

AUGUST 11, 2019



GO
VIRGINIA
REGION 6

EMPIRICAL ASSESSMENT

ECONOMIC AND LABOR MARKET CONDITIONS



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About Mangum Economics, LLC

Mangum Economics, LLC is a Richmond, Virginia based firm that specializes in producing objective economic, quantitative, and qualitative analysis in support of strategic decision making. Much of our recent work relates to IT & Telecom Infrastructure (data centers, terrestrial and subsea fiber), Renewable Energy, and Economic Development. Examples of typical studies include:

POLICY ANALYSIS

Identify the intended and, more importantly, unintended consequences of proposed legislation and other policy initiatives.

ECONOMIC IMPACT ASSESSMENTS AND RETURN ON INVESTMENT ANALYSES

Measure the economic contribution that businesses and other enterprises make to their localities.

WORKFORCE ANALYSIS

Project the demand for, and supply of, qualified workers.

CLUSTER ANALYSIS

Use occupation and industry clusters to illuminate regional workforce and industry strengths and identify connections between the two.

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Executive Summary

Consistent with the requirements of the GO Virginia initiative, this report provides an empirical assessment of economic and labor market conditions within GO Virginia Region 6. The principal findings from that assessment are as follows:

REGIONAL ECONOMY

In recent years, employment and wage growth in GO Virginia Region 6 has been largely consistent with statewide trends. However, there are significant differences in the performance and composition of the economies of the three Planning Districts (PDCs) that comprise Region 6 – George Washington, Middle Peninsula, and Northern Neck.

- The private sector accounts for a smaller proportion of total employment in Region 6 than is typical for Virginia. In 2018, private sector employment accounted for 76 percent of total employment in Region 6 as a whole, 76 percent in the George Washington PDC, 78 percent in the Middle Peninsula PDC, and 77 percent in the Northern Neck PDC as compared to 82 percent statewide in Virginia.
- Region-wide, total private employment growth in Region 6 was identical to that of the state as a whole over the last five years – 7.4 percent in Region 6 as a whole, 8.1 percent in the George Washington PDC, 5.8 percent in the Middle Peninsula PDC, and 3.6 percent in the Northern Neck PDC as compared to 7.4 percent statewide in Virginia.
- Region-wide, private sector average weekly wage growth in Region 6 was a little below the statewide average over the last five years – 9.8 percent in Region 6 as a whole, 9.4 percent in the George Washington PDC, 10.4 percent in the Middle Peninsula PDC, and 12.5 percent in the Northern Neck PDC as compared to 10.1 percent statewide in Virginia.
- Private sector average weekly wages in Region 6 are below the statewide average. In 2018, private sector average weekly wages were \$806 in Region 6 as a whole, \$840 in the George Washington PDC, \$682 in the Middle Peninsula PDC, and \$713 in the Northern Neck PDC as compared to \$1,113 statewide in Virginia.
- Over the one year period from 2017 to 2018, the three industry sectors in Region 6 with the largest employment growth were: 1) Professional, Scientific, and Technical Services (up 739 jobs), 2) Other Services (*i.e.*, primarily personal services) (up 474 jobs), and 3) Health Care and Social Assistance (up 438 jobs). While the three industry sectors with the largest employment losses were: 1) Manufacturing (down 289 jobs), 2) Wholesale Trade (down 132 jobs), and 3) Construction (down 96 jobs).
- Over the five-year period from 2013 to 2018, the three industry sectors in Region 6 with the largest employment growth were: 1) Accommodation and Food Services (up 1,600 jobs), 2) Transportation and Warehousing (up 1,576 jobs), and 3) Other Services (up 1,461 jobs). While

the three industry sectors with the largest employment losses were: 1) Wholesale Trade (down 612 jobs), 2) Information (down 407 jobs), and 3) Utilities (down 28 jobs).

- In 2017, Region 6 identifies six target industry clusters: 1) Distribution and Logistics, 2) Forestry, Wood Products, and Paper, 3) Information and Data Centers, 4) Manufacturing, 5) Professional, Technical, and Scientific Services, and 6) Seafood, Fishing, and Aquaculture.
- Of Region 6's six identified target industry clusters, in 2018 the three largest were: 1) Professional, Technical, and Scientific (10,080 jobs), 2) Manufacturing (5,500 jobs), and 3) Distribution and Logistics (3,469 jobs). While, the three highest paying were: 1) Professional, Technical, and Scientific (\$1,575 per week), 2) Information and Data Centers (\$1,160 per week), and, and 3) Manufacturing (\$977 per week).
- Over the one year period between 2017 and 2018 Professional, Technical, and Scientific Services was the only target industry cluster in Region 6 to exhibit employment growth (up 739 jobs). All other target industry sectors experience employment declines, with the largest occurring in Manufacturing (down 289 jobs).
- Over the five year period between 2013 and 2018 three target industry clusters in Region 6 experienced employment growth: 1) Professional, Technical, and Scientific Services (up 1,146 jobs), 2) Distribution and Logistics (up 1,126 jobs), and 3) Manufacturing (up 47 jobs). While the remaining three target industry clusters in Region 6 experienced employment declines: 1) Seafood, Fishing, and Aquaculture (down 111 jobs), 2) Information and data Centers (down 75 jobs), and 3) Forestry, Wood Products, and paper (down 25 jobs).

ECONOMIC DRIVERS

GO Virginia Region 6 is home to a large and diverse number of high-performing industries.

- We assessed the relative economic performance of specific industries within Region 6 using a Composite Economic Performance Index that took into account each industry's relative employment footprint, short-term and long-term employment growth, short-term and long-term wage growth, industry wage as a proportion of the average wage for the region, proportion of industry output exported out of Region 6, and employment multiplier.
- That analysis identified 82 industries within Region 6 that exhibited a Composite Economic Performance Index that was above the median for the region and 41 industries that were performed in the upper quartile.

WORKFORCE GAPS

Our "gap analysis" of potential shortfalls in the pipeline of completers graduating from regional post-secondary education programs in GO Virginia Region 6 relative to the occupation-driven demand for trained workers from those programs showed that:

- Many of the identified gaps pertained to occupations that typically require a baccalaureate degree, and this is largely attributable to the fact that there is only one four-year degree granting post-secondary education institution in Region 6 – Mary Washington University.
- However, in some instances, particularly in “middle-skill” occupations that require a less than a two-year, post-secondary certificate, there were identified gaps that could potentially be problematic:
 - Automotive Service Technicians and Mechanics
 - Bus and Truck Mechanics and Diesel Engine Specialists
 - Dental Assistants
 - Electrical Power-Line Installers and Repairers
 - Electricians
 - Heating, Air Conditioning, and Refrigeration Mechanics
 - Heavy and Tractor-Trailer Truck Drivers
 - Industry and Machinery Mechanics
 - Physical Therapist Assistants
 - Plumbers, Pipefitters, and Steamfitter

FORWARD-LOOKING DATA

Our analysis of forward-looking data required by GO Virginia guidelines drew heavily from the TEconomy Partners report, *Regional Entrepreneurial Assessment Project*. That analysis showed that:

- The share of the working-age population with at least a bachelor’s degree in Region 6 grew by 17 percent between 2012 and 2017, which was significantly faster than the 10 percent growth rate for the state as a whole or the 12 percent growth rate for the entire United States.
- The rate of new business formation in Region 6 is very close to the state average – 8 percent in 2017 as compared to 9 percent statewide.
- Start-up activity differs across Region 6. The area covered by the George Washington PDC has a high concentration of startup employment in Research and Development, Engineering and Technical Services, and Manufacturing. Both the Middle Peninsula and Northern Neck PDCs have high concentrations of startup employment in Agriculture, Food Processing, Natural Resources, and Finished Products.
- Most patents issued in Region 6 are to government organizations.

WHAT HAS CHANGED AND WHAT HAS NOT

Comparing this update to our 2017 analysis performed as part of GO Virginia Region 6’s original Growth and Diversification Plan shows that:

- Where employment growth in Region 6 was exceeding the statewide trend in our 2017 analysis, it has since fallen to the statewide trend and may be decelerating below it.

- Where employment growth in each of Region 6's three PDCs was accelerating and converging in our 2017 analysis, it is now decelerating and diverging.
- Where wage growth in Region 6 was exceeding the statewide trend in our 2017 analysis, that gap has since closed.
- Where the Transportation and Warehousing; Administrative Support and Waste Management; and Construction sectors led employment growth in our 2017 analysis, now the Professional, Scientific, and Technical Services; Other Services; and Health Care and Social Assistance sectors lead employment growth.
- The economic driver industries identified in this update are similar and still generally support the target industry clusters identified two years ago.
- As in our 2017 analysis, the most binding workforce gaps in GO Virginia Region 6 are still in Middle Skill occupations.

Introduction

Consistent with the requirements of the GO Virginia initiative, this report provides an updated assessment of economic and labor market conditions within GO Virginia Region 6. Region 6 is comprised of the city of Fredericksburg; and the counties of Caroline, Essex, Gloucester, King and Queen, King George, King William, Lancaster, Mathews, Middlesex, Northumberland, Richmond, Spotsylvania, Stafford, and Westmoreland. Region 6 is consistent with the service areas of the George Washington, Middle Peninsula, and Northern Neck Planning District Commissions (PDCs).

This report was commissioned by GO Virginia Region 6 and produced by Mangum Economics.

Economic Profile

In this section, we provide a context for the analysis to follow by reviewing recent economic trends within GO Virginia Region 6, and the three Planning Districts that comprise Region 6 (George Washington PDC, Middle Peninsula PDC, and Northern Neck PDC).¹

EMPLOYMENT BY OWNERSHIP CATEGORY

Figure 1 depicts employment by ownership category in Virginia, GO Virginia Region 6, and the three Planning Districts that are encompassed by Region 6, in 2018. As the figure depicts, while in Virginia overall private sector employment accounted for 82 percent of total employment, in Region 6 overall that figure was 76 percent. While at the PDC level, private sector employment accounted for

- 76 percent of total employment in the George Washington PDC,
- 78 percent of total employment in the Middle Peninsula PDC, and
- 77 percent of total employment in the Northern Neck PDC.

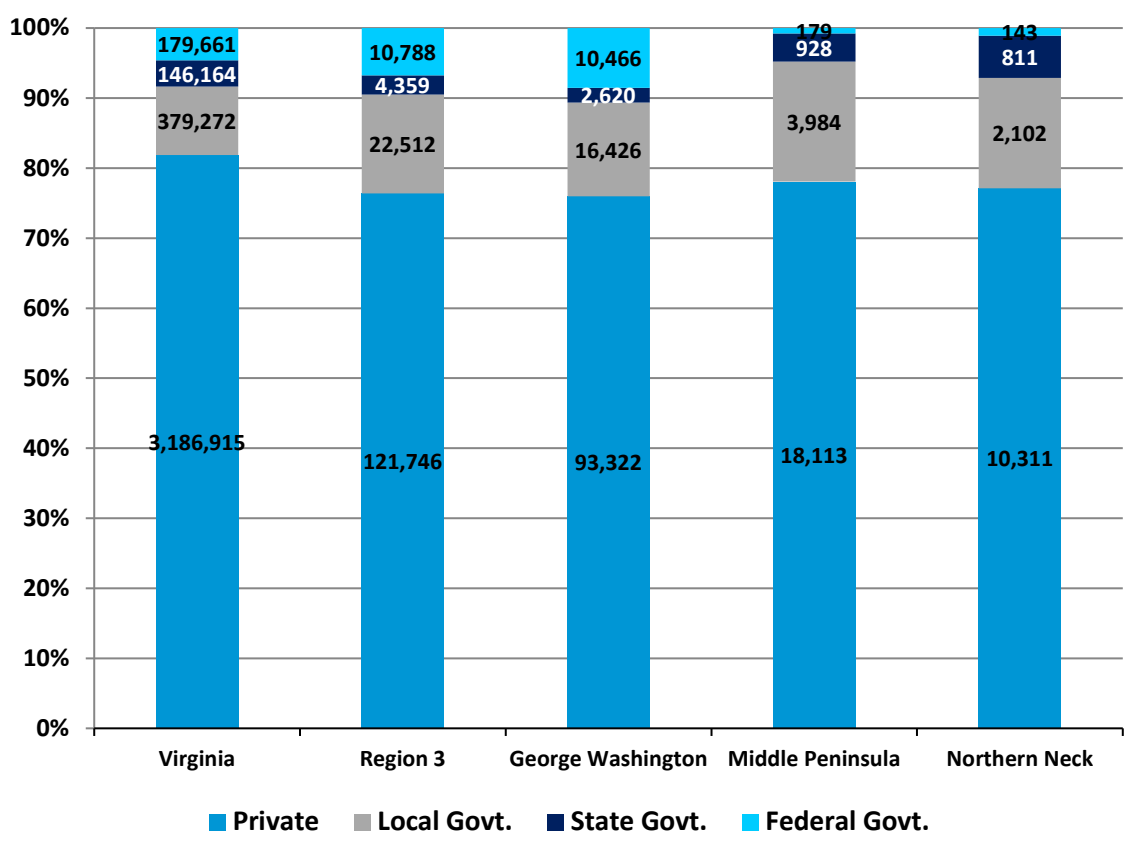
These below-average percentages of private sector employment are generally attributable to the higher percentage of local government employment in Region 6, where local government comprises 14 percent of total employment as compared to 10 percent at the statewide level (at the PDC level, the figures are 13 percent in the George Washington PDC, 17 percent in the Middle Peninsula PDC, and 16 percent in the Northern Neck PDC). The region also has a higher percentage of federal government employment. As a percentage of total employment, federal employment is

¹ The George Washington PDC encompasses the city of Fredericksburg and the counties of Caroline, King George, Spotsylvania, Stafford. The Middle Peninsula PDC encompasses the counties of Essex, Gloucester, King and Queen, King William, Mathews, and Middlesex. The Northern Neck PDC encompasses the counties of Lancaster, Northumberland, Richmond, and Westmoreland. These PDC service areas closely match that of GO Virginia Region 3, but they do not perfectly overlap. Franklin County is included in the West Piedmont PDC, but it is not part of Region 3. Likewise, Cumberland County and Nottoway County are part of Region 3, but they are not included in either of the three PDCs.



- 7 percent in Region 6
- 5 percent in Virginia, statewide,
- 9 percent in the George Washington PDC,
- 1 percent in the Middle Peninsula PDC, and
- 1 percent in the Northern Neck PDC.

Figure 1: Employment by Ownership Category – 2018²



Consistent with the GO Virginia initiative’s focus on private sector development, in the remainder of this section we will focus exclusively on private sector employment and wages.

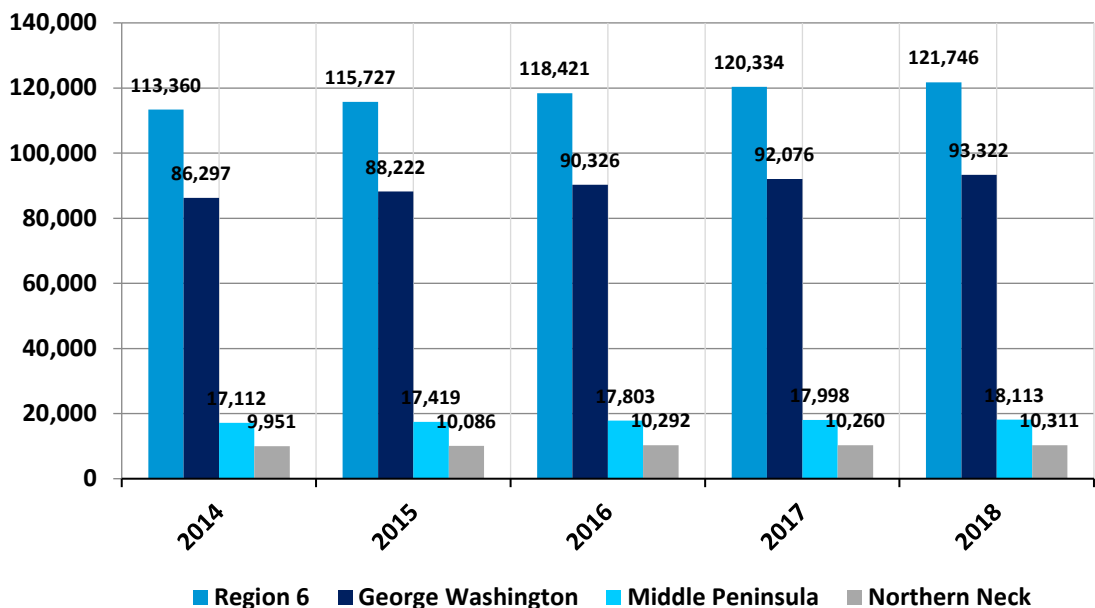
TOTAL PRIVATE EMPLOYMENT

Figure 2 provides data on total private employment trends in GO Virginia Region 6, and the three Planning Districts that it encompasses for the period from 2014 through 2018. Overall this five-year period, Region 6 experienced an increase of 8,386 jobs, or 7.4 percent growth in total private employment. This is identical to the 7.4 percent growth in total private employment experienced at the statewide level over this same period.

² Source: Virginia Employment Commission.



Figure 2: Total Private Employment in GO Virginia Region 6 and Planning Districts – 2014 to 2018³



To control for seasonality and provide a point of reference, Figures 3 and 4 compare the annual change in total private employment in Region 6 and the three Planning Districts that it encompasses to that of the state of Virginia as a whole over the same five year period. Any point above the zero line in this graph indicates annual employment growth, while any point below the zero line indicates annual employment decline. As these data indicate, annual private employment growth in the Middle Peninsula and Northern Neck PDCs tracked below the statewide norm throughout the period in every year but 2016, while annual private employment growth the George Washington PDC exceeded the statewide norm in every year but 2015 and 2018.

As of 2018, annual private employment growth was:

- 1.5 percent in Virginia statewide,
- 1.2 percent in Region 6 overall,
- 1.4 percent in the George Washington PDC,
- 0.6 percent in the Middle Peninsula PDC, and
- 0.5 percent in the Northern Neck PDC.

³ Source: Virginia Employment Commission.



