



Assessing Alexandria/Arlington's Regional Labor Market

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Alexandria/Arlington Regional Workforce Council

We help drive Alexandria City's and Arlington County's economic growth by implementing an effective and efficient workforce ecosystem that delivers innovative, integrated, data-driven products and services designed and aligned to meet the needs of businesses and job seekers. We hold ourselves accountable to the system's goals and support high-impact outcomes.
workforcecouncil.arlingtonva.us

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Executive Summary

This report will help the Alexandria/Arlington Regional Workforce Council better understand trends shaping the region's workforce and identify sources of current and future labor demand. This information will support the Regional Workforce Council's planning activities and inform its future investment decisions. Several key themes emerged from this research, and each directs regional stakeholders toward some kind of action. These themes, described below, include the need for greater collaboration between the region's workforce boards, focusing investments on key service sectors, and continuing to collaborate with other regional stakeholders to diversity the region's economy.

The Alexandria/Arlington region is very much a part of the Greater Washington metro area. Alexandria/Arlington-based businesses employ many residents of Fairfax County and other parts of the metro area, just as many Alexandria/Arlington residents work in the District of Columbia and throughout the broader region. As a result, the Greater Washington metro area's economic performance will very much dictate whether Alexandria/Arlington's employers can meet their workforce needs and whether residents can find career opportunities. Given this reality, future workforce planning must involve effective communication and collaboration between not only between private sectors employers and public and non-profit service providers, but also between the Greater Washington metro area's workforce development boards (e.g., Alexandria/Arlington Regional Workforce Council (VA), Northern Virginia Workforce Development Board (VA), WorkSource Montgomery (MD), Prince George's County Economic Development Corporation Workforce Services Division (MD), and the District of Columbia Workforce Investment Council (DC)).

Another theme emerging from this research is the extent to which the Greater Washington metro area, and Alexandria/Arlington specifically, is from top to bottom a services-based economy. When good paying federal contractors are thriving, there is a great demand for highly-skilled workers and this demand attracts many young, educated workers to the region. However, when activities related to the federal government slow many of these workers must find alternative opportunities either in the region or elsewhere. Responding to these demand drivers—which are often outside of local control—can challenge both employers and training providers because properly scaling hiring and training programs becomes more difficult. These activities also drive demand in the region's more lower-wage industries like hospitality. Alexandria City and Arlington County have some of Virginia's highest hotel occupancy rates and as a result the hospitality industry creates significant workforce demand. However, factors such as the region's high cost of living—particularly for housing—can make it difficult for these lower wage workers to both live and work in the region. Given the importance of these services activities for the entire workforce, they must remain an important area of focus for the Regional Workforce Council as it decides which training programs to invest in and support.

The research also makes clear the region's dependence on the federal government and the pressing need to diversify the regional economy. Diversification strategies are multi-faceted strategies that involve participation from many different stakeholders. Workforce boards, community colleges and other training providers must invest in and deliver training that prepares current and future workers for new and emerging industries and opportunities. Economic development organizations must continue efforts to

attract and retain businesses that participate in a wider array of private sector markets. Small business and entrepreneurial support providers must continue to help entrepreneurs get their businesses off the ground and help small businesses identify more non-governmental business opportunities. Strong relationships have already been established between the Alexandria/Arlington Regional Workforce Council, the Alexandria Economic Development Partnership (AEDP), Arlington Economic Development (AED), and key service providers (e.g., Small Business Development Centers), and these regional actors must continue to communicate, coordinate and collaborate in order to create a more diversified economy.

The research presented below often touches on these three key themes. The report (Attachment A) itself begins by looking at the supply of workers by examining key characteristics of the region's population and labor force. It then examines current and future sources of labor demand, by looking at the region's current economic structure, and then examining more detailed industry and occupational trends and projections. The report complements this more medium- and long-term analysis by looking at data from online job postings to identify employers that are currently hiring and the jobs they seek to fill. The report also discusses key issues—talent attraction and retention, education, transportation and infrastructure, commercial and industrial development, entrepreneurship and innovation—that will influence the direction of the region's future workforce and economic development. It concludes by again highlighting the themes emerging from the analysis.

Workforce supply

The region's people

The changing demographics of Alexandria/Arlington's population—and that of the broader Washington metro area—can affect the quantity and quality of workers available to area companies. Moreover, the population's size and relative wealth can also influence the region's workforce because growing consumer demand can also create more employment opportunities in locally-serving industries.

Alexandria/Arlington is now home to over 382,000 residents, which represents 6.3 percent and 13.1 percent of the Washington, DC metro area and Northern Virginia population, respectively. The region experienced somewhat slower growth during the 2000s, but since 2010 it has grown 1.8 percent annually. This was slightly faster than either the Washington metro area or Northern Virginia.

Natural increase and international immigration has driven much of the region's population growth, and since 2011 helped to offset a net loss of domestic migrants. The latter can be attributed to factors such as the high cost of living (and particularly housing) and limited employment opportunities caused by the local economic slowdown caused by federal budget cuts and sequestration during the first half of the decade. Nevertheless, the region's population remains somewhat unique both nationally and within the metro area because 1 out of 4 of residents are aged 25 to 34 (24.9 percent); a figure much greater than the metro area (15.2 percent) or the US overall (13.7 percent). By contrast, Alexandria/Arlington lacks the diversity found in the rest of the metro area. Only 31.2 percent of the region's population is non-white, as compared to 46.2 percent of the Washington metro area population.

The region's labor force

In July 2016, Alexandria/Arlington's labor force included over 241,000 workers—the highest it had been since the recession. Alexandria/Arlington has relatively lower unemployment rates than the region, state and nation. In September 2016, unemployment was only 2.8 percent, or almost half of the national rate of 5.0 percent. Alexandria/Arlington's labor force is similarly unique in that its labor force participation rate is almost 80 percent, a figure that far exceeds both the US (63.1 percent) and the Washington, DC metro area (71.8 percent). This is due in part to more people of prime working age, older workers staying in the labor force longer, and the need for two incomes due to the region's high cost of living.

Alexandria/Arlington remains an employment center, but these two jurisdictions are very much connected to the larger Washington, DC metro area. According to the US Census Bureau's Longitudinal Employer-Household Dynamics program¹ approximately 238,000 people worked in Alexandria/Arlington in 2014, of which about 48,000 (20 percent) lived in the region. Similarly there were roughly 187,000 workers living in the region in 2014, but 139,000 of those workers (75 percent) worked outside of Alexandria/Arlington. In addition to the 20 percent of workers who live in Alexandria/Arlington, a significant number of the region's workers (29 percent) live in Fairfax County, with the region's other workers drawn more evenly from throughout the metro area. Workers that live in Alexandria/Arlington have different commuting patterns as 32 percent of the region's working residents worked in the District of Columbia, 25 percent in the Alexandria/Arlington, and 24 percent worked in Fairfax County.

Workers that live in Alexandria/Arlington have relatively high levels of educational attainment thereby giving Alexandria/Arlington with a significant workforce advantage. More than two-thirds of the region's population aged 25 and older has at least a bachelor's degree, a figure more than twice the national average (30.6 percent) and 18 percent higher than the Washington metro area (49.4 percent). Moreover, 36.4 percent of the region's population (Age 25+) has a graduate or professional degree. The foreign-born population influences educational attainment at both ends of the educational spectrum. For instance, foreign-born residents represent 77 percent of the population (age 25 plus) that lacks a high school degree, but they also comprise 20 percent of residents with a graduate or professional degree.

The region's 2015 per capita annual income was almost \$85,000, which is 75 percent higher than the nation, 60 percent higher than the state, and 30 percent higher than Washington metro area. In spite of some significant declines during the recession and sequestration, the region's per capita income has continued to grow and is now 18 percent higher than it was in 2000. Not all area residents have high incomes, in 2015 4.8 percent of Alexandria/Arlington families lived in poverty; roughly of half of which were single female-led households. The region's poverty rate has declined since 2010, due in part to lower income residents being priced out of the region.

Workforce demand

The region's current economic structure shapes our understanding of the regional demand for labor. Government and professional and business services account for 45 percent of employment in

¹ <http://lehd.ces.census.gov/>

Alexandria/Arlington. The professional and business services sector employs approximately 83,000 people or almost 30 percent of the region's workforce. It includes many of the contractors providing services to the federal government. Looking to the future, the region overall is projected to add approximately 13,700 net new jobs over the course of the next five years. By contrast, direct government employment is projected to continue declining both in absolute and relative terms. By 2021, government will account for less than 15 percent of Alexandria/Arlington's total employment. While these activities drive much of the regional economy, the growth of other large sectors such as education and health services; trade, transportation and utilities; and leisure and hospitality are more reliant on the region's continued population growth.

Industry trends and projections

More detailed industry analysis can help to identify more specific growth opportunities. Different types of industries create different job opportunities, and within Alexandria/Arlington region, there are large numbers of jobs that pay well above average wages and large numbers that pay well below the average wage. The average annual wage for all industries in Alexandria/Arlington was \$80,500.² Industries that pay average wages in excess of 120 percent of the average wage account for 45 percent of all the region's jobs, whereas industries that pay average wages below 80 percent of the average wage account for 37.6 percent of all the region's jobs. Only 17.3 percent of all the region's jobs are in industries that pay average wages that are above 80 percent and below 120 percent of the region's average wage.

Two high paying industries from the professional and business services sector—computer systems design and related services, and management, scientific and technical consulting services—contributed to the region's growth as each added 5,000 net new jobs between 2011 and 2016. These industries are also projected to be important sources of net new employment over the next five years. Due to the impact of BRAC and sequestration, the region lost high paying jobs in government activities such as national security and international affairs.³ Industry projections show that the federal government will generate employment opportunities over the next half decade, not through growth but rather by replacing retiring workers retiring or those leaving public service.

The industries that pay closer to the average wage include more locally-serving industries. Growth in these industries often depends on continued population growth. These industries include dentist's offices, outpatient care centers, and medical and diagnostic laboratories, which all experienced net employment growth between 2011 and 2016. Industries that pay well below the average industry wage also tend to be more locally-serving industries such as restaurants and other eating places, services to buildings and dwellings, elementary and secondary schools, and grocery stores. These four industries all created over 1,000 net new jobs between 2011 and 2016. With the exception of elementary and secondary schools, these also paid average annual wages below \$30,000.

² Chmura Economics, JobsEQ, 2nd Qtr 2016.

³ This is due in part to the relocation of Department of Defense personnel and affiliated contractors out of Arlington and to places like nearby Fort Belvoir in Fairfax County.

Occupational trends and projections

Industries tell us what companies make, occupations describe what workers do. Workers' educational backgrounds are important considerations for developing strategies that both help employers meet their workforce needs and placing workers in appropriate opportunities. The minimum educational requirement for different occupations provides another lens for examining workforce demand. Much like the distribution of industry employment, the region has many workers in occupations requiring at least a 4-year degree (38 percent), many in occupations requiring high school or less (53 percent), but only about 10 percent in occupations that require some post-secondary education, a professional certification, or an associates' degree.

Among occupations requiring at least a 4-year degree, computer-related occupations such as software developers, computer programmers and systems analysts, and network and computer systems administrators were among the fastest growing and better paying occupations. These occupations often paid in excess of \$100,000 annually and the region added several hundred net new jobs in each between 2011 and 2016. Demand for these occupations is projected to continue over the next five years.

Computer-related jobs, such as computer user support specialists and web developers, were also among the fastest growing middle-skill jobs. Other middle-skill occupations that grew and projected to continue growing were in healthcare fields like nursing and education-related occupations like teacher assistants and preschool teachers. Janitors and cleaners added more net new jobs than any other occupation between 2011 and 2016 than any other occupation requiring a high school degree or less. Food service-related occupations like waiters and waitresses, food preparation workers, and cooks also grew, as did retail occupations like cashiers. Given the high cost of living in Alexandria/Arlington, it is very hard for the workers that fill these jobs to live in the region. This poses some real challenges for the region in terms of providing affordable housing or reliable public transportation so that these workers can get to work in a reasonable amount of time. The majority of total annual demand for these lower skill jobs will be a function of replacement demand more so than growth.

Current demand for labor

The industry and occupational trends and projections described above help understand medium- to long-term employment trends. By contrast, examining online job advertisements allows us to better understand what jobs employers are looking to fill presently. We used the Real-Time Labor Market Information tool Help Wanted Online⁴ to identify what jobs regional employers currently seek to fill. Much like the examination of occupations, we looked at these data through the lens of the job's requisite education level. For jobs posting requiring at least a 4-year degree, the most common employers were government contractors, such as ACCENTURE, Booz Allen Hamilton, Deloitte and CACI. These firms sought to hire workers for a variety of computer-related occupations such as computer system analysts, software developers, and web developers. The growing importance of cyber-security also becomes apparent as

⁴ <https://www.conference-board.org/data/helpwantedonline.cfm>

information security analysts, and network and computer systems administrators were commonly advertised occupations, as were jobs seeking workers with security clearances.

Job postings for middle skill jobs—those that required a minimum of 2-year degree—were a more diverse set of occupations and employers. Commonly advertised jobs included computer user support specialists, web developers and to a lesser extent cyber-related occupations like information security analysts and network and computer systems administrators. Healthcare-related occupations—particularly in nursing—were also important as Inova Health System and Virginia Hospital Center were two large employers advertising positions that required workers with Associates’ degrees. The retail and hospitality sectors are also important for workers that lack post-secondary education. Large retailers like Macy’s, Nordstrom, and Target seek to fill retail sales, customer service representatives, and supervisory roles. The hospitality industry was another important source of lower-skill jobs, with Marriott, Hilton Worldwide and Ritz-Carlton advertising large numbers of jobs for maids and housekeepers and general maintenance and repair workers.

Assets and factors shaping the region’s economy

Effective workforce planning will require a thorough understanding of the assets and factors that influence the region’s economy and workforce, both now and in the future. We examine these key workforce issues through the lens of the region’s Strengths, Weaknesses, Opportunities and Threats (SWOT). Input for this SWOT was drawn from two primary sources—the regional analysis presented above and stakeholder input. Several regional stakeholders provided input in a September 2016 meeting facilitated by the Alexandria/Arlington Regional Workforce Council. These business, education, and other community stakeholders identified what they believed to be the region’s key opportunities and challenges, as they relate to talent attraction and retention, secondary and postsecondary education, transportation and infrastructure, commercial and industrial development, and entrepreneurship and innovation.

Talent attraction and retention

Alexandria/Arlington has a deep talent base due to its ability to attract many young, educated workers. First and foremost, quality career opportunities attract these workers to the region, while it’s high quality of life and numerous amenities retains them. However, the region’s relatively high cost of living—and especially housing—forces many of these younger to look elsewhere in the metro area and beyond once they get older and look buy homes and/or start families. These factors have contributed to several years of net domestic out-migration in Alexandria/Arlington.

Opportunities to expand the region’s talent base can occur through the continued attraction of international immigrants, creating opportunities for veterans leaving the military, and establishing career pathways for existing workers that may not have a 4-year degree. The impact of the new administration on federal employment and spending will go a long way in determining the trajectory of the regional economy and its ability to attract talented workers and provide opportunities for the workers already present in the region.

Secondary and postsecondary education

The region's educational institutions are clear strengths that contribute to the region's workforce in many ways. Some of the region's high schools, such as Yorktown and Washington-Lee in Arlington, are viewed as some of the region and nation's best. However, a big regional challenge is the achievement gap for the Hispanic students relative to other racial and ethnic groups. Whether through bilingual education or other types of programs, closing this achievement gap will be important for the region to more fully integrate these students into the community and prepare them for either the post-secondary education or the world of work.

Regarding postsecondary education, the region is well-served by a wide variety of public and private post-secondary institutions that offer an array of programs, particularly for adult learners and continuing education for incumbent workers. Within the region, students can access law schools, graduate schools, university research centers, undergraduate programs and community college and technical training programs. However, many of these institutions are satellite campuses of larger institutions that primarily serve students that are already in the world of work. An economic slowdown might diminish the resources that workers are able to devote towards professional education. Depressed enrollments would in turn limit the number of available programs.

Transportation and infrastructure

The region's transit system is important to workers and employers alike. Residents of Alexandria/Arlington commuters a relatively shorter commutes than other locations in the Washington metro area, and nearly 1 in 4 residents took public transportation. The range of transit options one of the region's real competitive advantages in attracting new workers, particularly millennial workers. Nevertheless, the public transit infrastructure—and particularly Metrorail—are experiencing significant strains. Ridership for most forms of public transportation is on the decline due to maintenance concerns and diminishing reliability.

A lack of a dedicated funding mechanism for the Washington Metropolitan Area Transit Authority (WMATA) has contributed to these issues and local jurisdictions only have marginal influence in addressing these concerns. Also, an economic slowdown or shrinking of the federal workforce could further depress metro ridership and revenues. Public transportation is particularly important to federal employees. Encouraged in part by federal transit benefits, 37 percent of the government workers living in Alexandria/Arlington used public transportation. As public transportation becomes a less attractive option, more workers will take to the roads, and thereby causing further congestion and longer commute times and making the region a less attractive place to live.

Commercial and industrial development

In order to maintain and strengthen its existing base, the region must ensure that the business environment is one that will allow its existing employers to grow and is attractive to potential new employers. Developing this activity is not only important for creating jobs, but also for building the region's tax base so that it can fund things like broadband expansion, education, workforce training, mental health or other key government services. In spite of strong levels of visitor spending, the region's tax base has been hurt by rising office vacancy rates due to BRAC, sequestration and GSA rent caps that forced many federal agencies

to reduce their footprint in Arlington and Alexandria or find less expensive office space elsewhere. For private sector employers, the opening of the Silver line and a desire to be in Washington, DC has created more options and increased competition for business within the metro area. Office vacancy rates are 20 percent in Arlington and 17 percent in Alexandria.

Alexandria City and Arlington County are pursuing companies from several new and emerging private sector industries, which should help to diversify the economy and reduce office vacancy rates. Since the region is built out, almost all development must be redevelopment and this provides opportunities to convert existing space into real estate products that are more suited to the target industries or the changing nature of demand. Nevertheless, if the level of government activity and contracting slows down, trends in office vacancy will be difficult to reverse in the short- and medium-term.

Entrepreneurship and innovation

The Washington metro area has a reputation as being a ‘Federal City’ and thereby lacking an entrepreneurial culture. This is a real regional weakness, as changes in federal spending would affect the region less if area businesses served a wider array of markets. Moreover, the region must also do a better job of retaining the innovative companies started in the region. The region is not, however without assets from which to build. It is home to key research organizations such as Defense Advanced Research Projects Administration (DARPA), the Office of Naval Research (ONR), the Air Force Office of Scientific Research (AFOSR), the National Science Foundation, and major research institutions (University of Virginia (UVA), George Mason University (GMU), Virginia Polytechnic Institute and State University (Virginia Tech)). The region can create opportunities not only better leveraging these assets, but also by better connecting small businesses and entrepreneurs to business incubators and accelerators like 1776, Eastern Foundry, and the University of Virginia’s Jefferson Education Accelerator, and Capitol Post, and connecting them to service providers like small business development centers.

Conclusion

The region’s labor market is somewhat polarized with many high-wage, high-skill jobs at one end, many low-wage, low skill jobs at the other end, and fewer jobs in the middle. However, employers must be able to find workers for all three segments of the workforce to ensure the success of their business and by extension the region’s continued prosperity. A number of issues will influence the availability of ready and qualified workers. Some—but not all—of these issues are beyond local influence and action. As a result, the region can take action to enhance its ability to attract and retain talent, prepare future workers and provide continuing education, improve transit systems, develop and diversify its economic base, and support small businesses and entrepreneurs.

In regions like Alexandria/Arlington—where the labor market and economic activity is so fluid between multiple states and jurisdictions—trying to estimate a specific gap between labor force supply and labor force demand is often not a useful exercise. Rather, it is perhaps more useful to consider several key scenarios that might shape the region’s economic trajectory and by extension the nature of labor demand and supply. The industry and occupational projections examined in this report present a most likely scenario of what will happen if no major event significantly alters the region’s future economic trajectory.

This is but one scenario, as others might assume economic changes that will create vicious or virtuous cycles for the region's workforce. For instance, major cuts to federal employment and spending place a significant drag on the regional economy, thereby diminishing the region's ability to attract and retain talented workers and reducing demand for workers in more locally-serving industries such as healthcare, retail, hospitality or other personal services. Alternatively regional employers might develop new strengths and diversify their customer base thereby making their demand for labor less dependent on the federal spending.

Introduction

Arlington County and Alexandria City are central jurisdictions within the Washington-Arlington-Alexandria, DC-VA-MD-WV Metropolitan Statistical Area (Hereafter, the ‘Washington metro area’). Relative to other parts of the country, the Alexandria/Arlington region has had relatively strong economic performance over the past decade and a half. Its unemployment rate is consistently lower than the nation, state, and surrounding jurisdictions and its per capita income is among the highest in the nation. However, the region’s economy is very much influenced by broader regional economic trends, particularly as they relate to the activities of the federal government. The region’s employers also draw significant numbers of workers from Fairfax County, while many Arlington and Alexandria residents go to work in the District and Fairfax County.

Although part of the broader Washington, DC metro area, Alexandria/Arlington’s economy and workforce make it relatively unique. The region is home to the Pentagon and many other federal agencies (e.g., The National Science Foundation, US Patent and Trade Office), and as a result it is highly dependent on direct federal employment and government contracting. Over 45 percent of the region’s employment are in just two economic sectors—Government and Professional and Business Services. Government represents over 15 percent of total Alexandria/Arlington employment, while professional and business services—which includes many of the government contractors—accounts for almost 30 percent of total regional employment.

These sectors form the region’s economic base and bring non-local money into the economy. The growth spurred by these activities in turn creates employment opportunities in more locally-serving industries such as healthcare, education, hospitality and retail. The resulting economy therefore creates job opportunities for workers in all different segments of the workforce. The region’s government and professional and business services sector creates many good, high paying jobs for highly-skilled and educated workers. These sectors, and others like healthcare and education, also provide jobs for middle-skill workers. The region’s lower-wage, lower-skill workers find opportunities in important regional sectors like hospitality, among others.

