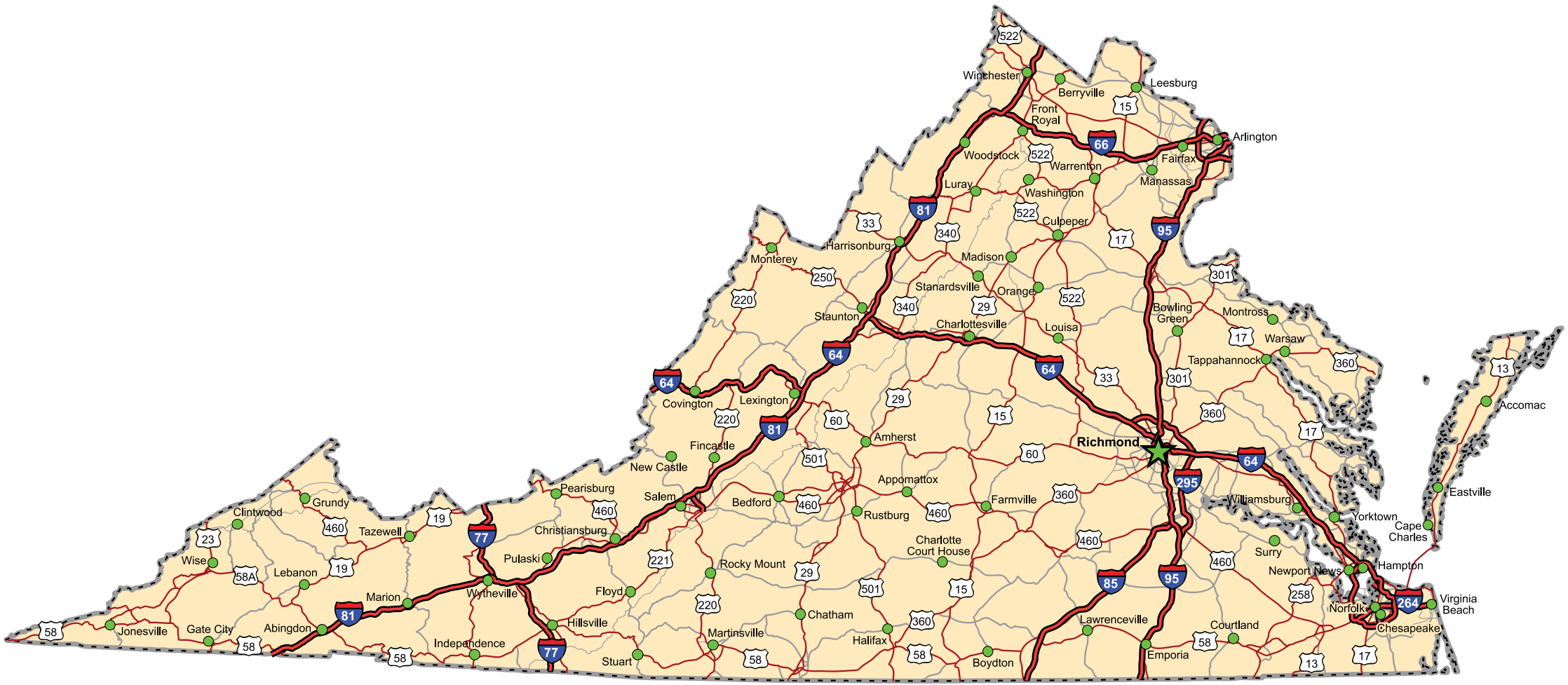# 2019 State of the Commonwealth Report

■ DRAGAS CENTER FOR ECONOMIC ANALYSIS AND POLICY ■ STROME COLLEGE OF BUSINESS ■ OLD DOMINION UNIVERSITY

December 2019

Dear Reader:

This is Old Dominion University's fifth annual State of the Commonwealth Report. While it represents the work of many people connected in various ways to the university, the report does not constitute an official viewpoint of Old Dominion, its president, John R. Broderick, the Board of Visitors, the Strome College of Business or the generous donors who support the activities of the Dragas Center for Economic Analysis and Policy.

While the enthusiasm we have for our work remains high, it has been dampened by the recent passing of George Dragas, the individual most responsible for perceiving the need for an annual report on the state of Hampton Roads 20 years ago and procuring the financial support to sustain it. The State of the Region Report: Hampton Roads was the progenitor of the State of the Commonwealth Report. George was a very successful businessman, who simultaneously exhibited marvelous foresight and a keen sense of civic duty. Without George and his family, there would be no State of the Commonwealth Report and no Dragas Center for Economic Analysis and Policy. We are indebted to him.

The 2019 State of the Commonwealth report is divided into five parts:

Virginia's Growth Improves in Uncertain Times
Virginia's economy is poised to grow for the fifth consecutive year. The number of jobs and people employed set new records in the summer of 2019 and CNBC recently ranked the Commonwealth as the most business-friendly state in the country. However, increasing economic uncertainty threatens the promise of a bright start to the coming decade. We assess the performance of the Virginia economy and ask what the future holds.

Virginia's Metropolitan Areas: Moving Forward
Many indicators of economic performance suggest that the Commonwealth's metropolitan areas grew in 2018 and into 2019. Unemployment is below 3% across Virginia's metros, and average wages have risen over the last three years. Compared to 2015, the metros are in a better place today but there are storm clouds on the horizon.

The Virginia Retirement System: Assessing Its Challenges and Charting Its Future
The Virginia Retirement System (VRS) manages the assets in the Commonwealth's public employee retirement systems. The available evidence suggests that the VRS has been well managed and has outperformed many other state pension funds. We evaluate the VRS's performance and suggest changes that could enable it to lower its costs even while improving its rate of return.

Marijuana in Virginia
Over 30 states permit the personal use of marijuana for medical purposes and more than 10 states have legalized the possession of small amounts for personal use. With increasing calls in Virginia for the decriminalization or legalization of small amounts of marijuana, we examine who uses the substance, who is being arrested for possession or use, and what the revenue impact might be if marijuana were legalized in the Commonwealth.

Federal Spending in the Commonwealth: A Primer
In fiscal year 2018, federal government awards in Virginia totaled $109 billion, or $12,866 per Virginian. The Commonwealth's economy is fueled, for better or worse, by spending decisions in the halls of Congress and the White House. We explore how the federal government spends money in Virginia and highlight procurement spending in the state's metropolitan areas. We also look back at the impact of the Budget Control Act of 2011 on the economies of Northern Virginia and Hampton Roads.

The Strome College of Business and Old Dominion University continue to provide support for the State of the Commonwealth report. However, it would not appear without the vital backing of the private donors whose names appear below. They believe in the Commonwealth and the power of rational discussion to improve our circumstances, but are not responsible for the views expressed in the report.

The following individuals were instrumental in the writing, editing, design and dissemination of the report:

If you have comments or suggestions, please email us at rmcnab@odu.edu. All five State of the Commonwealth reports are available at www.ceapodu.com.

Sincerely,

Robert M. McNab
Director, Dragas Center for Economic Analysis and Policy
Professor of Economics, Department of Economics
Strome College of Business
Old Dominion University

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VIRGINIA'S GROWTH IMPROVES IN UNCERTAIN TIMES

And once the storm is over, you won't remember how you made it through, how you managed to survive. You won't even be sure, in fact, whether the storm is really over. But one thing is certain. When you come out of the storm, you won't be the same person who walked in. That's what this storm's all about.

– Haruki Murakami, Author

In the aftermath of the Great Recession, real (inflation-adjusted) economic growth in Virginia rebounded to 2.7% in 2010, suggesting to some that we were on the road to recovery. Yet, whether due to federal budget sequestration, poor private-sector job creation or superior economic opportunities in other states, the Commonwealth soon fell into an economic malaise, neither growing nor contracting – merely, it seemed, muddling along. Things, however, could have been worse. Joseph Stiglitz, a Nobel laureate in economics, commenting on the state of the U.S. and European economies in 2014, aptly noted, "Malaise is better than a recession, and a recession is better than a depression."[1]

If where you stand determines what you see, then one's perspective on the state of the Virginia economy in 2019 is likely quite different than it was in 2014. 2019 will be the fifth consecutive year of real economic growth. Barring an unforeseen shock, 2019 also will be the second consecutive year with economic growth in excess of 2%. It speaks to the Commonwealth's recent malaise that this is unabashed good news.

Several factors that produced the malaise simultaneously are responsible for the recent surge in economic activity in Virginia. Federal spending has risen in the latter half of the

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[1]   Joseph Stiglitz, "The current economic malaise is the result of flawed policies," *The Guardian*, Feb. 6, 2014, https://www.theguardian.com/business/economics-blog/2014/feb/06/current-economic-malaise-flawed-policies.

current decade, fueling economic activity in Northern Virginia and Hampton Roads. The Commonwealth has made a concerted effort to improve its business climate and recently reclaimed the top position in CNBC's "business friendly" state rankings. Job creation has continued to increase, revenues have climbed and unemployment has declined. Virginia, it would seem, is poised to enter the third decade of the century from an advantageous position.

Increasing economic uncertainty, however, may undermine the promise of a bright start to the coming decade. At the national level, political uncertainty has (so far) not significantly affected equities markets. The impeachment proceedings and the 2020 presidential election could change that equation. Trade policy, on the other hand, has lowered global merchandise trade volumes and global economic growth. Immigration, which has offset the outflow of Virginians to other states, is an increasingly contentious issue. Reflecting decisions of the Trump administration, the number of international students enrolling in American colleges has declined.[2] This is one of the reasons why headcount college enrollments have declined eight years in a row. This may undermine the long-term growth of the Virginia and U.S. economies.[3] While increases in federal spending are typically good news for the Commonwealth, these increases have been financed by federal deficit spending. The federal government is projected to run trillion-dollar annual deficits through the end of the next decade. At what point will investors hesitate to lend to an increasingly indebted United States?

Balancing the recent spate of good news with the growing uncertainties of the long term is the primary task we undertake in this chapter. We will work toward presenting a clearer picture of the state of the Commonwealth and ask what policies might work best for Virginia in these uncertain times.

Growth Accelerates, But Questions Linger

Gross domestic product (GDP) is the headline measure of economic performance in the United States and the Commonwealth of Virginia. GDP is an estimate of the level of economic output in an area and, when examined over time, provides insight into the ebb and flow of economic activity. While there is no perfect measure of economic well-being or performance, GDP is (for now) commonly used to gauge the success of local, state and national economies.[4] As with many measures of economic activity at the state and local level, state GDP data arrive with a lag. The U.S. Department of Commerce's Bureau of Economic Analysis published data for the second quarter of 2019 in November 2019. This release not only provided advance estimates for the second quarter of 2019, but also revised annual estimates for 2014 to 2018 and the first quarter of 2019.

Table 1 presents annual GDP for Virginia in nominal and real (inflation-adjusted) dollars from 2008 to 2019. We focus on real GDP, as it removes the influence of inflation. While the Virginia economy contracted only once in the current decade (2014), the overall rate of growth has been underwhelming. From 2008 to 2018, Virginia's real GDP grew at an annual average rate of only 1.1%.[5] If we focus on the last five years for which we have GDP data (2014 to 2018), the pace of economic activity in the Commonwealth ticked upward to 1.7%.

We forecast that real GDP growth for Virginia will be 2.5% in 2019, slightly below that of 2018. If this forecast is accurate, then the Commonwealth will have put together two consecutive years of real GDP growth in excess of 2%. This would boost the five-year annual average growth rate of 1.7% from 2014 to 2018 to 1.8% from 2015 to 2019.

2   Bureau of Economic Analysis, 2019, available at: https://www.bea.gov/data/gdp/gdp-state.
3   Paul Fain, "College Enrollment Declines Continue," *Inside Higher Education* (May 30, 2019), www.insidehighered.com/quicktakes/2019/05/30/college-enrollment-declines-continue.
4   GDP does not capture the value of household production, likely underestimates the size of the informal economy and may not correlate with "happiness" or other measures of social well-being.
5   We use the compound annual growth rate (CAGR) to estimate the annual average rate of economic growth. CAGR can be expressed as the following: CAGR = (Final Period/Initial Period)^(1/number of periods-1)-1.

Graph 1 compares the economic performance of Virginia and the United States from 2010 to 2019. Two points stand out. First, for most of the current decade, the Commonwealth's economic performance has lagged that of the nation. In 2010, we grew slightly faster than the national average. From 2010 to 2018, however, Virginia failed to keep pace with the nation. On the other hand (as economists tend to say), the Commonwealth's performance did improve considerably in 2017 and 2018, approaching that of the nation. We forecast that Virginia's real GDP growth will exceed that of the U.S. in 2019, as the national economy appears to be slowing considerably.

TABLE 1			
VIRGINIA'S GROSS DOMESTIC PRODUCT AND ANNUAL GROWTH RATES, 2008-2019*			
YEAR	**NOMINAL GDP**	**REAL GDP**	**REAL GDP GROWTH**
2008	$399,032	$425,804	-0.3%
2009	$408,919	$425,584	-0.1%
2010	$422,902	$437,268	2.7%
2011	$432,393	$441,609	1.0%
2012	$444,950	$444,950	0.8%
2013	$455,070	$446,560	0.4%
2014	$463,782	$445,527	-0.2%
2015	$484,628	$454,098	1.9%
2016	$493,866	$455,393	0.3%
2017	$510,425	$463,426	1.8%
2018	$534,449	$476,388	2.8%
2019	$559,568	$488,298	2.5%

Sources: Bureau of Economic Analysis, 2019, and the Dragas Center for Economic Analysis and Policy, Old Dominion University. Table SAGDP9N, real GDP by state. Millions of chained 2012 dollars. *2019 represents our Virginia forecast.

GRAPH 1

VIRGINIA AND THE UNITED STATES: ANNUAL CHANGE IN REAL GROSS DOMESTIC PRODUCT, 2010-2019*

— Virginia Real GDP — United States Real GDP

Sources: Bureau of Economic Analysis, 2019, and the Dragas Center for Economic Analysis and Policy, Old Dominion University. Table SAGDP9N, real GDP by state. Millions of chained 2012 dollars. *2019 represents our national and Virginia forecast.

The Global Economy Taps The Brakes As Uncertainty Increases

Virginia's economic performance improved in 2017 and 2018 and we forecast continued growth in 2019. Political and economic uncertainty, however, has recently increased and may undermine prospects for future growth. Uncertainty makes it harder for businesses to plan, increasing the cost of doing business.

One measure of policy uncertainty is displayed in Graph 2. The Economic Policy Uncertainty Index attempts to capture newspaper articles about economic policy uncertainty, Congressional Budget Office (CBO) measures of temporary tax provisions that are set to expire within the next decade and the dispersion of the forecasts in the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters.[6] Index values greater than 100 suggest higher than average economic policy uncertainty, while values less than 100 suggest less policy uncertainty.

It should be no surprise that the index increases during periods of economic stress and declines during periods of economic expansion. Historically, the index increases during and in the aftermath of declines in economic activity. During the 2001 recession, the index peaked at 130.6, while the peak attributable to the Great Recession did not occur until 2011.[7] **2019 was the first year in its history that the index signaled increasing uncertainty during a period of economic expansion. Similar spikes in uncertainty also occurred in the global and Chinese indices.**

In April 2019, the World Trade Organization (WTO) released its preliminary estimate for the growth in global merchandise trade for 2018. Global trade grew 3%, almost a full percentage point lower than the original forecast in 2018 of 3.9%. Global trade volumes declined by 0.3%

in the fourth quarter of 2018, largely a result of a trade conflict between the U.S. and China. In the first quarter of 2019, global merchandise trade flows were flat from the fourth quarter of 2018. In year-over-year terms, global exports and imports contracted by 2.7% and 3.1%, respectively.[8]

In April of 2019, the WTO forecasted that trade would grow by 2.6% in 2019, with the possibility of higher growth if there was a resolution to the ongoing trade conflict between the two countries.[9] **In October 2019, however, the WTO significantly revised its global trade forecast downward, from 2.6% to 1.2%.**

With the growth in global merchandise trade slowing, it should be no surprise that global economic forecasts have been revised downward. In the summer of 2019, the EU lowered its 2020 real GDP growth forecast to 1.4%.[10] Several private firms also have reduced their forecasts for Chinese real GDP growth in 2020 to below 6%.[11]

For the United States, expectations for growth in 2019 have softened considerably and shifted the Federal Reserve's policy focus. From the first quarter of 2009 through the end of the fourth quarter of 2015, the Fed's Federal Open Market Committee (FOMC) did not change its target federal funds rate. In essence, the Federal Reserve maintained an accommodative monetary policy even though the U.S. economy grew over most of the period. As illustrated in Graph 3, the FOMC raised the target rate once in 2015 and once again in 2016. In 2017 and 2018, the market consensus was the FOMC would continue to raise its target federal funds rate and unwind its liabilities accrued during the Great Recession.

Increasing trade tensions, a slowdown in global growth and declining expectations about U.S. economic activity have led to a rapid shift in the FOMC's behavior. The FOMC lowered its target federal funds rate by 25 basis points in August, September and October of 2019.

6   More information about the index can be found at: http://www.policyuncertainty.com/methodology.html. For a discussion of the methodology, see Scott Baker, Nicholas Bloom and Steven Davis, "Measuring Economic Policy Uncertainty," *NBER Working Paper 21633*, October 2015.
7   The National Bureau of Economic Research determined that the 2001 recession was from March 2001 to November 2001. The Great Recession was from December 2007 to June 2009.
8   World Trade Organization, "Latest Trade Trends, 1st Quarter 2019," Aug. 28, 2019, https://www.wto.org/english/res_e/statis_e/daily_update_e/latest_trade_trends_e.pdf.
9   World Trade Organization, "Global trade growth loses momentum as trade tensions persist," April 2, 2019, https://www.wto.org/english/news_e/pres19_e/pr837_e.htm.
10 European Commission, "European Economic Forecast, Summer 2019 (Interim)," https://ec.europa.eu/info/sites/info/files/economy-finance/ip108_en.pdf.
11 Bloomberg, "China seen heading for sub-6% economic growth as tariffs soar," Sept. 2, 2019, https://www.bloomberg.com/news/articles/2019-09-03/china-s-economy-will-grow-at-5-7-in-2020-oxford-economics-says.

At the end of 2019, the FOMC's stance could best be described as "watch, wait and react." In other words, the FOMC is watching the economy to see if the rate cuts boosted economic activity. If economic activity increases, the FOMC will become less accommodative. On the other hand, if economic activity falters, the FOMC may reduce its target federal funds rate again in 2020.

Graph 4 illustrates the change in the median forecast among members of the Federal Reserve Board of Governors from September 2018 to September 2019. Even with a more accommodative monetary policy, the most recent median forecast is that real GDP growth will slow to approximately 2% in 2020 and 2021, subject to the usual caveats about economic shocks and policy uncertainty.

Our concluding thought is that the increasing uncertainty undermines business and consumer confidence. If global growth continues to slow, the prospects for 2020 and beyond will certainly dim. While there remains the possibility that trade conflicts with China will abate and global trade volumes will rebound, there is also a strong likelihood that the ongoing trade conflicts will intensify. Forecasting in such an environment is exceedingly difficult, given the volatility of information, policies and politics. The Commonwealth, in such an environment, should be conservative in its expectations for economic growth.