Figure 3: Annual Change in Total Private Employment in GO Virginia Region 6 – 2014 to 2018⁴

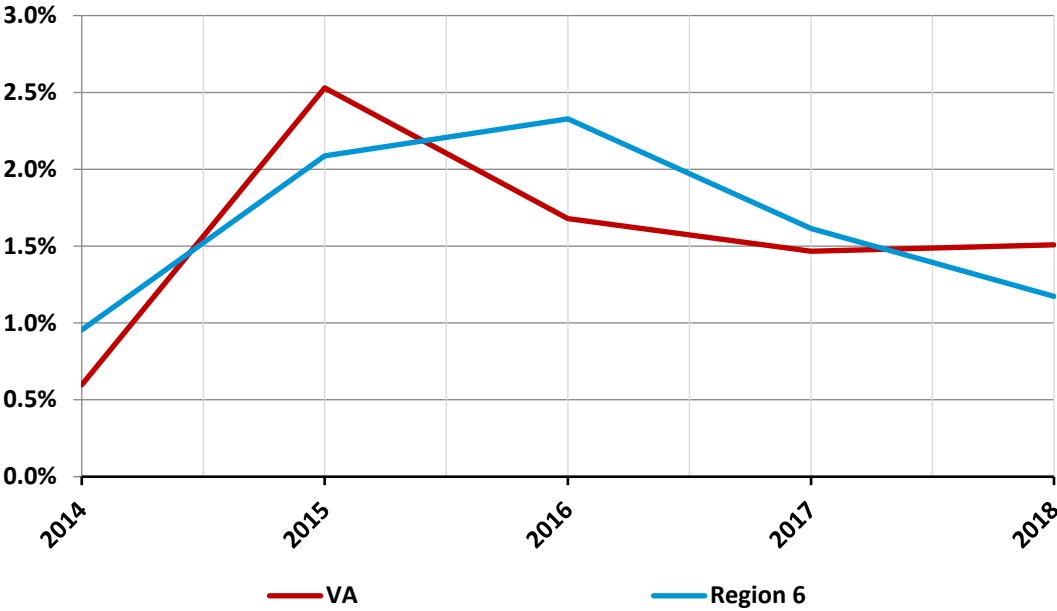
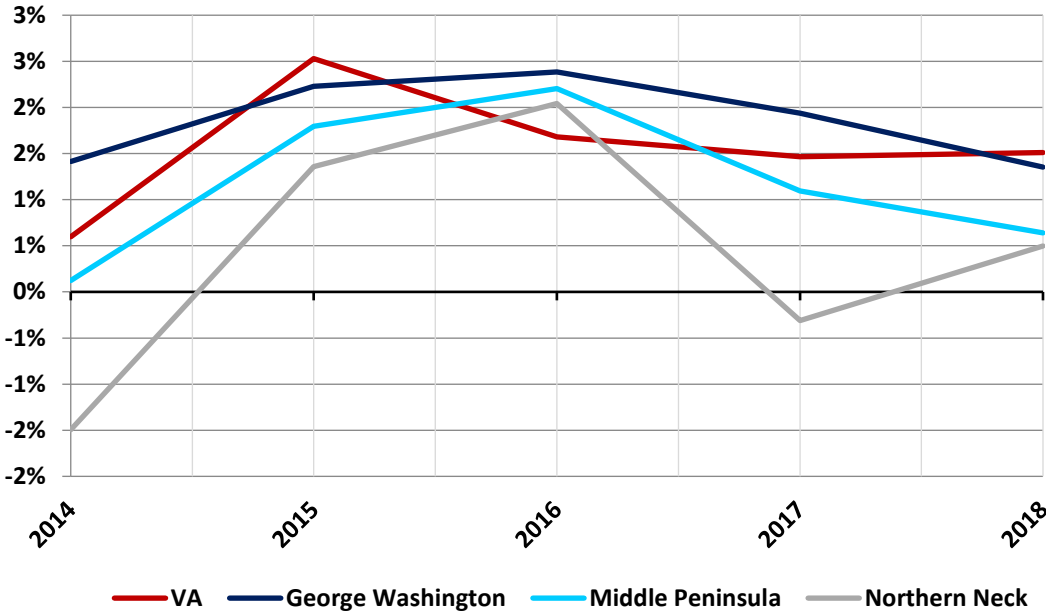


Figure 4: Annual Change in Total Private Employment in GO Virginia Region 6 by PDC – 2014 to 2018⁵



⁴ Source: Virginia Employment Commission.

⁵ Source: Virginia Employment Commission.

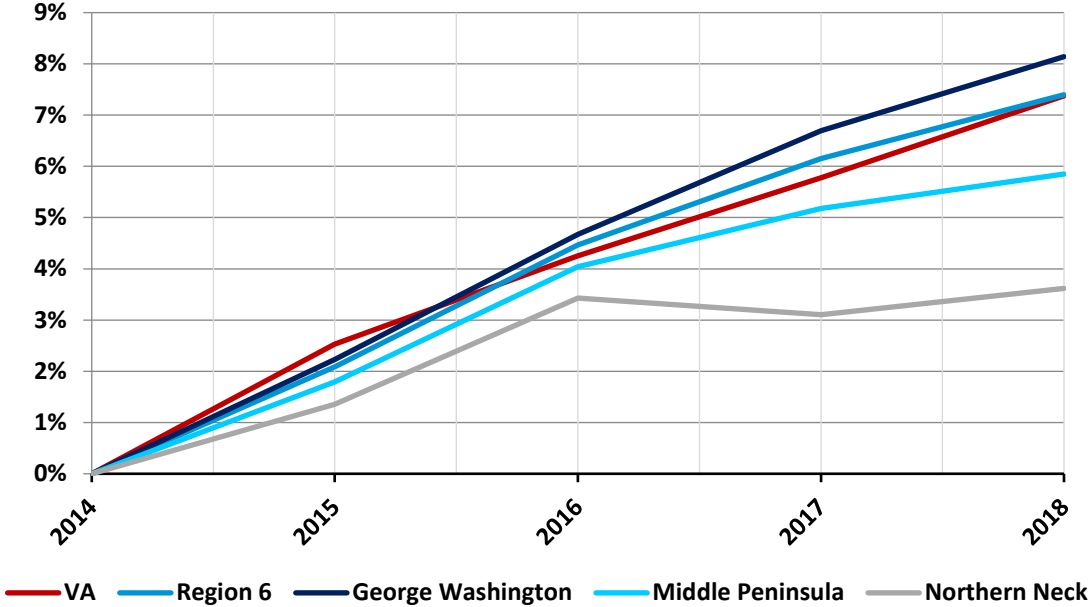


Finally, Figure 5 depicts the cumulative annual growth in total private employment in Region 6 and the three Planning Districts that it encompasses between 2014 and 2018. As these data show, where cumulative annual total private employment growth in the Middle Peninsula and Northern Neck PDCs generally underperformed the statewide norm over the period, cumulative annual total private employment growth in the George Washington PDC generally outperformed the statewide norm.

For the period as a whole:

- Virginia experienced a 7.4 percent cumulative increase in total private employment,
- Region 6 overall also experienced a 7.4 percent increase,
- the George Washington PDC experienced an 8.1 percent increase,
- the Middle Peninsula PDC experienced a 5.8 percent increase, and
- the Northern Neck PDC experienced a 3.6 percent increase.

Figure 5: Cumulative Growth in Total Private Employment in GO Virginia Region 6 and Planning Districts – 2014 to 2018⁶



PRIVATE SECTOR AVERAGE WEEKLY WAGES

Figure 6 provides data on trends in private sector average weekly wages in GO Virginia Region 6, and the three Planning Districts that it encompasses for the period from 2014 through 2018. While Figure 7 depicts the cumulative growth in private-sector average weekly wages in each geography between 2014 and 2018 on an annual basis (unadjusted for inflation).

⁶ Source: Virginia Employment Commission.



Figure 6: Private Average Weekly Wages in GO Virginia Region 6 and Planning Districts – 2014 to 2018⁷

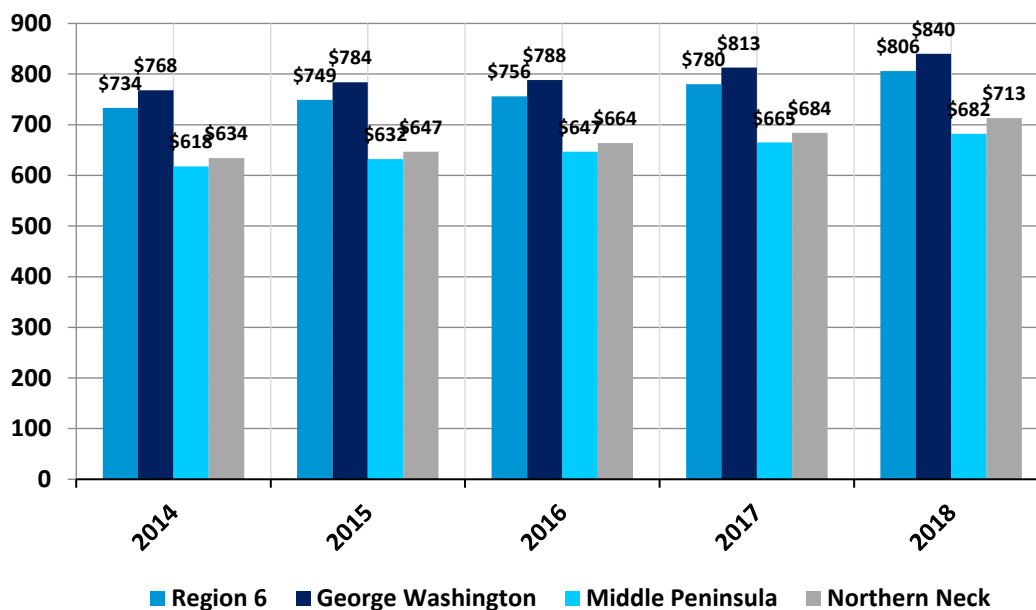
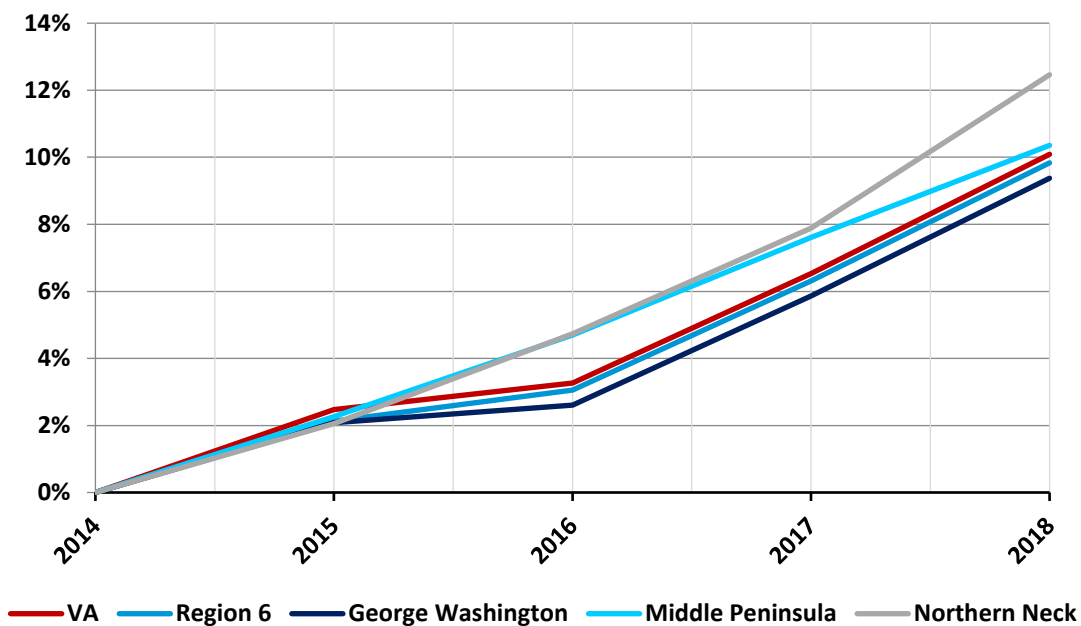


Figure 7: Cumulative Nominal Growth in Private Average Weekly Wages in GO Virginia Region 6 and Planning Districts – 2014 to 2018⁸



⁷ Source: Virginia Employment Commission.

⁸ Source: Virginia Employment Commission.

As these data show, over this period private sector average weekly wages (unadjusted for inflation) increased by

- 10.1 percent statewide in Virginia,
- 9.8 percent in Region 6 overall,
- 9.4 percent in the George Washington PDC,
- 10.4 percent in the Middle Peninsula PDC, and
- 12.5 percent in the Northern Neck PDC.

EMPLOYMENT BY MAJOR INDUSTRY

In this portion of the section, we provide a drill-down for employment and wages by major industry sector in GO Virginia Region 6 and the three Planning Districts it encompasses. As shown in Figure 8, in 2018 the three largest industry sectors in Region 6 were: 1) Retail Trade (22,705 jobs), 2) Health Care and Social Assistance (19,687 jobs), and 3) Accommodation and Food Services (16,788 jobs).

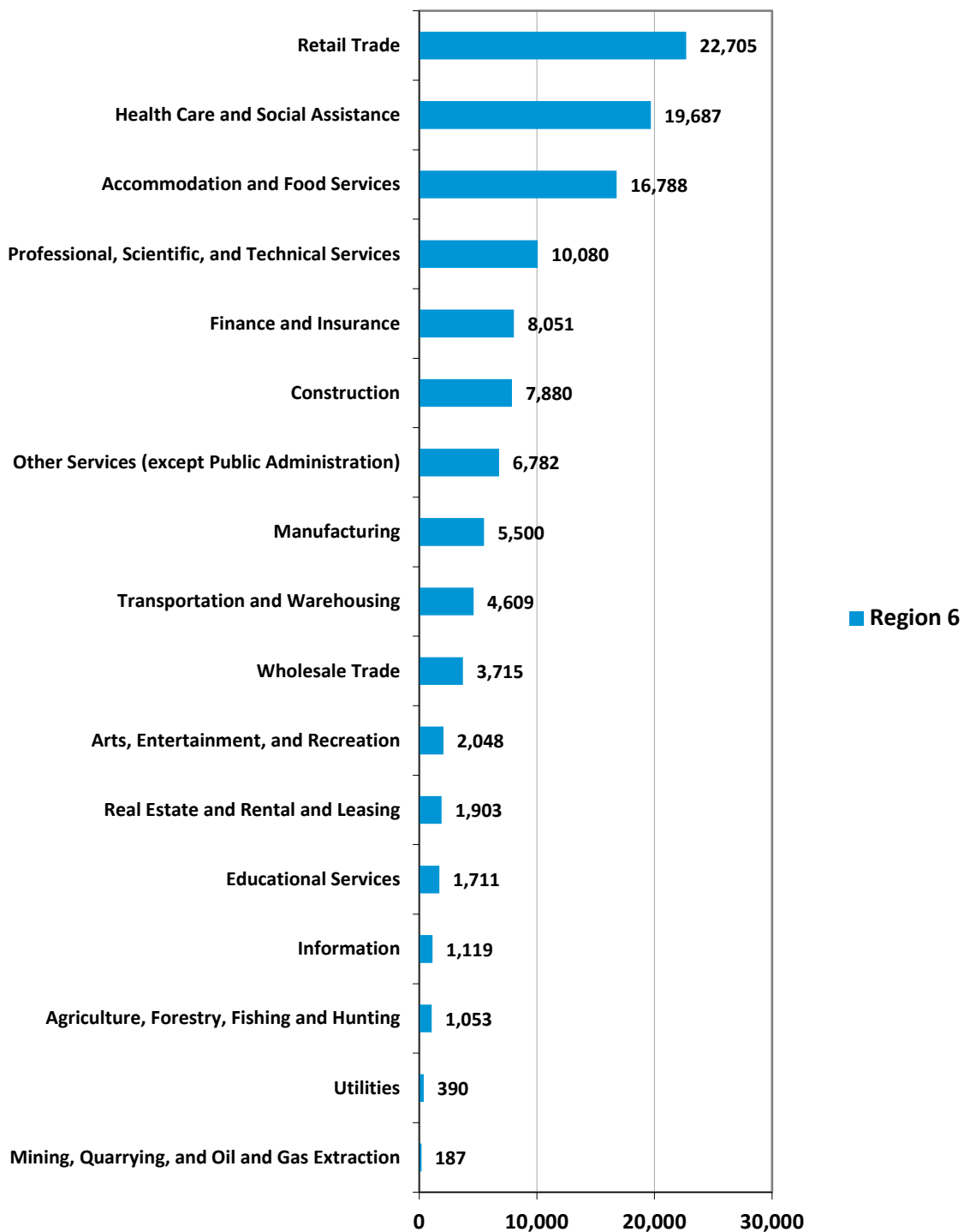
Figure 9 provides a similar breakdown by PDC. In 2018 the three largest industry sectors in the George Washington PDC were: 1) Retail Trade (17,137 jobs), 2) Health Care and Social Assistance (14,868 jobs), and 3) Accommodation and Food Service (13,381 jobs). In the Middle Peninsula PDC, the three largest industry sectors that year were: 1) Retail Trade (3,919 jobs), 2) Health Care and Social Assistance (3,091 jobs), and 3) Accommodation and Food Services (2,300 jobs). While in the Northern Neck PDC, the three largest industry sectors were: 1) Health Care and Social Assistance (1,728 jobs), 2) Retail Trade (1,649 jobs), and 3) Manufacturing (1,384 jobs).

Figures 10 and 11 provide similar data for average weekly wages in 2018. As shown in Figure 10, in 2018 the three highest paying industry sectors in Region 6 were: 1) Utilities (\$1,872 per week), 2) Professional, Scientific, and Technical Services (\$1,575 per week), and 3) Finance and Insurance (\$1,184 per week).

Figure 11 provides the same rankings by PDC. In 2018 the three highest paying sectors in the George Washington PDC were: 1) Utilities (\$1,924 per week), 2) Professional, Scientific, and Technical Services (\$1,643 per week), and 3) Finance and Insurance (\$1,198 per week). In the Middle Peninsula PDC, the three highest paying industry sectors that year were: 1) Manufacturing (\$1,098 per week), 2) Transportation and Warehousing (\$1,009 per week), and 3) Professional, Scientific, and Technical Services (\$968 per week). While in the Northern Neck PDC, the three highest paying industry sectors were: 1) Utilities (\$1,704 per week), 2) Finance and Insurance (\$1,245 per week), and 3) Professional, Scientific, and Technical Services (\$1,062 per week).



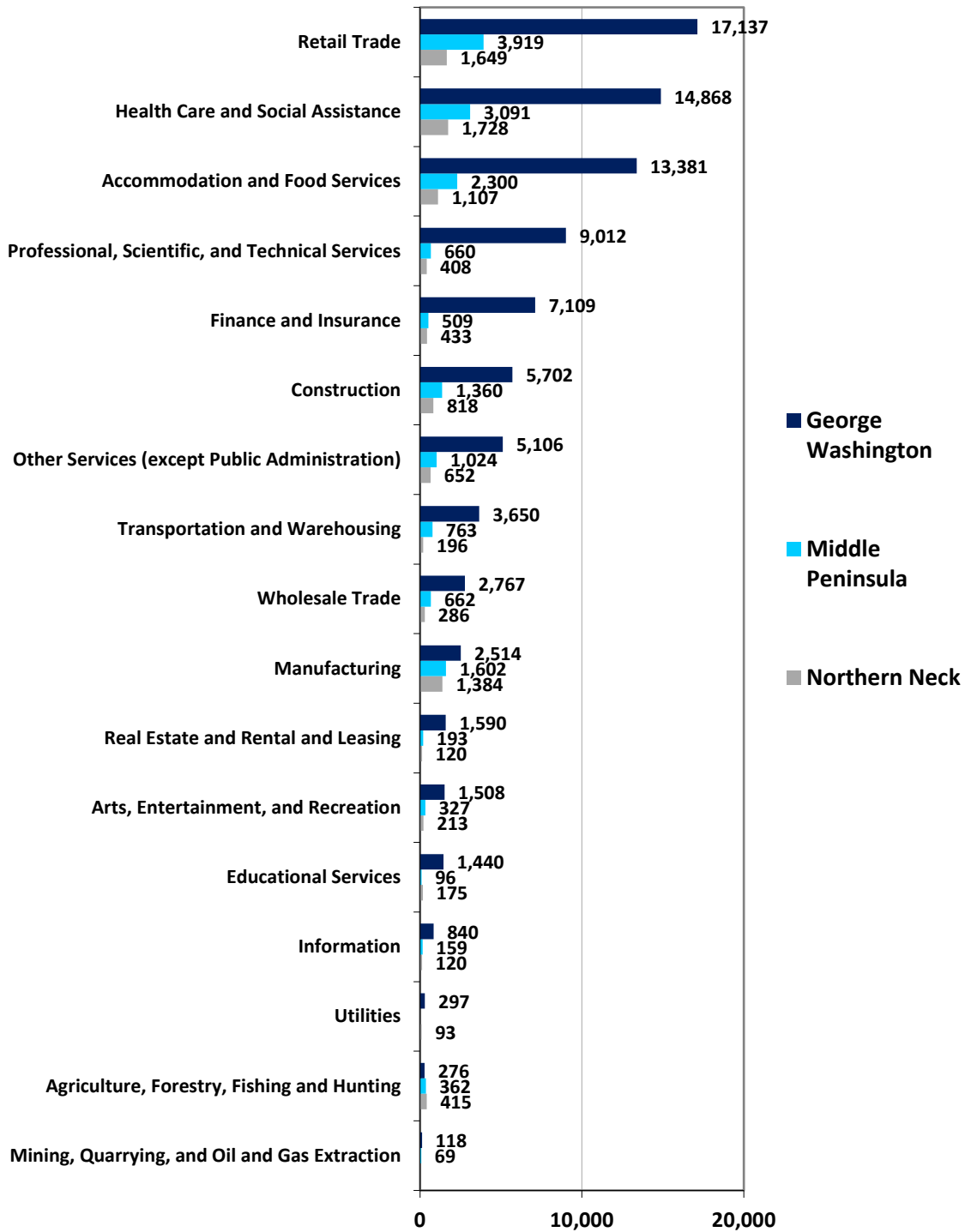
Figure 8: Private Employment by Major Industry Sector in Region 6 – 2018⁹



⁹ Source: Virginia Employment Commission.