Quality job opportunities that require higher levels of skill and education attract many young, educated workers to the region. Even within the broader Washington metro area, these workers make Alexandria/Arlington’s population is unique. Almost one out of every four people living in Alexandria/Arlington is between the ages of 25 and 34, which is almost twice as great as the national average. Moreover, over two-thirds of the region’s population aged 25 and older have at least a bachelor’s degree, and more than a third have a graduate or professional degree. Again, this sets Alexandria/Arlington apart from the nation, the state, and the rest of the metro area.

In order to continue growing, the region must address a number of key workforce-related challenges. For instance, cuts in federal employment and contracting may reduce the number of job opportunities and make the region less competitive for attracting talent. The region’s high cost of living also poses challenges for workers of all levels, as the cost of housing and childcare can prove burdensome for many. These issues and many other will shape the region’s demand for labor, as well as the opportunities available to workers throughout the entire workforce.

This report seeks to help the Alexandria/Arlington Regional Workforce Council better understand its regional workforce trends and to identify sources of current and future labor demand. This information will support the workforce council's planning activities and inform their future investment decisions. The report begins by looking at the worker supply by examining some basic demographics trends. These trends include age, race and ethnicity as well as key labor force characteristics such as labor force participation, commuting patterns, per capita income and self-employment. Regional trends are presented in relation to the United States, Commonwealth of Virginia, and Washington, DC metro area.

The report then examines current and future sources of labor demand by looking at the region's current economic structure, as well as past employment trends and future employment projections. Specifically, this analysis looks at industry trends and projections through the lens of industry average wages to high, medium and low paying industries that are projected to offer employments over the next half-decade. It also examines occupational trends and projections based on their minimum educational requirements (e.g., 4-year degree or more, high school or less). These employment trends and forecasts offer a medium-to long-term perspective on workforce demand. We complement this analysis by looking at Real-Time Labor Market Information that aggregates data from online job postings to see what employers are currently hiring and what jobs they seek to fill presently.

It should be noted that the employment projections presented here assume that there will be no major shock to the regional economy, but there are many other issues that can influence the future trajectory of the regional economy. As a result, the report will also look at several key issues—talent attraction and retention, education, transportation and infrastructure, commercial and industrial development, entrepreneurship and innovation—that will influence the direction of the region's future workforce and economic development. For each of these issues, the report will examine regional strengths, weaknesses, opportunities and threats. The report concludes by highlighting some of the key themes emerging from the analysis.

Workforce supply

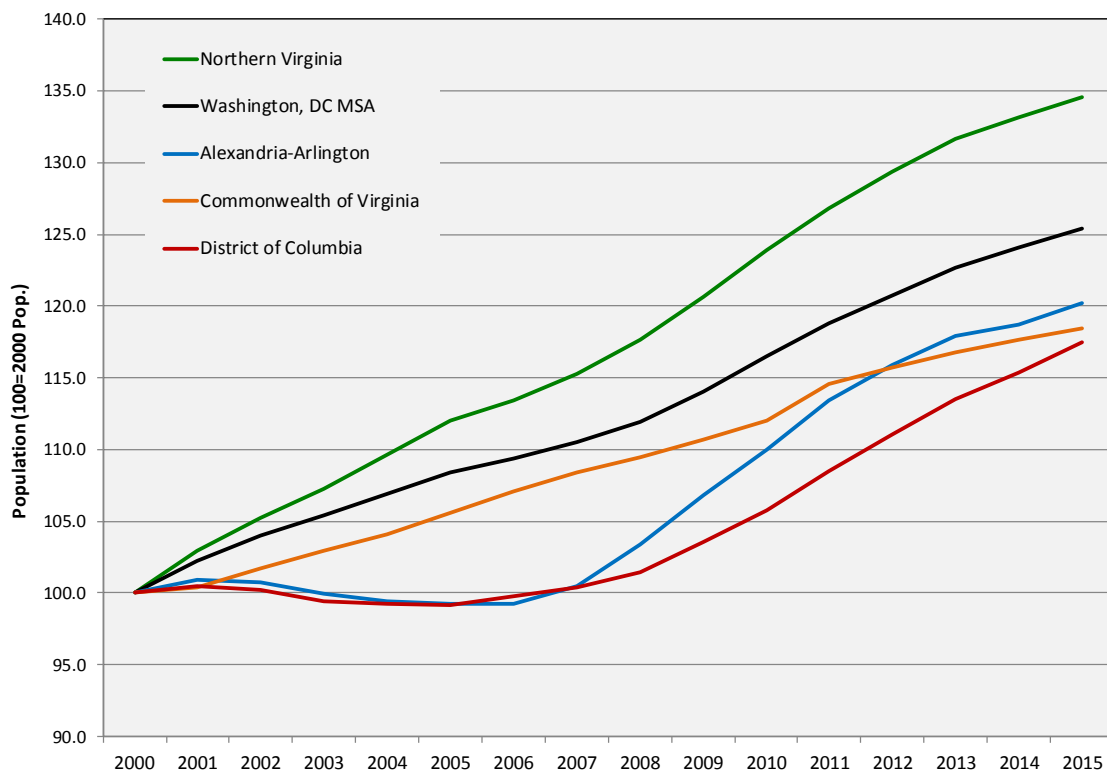
This section examines Alexandria/Arlington's people, its labor force, and some critical workforce characteristics like educational attainment, income and self-employment. Changes in the demographics of Alexandria/Arlington's population—and that of the broader Washington metro area—can affect the quantity and quality of workers available to area companies. Moreover, the population's size and relative wealth can also influence the region's workforce because growing consumer demand can also influence regional growth. In addition to the size of the population, worker age, labor force participation unemployment, and the extent to which the region draws in-commuters are also important factors. This section also considers factors such as self-employment and educational attainment as a way to gauge the capacity of the region's workforce to take on more value-added activities.

The region's people

Population

Alexandria/Arlington is now home to over 382,000 residents, 60 percent of which live in Arlington and 40 percent live in Alexandria. Combined, Alexandria/Arlington's population represents 6.3 percent and 13.1 percent of the Washington, DC metro area and Northern Virginia population, respectively. Figure 1 shows the relative growth trends for these areas, as well as the District of Columbia and the Commonwealth of Virginia. Since 2000, Alexandria/Arlington has grown at a slower annual rate (1.2 percent annually) than

Figure 1: Relative population growth (2000=100)



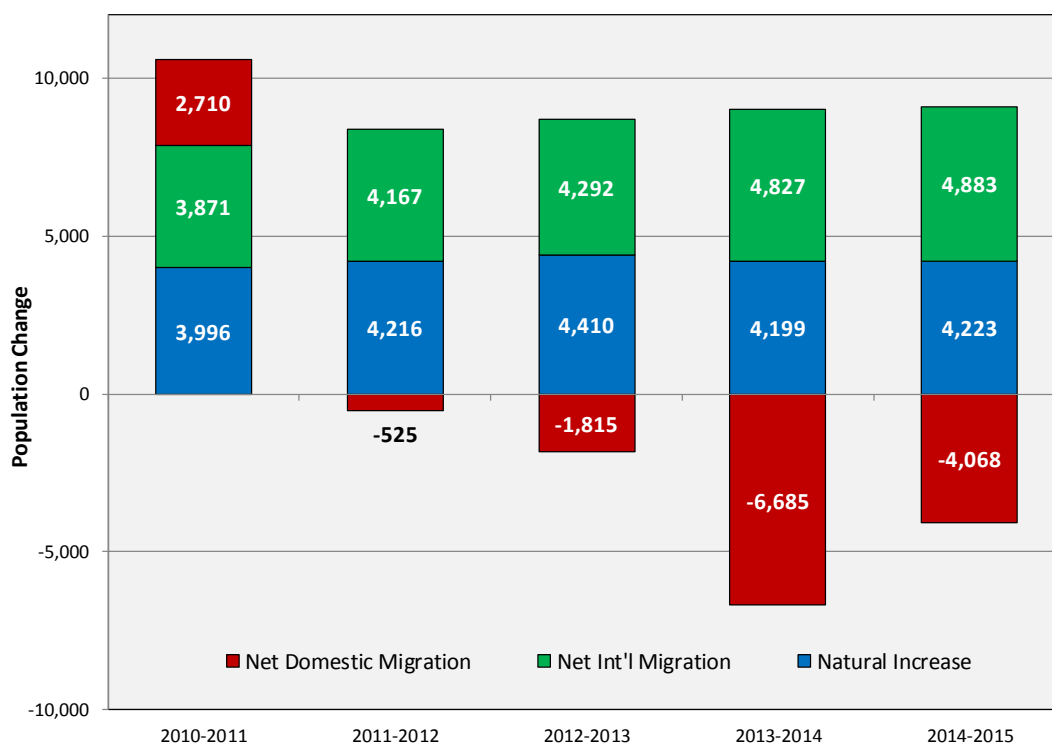
Source: US Census Bureau Population Estimates Program

either the broader Washington metro area (1.5 percent) or Northern Virginia (2.0 percent). In fact, the region was a net loser of population between 2001 and 2006 due to variety of factors such as the aftermath of the terrorist attacks of 9/11 and the Department of Defense’s Base Realignment and Closure (BRAC) that relocated many DoD-related activities outside of Alexandria/Arlington.

Since the recession, however, growth returned to the DC metro area’s more central jurisdictions. While still growing faster than the state and the nation, growth in Northern Virginia has started to slow. Since 2010, Northern Virginia grew at a rate of 1.7 annually. By contrast Alexandria/Arlington’s growth increased to 1.8 percent annually and the District of Columbia grew at an annual rate 2.1 percent annually between 2010 and 2015. The Metro Washington Council of Governments (MWCOG) projects Alexandria/Arlington’s growth to continue between 2015 and 2020, albeit it at a somewhat slower pace (1.3 percent annually). Between 2015 and 2020, MWCOG projects the Alexandria/Arlington region to add an additional 23,700 net new residents and these new residents will be split close to evenly between the two jurisdictions.⁵

In spite of the continued population growth, there are some clear challenges arising. Figure 2 shows the three main elements of population change (Net domestic migration, net international migration, and

Figure 2: Components of population growth in Alexandria-Arlington



Source: US Census Bureau, Population Estimates Program, V2015

natural increase) within the Alexandria/Arlington region. Most notably, the region has experienced a net loss of domestic migrants since 2011. Many factors explain this trend such as the high cost of living (and

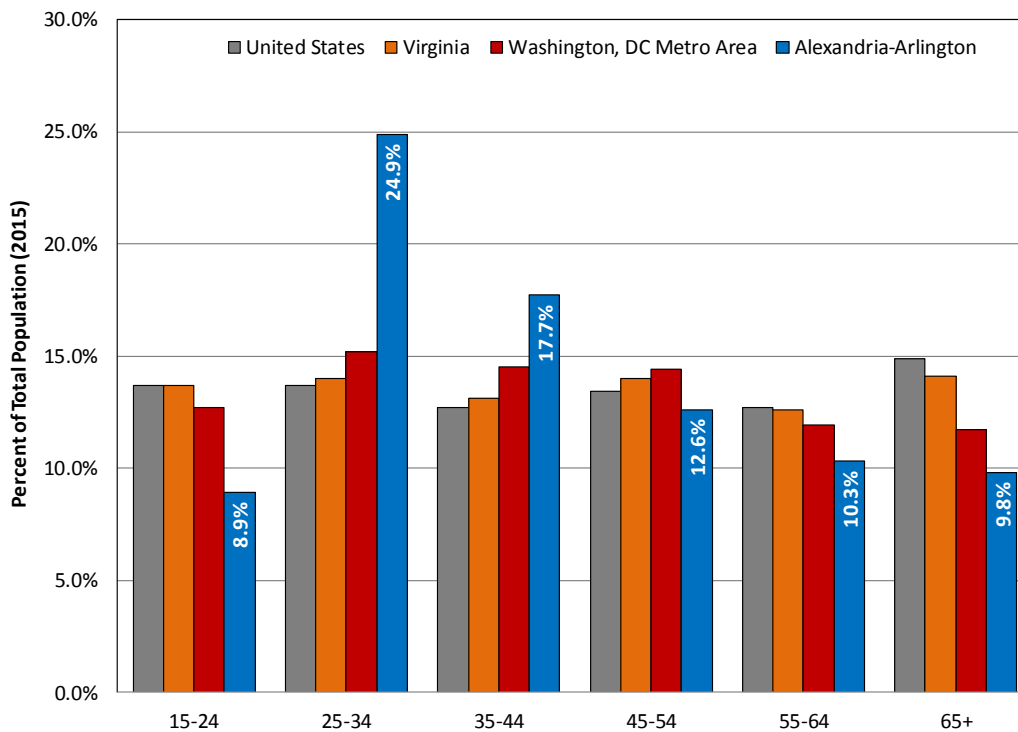
⁵ <https://www.mwcog.org/documents/2016/08/01/cooperative-forecasts-employment-population-and-household-forecasts-by-traffic-analysis-zone-cooperative-forecast-demographics-housing-population/>

particularly housing) forcing people to look elsewhere—be it in the broader metro area or the country. Similarly, the local economic slowdown caused by federal budget cuts and sequestration led to fewer employment opportunities. As a result, recent graduates or job seekers may look to other markets that offer equally attractive career opportunities in more affordable locations.

It is important to note that these trends are not exclusive to Alexandria/Arlington. The Washington metro area's Maryland suburbs (e.g., Montgomery and Prince Georges County) have experienced similar domestic outmigration during this time period. Within the broader Washington metro area and Northern Virginia, net domestic out migration has been occurring since 2013. In fact, only the District of Columbia has continued to attract more domestic in-migrants than it has lost.

Regardless, this is an issue for which the Alexandria/Arlington region must pay attention. For the region to continue to thrive it must continue to be an attractive place for people to work and live. Therefore, it must not only continue to attract residents, but also remain a desirable location for its existing residents. Moreover, since new international migration has become one of the area's primary sources of net new population growth, the region must continue to be an attractive and welcoming destination for international talent as well.

Figure 3: Percent of population by age cohort



Source: US Census Bureau, 2015 American Community Survey

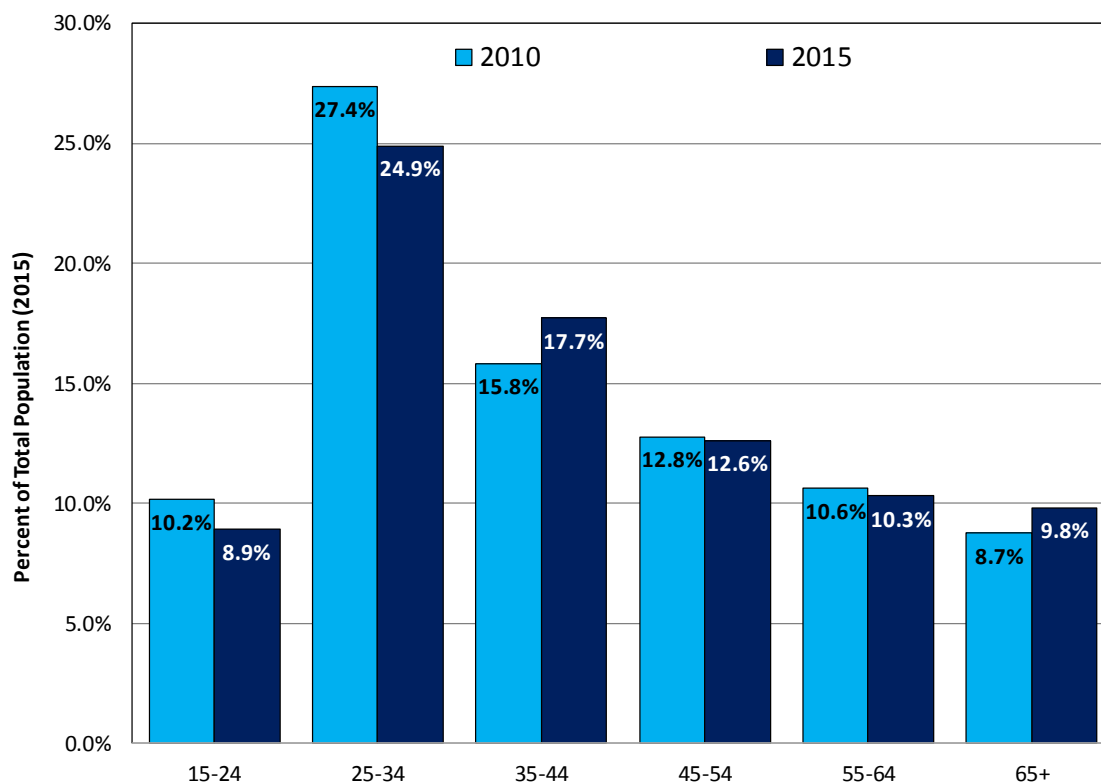
Age structure

The age of a region's population will in many ways influence the current and future structure of its workforce. Figure 3 shows that Alexandria/Arlington's population by different age cohorts relative to the nation, state and metro area. What becomes readily apparent is that the region's age composition presents a very different set of opportunities and challenges than those facing many other parts of the country. Many places nationwide are concerned about an aging population and the impact of the graying of the workforce and retiring baby boomers. However, this is less a concern in Alexandria/Arlington.

Alexandria/Arlington has a disproportionately younger population, not only relative to the state and the nation but also the broader Washington metro area. The region's recent population growth has been fueled in large part to many young, educated workers moving to Alexandria/Arlington for their first professional jobs in the region or in the metro area. As a result the region has almost twice as great a share of residents aged 25 to 34 (24.9 percent), than the US overall (13.7 percent). Alexandria/Arlington has significantly more workers within the prime working years of 25 to 54 (55.2 percent) than the metro area as a whole (44.1 percent).

While these younger residents provide a real workforce advantage, they workers are also more mobile and less entrenched in the region. As a result, keeping these younger residents in Alexandria/Arlington will be a more difficult task. As noted above, the region has experience net domestic out-migration since 2011 due to a variety of factors including the slumping regional economy due to the recent budget battles and

Figure 4: Change in age distribution in Alexandria-Arlington



Source: US Census Bureau, 2015 American Community Survey

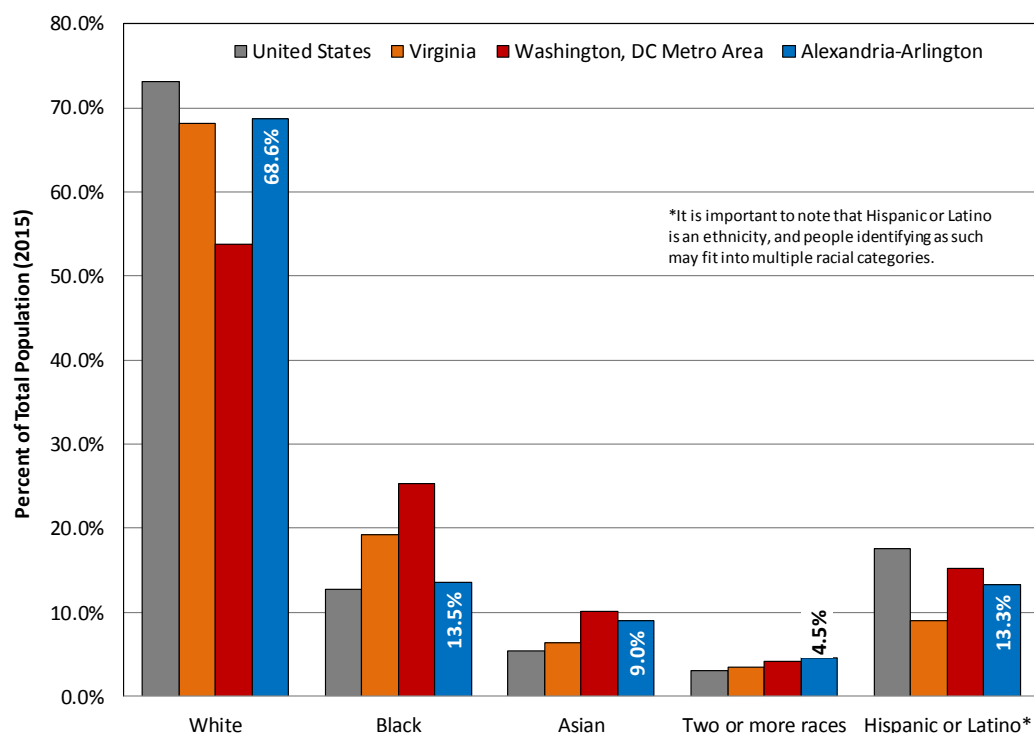
sequestration. However, the high cost of living—particularly as it relates to housing—is another factor that drives many of the region’s residents to other locations. As these residents look to start families or purchase homes, the high cost of living often drives them toward other locations in Northern Virginia or elsewhere in the country. Figure 4 shows that the share of Alexandria/Arlington’s population aged 25-34 declined by 2.5 percent since 2010, while the share of population aged 35 to 44 increased by 1.9 percent. As a result, we can surmise that some of these residents are aging in place. The extent to which these patterns continue will be greatly influenced by factors related to cost of living and the overall health of the regional economy.

Racial and ethnic diversity

As the region’s racial and ethnic composition changes, so too will its workforce. Figure 5 shows Alexandria/Arlington’s racial and ethnic composition as compared to the nation, state, and the Washington, DC Metro region. Alexandria/Arlington lacks the diversity found in the rest of the metro area. Over 68 percent of Alexandria/Arlington’s population is white, which is similar to the state and slightly less than the nation. However, the Washington DC metro area is close to becoming a minority-majority region. The proportion of black residents is almost twice as great (25.3 percent) in the broader metro area than it is in Alexandria/Arlington (13.5 percent). The proportion of Asian and Hispanic or Latino residents is also greater in the broader Washington, DC metro area than it is Alexandria/Arlington.

Within Alexandria/Arlington, these trends remained largely constant between 2010 and 2015. The share of black and Hispanic residents has remained roughly same during that period, and the Asian population increased slightly (7.7 percent in 2010 to 9 percent in 2015). Regional stakeholders noted that a relative

Figure 5: Percent of population by race and ethnicity



Source: US Census Bureau, 2015 American Community Survey

lack of diversity, particularly within the middle classes, may pose a challenge for the region as it may diminish the region's attractiveness to the best available talent. Given the choice, talented African-American or Hispanic workers may opt to live in other places in the metro area with more diverse populations.