GRAPH 2

ECONOMIC POLICY UNCERTAINTY INDEX: UNITED STATES, 2000-2019*
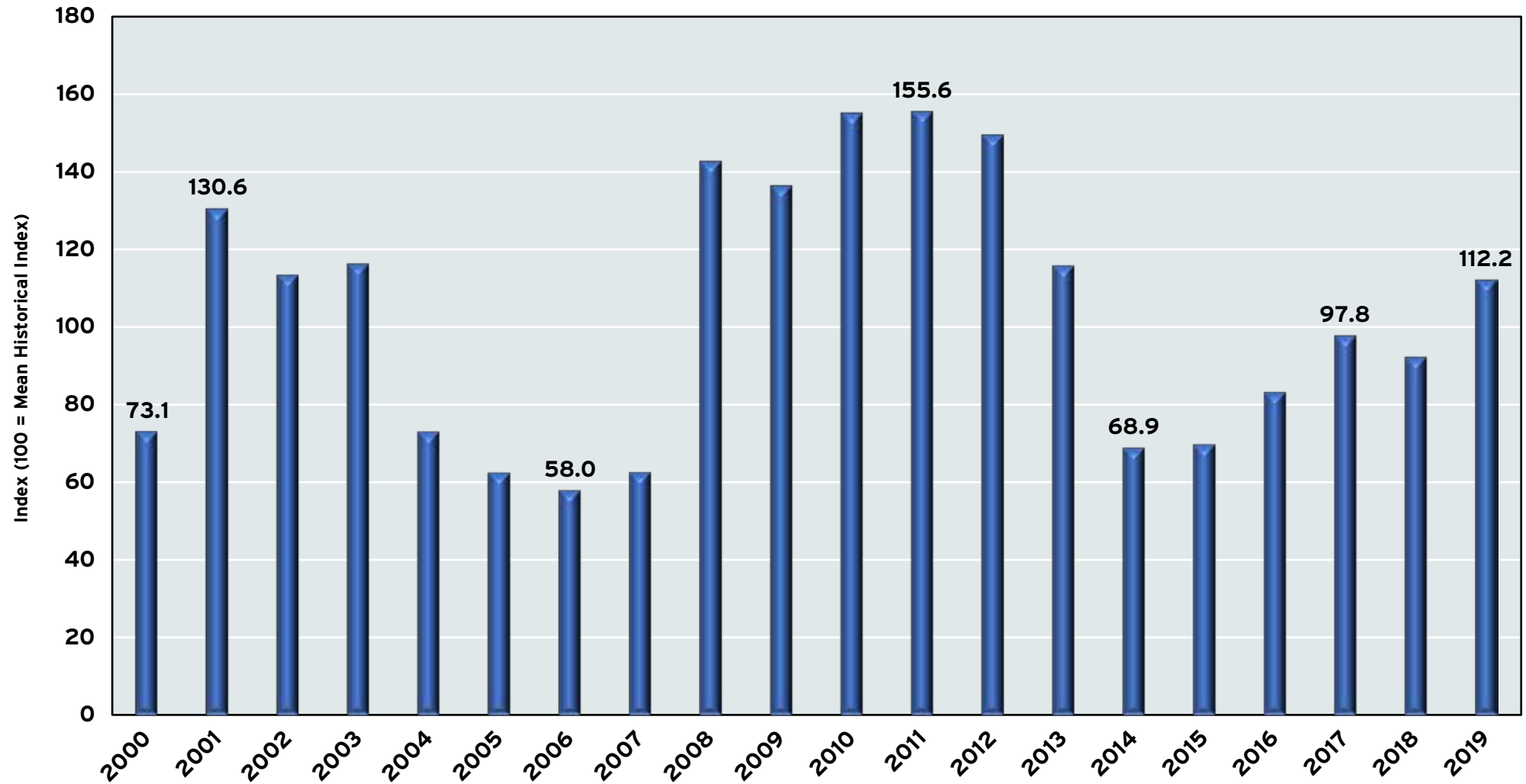
Sources: Economic Policy Uncertainty Index (2019) and the Dragas Center for Economic Analysis and Policy, Old Dominion University. Annual averages constructed from weekly data. *2019 data represent the annual average through Sept. 10, 2019.

GRAPH 3

FEDERAL OPEN MARKET COMMITTEE:
TARGET FEDERAL FUND CHANGE IN BASIS POINTS, UNITED STATES, 2015-2019
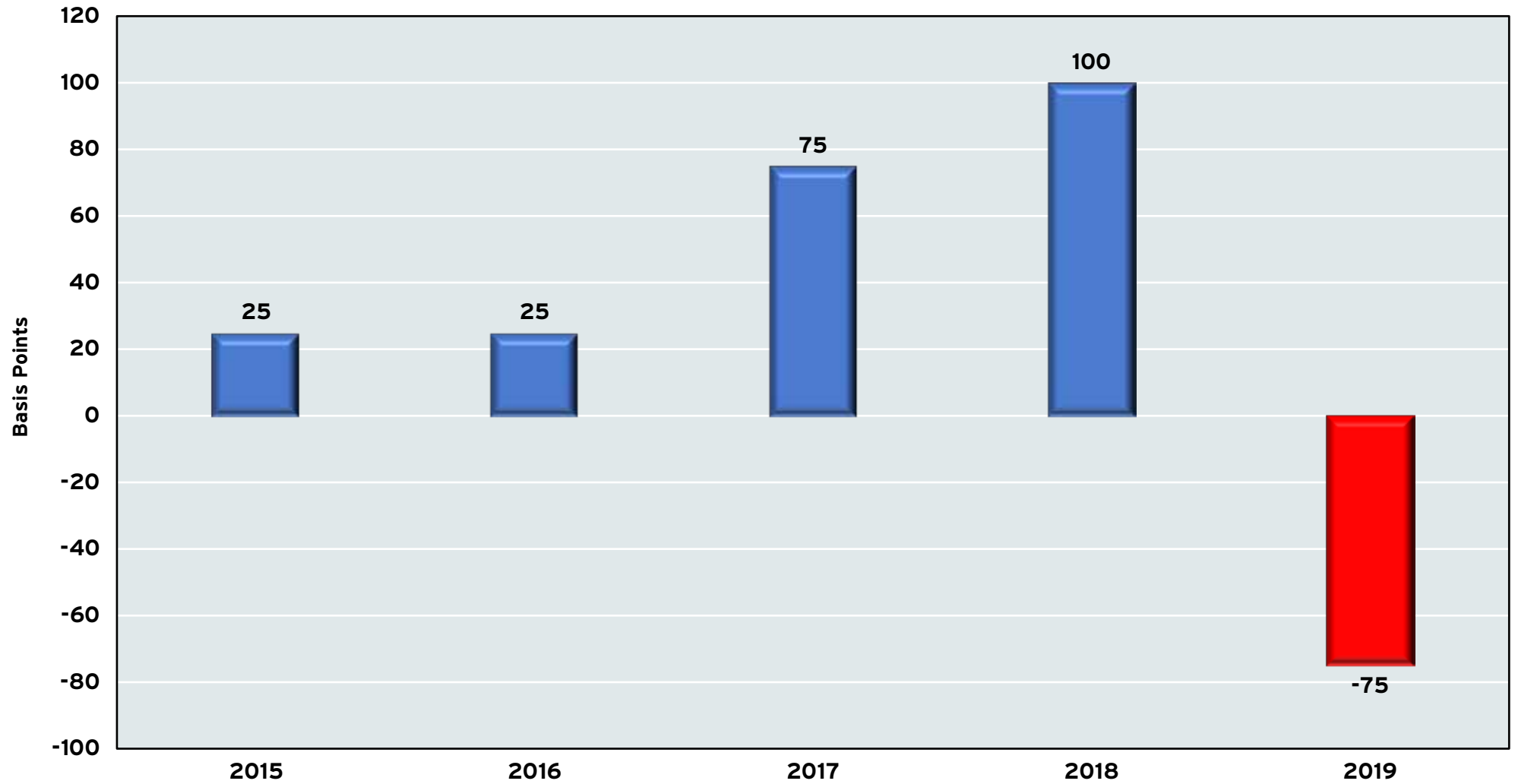
Sources: Federal Reserve Board of Governors (2019) and the Dragas Center for Economic Analysis and Policy, Old Dominion University. 1 basis point is equal to 0.01%. Data current as of Nov. 27, 2019, and subject to revision.

GRAPH 4

MEDIAN PROJECTIONS OF FEDERAL RESERVE BOARD MEMBERS AND PRESIDENTS: ANNUAL CHANGE IN REAL GDP, UNITED STATES, 2019-2021
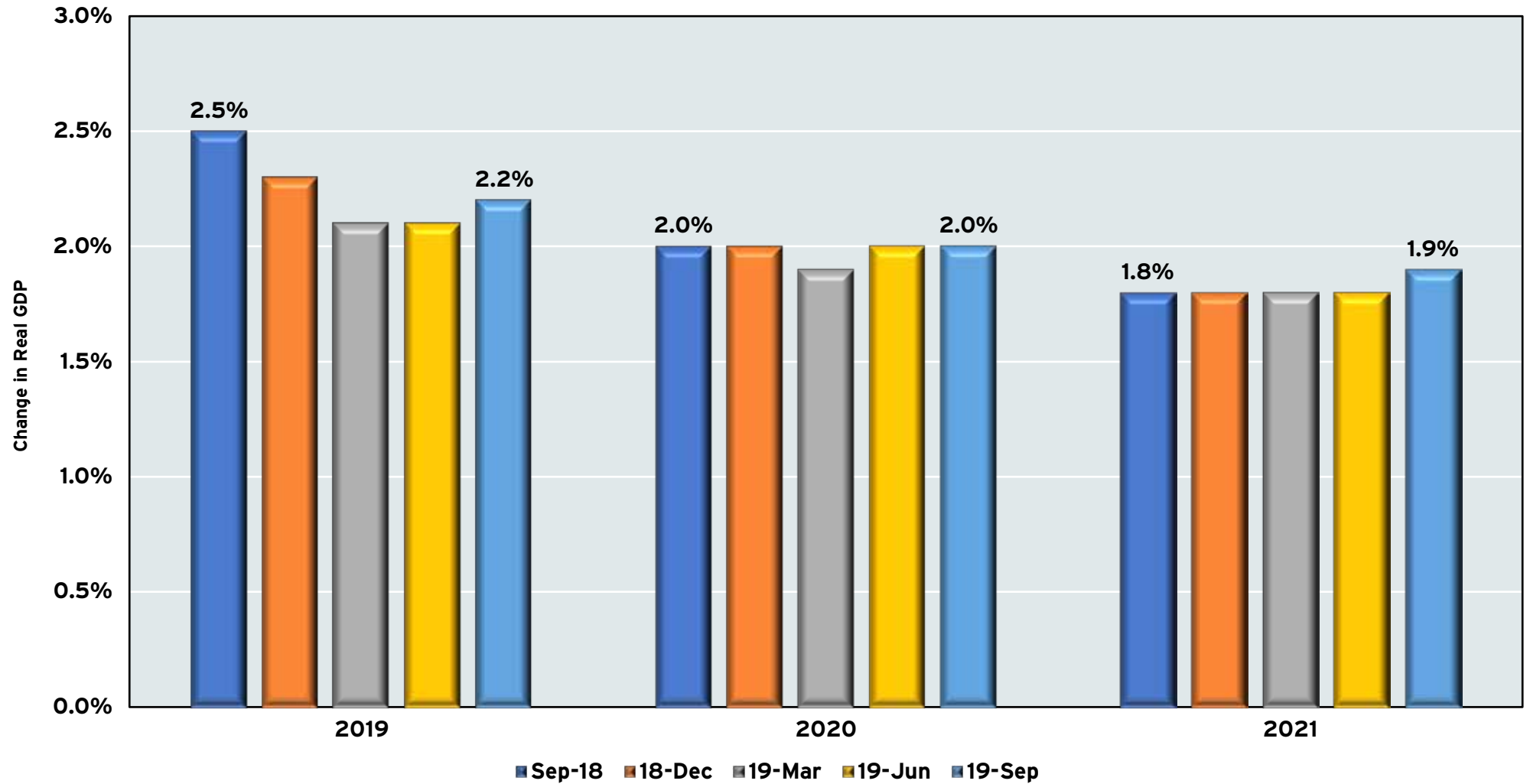
Source: United States, Federal Open Market Committee (2010). Data current as of Oct. 10, 2019, and subject to revision. https://fraser.stlouisfed.org/title/677

Labor Markets Hit New Highs

As economic activity in Virginia has improved in the last years of the current decade, it should be no surprise that labor market conditions in the Commonwealth have improved as well. Graph 5 illustrates how the seasonally adjusted civilian labor force and civilian individual employment have evolved from January 2005 to October 2019.[12] One can clearly see the impact of the Great Recession on the size of the labor force and individual employment. From its prerecession peak in October 2008, the civilian labor force fell by 1.4% to its trough in November 2009. The decline in individual employment, however, was more significant. From its prerecession peak in July 2008, individual employment fell by 4.6% to its bottom in December 2009.

Virginia's tepid economic performance in the first half of the decade is reflected in the labor force data. From December 2009 to December 2015, individual employment rose 6.4%, but the labor force only grew by 2.7%. The relatively rapid rise in individual employment relative to the labor force meant that Virginia's unemployment rate fell rapidly from a peak of 7.5% to 4.1% in December 2015 (Graph 6).

Since 2015, however, the pace of individual employment growth has slowed while the size of the labor force has accelerated compared to the earlier period. From December 2015 to December 2018, the civilian labor force in Virginia grew 3% while individual employment growth slowed to 4.4%. Since individual employment continued to grow faster than the labor force, the unemployment rate in the Commonwealth continued to decline, reaching 2.6% in October 2019. If someone wants a job, there is likely an employer in need of an employee to fill a position.

With unemployment nearing historical lows and individual employment growth slowing because those who want a job, have a job, how can the Commonwealth and the nation continue to grow? One route to increasing productivity growth is to spur the flow of inventions and innovations emanating from the Commonwealth's federal laboratories and university campuses. Other policy options include offering tax incentives for investments in business plants and equipment (including repeal of Virginia's machinery and tools tax) and finding ways to increase labor force participation rates. Addressing the urban-rural divide in education, broadband access, quality of infrastructure and other factors will also require concerted action. Each of these possibilities involves heavy economic and political lifting but realistically must receive consideration if we are to spur economic growth in our current situation.[13]

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12   The civilian labor force consists of employed persons and unemployed persons. The Bureau of Labor Statistics defines employed persons as "persons who did any work for pay or profit during the survey reference week; persons who did at least 15 hours of unpaid work in a family-operated enterprise; and persons who were temporarily absent from their regular jobs because of illness, vacation, bad weather, industrial dispute, or various personal reasons." The BLS classifies persons as unemployed "if they do not have a job, have actively looked for work in the prior 4 weeks, and are currently available for work. Persons who were not working and were waiting to be recalled to a job from which they had been temporarily laid off are also included as unemployed." For more information, see https://www.bls.gov/cps/lfcharacteristics.htm.

13   The debate of familial-based versus merit-based immigration is outside the scope of this chapter but a topic worthy of discussion. There is a trend toward merit-based immigration among developed countries, which, in turn, appears to affect familial-sponsorship and remittances as noted by Sandar Mukopadhyay and Miaomiao Zou, "Will skill-based immigration policies lead to lower remittances? An analysis of the relations between education, sponsorship, and remittances," *Journal of Development Studies*, 2019, https://doi.org/10.1080/00220388.2019.1585812.

GRAPH 5

SEASONALLY ADJUSTED CIVILIAN LABOR FORCE AND CIVILIAN INDIVIDUAL EMPLOYMENT: VIRGINIA, JANUARY 2005 TO OCTOBER 2019
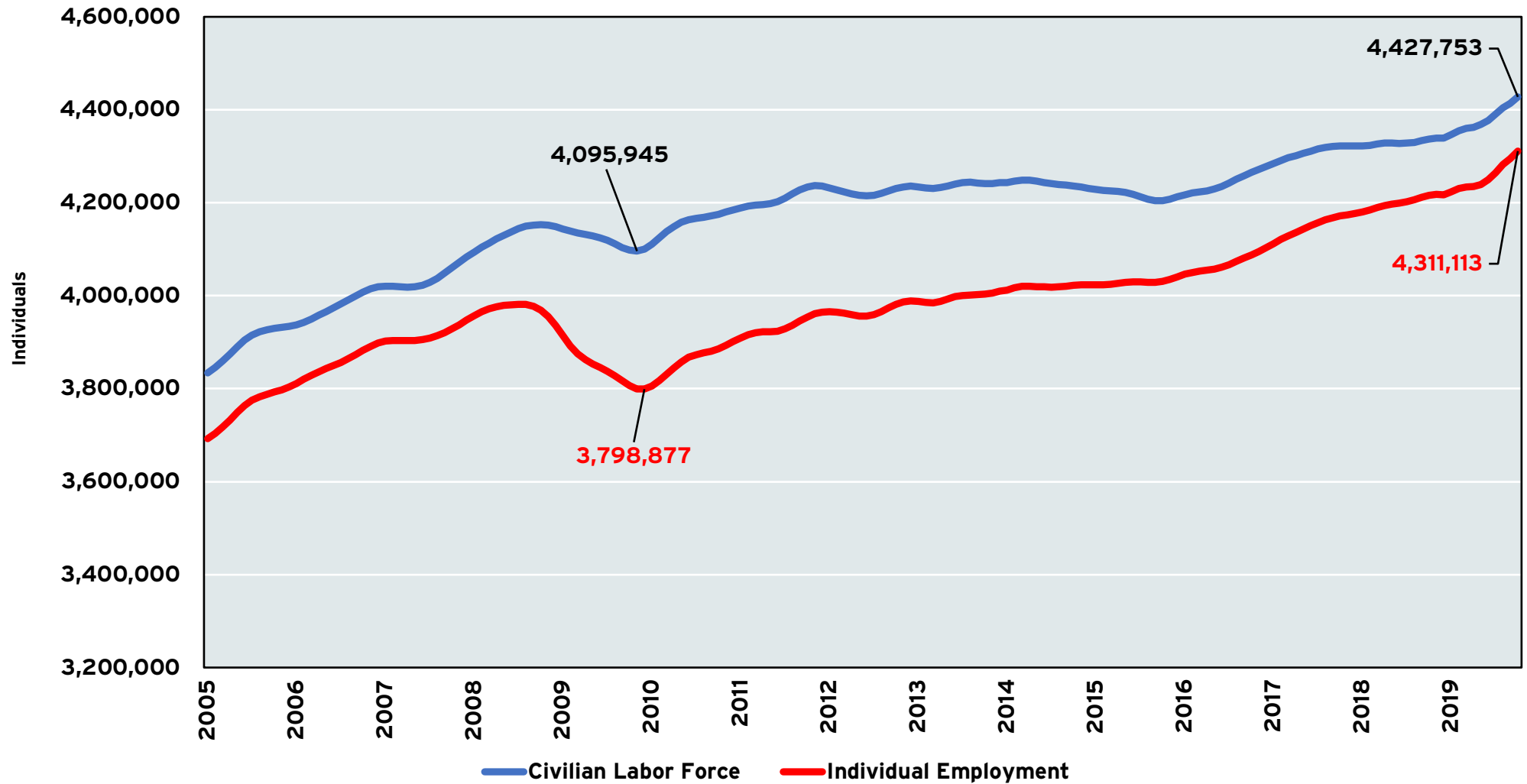
Source: Bureau of Labor Statistics, 2019. Data current as of Nov. 27, 2019, and subject to revision.

GRAPH 6

**SEASONALLY ADJUSTED UNEMPLOYMENT RATE:
VIRGINIA AND THE UNITED STATES, JANUARY 2005 TO OCTOBER 2019**
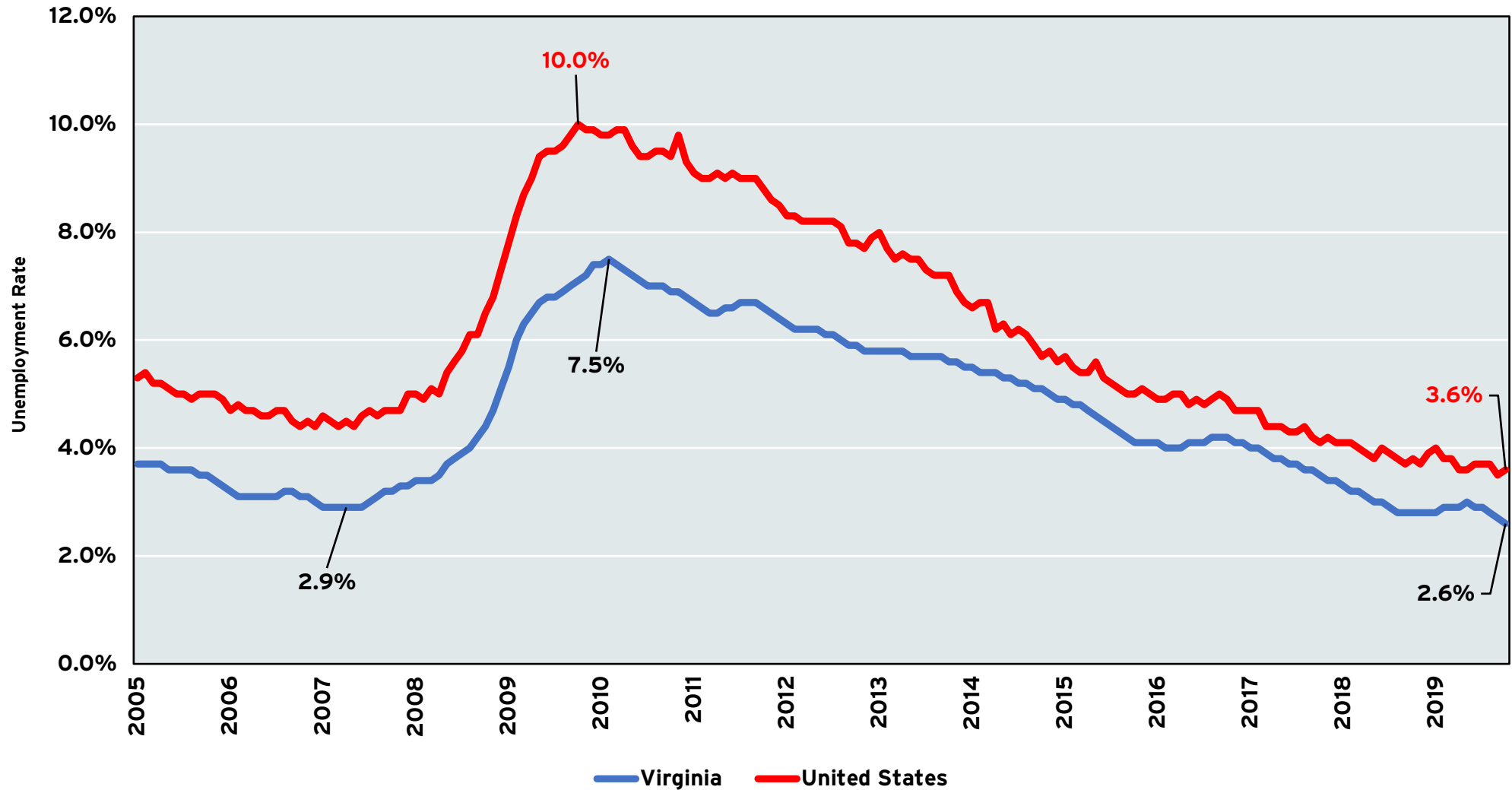
Source: Bureau of Labor Statistics, 2019. Data current as of Nov. 27, 2019, and subject to revision.