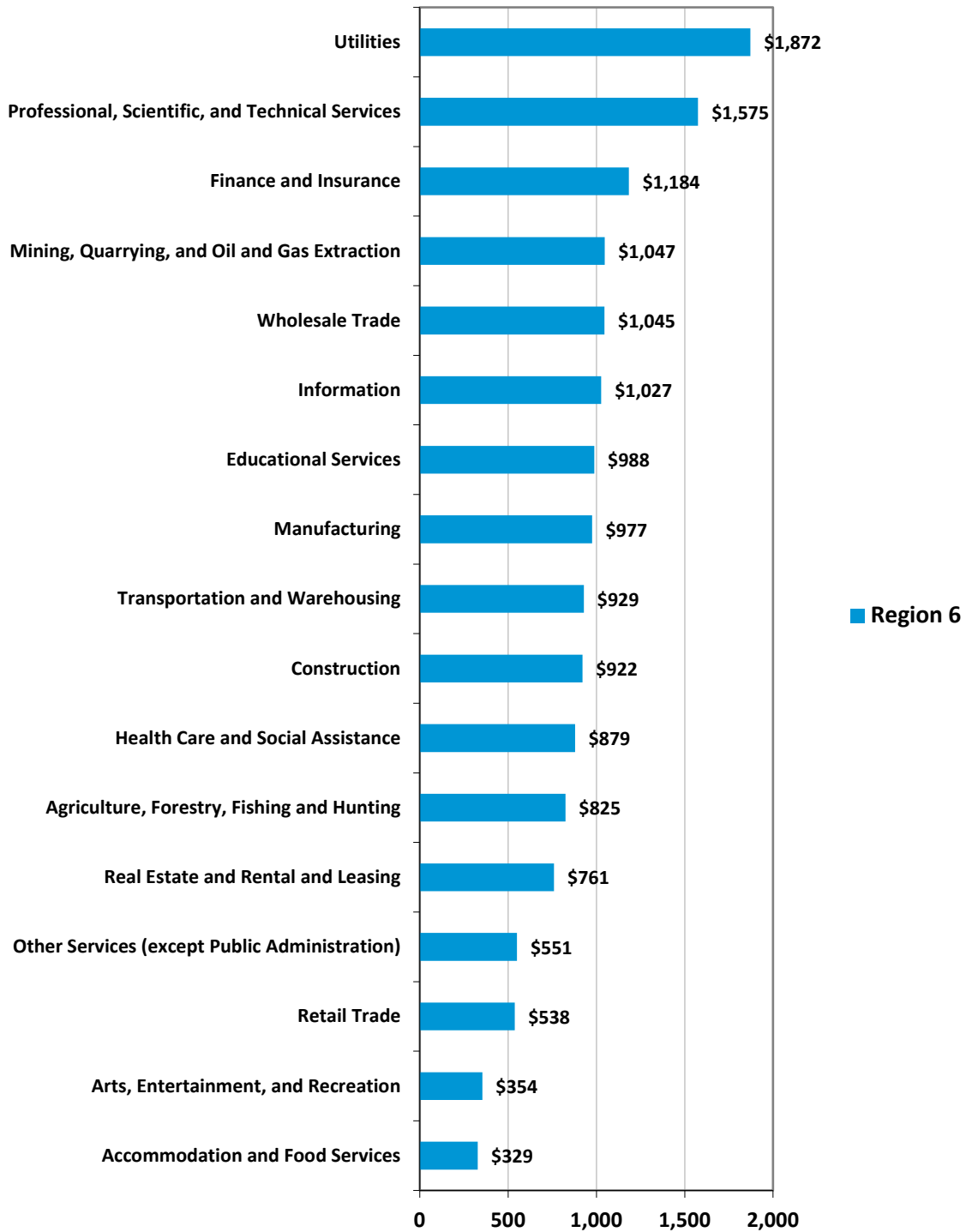
Figure 9: Private Employment by Major Industry Sector in Region 6 by PDC – 2018¹⁰



¹⁰ Source: Virginia Employment Commission.



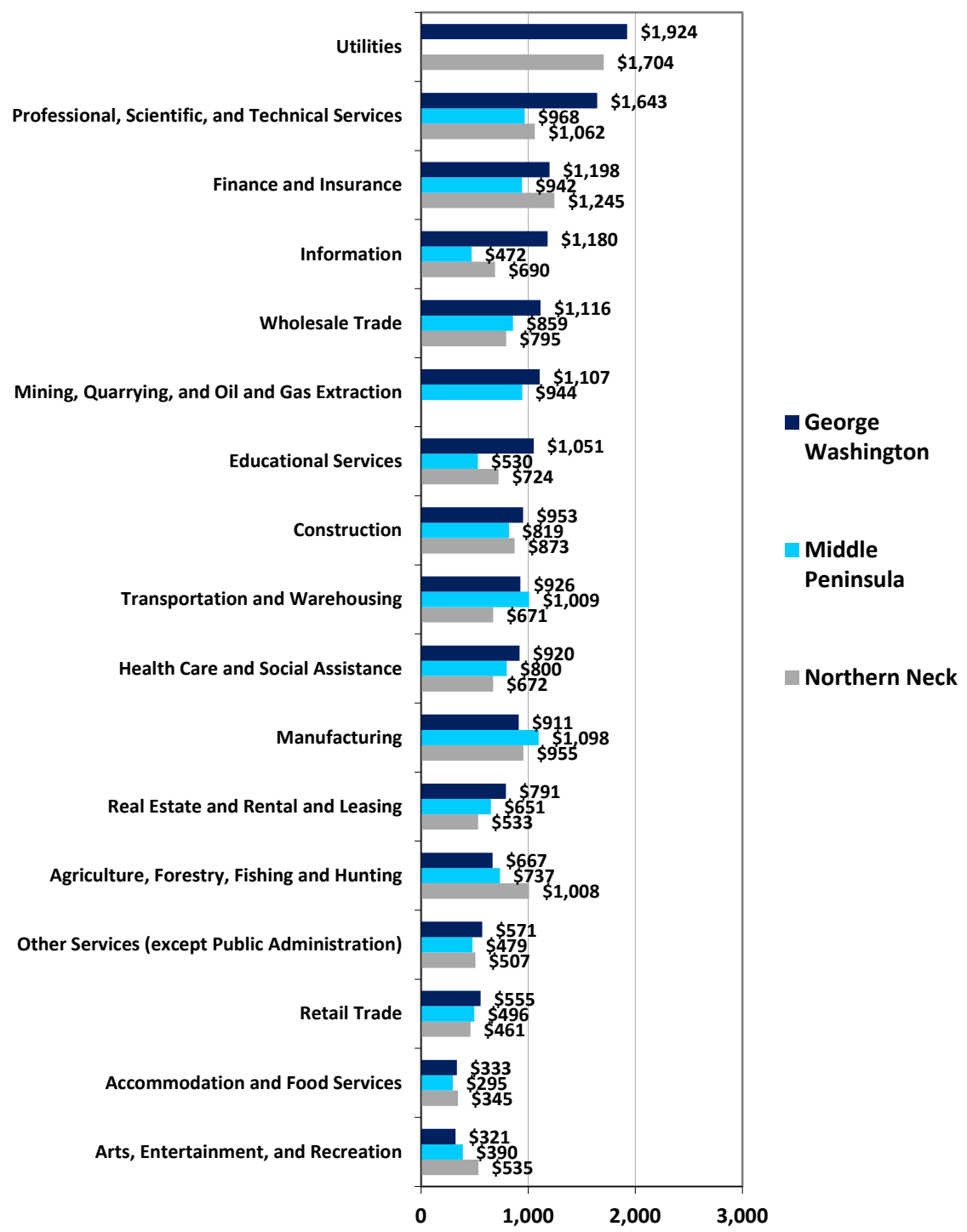
Figure 10: Private Average Weekly Wages by Major Industry Sector in Region 6 – 2018¹¹



¹¹ Source: Virginia Employment Commission.



Figure 11: Private Average Weekly Wages by Major Industry Sector in Region 6 by PDC – 2018¹²



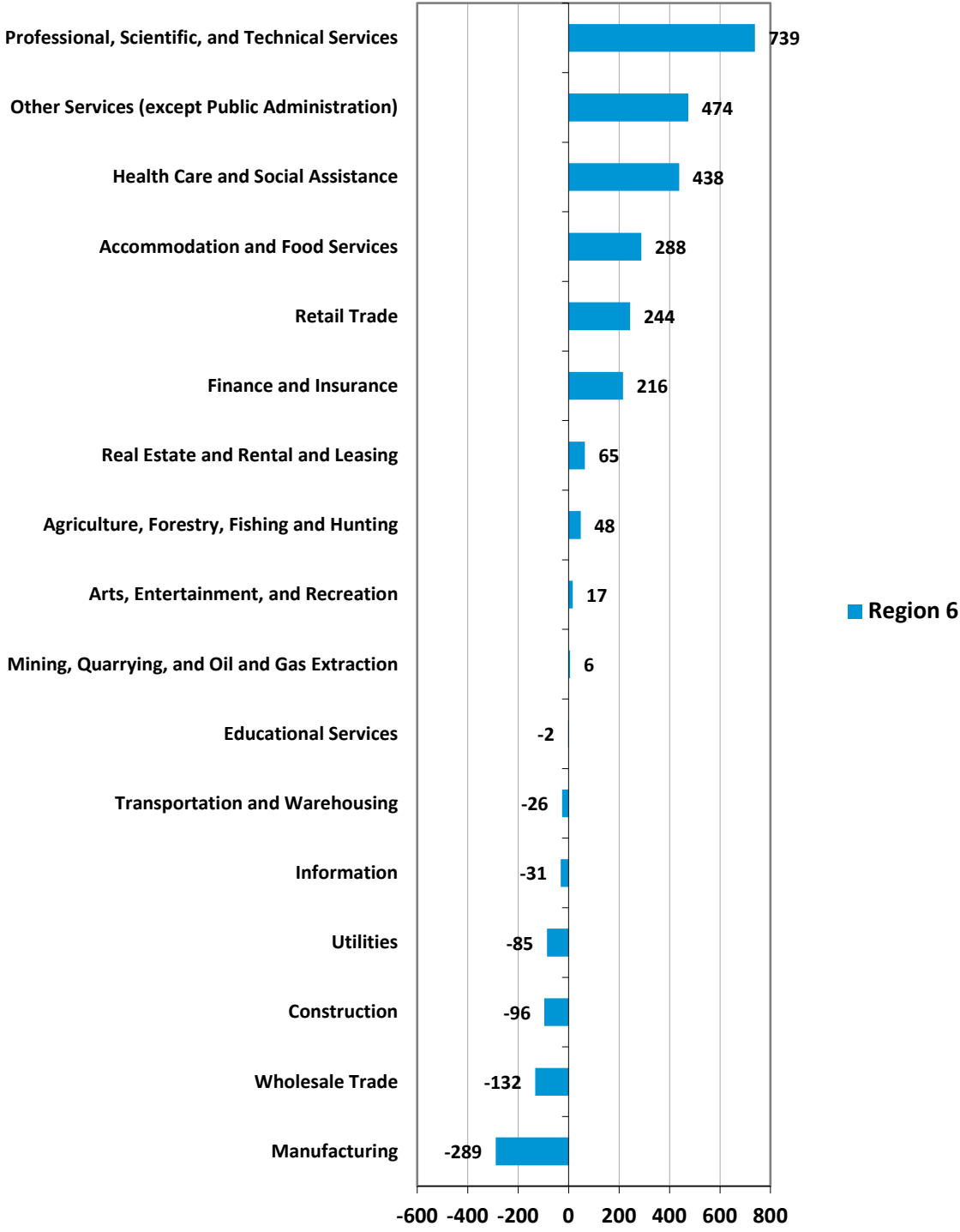
¹² Source: Virginia Employment Commission.

Finally, Figures 12 through 15 depict one-year (2017 to 2018) and five-year (2013 to 2018) employment changes in Region 6 and the three Planning Districts it encompasses. As shown in Figure 12, over the one year period between 2017 and 2018 the three industry sectors in Region 6 with the largest employment growth were: 1) Professional, Scientific, and Technical Services (up 739 jobs), 2) Other Services (up 474 jobs), and 3) Health Care and Social Assistance (up 438 jobs). While at the other end of the spectrum, the three industry sectors in Region 6 with the largest employment losses between 2017 and 2018 were: 1) Manufacturing (down 289 jobs), 2) Wholesale Trade (down 132 jobs), and 3) Construction (down 96 jobs). Figure 13 provides similar data for one-year employment growth at a Planning District level.

As shown in Figure 14, over the five year period between 2013 and 2018 the three industry sectors in Region 6 with the largest employment growth were: 1) Accommodation and Food Services (up 1,600 jobs), 2) Transportation and Warehousing (up 1,576 jobs), and 3) Other Services (up 1,461 jobs). While at the other end of the spectrum, the three industry sectors in Region 6 with the largest employment losses between 2013 and 2018 were: 1) Wholesale Trade (down 612 jobs), 2) Information (down 407 jobs), and 3) Utilities (down 28 jobs). Figure 15 provides similar data for five-year employment growth at a Planning District level.



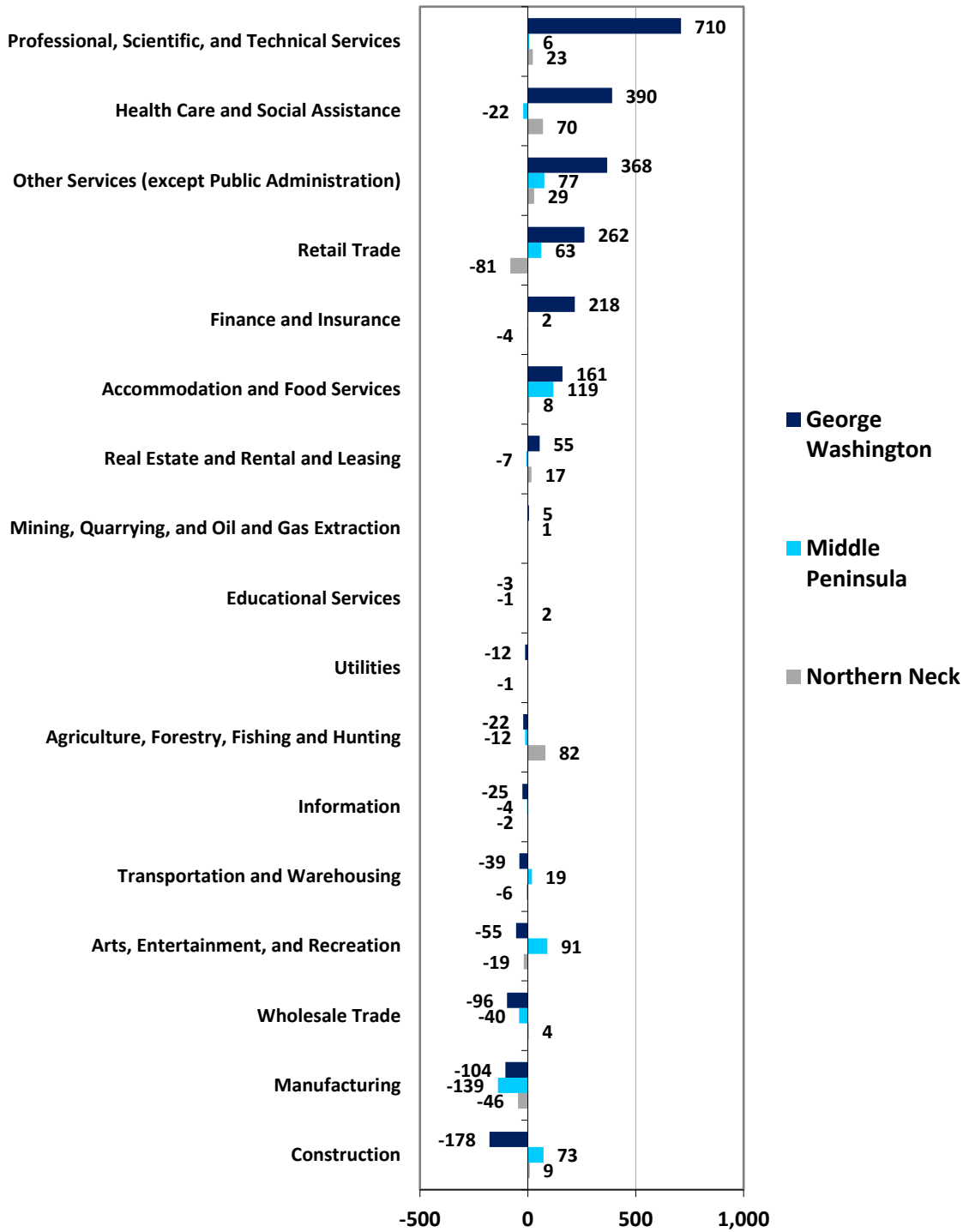
Figure 12: One Year Change in Private Employment by Major Industry Sector in Region 6 (2017 to 2018)¹³



¹³ Source: Virginia Employment Commission.



Figure 13: One Year Change in Private Employment by Major Industry Sector in Region 6 by PDC (2017 to 2018)¹⁴



¹⁴ Source: Virginia Employment Commission.