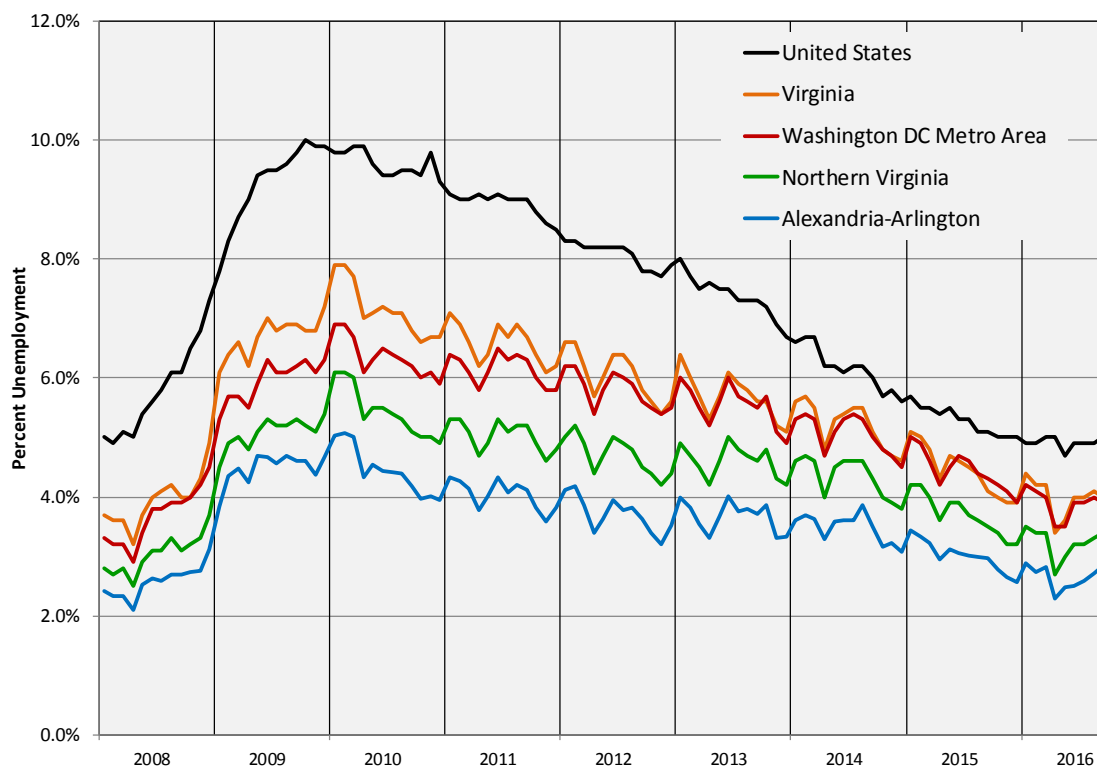
The region's workforce

Labor force

The size of a region's labor force offers an indicator of its economic strength. A large, growing labor force indicates that there are sufficient employment opportunities to attract people to the region and motivate them to participate in the labor force. In July 2016, Alexandria/Arlington's labor force included over 241,000 workers—the highest it had been since the recession. During the recession, the nadir occurred in February 2010 when the region had only 223,000 workers in the labor force. Much like the region's population, these workers were split roughly 60-40 between Arlington and Alexandria.

The region's labor force differs—particularly from the rest of the Commonwealth—in several distinct ways. First, Alexandria/Arlington has relatively lower unemployment rates than the region, state and nation. In September 2016, unemployment was only 2.8 percent, or almost half of the national rate of 5.0 percent. Figure 6 shows that the unemployment rate peaked during the first quarter of 2010. For the region, this meant an unemployment rate of 5.1 percent, which translates into approximately 11,300 unemployed

Figure 6: Unemployment trends (2008-2016)



Source: US Bureau of Labor Statistics, Local Area Unemployment Statistics

workers. In spite of this, the region's unemployment rate was almost half of the national unemployment rate. This figure was also lower than the state and the metro area which had unemployment rates just below 8 and 7 percent, respectively. Northern Virginia overall was just above 6 percent during this period. In spite of the regional challenges related to federal budget cuts and sequestration, the region's labor force has continued to grow and attract new workers.

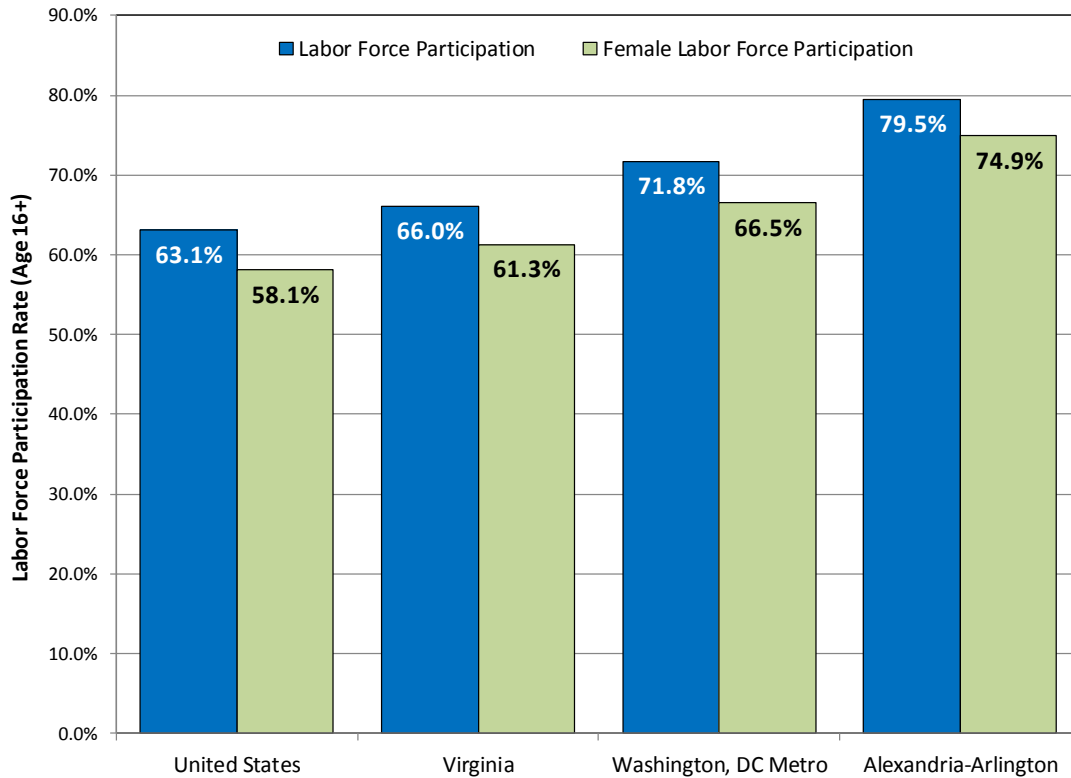
The region's unemployed are somewhat reflective of its population and workforce. As a result, the characteristics of Alexandria/Arlington's insured unemployed differ from the Commonwealth of Virginia in a several distinct ways, particularly as it related to the age and the educational attainment level of claimants. According to the Virginia Employment Commission, between September 2015 to September 2016 period, 750 workers claimed unemployment insurance in Alexandria/Arlington (Local Workforce Investment Area XII).⁶ Almost a third of these workers claiming unemployment insurance (30.4 percent) were between the ages of 25 and 34, whereas statewide this figure was 23.6 percent. By contrast, workers aged 45 to 54 was age cohort comprising the largest share of unemployed workers (24.9 percent), but in Alexandria/Arlington this age cohort had the third most unemployed workers behind workers aged 25 to 34 and 35 to 44. Given the relative youth of the region's workforce, this is not entirely surprising.

The area where the region diverges from the state is the share of unemployed by educational attainment level. Throughout the Commonwealth of Virginia, 40.5 percent of the insured unemployed workers between September 2015 and September 2016 had a high school degree or less; in Alexandria/Arlington this group accounted for only 20 percent of the insured unemployed. Conversely, workers with a bachelors' or graduate degree comprised 25.5 percent of the Commonwealth's unemployed, but in the region this group made up over half (55.9 percent) of the Alexandria/Arlington's unemployed workers. This may seem counterintuitive, but again it is important to remember that, 1) the region has a very low unemployment rate, and 2) it is reflective of the region's population and workforce where (as will be shown below) these workers represent a larger share of the total workforce.

In addition to the low levels of unemployment, the other characteristic of Alexandria/Arlington's labor force that sets it apart is its high rate of labor force participation. Figure 7 shows the labor force participation for the population aged 16 and older. Nationwide, 63 percent of the population aged 16 and older participated in the labor force, a figure that has slowly been declining due to the retirements of the Baby Boom generation. However in Alexandria/Arlington this figure is much higher at almost 80 percent, a figure that far exceeds both the state and the broader Washington, DC metro area.

⁶ These data are drawn from the Community Profiles available on the Virginia Employment Commission website: http://virginialmi.com/report_center/community_profiles/5115000452.pdf

Figure 7: Labor force participation rates (Population aged 16+)



Source: US Census Bureau, 2015 American Community Survey

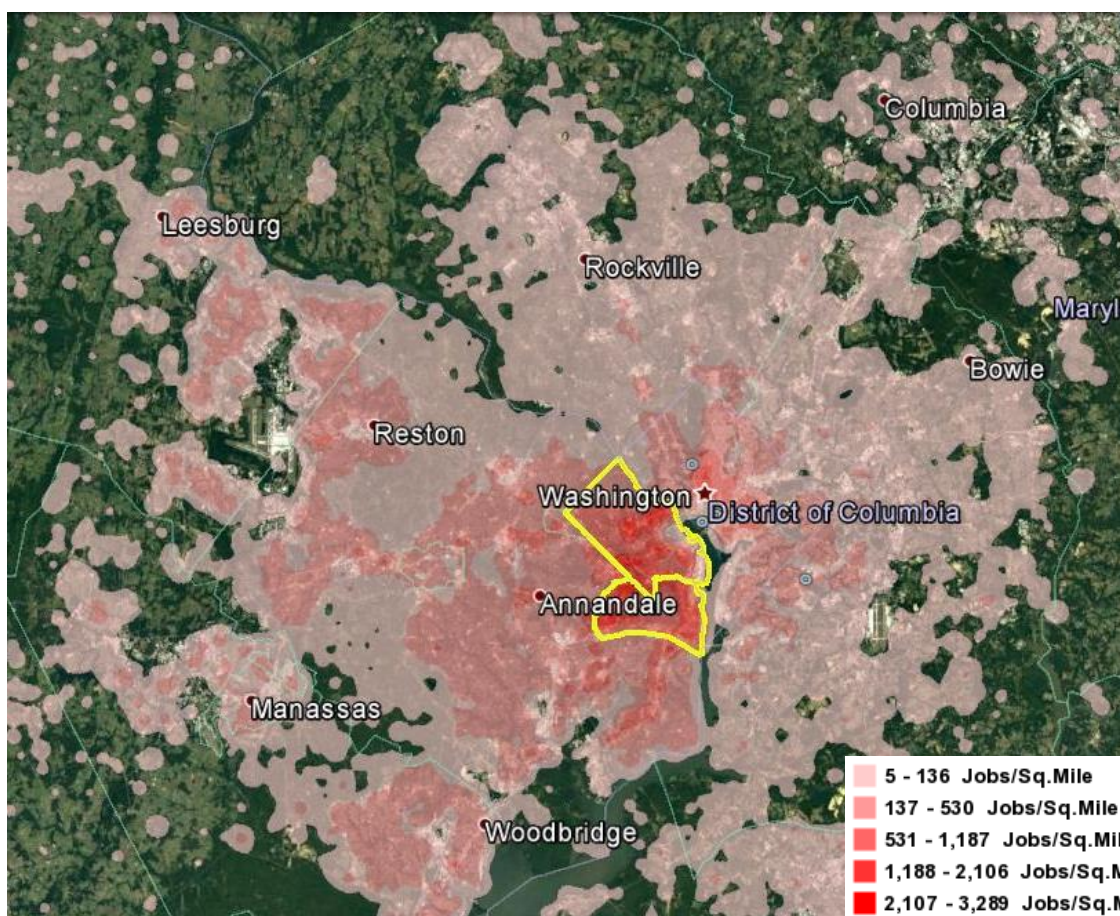
Several factors contribute to these higher rates. One is basic demography as the region has more people of prime work age. However, the region also has a highly educated workforce and many of these workers are able to stay in the workforce longer since their work may be less physically demanding than places that have larger numbers of workers in manufacturing or the trades. In fact, 28.3 percent of the region's population aged 65 and older remains in the labor force, which is 11 percent higher than the national participation rate for this age cohort. Where the labor force participation patterns diverge from the rest of the region, commonwealth and country is for the youth population. Among residents aged 16 to 19, fewer than 30 percent participate in the labor force as opposed to roughly 38 percent in the nation and state, and 36 percent in the broader metro area. This may be partly explained by the region's relative affluence as it may be less financially necessary for teenagers to find work.

Commuting and the regional labor shed

Alexandria/Arlington remains an employment center as more people come to the region to work, than residents that work outside of Alexandria/Arlington. That said, these two jurisdictions are very much connected to the larger Washington, DC metro area. According to the US Census Bureau's Longitudinal Employer-Household Dynamics program⁷ approximately 238,000 people worked in Alexandria/Arlington in 2014, of which only about 48,000 (20 percent) lived in the region. Similarly there were roughly 187,000 workers living in the region in 2014, but 139,000 of those workers (75 percent) worked outside of Alexandria/Arlington.

Figure 8 and 9 show the commuting patterns for Alexandria/Arlington workers and residents, and these patterns have remains relatively consistent since 2010. Like many places throughout the broader metro area, more central jurisdictions draw in workers. This is due in part to the region's high housing costs leading many workers to live in more affordable, but less central, locations. Figure 8 highlights the places where residents working in Alexandria/Arlington live. In addition to the 20 percent of workers who live in

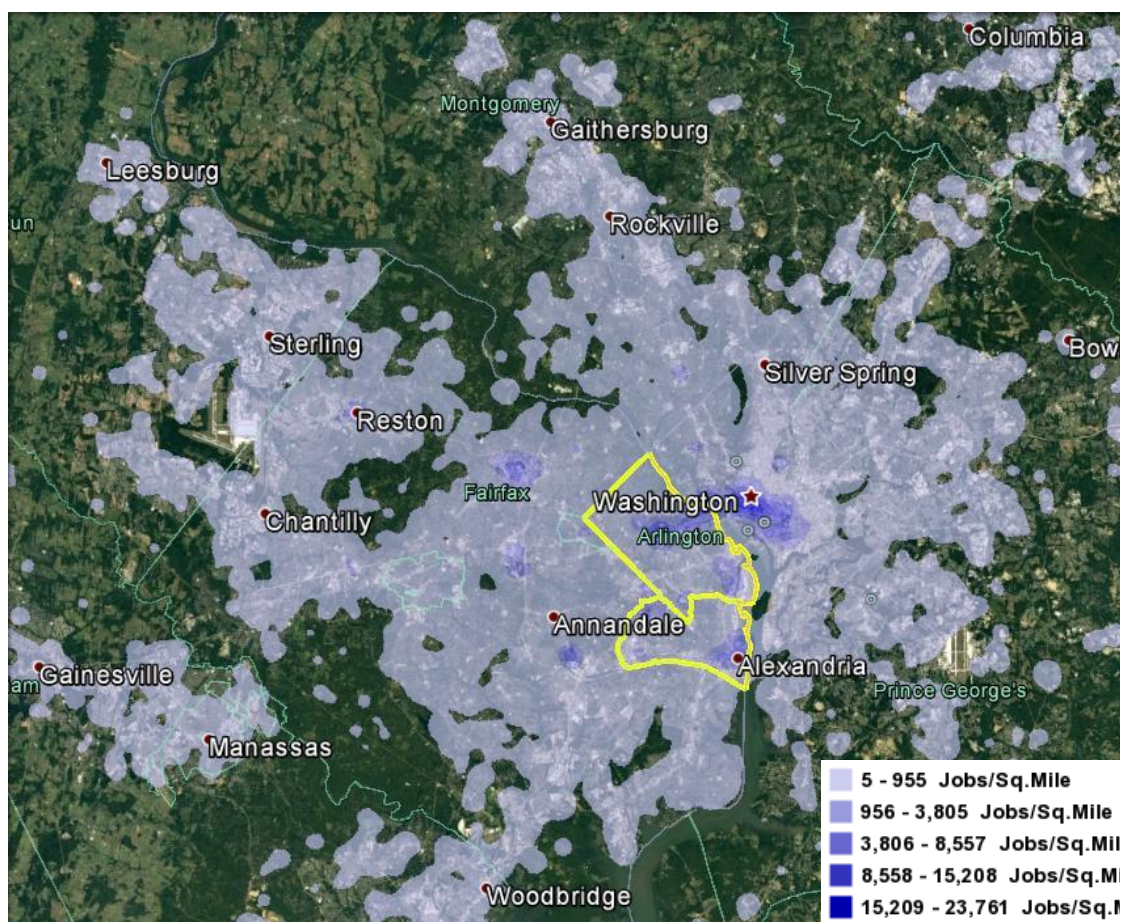
Figure 8: Home location of workers that work in Alexandria-Arlington (2014)



Source: US Census Bureau, Local Employment Dynamics, OnTheMap

⁷ <http://lehd.ces.census.gov/>

Figure 9: Work location of workers that live in Alexandria-Arlington (2014)



Source: US Census Bureau, Local Employment Dynamics, OnTheMap

Alexandria/Arlington, a significant number of the region's workers (29 percent) live in Fairfax County. Beyond Fairfax County the region draws more evenly from throughout the entire Washington metro area. For instance, residents of Prince Georges County (MD), the District of Columbia, and Prince William County (VA) each account for about 7 percent of the Alexandria/Arlington workforce, while Loudoun County (VA) and Montgomery County (VA) residents each represent about 5 percent.

As seen in Figure 9, commuting patterns for Alexandria/Arlington residents differ from those that work in the region. In addition to the 25 percent of residents that worked in the Alexandria/Arlington, 32 percent of the region's residents worked in the District of Columbia. After the District and Alexandria/Arlington, Fairfax County was the third largest work destination for area residents as approximately 24 percent worked in places like Tysons Corners and Springfield in Fairfax County. Beyond these jurisdictions, Alexandria/Arlington residents worked in smaller numbers in other places around the region. For instance, 3.8 percent worked in Montgomery County (MD), 2.6 percent in Prince Georges County (MD), and less than 2 percent of Alexandria/Arlington residents worked in Loudoun and Prince William Counties in Virginia.

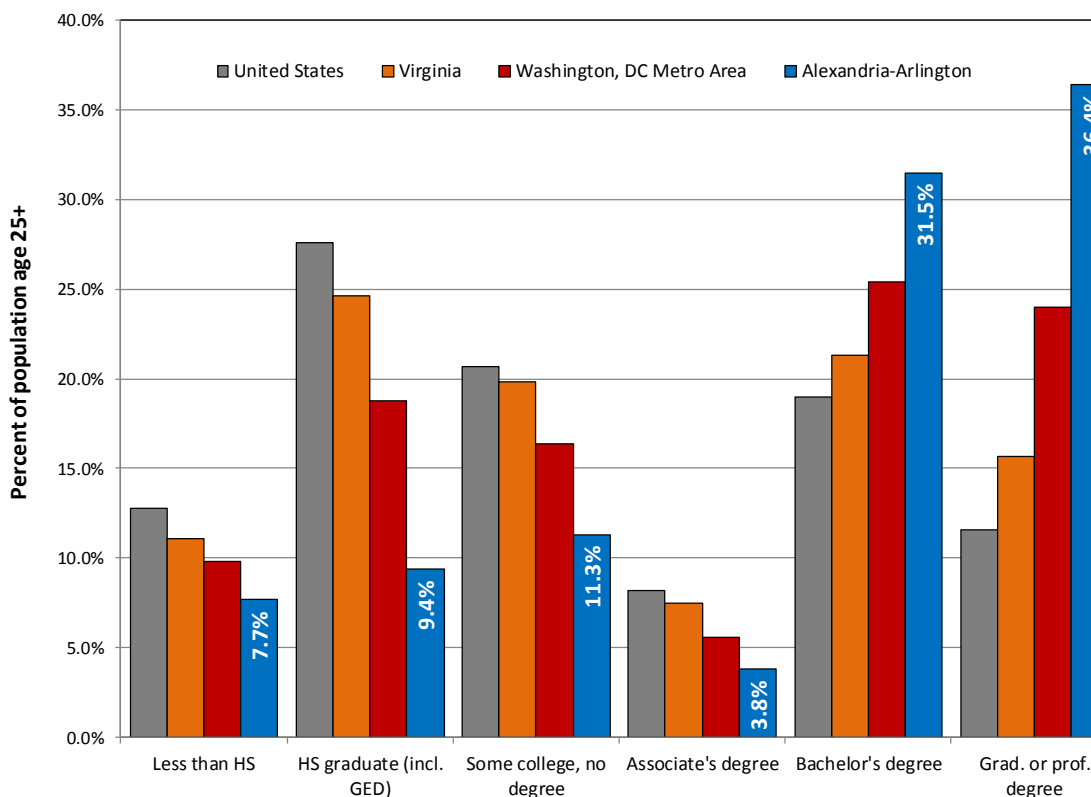
Educational attainment

Among the workers that live in Alexandria/Arlington, many have high levels of educational attainment and this provides Alexandria/Arlington with a significant workforce advantage. Figure 10 shows that more than two-thirds of the region's population aged 25 and older have at least a bachelor's degree. This is more than twice the national average (30.6 percent) and more than 18 percent higher than the Washington metro area as a whole (49.4 percent). Moreover, 36.4 percent of the region's population (Age 25+) has a graduate or professional degree—more than three times as great as the nation (11.6 percent) and more than twice as great as the Commonwealth of Virginia (15.7 percent). At the other end of the educational spectrum, only 17 percent of the population (Age 25+) has a high school degree or less which is less than half of proportion of population in nation and Virginia.

As noted above, the region's net domestic out-migration has been offset in part by net international immigration. The foreign-born population influences educational attainment at both ends of the educational spectrum. For instance, foreign-born residents represent 77 percent of the population age 25 plus that lacks a high school degree. At the other end of the spectrum, foreign-born residents comprise 20 percent of residents with a graduate or professional degree. As a result, the foreign-born population presents both challenges and opportunities for the region.

