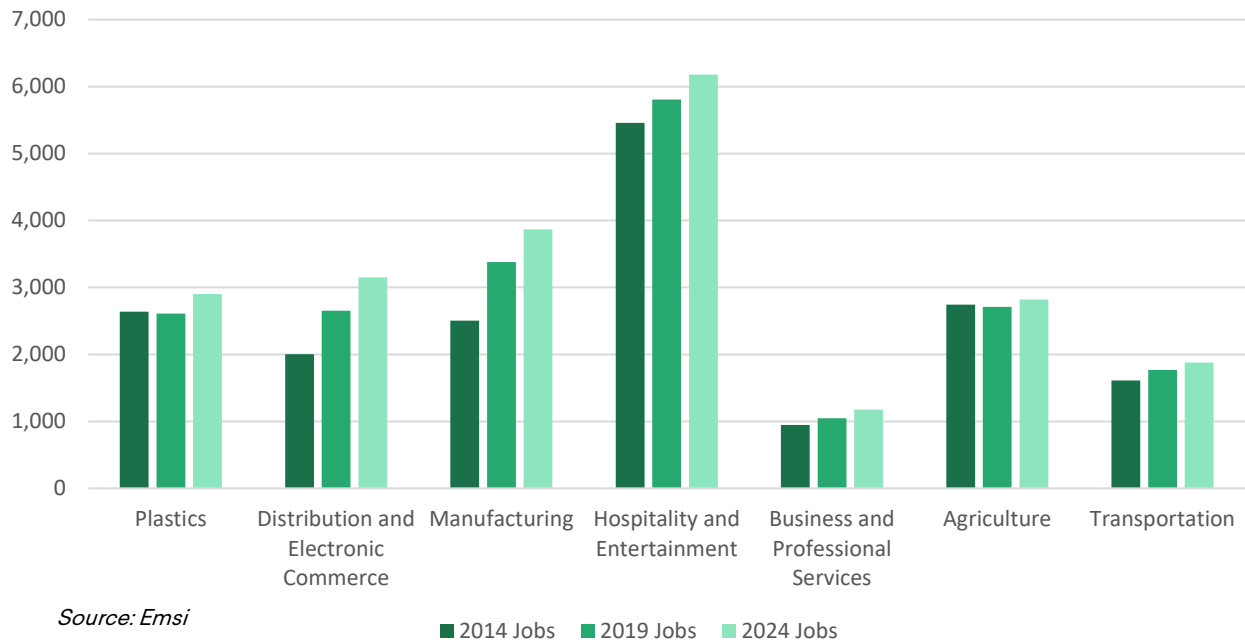


Source: Emsi

The less than average LQ's for the Business and Professional Services cluster highlight an opportunity for the regional economy to grow and diversify. As the supply chain section of the report will show, these services are in high demand from existing businesses and consumers in the region. While the cluster has grown recently, considerable expansion opportunity still exists based on current demand.

As figure 23 and its corresponding table show, the targeted clusters have been an important part of job growth since 2014 for the Upper Shore. The combined seven clusters have had job growth of 12 percent from 2014 to 2019, double the 6 percent across all industries in the region over the same time period. In this five-year period, the over 2,000 jobs added in the target clusters represent nearly two-thirds of job growth for the entire region. At the same time, the clusters represent less than one-third of total employment.

Figure 23) Employment trends for target clusters the Upper Shore Counties 2019



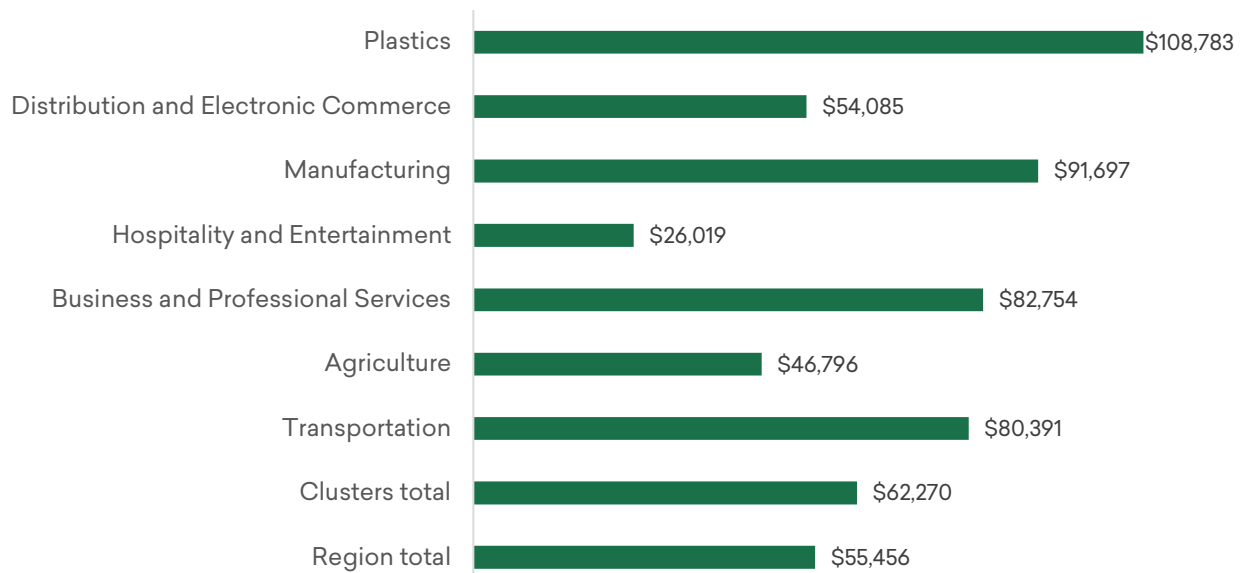
Cluster	2014 Jobs	2019 Jobs	2024 Jobs	Job growth 2014 – 2019	%Job growth 2014 – 2019	Job growth 2019 – 2024	%Job growth 2014 - 2019
Plastics	2,638	2,608	2,903	-30	-1%	295	11%
Distribution and Electronic Commerce	2,002	2,653	3,152	651	33%	499	19%
Manufacturing	2,506	3,378	3,869	872	35%	491	15%
Hospitality and Entertainment	5,459	5,807	6,179	348	6%	372	6%
Business and Professional Services	948	1,046	1,175	98	10%	129	12%
Agriculture	2,745	2,712	2,821	-33	-1%	109	4%
Transportation	1,612	1,769	1,880	157	10%	111	6%
Clusters total	17,910	19,973	21,979	2,063	12%	2,006	10%
Region total	60,352	63,704	67,660	3,352	6%	3,956	6%
Cluster share of Regional Total	30%	31%	33%	62%		51%	