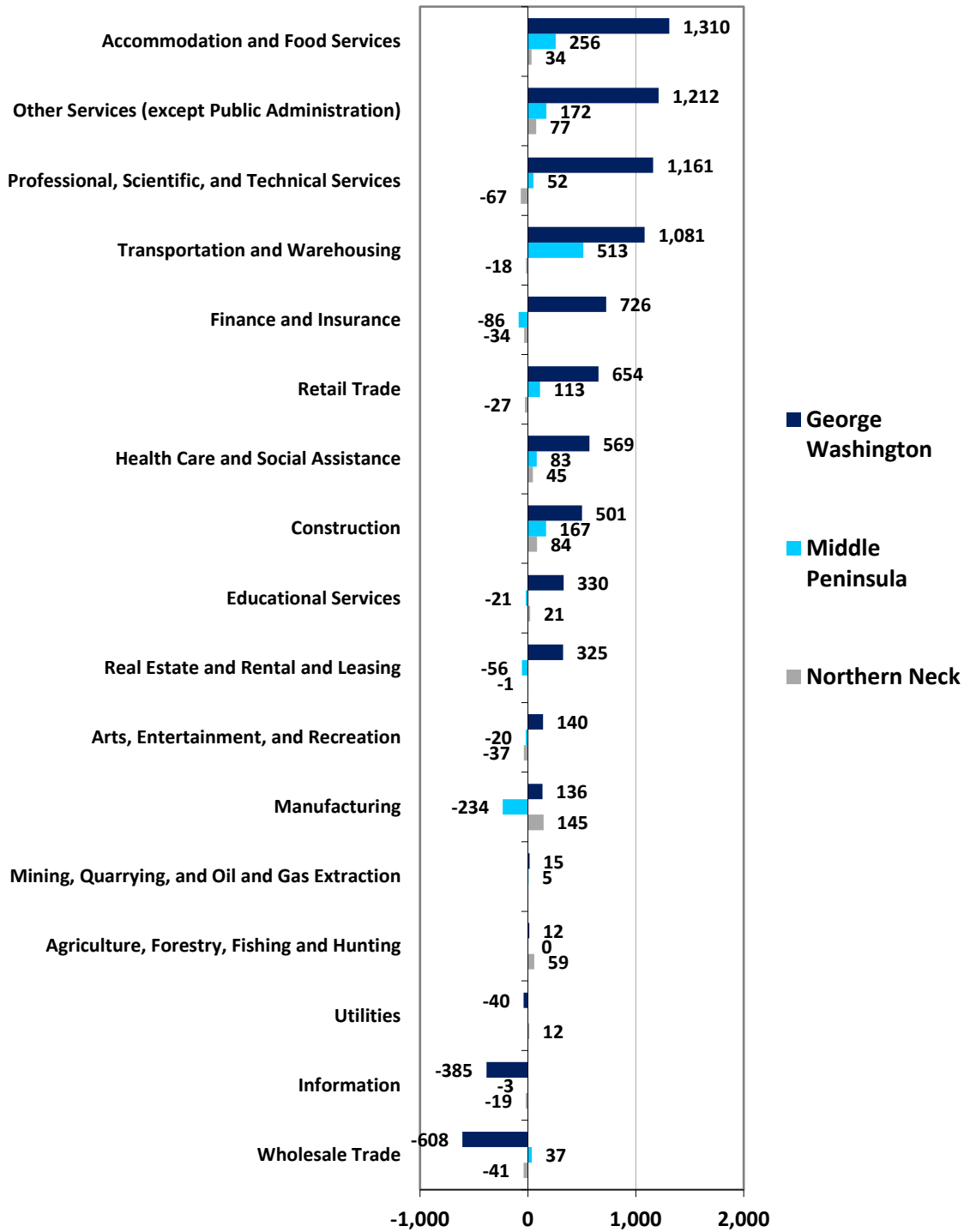
Figure 14: Five Year Change in Private Employment by Major Industry Sector in Region 6 (2013 to 2018)¹⁵



¹⁵ Source: Virginia Employment Commission.



Figure 15: Five Year Change in Private Employment by Major Industry Sector in Region 6 by PDC (2013 to 2018)¹⁶



¹⁶ Source: Virginia Employment Commission.

EMPLOYMENT BY TARGET CLUSTER

In this portion of the section, we provide a drill-down for employment and wages for each of GO Virginia Region 6's six identified target industry clusters. Those clusters are:

1. [Distribution and Logistics](#)¹⁷
2. [Forestry, Wood Products, and Paper](#)¹⁸
3. [Information and Data Centers](#)¹⁹
4. [Manufacturing](#)²⁰
5. [Professional, Technical, and Scientific Services](#)²¹
6. [Seafood, Fishing, and Aquaculture](#)²²

In interpreting the information that follows, it is important to be aware that at this level of reporting the employment and wage data publicly provided by the Virginia Employment Commission are often subject to data suppression. That occurs when an industry contained in the cluster has a sufficiently small number of employees or employers that the Virginia Employment Commission is prohibited from publicly releasing those data because they could divulge employment or wages in an individual firm. As a result, the data presented in the following tables will in some cases unavoidably under-represent actual employment.

As shown in Figure 16, in 2018 the three largest target industry clusters in Region 6 were: 1) Professional, Technical, and Scientific (10,080 jobs), 2) Manufacturing (5,500 jobs), and 3) Distribution and Logistics (3,469 jobs). While as shown in Figure 17, the three highest paying target industry clusters in Region 6 that year were: 1) Professional, Technical, and Scientific (\$1,575 per week), 2) Information and Data Centers (\$1,160 per week), and Manufacturing (\$977 per week).

¹⁷ This cluster includes: Air Transportation (NAICS 481), Rail Transportation (NAICS 482), Water Transportation (NAICS 483), Truck Transportation (NAICS 484), Support Activities for Transportation (NAICS 488), and Warehousing and Storage (NAICS 493).

¹⁸ This cluster includes: Forestry and Logging (NAICS 113), Support Activities for Forestry (NAICS 1153), Wood Product Manufacturing (NAICS 321), and Paper Manufacturing (NAICS 322).

¹⁹ This cluster includes: Motion Picture and Sound Recording Industries (NAICS 512), Broadcasting (except internet) (NAICS 515), Internet Publishing and Broadcasting (NAICS 516), Telecommunications (NAICS 517), Internet Service Providers, Web Search Portals, and Data Processing Services (NAICS 518), and Other Information Services (NAICS 519).

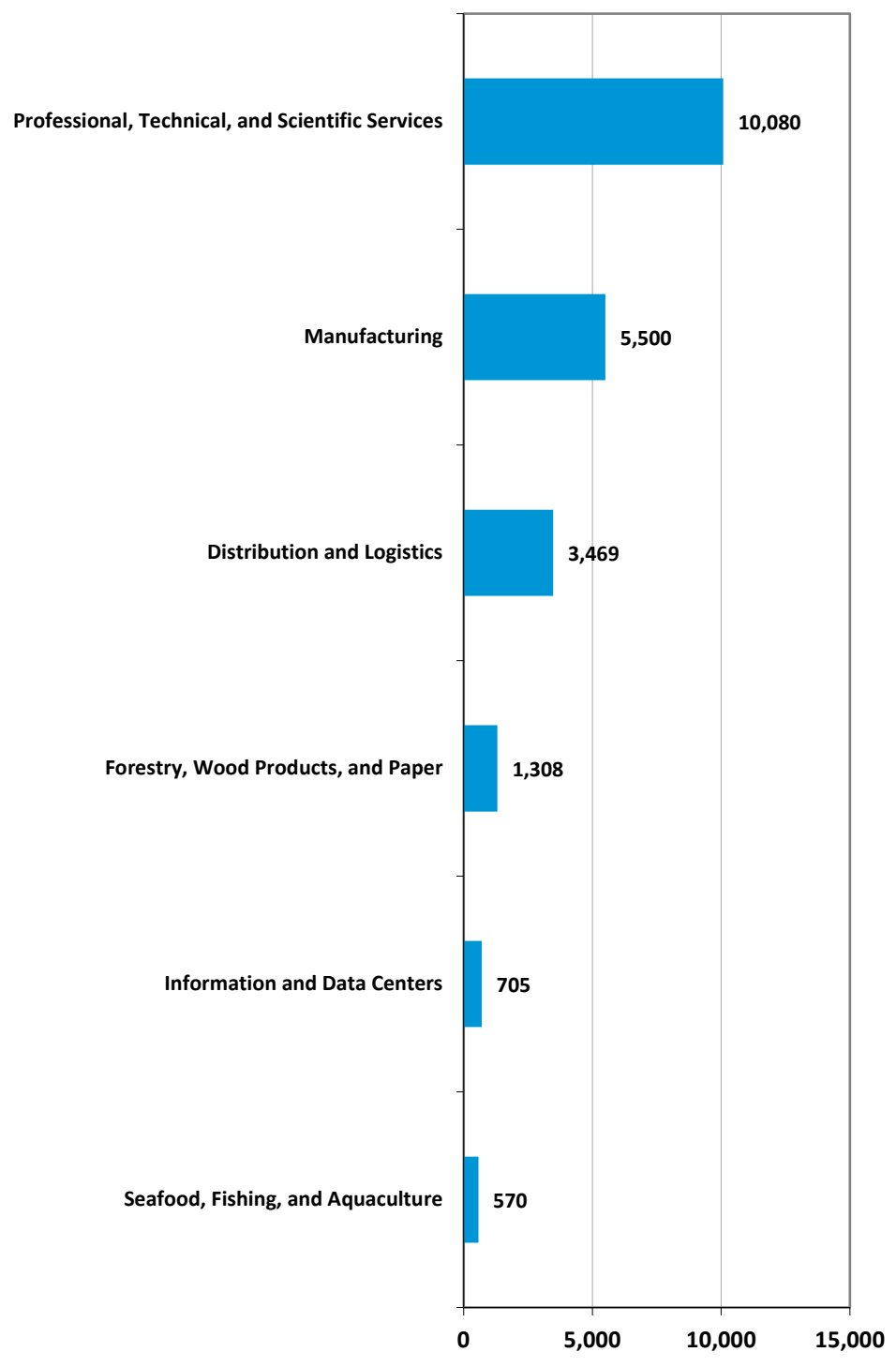
²⁰ This cluster encompasses all Manufacturing (NAICS 31-33).

²¹ This cluster encompasses all Professional, Technical, and Scientific Services (NAICS 54).

²² This cluster includes: Animal Aquaculture (NAICS 1125), Fishing (NAICS 1141), and Seafood Product Preparation and Packaging (NAICS 3117).



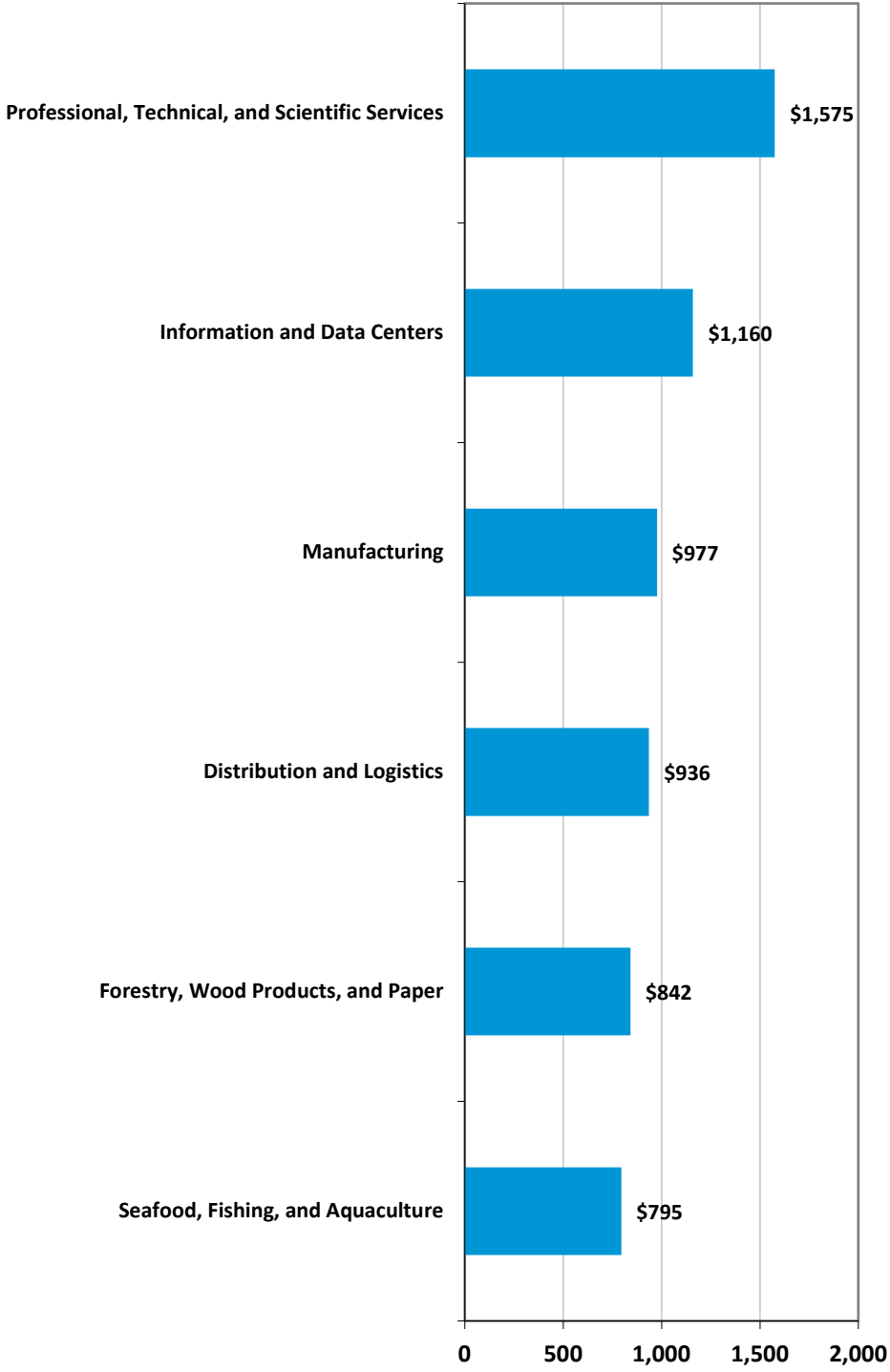
Figure 16: Private Employment by Target Industry Cluster in Region 6 – 2018²³



²³ Source: Virginia Employment Commission.



Figure 17: Private Average Weekly Wages by Target Industry Cluster in Region 6 – 2018²⁴



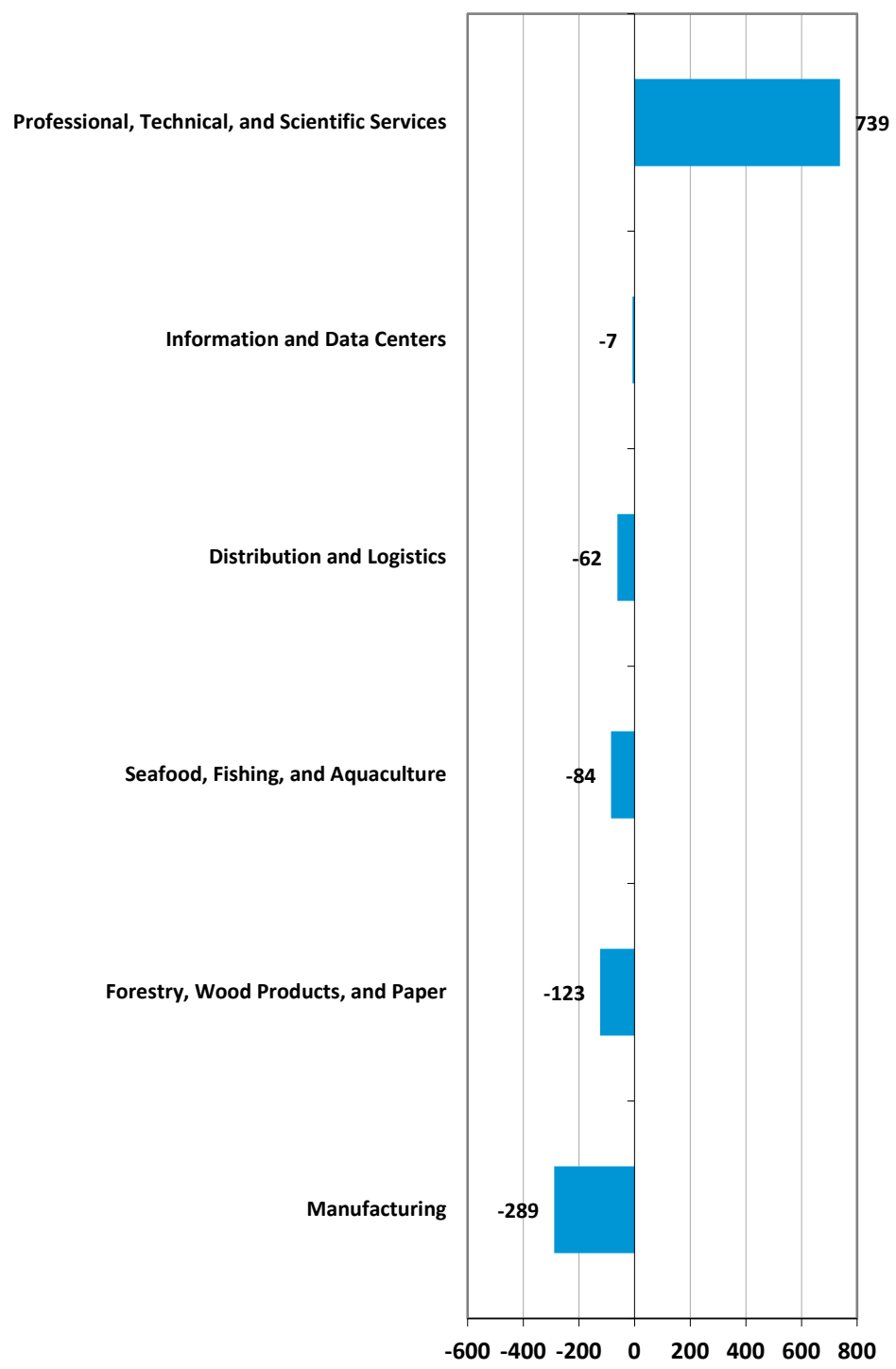
²⁴ Source: Virginia Employment Commission.

Finally, Figures 18 and 19 depict one-year (2017 to 2018) and five-year (2013 to 2018) employment changes in Region 6 for each of the six identified target industry clusters. As shown in Figure 18, over the one year period between 2017 and 2018 Professional, Technical, and Scientific Services was the only target industry cluster in Region 6 to exhibit employment growth (up 739 jobs). All other target industry sectors experience employment declines, with the largest occurring in Manufacturing (down 289 jobs).

As shown in Figure 19, over the five year period between 2013 and 2018 three target industry clusters in Region 6 experienced employment growth: 1) Professional, Technical, and Scientific Services (up 1,146 jobs), 2) Distribution and Logistics (up 1,126 jobs), and 3) Manufacturing (up 47 jobs). While the remaining three target industry clusters in Region 6 experienced employment declines: 1) Seafood, Fishing, and Aquaculture (down 111 jobs), 2) Information and data Centers (down 75 jobs), and 3) Forestry, Wood Products, and paper (down 25 jobs).