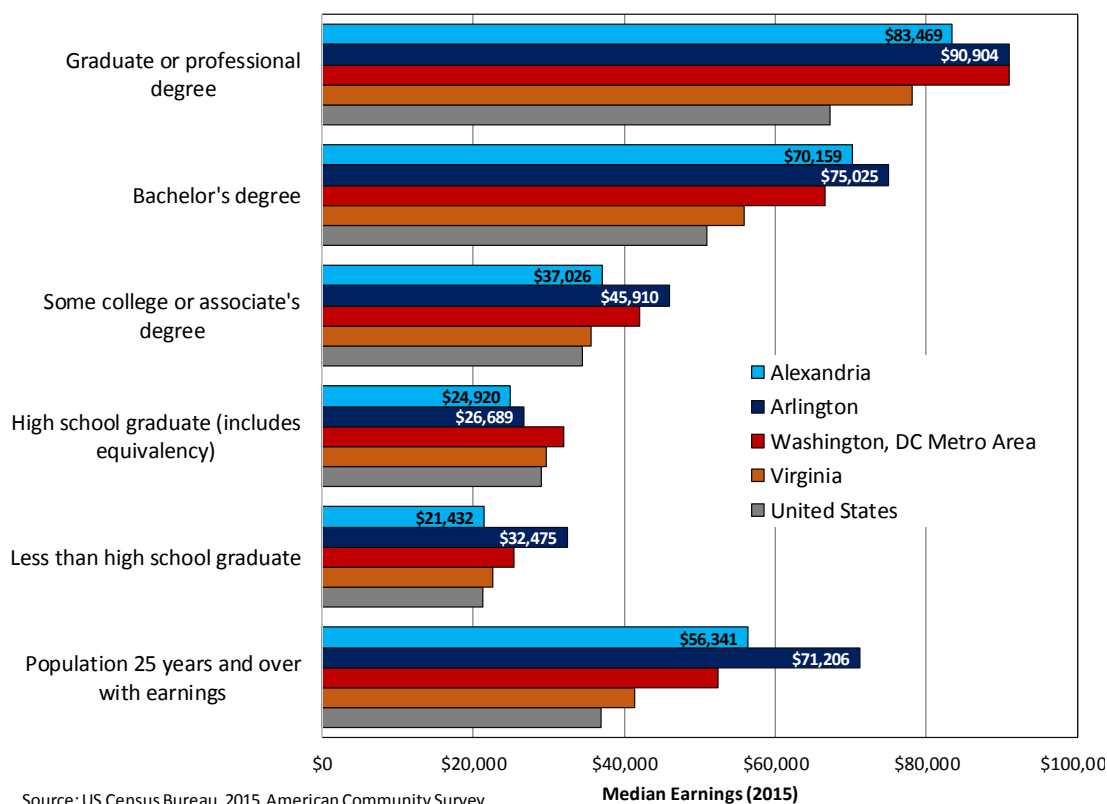
These data are important because they speak to the region's capacity to build and grow an innovative economy. Greater levels of educational attainment are also generally associated with greater earning

Figure 10: Educational attainment by percent of total population (age 25+)



Source: US Census Bureau, 2015 American Community Survey

Figure 11: Median earnings by educational attainment level (age 25+)



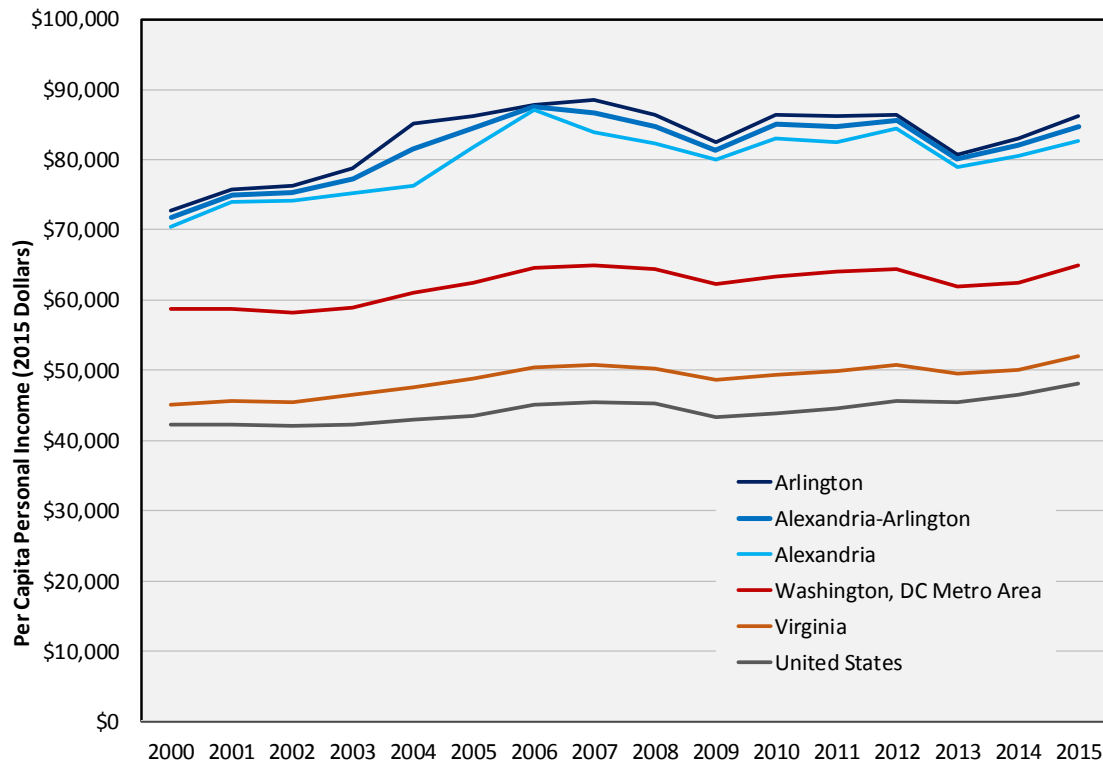
potential. Figure 11 shows median earnings by educational attainment level.⁸ Workers with higher levels of educational attainment are more likely to earn a higher salary. This is not true not just for workers with bachelors or graduate degrees, but also for workers who pursue associates degrees or some kind of post-secondary training. In the long run, these differences can be significant. For instance, over a 40 year career a worker in Alexandria or Arlington with a bachelor's degree is likely to make close to \$2 million more than a worker with just a high school degree.

Income and poverty

Driven in part by the demand for highly skilled and educated workers, Alexandria/Arlington is a relatively high income area. According to the US Bureau of Economic Analysis, the region's 2015 per capita annual income was almost \$85,000. Per capita incomes are therefore approximately 75 percent higher than the nation, 60 percent higher than the state, and 30 percent higher than Washington metro area. Figure 12 shows per capita income (adjusted for inflation) since 2000. In spite of some significant declines during the recession and sequestration, the region's per capita income is now 18 percent higher than it was in 2000. Consequently, incomes in the region have grown faster than the nation (13.9 percent), state (15.3 percent), or metro region (10.6 percent) during the same time.

⁸ Since these are median earnings, we were unable to create a weighted average for Alexandria-Arlington region. As a result, Alexandria and Arlington are listed separately.

Figure 12: Per capita personal income (2000-2015)



Source: US Bureau of Economic Analysis, Adjusted for inflation using Bureau of Labor Statistics (BLS) Consumer Price Index

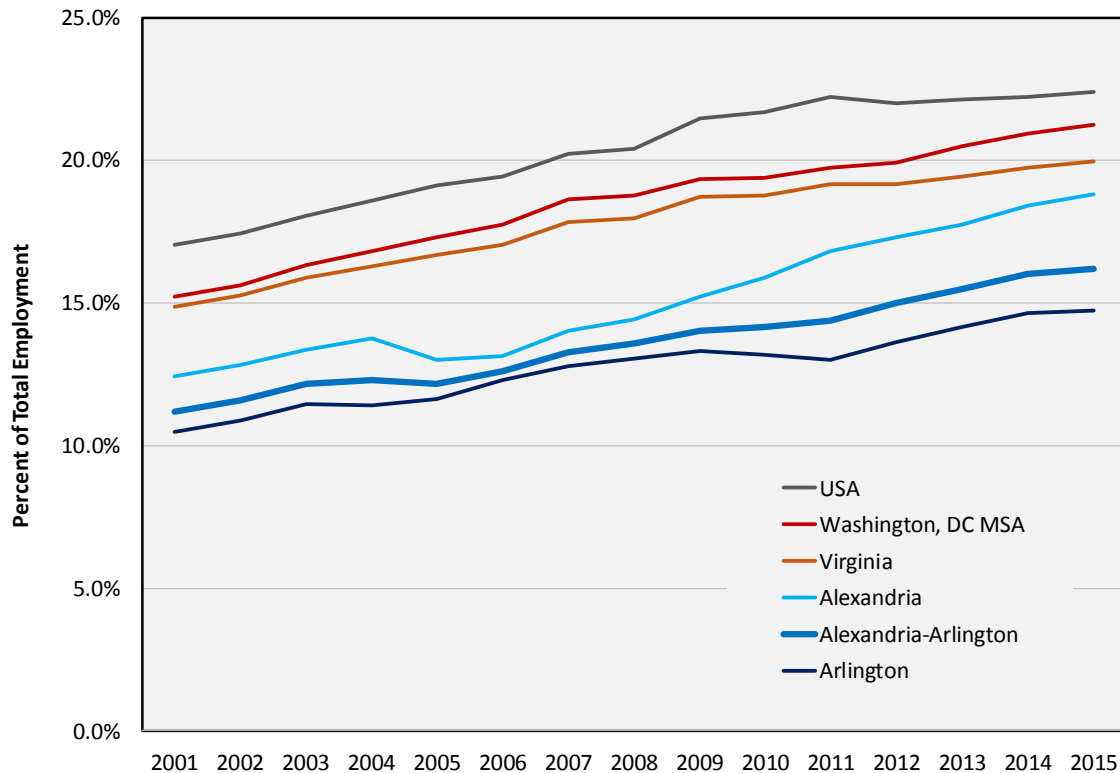
This is not to say that all area residents have high incomes. According to the 2015 American Community Survey, 4.8 percent of Alexandria/Arlington families lived in poverty. Albeit lower than metro area, state and nation, this still represents 3,850 families. Slightly more than half of those families, were female-led households. Nevertheless, the region's poverty rate has been declining over the past half-decade as it is down from 6.3 percent in 2010. Part of this is due to a growing economy, but it is also the result of many families being unable to afford to live in Alexandria/Arlington. As a result, lower income families are forced to look outside the region for more affordable places to live.

Entrepreneurship and self-employment

Self-employment allows many workers to supplement their current wages or take charge of their own employment future. Self-employed workers engage in a variety of activities ranging from management consultants to real estate agents to artists. According the US Bureau of Economic Analysis, proprietors employment accounted for 56,300 jobs or approximately 16 percent of the region's total employment in 2015. In Alexandria proprietor employment represented 18.8 percent of total employment, while in Arlington they comprised at 14.7 percent of total employment. However, both jurisdictions were below the national (22.4 percent), state (19.9 percent) and metro area (21.2 percent) proportions.

Figure 13 shows how these figures have changed since 2001. These figures have grown steadily over the past 15 years. Even though growth in Alexandria and Arlington has not been as fast as the DC metro area, the region's annual growth rate—and particularly in Alexandria—has been faster than either the state or

Figure 13: Sole proprietors as a percent of total employment



Source: US Bureau of Economic Analysis

the nation. It should be noted that higher proportions of self-employment does not always indicate economic strength. Rural places often have high levels of self-employment because many of their residents must engage in entrepreneurship out of necessity, rather than opportunity. A relative lack of wage and salary jobs may force many workers to create their own opportunities because none are available or they need to generate supplemental income.

The average annual income for proprietors in Alexandria/Arlington was \$38,300 in 2015—a figure higher than the nation, state and metro region. While some residents are able to generate their primary income through self-employment, but this figure is well below the region’s average wage. As a result, we can infer that for many others in the region self-employment is often a vehicle for generating supplemental income.

It is also important to note that regional entrepreneurial capacity can be reflected in more ways than just self-employment. For instance, wage and salary workers can demonstrate their entrepreneurial capacity by identifying new ways to develop new products or processes. Their capacity to do this is often reflected in a region’s level of educational attainment. As noted above, this is one area where Alexandria/Arlington and the entire Washington, DC metro area have a real workforce advantage.

Workforce demand

In order to understand labor demand, we must first understand the region's current economic structure, but also of how the economy has changed and how it is likely to change in the future. It is important to note that the projected data presented here are based on past trends and future projections that consider both existing national and regional trends. Throughout, it is important to remember that the industry and occupational projections present a most likely scenario of what will happen if no major event significantly alters the region's future economic trajectory.

This section begins by looking at the Alexandria/Arlington's broad economic structure, and importantly its reliance on the federal government. It then takes a more medium- to long-term view of the economy by looking at the industries that have grown over the past five years and those that are projected to grow over the next five years.⁹ We examine these trends by first considering whether they are high, medium or low-wage industries. This lens gives us some indication about where opportunities will emerge for different segments of the labor force.

After examining the industry trends, we will then focus our attention on the occupations that have grown and are projected to grow in the region. Again, we segment this analysis by looking at occupations according to their requisite levels of skill and education. These employment trends and projections provide a more medium to long-term perspective. As a result, we also analyze online job advertisements—often referred to as Real-Time Labor Market Information—in order to offer a more current snapshot of labor demand.

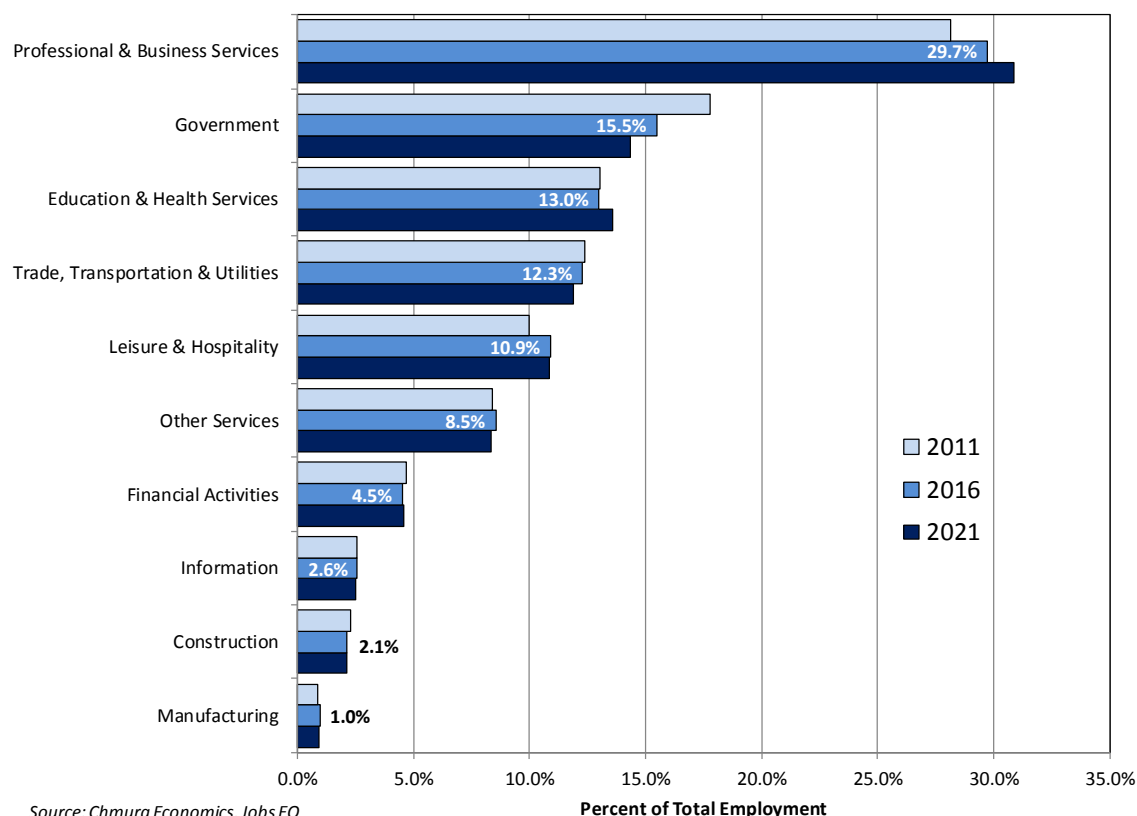
Economic structure

The federal government and its supporting businesses drive much of the Alexandria/Arlington economy. Figure 14 highlights the relative share of employment by sector for Alexandria/Arlington. The professional and business services sector—many of the firms involved in federal contracting—represents the region's largest employing sector. This sector employs approximately 83,000 people or almost 30 percent of the region's economy. High-wage, high skill jobs in the professional, scientific, and technical services industry make up about three-quarters of the sector's total employment. It is a key element of the region's economic base, as it represents activities that bring new money into the region. By contrast, other large sectors such as education and health services; trade, transportation and utilities; and leisure and hospitality contain many activities that rely more on the region's continued population growth.

Looking to the future, the region is projected to add approximately 13,700 net new jobs over the course of the next five years. Figure 14 also shows the industry sectors most likely to be affected by this growth. The two sectors expected to experience the most growth are professional and business services and education and health services. By 2021, the professional and business services sector is expected to account for almost 31 percent of the region's total employment. A growing population will spur continued growth in education and health services. By contrast, direct government employment is projected to continue

⁹ Unless otherwise noted, industry and occupation employment data and projections were provided by Chmura Economics & Analytics (www.chmuraecon.com).

Figure 14: Sector employment as a percent of total employment



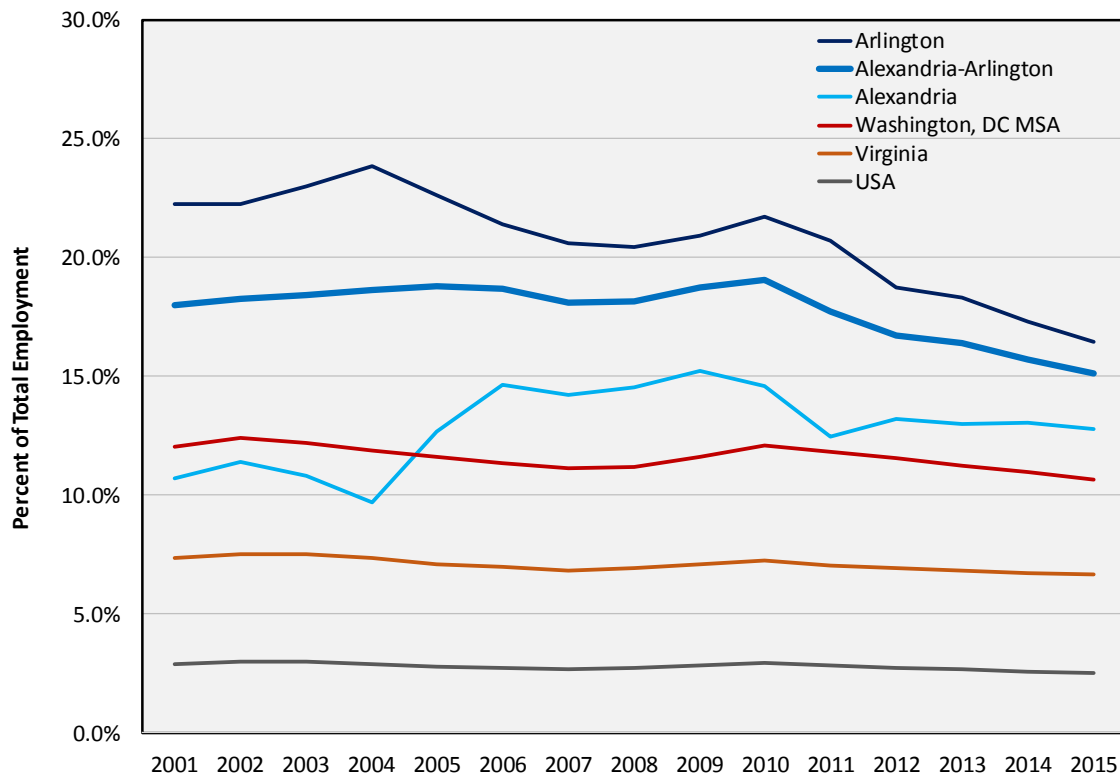
declining both in absolute and relative terms. By 2021, it is projected to be less than 15 percent of Alexandria/Arlington's total employment.

The role of the federal government

It is impossible to discuss the region's economic structure without giving special mention to the federal government's role. Alexandria/Arlington is home to the Pentagon and many other federal agencies (e.g., The National Science Foundation, US Patent and Trade Office). Many regional workers either work directly for the federal government, or for one of the many contractors that rely on federal spending. Over the course of this decade, much of the rest of the country experienced a steady recovery from the recession. However, this was not the situation in Alexandria/Arlington, the rest of Northern Virginia, and the Washington metro area as the broader regional economy experienced significant economic headwinds due to the Budget Control Act and Sequestration.

These challenges become apparent when looking at direct federal employment. In 2015, Alexandria/Arlington was home to 52,600 federal civilian and military jobs. After significant declines between 2011 and 2012, and again between 2013 and 2014, this figure is roughly 11,000 lower than it had been in 2010. Over 80 percent of the net job loss occurred in Arlington. Using data from the US Bureau of Economic Analysis, Figure 15 shows federal employment as a percentage of total employment. Federal jobs now represent 15.1 percent of the region's total 2015 employment, down from 19.1 percent in 2010. As

Figure 15: Federal (civilian and military) employment as a percent of total employment



Source: US Bureau of Economic Analysis

noted above, Arlington was particularly affected as federal employment as a share of total employment is now almost 7.5 percent lower than its peak in 2004.