Source: Emsi

While Agriculture and Plastics saw negative growth between 2014 and 2019, they remain an important part of the Upper Shore Economy because of their concentration and number of jobs they employ. Meanwhile, Manufacturing not only produced the most job growth numerically (872) but also by percent share (35 percent). Distribution and Electronic Commerce also grew rapidly, increasing the number of jobs in its cluster by one-third.

Industries that have high earnings per job typically employ more jobs that offer higher wages. Additionally, higher earnings result in greater amounts of Gross Regional Product in the region. Targeting industries or clusters with high average earnings per job helps a regional economy grow.

Figure 24) Average earnings per job for target clusters, the Upper Shore, 2019



Source: Emsi

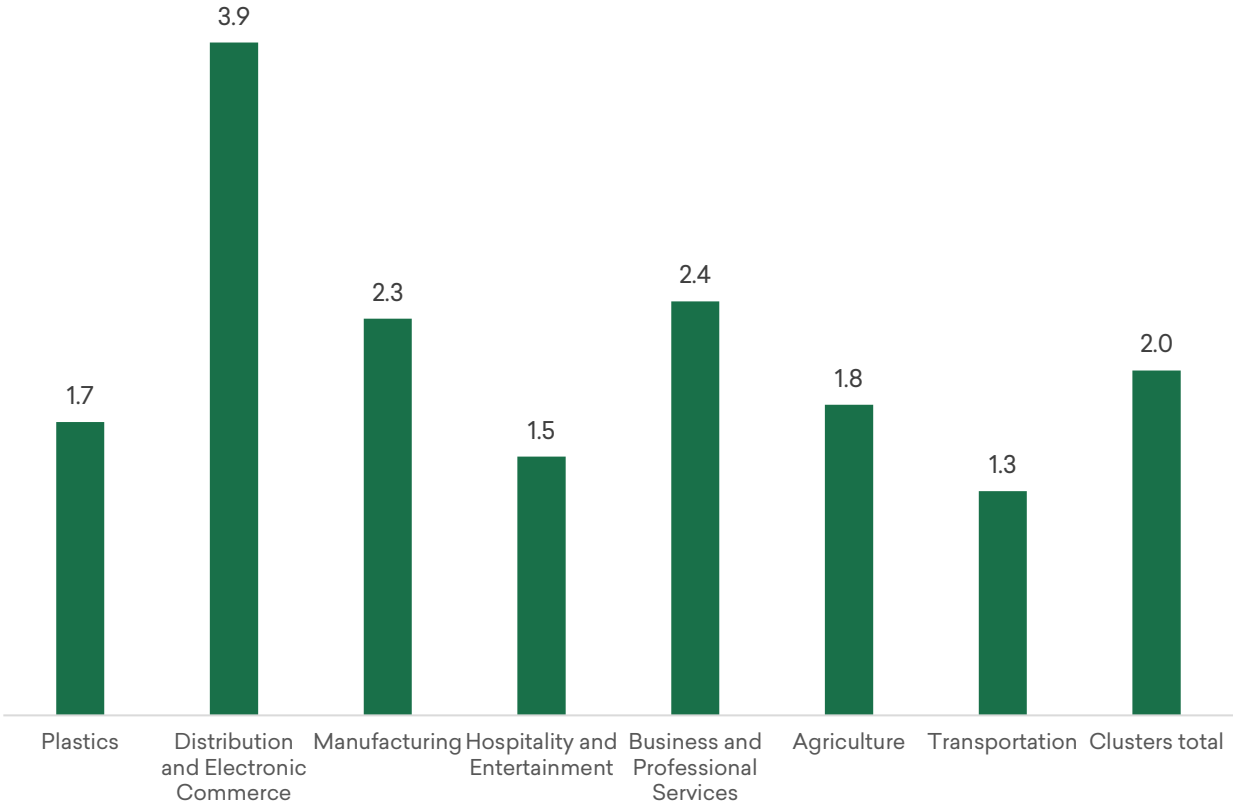
Many of the target clusters and the industries that comprise them have high average earnings relative to other industries in the region. The Plastics cluster has the highest industry earnings with nearly \$109,000 in earnings per job in this cluster—nearly double the earnings per job of \$55,450 for the entire region. The Manufacturing, Business and Professional Services, and Transportation clusters also have earnings substantially above the regional average. Meanwhile, Distribution and Electronic Commerce has earnings roughly on par with all other industries in the region.

The two clusters that have earnings below the regional average are Agriculture and Hospitality and Entertainment. The latter has an average earnings per job of just \$26,000—less than half the regional average.

A jobs multiplier indicates how important an industry is in regional job creation. A jobs multiplier of 3, for example, would mean that for every job created by that industry, 2 other jobs would be created in other industries (for a total of 3 jobs).