Labor Force Participation Rates

The civilian labor force represents those individuals who are employed or who are seeking employment. Disaffected workers who have abandoned attempts to secure gainful employment are not included in the labor force, and thus not reflected in the employment and unemployment data. Labor force participation, which is a percentage of the working-age (16 to 64) population that is employed or unemployed and seeking employment, typically falls during economic contractions and rises during economic expansions. Graph 7 presents labor force participation rates for the U.S. and Virginia.

Whether nationally or in Virginia, labor force participation rates remain below their prerecession peaks. The long-term decline in labor force participation rates represents an economic puzzle, with demographic change (baby-boomer retirements), dependence on government benefits, structural unemployment (jobs exist, but workers are not qualified to fill them) and the opioid crisis all considered as potential contributing factors.

One perspective is that the demand for labor has shifted over the previous decades in favor of highly skilled labor and will likely continue in this vein over the coming decade.[14] While manufacturing's share of GDP has remained relatively steady, manufacturing employment has fallen due to significant improvements in worker productivity. Fewer workers can produce more output, and this trend is likely to accelerate as automation continues to be utilized in the manufacturing and service industries. Historically, automation may have eliminated jobs within an industry,

but some workers could retrain and remain within the industry while others had to leave the industry altogether. An architect who may have previously spent hours producing blueprints with the help of staff can now achieve the same work with computer software, reducing the need for staff. Robotics has taken over parts of the car manufacturing process, increasing worker productivity and output, but also decreasing the demand for autoworkers.

The latest wave of automation, some argue, appears to eliminate entire industry employment cohorts. Legal firms are increasingly using sophisticated software that accelerates the speed of discovery but may also displace lawyers. If autonomous long-haul trucks enter the market, the livelihood of many truckers comes under significant pressure. For now, it is difficult to separate promises and reality, but it does appear we may be on the cusp of significant change. If so, automation will be to the benefit of consumers and businesses but to the detriment of the workers who now must learn new skills for different industries and professions.

Another perspective is that the labor supply is no longer as responsive to increases in real earnings as it was in the past. Disaffected workers may have high reservation wages due to their ability to cobble together cash income with public benefits.[15] These workers may also be in poorer health as a result of "diseases of despair," such as substance abuse, and are effectively unemployable in many industries.[16] A not-so-uncommon complaint by employers in manufacturing and transportation industries, for example, is that skilled workers are in short supply and many who apply for work are disqualified due to substance abuse. This problem may only be exacerbated by the increasing number of states that have decriminalized or legalized recreational marijuana.

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14 Eleanor Krause and Isabel Sawhill, 2017, "What we know and don't know about declining labor force participation: A review," the Brookings Institution.
15 The reservation wage is the lowest wage rate at which an individual is willing to accept employment. Lizhong Peng, Xiaohaio Guo and Chad Meyerhoefer (2018) found that Medicaid expansion has led to a "statistically significant decrease in employment of 1.3 percent one year after the Medicaid expansion. This disemployment effect is transitory and appears to primarily occur in low-wage sectors. In particular, employment returns to pre-expansion levels within two years." In other words, immediately after Medicaid expansion, reservation wages appeared to temporarily increase. https://www.nber.org/papers/w25105.
16 https://www.brookings.edu/bpea-articles/mortality-and-morbidity-in-the-21st-century/.

GRAPH 7

**LABOR FORCE PARTICIPATION RATES:
VIRGINIA AND THE UNITED STATES, JANUARY 2005 TO OCTOBER 2019**
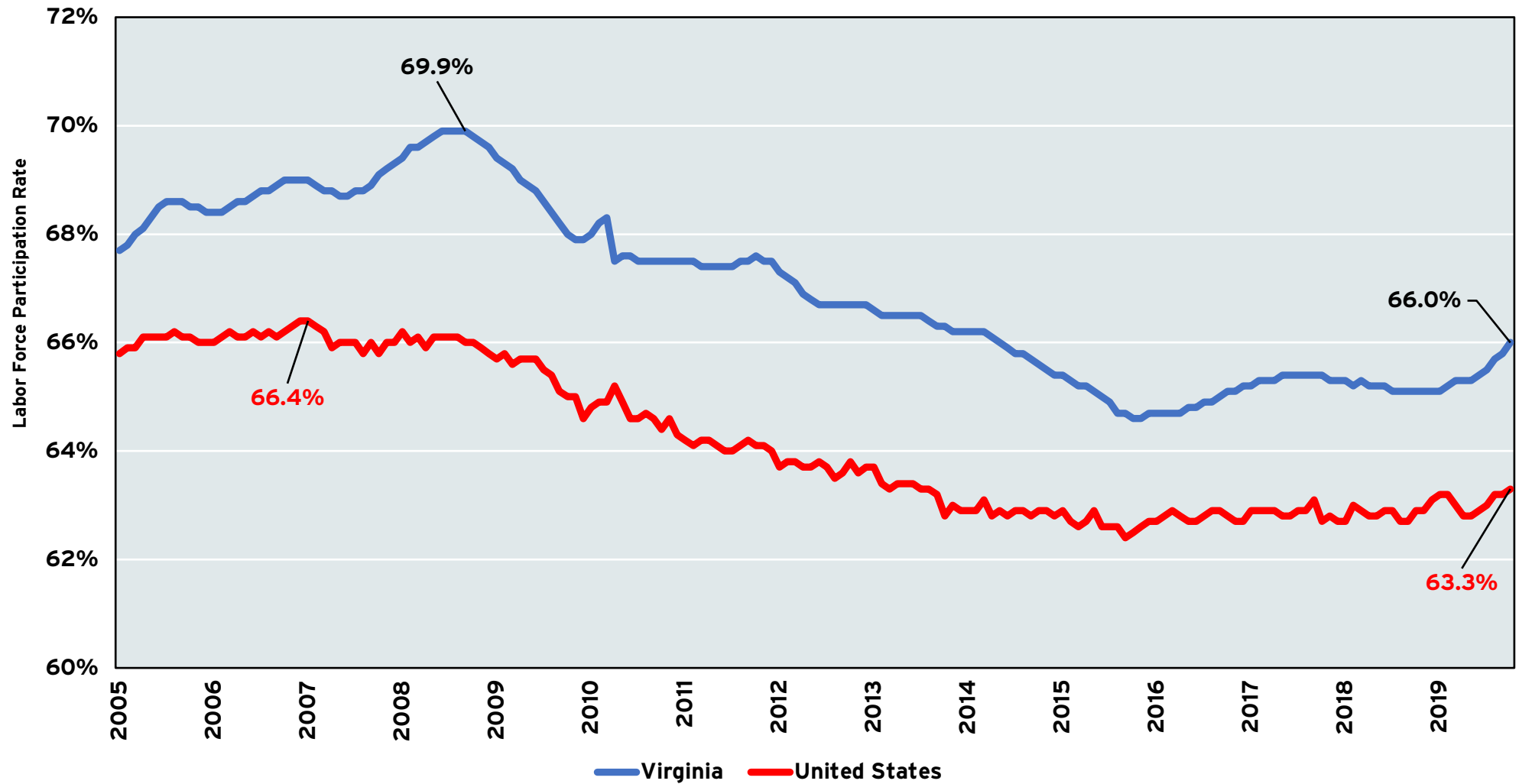
Source: Bureau of Labor Statistics, 2019. Data current as of Nov. 27, 2019, and subject to revision.

One factor that has received much attention is the rise of the "gig economy," or "fauxmation economy." If one drives for Uber or Lyft, delivers groceries for Postmates or DoorDash, finds jobs through Thumbtack or engages in a host of other activities, is this considered formal work? A 2016 survey of people 21 and older who were not retired found that 37% engaged in paid informal work. Even if one excluded those survey respondents who engaged solely in renting or selling activities, 20% of the respondents engaged in paid, informal work, the survey revealed.[17] For those engaging in informal work, hourly wages were comparable or higher to the survey respondents' former wages in traditional work.

The authors of the 2016 study argued that if informal workers who worked at least 20 hours a week were counted as employed, the national labor force participation rate in 2015 would have increased by 0.5% to 1%. If all informal workers were classified as employed, regardless of hours, the labor force participation rate would have been two percentage points higher in 2015. As the size of the gig economy grows, the gap between measured labor force participation and actual labor force participation is likely to widen. This is not just a measurement challenge for economists. Our labor laws and policies remain rooted in the concept of traditional employment. With an increasing number of Virginians and Americans in the gig economy or informal employment, policies and regulations must adapt to the new normal.

Labor force participation rates vary across the Commonwealth. Figure 1 displays these rates by county and independent city in 2018. Labor force participation rates were markedly lower in southwestern Virginia, with some counties observing participation rates below 50%. The highest labor force participation rates are those above 70%, seen in Northern Virginia, Richmond and parts of Hampton Roads.

FIGURE 1

LABOR FORCE PARTICIPATION BY COUNTY AND INDEPENDENT CITY: VIRGINIA, 2018
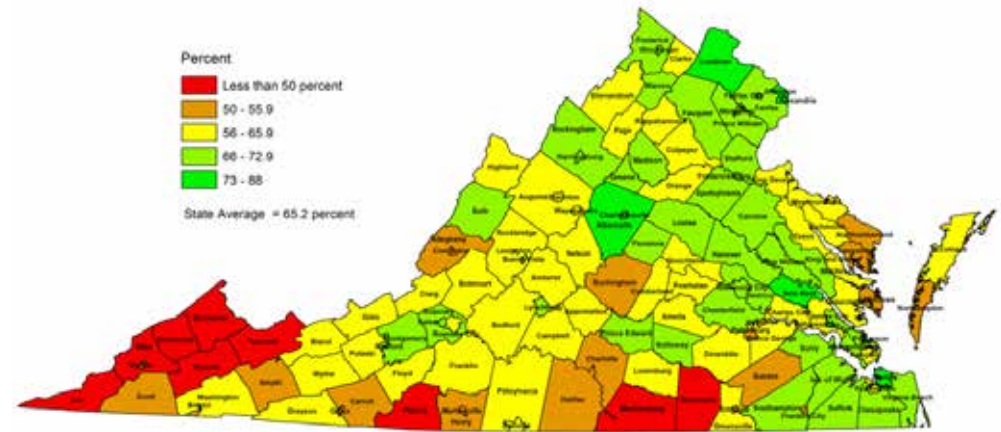
Source: Virginia Employment Commission (2019), "Labor Force Participation Rates," https://virginiaworks.com/labor-force-participation-rates/category/labor-force-participation-rates

Figure 2 presents the change in labor force participation rates by county and independent city from 2013 to 2018. Over this period, Virginia's average labor force participation rate declined by 5.7%. Fewer than 10 localities observed an increase in labor force participation rates, with the remainder of localities observing declines. Declines occurred not only in the western counties but also in Northern Virginia and Hampton Roads.

Different localities face different challenges. Unemployment is higher and labor force participation rates are lower in rural areas of the Commonwealth. A lack of economic opportunities, the decreasing importance of agriculture and manufacturing in Virginia's economy and the devastating impact of the opioid crisis all play a role here. The challenge in these localities is to foster economic development in order to reduce unemployment rates and induce disaffected workers to return to the labor force.

17   Anat Bracha and Mary A. Burke, "Who counts as employed? Informal work, employment status, and labor market slack," *Federal Reserve Bank of Boston Working Paper Series 16-29*, 2016.

FIGURE 2

CHANGE IN LABOR FORCE PARTICIPATION RATES BY COUNTY AND INDEPENDENT CITY, 2013-2018

Source: Virginia Employment Commission (2019), "Labor Force Participation Rates," https://virginiaworks.com/labor-force-participation-rates/category/labor-force-participation-rates
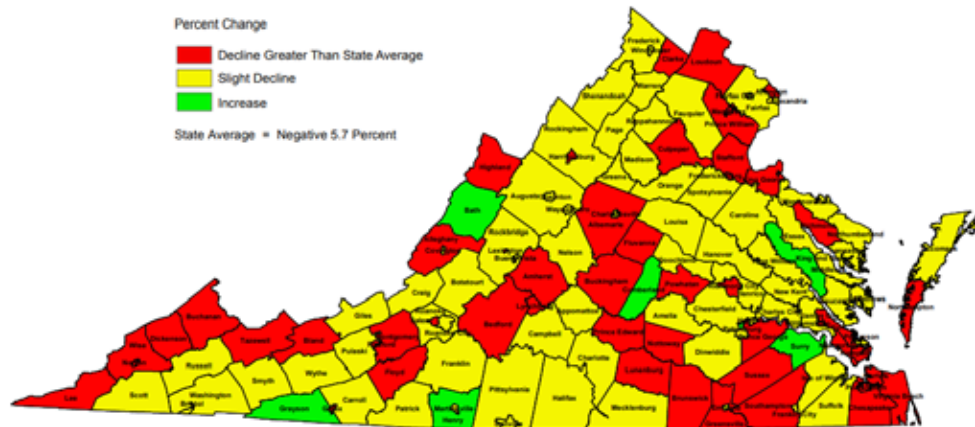
In many urban areas, declines in unemployment rates and the decline in labor force participation rates have exacerbated the shortage of workers. Moving disaffected workers back into the workforce has a host of benefits beyond addressing the need for labor. The challenge now is to ask the hard questions about what is to be done.

There is no magic elixir or "slam-dunk" economic development project that will solve these issues. Raising the capabilities of the existing and future workforce is a long-run effort that requires investments in K-12 schools, community colleges and public universities. Improving infrastructure should not just focus on roads. In an increasingly connected global economy, counties and cities without reliable, fast and cheap internet connections are left behind. These efforts take time and patience to bear fruit, so it is best to start sooner than later.

Businesses Continue To Add Jobs (Slowly)

As with individual employment, nonfarm payrolls (jobs) continued to expand in 2018 and into 2019. Graph 8 illustrates the number of jobs in the Commonwealth from January 2005 to October 2019. The seasonally adjusted number of jobs in Virginia set a historical record in July 2019. On the other hand, the growth in jobs has moderated somewhat in 2019. In the first eight months of 2018, year-over-year growth was over 1%. In 2019, only January saw year-over-year job growth higher than 1%, and some months approached 0.5% growth. More jobs, but at a slower rate.

Graph 9 compares the year-over-year change in jobs for Virginia and the United States. Virginia's job growth was as strong as that of the U.S. prior to the Great Recession, and the Commonwealth's economy did not shed as many jobs as the nation did during the recession. In the aftermath of the Great Recession and budget sequestration, Virginia's job growth faltered when compared to that of the United States. Job growth in Virginia has, with few exceptions, been below that of the national average this decade. Focusing in on 2019, it appears that year-over-year job growth in the U.S. and Virginia is decelerating in the latter half of the year.

Graph 10 presents real average hourly earnings for Virginia and the United States for the period January 2007 to October 2019. While real average hourly earnings remained higher in Virginia than the nation, the gap between the Commonwealth and the U.S. has narrowed in recent years. It would appear that even with a tight labor market, workers in Virginia (on average) have not seen large increases in their paychecks in recent years. If labor markets are tightening in the Commonwealth, then we would reasonably expect that earnings would increase and likely outpace inflation.[18] We are interested in **real average hourly earnings** because real earnings control for the impact of inflation.

Economists continue to explore the puzzle of why real earnings have not risen faster in the current economic expansion. One possible explanation is there is a large reserve of labor outside the labor force

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18 Average hourly earnings reflect not only changes in hourly and incentive wage rates, but also variable factors such as overtime and late-shift work. For more information, see https://www.bls.gov/opub/hom/pdf/ces-20110307.pdf.

and employers have used this development to restrain the growth in earnings. The growth of contract and informal employment and the decline of unions may also restrain wage growth. Automation plays a role here, as well, displacing workers and reducing their ability to negotiate for higher wages. Regardless of the reasons, this economic expansion has not led to the increases in earnings observed in previous periods of economic growth. Is this stagnation in workers' earnings an aberration? We will have to wait a bit longer to get our answer to this question.

GRAPH 8

**SEASONALLY ADJUSTED NONFARM PAYROLLS (JOBS):
VIRGINIA, JANUARY 2005 TO OCTOBER 2019**
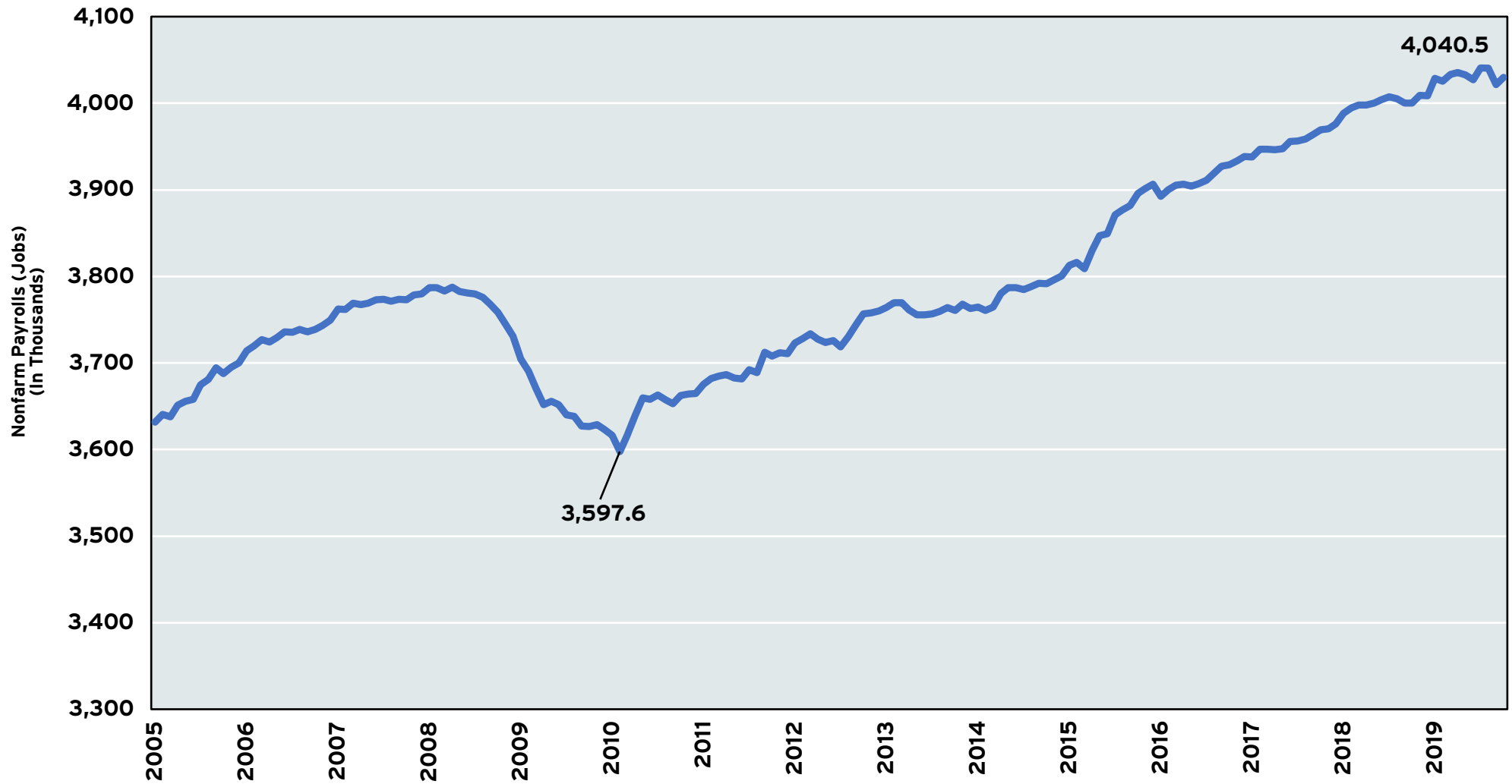
Source: Bureau of Labor Statistics, 2019. *Data current as of Nov. 27, 2019, and subject to revision.