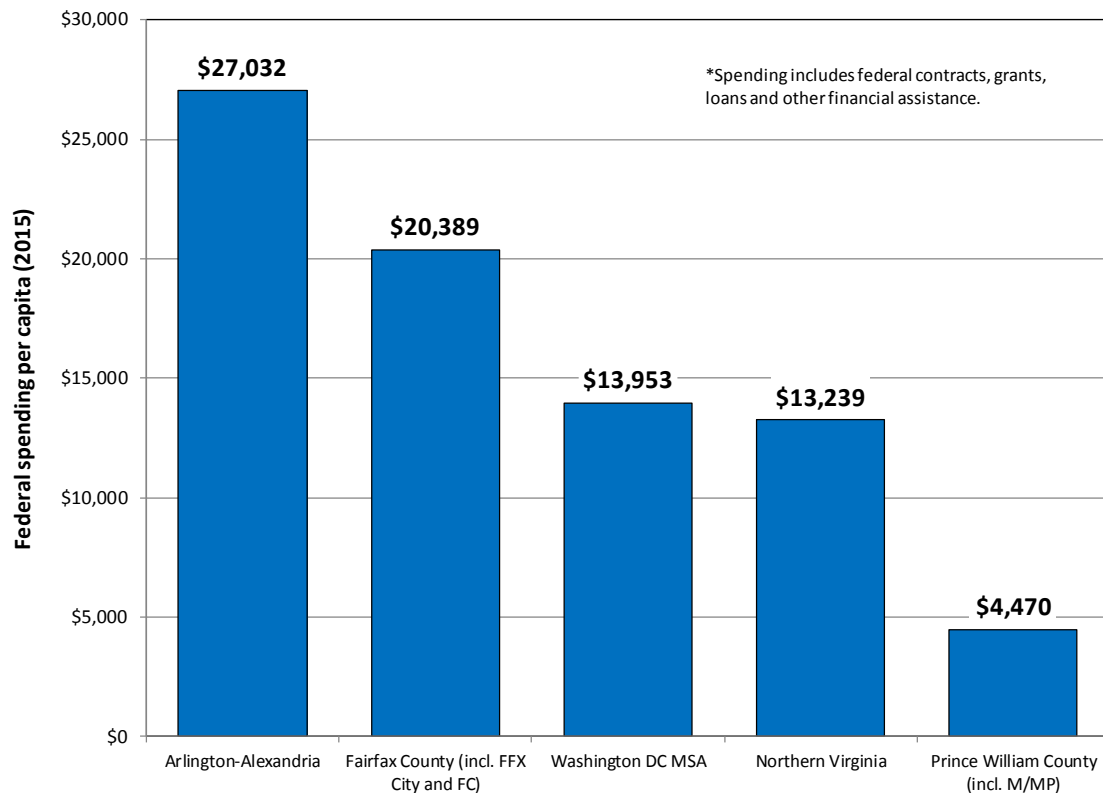
There is more to this than just direct federal employment. In FY 2015, Alexandria/Arlington received about \$10.3 billion in federal contracts, grants, loans and other financial assistance; approximately 80 percent of which went to Arlington. This figure is roughly \$2.5 billion less than what it received in FY 2010.¹⁰ In spite of this reduction in spending, the region remains highly dependent on this government spending. Figure 16 shows that in 2015 Alexandria/Arlington received about \$27,000 in federal contracts for every resident. This was more than Fairfax County (\$20,400 per capita), the DC metro area (\$14,000 per capita), or Northern Virginia overall (\$13,200 per capita).

These trends pose several challenges for the region. First and foremost, the local jurisdictions have little influence over the decisions made about federal employment and spending that so greatly influence the region's economic trajectory. The Washington, DC metro area remains a "company town" and Congress is its board of directors. This reliance on the federal government creates an economy with relatively low levels of economic diversity. Figure 17 uses a Herfindahl Index¹¹—a metric to describe industrial diversity—to

¹⁰ These data are available through the usaspending.gov website.

¹¹ The Herfindahl index is a summary metric that helps to describe economic diversity. In this instance, the index was calculated taking the proportion of each 2-digit NAICS industry within the region and squaring that number. Then, those results were

Figure 16: Federal procurement spending per capita (2015)



Source: USAspending.gov; US Census Population Estimates V2015

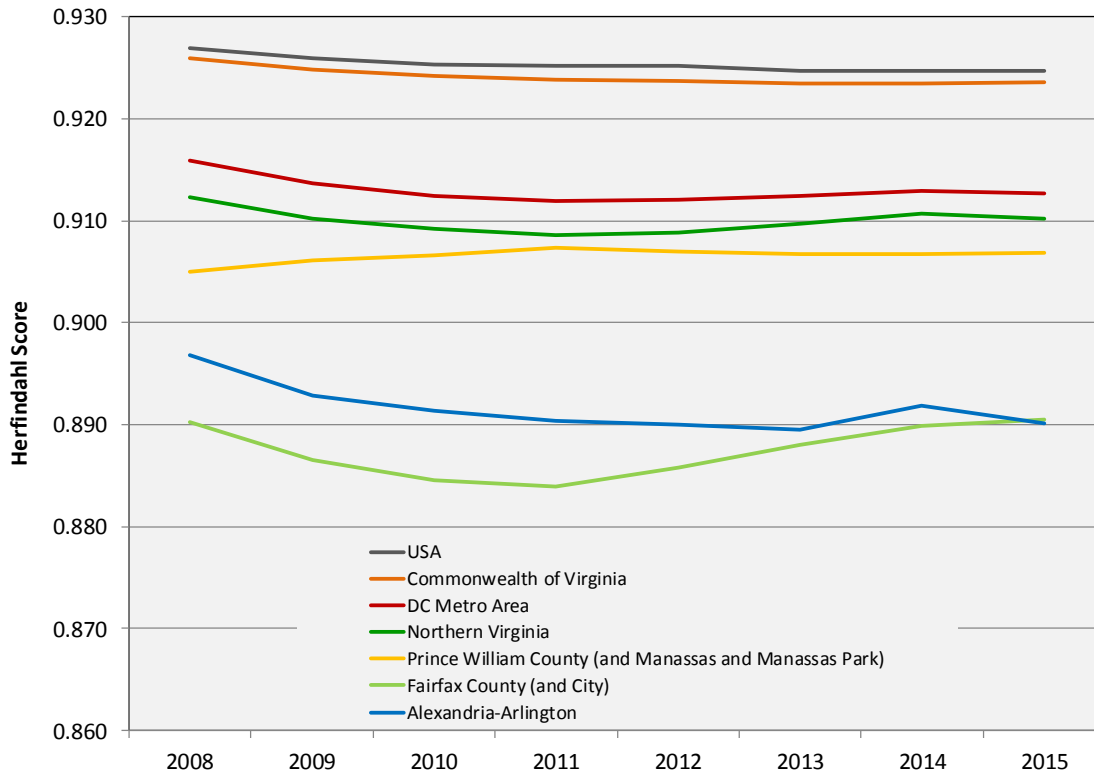
show the economic diversity of Alexandria/Arlington relative to the state, the metro area, and other key jurisdictions in Northern Virginia. What becomes quickly apparent is that jurisdictions like Alexandria/Arlington and Fairfax County that depend heavily on the federal government employment and contracting have much lower levels of economic diversity than the Washington, DC metro area or the broader Northern Virginia region. The consequence of this overreliance on the federal government is that it hinders Alexandria/Arlington's ability to mitigate risks to its economy and limits its ability take advantage of new opportunities. Moving forward, the extent to which the firms rely on federal contracts can pivot away from federal customers and toward other markets will go a long way in determining the future shape of the regional economy.

Detailed industry trends and projections

The data discussed above that looks at the region's economic sectors can provide important insights into the region's broad economic trends and demonstrate the continued importance of government and advanced professional and business services to the Alexandria/Arlington and Washington, DC metro economies. More detailed industry analysis can help to identify growth opportunities in more specific industries. This section will consider past and future projected employment trends for industries at the 4-

summed across all the industries and those sums were subtracted from 1. In a hypothetical perfectly diverse economy, the summed value would be 1.

Figure 17: Industrial diversity



Source: Chmura Economics, JobsEQ

digit NAICS level. This analysis will allow us to identify the industries that will generate current and future employment opportunities.

However, not all industries are alike and the type of workers that will likely benefit from the opportunities in high-wage industries is different than those who find opportunities in lower wage industries. Within the Alexandria/Arlington region, the average annual wage for all industries in Alexandria/Arlington was \$80,500.¹² As a result, we consider employment trends for industries that pay well above the average wage (120 percent or more of the average wage), around the average wage (80 to 120 percent of the average wage) and those that pay well below average wages (less than 80 percent of the average wage).

The data presented below show employment trends for 4-digit NAICS industries between 2011 and 2016. In 2011 the economy had recovered somewhat from the recession, but would slow in the intervening period due to federal budget battles and sequestration. Since mid-2014, however, the economy has once again continued to grow. As a result, these two years represent comparable places in the business cycle. We also consider those industries that are likely to create employment opportunities moving forward. As a result, we include data on the number of replacement jobs (e.g., back filling retirees) and jobs created by growth (e.g., to meet increased aggregate demand). It is important to reiterate that projections provide an informed estimate of what is likely to happen if there are no major significant economic disruptions. Given

¹² Chmura Economics, JobsEQ, 2nd Qtr 2016.

the region's reliance and the federal government and the uncertainty surrounding a new administration, this is particularly important to keep these caveats in mind.

Employment trends and projections in high-paying industries

Industries that pay average wages in excess of 120 percent of the average wage account for 45 percent of all the region's jobs. Figure 18 lists the 10 industries that experienced the most net new employment growth between 2011 and 2016. Two industries—computer systems design and related services, and management, scientific and technical consulting services—each added 5,000 net new jobs during this period. These industries form the core of the professional and business services sector that serves as the region's economic base. Combined, they account for almost half of that sector's total employment and are the primary drivers of its growth. These two industries include many of the region's largest contractors (e.g. Deloitte, Booz Allen Hamilton, SRA International, CACI, SAIC) the serve the federal government.

Other industries with above average wages that have grown over the past half-decade are also representative of the region's other competitive strengths. This includes government activities related to justice, public order and safety which added over 500 net new jobs, and advocacy-related activities such as business, professional, labor, political and similar organizations that added 360 net new jobs. Combined, three financial services related industries—non-deposit credit intermediation; other financial investment activities, and agencies, brokerages; and other insurance related activities—gained over 1,000 net new jobs in the region between 2011 and 2016. These industries include two Arlington-based firms such as Cambridge Associates and FBR Capital Markets Corporation which both employ roughly 300 people. Two information-related industries—data processing and hosting services and newspaper, periodical, book, and directory publishers—each added over 200 net new jobs in the past five years.

Figure 18: Employment trends in high paying industries (2011-2016)

NAICS	Industry	2011 Emp.	2016 Emp.	2011-2016	Average Wage
5415	Computer Systems Design & Related Services	16,080	21,642	5,562	\$123,981
5416	Mgmt, Sci., & Tech. Consulting Services	14,732	20,034	5,302	\$114,409
9221	Justice, Public Order, & Safety Activities	6,404	6,967	563	\$100,012
5611	Office Administrative Services	926	1,371	445	\$97,677
8139	Business, Prof., Labor, Political, & Similar Orgs.	8,659	9,022	363	\$104,568
5222	Nondepository Credit Intermediation	572	919	347	\$137,297
5239	Other Financial Investment Activities	1,304	1,614	310	\$246,137
5242	Agencies, Brokerages, & Other Insurance Related Activities	823	1,117	294	\$112,716
5182	Data Processing, Hosting, & Related Services	947	1,177	230	\$119,532
5111	Newspaper, Periodical, Book, & Directory Publishers	1,635	1,844	209	\$106,633

Source: Chmura Economics, JobsEQ

Looking toward the future, the computer systems design and related services and the management, scientific and technical consulting services will continue to be important sources of net new employment. Figure 19 shows that when considering the demand for workers caused by both replacement and growth, these two industries are expected to hire almost 1,000 new workers annually in the region between 2016 and 2021. Other high paying professional and business services industries expected to create significant numbers of employment opportunities during this period include architectural, engineering, and related services; scientific research and development services; and management of companies and enterprises. Given the nature of these industries' activities and the wages they are able to pay, companies in these industries are more likely to look nationally and internationally to find talent and meet their future labor needs.

Due to the impact of BRAC and sequestration, no high paying industry lost more employment in Alexandria/Arlington than national security and international affairs (mostly through the relocation of Department of Defense personnel and affiliated contractors out of Arlington and to places like nearby Fort Belvoir in Fairfax County) between 2011 and 2016. However, the industry employment projections show that the federal government-related activities will be a source of employment opportunities in the next five

Figure 19: Projected employment trends in high paying industries (2016-2021)

NAICS	Industry	2016 Emp.	Annual Repl. Demand (2016-2011)	Annual Growth Demand (2016-2021)	Total Annual Demand (2016-2021)	Average Wage
5416	Management, Scientific, & Technical Consulting Services	20,034	436	567	1,003	\$114,409
5415	Computer Systems Design & Related Services	21,642	401	546	947	\$123,981
9281	National Security & International Affairs	17,618	404	-112	292	\$118,509
5413	Architectural, Engineering, & Related Services	7,750	176	103	279	\$109,484
9261	Administration of Economic Program	15,156	347	-97	249	\$111,542
8139	Business, Professional, Labor, Political, & Similar Organizations	9,022	180	9	190	\$104,568
9221	Justice, Public Order, & Safety Activities	6,967	187	-8	179	\$100,012
5417	Scientific Research & Development Services	4,456	101	24	124	\$112,066
5511	Management of Companies & Enterprises	3,688	79	29	108	\$159,701
5239	Other Financial Investment Activities	1,614	35	63	98	\$246,137

Source: Chmura Economics, JobsEQ

years. National security and international affairs; administration of economic programs; and justice, public order and safety activities are all projected to create several hundred job opportunities each year. In each instance, however, the employment opportunities will be the result of demand created by the need to replace workers either retiring or leaving public service. As noted earlier, given the uncertainty surrounding the impact of the new administration on the federal workforce, this replacement demand may not materialize as projected.

Employment trends and projections in average-paying industries

The region's industries are somewhat polarized by significant number of jobs in industries that pay above average wages and those that pay below average wages. In the middle, only 17.3 percent of all the region's jobs are in industries that pay average wages that are above 80 percent and below 120 percent of the

region's average wage. As shown in Figure 20, the industries that pay closer to average wages continue to reflect the importance of the region's professional and business services sector. The other professional, scientific and technical services and the investigation and security services industries each added about 800 net new jobs between 2011 and 2016, while the advertising, public relations and related services industry added almost 200 net new jobs during this period.

Figure 20: Employment trends in average paying industries (2011-2016)

NAICS	Industry	2011 Emp.	2016 Emp.	2011-2016	Average Wage
5419	Other Prof., Sci., & Tech. Services	2,228	3,066	838	\$88,800
5616	Investigation & Security Services	2,524	3,308	784	\$76,387
8133	Social Advocacy Organizations	2,285	2,669	384	\$85,814
6212	Offices of Dentists	894	1,108	214	\$69,286
5418	Advertising, Public Relations, & Related Services	1,379	1,567	188	\$87,558
9231	Administration of Human Resource Programs	1,335	1,521	186	\$88,847
4851	Urban Transit Systems	781	941	160	\$87,362
6214	Outpatient Care Centers	582	740	158	\$80,303
6215	Medical & Diagnostic Laboratories	88	202	114	\$85,088
5151	Radio & Television Broadcasting	1,058	1,168	110	\$83,972

Source: Chmura Economics, JobsEQ

Within this group of industries we also begin to find more locally-serving industries—those whose growth depends largely on the region's continued population growth. This is particularly true for several healthcare-related industries such as dentists offices, outpatient care centers, and medical and diagnostic laboratories, which all experienced net employment growth between 2011 and 2016. By contrast, executive, legislative, and other general government support lost more than 1,000 jobs in the region during the period. Building equipment contractors and facilities support services were two other industries that pay close to average wages, but lost significant net employment as they lost 650 and 590 net jobs during

Figure 21: Projected employment trends in average paying industries (2016-2021)

NAICS	Industry	2016 Emp.	Annual Repl. Demand (2016-2011)	Annual Growth Demand (2016-2021)	Total Annual Demand (2016-2021)	Average Wage
4811	Scheduled Air Transportation	6,536	184	19	203	\$90,319
6221	General Medical & Surgical Hospitals	4,333	83	43	127	\$70,740
5419	Other Professional, Scientific, & Technical Services	3,066	63	44	107	\$88,800
5313	Activities Related to Real Estate	2,041	48	56	104	\$70,557
6211	Offices of Physicians	2,290	47	53	100	\$96,376
5612	Facilities Support Services	1,890	47	50	97	\$96,089
5616	Investigation & Security Services	3,308	58	28	86	\$76,387
8133	Social Advocacy Organizations	2,669	55	28	83	\$85,814
5412	Accounting, Tax Preparation, Bookkeeping, & Payroll Services	2,066	48	16	65	\$87,332
5221	Depository Credit Intermediation	1,923	53	5	58	\$74,905

Source: Chmura Economics, JobsEQ

this period, respectively. These industries were likely impacted by the slowdown in federal spending.

Looking ahead, Figure 21 shows that professional and business services-related and healthcare-related industries will continue to be important sources of average paying jobs. The other professional, scientific and technical services industry and investigation and security services industries are expected to create close to 100 openings annually between 2016 and 2021. Facilities support services is also projected to rebound by generation 100 regional job opportunities annually through a combination of growth and replacement jobs. Continued population growth will also mean that healthcare-related industries including general medical and surgical hospitals and doctor's offices will provide another source of average paying activities. Scheduled air transportation is an average paying industry that is projected to have approximately 200 openings per year. This demonstrates the importance of Washington Reagan National Airport not only as a critical element of the region's infrastructure, but also as an employer in Alexandria/Arlington.

Employment trends and projections in lower-paying industries

Just as the region has a large share of its employment in industries that pay above average wages, so too does it have a lot of employment in industries that pay well below the regional average wage. Within Alexandria/Arlington, industries that pay average wages below 80 percent of the average wage account for 37.6 percent of all the region's jobs. Figure 22 identifies the ten relatively low-paying industries that created the most net new regional employment between 2011 and 2016. Almost all of these industries are locally-serving industries whose growth relies upon continued population growth. Restaurants and other eating places added over 2,000 net new jobs in Alexandria/Arlington between 2011 and 2016. Three other industries—services to buildings and dwellings; elementary and secondary schools; and grocery stores—each added over 1,000 net new jobs during this period. Of these industries, only elementary and secondary schools paid an average annual wage above \$30,000.

Figure 22: Employment trends in lower paying industries (2011-2016)

NAICS	Industry	2011 Emp.	2016 Emp.	2011-2016	Average Wage
7225	Restaurants & Other Eating Places	15,814	18,037	2,223	\$22,280
5617	Services to Buildings & Dwellings	5,787	7,332	1,545	\$20,757
6111	Elementary & Secondary Schools	10,282	11,677	1,395	\$59,988
4451	Grocery Stores	3,215	4,310	1,095	\$27,472
7223	Special Food Services	1,056	1,559	503	\$32,691
4853	Taxi & Limousine Service	848	1,258	410	\$20,527
7139	Other Amusement & Recreation Industries	3,112	3,513	401	\$24,657
5613	Employment Services	2,105	2,471	366	\$57,700
4881	Support Activities for Air Transportation	383	702	319	\$26,305
6241	Individual & Family Services	1,648	1,950	302	\$46,914

Source: Chmura Economics, JobsEQ

These relatively lower paying industries also employ large numbers part-time workers and which often have high levels of turnover. Figure 23 shows that many of the employment opportunities in these relatively low-paying industries will be the result of replacing workers, more so than creating new jobs. This is particularly true in retail and service-related industries like restaurants; traveler accommodation; and grocery stores. Industries like elementary and secondary schools which pay comparatively higher wages are projected to create more equal amounts of replacement and growth jobs. Among the ten industries identified in Figure 23, continuing care retirement communities & assisted living facilities for the elderly is the only industry that is expected to create more job opportunities through growth than through replacement jobs. This is likely the outcome of the population's continued aging.

Figure 23: Projected employment trends in lower paying industries (2016-2021)

NAICS	Industry	2016 Emp.	Annual Repl. Demand (2016-2021)	Annual Growth Demand (2016-2021)	Total Annual Demand (2016-2021)	Average Wage
7225	Restaurants & Other Eating Places	18,037	664	153	817	\$22,280
6111	Elementary & Secondary Schools	11,677	267	214	480	\$59,988
5617	Services to Buildings & Dwellings	7,332	173	57	230	\$20,757
7211	Traveler Accommodation	5,678	172	56	228	\$36,445
4451	Grocery Stores	4,310	143	26	168	\$27,472
7139	Other Amusement & Recreation Industries	3,513	110	41	150	\$24,657
5613	Employment Services	2,471	58	37	95	\$57,700
6233	Continuing Care Retirement Communities & Assisted Living Facilities for the Elderly	1,365	30	63	92	\$32,400
4411	Automobile Dealers	2,150	59	28	87	\$63,372
8121	Personal Care Services	1,897	59	28	87	\$32,973

Source: Chmura Economics, JobsEQ

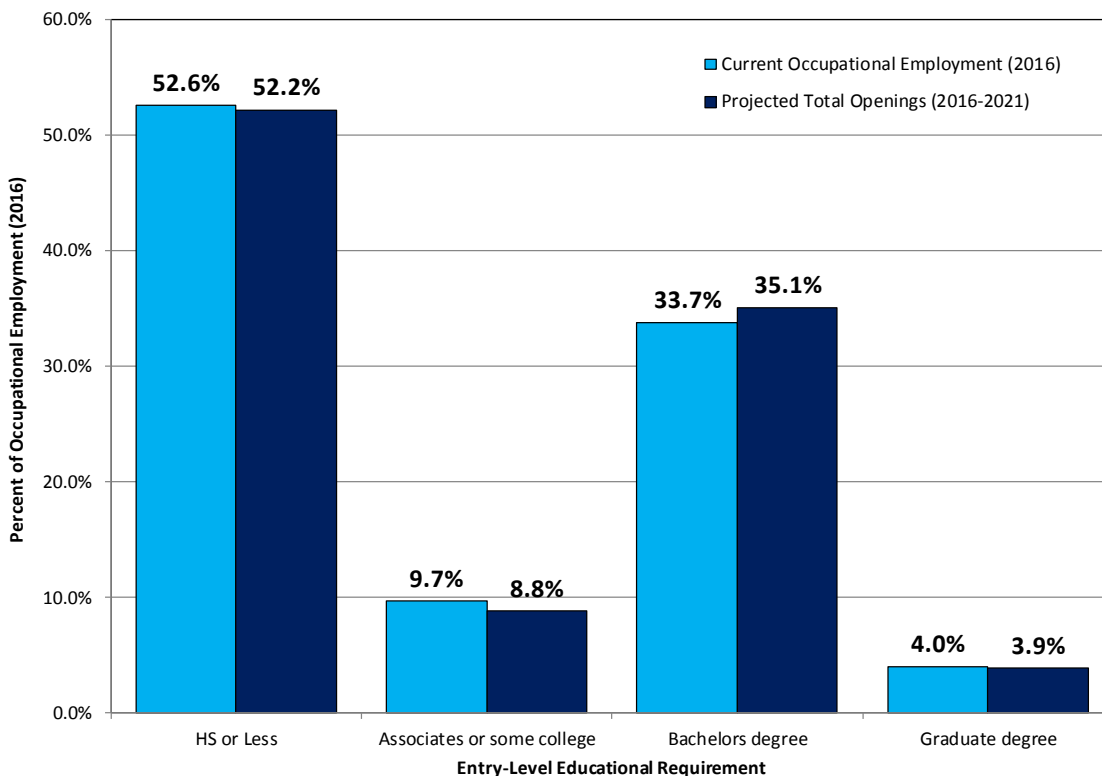
Detailed occupation trends and projections

The data described above provide important insights into what industries have created jobs and are projected to create jobs in the future. Average industry wages, however, only tell part of the story as some high paying industries may also create low-wage, lower-skill jobs and vice versa. By looking at occupational trends and projections we can better understand the types of jobs that are growing and that provides some indication about the kinds of workers that will be needed to fill those jobs.