Jobs multipliers are primarily tied to the type of industries in the scenario—industries with a high sales/labor ratio typically have a high jobs multiplier, and vice versa. Adding jobs to the target clusters will benefit the Upper Shore by increasing jobs in related industries.

Figure 25) Job multipliers for target clusters Upper Shore Counties 2019



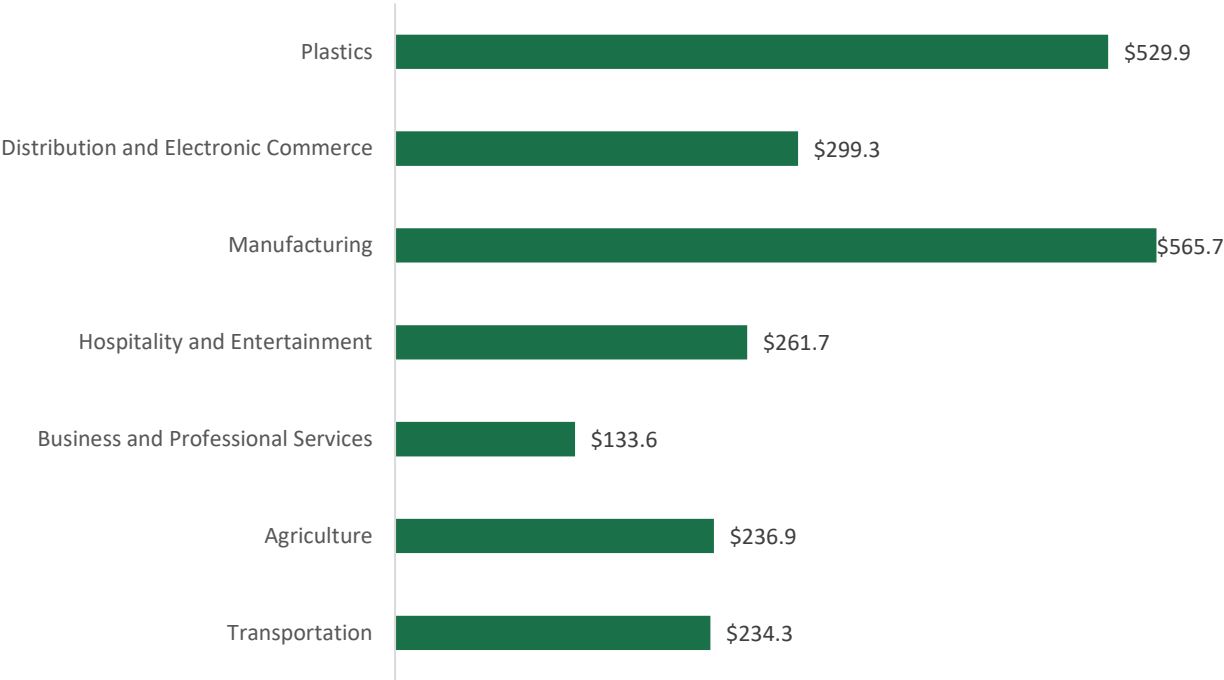
Source: Emsi

The job multiplier for the clusters is two, meaning that for every job added within the target clusters, on average, one additional job would be created because of new economic activity in Upper Shore. The Distribution and Electronic Commerce cluster boasts the highest job multiplier at 3.9—every job added in this cluster would result in an estimated additional three jobs in other industries. Manufacturing and Business and Professional Services also have job multipliers greater than two. As these multipliers demonstrate, adding jobs in any of these clusters would spur economic growth in the region.

Gross Regional Product (GRP) is simply GDP for the region of study. More commonly, GRP is GDP for any region smaller than the United States, such as a state or metro. GRP measures the final market value of all goods and services produced in the region of study.

GRP is the sum of total industry earnings, taxes on production & imports, and profits, less subsidies (GRP = **earnings** + **TPI** + **profits** – **subsidies**).

Figure 26) Gross Regional Product, in millions, for target clusters in the Upper Shore, 2019



Source: Emsi

Collectively, the seven target clusters provide nearly \$2.3 billion in GRP for the Upper Shore. The region’s entire economy has a GRP of just over \$6 billion, meaning that the target clusters represent approximately 37 percent of the Upper Shore economy. Manufacturing and Plastics dominate the GRP for the clusters, representing \$1.1 billion combined. These two clusters consequently contribute to 18 percent of the entire Upper Shore GRP despite only representing just 9 percent of total jobs.

Supply Chain Analysis

Supply chain analysis is a process by which the inputs and outputs of an area's industry clusters are evaluated—which goods and services are being bought and sold, in what quantities, and where they are being bought from or sold to. The analysis can help identify the different types of businesses that comprise an industry cluster and, most importantly for economic development, can identify segments of the supply chain that may be absent from a particular region. These pockets of absence, otherwise known as supply chain gaps, can represent opportunities for new development that can strengthen existing industry clusters and may support other non-related industries in the region as well.

Figure 27, on the next page, shows in-region sales and exported (out-of-region) sales for each industry cluster. This is useful for understanding how much revenue a cluster is bringing into the region through its sales of goods and services outside of the region. Industries that predominantly export their products bring new money into the economy, which in turn drives other regional businesses. Plastics, for example, sells 98% of its products outside of the Upper Shore, bringing an estimated \$1.3 billion in sales into the region from exports.

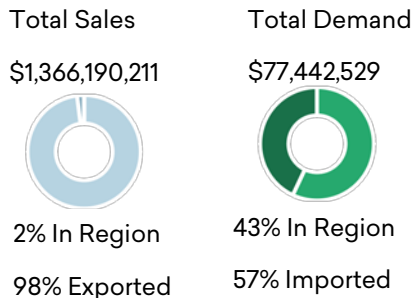
Shortening supply chains by connecting businesses within the region and that can provide goods and services locally has numerous benefits, including growing economic prosperity while reducing environmental impacts.