GRAPH 9

YEAR-OVER-YEAR CHANGE IN SEASONALLY ADJUSTED NONFARM PAYROLLS (JOBS): VIRGINIA AND THE UNITED STATES, JANUARY 2005 TO OCTOBER 2019
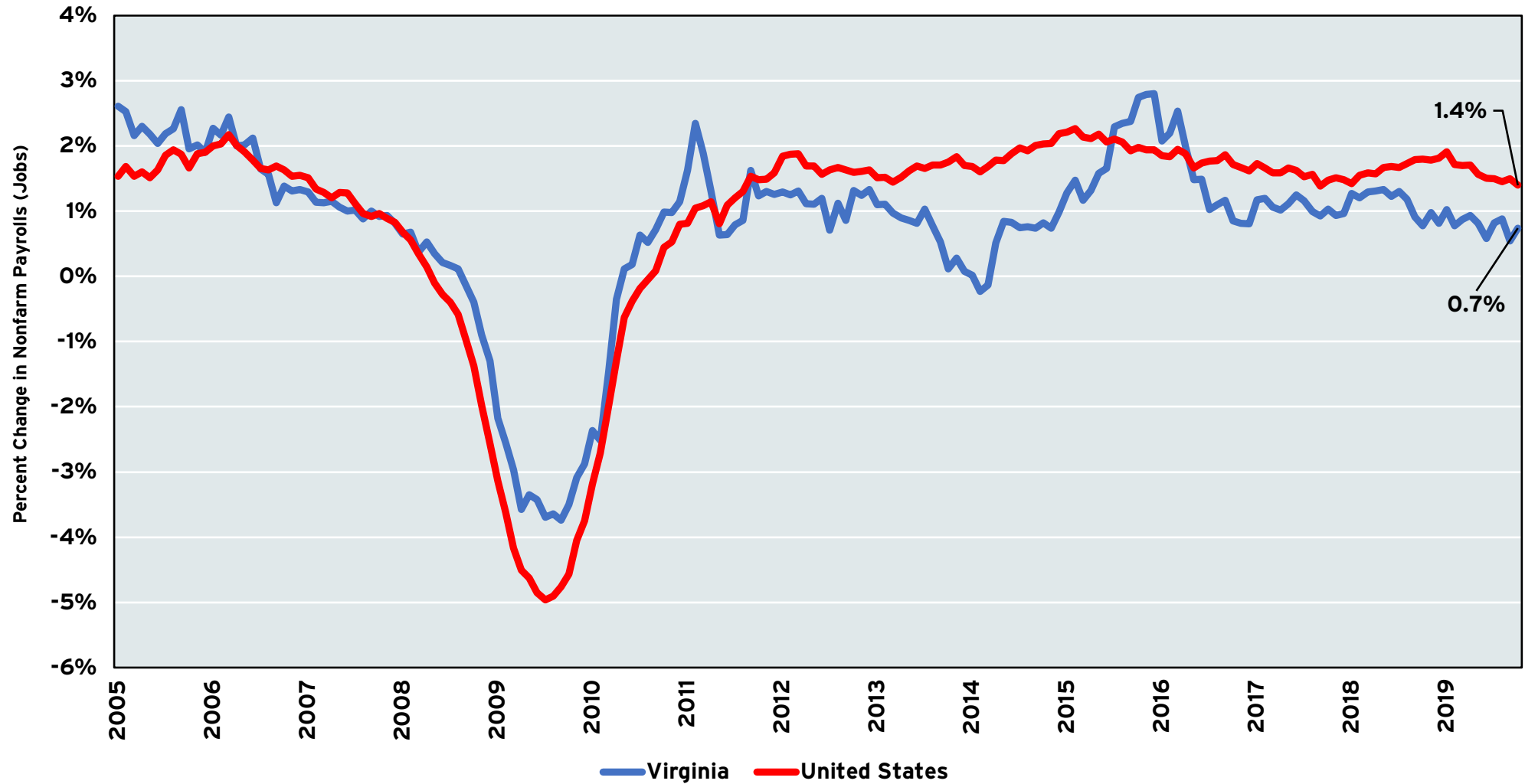
Source: Bureau of Labor Statistics, 2019. *Data current as of Nov. 27, 2019, and subject to revision.

GRAPH 10

SEASONALLY ADJUSTED REAL AVERAGE HOURLY EARNINGS IN 2019 DOLLARS: VIRGINIA AND THE UNITED STATES, JANUARY 2007 TO OCTOBER 2019

Virgina Real Hourly Earnings ▬▬ **U.S. Real Hourly Earnings**
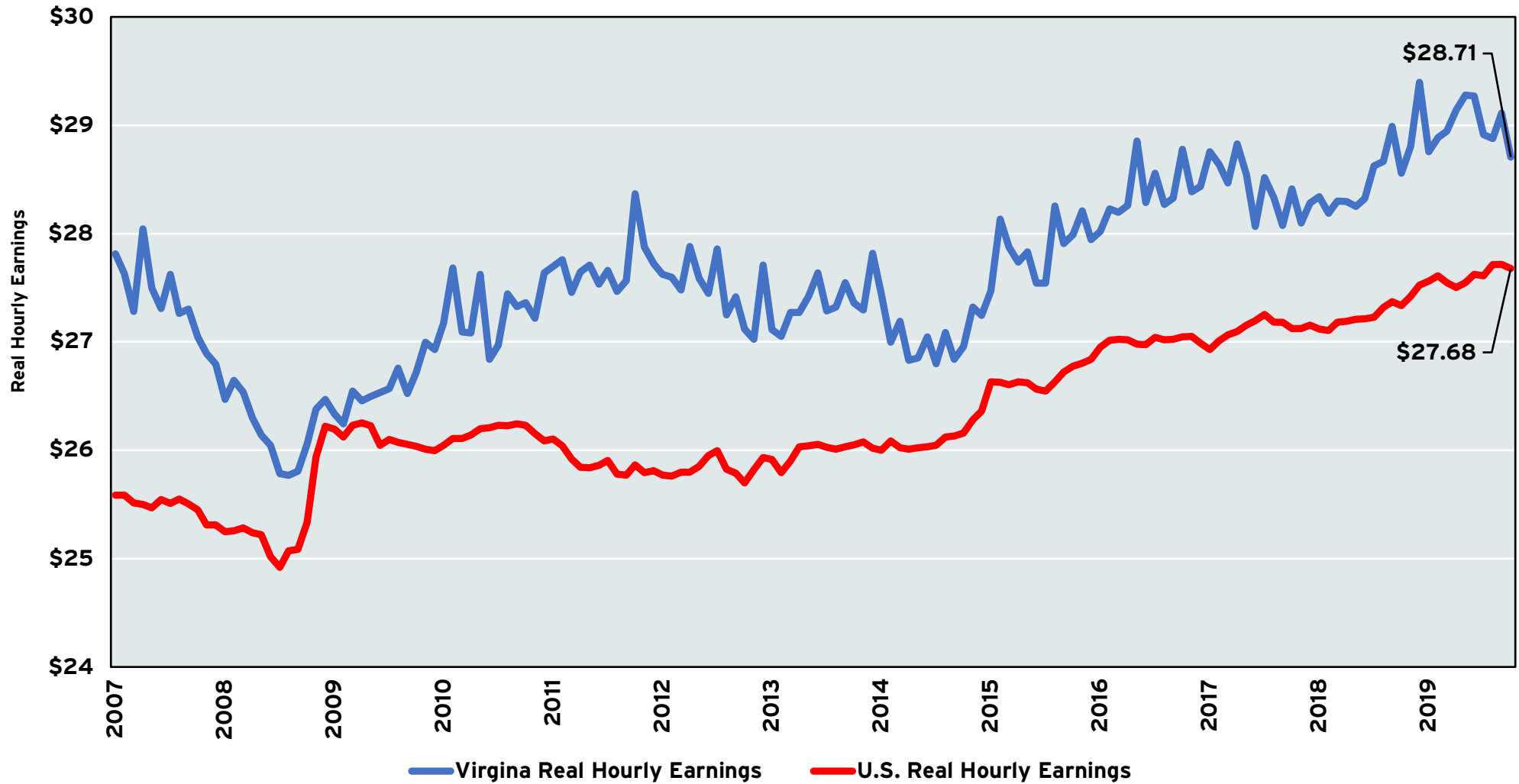
Source: Bureau of Labor Statistics, 2019. The Consumer Price Index for All Urban Consumers is used to obtain real average hourly earnings and is indexed to be 100 in January 2019. Data current as of Nov. 27, 2019, and subject to revision.

Sectoral Growth In Virginia

Table 3 reveals that the share of private industries in real GDP grew from 80.1% in 2000 to 82.1% in 2018. The increasing contribution of private industries to economic activity in the Commonwealth suggests that the economy is slowly diversifying.[19]

Table 3 also shows the contributions of each sector to real GDP for 2000, 2010 and 2018. Two sectors – finance, insurance, real estate, rental and leasing, and professional and business services – accounted for nearly 40% of real GDP in Virginia in 2018. The professional and business services sector continued to increase in size, exceeding 20% of real GDP in 2018. The share of real GDP contributed by government and government enterprises in 2018 was almost 18%, down from 20% in 2000.

From 1997 to 2016, the government and government enterprises sector was the largest sector in terms of economic activity in Virginia. However, in 2017, the professional and business services sector eclipsed the government and government enterprises sector. In 2018, the finance, insurance, real estate, rental and leasing sector was approximately the same size in terms of economic activity as the government sector. The growth of these two sectors once again reflects the reality that changes in federal spending reverberate throughout Virginia.

Table 3 sheds light on the growth of professional and business services. Within this sector, employment grew rapidly in the professional, scientific and technical services sub-sector from 2000 to 2010, though it grew at a slower pace from 2010 to 2018. Administrative and support services growth slowed a bit from 2000 to 2010 but increased from 2010 to 2018. Management of companies and enterprises, while growing absolutely over time, has fallen as a percentage of nonfarm employment. One might expect this category to grow slower than total nonfarm employment, as these jobs tend to be highly skilled and well compensated.

Let's compare this to the government and government enterprises sector as displayed in Table 3. Federal, state and local government employment were all higher in 2018 than 2000; however, military employment declined significantly over this period. Military employment fell from approximately 168,000 in 2000 to about 152,000 in 2010, and then to approximately 136,000 in 2018. The gains in federal, state and local employment offset these losses, but the slow growth in overall employment in this sector meant that Virginia's share of total nonfarm jobs fell over the period.

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19   We recognize that federal transfer payments to individuals (Social Security), federal payments for medical services (Medicare and Medicaid) and federal contracts to private businesses will increase the sectoral contributions of private businesses, even though the origination of this activity is the federal government.

TABLE 2			
SECTORAL CONTRIBUTIONS TO REAL GDP: **VIRGINIA, 2000, 2010 AND 2018**			
SECTOR	**2000**	**2010**	**2018**
Agriculture, forestry, fishing and hunting	0.6%	0.4%	0.4%
Mining, quarrying and oil and gas extraction	0.9%	0.6%	0.4%
Utilities	1.7%	1.5%	1.5%
Construction	6.2%	3.5%	3.4%
Manufacturing	11.6%	9.6%	8.8%
Wholesale trade	4.7%	4.3%	4.5%
Retail trade	5.6%	5.1%	5.4%
Transportation and warehousing	2.8%	2.5%	2.5%
Information	3.8%	4.4%	4.3%
Finance, insurance, real estate, rental and leasing	16.7%	17.9%	17.8%
Professional and business services	13.0%	18.5%	20.5%
Educational services, health care and social assistance	5.9%	7.1%	7.4%
Arts, entertainment, recreation, accommodation and food services	3.7%	3.1%	3.0%
Government and government enterprises	20.0%	18.9%	17.9%
Addendum: Total private industries	80.1%	81.1%	82.1%
Addendum: Real GDP in millions of chained 2012 dollars	$346,161	$437,268	$476,388

Source: Bureau of Economic Analysis, Gross Domestic Product by State, 2019. Table SAGDP9N Real GDP by State in millions of chained 2012 dollars.

TABLE 3

SELECTED SECTORAL EMPLOYMENT AS A PERCENTAGE OF TOTAL NONFARM EMPLOYMENT: VIRGINIA, 2000, 2010 AND 2018

INDUSTRY	2000	2010	2018
PROFESSIONAL AND BUSINESS SERVICES	**16.1%**	**18.1%**	**18.5%**
Professional, scientific and technical services	372,566 (8.6%)	508,235 (10.8%)	572,803 (10.9%)
Management of companies and enterprises	72,978 (1.7%)	76,370 (1.6%)	80,830 (1.5%)
Administrative and support services	251,888 (5.8%)	266,387 (5.7%)	321,380 (6.1%)
GOVERNMENT AND GOVERNMENT ENTERPRISES	**18.6%**	**18.6%**	**16.8%**
Federal civilian	165,746 (3.8%)	191,161 (4.1%)	199,276 (3.8%)
Military	168,189 (3.9%)	152,360 (3.2%)	136,468 (2.6%)
State government	151,445 (3.5%)	156,188 (3.3%)	166,587 (3.2%)
Local government	321,759 (7.4%)	374,578 (8.0%)	383,405 (7.3%)
Addendum: Total nonfarm employment	4,337,959	4,689,327	5,275,447

Source: Bureau of Economic Analysis (2019). Table SA25N, Total Full-Time and Part-Time Employment by NAICS Industry.

A Rising Tide Of Federal Government Spending, Deficits And Debt

The presence of the federal government in Virginia ranges from government agencies and departments in Northern Virginia to aircraft carriers and military personnel stationed in Hampton Roads. For better or worse, Virginia's economic performance is influenced by decisions about the size and scope of the federal government. It should be no surprise that a recent analysis by the Nelson A. Rockefeller Institute of Government (the State University of New York's public policy research arm) estimated that Virginia ranks first for the net benefits it receives from the federal government.[20]

The Rockefeller Institute defined the balance of payments as federal spending in each state minus the amount of revenue paid by state residents and other economic agents to the federal government. A state with a positive balance of payments received more spending than its residents and businesses paid in taxes to the federal government (and vice versa).

Table 6 displays the top five states in terms of the absolute balance of payments and per capita balance of payments. For fiscal year 2017, the Rockefeller Institute estimated that Virginia received approximately $87.2 billion more than its residents and business paid in federal taxes, or $10,301 per capita. Virginia's estimated absolute net benefits from the federal government were almost twice that of the next state (Florida). On a per capita net payment basis, the Commonwealth "earned" almost $1,200 more than the next highest state, Kentucky.

TABLE 4				
TOP FIVE STATES IN BALANCE OF PAYMENTS WITH THE FEDERAL GOVERNMENT, FISCAL YEAR 2017				
RANK	**STATE**	**ABSOLUTE BALANCE OF PAYMENTS (IN BILLIONS)**	**STATE**	**PER CAPITA BALANCE OF PAYMENTS**
1	Virginia	$87.2	Virginia	$10,301
2	Florida	$45.9	Kentucky	$9,145
3	Kentucky	$40.7	New Mexico	$8,692
4	Maryland	$36.5	West Virginia	$7,283
5	North Carolina	$34.5	Alaska	$7,048

Source: Laura Schultz and Michelle Cummings, "Giving or Getting? New York's Balance of Payments with the Federal Government: 2019 Report"

An award is defined as money the federal government has promised to pay a recipient. Funding may be awarded to a company, organization, government or individual. An obligation is a binding agreement between the federal government and the recipient of an award to spend the award now or in the future.

Contracts[21] are typically the largest category of federal spending in Virginia, followed by direct payments[22] and grants.[23] Direct payments are typically made to individuals and are largely determined by law. The most common direct payment is Social Security. Since the law typically sets eligibility and payments that are made directly to individuals, direct payments are largely outside the purview of the annual budgeting process and are considered mandatory spending. Contracts and grants, on the other hand, are typically the result of an annual appropriations bill. Unlike mandatory spending, contracts and grants are (for the most part) determined on an annual basis and are considered discretionary spending.

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20 Laura Schultz and Michelle Cummings. "Giving or Getting? New York's Balance of Payments with the Federal Government: 2019 Report," Jan. 8, 2019, https://rockinst.org/issue-areas/fiscal-analysis/balance-of-payments-portal/.
21 The federal government defines a contract as an agreement between the federal government and a prime recipient to provide goods and services for a fee.
22 The federal government defines a direct payment as a cash payment made by the federal government to an individual, a private firm or another private institution.
23 The federal government defines a grant as an award of financial assistance from a federal agency to a recipient to carry out a public project or service authorized by a United States law. Unlike loans, grants do not need to be repaid. Most grants are awarded to state and local governments.

Table 5 illustrates how federal funds flowed into the Commonwealth from FY 2015 to FY 2018. Contract spending continued to be the largest category of federal awards in Virginia, followed by direct payments. Regarding direct payments, most of these were to individuals; the Social Security Administration accounted for over 80% of all federal government direct payment expenditures in the Commonwealth in FY 2018. Per capita federal awards to the Commonwealth were $12,856 in FY 2018, higher than Maryland ($11,868), West Virginia ($9,339) and North Carolina ($6,973).[24]

Graph 11 summarizes total federal awards, Department of Defense awards and non-DOD awards made to individuals or organizations in Virginia from FY 2008 to FY 2018. Total federal awards in Virginia rose by $10.6 billion from FY 2016 to FY 2017 and $8.9 billion from FY 2017 to FY 2018. It should be no surprise that the increasing levels of federal awards from FY 2016 to FY 2018 were closely correlated with improving economic growth in the Commonwealth.

Of the $108.9 billion in total federal awards in Virginia in FY 2018, approximately 54% were for federal contracts ($58.3 billion), up slightly from approximately 53% of all federal awards in FY 2017 (Graph 12). Two observations emerge from the contract data. First, the level of federal contracts peaked in FY 2011 and declined through FY 2015. Total federal contract awards started to increase in FY 2016 and almost returned to the FY 2011 peak in FY 2018. Second, DOD contract awards declined this decade, falling almost 15% from FY 2011 to FY 2018. The most recent data suggest that contract awards continued to increase in FY 2019. If so, FY 2019 awards and, more specifically, contracts, will exceed the FY 2011 peak. However, even if this were to occur, the real (inflation-adjusted) value of federal contracts in Virginia has declined this decade.

TABLE 5

NOMINAL FEDERAL AWARDS IN VIRGINIA: BILLIONS OF NOMINAL DOLLARS, FISCAL YEARS 2015-2018*

YEAR	FY 2015	FY 2016	FY 2017	FY 2018
Contracts	$48.7	$50.6	$52.9	$58.3
Direct payments	$27.8	$29.5	$33.9	$35.4
Grants	$9.7	$9.0	$11.3	$12.2
Other financial assistance	$0.2	$0.3	$1.7	$1.7
Loans	$0.6	$0.01	$0.1	$1.2
Total	$87.0	$89.4	$100.0	$108.9

Source: USAspending.gov. Data are current as of Oct. 21, 2019, and subject to revision. *We note that the FY 2019 data continued to be revised, as the fiscal year concluded on Sept. 30, 2019, and are not included in the table. Categories may not sum to the total due to rounding and miscellaneous awards.

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24 USAspending.gov. Data are current as of Oct. 21, 2019, and subject to revision. We note that the FY 2019 data continued to be revised, as the fiscal year concluded on Sept. 30, 2019, and thus are not included in the analysis.