The region's occupational trends and projections tend to mirror the industry trends and projections. However, whereas industries tell us what companies make, occupations describe what workers do. Workers' educational backgrounds are important considerations for developing strategies that help employers meet their workforce needs and placing workers in appropriate opportunities. More plainly, the strategies for placing workers without a high school degree will differ from those strategies that connect workers with graduate degrees to career opportunities.

To that end, this section will look at growth patterns and projected trends for occupations requiring different levels of educational attainment. Figure 24 shows the percent of occupational employment and projected openings by the entry level educational requirements. Over half of the occupational employment in Alexandria/Arlington is in occupations that require a high school degree or less. Another roughly ten

Figure 24: Percent of occupational employment by minimum education requirements



Source: Chmura Economics, JobsEQ, 2016 Q2

percent of occupational employment falls in more middle-skill jobs that require some post-secondary education, a professional certification, or an Associates' degree. Almost 34 percent of jobs required entry-level workers to have at least a 4-year degree, and four percent require a graduate or professional degree. Figure 24 also shows the education requirements for project openings over the next five years, and these trends are largely consistent with the existing workforce.

This section will examine occupational trends and projected growth based on entry-level educational requirements. As a result, we will focus specifically on those occupations that require at least a 4-year degree, more middle-skill occupations that require some post-secondary education and training, and lower-skill occupations that require a high school degree or less. Many of the workers that fill occupations requiring at least a 4-year degree will be drawn from the broader mid-Atlantic region, the nation and even abroad, but most middle-skill and lower-skill jobs will be filled by a more local talent pool. As a result, the positions that will need to be filled over the next five years provide employment opportunities for local residents as well as an opportunity to bring new, talented workers to the region.

Employment trends in occupations requiring at least a 4-year degree

As noted earlier, government contractors providing management and IT services are core elements of the region's economic base and have driven the region's recent economic growth. Consequently, it is not surprising to see that the number of computer-related occupations has grown significantly over the past five years. Figure 25 shows that Alexandria/Arlington saw growth in the number of software developers, computer programmers and systems analysts, and network and computer systems administrators. These occupations paid average wages close to, or in excess of, \$100,000 annually and the region added several hundred net new jobs in each between 2011 and 2016.

Figure 25: Fastest growing occupations requiring at least a 4-year degree (2011-2016)

SOC	Occupation	2011 Emp.	2016 Emp.	2011-2016	Average Wage	Entry-Level Education
15-1132	Software Developers, Applications	3,314	4,161	847	\$111,200	Bachelor's degree
13-1111	Management Analysts	4,632	5,265	633	\$103,300	Bachelor's degree
15-1121	Computer Systems Analysts	2,297	2,844	547	\$101,700	Bachelor's degree
15-1131	Computer Programmers	1,574	2,004	430	\$98,500	Bachelor's degree
15-1133	Software Developers, Systems Software	1,849	2,246	397	\$118,200	Bachelor's degree
13-1161	Market Research Analysts & Marketing Specialists	1,804	2,146	342	\$74,800	Bachelor's degree
11-1021	General & Operations Managers	5,188	5,478	290	\$147,100	Bachelor's degree
11-3021	Computer & Information Systems Managers	1,373	1,615	242	\$161,300	Bachelor's degree
25-2021	Elementary School Teachers, Except Special Ed.	1,683	1,909	226	\$73,400	Bachelor's degree
15-1142	Network & Computer Systems Administrators	1,254	1,462	208	\$100,500	Bachelor's degree

Source: Chmura Economics, JobsEQ

Management occupations, such as general and operations managers and computer and information systems managers, were among the highest paying growing occupations that required at least a bachelor's degree. These two occupations pay average wages of close to, or in excess of, \$150,000 annually. More modest wages are found in other growth occupations such as market research analysts and marketing specialists, and elementary school teachers that both pay annual wages around \$75,000.

Figure 27: Fastest growing occupations requiring some post-secondary education (2011-2016)

SOC	Occupation	2011 Emp.	2016 Emp.	2011-2016	Average Wage	Entry-Level Education
15-1151	Computer User Support Specialists	1,979	2,374	395	\$61,200	Some college, no degree
25-9041	Teacher Assistants	1,639	1,786	147	\$33,000	Some college, no degree
15-1134	Web Developers	635	764	129	\$85,200	Associate's degree
43-3031	Bookkeeping, Accounting, & Auditing Clerks	3,331	3,456	125	\$46,600	Some college, no degree
15-1152	Computer Network Support Specialists	601	708	107	\$77,700	Associate's degree
39-5012	Hairdressers, Hairstylists, & Cosmetologists	899	1,006	107	\$36,400	Postsecondary non-degree award
25-2011	Preschool Teachers, Except Special Education	574	669	95	\$37,800	Associate's degree
49-3023	Automotive Service Technicians & Mechanics	1,026	1,109	83	\$51,700	Postsecondary non-degree award
31-9091	Dental Assistants	394	457	63	\$42,800	Postsecondary non-degree award
29-2021	Dental Hygienists	208	254	46	\$91,400	Associate's degree

Source: Chmura Economics, JobsEQ

Source: Chmura Economics, JobsEQ

Figure 26 lists the occupations that are projected to grow over the next five years. Many of these occupations are the same management and computer-related occupations that grew in the previous five years. Other occupations within the professional and business services that are projected to grow in the next half decade include lawyers, business operations specialists, and human resources specialists. Several growth occupations listed in Figure 26 pay lower average wages, and they also likely draw more from the local or Washington metro area labor force. These jobs include healthcare-related occupations such as registered nurses and education-related occupations such as elementary and secondary school teachers.

Employment trends in middle skill occupations

There are relatively fewer middle-skill occupations, but these occupations are often important because they provide decent paying employment opportunities for workers that lack a four-year degree. As a result, these jobs are more likely to be filled by workers drawn from the local population. Figure 27 identifies the ten occupations requiring a minimum of an associate's degree, post-secondary certification, or some college that have added the most net new employment over the past five years.

Computer user support specialists added almost 400 net new jobs in the past five years, far more than any other occupation requiring similar levels of formal education. Other growing IT-related jobs included web developers and computer network support specialists, both of which were among the higher paying middle-skill jobs. Other growth occupations requiring this level of education were in healthcare (e.g., dental

hygienists and dental assistants), education (e.g., teachers' assistants and preschool teachers), or some kind of service activity that require training and certification (e.g., hair dressers, auto mechanics).

Figure 28 lists the occupations that are also projected to grow in the future. IT occupations like computer user support specialists and web developers are projected to 90 and 40 workers per year, driven in large part by growth not replacement. The demand for education and healthcare related occupations such as teaching assistants, nursing assistants and licensed practical nurses will be driven by both replacement and growth.

Employment trends in occupations requiring a high school degree or less

Figure 29 shows which occupations requiring a high school degree or less added the most net new jobs between 2011 and 2016. With over 900 net new jobs, the region added more janitors and cleaners than any other occupation requiring a high school degree or less. Food service-related occupations like waiters and waitresses, food preparation workers, and cooks also grew, as did retail occupations like cashiers. With the exception of some sales representatives, all of these jobs paid average annual wages well below the regional average wage.

Given the high cost of living in Alexandria/Arlington, it is very hard for the workers that fill these jobs to live in the region. This poses some real challenges for the region in terms of providing affordable housing or reliable public transportation so that these workers can get to work in a reasonable amount of time. These challenges, combined with relatively low pay and low-skill nature of these jobs contributes to relatively high

Figure 28: Projected total annual demand for occupations requiring some post-secondary education (2011-2016)

SOC	Occupation	2016 Emp.	Annual Repl. Demand (2016-2011)	Annual Growth Demand (2016-2021)	Total Annual Demand (2016-2021)	Average Wage
15-1151	Computer User Support Specialists	2,374	32	61	93	\$61,200
25-9041	Teacher Assistants	1,786	43	31	75	\$33,000
31-1014	Nursing Assistants	1,499	33	27	60	\$29,800
39-5012	Hairdressers, Hairstylists, & Cosmetologists	1,006	42	13	54	\$36,400
15-1134	Web Developers	764	13	26	39	\$85,200
49-3023	Automotive Service Techs. & Mechanics	1,109	35	3	38	\$51,700
29-2061	Licensed Practical & Licensed Vocational Nurses	936	24	11	35	\$50,600
25-2011	Preschool Teachers, Except Special Education	669	19	8	27	\$37,800
31-9092	Medical Assistants	570	12	15	26	\$36,700
23-2011	Paralegals & Legal Assistants	829	18	6	24	\$64,600
49-3011	Aircraft Mechanics & Service Techs.	917	21	2	23	\$66,100
15-1152	Computer Network Support Specialists	708	10	13	22	\$77,700
53-3032	Heavy & Tractor-Trailer Truck Drivers	773	14	7	22	\$45,100
31-9091	Dental Assistants	457	11	8	19	\$42,800
43-3031	Bookkeeping, Accounting, & Auditing Clerks	3,456	33	-14	18	\$46,600
19-4093	Forest & Conservation Techs.	456	20	-2	18	\$48,100
19-4099	Life, Physical, & Social Science Techs., All Other	290	15	1	16	\$60,400
17-3023	Electrical & Electronic Engineering Techs.	440	11	4	15	\$71,500
31-9011	Massage Therapists	278	4	10	14	\$45,700
19-4091	Environmental Science & Protection Techs., Including Health	198	9	4	13	\$57,300

Source: Chmura Economics, JobsEQ

levels of turnover. Figure 30 shows how many annual openings are likely to occur in these relatively low-skill occupations. The majority of total annual demand will be a function of replacement demand more so than growth. With the exception of some sales representatives, first-line supervisors, secretaries and executive assistants, and maintenance and repair workers, all of these occupations pay less than \$40,000 annually.

Figure 29: Fastest growing occupations requiring no post-secondary education (2011-2016)

SOC	Occupation	2011 Emp.	2016 Emp.	2011-2016	Average Wage	Entry-Level Education
37-2011	Janitors & Cleaners, Except Maids & Housekeeping Cleaners	6,399	7,317	918	\$27,500	Less than high school
35-3031	Waiters & Waitresses	4,835	5,493	658	\$26,200	Less than high school
35-3021	Combined Food Prep. & Serving Workers, Incl. Fast Food	4,105	4,692	587	\$21,600	Less than high school
41-2011	Cashiers	3,869	4,262	393	\$23,300	Less than high school
41-3099	Sales Representatives, Services, All Other	2,499	2,851	352	\$77,400	High school diploma or equivalent
43-4051	Customer Service Representatives	4,173	4,519	346	\$39,600	High school diploma or equivalent
53-3041	Taxi Drivers & Chauffeurs	801	1,105	304	\$30,200	Less than high school
35-2014	Cooks, Restaurant	2,193	2,486	293	\$26,900	Less than high school
39-9021	Personal Care Aides	1,484	1,755	271	\$24,600	Less than high school
43-9061	Office Clerks, General	5,628	5,862	234	\$38,500	High school diploma or equivalent

Source: Chmura Economics, JobsEQ

Figure 30: Projected annual demand for occupations requiring no post-secondary education (2011-2016)

SOC	Occupation	2016 Emp.	Annual Repl. Demand (2016-2011)	Annual Growth Demand (2016-2021)	Total Annual Demand (2016-2021)	Average Wage
35-3031	Waiters & Waitresses	5,493	273	32	305	\$26,200
41-2031	Retail Salespersons	5,561	200	39	239	\$27,400
37-2011	Janitors & Cleaners, Except Maids & Housekeeping Cleaners	7,317	148	68	215	\$27,500
35-3021	Combined Food Preparation & Serving Workers, Including Fast Food	4,692	154	49	203	\$21,600
41-2011	Cashiers	4,262	186	10	197	\$23,300
43-4051	Customer Service Representatives	4,519	119	60	178	\$39,600
43-9061	Office Clerks, General	5,862	129	39	168	\$38,500
37-2012	Maids & Housekeeping Cleaners	3,994	106	39	145	\$25,900
41-3099	Sales Representatives, Services, All Other	2,851	73	47	121	\$77,400
35-2014	Cooks, Restaurant	2,486	70	43	113	\$26,900
49-9071	Maintenance & Repair Workers, General	2,860	77	28	105	\$45,400
39-9011	Childcare Workers	2,130	82	22	103	\$26,300
53-7062	Laborers & Freight, Stock, & Material Movers, Hand	2,477	80	17	97	\$29,000
43-6014	Secretaries & Administrative Assistants, Except Legal, Medical, & Executive	5,263	56	33	89	\$43,100
43-5081	Stock Clerks & Order Fillers	2,245	76	12	88	\$28,600
35-9031	Hosts & Hostesses, Restaurant, Lounge, & Coffee Shop	846	65	7	71	\$22,400
43-1011	First-Line Supervisors of Office & Administrative Support Workers	2,651	40	27	67	\$67,200
33-9032	Security Guards	2,922	40	25	65	\$38,400
35-1012	First-Line Supervisors of Food Preparation & Serving Workers	1,500	46	17	63	\$41,500
43-4171	Receptionists & Information Clerks	1,753	46	16	62	\$31,700

Source: Chmura Economics, JobsEQ

Current labor demand

The employment trends and projections presented above enable us to think about the medium to long-term labor demand trends, making them useful for longer-term workforce planning. However, it is also important to consider more short-term demand trends. Examining online job advertisements through the use of Real-Time Labor Market Information (in this instance, Help Wanted Online¹³), allows us to better understand what jobs employers are looking to fill presently. Using this tool, we have identified—for each education level—the most advertised occupations and employers with the most job advertisements in Alexandria/Arlington over the current calendar year (January 1, 2016 to November 28, 2016). The number of job advertisements looks substantially larger than the number of projected annual openings presented in the previous section. Therefore it is important to remember that many of the job postings presented here will be filled by people who already have jobs and are already in the region. As a result many of these jobs are not the product of growth or replacing workers that have left the workforce.¹⁴

Some clear trends emerge from the listings presented in Figure 31. For instance, the importance of the region's contractor community becomes quickly apparent when considering the jobs requiring workers with at least a 4-year degree. The employers with the most advertisements are also a who's who of government contractors, including ACCENTURE, Booz Allen Hamilton, Deloitte and CACI. These contractors are mostly looking to hire workers for a variety of computer-related occupations such as computer system analysts, software developers, and web developers and some of the common skills employers sought included Java, SQL, Linux MS, and Microsoft SharePoint. The growing importance of cyber security also becomes apparent as information security analysts and network and computer systems administrators were commonly advertised occupations. Employers were not only looking for Cyber Security skills, but also for workers with security clearances.

Middle skill jobs that required a minimum of 2-year degree was a more diverse set of occupations and employers. Computer-related occupations remain available to workers with associate's degrees. Commonly advertised jobs included computer user support specialists, web developers and to a lesser extent cyber-related occupations like information security analysts and network and computer systems administrators. For many of these jobs employers are looking for workers with experience in tech support, JavaScript, MS SharePoint, Java, MS Windows, as well as possessing security clearances. Healthcare-related occupations—particularly in nursing—were also important as Inova Health System and Virginia Hospital Center were two large employers advertising positions that required workers with Associates' degrees.

¹³ <https://www.conference-board.org/data/helpwantedonline.cfm>

¹⁴ Real-Time LMI systems like HWOL are powerful tools for analyzing current labor demand. That said, it bears mentioning several caveats about these data. For instance, not all online job advertisements lead to actual jobs or hiring, as in some case employers may just be looking to build a pool of resumes. In addition, not all jobs are posted online. Larger employers and positions that require greater levels of education are more likely to advertise job openings online than small employers seeking lower-skilled workers. As a result, a large IT contractor is more likely to advertise its jobs online than a small lawn care company. For more information about the strengths and weaknesses of Real-Time LMI and several of the main vendors, please see: <http://www.jff.org/publications/real-time-labor-market-information-environmental-scan-vendors-and-workforce-development>

Figure 31: Online Job Postings (2016)

Ed. Level	Ten Most Advertised Occupations by Education Level	Available Jobs (2016)	Employers w/ Job Advertisements by Education Level	Available Jobs (2016)
Bachelor's or Graduate Degree	Computer Occupations, All Other	5,959	ACCENTURE	3,126
	Computer Systems Analyst	4,491	Booz Allen Hamilton	2,618
	Management Analysts	4,488	Deloitte	2,173
	Information Security Analysts	4,386	CACI	1,696
	Software Developers, Applications	4,257	Anthem, Inc.	1,095
	Network & Computer Systems Admin.	3,886	Inova Health System	1,071
	Accountants & Auditors	2,599	General Dynamics	936
	Marketing Managers	2,139	Alion Science	901
	Managers, All Other	1,785	Engility Corporation	810
	Web Developers	1,667	CSRA RESA	781
Associate's Degree	Computer User Support Specialists	1,276	Inova Health System	323
	Web Developers	1,155	Forward Air, Inc.	205
	Heavy & Tractor-Trailer Truck Drivers	1,148	Virginia Hospital Center	192
	Registered Nurses	892	US Patent and Trade Office	151
	Hairdressers, Hairstylist & Cosmetologists	232	INOVA Geo	130
	LP/LV Nurses	219	Transportation Security Administration	106
	Network & Computer Systems Admin.	153	Pentagon Federal Credit Union	105
	Information Security Analysts	150	United States Army	101
	Exec. Secretaries & Exec. Assistants	136	Hair Cuttery	99
	General Maintenance & Repair Workers	119	US Department of State	95
GED/High School	Retail Salespersons	1,505	Marriott	495
	First-line Spvrs. of Retail Sales Workers	1,314	Hilton Worldwide	379
	First-line Spvrs. of Food Prep. Workers	1,002	Macy's	353
	First-line Spvrs. of Office & Admin. Workers	791	Inova Health System	347
	Customer Service Representatives	733	Harris Teeter	294
	Maids & Housekeeping Cleaners	707	Target Corporation	244
	General Maintenance & Repair Workers	568	Nordstrom	240
	Managers, All Other	547	Sunrise Senior Living	220
	Stock Clerks & Order Fillers	452	Ritz-Carlton	219
	Security Guards	451	United States Army	184

Source: Help Wanted Online (1/1/16 to 11/28/16)

Employers were also seeking workers to fill support occupations, either in office settings such as executive secretaries and executive assistants, or in distribution and wholesaling like truck drivers.

The retail and hospitality sectors are also important for workers that lack post-secondary education. Large retailers like Macy's, Nordstrom, and Target were among the employers looking to hire the most workers at this education level. Within the retail sector job openings were available for people to fill retail sales, customer service representatives, and supervisory roles. The hospitality industry was another important source of lower-skill jobs, thereby highlighting the importance of attracting visitors and visitor spending. Marriott, Hilton Worldwide and Ritz-Carlton had many of the job advertisements that represent opportunities for workers without postsecondary education. The most in-demand hospitality related jobs included maids and housekeepers and general maintenance and repair workers.

Connecting labor supply and demand

The demand for workers shapes the labor pool. High quality, good paying jobs created by the region's government and private sector employers has attracted many young, talented workers, and the region's high quality of life has helped to retain many of them. The revenues created by those industries and the incomes spent by those workers in turn creates job opportunities for many middle and lower skill workers in more locally-serving industries. Alexandria/Arlington's economy—while unique—remains deeply connected to the broader metro area, the Commonwealth of Virginia, State of Maryland and District of Columbia. In regions like Alexandria/Arlington—where the labor market and economic activity is so fluid between multiple states and jurisdictions—trying to estimate a specific gap between labor force supply and labor force demand is not always helpful. Rather, it is more useful to consider several key scenarios that might shape the region's economic trajectory and by extension the nature of labor demand and supply.

As has been mentioned above, the industry and occupational projections presented above assume that no major event significantly alters the region's future economic trajectory. This assumption of no major economic disruptions represents one potential scenario. Alternative scenarios worth considering might assume economic changes that will create vicious or virtuous cycles for the region's workforce.

For instance, major cuts to federal employment—and importantly federal spending—would place a significant drag on the regional economy. This would result in fewer high quality job opportunities that would diminish the region's ability to attract and retain talented workers. The region is already experiencing net domestic out-migration and this might further exacerbate that trend as talented workers would look elsewhere for employment opportunities. Slower population growth and diminished consumer spending would in turn reduce demand for healthcare, retail, hospitality or other personal services.

A third scenario might revolve around regional employers developing new strengths and diversifying their customer base thereby making them less dependent on the federal government. In this scenario, area businesses would continue to lure top talent with quality employment opportunities regardless of what happens with the federal government. The continued spending would enable the region's more locally-serving industries to create employment opportunities for middle and lower-skill workers.

At present, there is a lot of uncertainty about which of these scenarios is more likely to occur. For the sake of workforce planning it is important to be mindful of how some of these broader economic trends can influence the region's economic and workforce trajectory. There are also many other factors at play that will influence the nature and extent of employment opportunities in the region, as well as the region's ability to create, retain and develop talent. In some instances these are factors that regional stakeholders can influence, and others are outside of local control. The next section examines a number of the factors that will shape the region's workforce by considering the region's strengths, weaknesses, opportunities and threats (SWOT).