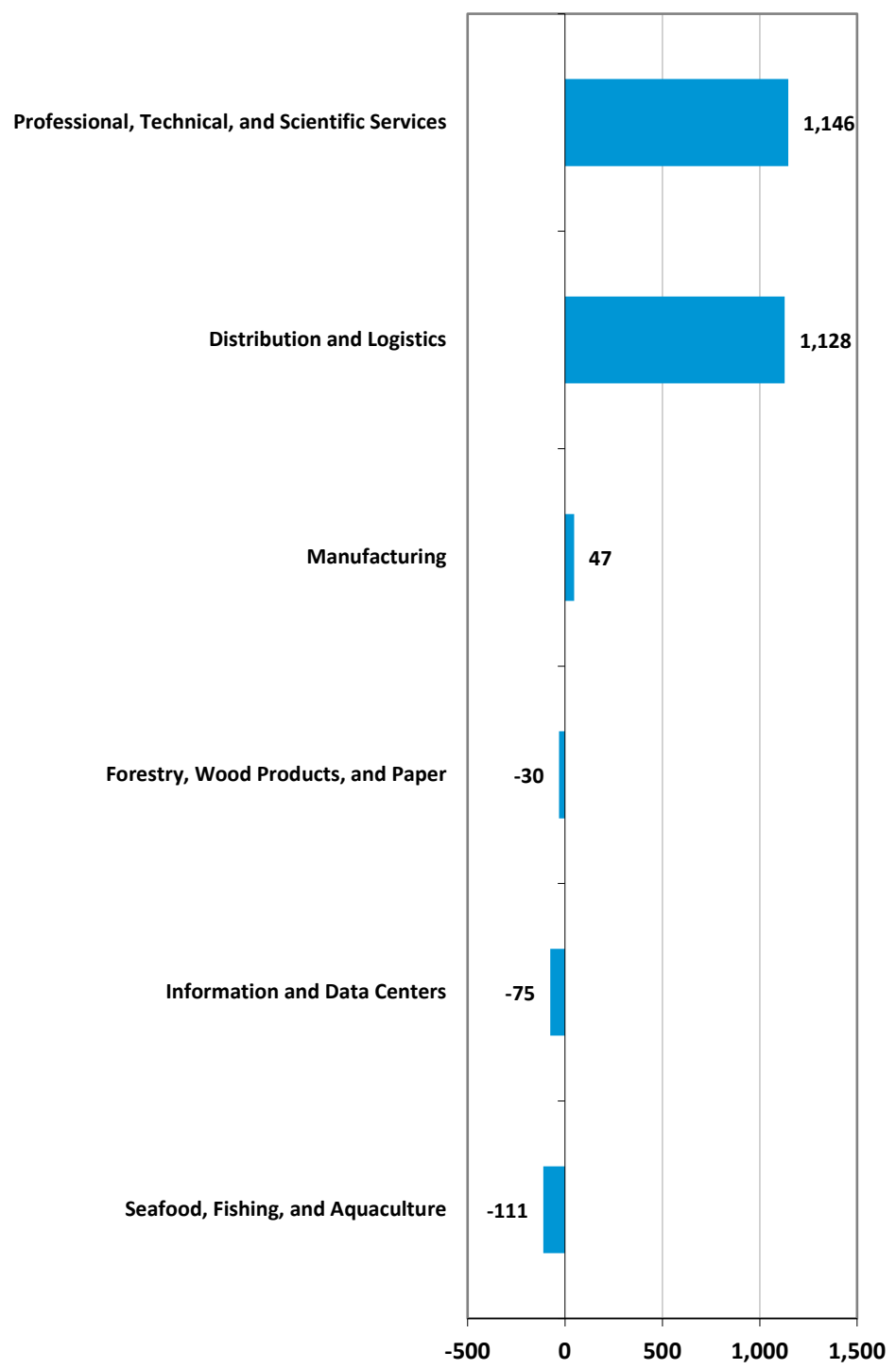
Figure 18: One Year Change in Private Employment by Target Industry Cluster in Region 6 (2017 to 2018)²⁵



²⁵ Source: Virginia Employment Commission.



Figure 19: Five Year Change in Private Employment by Target Industry Cluster in Region 6 (2013 to 2018)²⁶



²⁶ Source: Virginia Employment Commission.

Economic Drivers

In this section, we identify those industries that make an above average contribution to the growth of GO Virginia Region 6's economy and the economies of the three Planning Districts that comprise Region 6.

METHOD

To identify these economic driver industries, we employ a composite economic performance index that is based on eight individual metrics. These metrics were selected based on GO Virginia's prioritization of fast-growing, export industries, that offer high wages, and have a significant economic impact. Each metric, and the weight that it is given in the composite economic performance index is listed below.

7. [Employment Location Quotient or "LQ" \(weight = 11 percent\)](#): This metric measures the relative employment footprint of an industry.²⁷ If it is greater than one, that indicates that the industry has a larger employment footprint in the area than one would expect based on the statewide norm. If it is less than one, the industry has a smaller employment footprint than one would expect based on the statewide norm.
8. [Short-Term Employment Growth or "ST Emp." \(weight = 11 percent\)](#): This metric measures one-year employment growth in an industry.²⁸
9. [Long-Term Employment Growth or "LT Emp." \(weight = 11 percent\)](#): This metric measures five-year employment growth in an industry.²⁹
10. [Short-Term Wage Growth or "ST Wage" \(weight = 11 percent\)](#): This metric measures one-year wage growth in an industry.³⁰
11. [Long-Term Wage Growth or "LT Wage" \(weight = 11 percent\)](#): This metric measures five-year wage growth in an industry.³¹

²⁷ More specifically, the employment location quotient is calculated as: $LQ = ((\text{area private employment in industry } i) / (\text{total area private employment})) / ((\text{statewide private employment in industry } i) / (\text{total statewide private employment}))$. Data Source: derived from Virginia Employment Commission data.

²⁸ More specifically, short-term employment growth is calculated as: $ST \text{ emp} = ((2018 \text{ area private employment in industry } i) - (2017 \text{ area private employment in industry } i))$. Data Source: derived from Virginia Employment Commission data.

²⁹ More specifically, long-term employment growth is calculated as: $LT \text{ emp} = ((2018 \text{ area private employment in industry } i) - (2013 \text{ area private employment in industry } i))$. Data Source: derived from Virginia Employment Commission data.

³⁰ More specifically, short-term wage growth is calculated as: $ST \text{ wage} = ((2018 \text{ area private weekly wage in industry } i) - (2017 \text{ area private weekly wage in industry } i))$. Data Source: derived from Virginia Employment Commission data.

³¹ More specifically, long-term wage growth is calculated as: $LT \text{ wage} = ((2018 \text{ area private weekly wage in industry } i) - (2013 \text{ area private weekly wage in industry } i))$. Data Source: derived from Virginia Employment Commission data.

12. Relative Wage or “Rel. Wage” (weight = 11 percent): This metric measures the wage in an industry relative to the average wage across all industries.³² If it is greater than one, the wage in the industry is higher than the average wage for the area. If it is less than one, the wage in the industry is lower than the average wage for the area.
13. Industry Exports or “Exports” (weight = 17 percent): This metric measures the proportion of an industry’s output that is exported outside of Region 6.³³
14. Type I Multiplier or “Type I Mult.” (weight = 17 percent): This metric measures the direct and indirect employment impact the industry has on Region 6. It is an indication of the depth and breadth of an industry’s economic roots within an area. The larger the metric, the larger the proportion of the industry’s operational expenditures that go to suppliers and employees within the area, so the smaller the leakage of dollars outside of the area.³⁴

Each metric was produced for all industries at a four-digit NAICS level in GO Virginia Region 6.³⁵ Each industry is ranked on each metric relative to all other industries. Those rankings are then weighted and summed to produce the composite economic performance index for that industry. The larger the index, the higher the economic performance of that industry relative to all other industries within the study area.

CAVEATS

It is important to point out that the employment and wage data used in this section are taken from the Virginia Employment Commission’s Quarterly Census of Employment and Wages. Although these data provide the most comprehensive look at regional labor market data available, they are subject to limitations. Because these data are based on unemployment insurance reports filed by employers, they only reflect “covered” employment – employment that is covered by unemployment insurance. As a result, certain categories of employment (e.g., self-employed) and employment in certain industries (e.g., agriculture) may be under-reported. In addition, the Virginia Employment Commission is required to suppress data when disclosure of those data could be used to identify employment and wages in a specific firm. This generally occurs when there is only one major employer in that industry within the region (e.g., the RockTenn paper mill in West Point).

³² More specifically, relative wage is calculated as: $\text{Rel. wage} = (\text{2018 private weekly wage in industry } i) / (\text{2018 area private weekly wage across all industries})$. Data Source: derived from Virginia Employment Commission data.

³³ More specifically, industry exports is calculated as: $\text{Exports} = (\text{2016 industry output exported outside of Region 6}) / (\text{2016 total industry output produced in Region 6})$. Data Source: derived from IMPLAN data.

³⁴ Data Source: IMPLAN.

³⁵ NAICS stands for North American Industry Code System. It is a coding taxonomy that the U.S. Bureau of Labor Statistics uses to classify industries. It is a six-digit code, where the first two digits denote major industry sectors such as Manufacturing or Retail Trade. Going beyond two digits increases the granularity of the classification.

RESULTS

Table 1 provides a listing of the economic drivers in GO Virginia Region 6. In addition, economic driver industries that are within one of GO Virginia Region 6's six identified target industry clusters are identified by cluster number and highlighted in yellow:

1. [Cluster 1](#): Distribution/Logistics
2. [Cluster 2](#): Forestry, Wood Products, and Paper
3. [Cluster 3](#): Information and Data Centers
4. [Cluster 4](#): Manufacturing
5. [Cluster 5](#): Professional, Technical, and Scientific Services
6. [Cluster 6](#): Seafood, Fishing, and Aquaculture

Economic drivers are defined as industries that demonstrated a composite economic performance index that was above the median for the study area. Each composite economic performance index was calculated in accordance with the method described above. Bolded entries in Table 1 rank in the first quartile for performance (*i.e.*, top 25 percent).



Table 1: Region 6 – Industries Demonstrating Above Median Economic Performance

Industry	Cluster	LQ	ST Emp	LT Emp.	ST Wage	LT Wage	Rel. Wage	Exports	Type 1 Mult.	P-INDEX
Remediation and Other Waste Management Services		2.78	45	171	7.6%	24.7%	1.03	0.14	1.37	125.4
Architectural, Engineering, and Related Services	4	0.97	226	477	3.5%	7.8%	2.09	0.22	1.36	121.1
Specialized Freight Trucking	1	1.95	2	191	6.5%	13.3%	1.17	0.27	1.39	121.0
Sawmills and Wood Preservation	2	4.22	-37	97	5.5%	23.8%	1.03	0.83	1.45	119.0
Other Professional, Scientific, and Technical Services	4	1.10	1	139	11.1%	35.1%	1.16	0.19	1.29	111.5
Independent Artists, Writers, and Performers		0.97	5	9	6.0%	83.2%	1.35	0.11	1.49	111.4
Oilseed and Grain Farming		8.46	-10	-6	5.1%	15.3%	1.00	0.90	1.48	110.5
RV (Recreational Vehicle) Parks and Recreational Camps		2.69	34	29	2.6%	19.6%	0.56	0.99	1.31	110.0
Support Activities for Road Transportation	1	2.25	23	62	3.8%	12.5%	1.10	0.10	1.38	109.2
Other Financial Investment Activities		0.21	5	26	7.1%	31.2%	2.80	0.09	1.64	109.1
Gasoline Stations		2.03	51	192	3.8%	11.3%	0.50	0.22	1.31	107.3
Couriers and Express Delivery Services	1	0.84	24	79	4.1%	10.6%	1.04	0.27	1.35	106.0
Lumber and Other Construction Materials Merchant Wholesalers		0.68	12	12	11.7%	24.9%	1.47	0.14	1.30	105.9
Management, Scientific, and Technical Consulting Services	4	0.71	233	324	2.4%	1.2%	2.27	0.42	1.26	103.8
Waste Collection		1.21	13	25	0.3%	15.7%	1.23	0.14	1.37	103.5
Management of Companies and Enterprises		0.62	-14	11	6.8%	15.7%	1.68	0.18	1.37	102.2
Data Processing, Hosting, and Related Services	3	0.25	13	-7	17.6%	14.4%	1.32	0.13	1.52	102.1
Other Information Services	3	0.40	-20	-30	7.0%	56.5%	1.78	0.22	1.40	102.0
General Freight Trucking	1	1.02	-68	97	5.6%	11.3%	1.08	0.27	1.39	101.6



Table 1: Region 6 – Industries Demonstrating Above Median Economic Performance

Industry	Cluster	LQ	ST Emp	LT Emp.	ST Wage	LT Wage	Rel. Wage	Exports	Type 1 Mult.	P-INDEX
Miscellaneous Durable Goods Merchant Wholesalers		1.15	11	74	5.4%	15.2%	1.00	0.14	1.30	101.0
Warehousing and Storage	1	1.32	-2	762	3.7%	1.0%	1.23	0.39	1.29	100.4
Services to Buildings and Dwellings		0.95	62	544	4.9%	26.0%	0.67	0.14	1.23	99.7
General Merchandise Stores.		2.00	-25	2981	4.0%	27.5%	0.62	0.11	1.32	99.6
Direct Selling Establishments		1.66	-13	-1	11.9%	19.3%	1.15	0.03	1.46	99.6
Cement and Concrete Product Manufacturing	4	1.60	17	10	4.0%	20.1%	1.30	0.66	0.54	98.8
Office Administrative Services		0.37	56	4	7.7%	31.8%	1.38	0.02	1.33	98.4
Waste Treatment and Disposal		1.24	5	1	0.4%	8.4%	1.89	0.14	1.37	97.9
Furniture and Home Furnishing Merchant Wholesalers		0.07	-1	-1	21.9%	171.1%	1.62	0.14	1.30	97.6
Petroleum and Petroleum Products Merchant Wholesalers		1.20	-3	14	3.4%	21.3%	1.31	0.14	1.30	97.3
Electronic Shopping and Mail-Order Houses		0.20	-5	32	8.3%	112.7%	1.26	0.03	1.46	97.0
Traveler Accommodation		0.73	31	-9	3.9%	26.2%	0.51	0.96	1.30	96.7
Business Support Services		0.19	181	-203	79.9%	38.9%	1.12	0.09	1.33	96.7
Inland Water Transportation	1	3.43	-2	6	-5.7%	-19.9%	1.32	0.61	1.45	96.4
Building Material and Supplies Dealers		2.01	202	306	-1.8%	5.0%	0.71	0.09	1.31	96.4
Computer Systems Design and Related Services	4	0.49	120	314	0.7%	2.3%	2.27	0.22	1.21	95.8
Automotive Repair and Maintenance		1.87	73	304	2.7%	12.5%	0.96	0.13	1.18	94.7
Aquaculture	3	4.08	-1	32	1.7%	34.9%	0.94	0.17	1.20	93.3
Agencies, Brokerages, and Other Insurance Related Activities		0.52	10	45	2.9%	21.8%	1.11	0.00	1.51	93.1
Offices of Physicians		1.36	125	289	2.3%	2.0%	1.84	0.01	1.25	93.1



Table 1: Region 6 – Industries Demonstrating Above Median Economic Performance

Industry	Cluster	LQ	ST Emp	LT Emp.	ST Wage	LT Wage	Rel. Wage	Exports	Type 1 Mult.	P-INDEX
Hardware, and Plumbing and Heating Equipment and Supplies Merchant Wholesale		0.53	9	20	4.8%	11.8%	1.40	0.14	1.30	93.0
Business Schools and Computer and Management Training		3.40	11	269	-5.3%	4.3%	2.85	0.14	1.20	92.9
Insurance Carriers		0.13	-2	10	1.2%	14.4%	1.40	0.57	1.37	92.0
Securities and Commodity Contracts Intermediation and Brokerage		1.02	12	56	3.6%	16.5%	4.76	0.09	1.19	91.8
Logging	2	2.83	-1	18	0.6%	18.5%	1.10	0.22	1.20	91.6
Outpatient Care Centers		1.17	28	284	0.7%	18.7%	1.31	0.00	1.28	91.5
Charter Bus Industry	1	2.14	62	62			0.97	0.11	1.38	91.4
Other Miscellaneous Manufacturing	4	0.51	4	2	21.6%	43.8%	1.12	0.89	0.35	90.9
Household and Institutional Furniture and Kitchen Cabinet Manufacturing	4	0.46	16	33	4.1%	21.2%	1.05	0.98	0.51	90.4
Professional and Commercial Equipment and Supplies Merchant Wholesalers		1.00	40	-26	-1.9%	11.9%	1.60	0.14	1.30	90.3
Other Support Services		0.16	-59	-24	102.6%	104.2%	1.76	0.03	1.48	90.2
Greenhouse, Nursery, and Floriculture Production		1.71	-29	1	4.9%	26.7%	0.81	0.97	1.20	90.0
Personal and Household Goods Repair and Maintenance		2.28	10	55	1.5%	19.0%	0.86	0.16	1.15	89.7
Lessors of Real Estate		1.18	40	224	11.0%	-2.7%	0.80	0.00	1.31	89.6
Household Appliances and Electrical and Electronic Goods Merchant Wholesale		0.20	-1	-16	19.9%	16.0%	1.32	0.14	1.30	88.4
Architectural and Structural Metals Manufacturing	4	0.38	-6	40	6.5%	15.1%	1.43	0.97	0.79	87.3

Table 1: Region 6 – Industries Demonstrating Above Median Economic Performance

Industry	Cluster	LQ	ST Emp	LT Emp.	ST Wage	LT Wage	Rel. Wage	Exports	Type 1 Mult.	P-INDEX
Motor Vehicle and Motor Vehicle Parts and Supplies Merchant Wholesalers		1.21	-6	-198	-3.2%	104.6%	1.53	0.14	1.30	86.9
Other Personal Services		0.73	29	94	16.3%	24.1%	0.56	0.00	1.27	86.5
Offices of Real Estate Agents and Brokers		1.07	38	92	-2.1%	20.4%	0.97	0.00	1.31	86.4
Jewelry, Luggage, and Leather Goods Stores		1.32	13	-5	9.0%	21.1%	0.69	0.00	1.35	86.1
Personal Care Services		1.42	78	190	3.0%	24.8%	0.59	0.00	1.24	86.0
Radio and Television Broadcasting	3	0.42	8	-5	6.7%	7.6%	1.11	0.05	1.43	85.8
Other General Purpose Machinery Manufacturing	4	0.01	-22	-20	34.0%	60.3%	1.71	1.00	0.43	85.2
Nonmetallic Mineral Mining and Quarrying		1.98	6	20	-2.1%	12.9%	1.30	0.28	0.39	84.7
Continuing Care Retirement Communities and Assisted Living Facilities for t		1.17	74	341	-1.0%	7.8%	0.63	0.10	1.25	84.7
Lawn and Garden Equipment and Supplies Stores		1.88	26	54	-1.7%	0.7%	0.58	0.09	1.31	84.4
Automotive Parts, Accessories, and Tire Stores		1.80	10	100	2.3%	4.8%	0.78	0.14	1.18	83.5
Home Furnishings Stores		1.36	18	55	-1.1%	9.9%	1.00	0.07	1.27	83.3
Electronics and Appliance Stores		1.20	-45	21	4.2%	32.4%	0.93	0.01	1.32	83.1
Travel Arrangement and Reservation Services		0.27	0	-5	5.6%	15.0%	1.00	0.03	1.49	82.6
Offices of Other Health Practitioners		1.33	161	253	2.7%	16.4%	1.02	0.00	1.17	82.3
Other Fabricated Metal Product Manufacturing	4	0.80	-11	58	8.9%		1.57	0.97	0.43	82.2
Offices of Dentists		1.24	89	129	3.4%	6.8%	1.27	0.00	1.15	81.6



Table 1: Region 6 – Industries Demonstrating Above Median Economic Performance

Industry	Cluster	LQ	ST Emp	LT Emp.	ST Wage	LT Wage	Rel. Wage	Exports	Type 1 Mult.	P-INDEX
Drugs and Druggists' Sundries Merchant Wholesalers		0.07	0	-5	14.4%	-36.1%	2.20	0.14	1.30	81.3
Restaurants and Other Eating Places		1.34	176	1314	2.1%	14.5%	0.39	0.00	1.24	81.1
Automotive Equipment Rental and Leasing		0.80	-10	69	11.3%	4.0%	0.85	0.12	1.28	79.9
Automobile Dealers		1.37	-16	113	-2.6%	9.5%	1.25	0.14	1.18	79.7
Individual and Family Services		1.46	82	266	-1.5%	12.6%	0.51	0.01	1.25	79.2
Other Motor Vehicle Dealers		2.41	1	64	-6.8%	3.9%	1.07	0.14	1.18	79.0
Activities Related to Credit Intermediation		0.32	5	24	0.5%	-7.1%	1.42	0.08	1.36	78.8
Other Textile Product Mills	4	0.59	0	-7	4.1%	13.6%	0.87	0.99	1.18	78.8
Electronic and Precision Equipment Repair and Maintenance		0.80	15	55	11.2%	-11.6%	1.34	0.01	1.21	78.8
Cattle Ranching and Farming		0.49	30	-5		3.0%	0.33	0.74	1.44	78.6

Workforce Gap Analysis

In this section, we compare the occupation-driven demand for trained workers in GO Virginia Region 6 to the pipeline of completers graduating from regional post-secondary education programs, to identify potential gaps between the two.