GRAPH 11

NOMINAL TOTAL FEDERAL, DOD AND NON-DOD AWARDS:
VIRGINIA, FY 2008 TO FY 2018*
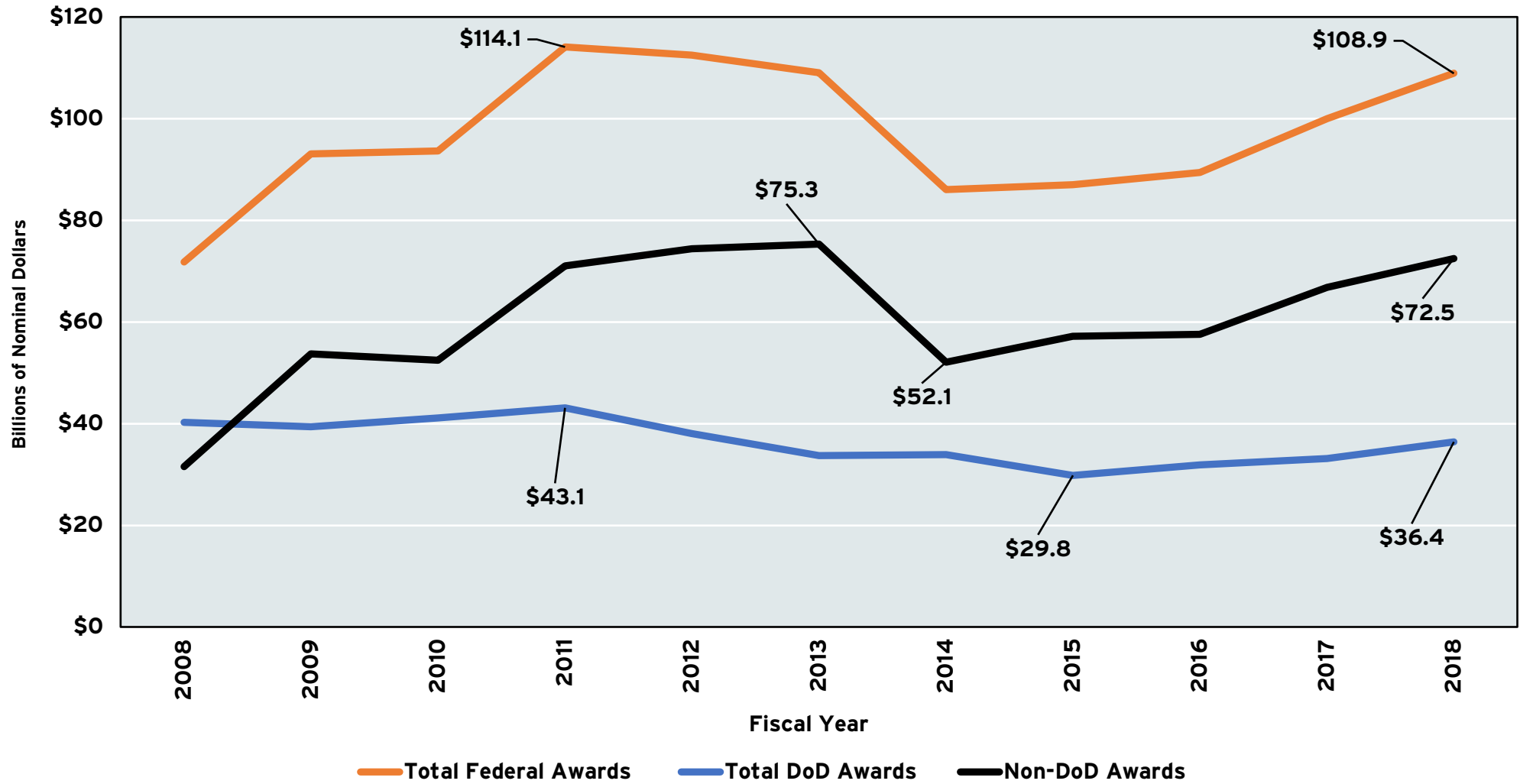
Source: USAspending.gov. Data are current as of Oct. 21, 2019, and subject to revision. *We note that the FY 2019 data continued to be revised, as the fiscal year concluded on Sept. 30, 2019, and are not included in the analysis.

GRAPH 12

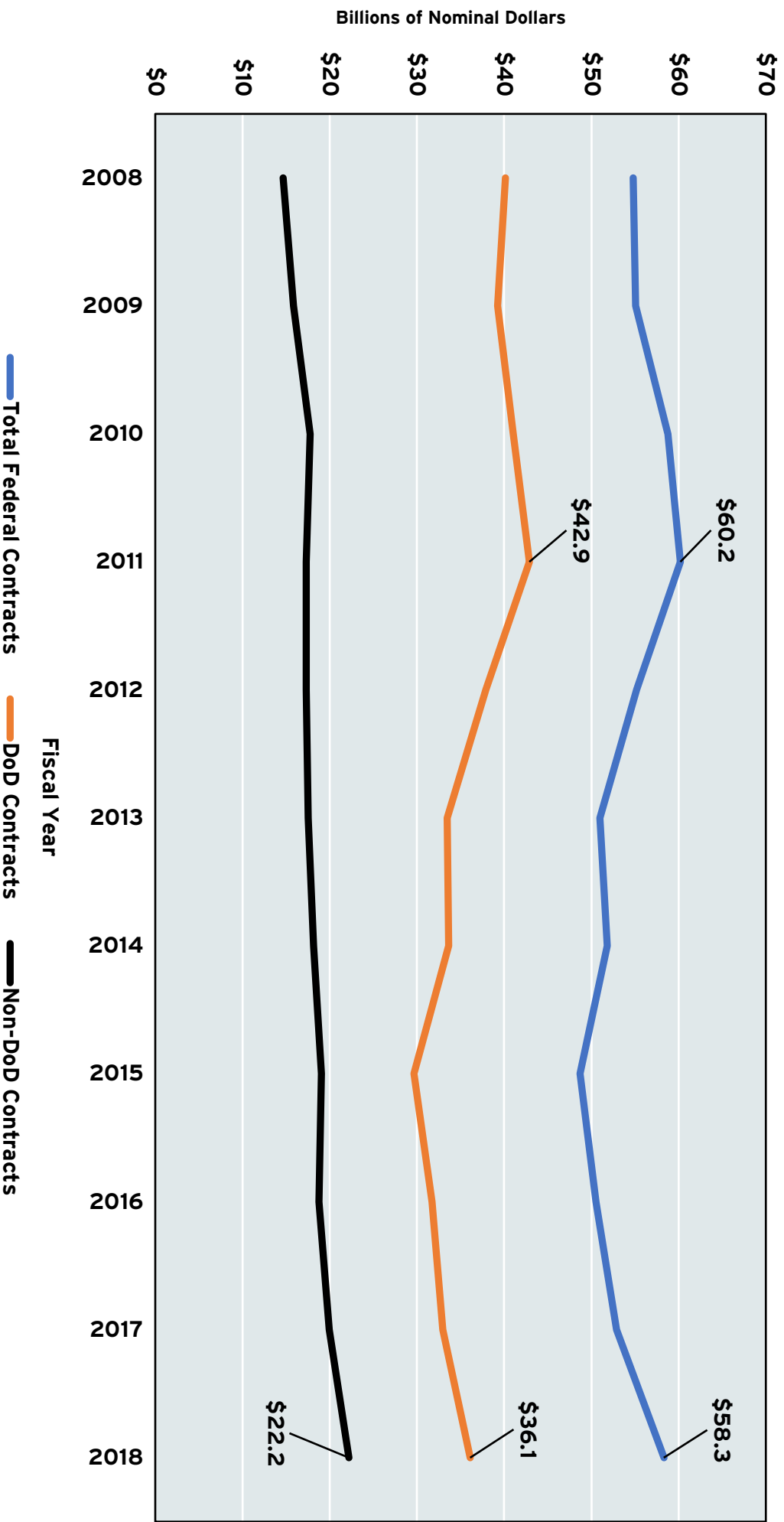**NOMINAL TOTAL FEDERAL, DOD AND NON-DOD CONTRACTS: VIRGINIA, FY 2007 TO FY 2018***

Billions of Nominal Dollars

— Total Federal Contracts
— DoD Contracts
— Non-DoD Contracts

Fiscal Year

$60.2
$42.9
$58.3
$36.1
$22.2

We also need to note that the federal government entered FY 2020 under a continuing resolution (CR). A CR freezes spending levels (with some small variances) to those of the previous fiscal year and typically prohibits new program starts. The promised increases in DOD spending in FY 2020 require the timely passage of the DOD appropriations bill by Congress, else Virginia's economy may enter 2020 in a weaker position than expected.

The recent agreement to extend the debt ceiling to mid-2021 and raise the discretionary spending caps, on the surface, is welcome news for the Commonwealth. The Bipartisan Budget Act of 2018 set the national defense discretionary base budget authority cap at $647 billion for FY 2019. The Bipartisan Budget Act of 2019 then raised the national defense discretionary caps to $667 billion for FY 2020 and $672 for FY 2021.[25] These increases will lead to a rise in DOD expenditures on maintenance, operations, personnel and procurement in Virginia, assuming timely passage of the requisite appropriations acts. The question is: How long can the federal government sustain its current fiscal path?

Graph 13 displays the Congressional Budget Office's projections of the federal deficits for FY 2019 to FY 2029. Over the last several years, a series of bipartisan budget agreements has boosted discretionary spending, while mandatory spending has continued to rise as the population ages. The Tax Cuts and Jobs Act of 2017 reduced corporate taxes permanently and individual income taxes through the mid-2020s. The cumulative effect of these decisions has been a significant erosion of the fiscal position of the federal government. If nothing changes, the CBO projects the federal government will run trillion-dollar deficits through 2029.

Deficits and debt matter. It's not a question of whether a recession will occur, but when it will occur. A slowing national economy will reduce revenue growth and increase demands for public services, swelling the federal deficit. At some point, the bill will come due and the federal government will have to increase taxes and cut expenditures to right its fiscal ship.

Federal spending is a cornerstone of the Virginia economy. As the past few years have demonstrated, increases in federal spending have helped Virginia's economy pick up the pace. Yet, Virginia is also vulnerable to decisions (and tweets) emanating from Congress and the White House. The Commonwealth cannot and should not completely transition away from its reliance on federal government spending. Instead, it should seek out opportunities to encourage private-sector growth by leveraging its strengths and relationships with the federal government.

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25 Congressional Research Service, "The defense budget and the Budget Control Act: Frequently asked questions," Sept. 30, 2019.

GRAPH 13

**ACTUAL AND PROJECTED FEDERAL DEFICITS,
FY 2019 TO FY 2029***

Billions of Nominal Dollars

Value	Year
-$779	2018
-$960	2019
-$1,008	2020
-$1,034	2021
-$1,159	2022
-$1,181	2023
-$1,151	2024
-$1,284	2025
-$1,274	2026
-$1,260	2027
-$1,479	2028
-$1,378	2029

Fiscal Year
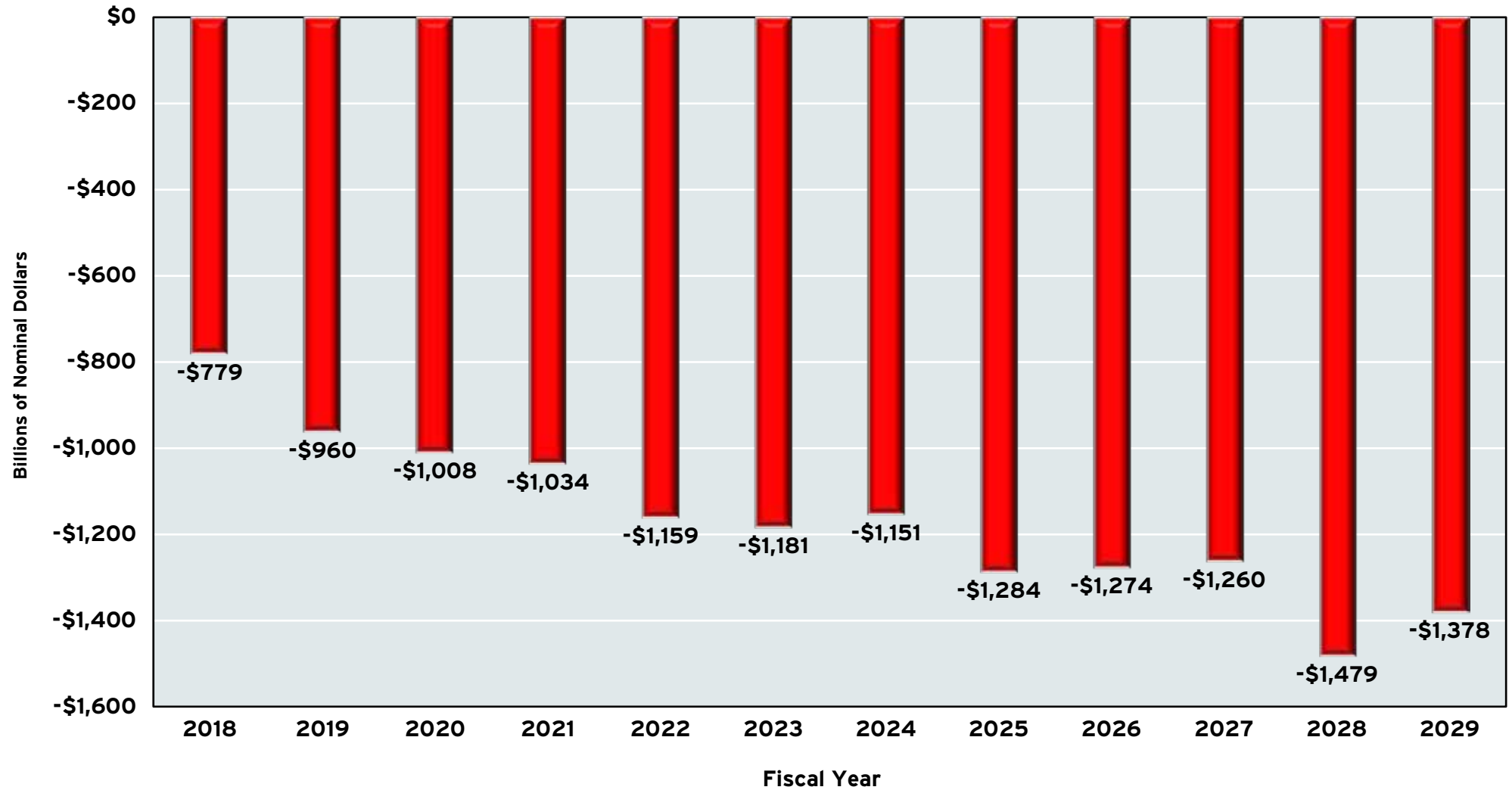
Sources: Congressional Budget Office (2019), Update to the Budget and Economic Output: 2018 to 2029, and the Dragas Center for Economic Analysis and Policy, Old Dominion University. Federal deficits in nominal dollars. Off-Budget includes the revenue and outlays of the Social Security Trust Funds and the net cash flow of the U.S. Postal Service. *Actual deficit for FY 2018 and projected deficits for FY 2019 to FY 2029.

Troubling Signs In Establishment Data

An establishment is the single physical location where business is conducted or where services or industrial operations are performed. A state's economic activity is not only reflected in the value of output and the number of people employed by businesses, but also in whether the number of establishments is growing over time. States displaying robust economic growth will display gains in output, employment and establishments. States that are performing relatively poorly will display slow growth or declines in output, employment and establishments.

At the start of the century, establishment growth in Virginia reflected improving economic performance. From 2000 to 2007, the number of establishments in Virginia increased over 14% (Graph 14). As one might expect, the number of establishments declined during the Great Recession, reaching its nadir in 2011. At the end of 2016 (the most recent data), there were still about 1,000 fewer establishments in Virginia than the peak observed prior to the Great Recession.

More troubling is the relative decline of Virginia when compared to the United States. Table 6 illustrates that Virginia's establishment growth was faster than that of the nation in previous decades. Not so for the current decade. The lackluster performance of the Virginia economy is apparent in the slow growth of the number of establishments. Given the recent upticks in economic activity in the Commonwealth, it may turn out that the number of establishments surged in the state in recent years. We will only be able to determine this in the coming years due to significant lags in the data.

TABLE 6 ANNUAL AVERAGE ESTABLISHMENT GROWTH, VIRGINIA AND THE UNITED STATES			
	ANNUAL ESTABLISHMENT GROWTH 1990-1999	ANNUAL ESTABLISHMENT GROWTH 2000-2009	ANNUAL ESTABLISHMENT GROWTH 2010-2016
United States	1.4%	0.6%	0.8%
Virginia	1.7%	1.1%	0.6%

Sources: U.S. Census Bureau, County Business Patterns, and the Dragas Center for Economic Analysis and Policy, Old Dominion University. The growth rate is the compound annual growth rate.

GRAPH 14

**TOTAL ESTABLISHMENTS:
VIRGINIA, 1986-2016**
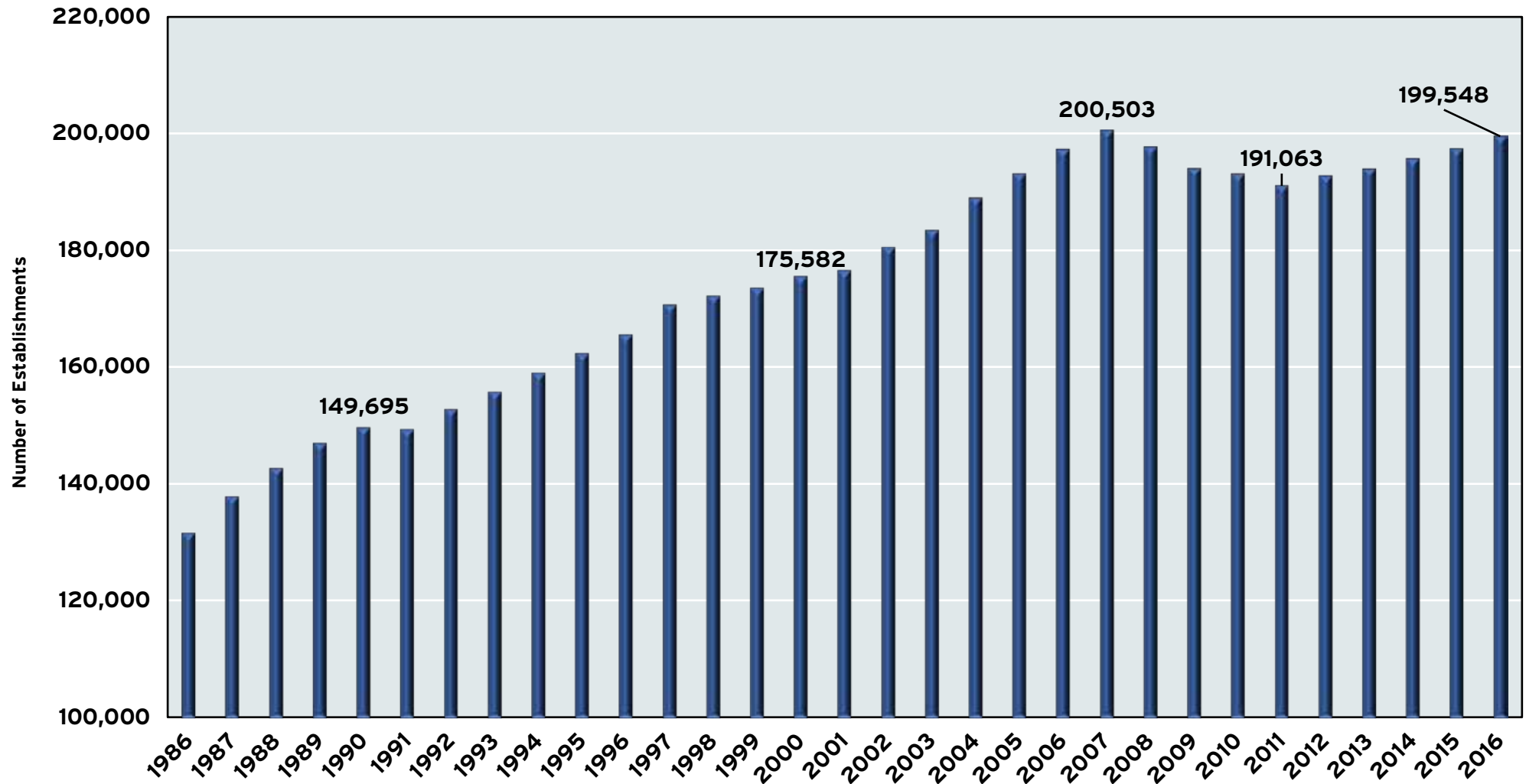
Bar chart showing Number of Establishments on the y-axis (100,000 to 220,000) and years 1986-2016 on the x-axis. Labeled values: 149,695 (1990), 175,582 (2000), 200,503 (2007), 191,063 (2011), 199,548 (2016).

Sources: U.S. Census Bureau, County Business Patterns, and the Dragas Center for Economic Analysis and Policy, Old Dominion University

Virginia Compared To Other States

Comparing Virginia's economic performance with that of other states provides an objective benchmark of how the Commonwealth is doing. Yes, Virginia suffered through the blows of the Great Recession and federal budget sequestration, but other states could point to similar economic shocks. Table 7 illustrates that Virginia's economic performance, as measured by growth in real GDP, fell from 20th in 2010 to a low of 47th in 2014. Our recent surge in economic activity is reflected in the data, with the Commonwealth being ranked 20th in 2017 and 13th in 2018. Last year

was the first time in over a decade that Virginia ranked among the top 15 states in terms of economic performance.

What should also be clear from Table 7 is that some states (Alaska, North Dakota, Texas) experienced natural resource booms and busts this decade. North Dakota provides an illustrative example, with the highest rates of growth from 2010 to 2012 and the most significant rates of contraction from 2015 to 2017. Federal government spending acts in a similar fashion for the Virginia economy. The stagnation of spending in the early part of the decade constrained growth in the Commonwealth, while the recent surges in federal spending are closely correlated with Virginia's improving economic fortunes.