Assets and factors shaping the region's economy and workforce

The industry and occupations projections discussed above are reliant on no significant disruptions to the regional economy. With this in mind, effective workforce planning will require a thorough understanding of the assets and factors that currently influence the region's economy and workforce and those that will affect its future trajectory. A number of these issues have been raised earlier, but this section takes a somewhat more systematic approach by looking at several key workforce issues through the lens of a regional SWOT analysis.

SWOT analyses allow us to consider both the internal and external factors that can help and hinder the regional economy. Typically, an internal appraisal in a regional economic SWOT analysis focuses on identifying the local strengths and weaknesses underlying a regional economy, whereas an external appraisal concentrates on opportunities and threats that face the region from the outside that local actors have very little influence over. SWOT exercises are designed to help sort through a much wider range of factors, variables, or conditions that need to be considered in order to undertake effective regional planning.

Input for this SWOT was drawn from two primary sources—the regional analysis presented above and stakeholder input. Several regional stakeholders provided input in a September 2016 meeting facilitated by the Alexandria/Arlington Regional Workforce Council. These stakeholders identified what they believed to be some of the region's key opportunities and challenges. Several broad sets of issues emerged from this combined input. These issues include:

- Talent attraction and retention
- Secondary and postsecondary education
- Transportation and infrastructure
- Commercial and industrial development
- Entrepreneurship and innovation

Understanding and addressing these issues will allow the region to take advantage of emerging opportunities, as well as mitigating the risk of potential challenges. The strengths, weaknesses, opportunities and threats for each of these broad issues are discussed in greater detail below.

Talent attraction and retention

As demonstrated earlier, Alexandria/Arlington is home to a deep base of talent. The region has a highly educated population where over two-thirds of the population (aged 25+) has at least a 4-year degree, and over 36 percent have a graduate or professional degree. These education attainment levels distinguish the region from the rest of the metro area, the Commonwealth and the nation. So too does its demographics, as 1 in 4 residents were between the age of 25 and 34 and almost 43 percent were aged 25 to 44. This young, educated workforce has been a key element of the region's success. Regardless, a recent Brookings Institution study found that the DC metro area's was highly reliant on talent born out of the region.¹⁵ As a

¹⁵ <https://www.brookings.edu/blog/the-avenue/2016/11/14/the-metro-talent-competition-attracting-and-growing-highly-educated-workers/>

result, continued growth will necessitate that the region continue attracting and retaining these workers, as well as making better use of the talent already in place.

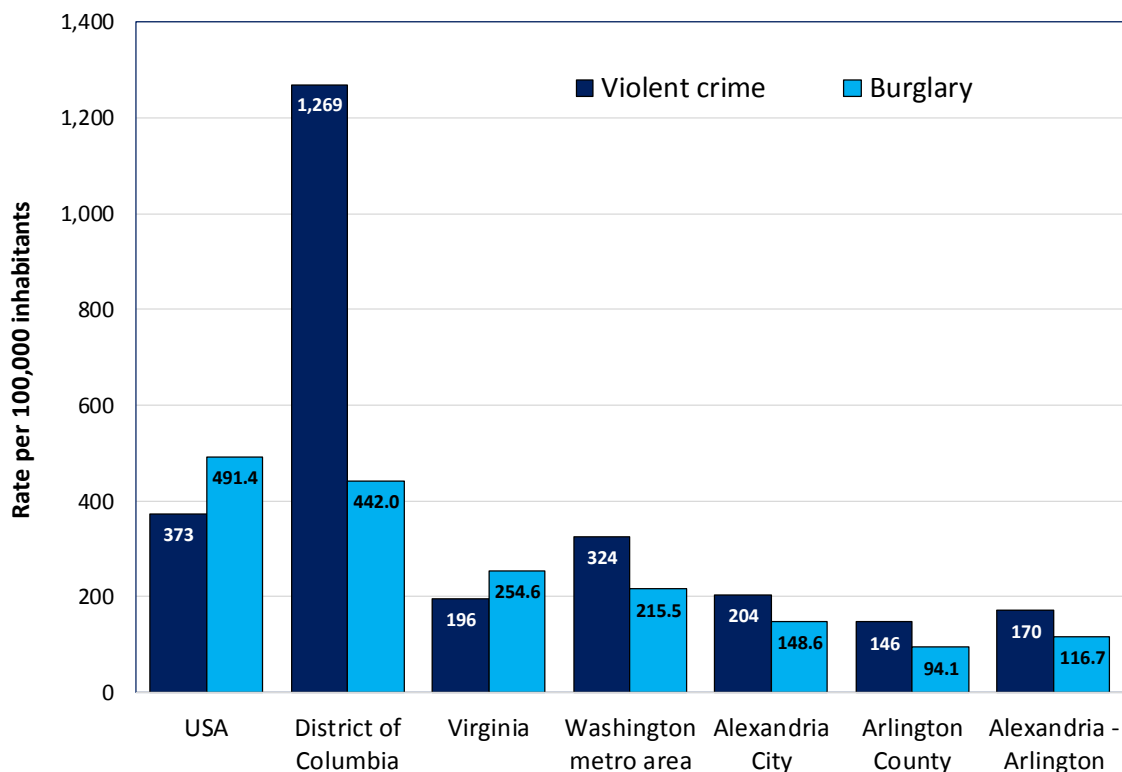
Strengths and weaknesses

A relatively strong labor market for recent college graduates helped build the regional labor force. A 2013 study of young professionals¹⁶ commissioned by Arlington Economic Development showed that Arlington had not been a place that millennials and Gen Xers considered initially, but rather moved there because of a job opportunity. It was only after moving to Arlington that these workers then began to appreciate the region's other strengths.

Once in the region, workers begin to appreciate the region's many amenities. These amenities include the good public schools and access to public transit (discussed in greater detail below). Arlington and Alexandria have almost 200 family and pet friendly, natural, historic, waterfront and neighborhood parks, as well as many national parks (e.g., Mount Vernon, George Washington Parkway) and national monuments (e.g. Air Force Memorial, Arlington National Cemetery, Marine Corps War Memorial). Combined between the two jurisdictions there are also over 140 miles of biking and hiking paths. They also have a wide variety cultural and arts centers and musical venues (e.g., Torpedo Factory Art Center, The Birchmere).

Additionally, the region is viewed as a safe place to live and raise a family. Figure 32 shows the FBI Uniform Crime Statistics for the region, the metro area, the state and the nation. Relative to the nation and the rest of the Washington metro area, Alexandria and especially Arlington have lower rates of violent crime and

Figure 32: Crime Statistics (2015)



Source: FBI Uniform Crime Statistics

burglary. Due in part to high rates of violent crime in the District, the rate of violent crime and burglary in Alexandria/Arlington are almost half of that in the rest of the metro area.

In spite of all these assets and positive attributes the region's cost of living represents a significant challenge for attracting and retaining talent. The Bureau of Economic Analysis's Regional Price Parities (RPP) show that in 2014 the Washington Metro region was almost 20 percent more expensive than the nation as a whole. The only metro areas that were similarly as expensive were Honolulu, the New York City region, and the San Francisco Bay area. The cost of housing plays a big role in the region's high cost of living, as the BEA RPPs show that rents in the DC metro are 70 percent higher than the national average.

The Economic Policy Institute's Family Budget Calculator showed that in Northern Virginia a family of two adults and two children required an average of almost \$82,300 to meet their basic needs.¹⁷ While still less than the \$106,500 it was required for the same family to meet their basic needs in Washington, DC, Northern Virginia was still one of the country's most expensive places to raise a family. This high cost of living partially contributes to the region's high levels of labor force participation because many families need two incomes to meet many of their basic needs.

Opportunities and threats

Given that the region relies on many young, educated workers moving to the region for employment opportunities, retaining these Millennial and Generation X workers will be critical. The region could, however, widen its base of talent by looking at other sources of talent. As noted earlier, international immigration contributes greatly to the region's population growth. The region's foreign born population participates in all levels of the labor force from highly educated workers to lower-wage laborers. Remaining an open and welcoming place to these foreign born and immigrant populations will be vital for the region to continue growing and for meeting the region's workforce demand.

The veteran population offers another pool of workers that that can help the region grow and strengthen its workforce. In spite of being home to the Pentagon and the Department of Defense, a relatively smaller proportion of veterans live in Arlington and Alexandria. Figure 33 shows that the veteran population 10.8 percent of the Virginia population (aged 18+), and 8.3 percent of the DC metro area's population, it is only 7.5 percent of the Alexandria/Arlington population. However, the region does have an advantage in the

Figure 33: Veteran Population

	Veterans as a % of civilian pop. (Age 18+)	% of veteran pop. aged 18-64
United States	7.6%	50.5%
Virginia	10.8%	62.5%
Washington, DC Metro Area	8.3%	64.6%
Alexandria-Arlington	7.5%	68.0%

Source: US Census Bureau, 2015 American Community Survey

¹⁷ <http://www.epi.org/resources/budget/budget-factsheets/#/567>

segment of the veteran population that is of working age (18-64). More than two-thirds of the veterans living in Alexandria/Arlington are of working age, and this is a population that the region should better leverage. In addition to having skills and discipline, Veterans are also more likely to have security clearances. As was demonstrated in the analysis of online job postings, workers with security clearances were in high demand, particularly government contractors in fields such as cyber-security.

Another opportunity for building and strengthening the regional workforce is develop more of the talent pool that is already in place. One way to accomplish this is by establishing pathways for workers that over time can potentially lead them all the way from high school to more advanced jobs with businesses in the region's leading clusters. Many area high school students pursue four-year degrees at colleges and universities all around the country but many others—for a variety of reasons—do not continue on to complete traditional four-year degrees. Connecting students to these career pathway opportunities will allow younger workers who already live in the region to fill many of the existing jobs. Northern Virginia Community College will be a vital partner in developing this local talent, as it is actively involved in preparing and training both students and incumbent workers for the demand of the region's employers.

Better leveraging the in-place talent will make the region less reliant on both domestic and international migrants. Given the high cost of living, other places like Pittsburgh or Des Moines may appear more attractive, all things being equal. The aforementioned Arlington Economic Development survey noted that it was the availability of quality jobs, first and foremost, that drew young, educated workers to Arlington. As a result a local economic downturn represents, perhaps, the greatest threat to the region's talent base. Without these opportunities, these workers will likely look elsewhere. The impact of the new administration on federal employment and spending will go a long way in determining the trajectory of the regional economy and as a result, its ability to attract talented workers and provide opportunities for the workers already present in the region.

Secondary and postsecondary education

Although the region attracts many young, educated workers, these workers are not the only source of regional talent. A strong educational infrastructure has helped to develop future workers and to provide continuing education for incumbent workers. The quality of its local schools is one of the region's perceived enduring strengths, and an asset that keeps attracts workers to live in the region. Moreover, the region is well served by higher education even though it does not have the main campus of any major research university. This section identifies some of the key elements of the region's educational assets and considers future threats and opportunities.

Strengths and weaknesses

The region's educational institutions are clear strengths that contribute to the region's workforce in many ways. Some of the region's high schools, such as Yorktown and Washington-Lee in Arlington, are viewed as some of the region and nation's best. These schools are not only important for preparing a future generation of citizens and workers, but they are also important considerations for attracting people to the region and keeping them here. Both of these school districts are minority majority districts:

Figure 34: Class of 2016, Virginia On-Time Graduation Rate

High School	All Students	White	African-American	Hispanic
Yorktown (APS)	97.0%	100.0%	91.3%	84.6%
Washington-Lee (APS)	94.8%	100.0%	98.4%	86.3%
Wakefield (APS)	88.1%	91.8%	93.4%	81.1%
T.C. Williams (ACPS)	82.1%	92.8%	84.6%	70.5%
Virginia	91.3%	93.9%	88.3%	82.8%

Source: Virginia Department of Education

- Arlington Public Schools (APS) has 26,400 students, of which 46.9 percent are white, 27.9 percent Hispanic, 10.3 percent are black or African-American, and 9 percent Asian. Among the three largest high schools, Wakefield High School is the most diverse. There is also a significant international presence as students in Arlington Public Schools (APS) come from 96 countries and speak 81 different languages.¹⁸
- Alexandria City Public Schools (ACPS) has 15,500 students, of which 36 percent are Hispanic, 29.3 percent are black or African-American, 27.1 percent are white, and 4.6 percent Asian. Much like APS, there is a significant international presence as students in Arlington Public Schools (APS) come from 127 countries and speak 115 different languages.¹⁹

This diversity is the result of the continual influx of new residents from all backgrounds and socio-economic classes.

Figure 34 shows the Class of 2016's Virginia On-Time Graduation Rate for the three largest high schools in Arlington (Yorktown, Washington and Lee, and Wakefield) and T.C. Williams High School in Alexandria. Yorktown and Washington-Lee are well above the state average for on-time completion, whereas Wakefield and T.C. Williams tends to lag behind the state average. One of the big challenges facing the region is the achievement gap for the region's Hispanic students relative to other racial and ethnic groups. This gap is particularly significant in T.C. Williams High School where the completion rate for Hispanic students is 12 percent lower than it is for Hispanic students statewide, and 21 percent lower than it is for all Virginia students. Closing this gap will be important for the region to effectively integrate these students into the community and prepare them for either the post-secondary education or the world of work.

While the region has several strong secondary schools, many of these local graduates leave the region to go to college. Nevertheless, the region is well-served by a wide variety of public and private post-secondary institutions that offer an array of programs, particularly for adult learners and continuing education for people already in the workforce. Within the region, students can access law schools, graduate schools,

¹⁸ <http://www.apsva.us/wp-content/uploads/2015/03/QuickFacts-1.pdf>

¹⁹ <http://www.acps.k12.va.us/fastfact.php>

university research centers, undergraduate programs and community college and technical training programs. These institutions include:

- George Mason University's Arlington Campus is home to two schools including,
 - The Schar School of Policy and Government which offers Master's and Doctoral degrees in public policy, health and medical policy, international commerce and policy, organizational development, transportation, and peace operations. Within the broader Washington metro area, there are 13,000 alumni who work in both the public and private sector.
 - The Antonin S. Scalia Law School which is housed in a new, 150,000 square foot facility. The GMU Law School was established in 1979, and is today nationally recognized for its intellectual property curriculum. Entrance into the GMU Law School is selective, with just 159 students entering in Fall of 2015 out of an applicant pool of approximately 5,000.
- Marymount University in Arlington is an independent Catholic university that provides Bachelor's, Master's and Doctoral degrees in a number of disciplines and has a student body of approximately 3,600.
- A number of universities located outside of Arlington and Alexandria have satellite campuses in the region. These facilities are often focused on graduate instruction geared primarily towards working professionals. Among the largest of these institutions are Georgetown University (Arlington), Virginia Tech National Capital Region (Alexandria and Arlington) and the George Washington University Graduate Education Center (Alexandria and Arlington).
- Northern Virginia Community College (NVCC) has a campus in Alexandria City. NVCC is one of the nation's largest post-secondary institutions. Its Alexandria Campus offers a variety of classes and serves 17,000 students pursuing their Associates Degrees.
- There are a number of other smaller colleges and institutes in the Alexandria and Arlington region such as Everest College Arlington, Argosy University Washington D.C., Westwood College Arlington Ballston, the Art Institute of Washington, the University of Management and Technology, Chamberlain College of Nursing Virginia and DeVry University.

These institutions provide the region's resident's with many options, but given that many are satellite campuses of larger institutions that often serve students that are already in the world of work. As a result, in order to complete degrees area students take many night classes and their required course work is not always offered locally.

Opportunities and threats

This is an area where the region can generally maintain strength, but there are nevertheless opportunities to build on the region's existing assets. For instance, the region could strengthen its public education by closing its achievement gap. Programs such as bilingual education provide an opportunity to close the achievement gap and further engagement the region's Hispanic population. These programs can be

particularly helpful for students who may speak primarily Spanish in the home to keep pace with their peers, and can be an important avenue for closing the achievement gap. APS offers Spanish immersion programs at two elementary schools, one middle school and one high school. ACPS offers Spanish-English dual language programs at two K-5 schools. These programs are designed to help students from both language groups achieve higher levels of education achievement. As with many of the other issues facing the region, the uncertainty about the region's future economy will have consequences for the number and quality of educational programs and opportunities. A reduction in federal activity, either through direct federal employment or perhaps more importantly contracting opportunities will affect the region's tax base. More limited resources could lead to more crowded classrooms, fewer available programs, and greater difficulties in attracting and retaining top teaching talent.

The large numbers of university programs in region provide many opportunities for the region's residents and workforce. These facilities and resources, however, are not utilized as fully as they could be. As a result, there are opportunities to better leverage these programs for non-degree programming in areas such as executive education and small business assistance. For the post-secondary institutions, an economic slowdown might diminish the resources that workers are able to devote towards professional education opportunities available through the region's postsecondary education. Depressed enrollments will in turn limit the number of available programs.

Transportation and infrastructure

The ability of people to get to and from work in an efficient manner is a critical element in making the region an attractive place to live and work. The aforementioned Arlington Economic Development survey of young professionals noted that public transit was seen as an advantage that this area had over other locations and was one of the region's more attractive qualities. The region's transit system is also important to employers. Commuting times and costs shape how large a labor pool they have to draw upon to meet their workforce needs. Transportation issues are important for the region broadly as well as the workforce more specifically. This section therefore considers some of the region's key transportation issues and challenges and what they mean for the region's workforce.

Strengths and weaknesses

As with many large metropolitan areas, the Washington metro is known for having a particularly difficult commute. In the Washington metro area, 17.3 percent of workers had commutes lasting longer than an hour. Among the nation's 15 largest metropolitan areas, only the New York metropolitan area (21.4 percent) had a greater proportion. Since the Arlington and Alexandria are two of the metro area's more central jurisdictions, one of their competitive advantages is shorter commute times relative to more suburban locations. According to the 2015 American Community Survey, workers that live in Alexandria/Arlington had mean average commute times of 29.6 minutes—almost five minutes shorter than workers in the broader Washington metro area (34.4 minutes).

Figure 35: Means of Transportation to Work (2015)

Means of Transportation to Work	United States	Virginia	Washington metro area	Alexandria-Arlington
Car, truck or van	85.6%	86.6%	75.0%	63.6%
Public transportation	5.2%	4.7%	14.4%	24.0%
Walked	2.8%	2.3%	3.5%	4.7%
Bicycle	0.6%	0.4%	0.8%	1.6%
Other	1.2%	1.3%	1.2%	0.9%
Worked at home	4.6%	4.6%	5.1%	5.2%

Source: US Census Bureau, 2015 American Community Survey

Not only do workers in Alexandria/Arlington have shorter average commutes, but they also have many more commuting options. Figure 35 shows that in 2015 63.6 percent of Alexandria/Arlington residents drove to work, over 11 percent less than the metro area overall. By contrast, nearly 1 in 4 residents took public transportation; a figure 10 percent greater than the workers in the overall metro area. This is due in part to the range of choices available to commuters through Metrorail and Metrobus, ART in Arlington and DASH in Alexandria. Smaller numbers of residents take other forms of transportation. Almost 5 percent of Alexandria/Arlington residents walk to work, while another 1.6 percent bike to work.

This range of options is one of the region's real competitive advantages in attracting new workers, particularly millennial workers. Nevertheless, the public transit infrastructure—and particularly Metrorail—are experiencing significant strains. Insufficient investment in maintenance, due in part to a lack of a dedicated funding mechanism, has led to safety and reliability concerns. These challenges have led to a significant decline in ridership. Figure 36 shows the annual change in Metrorail ridership²⁰, where there has been relatively steady decline in ridership between 2010 and 2015.²¹ However between 2015 and 2016, Metrorail ridership has dropped precipitously. System wide, ridership fell by 9.5 percent during this period and 10.2 and 8.5 percent in Arlington and Alexandria, respectively.

It should be noted that these data were collected in May 2016, before SafeTrack (the accelerated track work plans to address safety concerns) began in earnest in 2016 and caused further disruption to the Metrorail system. With the exception of Arlington Transit which saw a ridership increase of 13.8 percent between the 4th quarter of FY 2015 and FY 2016, other public transit systems also experienced drops in ridership. For instance, Alexandria DASH ridership declined by 2.6 percent and Virginia Railway Express (VRE)—which has stops in Alexandria and Crystal City—saw ridership decline 3.4 during the same period.²² In addition, Metrobus ridership on the routes that serve Arlington and Alexandria was also down 3 to 4 percent between June 2015 and June 2016.

²⁰ http://www.wmata.com/pdfs/planning/2016_historical_rail_ridership.pdf

²¹ Fairfax county stations experienced a spike between 2014 and 2015 due to the opening the Silver line.