Figure 27, on the next page, also shows the total demand in the Upper Shore for the goods and services offered by each industry cluster. This is the demand by Upper Shore residents and businesses for the products and/or services produced by that industry cluster – regardless of whether the products or services are actually produced by companies within the region. For example, the Hospitality and Entertainment cluster had approximately \$371.7 million in demand in the Upper Shore in 2018. A portion of that \$371.7 million came from businesses demanding the services provided by this cluster while the remainder was demanded by local consumers—residents of the region.

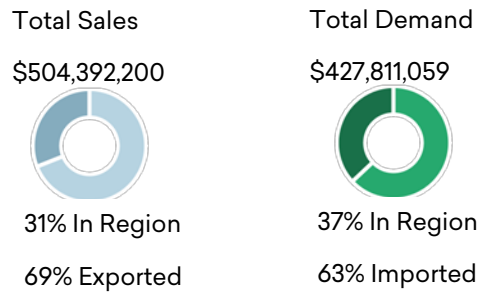
Furthermore, the figure shows how much of local demand is met by companies within the region and how much of local demand is met by importing from other regions. This comparison helps determine opportunities to expand local businesses' shares of local demand. For example, just 18 percent of regional demand for the manufacturing cluster is being met by regional companies. The 82 percent of regional demand met by imports means that nearly \$239 million went to manufacturing firms not located in the Upper Shore.

Figure 27) Cluster performance trends—sales and demand—Upper Shore 2018

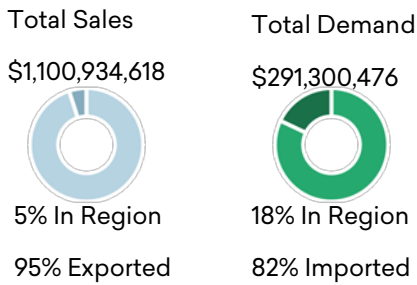
Plastics



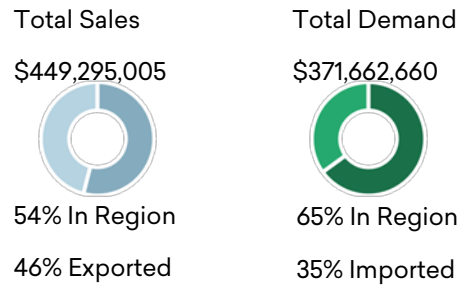
Distribution and Electronic Commerce



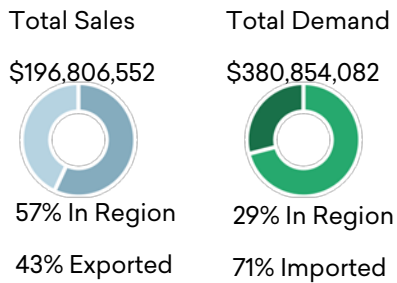
Manufacturing



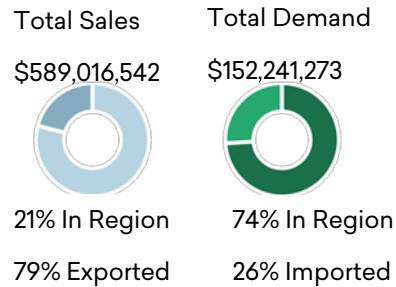
Hospitality and Entertainment



Business and Professional Services



Agriculture



Transportation



Industries to target

Table 4 on the next page shows the purchases of services and manufactured goods made by businesses in the Upper Shore. This information helps quantify the supply chain needs of businesses within the three counties. By comparing the proportion of supply chain needs met by companies within the region to the proportion met by importing goods and services from outside the region, potential opportunities for new development can be identified. In reviewing the below data, certain industry clusters may be better targets for economic development efforts than others. Certain clusters, such as Chemical and Plastics manufacturing, are strong in the region and primarily export their products, bringing in valuable dollars. At the same time, however, other companies are heavily importing products from these same industry clusters. The broad Manufacturing target cluster--which includes the manufacturing six subclusters listed on page 23--only five percent of production is sold within the region, while simultaneously, all businesses within the region import about 82 percent of their needs (Figure 27). This gap is even greater in chemical manufacturing where, similar to the broader Manufacturing cluster, just five percent of production remains in the Upper Shore. Other businesses, however, imported 97 percent of demand for chemical manufacturing, representing \$499 million leaving the region in 2018 through this leakage alone.

Table 4 also shows more detailed industry sectors that have potential to sell more of their goods and services within the region. Manufacturing industries, particularly plastics, chemical, and transportation equipment, are heavily imported by Upper Shore businesses, yet these sectors are also well-represented within the area. Many of the industry sectors shown in Table 4 are sectors that commonly sell to other businesses--such as management services, transportation, wholesale services, and manufacturing. Additionally, these targeted sectors offer high wages relative to the regional average. Consequently, finding existing or attracting new businesses in these industries will alleviate supply chain leakage in the region, bolstering growth for the economy, and offering well-paying jobs.