TABLE 7			
ANNUAL REAL GDP GROWTH AND REAL GDP GROWTH RANKINGS: VIRGINIA AND SELECTED STATES, 2010-2018			
YEAR	**VIRGINIA RANK**	**HIGHEST-PERFORMING STATE**	**LOWEST-PERFORMING STATE**
2010	20 (2.7%)	North Dakota (7.6%)	Wyoming (-3.8%)
2011	35 (1.0%)	North Dakota (11.3%)	Louisiana (-5.4%)
2012	29 (0.8%)	North Dakota (22.4%)	Wyoming (-2.4%)
2013	35 (0.4%)	Texas (4.3%)	Alaska (-5.1%)
2014	47 (-0.2%)	Delaware (7.7%)	Alaska (-2.8%)
2015	28 (1.9%)	Oregon (5.3%)	North Dakota (-3.0%)
2016	38 (0.3%)	Oregon (4.6%)	North Dakota (-7.1%)
2017	20 (1.8%)	Washington (4.1%)	North Dakota (-1.6%)
2018	13 (2.8%)	Washington (5.7%)	Alaska (-0.3%)

Source: Bureau of Economic Analysis, "Gross Domestic Product by State, Various Years." Growth rates of real GDP are in parentheses.

Of course, Virginia's improvement in economic performance should not be entirely attributed to increases in federal government spending. While no measure of business climate is perfect, CNBC annually scores all 50 states on more than 60 measures of competitiveness. Although a state's rank may fluctuate year to year, the trend over time is illustrative of whether the business climate is improving or deteriorating, relative to other states.

Table 8 reveals that Virginia consistently ranked among the top three states from 2007 to 2012. The Commonwealth then proceeded to slide in the rankings, falling to 13th in 2016. As other states aggressively moved to improve their business climates, Virginia appeared to be satisfied with the status quo. Concerted action to address its business climate helped Virginia climb back into the top 10 in 2017 and the Commonwealth regained the top position in the rankings in 2019.

Yet, the Commonwealth should not rest on its laurels. In Graph 15, we present individual rankings for the top four states in the 2019 CNBC index. Lower ranks reflect more desirable rankings. The Commonwealth ranked first in the workforce category but was outside the top 10 in the other primary categories. This is a change from 2018, when Virginia ranked first in infrastructure, first in economy and was in the top 10 in workforce and technology. A significant warning sign is the relatively poor ranking in the cost of doing business. It is certainly time for Virginia to examine its tax structure and determine whether there are taxes, such as the Business, Professional and Occupational License Tax (BPOL), which have significant variation across localities and could be readily replaced by a slight increase in the corporate tax rate.

A familiar story emerges from the CNBC rankings. Long-run investments in workforce development and infrastructure are more likely to pay off than massive bets on "one-off" projects. These patient policies establish the foundation for long-term growth. One only needs to look south to the success of the Research Triangle in North Carolina to see how sound, long-term investments can pay off in terms of economic development.

TABLE 8			
CNBC: AMERICA'S TOP STATES FOR BUSINESS, 2007-2019			
YEAR	VIRGINIA	HIGHEST-PERFORMING STATE	LOWEST-PERFORMING STATE
2007	1	Virginia	Alaska
2008	2	Texas	Alaska
2009	1	Virginia	Alaska
2010	2	Texas	Alaska
2011	1	Virginia	Rhode Island
2012	3	Texas	Rhode Island
2013	5	South Dakota	Hawaii
2014	8	Georgia	Rhode Island
2015	12	Minnesota	Hawaii
2016	13	Utah	Rhode Island
2017	7	Washington	West Virginia
2018	4	Texas	Alaska
2019	1	Virginia	Rhode Island

Source: CNBC, "America's Top States for Business, Various Years"

GRAPH 15

CNBC BUSINESS RANKINGS BY CATEGORY: TOP FOUR STATES, 2019
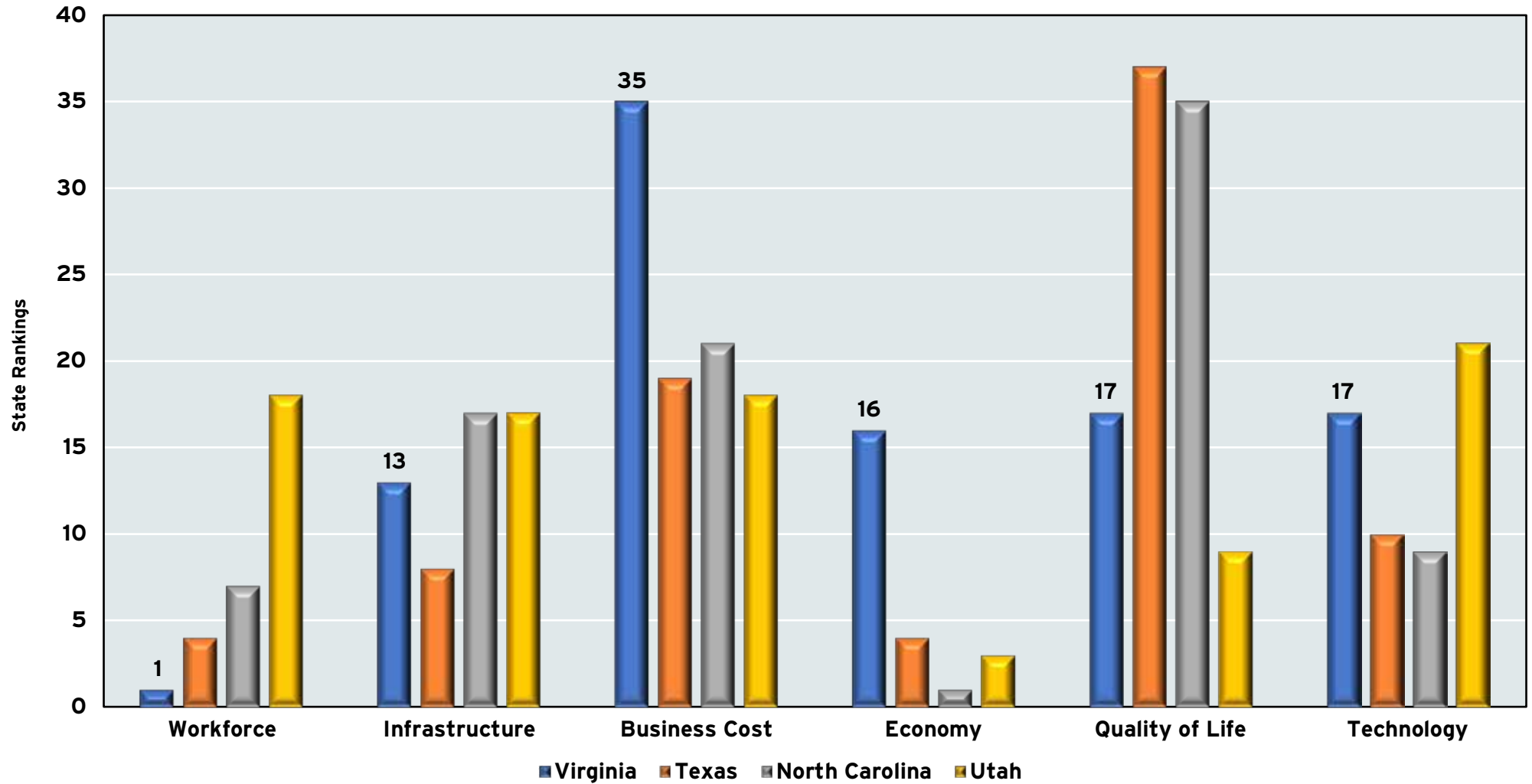
Source: CNBC, "America's Top States for Business, 2019"

Final Thoughts

Virginia is poised to grow for a fifth consecutive year and its growth may exceed 2% for the second consecutive year. Improvements in economic activity are reflected by growth in the labor force, individual employment, jobs and, to a lesser extent, real hourly earnings. The Commonwealth's fiscal situation has continued to improve but, as Virginia Secretary of Finance Aubrey Layne noted earlier this year, a recession in the next 12 to 18 months is "more likely than not."[26]

As markets have become increasingly pessimistic about the prospects for growth in 2020, it is time for Virginia to take stock. The Commonwealth's labor markets are at (or beyond) full employment and when appropriations bills are finally passed, the federal government is likely to spend more money in Virginia in FY 2020 than it did in previous fiscal years. One might look at the economic data and conclude that Virginia is poised to leap into the next decade. Another might look at the same data and conclude the leap could be off the proverbial economic cliff into a recession.

If there is one thing we can (hopefully) agree upon, it is that we live in uncertain times. Equities markets have been roiled by incomplete (or false) information about trade talks between China and the United States.[27] Even though median household income in the nation reached almost $62,000 in 2018, income and wealth inequality continued to climb, reaching levels not seen in the past 60 years.[28] While some will point to social media for much of the coarseness of our political discourse,[29] history suggests that politics have always been personal.

The Commonwealth has performed well in recent years and should be commended for improving its business climate. Virginia, however, must resist the lures of quick fixes, whether it is casinos to address the fiscal shortcomings of local governments or publicly subsidized sports stadiums for professional sports franchises.

As we have noted, it would be more prudent to improve the regulatory climate, reform the tax system and make wise investments in infrastructure, rural broadband and K-12 education. These efforts will take time to bear fruit but will position Virginia for growth in the coming years. Patience is indeed a virtue when it comes to economic development.

A storm is coming, and when we come through it, we will be different. How we prepare now for the storm will, in part, determine how resilient we are in times of economic trouble. Robert Baden-Powell, the founder of the worldwide Boy Scout movement, wrote that the motto of the Scouts was "Be Prepared." When asked what they should be prepared for, he famously replied, "Why, for any old thing."[30] Virginia should take this advice to heart.

26 Fadel Allassan, "Virginia finance chief says recession likely: 'We just need to be prepared,'" *Virginia Mercury*, Aug. 16, 2019, https://www.virginiamercury.com/2019/08/16/virginia-finance-chief-says-recession-likely-we-just-need-to-be-prepared/.
27 Sarah Ponczek and Vildana Hajric, "Nonsense market moves have investors 'exhausted' by trade talks," *Bloomberg*, Oct. 10, 2019.
28 Jacob Knutson, "U.S. income inequality surges to highest level in 50 years," Axios, Sept. 26, 2019.
29 Jay David Bolter, "Social media are ruining political discourse," The Atlantic, May 19, 2019, https://www.theatlantic.com/technology/archive/2019/05/why-social-media-ruining-political-discourse/589108/.
30 Bryan Wendell, "Be Prepared: The origin story behind the Scout motto," May 9, 2017, https://blog.scoutingmagazine.org/2017/05/08/be-prepared-scout-motto-origin/.

VIRGINIA'S METROPOLITAN AREAS: MOVING FORWARD

If something could be shown to be and not to be at the same time, it would be intermediate between what purely is and what in every way is not, and that neither knowledge nor ignorance would be set over it, but something intermediate between ignorance and knowledge ... and now the thing we call opinion has emerged.

– Plato, "The Republic, Book 5"

Discerning the performance of Virginia's metropolitan area economies may remind one of an introductory philosophy class in college. Much like Plato's prisoners in the cave attempting to use shadows and sounds to determine the true nature of objects behind them, we must take pieces of information and attempt to understand the true nature of the metro area economies. While dim at first, the picture becomes clearer over time.

This decade has indeed challenged observers of Virginia's metropolitan areas. The lingering aftermath of the Great Recession was multiplied in several metros by federal budget sequestration and the subsequent caps on federal discretionary spending.[1] The evolving nature of the Commonwealth's economy and shifts in population have concentrated output and population in the "urban crescent" of Hampton Roads, Northern Virginia and Richmond. If an independent observer in 2015 opined on the prospects of Virginia's regions, such declarations would likely have bent more toward pessimism than optimism. As more recent data have become available, these opinions would have gradually evolved, becoming increasingly, dare we say, hopeful.

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1   For the purposes of this chapter, a metropolitan area conforms to the Office of Management and Budget's 2018 delineations of metropolitan statistical areas. We do not include the Kingsport-Bristol-Bristol, TN-VA, MSA in our analysis due to a lack of economic data.

Many of the economic performance indicators suggest that Virginia's metropolitan areas are enjoying their third (or more) consecutive year of economic growth. Recently released data show that Virginia's metropolitan areas grew in real (inflation-adjusted) terms in 2018, and individual employment has increased in each of the areas. The unemployment rate is below 3% across Virginia's metros. Average wages grew in 2017, 2018 and in the first quarter of 2019. Although population growth was uneven across the metros, each was more populated in 2018 than in 2010. Putting these pieces of data together suggests that Virginia's metros are generally in a better place than they were in 2015.

Yet, the road ahead is neither straight nor lacking potential hazards. Northern Virginia and Hampton Roads are closely tied to the size and composition of federal government spending. Even though the federal government plans to spend more in 2020 than 2019 (especially on defense), the question remains: How long can these increases go on? Residents have continued to leave in pursuit of both better economic opportunities and quality of life in other states. While these losses are offset in some metro areas by international migration, whether the United States continues to be a welcoming home to international migrants remains an increasingly contentious question. The growing importance of services and the relative decline of agriculture and manufacturing in the Virginia economy call into question the economic base of some metro areas. These challenges await the new Virginia General Assembly and lawmakers at the local government level.

To explore how Virginia is faring at the metropolitan level, we examine a number of measures of economic performance: median household income, poverty, employment, wages and population. Each of these measures is available on a more frequent basis than gross domestic product (GDP) and they provide a more current picture of the economic activity in each metro area. We also present the most recent (but lagged) data for metropolitan area GDP. From these measures, we work to construct a clearer picture of the health of Virginia's metro area economies.

One difficulty in comparing metropolitan statistical areas (MSAs) is that different government agencies and departments use different definitions for these areas. From the Bureau of Labor Statistics (BLS), for example, some data are available for Northern Virginia, which is the Virginia portion of the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA. Other data from the BLS are only available for the entire Washington-Arlington-Alexandria MSA. The Bureau of Economic Analysis (BEA) provides economic data on the performance of MSAs. However, the BLS, BEA and the U.S. Census may use a different basis to define which counties and independent cities are in specific MSAs. Individual MSAs also see additions and subtractions of counties and cities over time. In 2018, for example, the Office of Management and Budget (OMB) added Camden County in North Carolina, and Virginia's Southampton County and city of Franklin to the Virginia Beach-Norfolk-Newport News MSA.[2] The reader should be aware of these geographical differences and exercise care when examining data from different sources, even if those sources are from the same department or agency.

Uneven Growth In Household Incomes

Between the decennial censuses, the U.S. Census Bureau conducts surveys of the nation's population to learn more about where people are living and working, and what they are earning, as well as to get answers to a host of other questions. The American Community Survey (ACS) is one such product, surveying more than 3.5 million Americans each year.[3] The responses not only inform us of the changing nature of the U.S. population, but also are used to distribute hundreds of billions in federal and state

2   https://www.whitehouse.gov/wp-content/uploads/2018/09/Bulletin-18-04.pdf.
3   U.S. Census Bureau (2019), American Community Survey, https://www.census.gov/programs-surveys/acs/about.html.

dollars each year. Given the substantial lags in data relating to economic activity (a subject we touch on later in this chapter) at the metropolitan and county levels, we draw upon data from the ACS to see how Virginia's metros have fared so far this decade.

Table 1 presents real (inflation-adjusted) median household income for Virginia and its metropolitan areas. From 2010 to 2018, real median household income in the United States increased by 7.2%, reflecting improving economic conditions. Over the same period, Virginia's real median household income increased only by 3.6%, mirroring the anemic performance of the Commonwealth's economy in the first half of the decade. Four metro areas (Blacksburg, Charlottesville, Lynchburg and Winchester) saw gains in real median household income that exceeded the national average, and another four exceeded the state average (Richmond, Roanoke, Staunton and Washington, D.C.). Only one metro, Hampton Roads, saw almost no change in real median household income this decade.

Of interest is the 21% growth in median household income in the Winchester MSA. Graph 1 presents real median household income from 2010 to 2018 for this metro area. What should be readily apparent is that real household income in the Winchester metro area has been quite volatile. In fact, this area had the highest measure of variability for real median household income from 2010 to 2018 among Virginia's metros, suggesting that we should pay more attention to the overall trend rather than one specific year.[4]

What lessons can be taken from the real median household income data? First, the data can be volatile, especially in less populated metropolitan areas where sample sizes may be small. Second, almost all of Virginia's metros had increases in real median household income this decade, but Virginia and several metro areas lagged the nation. This suggests that non-metro areas of Virginia performed poorly relative to the state's metro areas. The variation in household incomes also supports the argument that economic development in Virginia

should take regional variations into account. Improving primary and secondary education, expanding access to broadband and continuing to make wise investments in infrastructure are necessary to promote economic development across the Commonwealth.

| TABLE 1			
REAL MEDIAN HOUSEHOLD INCOME IN THE PAST 12 MONTHS: 2010, 2018 AND PERCENTAGE CHANGE FROM 2010 TO 2018, VIRGINIA'S METROPOLITAN STATISTICAL AREAS, VIRGINIA AND THE UNITED STATES			
	2010	**2018**	**PERCENT CHANGE**
United States	$57,762	$61,937	7.2%
Virginia	$70,029	$72,577	3.6%
Blacksburg	$46,314	$50,313	8.6%
Charlottesville	$65,567	$71,052	8.4%
Harrisonburg	$52,155	$53,046	1.7%
Lynchburg	$47,608	$51,143	7.4%
Richmond	$63,855	$67,703	6.0%
Roanoke	$52,595	$55,151	4.9%
Staunton*	$49,767	$52,625	5.8%
Hampton Roads	$66,152	$65,604	-0.1%
Washington- Arlington- Alexandria	$97,555	$102,180	4.5%
Winchester	$53,815	$65,170	21.1%

Sources: U.S. Census Bureau, 2018 American Community Survey, Bureau of Labor Statistics and the Dragas Center for Economic Analysis and Policy, Old Dominion University. We estimate the real value of median household income in 2019 dollars using the BLS's research price index with a base date of January 2019. For more information about the research price index, see https://www.bls.gov/cpi/research-series/home.htm. Hampton Roads is the Virginia Beach-Norfolk-Newport News MSA and Washington-Arlington-Alexandria is the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA. *Data for the Staunton-Waynesboro MSA are for 2013 instead of 2010, due to data availability.

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4   We estimate the standard deviation of real median income for each metropolitan area. The standard deviation for the Winchester-Waynesboro MSA was $5,382, significantly higher than the next metro (Blacksburg = $3,638) and the larger metro areas, all of which had standard deviations under $2,500.

GRAPH 1

**REAL MEDIAN HOUSEHOLD INCOME IN THE PAST 12 MONTHS:
WINCHESTER METROPOLITAN STATISTICAL AREA, 2010-2018**
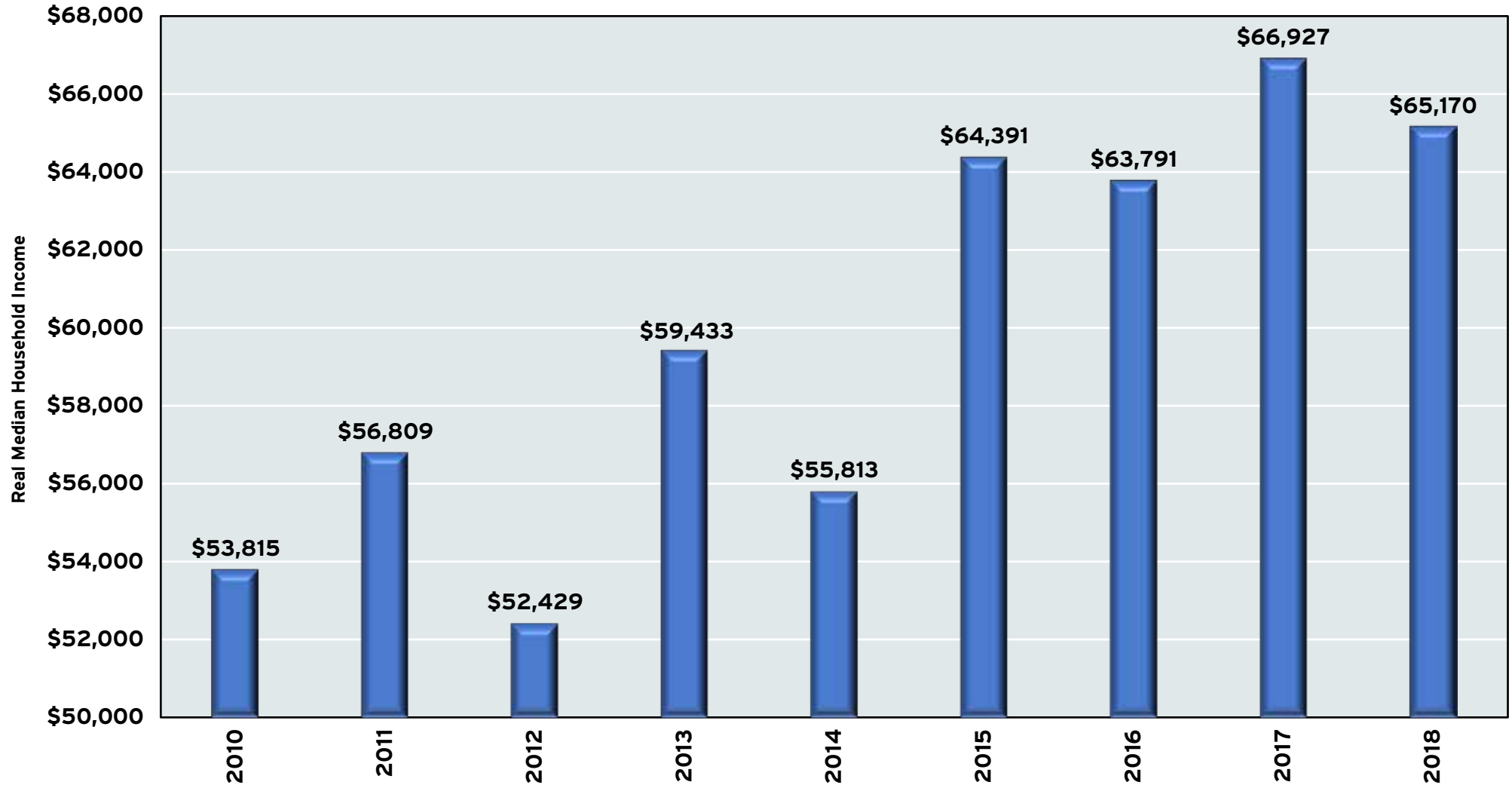
Sources: U.S. Census Bureau, 2018 American Community Survey, Bureau of Labor Statistics and the Dragas Center for Economic Analysis and Policy, Old Dominion University. We estimate the real value of median household income in 2019 dollars using the BLS's research price index with a base date of January 2019.