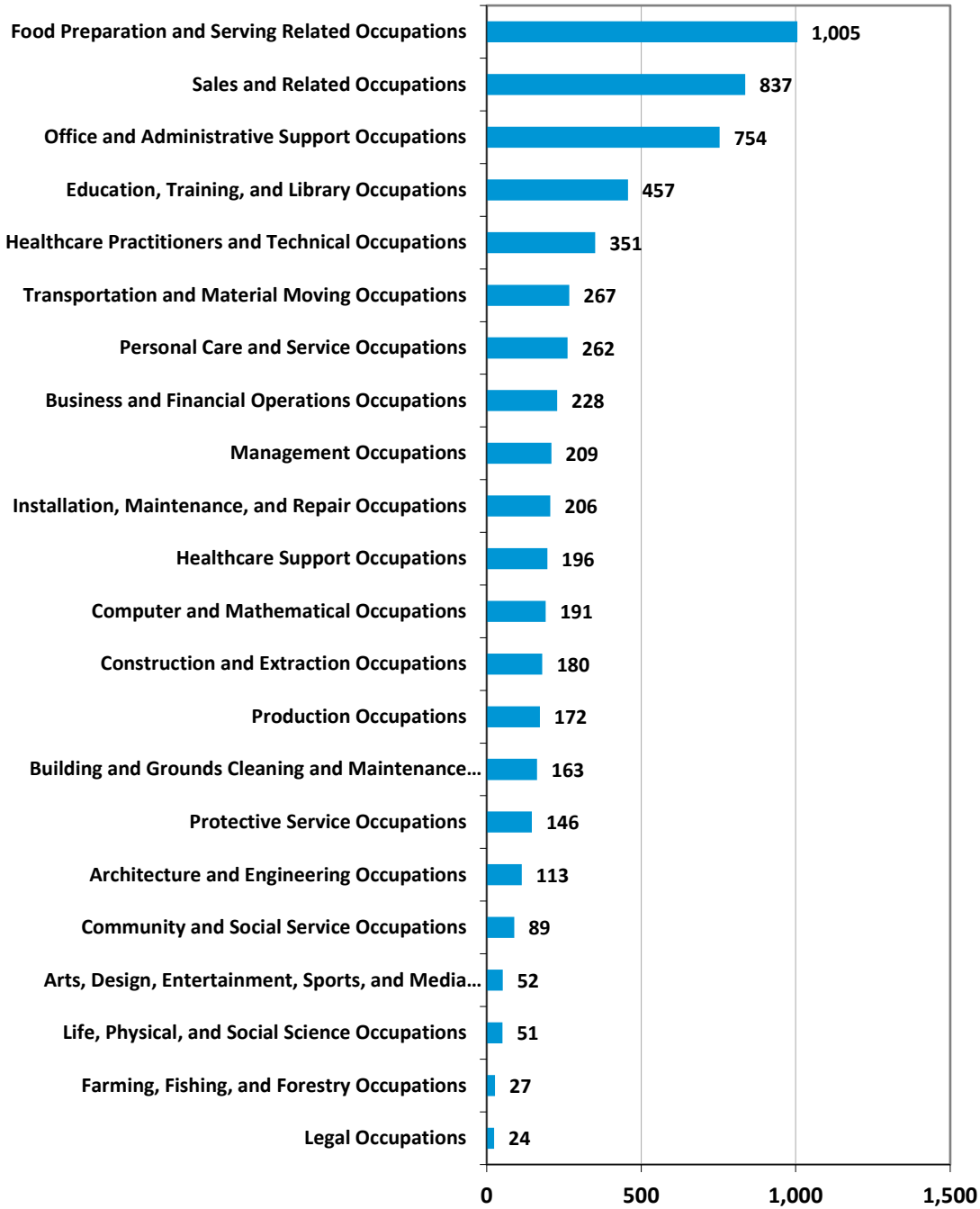
REGIONAL DEMAND FOR TRAINED WORKERS

To estimate the occupation-driven demand for trained workers in Region 6, we start with the most recent sub-state occupational employment projections from the Virginia Employment Commission. According to those projections, between 2014 and 2024 Region 6 will experience approximately 5,980 job openings each year.³⁶ Figure 20 provides a breakdown of these annual openings by major occupation category.

³⁶ Source: Virginia Employment Commission, “2014 to 2024 Sub-state Occupational Employment Projections.” It should be noted that the Virginia Employment Commission produces sub-state employment projections for Workforce Development Areas only. The Workforce Development Area most closely associated with GO Virginia Region 6 is the Bay Consortium. The Bay Consortium encompasses the Region 6 localities of the City of Fredericksburg, and the counties of Caroline, Essex, King and Queen, King George, King William, Lancaster, Mathews, Middlesex, Northumberland, Richmond, Spotsylvania, Stafford, and Westmoreland. However, the Bay Consortium does not include the Region 6 locality of Gloucester County, and it does include the counties of Accomack and Northampton, which are not part of Region 6.



Figure 20: Projected Average Annual Openings in Region 6 by Major Occupation Category – 2014 to 2024³⁷



³⁷ Data Source: Virginia Employment Commission.

REGIONAL SUPPLY OF COMPLETERS

To estimate the regional supply of completers from those education and training programs identified in the demand analysis, we use 2017-18 completions data from the U.S. Department of Education's IPEDS Data Center for all post-secondary institutions within Region 6.³⁸

COMPARING DEMAND AND SUPPLY

In the next step of the process, we use a crosswalk developed by the National Crosswalk Service Center to “map” occupations into the specific education and training program(s) necessary for entrance into that occupation.³⁹ It is important to realize that these relationships are often many-to-many (one occupation maps into multiple programs, or one program maps into multiple occupations). Our approach specifically takes this into account by “allocating” completers across occupations based on the number of annual openings associated with each occupation. Through this process, we are able to use the occupational employment projections for Region 6 to estimate the occupation-driven demand for trained workers in Region 6.

CAVEATS

In interpreting the results of this analysis, it is important to keep the following caveats in mind:

- Multi-campus institutions report enrollment and completion data to the IPEDS Data Center through their main campus only. As a practical matter, this means that all enrollment and completions are reported “as if” they occurred at the main campus. However, completers from Germanna Community College, which has its main campus in Orange County have been included in this analysis because of the branch campuses that Germanna Community College has in Region 6.
- Post-secondary institutions do not report completions for non-credit or specialized workforce training classes to the IPEDS Data Center. As a result, completers from these programs may not be captured in the pipeline of completers graduating from regional post-secondary education programs.
- For these reasons, the training “gaps” identified in this section are correctly viewed as “potential” gaps in the regional pipeline of trained workers. They identify areas where there may be an insufficient supply of programs or program graduates within the region, and where further conversations with employers and educators/training providers may be advisable.

³⁸ More specifically, those data capture degree and certificate completions in 2017-18 from Eastern Virginia Career College, Germanna Community College, Rappahannock Community College, University of Mary Washington, and Virginia Baptist College.

³⁹ The National Crosswalk Service Center is funded by the U.S. Department of Labor, Employment and Training Administration.

PERCENTAGE OF REGIONAL NEED MET

Tables 2 through 7 provide detail on the proportion of demand, in terms of projected annual openings, that is being met by the existing supply of post-secondary education completers from institutions of higher education within Region 6 in each of the Region's six identified Target Industry Clusters (for those occupations that are projected to have at least ten average annual openings between 2014 and 2024).

In these tables:

- [Occupation](#): Is an occupation within the specified cluster.
- [Avg. Annual Openings](#): Is the projected number of average annual openings for the given occupation over the period from 2014 to 2024.
- [Typical Educ. Level](#): Is the level of educational attainment typically associated with the given occupation.
- [Cert](#): Is the number of 2017-18 completers from education and training programs in Region 6 associated with the given occupation that received a less than two-year postsecondary education certificate.
- [Assoc](#): Is the number of 2017-18 completers from education and training programs in Region 6 associated with the given occupation that received an associate's degree.
- [BA](#): Is the number of 2017-18 completers from education and training programs in Region 6 associated with the given occupation that received a bachelor's degree.
- [MA](#): Is the number of 2017-18 completers from education and training programs in Region 6 associated with the given occupation that received a master's degree.
- [Total Comp](#): Is the total number of 2017-18 completions from education and training programs in Region 6 associated with the given occupation.
- [% of Need Met](#): Is the percentage of demand for trained workers in the given occupation that was met through regional education and training programs.

Many of the gaps identified in Tables 2 through 7 pertain to occupations that typically require a baccalaureate degree. The primary reason for this is that there is only one four-year degree granting post-secondary education institution in Region 6 – the University of Mary Washington in the City of Fredericksburg. In all likelihood, many of these shortfalls would actually be filled by graduates from institutions that are outside of the region.

However, there are some instances, particularly in “middle-skill” occupations that require a less than a two-year, post-secondary certificate, where the identified gaps could potentially be problematic. Those occupations are:

- Automotive Service Technicians and Mechanics
- Bus and Truck Mechanics and Diesel Engine Specialists
- Dental Assistants
- Electrical Power-Line Installers and Repairers
- Electricians
- Heating, Air Conditioning, and Refrigeration Mechanics
- Heavy and Tractor-Trailer Truck Drivers
- Industry and Machinery Mechanics
- Physical Therapist Assistants
- Plumbers, Pipefitters, and Steamfitters



Table 2: Potential Gaps in Pipeline of Trained Workers: Distribution and Logistics Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Office Clerks, General	157	HS						0%
Cooks, Restaurant	130	HS	18				18	14%
Registered Nurses	90	Assoc	64	195	22		281	100%
Customer Service Representatives	80	HS						0%
Receptionists and Information Clerks	73	HS						0%
First-Line Supervisors of Retail Sales Workers	66	HS						0%
General and Operations Managers	62	Assoc			59	10	70	100%
Management Analysts	50	BA			48	8	56	100%
Automotive Service Technicians and Mechanics	49		25				25	51%
Heavy and Tractor-Trailer Truck Drivers	48	HS						0%
Police and Sheriff's Patrol Officers	46							0%
Accountants and Auditors	43							0%
Bartenders	43	HS						0%
Maintenance and Repair Workers, General	43	HS						0%
Childcare Workers	40	HS	21	13			34	85%
Computer Systems Analysts	39	Assoc	10	12	19		42	100%
Software Developers, Systems Software	30	BA						0%
Sales Representatives, Wholesale and Manufacturing, Except T	28	BA						0%
Sales Representatives, Services, All Other	25							0%
Carpenters	24							0%
Light Truck or Delivery Services Drivers	23	HS						0%
Managers, All Other	22		71	18	267	8	364	100%
Bus Drivers, School or Special Client	22	HS						0%
Bookkeeping, Accounting, and Auditing Clerks	19	HS						0%
Training and Development Specialists	18	BA						0%
Secretaries and Administrative Assistants, Except Legal, Med	18	HS						0%

Table 2: Potential Gaps in Pipeline of Trained Workers: Distribution and Logistics Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Cooks, Institution and Cafeteria	17	<HS	2				2	14%
Software Developers, Applications	17	BA						0%
Mechanical Engineers	16	BA						0%
Electrical and Electronics Engineering Technicians	15		18				18	100%
Computer User Support Specialists	15	BA						0%
Heating, Air Conditioning, and Refrigeration Mechanics and I	14		7				7	50%
Operating Engineers and Other Construction Equipment Operato	14	HS						0%
Plumbers, Pipefitters, and Steamfitters	14							0%
First-Line Supervisors of Mechanics, Installers, and Repaire	14	HS						0%
Engineers, All Other	13			17			17	100%
Purchasing Agents, Except Wholesale, Retail, and Farm Produc	13	BA						0%
Human Resources Specialists	13	BA						0%
Electrical Engineers	13	BA						0%
Lawyers	13	Doc						0%
First-Line Supervisors of Construction Trades and Extraction	13	HS						0%
Electricians	13	Cert						0%
Industrial Machinery Mechanics	13	Cert						0%
Information Security Analysts	11	BA						0%
Cost Estimators	10	BA			10	2	11	100%
Network and Computer Systems Administrators	10	BA	3	3	5		11	100%
Financial Managers	10							0%
Market Research Analysts and Marketing Specialists	10	BA						0%
Electronics Engineers, Except Computer	10	BA						0%
Production, Planning, and Expediting Clerks	10	HS						0%



Table 3: Potential Gaps in Pipeline of Trained Workers: Forestry, Wood Products, and Paper Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Office Clerks, General	157	HS						0%
Registered Nurses	90	Assoc	64	195	22		281	100%
Customer Service Representatives	80	HS						0%
Receptionists and Information Clerks	73	HS						0%
General and Operations Managers	62	Assoc			59	10	70	100%
Management Analysts	50	BA			48	8	56	100%
Heavy and Tractor-Trailer Truck Drivers	48	HS						0%
Accountants and Auditors	43							0%
Maintenance and Repair Workers, General	43	HS						0%
Computer Systems Analysts	39	Assoc	10	12	19		42	100%
Software Developers, Systems Software	30	BA						0%
Sales Representatives, Wholesale and Manufacturing, Except T	28	BA						0%
Sales Representatives, Services, All Other	25							0%
Carpenters	24							0%
Light Truck or Delivery Services Drivers	23	HS						0%
Managers, All Other	22		71	18	267	8	364	100%
Bookkeeping, Accounting, and Auditing Clerks	19	HS						0%
Training and Development Specialists	18	BA						0%
Secretaries and Administrative Assistants, Except Legal, Med	18	HS						0%
Software Developers, Applications	17	BA						0%
Mechanical Engineers	16	BA						0%
Electrical and Electronics Engineering Technicians	15		18				18	100%
Computer User Support Specialists	15	BA						0%
Operating Engineers and Other Construction Equipment Operato	14	HS						0%
Plumbers, Pipefitters, and Steamfitters	14							0%
First-Line Supervisors of Mechanics, Installers, and Repaire	14	HS						0%

Table 3: Potential Gaps in Pipeline of Trained Workers: Forestry, Wood Products, and Paper Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Purchasing Agents, Except Wholesale, Retail, and Farm Produc	13	BA						0%
Human Resources Specialists	13	BA						0%
Electrical Engineers	13	BA						0%
First-Line Supervisors of Construction Trades and Extraction	13	HS						0%
Electricians	13	Cert						0%
Industrial Machinery Mechanics	13	Cert						0%
Water and Wastewater Treatment Plant and System Operators	12	HS						0%
Cost Estimators	10	BA			10	2	11	100%
Network and Computer Systems Administrators	10	BA	3	3	5		11	100%
Financial Managers	10							0%
Market Research Analysts and Marketing Specialists	10	BA						0%
Electronics Engineers, Except Computer	10	BA						0%
Production, Planning, and Expediting Clerks	10	HS						0%

Table 4: Potential Gaps in Pipeline of Trained Workers: Information and Data Centers Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Office Clerks, General	157	HS						0%
Customer Service Representatives	80	HS						0%
Receptionists and Information Clerks	73	HS						0%
First-Line Supervisors of Retail Sales Workers	66	HS						0%
General and Operations Managers	62	Assoc			59	10	70	100%
Management Analysts	50	BA			48	8	56	100%
Automotive Service Technicians and Mechanics	49		25				25	51%



Table 4: Potential Gaps in Pipeline of Trained Workers: Information and Data Centers Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Heavy and Tractor-Trailer Truck Drivers	48	HS						0%
Accountants and Auditors	43							0%
Maintenance and Repair Workers, General	43	HS						0%
Computer Systems Analysts	39	Assoc	10	12	19		42	100%
Software Developers, Systems Software	30	BA						0%
Sales Representatives, Wholesale and Manufacturing, Except T	28	BA						0%
Sales Representatives, Services, All Other	25							0%
Light Truck or Delivery Services Drivers	23	HS						0%
Managers, All Other	22		71	18	267	8	364	100%
Insurance Claims and Policy Processing Clerks	20							0%
Bookkeeping, Accounting, and Auditing Clerks	19	HS						0%
Training and Development Specialists	18	BA						0%
Secretaries and Administrative Assistants, Except Legal, Med	18	HS						0%
Software Developers, Applications	17	BA						0%
Mechanical Engineers	16	BA						0%
Fitness Trainers and Aerobics Instructors	16	BA						0%
Electrical and Electronics Engineering Technicians	15		18				18	100%
Computer User Support Specialists	15	BA						0%
Medical and Health Services Managers	14	BA						0%
Operating Engineers and Other Construction Equipment Operato	14	HS						0%
First-Line Supervisors of Mechanics, Installers, and Repaire	14	HS						0%
Engineers, All Other	13			17			17	100%
Purchasing Agents, Except Wholesale, Retail, and Farm Produc	13	BA						0%
Human Resources Specialists	13	BA						0%
Electrical Engineers	13	BA						0%
Lawyers	13	Doc						0%



Table 4: Potential Gaps in Pipeline of Trained Workers: Information and Data Centers Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Nurse Practitioners	13	MA						0%
First-Line Supervisors of Construction Trades and Extraction	13	HS						0%
Electricians	13	Cert						0%
Information Security Analysts	11	BA						0%
Cost Estimators	10	BA			10	2	11	100%
Computer and Information Research Scientists	10	MA	3	3	5		11	100%
Network and Computer Systems Administrators	10	BA	3	3	5		11	100%
Financial Managers	10							0%
Market Research Analysts and Marketing Specialists	10	BA						0%
Electronics Engineers, Except Computer	10	BA						0%
Parts Salespersons	10	HS						0%
Production, Planning, and Expediting Clerks	10	HS						0%
Electrical Power-Line Installers and Repairers	10	Cert						0%

Table 5: Potential Gaps in Pipeline of Trained Workers: Manufacturing Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Office Clerks, General	157	HS						0%
Cooks, Restaurant	130	HS	18				18	14%
Registered Nurses	90	Assoc	64	195	22		281	100%
Nursing Assistants	84	HS						0%
Customer Service Representatives	80	HS						0%
Receptionists and Information Clerks	73	HS						0%
First-Line Supervisors of Retail Sales Workers	66	HS						0%

Table 5: Potential Gaps in Pipeline of Trained Workers: Manufacturing Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
General and Operations Managers	62	Assoc			59	10	70	100%
Management Analysts	50	BA			48	8	56	100%
Automotive Service Technicians and Mechanics	49		25				25	51%
Heavy and Tractor-Trailer Truck Drivers	48	HS						0%
Accountants and Auditors	43							0%
Bartenders	43	HS						0%
Maintenance and Repair Workers, General	43	HS						0%
Licensed Practical and Licensed Vocational Nurses	42	Cert	181				181	100%
Computer Systems Analysts	39	Assoc	10	12	19		42	100%
Software Developers, Systems Software	30	BA						0%
Sales Representatives, Wholesale and Manufacturing, Except T	28	BA						0%
Sales Representatives, Services, All Other	25							0%
Carpenters	24							0%
Light Truck or Delivery Services Drivers	23	HS						0%
Managers, All Other	22		71	18	267	8	364	100%
Medical Assistants	21	Cert	18				18	86%
Insurance Claims and Policy Processing Clerks	20							0%
Bookkeeping, Accounting, and Auditing Clerks	19	HS						0%
Training and Development Specialists	18	BA						0%
Secretaries and Administrative Assistants, Except Legal, Med	18	HS						0%
Dental Assistants	17	Cert	8				8	47%
Cooks, Institution and Cafeteria	17	<HS	2				2	14%
Software Developers, Applications	17	BA						0%
Mechanical Engineers	16	BA						0%
Electrical and Electronics Engineering Technicians	15		18				18	100%
Computer User Support Specialists	15	BA						0%