Table 4) Purchases of goods and services by Upper Shore businesses from other local businesses or from businesses located outside of the region (2018)

2018 Demand For	2018 Demand met In-Region	2018 % Demand met In-Region	2018 Demand met by Imports	2018 % Demand met by Imports	2018 Total Demand	Wages
Professional, Scientific, and Technical Services	\$225,183,592	28%	\$583,315,572	72%	\$808,499,163	\$64,117
Chemical Manufacturing	\$13,986,748	3%	\$498,555,471	97%	\$512,542,219	\$60,927
Merchant Wholesalers, Nondurable Goods	\$98,509,154	21%	\$374,750,318	79%	\$473,259,472	\$53,951
Transportation Equipment Manufacturing	\$19,755,915	5%	\$339,497,451	95%	\$359,253,367	\$108,874
Merchant Wholesalers, Durable Goods	\$46,594,269	13%	\$320,364,388	87%	\$366,958,657	\$60,536
Credit Intermediation and Related Activities	\$98,819,778	26%	\$275,611,110	74%	\$374,430,888	\$53,741
Telecommunications	\$55,863,925	20%	\$230,323,664	80%	\$286,187,590	\$74,715
Securities, Commodity Contracts, and Other Financial Investments and Related Activities	\$92,733,545	33%	\$188,842,578	67%	\$281,576,123	\$107,793
Management of Companies and Enterprises	\$1,074,479	1%	\$186,019,929	99%	\$187,094,408	\$212,910
Fabricated Metal Product Manufacturing	\$9,309,773	6%	\$138,352,885	94%	\$147,662,658	\$46,267
Plastics and Rubber Products Manufacturing	\$36,425,468	25%	\$110,399,856	75%	\$146,825,324	\$91,005
Machinery Manufacturing	\$1,875,049	2%	\$109,327,295	98%	\$111,202,344	\$68,553
Truck Transportation	\$65,127,834	46%	\$76,072,272	54%	\$141,200,106	\$53,626
Miscellaneous Manufacturing	\$7,830,889	10%	\$67,314,921	90%	\$75,145,810	\$66,412
Data Processing, Hosting, and Related Services	\$675,839	1%	\$65,752,093	99%	\$66,427,932	Insf. Data
Nonmetallic Mineral Product Manufacturing	\$13,400,876	22%	\$47,317,190	78%	\$60,718,065	\$59,351
Electrical Equipment, Appliance, and Component Manufacturing	\$764,381	2%	\$45,723,338	98%	\$46,487,719	\$44,462
Total of Target Industries	\$787,931,515	18%	\$3,657,540,330	82%	\$4,445,471,845	\$71,077
Total Upper Shore	\$4,793,016,913	28%	\$12,438,862,973	72%	\$17,231,879,885	\$45,110
Total Target Industries as % of Upper Shore	16%		29%		26%	158%

Source: Emsi

Top Occupations

Table 5 on the following pages has information regarding the top occupations for each cluster, including historical job growth since 2014, projected job growth through 2024, and the current share of cluster employment. The data in table 5 and other occupation tables in the remainder of the report demonstrate the diversity in jobs employed by the target clusters. For example, in the Plastics and Manufacturing clusters, the top jobs include traditional factory workers like assemblers, and an array of engineers and management positions.

In nearly all instances the top occupations in the clusters are growing—and growing rapidly. For example, the top two occupations in the Distribution and Electronic Commerce (industrial truck operators and stock clerks) have both experienced the number of jobs more than double between 2014 and 2019. In 2014, the cluster employed 144 industrial truck operators. In 2019, that number increased to 397 (176 percent growth). While projections show growth slowing, Upper Shore businesses in Distribution and Electronic Commerce are expected to add another 86 jobs for industrial truck operators through 2024 (22 percent growth).

In some instances, a certain occupation might be exclusively employed by a specific industry and therefore represents a substantial share of employment in that cluster. One such example are farmworkers—roughly 96 percent of farmworkers in the Upper Shore are employed in Agriculture. Consequently, these workers make up nearly 22 percent of all jobs in the cluster.

In computer and math occupations, such as software developers, jobs are found throughout the entire economy. Consequently, these workers are not concentrated in one specific industry and therefore typically make up smaller shares of total cluster employment. For example, software developers are one of the top jobs in the Business and Professional Services cluster yet represent less than three percent of total cluster employment.

Table 5) Employment trends for top occupations for each target cluster, Upper Shore 2014 - 2024

Occupation	Employment			Change				% of Total Jobs in Cluster (2019)
	2014	2019	2024	2014 - 2019	2019 - 2024			
Plastics								
Assemblers and Fabricators, All Other, Including Team Assemblers	230	240	247	10	4%	7	3%	9.2%
First-Line Supervisors of Production and Operating Workers	178	200	222	21	12%	22	11%	7.7%
Shipping, Receiving, and Traffic Clerks	115	124	134	9	8%	10	8%	4.8%
First-Line Supervisors of Office and Administrative Support Workers	59	71	76	12	20%	6	8%	2.7%
Human Resources Specialists	22	34	37	12	55%	3	9%	1.3%
Industrial Engineers	20	29	33	9	46%	5	16%	1.1%
Manufacturing								
Assemblers and Fabricators, All Other, Including Team Assemblers	160	178	194	18	11%	15	9%	5.3%
Aerospace Engineers	118	161	170	44	37%	9	5%	4.8%
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	66	117	124	51	77%	7	6%	3.5%
First-Line Supervisors of Production and Operating Workers	90	114	132	24	27%	19	16%	3.4%
General and Operations Managers	73	103	117	29	40%	14	14%	3.0%
Business Operations Specialists, All Other	26	45	49	19	71%	4	9%	1.3%
Computer Systems Analysts	26	42	44	16	62%	2	5%	1.2%
Industrial Engineers	30	42	54	12	40%	12	30%	1.2%
Business and Professional Services								
Management Analysts	87	93	99	6	7%	6	6%	8.9%
Software Developers, Applications	21	30	38	9	44%	7	24%	2.9%
Managers, All Other	25	29	31	4	17%	2	8%	2.8%
Sales Representatives, Services, All Other	23	28	34	5	21%	6	21%	2.7%
General and Operations Managers	23	28	34	5	21%	6	20%	2.7%
Computer Systems Analysts	24	28	31	4	16%	3	12%	2.6%
Graphic Designers	20	25	28	5	26%	3	10%	2.4%