Poverty In Virginia's Metro Areas

A growing economy should lead to a reduction in the number of people living in poverty. That, in a nutshell, is the argument for policies to promote economic growth. The Census Bureau establishes dollar values for poverty, which vary by family size and composition. Via the Census and ACS surveys, the Census Bureau asks respondents about their income in the previous 12 months. If a family's total income is less than the dollar value of the appropriate threshold, then that family and every individual in it are classified as being in poverty.[5]

Table 2 presents estimates of the percentage of persons living in poverty in Virginia's metropolitan areas in 2010 and 2018, as well as the percentage of households receiving Supplemental Nutrition Assistance Program (SNAP) benefits (more commonly known as food stamps). In Virginia and the U.S., both the number of individuals in poverty and the percentage of households receiving food stamp benefits have fallen this decade.

Across Virginia's metropolitan areas, the picture is somewhat blurry. In some metros, the percentage of individuals in poverty increased from 2010 to 2018. In other areas, the changes in the poverty rate were relatively small and within the margin of error (Blacksburg, for example). In still other areas, the changes in the poverty rate were sufficiently large to conclude that an increase or decrease did occur.

It should be no surprise that the poverty rate and the percentage of households receiving food stamp benefits are highly correlated. Surprisingly, though, with the exceptions of Lynchburg and Roanoke, the percentage of households receiving food stamps is largely unchanged across Virginia's metropolitan areas. Why? Real incomes have not grown dramatically over this economic expansion. More Virginians are working now than ever before, but their earnings have not risen significantly this decade.

TABLE 2				
POVERTY RATE AND HOUSEHOLDS RECEIVING FOOD STAMPS IN 2010 AND 2018, VIRGINIA'S METROPOLITAN STATISTICAL AREAS, VIRGINIA AND THE UNITED STATES				
	2010 POVERTY RATE	**2018 POVERTY RATE**	**2010 SNAP RATE**	**2018 SNAP RATE**
United States	15.3%	13.1%	11.9%	11.3%
Virginia	11.1%	10.7%	8.6%	7.9%
Blacksburg	22.2%	22.5%	8.0%	8.4%
Charlottesville	12.3%	13.9%	6.8%	6.4%
Harrisonburg	19.9%	16.4%	7.4%	7.4%
Lynchburg	16.2%	14.6%	13.7%	10.3%
Richmond	11.6%	11.3%	9.8%	9.2%
Roanoke	13.7%	13.4%	10.8%	9.2%
Staunton*	11.3%	12.0%	8.9%	10.2%
Hampton Roads	10.6%	11.2%	8.6%	8.7%
Washington-Arlington-Alexandria	8.4%	7.6%	5.9%	6.5%
Winchester	12.5%	12.6%	7.8%	7.9%

Sources: U.S. Census Bureau, 2018 American Community Survey, and the Dragas Center for Economic Analysis and Policy, Old Dominion University. Hampton Roads is the Virginia Beach-Norfolk-Newport News MSA and Washington-Arlington-Alexandria is the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA. *Data for the Staunton-Waynesboro MSA are for 2013 instead of 2010, due to data availability.

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5 We estimate the number of persons in poverty using the 2018 1-year ACS data. For consistency, we use national estimates from ACS data instead of the Census Bureau's Current Population Survey Annual Social and Economic Supplement. For more information, see https://www.census.gov/newsroom/press-releases/2019/acs-1year.html.

Labor Markets Show Signs Of Growth In 2019

Are more people working in Virginia's metropolitan areas? There are two broad measures we can examine to answer this question: individual employment and nonfarm payrolls (jobs). Employment data capture responses by individuals to the questions of whether they are employed, looking for work or have abandoned attempts at finding employment. Nonfarm payroll data measure the number of jobs there are in an economy. A person who has two jobs would appear once in the employment data but twice in the jobs data.[6] One of the advantages of labor market data is that this information is more current than many other measures of economic activity.

Let's look first at the individual employment data. The Bureau of Labor Statistics (BLS) asks people about their employment status. If an individual is employed or looking for work, the BLS reports that he or she is in the labor force.[7] If a metropolitan area economy is growing, this should be reflected in the labor force data.

For most of the current decade, there has not been consistent growth in the civilian labor force across Virginia's metropolitan areas. In 2018, the civilian labor force expanded in some metro areas (Charlottesville, Richmond, Staunton, Hampton Roads, Northern Virginia and Winchester) and contracted in others. The story appears to have changed, however, in 2019. Data through October 2019 suggest that there were more people working or looking for work in Virginia's metros than for the same period in 2018.

Graph 2 displays the annual growth in individual employment for Virginia's metropolitan areas for 2017 and 2018. Individual employment points to an uptick in economic activity. More people reported that they were employed in 2017 than 2016, and likewise in 2018 than 2017. The growth in employment, however, has tapered in 2019.

One factor that may have contributed to the slower pace of individual employment growth is the relative absence of slack in metropolitan area labor markets. Because individual employment has grown faster than the civilian labor force, unemployment rates have declined across Virginia's metros over the past year. Graph 3 illustrates that by October 2019, unemployment rates had fallen below 3% across the metros and several were approaching 2% unemployment. For Virginians in the labor force, the prospects of finding a job or moving to a new job are quite favorable. The challenge for Virginia businesses is to find skilled labor in an environment where almost everyone in the labor force is gainfully employed.

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6   The Current Population Survey (CPS) covers households and asks whether an individual was employed or actively seeking employment. The Current Establishment Survey (CES) covers businesses and reports the number of jobs. An individual who is employed with two jobs would be counted once in the CPS and twice in the CES.

7   The civilian labor force consists of employed persons and unemployed persons. The Bureau of Labor Statistics defines employed individuals as "persons who did any work for pay or profit during the survey reference week; persons who did at least 15 hours of unpaid work in a family-operated enterprise; and persons who were temporarily absent from their regular jobs because of illness, vacation, bad weather, industrial dispute, or various personal reasons." The BLS classifies individuals as unemployed "if they do not have a job, have actively looked for work in the prior 4 weeks, and are currently available for work. Persons who were not working and were waiting to be recalled to a job from which they had been temporarily laid off are also included as unemployed." For more information, see https://www.bls.gov/cps/lfcharacteristics.htm.

GRAPH 2

ANNUAL CHANGE IN INDIVIDUAL EMPLOYMENT:
VIRGINIA'S METROPOLITAN STATISTICAL AREAS, 2017 AND 2018
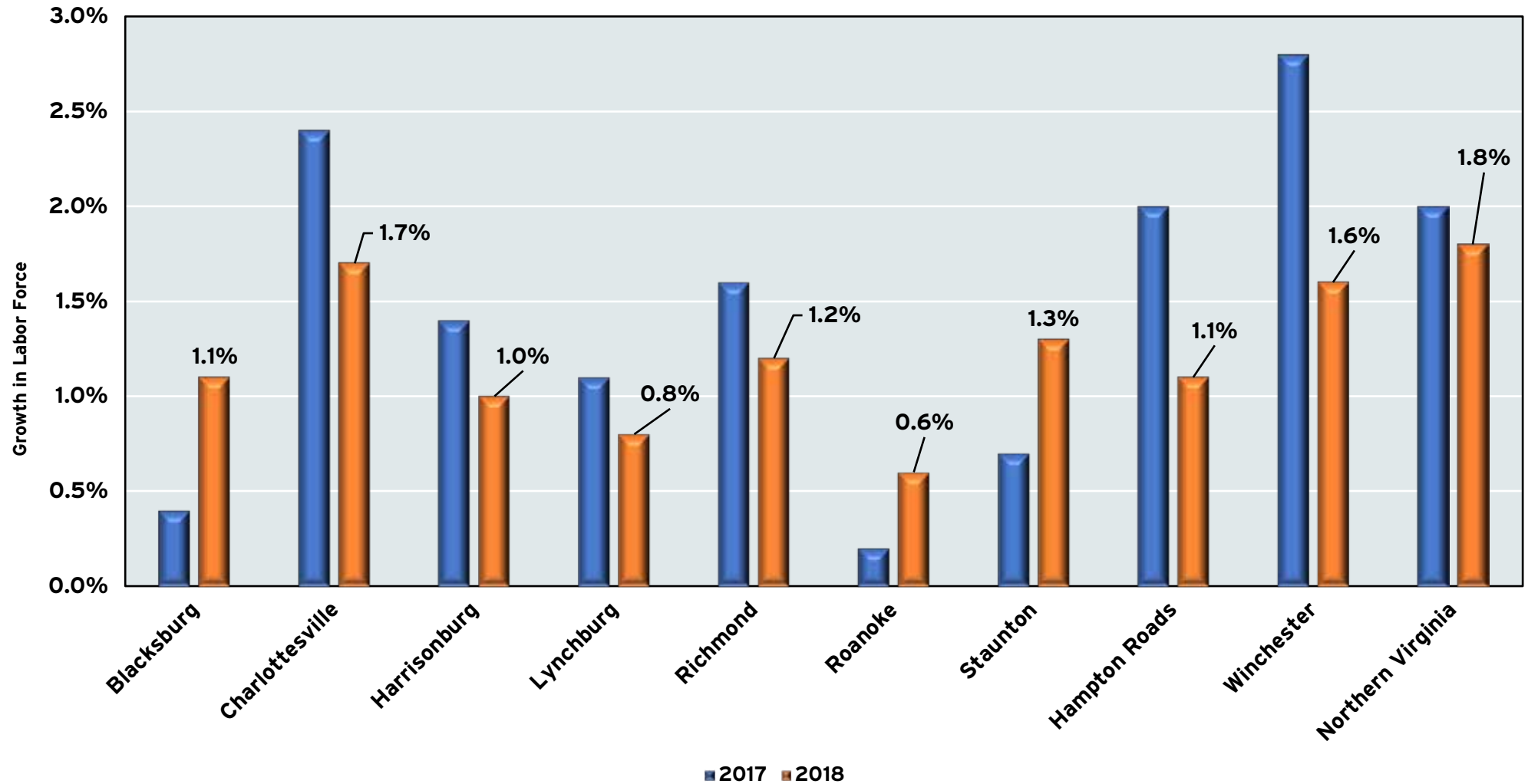
Source: Bureau of Labor Statistics, Local Area Unemployment Statistics, non-seasonally adjusted data. Hampton Roads refers to the Virginia Beach-Norfolk-Newport News MSA. Northern Virginia refers to the Virginia portion of the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA.

GRAPH 3

UNEMPLOYMENT RATE:
VIRGINIA'S METROPOLITAN STATISTICAL AREAS, OCTOBER 2018 AND OCTOBER 2019
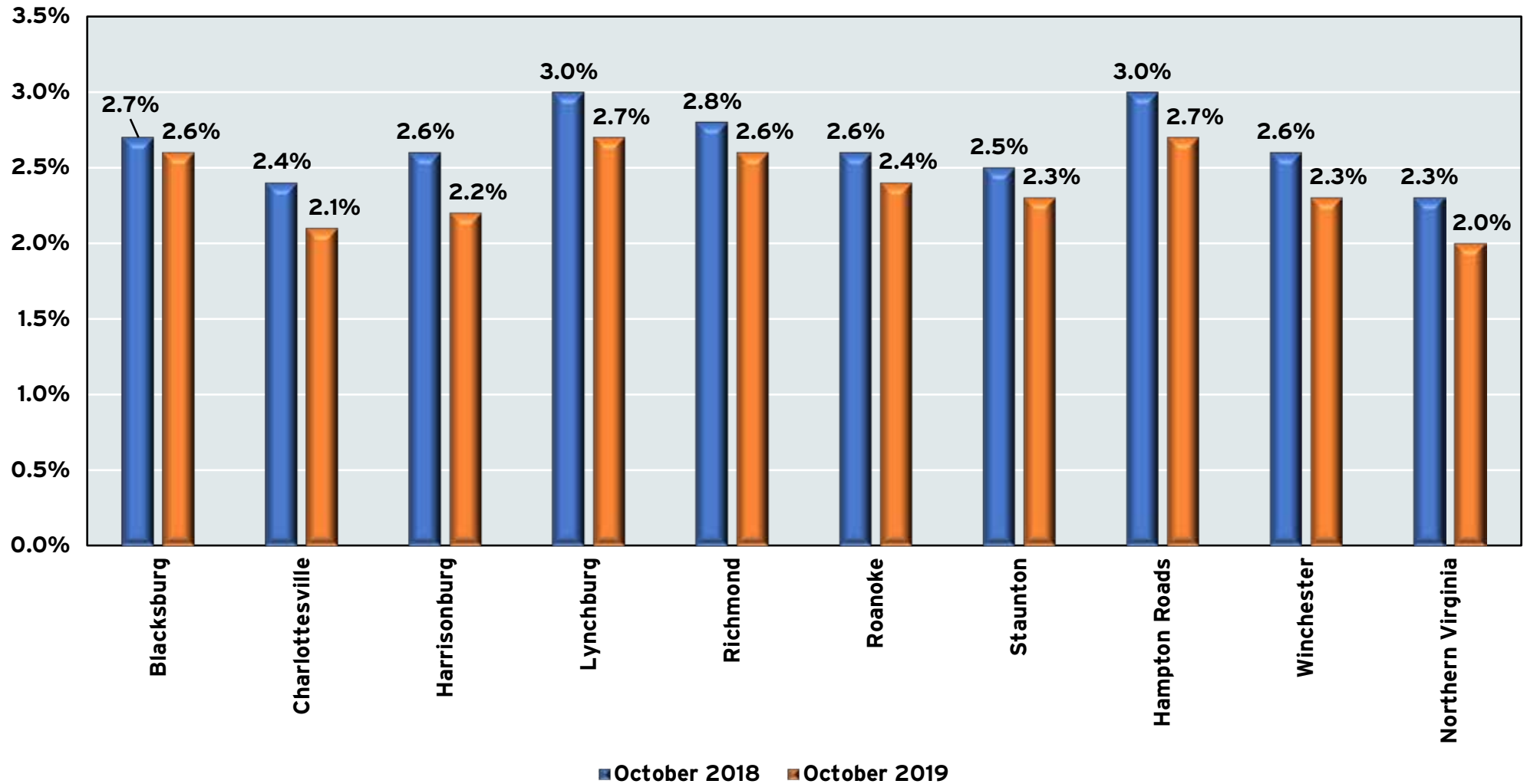
Source: Bureau of Labor Statistics, Local Area Unemployment Statistics, non-seasonally adjusted data, October 2019. Hampton Roads refers to the Virginia Beach-Norfolk-Newport News MSA. Northern Virginia refers to the Virginia portion of the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA.

The slowdown in the growth of individual employment in 2019 echoes the challenge of the national and state economies: finding a sufficient number of workers to sustain economic growth. Labor force participation rates have not recovered from the Great Recession across the Commonwealth. As the number of unemployed individuals in the labor force has declined (which is good news), the growth in individual employment has faltered because disaffected workers have not rejoined the labor force in large numbers (which is bad news). The aging of the workforce, a spatial mismatch between available workers and opportunities, the impact of the opioid crisis and the impact of an expanded social safety net on reservation wages[8] may inhibit labor force participation. The challenge moving forward is how to re-engage these disaffected workers, once again, so that they become productive members of society.

Are There More Jobs In Virginia's Metropolitan Areas?

The most accurate estimates of job growth come from the BLS Quarterly Census of Employment and Wages (QCEW). The QCEW captures about 98% of all wage and salary jobs in the United States, where jobs are defined as full- or part-time positions that are covered by state and federal unemployment insurance law.[9] A drawback of the QCEW is that the data arrive with a significant lag, usually five to six months after the end of the quarter.

Table 3 presents job growth for Virginia's metropolitan areas in 2017 and 2018. Also shown is the job growth rate for the first quarter of 2019 compared to the same period in 2018. While the jobs data lack a coherent story in 2017, each of Virginia's metros exhibited job growth in 2018. The

TABLE 3 JOB GROWTH IN 2017, 2018 AND 2019 Q1 VIRGINIA'S METROPOLITAN AREAS			
	2017	**2018**	**FIRST QUARTER 2019**
Blacksburg	0.1%	1.4%	1.2%
Charlottesville	2.2%	1.4%	1.2%
Harrisonburg	1.2%	0.6%	1.6%
Lynchburg	0.7%	0.8%	1.1%
Richmond	1.3%	0.8%	1.2%
Roanoke	-0.5%	0.5%	0.3%
Staunton	-0.5%	1.4%	2.0%
Hampton Roads	1.1%	1.3%	0.4%
Winchester	2.0%	1.9%	1.9%
Washington-Arlington-Alexandria	1.2%	1.0%	0.9%

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2019. Data reflect year-over-year percentage change, except for 2019 Q1, which represents the percentage change from 2018 Q1. Hampton Roads refers to the Virginia Beach-Norfolk-Newport News MSA. Northern Virginia refers to the Virginia portion of the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA.

first-quarter data for 2019 suggest that the job growth has continued, although at a slower pace for some metro areas.

While the QCEW presents the most accurate jobs data, it is, as previously noted, subject to considerable lag. We can examine the BLS's Current Establishment Survey (CES), which uses a sample of employers to estimate job gains and losses in the United States. While the CES is more current than the QCEW, it may be less accurate and subject to significant revisions, as it relies on a sample of employers in contrast to the QCEW, which captures almost all employers in the country. The BLS, for example, recently announced that the preliminary national estimate of nonfarm payrolls for March 2019 would be revised downward by 501,000 jobs

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8   The reservation wage is the lowest wage rate at which an individual is willing to accept employment. Lizhong Peng, Xiaohaio Guo and Chad Meyerhoefer (2018) found that Medicaid expansion has led to a "statistically significant decrease in employment of 1.3 percent one year after Medicaid expansion. This disemployment effect is transitory and appears to primarily occur in low-wage sectors. In particular, employment returns to pre-expansion levels within two years." In other words, immediately after Medicaid expansion, reservation wages appeared to temporarily increase. For more information, see https://www.nber.org/papers/w25105.
9   For more information, see https://www.bls.gov/cEw/.

(-0.3%) in 2020.[10] Sometimes these revisions go back several years and can lead to different conclusions regarding the health of job markets.

The CES data suggest that job growth has slowed in some metropolitan areas in 2019 to the same period last year (Blacksburg, Richmond, Hampton Roads and Northern Virginia). In other metros, job growth has accelerated in 2019 (Charlottesville, Harrisonburg, Lynchburg, Roanoke, Staunton and Winchester).

With over 80% of all metropolitan area jobs and approximately 70% of all jobs in the Commonwealth, Northern Virginia, Hampton Roads and Richmond typically drive job growth in Virginia. If job growth slows in these areas, it will typically slow for the Commonwealth. What explanations are there for the apparent slowdown in hiring?

There are two possible explanations for slowing job growth in the larger metropolitan areas. First, economic activity may be slowing. However, individual employment is growing, job growth was positive in the first quarter of 2019 and increases in federal spending should have boosted economic activity, especially in Northern Virginia and Hampton Roads. Second, as we suggested earlier, job growth may be slowing because employers are unable to find qualified employees to fill vacant positions. Reports from employers indicate that this may indeed be the case. National-level data indicate that voluntary job quits were at a postrecession high in July 2019. The number of open positions in the U.S. reached a postrecession high in January 2019 and remained near historic levels through the summer of 2019.

The national-level data also reveal more nonfarm job openings than unemployed individuals. In other words, there were more open positions than people looking for work. In October 2019, there were more than 1.2 job openings per unemployed individual in the United States. Virginia's unemployment rate also was 2.7% in October 2019. At the metro level in Virginia, unemployment rates are below 3% and approaching 2% in some areas.