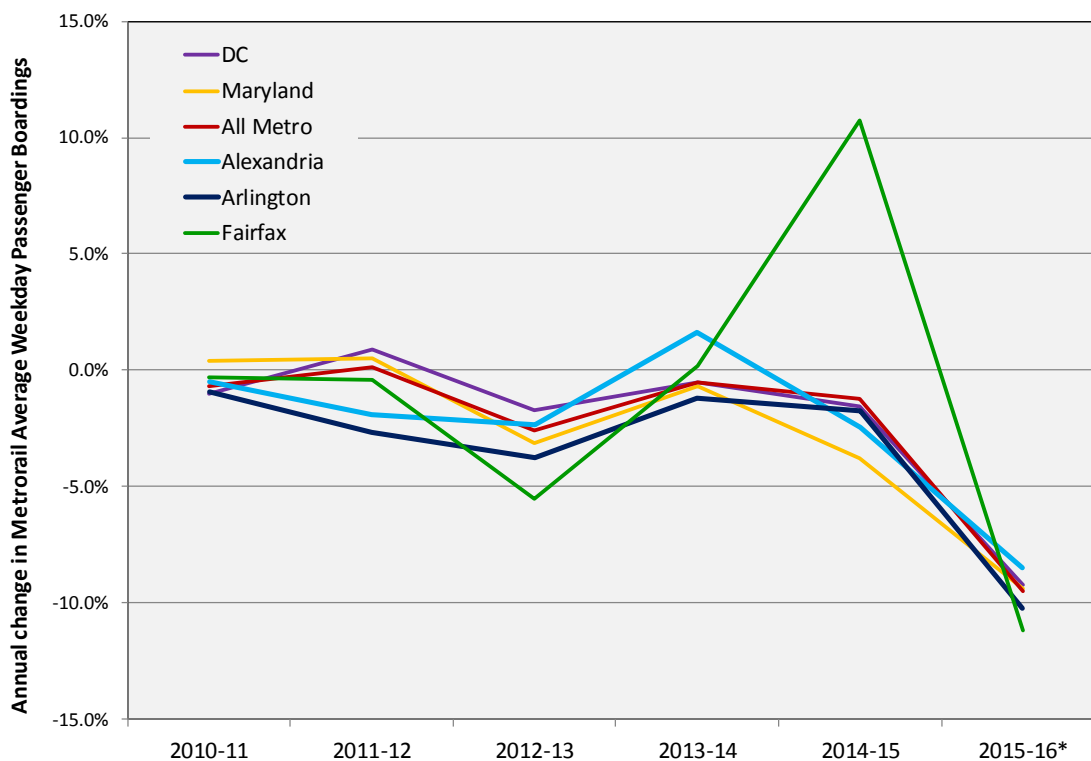
²² <http://www.novatransit.org/resources/ridership-data/>

Opportunities and threats

In spite of these challenges, the region's public transportation infrastructure remains a real asset to the region. Much of the current and planned development in Alexandria/Arlington is in close proximity to metro stations, or in areas served by regular bus routes. In spite of the transportation challenges, this accessibility is one of the region's main draws for keeping and retaining business. Housing values with close proximity to the metro are much higher than those that are not, and consequently a strong functioning public transportation infrastructure is a great value to many homeowners. The range of options is also a critical element in attracting and retaining workers, and particularly millennials. Therefore, if Alexandria and Arlington and the rest of the metro area served by the Washington Metropolitan Area Transit Authority (WMATA) can once again make Metro a reliable form of public transportation, it will go a long way to making it a tremendous asset for regional development.

Unfortunately, it will take more than local action to address these issues. As noted above, WMATA has no dedicated funding mechanism and relies on funds provided by the State of Maryland, Commonwealth of Virginia and District of Columbia. At present there is no real consensus among these jurisdictions about the best way to adequately fund WMATA and the Metrorail system. There is also some uncertainty on how the new administration will address infrastructure challenges and what that will mean for the metro system.

Figure 36: Annual Change in Metrorail Ridership



Source: Washington Metropolitan Area Transit Authority (WMATA)

Moreover, if the new administration seeks to reduce the size of the federal government, this could further depress metro ridership and revenues. Public transportation is particularly important to federal employees.

Encouraged in part by federal transit benefits, 37 percent of the government workers living in Alexandria/Arlington used public transportation. This is 13 percent greater than the workforce overall. As public transportation becomes a less attractive option, more workers will take to the roads, and thereby causing further congestion and longer commute times and making the region a less attractive place to live.

Commercial and industrial development

In order to maintain and strengthen its existing base, the region must ensure that its business environment is one that will allow its existing employers to grow and is attractive to potential new employers. Workforce quality is a primary consideration for many companies and this remains a regional strength. As noted above, quality jobs attract many skilled and highly educated workers, and the region's quality of life has helped keep them here. However, workforce is not the region's only asset as for attracting and retaining businesses. Other assets include its proximity to Washington, DC, the Pentagon, and Washington Reagan National Airport and the availability of office space that meets their needs.

Therefore, developing this environment and maximizing its use is of paramount importance to the region's economic development and tax base. Issues such as office vacancy can have important implications for the region's overall health. For instance, in Arlington each 1 percent of current office vacancy is worth \$3.4 million in local taxes.²³ This foregone tax revenue is money that can be used to upgrade broadband networks, fund education, create an attractive built environment, provide workforce training, or support many other key government services. Similarly, attracting both business and leisure travelers and growing visitor spending is another important element in the region's economic development as that spending not only creates jobs—often for lower wage workers in hospitality and retail—and further contributes to the region's tax base. T this section addresses several key issues and challenges that the region must address to ensure this future development.

Strengths and weaknesses

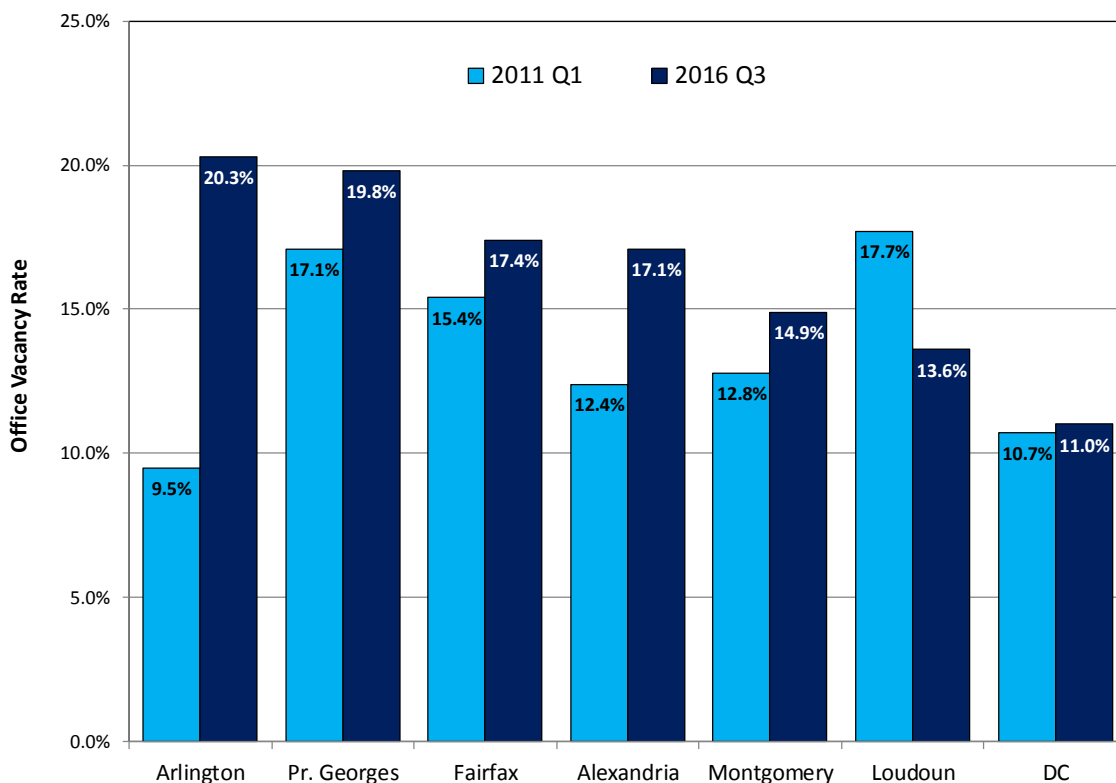
The region provides easy access to Washington, DC and is well served by Washington Reagan National Airport, but it is nevertheless viewed as an expensive place to do business. BRAC shifted many of the region's contractors out of places like Pentagon City and Crystal City and moved them to Fort Belvoir. Sequestration and GSA rent caps forced many federal agencies to reduce their footprint in Arlington and Alexandria or find less expensive office space elsewhere. For private sector employers, the opening of the Silver line and a desire to be in Washington, DC has created more options and increased competition for business within the metro area. In addition, increased telework options and remote offices result in many employers no longer needing as much office space per worker as they may have in the past.

²³ <https://www.arlingtoneconomicdevelopment.com/index.cfm?LinkServID=852178C0-C15C-86F7-F8223748DEE3B7E7&showMeta=0>

Combined, these factors have resulted in a dramatic increase in the region's (and particularly Arlington's) office vacancy rate. Figure 37 shows how the office vacancy rate has changed between the first quarter of 2011 and the third quarter of 2016. Arlington's office vacancy rate has more than doubled in this period, moving from 9.5 percent at the start of 2011 to over 20.3 percent in 2016. Much of this increase occurred between the end of 2011 through 2013 as the impacts of sequestration and the federal budget battles took hold. The impact of these events is also reflected in the fact that 95 percent of Arlington's vacant office space is in buildings with greater than 10 percent vacancy.²⁴ Alexandria's office vacancy rate also increased from 12.4 percent to 17.1 percent during this period and has been relatively steady since 2013. Alexandria's office vacancy rate remains less than Arlington and Prince Georges (MD) counties, and on par with Fairfax County.

Given the nature of the region's economy, commercial office space usage is an important indicator of the region's economic health. To a certain extent, these jurisdictions do not have the space to aggressively pursue more industrial employers. There are very few locations for industrial and warehousing projects, so those projects are largely limited to Arlington's Four Mile Run area and Alexandria's Eisenhower Valley area.

Figure 37: Office Vacancy Rates



Source: CoStar and Arlington Economic Development

²⁴ <https://www.arlingtoneconomicdevelopment.com/index.cfm?LinkServID=DC3C9BE8-C9E0-E9D4-4B83C822421B168E&showMeta=0>

The limited nature of these activities in the region inhibits its ability to create jobs for workers who might be attracted to, or have the skills to, work in more industrial or distribution-related fields.

Beyond commercial and industrial development, the region continues to be a strong destination for visitors and particularly business travelers. Visitor spending made important contributions to the region's economy and tax revenues. This non-local spending helps support many of the region's hotels, restaurants, and attractions. At 80.2 percent, Arlington County had the state's highest hotel occupancy rate in October 2016. Alexandria's rate of 73.8 percent was consistent with the broader Washington metro area (74.4 percent) and Fairfax/Tysons Corner (72.9 percent).²⁵ The impact of this spending also benefits the region's local tax revenues, as tourism contributed \$85.8 million and \$25.5 million of local tax receipts for Arlington and Alexandria, respectively.²⁶ Tourism spending remains vitally important to the local economy and local tax receipts. There are many internal and external factors that will determine growth opportunities for the region's hospitality industry. One factor that is under local control is the ability to in training that prepares workers for hospitality occupations. Doing so will enable the hospitality industry to remain a regional strength.

Opportunities and threats

The trends in office vacancy rates should begin to reverse themselves as Alexandria and Arlington become more diversified economies. To that end, Arlington and Alexandria are pursuing companies from several new and emerging private sector industries. For instance, Arlington has targeted companies from the IT/Cyber-security, medical technologies, education technologies, data analytics and renewable energy for investment. Alexandria has also targeted financial technology companies, commercial creatives (e.g., marketing, political consultants, landscape architects, etc.), and professional and trade associations. The latter has the added benefit of contributing the region's visitor spending because they often bring their boards of directors into town for meetings. Alexandria has also placed an emphasis on start-up and entrepreneurs, in part through Alexandria Economic Development Partnership's partnership with the Alexandria Small Business Development Center (SBDC).

The existing stock of commercial real estate poses some challenge for Arlington and Alexandria. Not only is office vacancy at high levels, but the nature of office space demand is changing. Increasingly businesses are looking for smaller and more flexible space to accommodate trends such as increased teleworking and shared spaces. This presents a danger that the region's stock of office space may become increasingly obsolete. Moreover, Alexandria and Arlington are landlocked jurisdictions that are built out, so unlike places in Loudoun County there are few new development opportunities. Rather, any kind of new development needs to come through redevelopment of existing properties.

While this may seem like a challenge, it also presents an opportunity for the region. Redevelopment opportunities can be used to convert existing space into real estate products that are more suited to the target industries or the changing nature of demand. With real estate conducive to companies from more

²⁵ These data are provided by Smith Travel Research and the Virginia Tourism Corporation.
http://www.vatc.org/uploadedFiles/Research/Lodging_Docs/2016YeartoDateOctoberLodgingReport.pdf

²⁶ US Travel Association and the Virginia Tourism Corporation: <https://www.vatc.org/research/economicimpact/>

advanced industries or co-working and incubator space (e.g., 1776²⁷) for entrepreneurs and remote workers, the region can attract more economic activity to newly developing areas like Potomac Yard in Alexandria or redeveloping areas like Ballston. Remaking the existing commercial real estate therefore provides an opportunity to remake the regional economy.

Alexandria and Arlington continue to compete with each other for economic development projects, particularly for large federal agencies (e.g., National Science Foundation). However, once a private sector prospect has decided to locate with the Washington metro area, the two jurisdictions are more likely to find themselves competing with the District of Columbia and Fairfax County. To that end, the local jurisdictions are working to become more business-friendly. This provides an advantage at least when they are competing with the District of Columbia, which has a reputation of being more difficult with which for businesses to work.

In spite of this any competition, there is a genuine sense of collaboration between Arlington and Alexandria when it comes to externally marketing the region to potential new investor looking to locate in the Washington metro region. For instance, Arlington Economic Development and the Alexandria Economic Development Partnership jointly promoted region at the last two SXSW festivals in Austin, TX and the CoreNet Global Summit in Los Angeles. In partnership with the Alexandria/Arlington Regional Workforce Council, both agencies also developed the Alexandria/Arlington Comprehensive Economic Development Strategy. This 5-year strategic plan analyzed the state of the workforce and economies of the City of Alexandria and Arlington County and established regional goals and objectives. On September 19, 2011, the US Department of Commerce's Economic Development Administration certified this strategy. This partnership has also begun to develop its next 5 year plan. This kind of ongoing collaboration creates opportunities to make better use of the jurisdiction's economic development marketing budgets and also eliminates some of the needless competition between the two jurisdictions. Moreover, it gets prospects thinking about coming to Alexandria and Arlington as much as they are considering the broader metro area.

Entrepreneurship and innovation

Developing more innovative companies and products will help address many of the commercial and industrial challenges identified above. The Washington metro area has a reputation as being a 'Federal City' and thereby lacking an entrepreneurial culture. To an extent, this is reflected in the lower than average share of self-employment mentioned above. Nevertheless, the region has many assets to leverage as well as some clear risks to address in further building an innovative economy.

Strengths and weaknesses

Even though the region may be seen as lacking an entrepreneurial economy due to the large federal presence, the federal government is nevertheless responsible for many of the region's critical innovation assets. Alexandria/Arlington is home to the Defense Advanced Research Projects Administration (DARPA), the Office of Naval Research (ONR), the Air Force Office of Scientific Research (AFOSR), and the National Science Foundation. These government agencies are responsible for sponsoring much of the nation's basic

²⁷ <http://www.1776.vc/>

research. In addition, the region has campuses of three R1 institutions in Virginia Tech, University of Virginia and George Mason University.

In addition, start-up companies and entrepreneurs have access to business incubators and accelerators like 1776, Eastern Foundry²⁸, and the University of Virginia's Jefferson Education Accelerator²⁹ in Arlington and Capitol Post in Alexandria.³⁰ Tech Shop-Arlington in Crystal City provides a Maker Space, and with funding from the Department of Veterans Affairs Center for Innovation (VACI) and DARPA, and is partly designed to assist veterans with their entrepreneurial efforts. Area entrepreneurs can also receive business counseling and services from the Mason Enterprise Center³¹ and Alexandria Small Business Development Center³², which are parts of the Commonwealth's SBDC network. The region is also developing more and more shared co-working spaces to enable self-employment.

The region therefore has a strong foundation of assets, and in fact has created a number of successful start-up companies in fields related to energy (e.g., Opower), Cybersecurity (e.g., Distil, ThreatConnect), and Healthcare Management (e.g., Evolent Health). However, according to a recent study commissioned by the 2030 Group of Greater Washington, the challenge for the region's entrepreneurial environment is less that it is unable to create new companies and more that it is unable to keep these companies. This study—completed by Amplifier Advisors—found that over the past 20 years, 105 area companies were sold for over \$1 billion, but only 16 of those companies were bought by buyers located in the region.³³ The inability to keep these companies has stunted the region's ability to further develop its entrepreneurial culture and diversify its economy.

Opportunities and threats

As noted earlier, Alexandria/Arlington has a relatively undiversified economy. However, the impacts of the recession and sequestration demonstrated how important it will be for many of the region's businesses to shift away from a B2G (Business to Government) to a B2B (Business to Business) model. The region is potentially well positioned to take greater advantage of the growing demand for services like Cyber Security in markets like finance or healthcare. The region has many of these capabilities already, however businesses of all sizes, but particularly small businesses and entrepreneurs may need access to the technical assistance necessary to make these transitions and sell to a broader array of markets.

The region's economic development organizations are working to leverage federal resources to promote greater entrepreneurial activity. For instance, Alexandria Economic Development Partnership received a federal grant from the Department of Defense for the purpose of facilitating entrepreneurship for displaced defense and defense contract workers in the National Capital Region. Since 2015, AEPD has used these

²⁸ <http://eastern-foundry.com/>

²⁹ <http://www.jeauva.com/>

³⁰ <https://thecapitolpost.com/>

³¹ <http://www.masonenterprisecenter.org/>

³² <http://alexandriasbdc.org/>

³³ <http://2030roadmap.com/wp-content/uploads/2016/04/2030-Group-Report-Final.pdf>

grant funds to support Capitol Post, a non-profit whose mission is to serve as the platform for military veterans and spouses growing sustainable and scalable businesses or transitioning into new careers. Capitol Post also serves as the home to Bunker Labs DC, an accelerator for high-growth startups. Capitol Post co-locates with AEDP and also operates a co-working space. AEDP also funds BOOST Alexandria, a business acceleration program for that uses proven accelerator models and curriculum to help startups form, scale, and grow for the purpose of fostering business development and creating economic resiliency in Alexandria, Virginia.³⁴ The first BOOST cohort included 12 startups ranging from seed stage to series A.

As with many of the issues discussed in this report, the future of the region's entrepreneurial and innovative capacity will be dictated in large part by decisions made by the federal government. Funding decisions made about Alexandria/Arlington's primary innovation assets like DARPA and the NSF will have a great regional impact. Unlike many other innovative regions around the country, federal spending more than venture capital drives regional innovation activities. Moreover, many of the key defense and security agencies like the Department of Defense and the Department of Homeland Security are increasingly looking beyond the region by opening offices in places like Silicon Valley to seek out innovative companies to help them solve their technological challenges.³⁵ As a result, companies based in the region need to both continue building their innovative capacity, but it further highlights the importance of broadening their markets so they are less reliant on the federal government as a customer.

³⁴³⁴ http://www.alexecon.org/sites/aedp/files/fact_sheet_-_boost_alexandria.pdf

³⁵ <http://2030roadmap.com/wp-content/uploads/2016/04/2030-Group-Report-Final.pdf>

Conclusions

This report described some of the key forces shaping Alexandria/Arlington's economy and workforce as well as identifying sources of current and future labor demand. It also discussed many of the issues related to talent attraction and retention, education, transportation and infrastructure, commercial and business development, and entrepreneurship and innovation that will shape the region's future workforce. This information will support the Workforce Council's planning activities and inform its future investment decisions. Several key themes emerged from this research. Around each of these themes there are several broad paths for action. These themes include the need for greater collaboration between the region's workforce boards, focusing investments on key service sectors, and continuing to collaborate with other regional stakeholders to diversify the region's economy.

The Alexandria/Arlington region is very much a part of the Greater Washington metro area. Alexandria/Arlington-based businesses employ many residents of Fairfax County and other parts of the metro area, just as many Alexandria/Arlington residents work in the District of Columbia and throughout the broader region. As a result, the Greater Washington metro area's economic performance will very much dictate whether Alexandria/Arlington's employers can meet their workforce needs and whether residents can find career opportunities. Given this reality, future workforce planning must involve effective communication and collaboration between not only between private sectors employers and public and non-profit service providers, but also between the Greater Washington region's workforce development boards (e.g., Alexandria/Arlington Regional Workforce Council, Northern Virginia Local Workforce Investment Board, Montgomery County Division of Workforce Investment Services, Prince George's Workforce Services Corporation, Washington DC Workforce Investment Council). This type of regional collaboration can yield real benefits by leveraging the resources of others, limiting waste by avoiding duplication of effort, and sharing experiences and best practices.

Another theme emerging from this research is the extent to which the Greater Washington region, and Alexandria/Arlington specifically, is from top to bottom a services-based economy. When good paying federal contractors are thriving, there is a great demand for highly-skilled workers and this demand attracts many young, educated workers to the region. However, when activities related to the federal government slow many of these workers must find alternative opportunities either in the region or elsewhere. Responding to these demand drivers—which are often outside of local control—can challenge both employers and training providers because properly scaling hiring and training programs becomes more difficult. These activities also drive demand in the region's more lower-wage industries like hospitality. Arlington and Alexandria have some of Virginia's highest hotel occupancy rates and as a result the hospitality industry creates significant workforce demand. However, factors such as the region's high cost of living—particularly for housing—can make it difficult for these lower wage workers to both live and work in the region. Given the importance of these services activities for the entire workforce, they must remain an important area of focus for the regional workforce council as it decides which training programs to invest in and support.

The research also makes clear the region's dependence on the federal government and the pressing need to diversify the regional economy. Diversification strategies are multi-faceted strategies that involve

participation from many different stakeholders. Workforce boards, community colleges and other training providers must invest in and deliver training that prepares current and future workers for new and emerging industries and opportunities. Economic development organizations must continue efforts to attract and retain businesses that participate in a wider array of private sector markets. Small business and entrepreneurial support providers must continue to help entrepreneurs get their businesses off the ground and help small businesses identify more non-governmental business opportunities. Strong relationships have already been established between the Alexandria/Arlington Regional Workforce Council, the AEDP, AED, and key service providers (e.g., SBDCs), and other regional actors must continue to communicate, coordinate and collaborate in order to create a more diversified economy.

The broad actions described above, are actions that local stakeholders can initiate. However the state of the economy, and workforce they seek to address, will depend on the regional economies' future trajectory. At present there is great uncertainty about the future regional economy. The industry and occupation projections presented in this report assumed that the region will not experience any major economic disruption, but that is only one of several scenarios that could shape the region's workforce.

A significant reduction in federal employment and spending would slow the regional economy. This might diminish the number of high quality job opportunities, cause talented workers to look elsewhere, and limit demand for healthcare, retail, hospitality or other personal services. Alternatively, regional employers could develop new strengths and diversify their customer base, reduce their on the federal government, and thereby create a more virtuous economy cycle. Regardless of which scenario plays out, the relative quality of the region's workforce and its many assets should allow it to transition to a more diversified economy. How long and how painful this transition takes remains to be seen. In the meantime, the region must continue to address those issues over which it has control to ensure that its entire workforce can effectively participate in the labor market. This will require addressing many of the pressing education, transit and development issues currently facing the region.



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