Occupation	Employment			Change				% of Total Jobs in Cluster (2019)
	2014	2019	2024	2014 - 2019	2019 - 2024			
Transportation								
Heavy and Tractor-Trailer Truck Drivers	569	601	600	32	6%	-1	0%	34.0%
Laborers and Freight, Stock, and Material Movers, Hand	76	84	89	8	10%	5	6%	4.7%
Railroad Conductors and Yardmasters	72	79	88	7	10%	9	11%	4.5%
Office Clerks, General	52	67	68	15	30%	1	1%	3.8%
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	42	52	51	10	23%	-1	-3%	2.9%
Distribution and Electronic Commerce								
Industrial Truck and Tractor Operators	144	397	483	253	176%	86	22%	15.0%
Stock Clerks and Order Fillers	152	322	376	170	112%	54	17%	12.1%
Light Truck or Delivery Services Drivers	81	148	170	67	83%	21	14%	5.6%
Heavy and Tractor-Trailer Truck Drivers	71	111	137	40	57%	26	23%	4.2%
Packers and Packagers, Hand	55	101	134	45	82%	33	33%	3.8%
First-Line Supervisors of Office and Administrative Support Workers	38	65	73	26	69%	9	13%	2.4%
Paper Goods Machine Setters, Operators, and Tenders	21	42	36	21	99%	-6	-14%	1.6%
Agricultural Inputs and Services								
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	620	584	625	-36	-6%	42	7%	21.5%
Farmworkers, Farm, Ranch, and Aquacultural Animals	268	320	342	52	19%	23	7%	11.8%
Agricultural Workers, All Other	99	114	123	15	16%	9	8%	4.2%
Agricultural Equipment Operators	57	65	71	8	14%	6	9%	2.4%
First-Line Supervisors of Farming, Fishing, and Forestry Workers	46	50	56	4	10%	5	10%	1.9%
Hospitality and Entertainment								
First-Line Supervisors of Food Preparation and Serving Workers	131	155	171	24	19%	16	10%	2.7%
General and Operations Managers	54	59	61	4	8%	2	4%	1.0%
Chefs and Head Cooks	45	49	53	4	9%	5	9%	0.8%
Food Service Managers	42	44	49	2	4%	5	12%	0.8%
Gaming Managers	35	40	41	5	15%	1	3%	0.7%

Source: Emsi

Table 6 on the next page has wage information along with the typical levels of education, experience, or training required for the top jobs found in the Upper Shore target clusters. As the data in the table show, the top jobs for the clusters are also diverse in terms of education, experience, and training needed. The occupation wages are also reflective of the high industry wages for the clusters.

The typical entry level education for the occupations are representative of the national norm—regional differences may exist. Additionally, certain occupations, particularly those in manufacturing or skilled trades, require no more than a high school diploma or equivalent based on the education. These jobs often do, however, require some form of on-the-job training. Occupations that have short, medium, or long-term on-the-job training typically require the training, usually a short-term credential or certificate, to be earned prior to gaining employment. On-the-job training is a good indicator that jobs do require some form of post-secondary education.

Table 6 also includes information regarding regional completions from the four post-secondary institutions within Upper Shore and anticipated annual openings for each occupation from 2019 through 2024. For example, assemblers and fabricators, the top occupation in both the Plastics and Manufacturing clusters are expected to have 65 openings each year through 2024. Openings exist both because of new job creation, expected retirements, and turnover from individuals permanently leaving that field.

Comparing annual openings to regional completions can help a region gauge how much talent it produces for the top jobs. In the table below, regional completions data is not available since many of these occupations do not require formal post-secondary education. For those that do require education beyond high school yet still do not have any regional completions, programs likely do not exist at the four colleges and universities included in this report.

Table 6) Earnings, education/training requirements, and regional completions compared to annual openings for top occupations for target cluster in the Upper Shore, 2019

Occupation	Median Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical On-The-Job Training	Regional Completions (2018)	Annual Openings
Plastics						
Assemblers and Fabricators, All Other, Including Team Assemblers	\$13.38	High school diploma or equivalent	None	Moderate-term on-the-job training	0	65
First-Line Supervisors of Production and Operating Workers	\$33.65	High school diploma or equivalent	Less than 5 years	None	0	46
Shipping, Receiving, and Traffic Clerks	\$18.15	High school diploma or equivalent	None	Short-term on-the-job training	0	40
First-Line Supervisors of Office and Administrative Support Workers	\$27.43	High school diploma or equivalent	Less than 5 years	None	0	76
Human Resources Specialists	\$29.52	Bachelor's degree	None	None	0	20
Industrial Engineers	\$38.16	Bachelor's degree	None	None	0	10
Manufacturing						
Assemblers and Fabricators, All Other, Including Team Assemblers	\$13.38	High school diploma or equivalent	None	Moderate-term on-the-job training	0	65
Aerospace Engineers	\$50.54	Bachelor's degree	None	None	0	27
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	\$20.48	High school diploma or equivalent	None	Moderate-term on-the-job training	0	30
First-Line Supervisors of Production and Operating Workers	\$33.65	High school diploma or equivalent	Less than 5 years	None	0	46
General and Operations Managers	\$52.33	Bachelor's degree	5 years or more	None	428	85
Business Operations Specialists, All Other	\$36.60	Bachelor's degree	None	None	0	35