Table 5: Potential Gaps in Pipeline of Trained Workers: Manufacturing Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Heating, Air Conditioning, and Refrigeration Mechanics and I	14		7				7	50%
Medical and Health Services Managers	14	BA						0%
Operating Engineers and Other Construction Equipment Operato	14	HS						0%
Plumbers, Pipefitters, and Steamfitters	14							0%
First-Line Supervisors of Mechanics, Installers, and Repaire	14	HS						0%
Engineers, All Other	13			17			17	100%
Emergency Medical Technicians and Paramedics	13	Cert	14				14	100%
Purchasing Agents, Except Wholesale, Retail, and Farm Produc	13	BA						0%
Human Resources Specialists	13	BA						0%
Electrical Engineers	13	BA						0%
Lawyers	13	Doc						0%
Nurse Practitioners	13	MA						0%
First-Line Supervisors of Construction Trades and Extraction	13	HS						0%
Electricians	13	Cert						0%
Industrial Machinery Mechanics	13	Cert						0%
Water and Wastewater Treatment Plant and System Operators	12	HS						0%
Information Security Analysts	11	BA						0%
Cost Estimators	10	BA			10	2	11	100%
Computer and Information Research Scientists	10	MA	3	3	5		11	100%
Network and Computer Systems Administrators	10	BA	3	3	5		11	100%
Financial Managers	10							0%
Market Research Analysts and Marketing Specialists	10	BA						0%
Electronics Engineers, Except Computer	10	BA						0%
Parts Salespersons	10	HS						0%
Production, Planning, and Expediting Clerks	10	HS						0%
Highway Maintenance Workers	10	HS						0%

Table 5: Potential Gaps in Pipeline of Trained Workers: Manufacturing Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Electrical Power-Line Installers and Repairers	10	Cert						0%

Table 6: Potential Gaps in Pipeline of Trained Workers: Professional, Technical, and Scientific Services Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Office Clerks, General	157	HS						0%
Insurance Sales Agents	98	BA						0%
Registered Nurses	90	Assoc	64	195	22		281	100%
Customer Service Representatives	80	HS						0%
Receptionists and Information Clerks	73	HS						0%
First-Line Supervisors of Retail Sales Workers	66	HS						0%
General and Operations Managers	62	Assoc			59	10	70	100%
Teacher Assistants	59	SomeCol						0%
Management Analysts	50	BA			48	8	56	100%
Automotive Service Technicians and Mechanics	49		25				25	51%
Heavy and Tractor-Trailer Truck Drivers	48	HS						0%
Accountants and Auditors	43							0%
Maintenance and Repair Workers, General	43	HS						0%
Licensed Practical and Licensed Vocational Nurses	42	Cert	181				181	100%
Childcare Workers	40	HS	21	13			34	85%
Computer Systems Analysts	39	Assoc	10	12	19		42	100%
Software Developers, Systems Software	30	BA						0%
Sales Representatives, Wholesale and Manufacturing, Except T	28	BA						0%
Sales Representatives, Services, All Other	25							0%



Table 6: Potential Gaps in Pipeline of Trained Workers: Professional, Technical, and Scientific Services Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Tellers	25	HS						0%
Carpenters	24							0%
Light Truck or Delivery Services Drivers	23	HS						0%
Managers, All Other	22		71	18	267	8	364	100%
Medical Assistants	21	Cert	18				18	86%
Insurance Claims and Policy Processing Clerks	20							0%
Hairdressers, Hairstylists, and Cosmetologists	19	Cert	1				1	5%
Bookkeeping, Accounting, and Auditing Clerks	19	HS						0%
Training and Development Specialists	18	BA						0%
Secretaries and Administrative Assistants, Except Legal, Med	18	HS						0%
Software Developers, Applications	17	BA						0%
Mechanical Engineers	16	BA						0%
Electrical and Electronics Engineering Technicians	15		18				18	100%
Computer User Support Specialists	15	BA						0%
Heating, Air Conditioning, and Refrigeration Mechanics and I	14		7				7	50%
Medical and Health Services Managers	14	BA						0%
Operating Engineers and Other Construction Equipment Operato	14	HS						0%
Plumbers, Pipefitters, and Steamfitters	14							0%
First-Line Supervisors of Mechanics, Installers, and Repaire	14	HS						0%
Engineers, All Other	13			17			17	100%
Food Service Managers	13	<HS						0%
Purchasing Agents, Except Wholesale, Retail, and Farm Produc	13	BA						0%
Human Resources Specialists	13	BA						0%
Electrical Engineers	13	BA						0%
Lawyers	13	Doc						0%
Nurse Practitioners	13	MA						0%

Table 6: Potential Gaps in Pipeline of Trained Workers: Professional, Technical, and Scientific Services Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
First-Line Supervisors of Construction Trades and Extraction	13	HS						0%
Electricians	13	Cert						0%
Industrial Machinery Mechanics	13	Cert						0%
Information Security Analysts	11	BA						0%
Cost Estimators	10	BA			10	2	11	100%
Computer and Information Research Scientists	10	MA	3	3	5		11	100%
Network and Computer Systems Administrators	10	BA	3	3	5		11	100%
Financial Managers	10							0%
Market Research Analysts and Marketing Specialists	10	BA						0%
Electronics Engineers, Except Computer	10	BA						0%
Social and Human Service Assistants	10	BA						0%
Production, Planning, and Expediting Clerks	10	HS						0%

Table 7: Potential Gaps in Pipeline of Trained Workers: Seafood, Fishing, and Aquaculture Cluster

Occupation	Occupational Demand		Supply of Completers					% of Need Met.
	Avg. Annual Openings	Typical Educ. Level	Cert.	Assoc.	BA	MA	Total Comp.	
Office Clerks, General	157	HS						0%
General and Operations Managers	62	Assoc			59	10	70	100%
Accountants and Auditors	43							0%
Managers, All Other	22		71	18	267	8	364	100%
Bookkeeping, Accounting, and Auditing Clerks	19	HS						0%
Computer User Support Specialists	15	BA						0%
Industrial Machinery Mechanics	13	Cert						0%



Forward-Looking Assessment

This section summarizes information for Region 6 tied to GO Virginia’s four priority areas: talent development, start-up companies, scale-ups, and site development for new business prospects. The information in this section relies heavily on a report for the region commissioned by the statewide board of GO Virginia.⁴⁰

TALENT DEVELOPMENT

Between 2012 and 2017, the share of the working-age population with at least a bachelor’s degree grew by 17 percent, which was significantly faster than the 10 percent growth rate for the state as a whole or the 12 percent growth rate for the entire United States.

Talent development is facilitated by the University of Mary Washington’s StartUp program that provides experiential startup training to high school, community college, and to its own students. Its EagleWorks Incubator and Germanna Community College’s FredCAT provide a mix of office space, prototyping space, and programming for entrepreneurs and startups. The University of Mary Washington EagleWorks Incubator and the University’s Center for Economic Development provide a range of mentoring, business services, and programs to support startup companies and their founders. The George Mason University Innovation Commercialization Assistance Program provides lean startup training.

START-UP COMPANIES

In Region 6, the rate of new business formation rate is very close to the state average. In 2017, it was 8 percent in the Region and 9 percent statewide. The rate varies significantly from one year to the next, however, over the 2007-2017 period the variance has stayed within a range without any significant upward or downward trend.

Startup activity in the region is occurring across almost the entire spectrum of industry sectors. Traded sector startups accounted for half of the total number of traded-sector companies existing in the area. Start-up activity differs across the region. The area covered by the George Washington Regional Commission has a high concentration of startup employment in Research & Development, Engineering & Technical Services, and Manufacturing. Both the Northern Neck and Middle Peninsula areas have high concentrations of startup employment in Agriculture, Food Processing, Natural Resources, and Finished Products. Startups in the Middle Peninsula area have a high concentration of employment in the Health Services and Life Sciences sectors, while those in the Northern Neck area have a high concentration in Manufacturing. Table 3 shows the number of start-ups and start-up employment within the region.

Table 3. – Start-Up Data by Major Industry Cluster for Region 6

⁴⁰ TEconomy Partners, *Regional Entrepreneurial Assessment Project: Briefing Report, Region 6: Mary Ball Washington Region*, 2018.

Major Industry Cluster	Number of Start-ups in Cluster	Number of Start-ups Surviving by 2017	Number of High Growth Start-ups in Cluster**	Start-up Employment Levels, 2017	Start-ups Industry Cluster Employment Concentration Index*
Agriculture & Food Processing	169	101	6	371	1.04
Business Services	994	514	77	2,067	0.71
Energy, Natural Resources, & Finished Products	110	57	14	572	1.40
Engineering, R&D, Testing & Technical Services	136	94	23	744	1.17
Financial & Insurance Services	278	127	7	391	0.60
Health Care Services	50	36	8	814	1.20
Information Technology & Communications Services	128	74	26	560	0.60
Life Sciences	70	34	10	258	1.03
Manufacturing	127	72	16	603	1.29
Ship Building, Aerospace, & Defense	7	3	2	8	0.10
Transportation, Distribution and Logistics	285	128	22	625	0.92
Other Traded Sectors	875	394	69	2,361	0.69

*Startups Employment Concentration Index represents specialization of startup activity in certain industry clusters given overall state trends. **Defined as greater than 25 percent annualized employment growth over the life of the company.

Patent activity is one way to measure the development impact of start-up companies. Patent awards have consistently declined year over year from 150 in 2014 to 88 in 2017. The overwhelming majority of patents issued to assignees in the region are to government organizations. Table 4 shows the organizational assignees of patents issued in the region between 2010 and 2017.

Table 4. – Assignees of Patents within Mary Ball Washington Region Inventors, 2010-2017

Assignees	# of patents
U.S. Navy	96
U.S. Postal Service	13
KLA-Tencor Corporation (Milpitas, CA)	11
NASA	10
Reid, John H. (Reid Engineering Corp., Fredericksburg, VA)	9
QRC Technologies Inc. (Fredericksburg, VA)	8
Altria Client Services	8
U.S. Army	8
College of William and Mary (VIMS)	8
Printpack Illinois Inc. (Fredericksburg, VA location)	7
Life Technologies Corp. (owned by Thermo Fisher Scientific; manufacturing facility in Middletown, VA)	6
Trimble Navigation Ltd. (Sunnyvale, CA; Herndon, VA location)	5
Manufacturing Technologies Inc.	5

Source: U.S. Patent & Trademark Office data from Thomson Reuters Thomson Innovation patent analysis database

Of the technology patents issued from 2010 to 2017, they cover a fairly wide range of purposes, from data processing to biotech. Table 5 shows the types of technology patents issued in the area.

Table 5. – Technology Class Patents Issued in Region 6, 2010-2017

Technology Class Area	Number of Patents
Digital computing or data processing equipment or methods, specially adapted for specific functions	11
Data processing systems specially adapted to administration and management purposes	7
Satellite radio beacon positioning systems; Determining position, velocity or attitude using signals transmitted by such systems	7
Biological treatment of water, wastewater, or sewage	7
Mutation or genetic engineering; DNA or RNA concerning genetic engineering, vectors, e.g. plasmids, or their isolation, preparation or purification	6

Source: U.S. Patent & Trademark Office data from Thomson Reuters Thomson Innovation patent analysis database



SCALE-UPS

In 2017 in the region, there were 1,086 startups in traded sectors that had been established since 2007 and were still in business, providing 6,090 jobs. By comparison, over the 2007-2017 period, total traded-sector industry employment grew by 5,202 jobs in Region 6.

Local growth and high growth companies are being launched in sectors aligned to regional industry strengths. However, the percentage of enterprises started in 2007 that were still in operation in 2017 was only 26.5 percent which is significantly lower than the statewide average of 31.4 percent. In Region 6, 6.6 percent of traded sector employment was in startups 0 5 years compared to 7.1 percent at the state level. While, in Region 6, 8.8 percent of traded sector employment was in startups aged 6 to 10 years compared to 7.3 percent at the state level.

In 2010, 256 traded sector companies were launched in Region 6. In 2017, 89 were still in business (a 34.8% survival rate), and those companies created 574 jobs. Table 6 shows how the survival of traded-sector start-ups in the region and their employment changed over time.

Table 6. – Traded-Sector Start-Up Survival and Employment, 2007-2017⁴¹

Founding Year of Startup Cohort	Number of Startups in Traded Sector Industries	Number of Startups Surviving by 2017	Survival Rate by 2017	Start-up Employment Levels 2017
2007	245	65	26.5%	483
2008	190	56	29.5%	441
2009	135	45	33.3%	296
2010	256	89	34.8%	574
2011	113	43	38.0%	261
2012	233	110	47.2%	679
2013	300	149	49.7%	604
2014	164	91	55.5%	434
2015	213	152	71.4%	876
2016	150	107	71.3%	494
2017	179	179	100%	948

⁴¹ Data Source: Business Dynamics Research Consortium database.

Data Appendix

ANNUAL EMPLOYMENT CHANGE BY MAJOR INDUSTRY SECTOR AND PLANNING DISTRICT – 2014 TO 2018

Table A1 – Annual Change in Employment in GO Virginia Region 6 by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	2.2%	2.4%	2.3%	1.4%	1.7%
Agriculture, Forestry, Fishing and Hunting	1.3%	2.9%	-3.9%	2.1%	4.8%
Arts, Entertainment, and Recreation	1.4%	10.6%	0.2%	-8.1%	0.8%
Construction	2.8%	3.0%	4.0%	1.6%	-1.2%
Educational Services	7.3%	7.2%	6.1%	1.7%	-0.1%
Finance and Insurance	3.6%	0.5%	0.4%	0.8%	2.8%
Health Care and Social Assistance	-0.8%	-0.1%	1.6%	0.7%	2.3%
Information	-2.0%	-7.6%	-11.4%	-6.0%	-2.7%
Manufacturing	0.5%	0.7%	4.8%	0.1%	-5.0%
Mining, Quarrying, and Oil and Gas Extraction	4.2%	5.7%	-2.2%	0.6%	3.3%
Other Services (except Public Administration)	2.1%	6.4%	2.2%	6.8%	7.5%
Professional, Scientific, and Technical Services	0.6%	2.3%	0.1%	1.6%	7.9%
Real Estate and Rental and Leasing	-4.5%	1.7%	12.9%	2.6%	3.5%
Retail Trade	0.2%	1.6%	-0.8%	1.2%	1.1%
Transportation and Warehousing	3.6%	3.5%	33.0%	7.2%	-0.6%
Utilities	17.0%	1.4%	1.2%	-5.4%	-17.9%
Wholesale Trade	2.1%	-1.6%	-10.2%	-1.5%	-3.4%

Table A2 – Annual Change in Employment in the George Washington PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	3.0%	2.4%	2.0%	1.8%	1.2%
Agriculture, Forestry, Fishing and Hunting	0.8%	-9.8%	8.3%	14.6%	-7.4%
Arts, Entertainment, and Recreation	4.4%	15.9%	0.4%	-5.9%	-3.5%
Construction	4.6%	2.2%	4.5%	1.1%	-3.0%
Educational Services	8.5%	8.8%	7.3%	2.6%	-0.2%
Finance and Insurance	4.8%	1.2%	0.8%	1.0%	3.2%
Health Care and Social Assistance	-0.2%	-0.4%	1.6%	0.4%	2.7%
Information	-3.3%	-10.3%	-13.3%	-6.2%	-2.9%
Manufacturing	1.0%	0.6%	9.9%	-1.4%	-4.0%
Mining, Quarrying, and Oil and Gas Extraction	3.9%	5.6%	-2.7%	2.7%	4.4%
Other Services (except Public Administration)	2.5%	8.0%	2.0%	7.7%	7.8%
Professional, Scientific, and Technical Services	0.2%	2.6%	-0.1%	2.9%	8.6%
Real Estate and Rental and Leasing	-3.4%	2.4%	16.0%	5.8%	3.6%
Retail Trade	-0.2%	1.4%	-0.2%	1.4%	1.6%
Transportation and Warehousing	4.2%	2.4%	28.4%	4.9%	-1.1%
Utilities	0.6%	0.0%	1.2%	-9.9%	-3.9%
Wholesale Trade	3.6%	-1.9%	-13.8%	-3.2%	-3.4%



Table A3 – Annual Change in Employment in the Middle Peninsula PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	-0.3%	3.8%	3.1%	0.0%	5.5%
Agriculture, Forestry, Fishing and Hunting	9.9%	-0.3%	0.0%	-5.8%	-3.2%
Arts, Entertainment, and Recreation	0.0%	-3.7%	-4.5%	-26.0%	38.6%
Construction	-1.6%	7.0%	0.2%	2.3%	5.7%
Educational Services	-8.5%	-3.7%	1.9%	-7.6%	-1.0%
Finance and Insurance	-6.7%	-5.4%	-2.3%	-1.2%	0.4%
Health Care and Social Assistance	-2.6%	2.4%	1.6%	2.2%	-0.7%
Information	5.6%	7.6%	-6.5%	-5.2%	-2.5%
Manufacturing	-1.3%	-4.5%	1.9%	-1.3%	-8.0%
Mining, Quarrying, and Oil and Gas Extraction	4.7%	6.0%	-1.4%	-2.9%	1.5%
Other Services (except Public Administration)	1.8%	0.5%	3.1%	5.5%	8.1%
Professional, Scientific, and Technical Services	7.4%	7.2%	-2.4%	-4.2%	0.9%
Real Estate and Rental and Leasing	-5.2%	0.4%	-2.5%	-13.4%	-3.5%
Retail Trade	0.7%	2.4%	-3.9%	2.3%	1.6%
Transportation and Warehousing	5.2%	18.3%	96.1%	22.0%	2.6%
Utilities		5.9%	1.4%	-1.4%	
Wholesale Trade	-1.1%	1.0%	3.0%	9.2%	-5.7%

Table A4 – Annual Change in Employment in the Northern Neck PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	-2.0%	0.1%	4.7%	-0.3%	0.7%
Agriculture, Forestry, Fishing and Hunting	-7.0%	16.9%	-15.5%	1.8%	24.6%
Arts, Entertainment, and Recreation	-12.8%	-1.4%	6.5%	1.3%	-8.2%
Construction	-3.3%	2.5%	6.6%	4.3%	1.1%
Educational Services	11.0%	2.3%	-0.6%	-0.6%	1.2%
Finance and Insurance	0.2%	-3.6%	-3.1%	0.0%	-0.9%
Health Care and Social Assistance	-2.1%	-1.0%	1.4%	0.2%	4.2%
Information	0.0%	-2.9%	-3.7%	-6.2%	-1.6%
Manufacturing	2.3%	8.3%	-0.7%	4.8%	-3.2%
Mining, Quarrying, and Oil and Gas Extraction					
Other Services (except Public Administration)	-0.2%	3.8%	2.3%	2.1%	4.7%
Professional, Scientific, and Technical Services	-1.3%	-10.7%	6.7%	-13.9%	6.0%
Real Estate and Rental and Leasing	-14.9%	-3.9%	10.1%	-5.5%	16.5%
Retail Trade	2.7%	1.5%	1.3%	-2.2%	-4.7%
Transportation and Warehousing	-6.1%	-1.0%	-1.5%	3.1%	-3.0%
Utilities	1.2%	3.7%	1.2%	9.3%	-1.1%
Wholesale Trade	-7.3%	-3.0%	4.1%	-7.8%	1.4%