Occupation	Median Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical On-The-Job Training	Regional Completions (2018)	Annual Openings
Computer Systems Analysts	\$45.19	Bachelor's degree	None	None	129	15
Industrial Engineers	\$38.16	Bachelor's degree	None	None	0	10
Business and Professional Services						
Management Analysts	\$41.82	Bachelor's degree	Less than 5 years	None	330	18
Software Developers, Applications	\$44.19	Bachelor's degree	None	None	111	10
Managers, All Other	\$35.88	Bachelor's degree	Less than 5 years	None	554	30
Sales Representatives, Services, All Other	\$28.39	High school diploma or equivalent	None	Moderate-term on-the-job training	0	43
General and Operations Managers	\$52.33	Bachelor's degree	5 years or more	None	428	85
Computer Systems Analysts	\$45.19	Bachelor's degree	None	None	129	15
Graphic Designers	\$20.16	Bachelor's degree	None	None	26	9
Transportation						
Heavy and Tractor-Trailer Truck Drivers	\$24.72	Postsecondary nondegree award	None	Short-term on-the-job training	0	132
Laborers and Freight, Stock, and Material Movers, Hand	\$13.42	No formal educational credential	None	Short-term on-the-job training	0	112
Railroad Conductors and Yardmasters	\$35.80	High school diploma or equivalent	None	Moderate-term on-the-job training	0	9
Office Clerks, General	\$15.83	High school diploma or equivalent	None	Short-term on-the-job training	0	143
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	\$18.11	High school diploma or equivalent	None	Short-term on-the-job training	0	150
Distribution and Electronic Commerce						
Industrial Truck and Tractor Operators	\$16.88	No formal educational credential	None	Short-term on-the-job training	0	93
Stock Clerks and Order Fillers	\$13.23	High school diploma or equivalent	None	Short-term on-the-job training	0	183

Occupation	Median Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical On-The-Job Training	Regional Completions (2018)	Annual Openings
Light Truck or Delivery Services Drivers	\$17.73	High school diploma or equivalent	None	Short-term on-the-job training	0	90
Heavy and Tractor-Trailer Truck Drivers	\$24.72	Postsecondary nondegree award	None	Short-term on-the-job training	0	132
Packers and Packagers, Hand	\$12.53	No formal educational credential	None	Short-term on-the-job training	0	46
First-Line Supervisors of Office and Administrative Support Workers	\$27.43	High school diploma or equivalent	Less than 5 years	None	0	76
Paper Goods Machine Setters, Operators, and Tenders	\$20.92	High school diploma or equivalent	None	Moderate-term on-the-job training	0	24
Agriculture						
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	\$13.53	No formal educational credential	None	Short-term on-the-job training	0	103
Farmworkers, Farm, Ranch, and Aquacultural Animals	\$12.00	No formal educational credential	None	Short-term on-the-job training	0	61
Agricultural Workers, All Other	\$17.89	No formal educational credential	None	Short-term on-the-job training	0	21
Agricultural Equipment Operators	\$13.31	No formal educational credential	None	Moderate-term on-the-job training	0	12
First-Line Supervisors of Farming, Fishing, and Forestry Workers	\$22.43	High school diploma or equivalent	Less than 5 years	None	0	10
Hospitality and Entertainment						
First-Line Supervisors of Food Preparation and Serving Workers	\$18.34	High school diploma or equivalent	Less than 5 years	None	0	73
General and Operations Managers	\$52.33	Bachelor's degree	5 years or more	None	428	85
Chefs and Head Cooks	\$26.21	High school diploma or equivalent	5 years or more	None	0	13
Food Service Managers	\$28.08	High school diploma or equivalent	Less than 5 years	None	103	16
Gaming Managers	\$35.53	High school diploma or equivalent	Less than 5 years	None	0	6

Source: Emsi

Table 7 below and on the following pages has data regarding the number of jobs found in the cluster and the total number of jobs across all Upper Shore industries for the top occupations in each cluster. Table 7 also has the number of resident workers, net commuters (jobs less resident workers), and Location Quotient (LQ or concentration) for these top jobs.

Understanding the number of jobs for an occupation found within a cluster compared to all industries can be helpful for numerous reasons. First, having most of employment in one cluster could indicate that workers in these occupations are specialized in that specific cluster. For example, nearly half of assemblers and fabricators are employed in Plastics. At the same time, however, another 178 assembler jobs exist in the Manufacturing cluster, meaning that employers in Plastics and Manufacturing may often be competing over these highly sought workers.

If an occupation has more resident workers than jobs, than the Upper Shore has a negative amount of net commuters. Conversely, a positive number for net commuters indicates that there are more jobs than resident workers. A negative number of net commuters is not necessarily bad—having a higher number of resident workers indicates the existence of talent within the region but is employed elsewhere. Understanding net commuters and resident workers can provide vital talent information to businesses thinking about expanding in the Upper Shore.

As an example, 103 jobs exist for general and operations managers in Manufacturing. A total of 857 general and operations manager jobs exist throughout all of Upper Shore across all industries. An additional 423 (net commuters) residents of the region are general and operations managers but work in the surrounding counties. Consequently, 1,280 general and operations managers exist within the Upper Shore—showcasing that opportunities exist for businesses that would like to expand and require this type of worker.

Table 7) Jobs in cluster and across all industries, resident workers, net commuters, and location quotients for the top occupations in each target cluster for the Upper Shore, 2019

Occupation	2019 Jobs in Cluster	2019 Jobs all industries	2019 Resident Workers	2019 Net Commuters	2019 Location Quotient
Plastics					
Assemblers and Fabricators, All Other, Including Team Assemblers	240	493	424	69	0.9
First-Line Supervisors of Production and Operating Workers	200	377	373	4	1.5
Shipping, Receiving, and Traffic Clerks	124	316	410	-94	1.2

Occupation	2019 Jobs in Cluster	2019 Jobs all industries	2019 Resident Workers	2019 Net Commuters	2019 Location Quotient
First-Line Supervisors of Office and Administrative Support Workers	71	667	1,074	-407	1.1
Human Resources Specialists	34	159	355	-196	0.6
Industrial Engineers	29	80	116	-36	0.7
Manufacturing					
Assemblers and Fabricators, All Other, Including Team Assemblers	178	493	424	69	0.9
Aerospace Engineers	161	323	236	87	11.8
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	117	190	162	28	1.8
First-Line Supervisors of Production and Operating Workers	114	377	373	4	1.5
General and Operations Managers	103	857	1,280	-423	0.9
Business Operations Specialists, All Other	45	313	508	-195	0.7
Computer Systems Analysts	42	162	358	-196	0.7
Industrial Engineers	42	80	116	-36	0.7
Business and Professional Services					
Management Analysts	93	159	424	-265	0.5
Software Developers, Applications	30	76	373	-297	0.2
Managers, All Other	29	337	587	-250	0.9
Sales Representatives, Services, All Other	28	290	612	-322	0.6
General and Operations Managers	28	857	1,280	-423	0.9
Computer Systems Analysts	28	162	358	-196	0.7
Graphic Designers	25	70	106	-36	0.6
Transportation					
Heavy and Tractor-Trailer Truck Drivers	601	1,031	1,222	-191	1.3
Laborers and Freight, Stock, and Material Movers, Hand	84	611	1,274	-663	0.5
Railroad Conductors and Yardmasters	79	79	62	17	4.8
Office Clerks, General	67	1,127	1,578	-451	0.9
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	52	1,319	1,853	-534	1.3
Distribution and Electronic Commerce					
Industrial Truck and Tractor Operators	397	572	509	63	2.4
Stock Clerks and Order Fillers	322	1,192	1,507	-315	1.5
Light Truck or Delivery Services Drivers	148	685	808	-123	1.8
Heavy and Tractor-Trailer Truck Drivers	111	1,031	1,222	-191	1.3

Occupation	2019 Jobs in Cluster	2019 Jobs all industries	2019 Resident Workers	2019 Net Commuters	2019 Location Quotient
Packers and Packers, Hand	101	239	447	-208	0.9
First-Line Supervisors of Office and Administrative Support Workers	65	667	1,074	-407	1.1
Paper Goods Machine Setters, Operators, and Tenders	42	181	100	81	4.7
Agricultural Inputs and Services					
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	584	610	570	40	2.3
Farmworkers, Farm, Ranch, and Aquacultural Animals	320	338	281	57	5.0
Agricultural Workers, All Other	114	114	103	11	3.7
Agricultural Equipment Operators	65	65	64	1	2.4
First-Line Supervisors of Farming, Fishing, and Forestry Workers	50	61	60	1	2.8
Hospitality and Entertainment					
First-Line Supervisors of Food Preparation and Serving Workers	155	451	682	-231	1.2
General and Operations Managers	59	857	1,280	-423	0.9
Chefs and Head Cooks	49	81	112	-31	1.4
Food Service Managers	44	125	135	-10	1.1
Gaming Managers	40	47	29	18	23.8

Source: Emsi

Table 8) Automation index for top occupations in each target cluster for the Upper Shore

Occupation	Automation Index
Agricultural Inputs and Services	
Farmworkers and Laborers, Crop, Nursery, and Greenhouse	113
Farmworkers, Farm, Ranch, and Aquacultural Animals	107
Agricultural Workers, All Other	108
Agricultural Equipment Operators	103
First-Line Supervisors of Farming, Fishing, and Forestry Workers	96
Hospitality and Entertainment	
First-Line Supervisors of Food Preparation and Serving Workers	108
General and Operations Managers	82
Chefs and Head Cooks	93
Food Service Managers	104
Gaming Managers	93

Source: Emsi

Automation Index

The automation index captures an occupation's risk of being affected by automation using four measures:

- % of time spent on high-risk work
- % of time spent on low-risk work
- Number of high-risk jobs in compatible occupations
- Overall industry automation risk

The index is scaled so that 100 = the "average worker," defined as the average index across all occupations, weighted by job numbers in 2018. The index has a standard deviation of 15.

Note that the share of time spent on low-risk work is a negative contributor to an occupation's index score (making the index score lower) while the other three measures are positive contributors (making the index score higher).

Understanding which occupations face a higher risk of automation is important when considering long-term, sustainable economic growth for the Upper Shore.

Occupation	Automation Index
Plastics	
Assemblers and Fabricators, All Other, Including Team Assemblers	113
First-Line Supervisors of Production and Operating Workers	89
Shipping, Receiving, and Traffic Clerks	109
First-Line Supervisors of Office and Administrative Support Workers	92
Human Resources Specialists	84
Industrial Engineers	92
Manufacturing	
Assemblers and Fabricators, All Other, Including Team Assemblers	113
Aerospace Engineers	77
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	111
First-Line Supervisors of Production and Operating Workers	89
General and Operations Managers	82
Business Operations Specialists, All Other	87
Computer Systems Analysts	82
Industrial Engineers	92

Occupation	Automation Index
Business and Professional Services	
Management Analysts	91
Software Developers, Applications	81
Managers, All Other	85
Sales Representatives, Services, All Other	97
General and Operations Managers	82
Computer Systems Analysts	82
Graphic Designers	81
Transportation	
Heavy and Tractor-Trailer Truck Drivers	110
Laborers and Freight, Stock, and Material Movers, Hand	117
Railroad Conductors and Yardmasters	98
Office Clerks, General	102
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	91
Distribution and Electronic Commerce	
Industrial Truck and Tractor Operators	120
Stock Clerks and Order Fillers	112
Light Truck or Delivery Services Drivers	113
Heavy and Tractor-Trailer Truck Drivers	110
Packers and Packagers, Hand	123
First-Line Supervisors of Office and Administrative Support Workers	92
Paper Goods Machine Setters, Operators, and Tenders	120