CUMULATIVE EMPLOYMENT CHANGE BY MAJOR INDUSTRY SECTOR AND PLANNING DISTRICT – 2014 TO 2018

Table A5 – Cumulative Change in Employment in GO Virginia Region 6 by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	0.0%	2.4%	4.8%	6.3%	8.2%
Agriculture, Forestry, Fishing and Hunting	0.0%	2.9%	-1.1%	1.0%	5.8%
Arts, Entertainment, and Recreation	0.0%	10.6%	10.8%	1.9%	2.8%
Construction	0.0%	3.0%	7.1%	8.9%	7.6%
Educational Services	0.0%	7.2%	13.7%	15.6%	15.5%
Finance and Insurance	0.0%	0.5%	0.9%	1.6%	4.4%
Health Care and Social Assistance	0.0%	-0.1%	1.5%	2.2%	4.5%
Information	0.0%	-7.6%	-18.1%	-23.1%	-25.2%
Manufacturing	0.0%	0.7%	5.5%	5.6%	0.3%
Mining, Quarrying, and Oil and Gas Extraction	0.0%	5.7%	3.4%	4.0%	7.5%
Other Services (except Public Administration)	0.0%	6.4%	8.8%	16.1%	24.9%
Professional, Scientific, and Technical Services	0.0%	2.3%	2.3%	3.9%	12.2%
Real Estate and Rental and Leasing	0.0%	1.7%	14.7%	17.7%	21.9%
Retail Trade	0.0%	1.6%	0.8%	2.1%	3.2%
Transportation and Warehousing	0.0%	3.5%	37.6%	47.6%	46.7%
Utilities	0.0%	1.4%	2.7%	-2.9%	-20.2%
Wholesale Trade	0.0%	-1.6%	-11.6%	-12.9%	-15.9%

Table A6 – Cumulative Change in Employment in the George Washington PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	0.0%	2.4%	4.5%	6.4%	7.7%
Agriculture, Forestry, Fishing and Hunting	0.0%	-9.8%	-2.3%	12.0%	3.8%
Arts, Entertainment, and Recreation	0.0%	15.9%	16.3%	9.5%	5.6%
Construction	0.0%	2.2%	6.8%	8.0%	4.8%
Educational Services	0.0%	8.8%	16.8%	19.9%	19.6%
Finance and Insurance	0.0%	1.2%	2.1%	3.1%	6.3%
Health Care and Social Assistance	0.0%	-0.4%	1.1%	1.5%	4.2%
Information	0.0%	-10.3%	-22.2%	-27.0%	-29.1%
Manufacturing	0.0%	0.6%	10.6%	9.0%	4.7%
Mining, Quarrying, and Oil and Gas Extraction	0.0%	5.6%	2.8%	5.6%	10.3%
Other Services (except Public Administration)	0.0%	8.0%	10.3%	18.7%	28.0%
Professional, Scientific, and Technical Services	0.0%	2.6%	2.5%	5.6%	14.6%
Real Estate and Rental and Leasing	0.0%	2.4%	18.7%	25.6%	30.1%
Retail Trade	0.0%	1.4%	1.2%	2.6%	4.2%
Transportation and Warehousing	0.0%	2.4%	31.4%	37.8%	36.3%
Utilities	0.0%	0.0%	1.2%	-8.8%	-12.4%
Wholesale Trade	0.0%	-1.9%	-15.4%	-18.1%	-20.9%

Table A7 – Cumulative Change in Employment in the Middle Peninsula PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	0.0%	3.8%	7.1%	7.0%	12.9%
Agriculture, Forestry, Fishing and Hunting	0.0%	-0.3%	-0.3%	-6.0%	-9.0%
Arts, Entertainment, and Recreation	0.0%	-3.7%	-8.1%	-32.0%	-5.8%
Construction	0.0%	7.0%	7.2%	9.6%	15.8%
Educational Services	0.0%	-3.7%	-1.9%	-9.3%	-10.3%
Finance and Insurance	0.0%	-5.4%	-7.6%	-8.6%	-8.3%
Health Care and Social Assistance	0.0%	2.4%	4.0%	6.3%	5.5%
Information	0.0%	7.6%	0.6%	-4.7%	-7.0%
Manufacturing	0.0%	-4.5%	-2.7%	-4.0%	-11.6%
Mining, Quarrying, and Oil and Gas Extraction	0.0%	6.0%	4.5%	1.5%	3.0%
Other Services (except Public Administration)	0.0%	0.5%	3.6%	9.2%	18.1%
Professional, Scientific, and Technical Services	0.0%	7.2%	4.6%	0.2%	1.1%
Real Estate and Rental and Leasing	0.0%	0.4%	-2.1%	-15.3%	-18.2%
Retail Trade	0.0%	2.4%	-1.6%	0.6%	2.2%
Transportation and Warehousing	0.0%	18.3%	131.9%	182.9%	190.1%
Utilities	0.0%	5.9%	7.4%	5.9%	
Wholesale Trade	-1.1%	1.0%	3.0%	9.2%	-5.7%

Table A8 – Cumulative Change in Employment in the Northern Neck PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	0.0%	0.1%	4.8%	4.5%	5.2%
Agriculture, Forestry, Fishing and Hunting	0.0%	16.9%	-1.2%	0.6%	25.4%
Arts, Entertainment, and Recreation	0.0%	-1.4%	5.0%	6.4%	-2.3%
Construction	0.0%	2.5%	9.3%	13.9%	15.2%
Educational Services	0.0%	2.3%	1.8%	1.2%	2.3%
Finance and Insurance	0.0%	-3.6%	-6.6%	-6.6%	-7.5%
Health Care and Social Assistance	0.0%	-1.0%	0.4%	0.6%	4.9%
Information	0.0%	-2.9%	-6.5%	-12.2%	-13.7%
Manufacturing	0.0%	8.3%	7.6%	12.8%	9.1%
Mining, Quarrying, and Oil and Gas Extraction					
Other Services (except Public Administration)	0.0%	3.8%	6.3%	8.5%	13.6%
Professional, Scientific, and Technical Services	0.0%	-10.7%	-4.7%	-17.9%	-13.0%
Real Estate and Rental and Leasing	0.0%	-3.9%	5.8%	0.0%	16.5%
Retail Trade	0.0%	1.5%	2.7%	0.5%	-4.2%
Transportation and Warehousing	0.0%	-1.0%	-2.5%	0.5%	-2.5%
Utilities	0.0%	3.7%	4.9%	14.6%	13.4%
Wholesale Trade	0.0%	-3.0%	1.0%	-6.9%	-5.6%

ANNUAL WAGE CHANGE BY MAJOR INDUSTRY SECTOR AND PLANNING DISTRICT – 2014 TO 2018

Table A9 – Annual Change in Nominal Weekly Wages in GO Virginia Region 6 by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	1.9%	4.1%	3.0%	3.0%	2.5%
Agriculture, Forestry, Fishing and Hunting	6.5%	4.0%	7.0%	5.6%	18.0%
Arts, Entertainment, and Recreation	0.7%	-1.3%	1.5%	3.6%	4.1%
Construction	3.4%	3.1%	1.6%	8.1%	0.1%
Educational Services	6.8%	6.1%	18.7%	2.8%	-0.3%
Finance and Insurance	3.1%	2.9%	0.7%	6.5%	6.0%
Health Care and Social Assistance	0.7%	1.7%	0.6%	3.3%	2.1%
Information	3.1%	0.0%	3.1%	0.7%	4.9%
Manufacturing	6.5%	5.3%	1.9%	-1.6%	4.7%
Mining, Quarrying, and Oil and Gas Extraction	10.6%	5.8%	0.5%	-2.1%	-2.1%
Other Services (except Public Administration)	1.5%	2.7%	0.9%	3.5%	1.3%
Professional, Scientific, and Technical Services	0.2%	1.6%	-1.8%	3.2%	2.6%
Real Estate and Rental and Leasing	0.2%	2.9%	-4.3%	7.0%	1.7%
Retail Trade	2.4%	1.9%	1.8%	1.2%	1.3%
Transportation and Warehousing	-0.3%	-1.2%	10.7%	0.8%	3.4%
Utilities	-2.1%	2.2%	4.5%	4.8%	7.0%
Wholesale Trade	2.5%	3.8%	-0.2%	5.4%	2.2%

Table A10 – Annual Change in Nominal Weekly Wages in the George Washington PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	2.1%	4.4%	2.9%	2.8%	2.1%
Agriculture, Forestry, Fishing and Hunting	6.7%	27.3%	-1.6%	5.0%	2.5%
Arts, Entertainment, and Recreation	-0.7%	-0.3%	0.0%	4.4%	4.2%
Construction	3.0%	2.5%	1.0%	9.3%	-1.1%
Educational Services	7.8%	9.0%	20.0%	2.4%	1.1%
Finance and Insurance	3.0%	2.5%	0.5%	6.6%	6.2%
Health Care and Social Assistance	0.6%	1.6%	-0.3%	3.4%	1.9%
Information	4.1%	0.1%	3.8%	2.7%	6.7%
Manufacturing	4.9%	8.6%	2.0%	-8.2%	2.7%
Mining, Quarrying, and Oil and Gas Extraction	8.4%	7.6%	3.5%	-5.8%	-4.2%
Other Services (except Public Administration)	1.3%	1.5%	0.2%	4.3%	1.2%
Professional, Scientific, and Technical Services	-0.4%	2.1%	-1.8%	2.9%	2.6%
Real Estate and Rental and Leasing	0.7%	2.0%	-5.6%	6.7%	1.5%
Retail Trade	2.2%	1.4%	4.0%	1.3%	0.9%
Transportation and Warehousing	-0.9%	-1.8%	6.3%	1.4%	4.4%
Utilities	-0.6%	2.6%	4.7%	5.5%	4.0%
Wholesale Trade	2.2%	3.8%	0.5%	6.3%	2.1%

Table A11 – Annual Change in Nominal Weekly Wages in the Middle Peninsula PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	-0.8%	3.6%	4.6%	2.9%	5.0%
Agriculture, Forestry, Fishing and Hunting	1.1%	1.5%	3.7%	3.6%	2.1%
Arts, Entertainment, and Recreation	5.5%	-0.5%	3.6%	6.4%	-2.3%
Construction	5.3%	5.6%	2.4%	4.2%	4.2%
Educational Services	-7.8%	-1.2%	-1.8%	-1.2%	-8.8%
Finance and Insurance	2.2%	1.7%	3.2%	2.7%	4.1%
Health Care and Social Assistance	1.5%	0.4%	6.1%	5.4%	3.2%
Information	8.2%	5.1%	-0.6%	-2.7%	-4.8%
Manufacturing	7.0%	3.9%	-0.4%	2.7%	8.6%
Mining, Quarrying, and Oil and Gas Extraction	15.3%	2.3%	-5.2%	5.2%	2.1%
Other Services (except Public Administration)	0.7%	7.1%	0.9%	1.9%	-0.2%
Professional, Scientific, and Technical Services	14.5%	-0.3%	-3.7%	3.8%	1.9%
Real Estate and Rental and Leasing	-3.3%	9.1%	-3.4%	1.2%	8.5%
Retail Trade	4.3%	4.3%	-7.9%	-0.6%	1.8%
Transportation and Warehousing	3.4%	3.3%	45.3%	-3.4%	-0.7%
Utilities		1.4%	2.8%	6.9%	
Wholesale Trade	1.3%	3.9%	1.8%	2.7%	3.5%

Table A12 – Annual Change in Nominal Weekly Wages in the Northern Neck PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	4.0%	1.9%	1.3%	4.7%	3.3%
Agriculture, Forestry, Fishing and Hunting	12.0%	-6.2%	17.2%	9.6%	40.4%
Arts, Entertainment, and Recreation	6.4%	1.0%	4.3%	-1.4%	7.4%
Construction	0.4%	5.9%	4.8%	4.7%	6.3%
Educational Services	7.4%	-13.3%	13.5%	5.6%	-11.1%
Finance and Insurance	3.3%	9.0%	1.8%	7.1%	3.8%
Health Care and Social Assistance	-0.6%	5.7%	0.6%	-2.1%	2.0%
Information	-5.5%	10.9%	7.9%	-14.3%	-4.6%
Manufacturing	9.5%	2.4%	4.5%	6.5%	3.8%
Mining, Quarrying, and Oil and Gas Extraction					
Other Services (except Public Administration)	3.2%	3.8%	6.7%	-1.4%	3.5%
Professional, Scientific, and Technical Services	6.7%	-6.6%	0.8%	-2.1%	-2.9%
Real Estate and Rental and Leasing	-5.2%	-1.5%	9.6%	11.3%	-6.5%
Retail Trade	1.0%	2.2%	2.4%	4.4%	3.1%
Transportation and Warehousing	2.8%	4.3%	-0.3%	-2.2%	0.9%
Utilities	1.1%	2.3%	5.2%	3.2%	8.4%
Wholesale Trade	3.5%	6.2%	-0.5%	4.7%	1.0%



CUMULATIVE WAGE CHANGE BY MAJOR INDUSTRY SECTOR AND PLANNING DISTRICT – 2014 TO 2018

Table A13 – Cumulative Change in Nominal Weekly Wages in GO Virginia Region 6 by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	0.0%	4.1%	7.2%	10.4%	13.2%
Agriculture, Forestry, Fishing and Hunting	0.0%	4.0%	11.3%	17.5%	38.6%
Arts, Entertainment, and Recreation	0.0%	-1.3%	0.1%	3.8%	8.1%
Construction	0.0%	3.1%	4.8%	13.3%	13.4%
Educational Services	0.0%	6.1%	26.0%	29.5%	29.1%
Finance and Insurance	0.0%	2.9%	3.7%	10.4%	17.0%
Health Care and Social Assistance	0.0%	1.7%	2.3%	5.6%	7.9%
Information	0.0%	0.0%	3.1%	3.8%	8.9%
Manufacturing	0.0%	5.3%	7.3%	5.6%	10.6%
Mining, Quarrying, and Oil and Gas Extraction	0.0%	5.8%	6.3%	4.2%	2.0%
Other Services (except Public Administration)	0.0%	2.7%	3.5%	7.1%	8.5%
Professional, Scientific, and Technical Services	0.0%	1.6%	-0.2%	3.0%	5.7%
Real Estate and Rental and Leasing	0.0%	2.9%	-1.5%	5.4%	7.2%
Retail Trade	0.0%	1.9%	3.8%	5.0%	6.4%
Transportation and Warehousing	0.0%	-1.2%	9.4%	10.2%	14.0%
Utilities	0.0%	2.2%	6.8%	11.9%	19.8%
Wholesale Trade	0.0%	3.8%	3.6%	9.2%	11.7%



Table A14 – Cumulative Change in Nominal Weekly Wages in the George Washington PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	0.0%	4.4%	7.5%	10.5%	12.9%
Agriculture, Forestry, Fishing and Hunting	0.0%	27.3%	25.3%	31.5%	34.7%
Arts, Entertainment, and Recreation	0.0%	-0.3%	-0.3%	4.1%	8.4%
Construction	0.0%	2.5%	3.5%	13.1%	11.9%
Educational Services	0.0%	9.0%	30.8%	33.8%	35.3%
Finance and Insurance	0.0%	2.5%	3.0%	9.8%	16.7%
Health Care and Social Assistance	0.0%	1.6%	1.3%	4.8%	6.7%
Information	0.0%	0.1%	3.9%	6.7%	13.8%
Manufacturing	0.0%	8.6%	10.8%	1.7%	4.5%
Mining, Quarrying, and Oil and Gas Extraction	0.0%	7.6%	11.3%	4.9%	0.5%
Other Services (except Public Administration)	0.0%	1.5%	1.7%	6.0%	7.3%
Professional, Scientific, and Technical Services	0.0%	2.1%	0.3%	3.2%	5.8%
Real Estate and Rental and Leasing	0.0%	2.0%	-3.7%	2.8%	4.4%
Retail Trade	0.0%	1.4%	5.4%	6.8%	7.8%
Transportation and Warehousing	0.0%	-1.8%	4.4%	5.8%	10.5%
Utilities	0.0%	2.6%	7.3%	13.3%	17.8%
Wholesale Trade	0.0%	3.8%	4.3%	10.9%	13.2%

Table A15 – Cumulative Change in Nominal Weekly Wages in the Middle Peninsula PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	0.0%	3.6%	8.3%	11.5%	17.1%
Agriculture, Forestry, Fishing and Hunting	0.0%	1.5%	5.3%	9.1%	11.3%
Arts, Entertainment, and Recreation	0.0%	-0.5%	3.0%	9.6%	7.1%
Construction	0.0%	5.6%	8.2%	12.8%	17.5%
Educational Services	0.0%	-1.2%	-3.0%	-4.1%	-12.5%
Finance and Insurance	0.0%	1.7%	4.9%	7.7%	12.1%
Health Care and Social Assistance	0.0%	0.4%	6.5%	12.3%	15.9%
Information	0.0%	5.1%	4.5%	1.6%	-3.3%
Manufacturing	0.0%	3.9%	3.5%	6.3%	15.5%
Mining, Quarrying, and Oil and Gas Extraction	0.0%	2.3%	-3.0%	2.1%	4.2%
Other Services (except Public Administration)	0.0%	7.1%	8.0%	10.1%	9.9%
Professional, Scientific, and Technical Services	0.0%	-0.3%	-4.0%	-0.3%	1.6%
Real Estate and Rental and Leasing	0.0%	9.1%	5.3%	6.6%	15.6%
Retail Trade	0.0%	4.3%	-3.9%	-4.5%	-2.7%
Transportation and Warehousing	0.0%	3.3%	50.1%	44.9%	43.9%
Utilities	0.0%	1.4%	4.3%	11.5%	-100.0%
Wholesale Trade	0.0%	3.9%	5.8%	8.6%	12.4%

Table A16 – Cumulative Change in Nominal Weekly Wages in the Northern Neck PDC by Major Industry Sector

Industry	2014	2015	2016	2017	2018
Accommodation and Food Services	0.0%	1.9%	3.2%	8.1%	11.7%
Agriculture, Forestry, Fishing and Hunting	0.0%	-6.2%	9.9%	20.5%	69.1%
Arts, Entertainment, and Recreation	0.0%	1.0%	5.4%	4.0%	11.7%
Construction	0.0%	5.9%	11.0%	16.3%	23.7%
Educational Services	0.0%	-13.3%	-1.5%	4.0%	-7.5%
Finance and Insurance	0.0%	9.0%	11.0%	18.8%	23.4%
Health Care and Social Assistance	0.0%	5.7%	6.3%	4.1%	6.2%
Information	0.0%	10.9%	19.7%	2.6%	-2.1%
Manufacturing	0.0%	2.4%	6.9%	13.9%	18.2%
Mining, Quarrying, and Oil and Gas Extraction					
Other Services (except Public Administration)	0.0%	3.8%	10.7%	9.1%	12.9%
Professional, Scientific, and Technical Services	0.0%	-6.6%	-5.9%	-7.9%	-10.6%
Real Estate and Rental and Leasing	0.0%	-1.5%	8.0%	20.3%	12.4%
Retail Trade	0.0%	2.2%	4.6%	9.3%	12.7%
Transportation and Warehousing	0.0%	4.3%	4.0%	1.7%	2.6%
Utilities	0.0%	2.3%	7.6%	11.0%	20.3%
Wholesale Trade	0.0%	6.2%	5.6%	10.5%	11.7%