Metropolitan Area Wages

With labor markets having tightened across the Commonwealth, one might expect that wage growth has followed suit. Nationally, real wages have increased this decade, but at a significantly slower pace when compared to earlier economic expansions. The tepid growth in wages for many Americans has led to calls for raising the federal minimum wage to $15 an hour, expanding the social safety net and increasing taxes on high-income and high-wealth taxpayers. We ask whether there is evidence of wage growth in Virginia's metropolitan areas.

We turn again to the QCEW to obtain the most accurate estimates of wage growth. Table 4 presents growth in total nominal wages from 2016 through the first quarter of 2019. Several observations emerge from the data. First, nominal (not adjusted for inflation) wages have increased over time in each of the Commonwealth's metropolitan areas. Second, wage growth appears to be sustained over time in some areas. Average wages increased by more than 3% in Charlottesville, Harrisonburg, Lynchburg and Winchester in 2017, 2018 and the first quarter of 2019. Even though average wages only increased by 0.5% in Blacksburg in the first quarter of 2019, this is on the heels of a 6.2% increase in 2018.

Overall, the labor market data suggest that economic activity improved in Virginia's metropolitan areas in 2018 and into 2019. More Virginians were working or looking for work in the fall of 2019 than in the fall of 2018. Unemployment rates across Virginia's metros continued to decline in 2019 and were approaching 2% in several metros in October 2019. Total and average wages have shown signs of growth, as one might expect with increasingly tight labor markets. The challenge now is finding enough skilled workers to sustain economic growth into 2020.

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10 For more information, see Bureau of Labor Statistics, "CES Preliminary Benchmark Announcement," Aug. 21, 2019, https://www.bls.gov/web/empsit/cesprelbmk.htm.

TABLE 4

GROWTH IN TOTAL NOMINAL WAGES IN VIRGINIA'S METROPOLITAN AREAS, 2016, 2017, 2018 AND 2019 Q1

	2016	2017	2018	2019 Q1
Blacksburg	1.2%	2.9%	6.2%	0.5%
Charlottesville	2.0%	6.0%	4.3%	3.3%
Harrisonburg	3.3%	3.1%	4.5%	3.9%
Lynchburg	1.9%	3.8%	3.2%	3.7%
Richmond	2.5%	4.7%	2.7%	1.7%
Roanoke	2.4%	0.9%	3.1%	3.9%
Staunton	3.5%	3.1%	4.7%	3.4%
Hampton Roads	1.2%	3.8%	3.5%	2.2%
Winchester	4.0%	5.1%	4.1%	5.1%
Northern Virginia	2.9%	4.2%	4.3%	1.9%

Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages, 2019. Data reflect year-over-year percentage change, except for 2019 Q1, which represents the percentage change from 2018 Q1. Hampton Roads refers to the Virginia Beach-Norfolk-Newport News MSA. Northern Virginia refers to the Virginia portion of the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA.

Changes In Population

Even though Virginia's economic performance lagged that of the nation for much of the decade, the percentage increase in Virginia's total population was greater than that of the nation. As illustrated in Table 5, from 2010 to 2018, Virginia's total population increased by 6.2%, 0.4 percentage points more than the United States. As with much of the data in this chapter, the picture is less clear at the metropolitan area level.

Population increased more in a number of metros than in the Commonwealth as a whole or the nation. Among the smaller metros, Charlottesville, Harrisonburg and Winchester grew appreciably faster than the state. For the larger metropolitan areas, Richmond and Northern Virginia grew faster than the state and nation. Roanoke and Hampton Roads were among the slowest-growing metros in the state from 2010 to 2018.

TABLE 5

TOTAL POPULATION AND PERCENTAGE CHANGE IN TOTAL POPULATION, VIRGINIA'S METROPOLITAN STATISTICAL AREAS, VIRGINIA AND THE UNITED STATES

	2010	2018	PERCENT CHANGE
United States	309,326,085	327,167,434	5.8%
Virginia	8,023,680	8,517,685	6.2%
Blacksburg	178,501	184,029	3.1%
Charlottesville	218,978	235,232	7.4%
Harrisonburg	125,398	135,277	7.9%
Lynchburg	252,981	263,353	4.1%
Richmond	1,209,896	1,306,172	8.0%
Roanoke	308,593	314,172	1.8%
Staunton	118,311	123,007	4.0%
Hampton Roads	1,671,174	1,715,687	2.6%
Northern Virginia	2,707,291	3,032,950	12.0%
Winchester	128,675	139,810	8.7%

Source: U.S. Census Bureau, 2018 Population Estimates. Hampton Roads consists of the Virginia portion of the Virginia Beach-Norfolk-Newport News MSA and Northern Virginia consists of the Virginia portion of the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA. We use the 2018 Census geographical delineation files to assign counties and independent cities to the Virginia portion of Hampton Roads and Northern Virginia.

Table 6 displays the components of population change for Virginia's metropolitan areas from 2010 to 2018. The U.S. Census Bureau breaks population change into two broad components: the natural increase in the population and net migration. The natural increase in the population is equal to births minus deaths. Net migration consists of domestic migration and international migration. For example, if more people move into a metro area from other countries than depart the metro area for other countries, then net international migration is positive (and vice versa). Turning first to the Commonwealth, the natural increase in the population from 2010 to 2018 was positive, indicating that more Virginians were born than died during this period. Even though net domestic migration was negative, it was more than compensated by net positive international migration.

TABLE 6

COMPONENTS OF POPULATION CHANGE, 2010-2018: VIRGINIA'S METROPOLITAN STATISTICAL AREAS AND VIRGINIA

	NATURAL INCREASE	NET DOMESTIC MIGRATION	NET INTERNATIONAL MIGRATION	POPULATION CHANGE
United States	10,714,959	--	7,694,370	18,409,329
Virginia	314,663	-62,763	263,741	515,641
Blacksburg	1,073	-655	5,387	5,775
Charlottesville	5,332	4,629	6,655	16,531
Harrisonburg	3,846	1,900	4,341	10,056
Lynchburg	1,869	5,237	3,671	10,694
Richmond	37,299	33,664	27,235	98,083
Roanoke	-677	649	5,730	5,702
Staunton	-134	3,760	918	4,511
Hampton Roads	71,855	-61,005	36,759	47,444
Northern Virginia	217,172	-43,627	167,095	342,540
Winchester	3,183	6,282	1,889	11,957

Source: U.S. Census Bureau, 2018 Population Estimates. Hampton Roads consists of the Virginia portion of the Virginia Beach-Norfolk-Newport News MSA and Northern Virginia consists of the Virginia portion of the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA. We use the 2018 Census geographical delineation files to assign counties and independent cities to the Virginia portion of Hampton Roads and Northern Virginia. The total change in the population includes a residual estimated by the Census Bureau. Data current as of Nov. 27, 2019, and subject to revision.

Graph 4 reveals that the annual level of net international migration was positive for Virginia from 2010 to 2018. Net international migration peaked in 2015 but has declined in each succeeding year. It appears that the Commonwealth has been an attractive destination for individuals moving from other countries. As illustrated in Table 6, international migration has offset domestic outmigration in Northern Virginia and partly offset domestic outmigration in Hampton Roads.

More troubling is that net domestic migration for Virginia was negative from 2010 to 2018. Examining the annual data in Graph 5,

we find that net domestic migration was positive from 2010 to 2013. From 2014 to 2018, however, more Virginians left for other states than residents of other states came to Virginia. Only two metropolitan areas, Washington-Arlington-Alexandria and Hampton Roads, experienced net domestic outmigration during this period. Let's take a look at the annual data for these two metro areas.
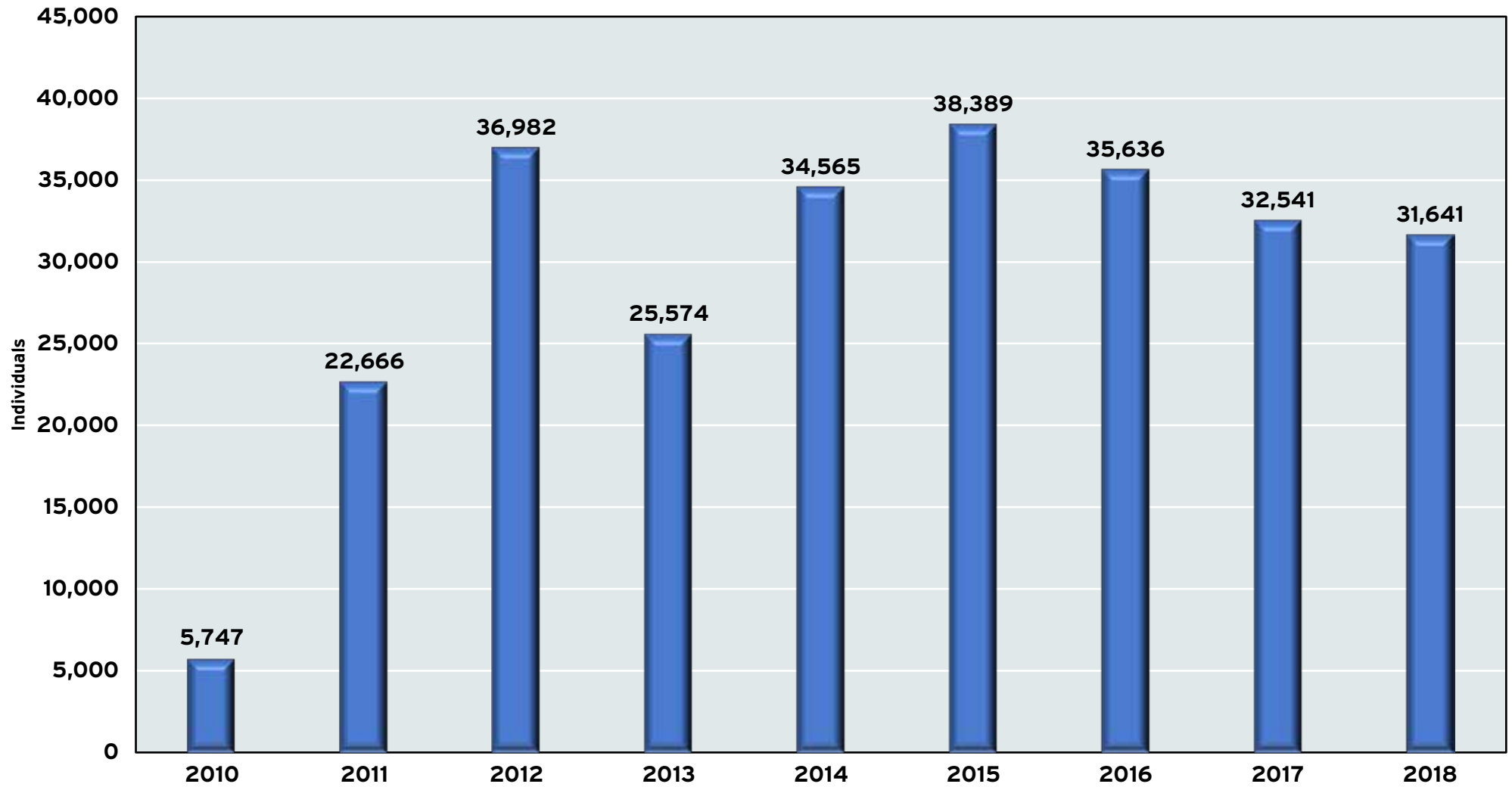
Graph 6 displays the components of population change and the change in total population for the Virginia portion of Hampton Roads from 2010 to 2018. While the Hampton Roads population has grown this decade, the annual growth has been paltry. The largest increase in the population came in 2012, when it increased by 11,073 (less than 1% of the total population). More recently, the natural increase in the population fell from its high of 10,133 in 2012 to 6,553 in 2018.

Turning to migration, international migration has been positive every year this decade and domestic migration has been negative every year. In two years, international migration was sufficient to offset domestic outmigration (2012 and 2014). In the other years, thousands more residents of Hampton Roads left for other domestic destinations than arrived from international locales. Relatively poor economic performance this decade appears to have contributed to the slow rate of population growth in Hampton Roads.

A different story emerges for the Northern Virginia portion of the Washington-Arlington-Alexandria metropolitan area in Graph 7. The natural increase in the population, with the exception of 2010, has been above 20,000 individuals annually. While net domestic migration was positive from 2010 to 2013, it turned negative in 2014 and has remained negative since. The good news is that net international migration has more than offset the outflow of residents of Northern Virginia to other destinations.

GRAPH 4

NET INTERNATIONAL MIGRATION:
VIRGINIA, 2010-2018

Source: U.S. Census Bureau, 2018 Population Estimates

GRAPH 5

**NET DOMESTIC MIGRATION:
VIRGINIA, 2010-2018**
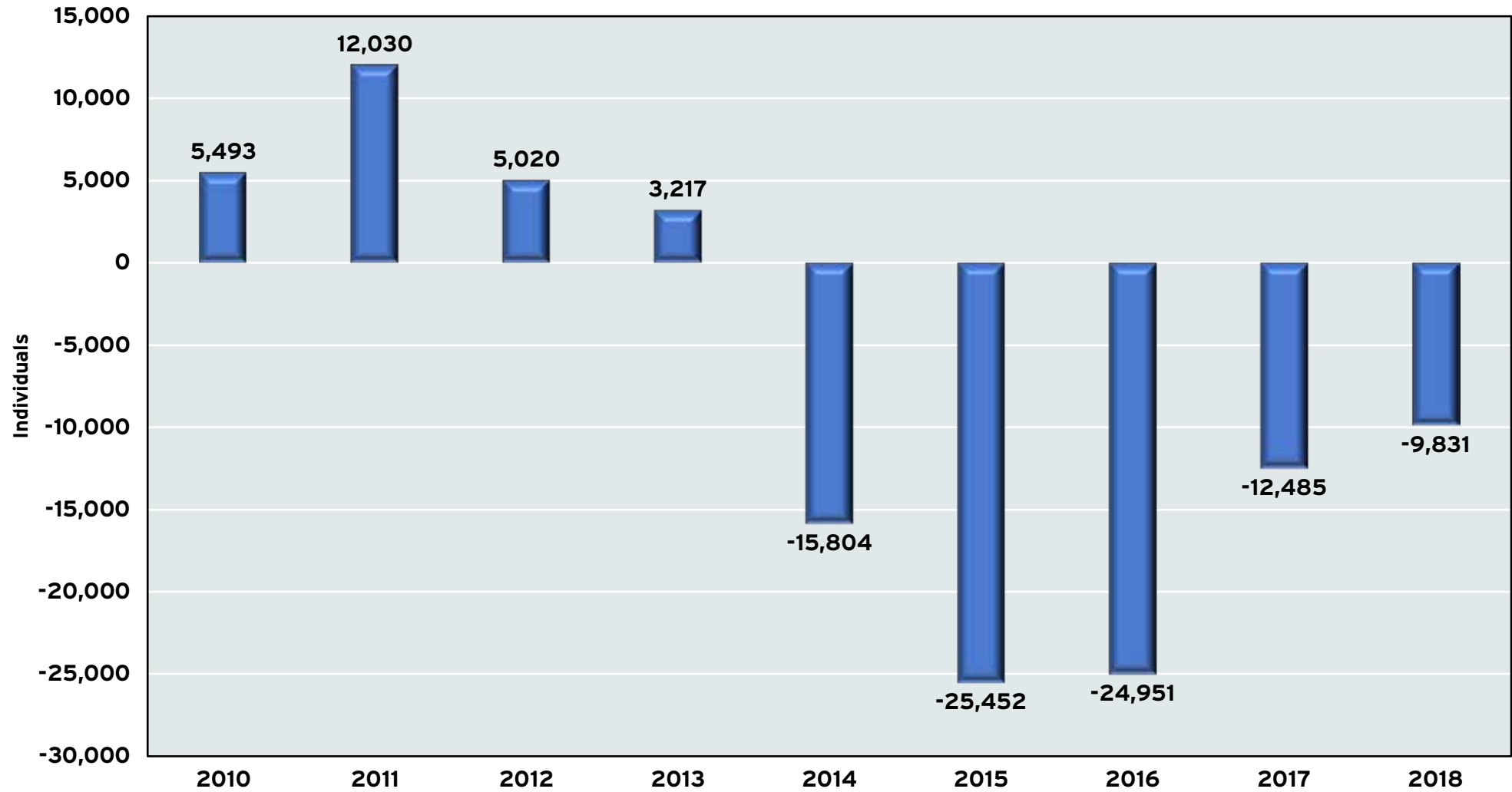
Source: U.S. Census Bureau, 2018 Population Estimates

GRAPH 6

COMPONENTS OF POPULATION CHANGE AND CHANGE IN TOTAL POPULATION: VIRGINIA PORTION OF THE HAMPTON ROADS MSA, 2010-2018
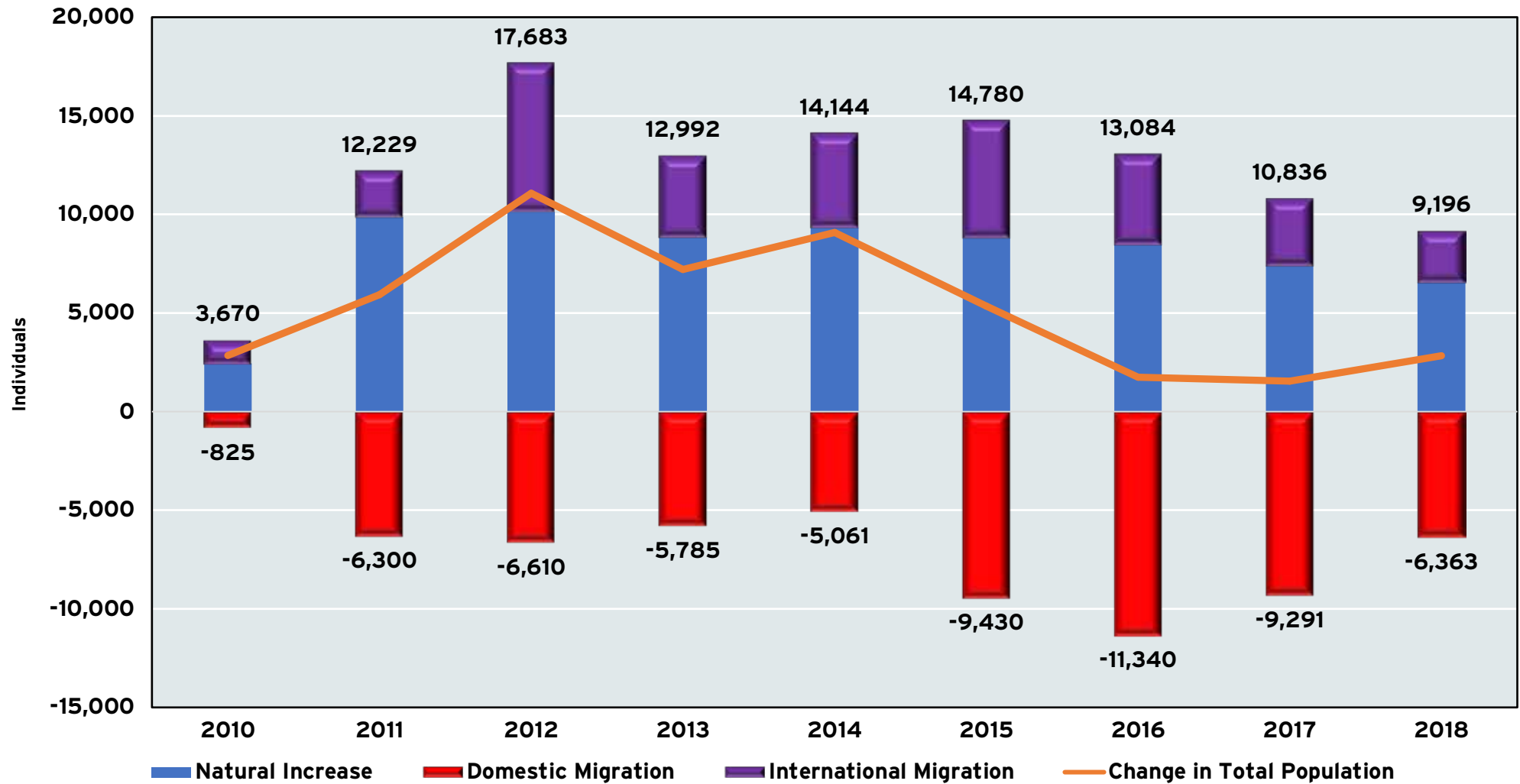
Source: U.S. Census Bureau, 2018 Population Estimates. Hampton Roads consists of the Virginia portion of the Virginia Beach-Norfolk-Newport News MSA. We use the 2018 Census geographical delineation files to assign counties and independent cities to Hampton Roads.

GRAPH 7

**COMPONENTS OF POPULATION CHANGE AND CHANGE IN TOTAL POPULATION:
VIRGINIA PORTION OF THE WASHINGTON-ARLINGTON-ALEXANDRIA MSA, 2010-2018**

Legend: Natural Increase | Domestic Migration | International Migration | Change in Total Population
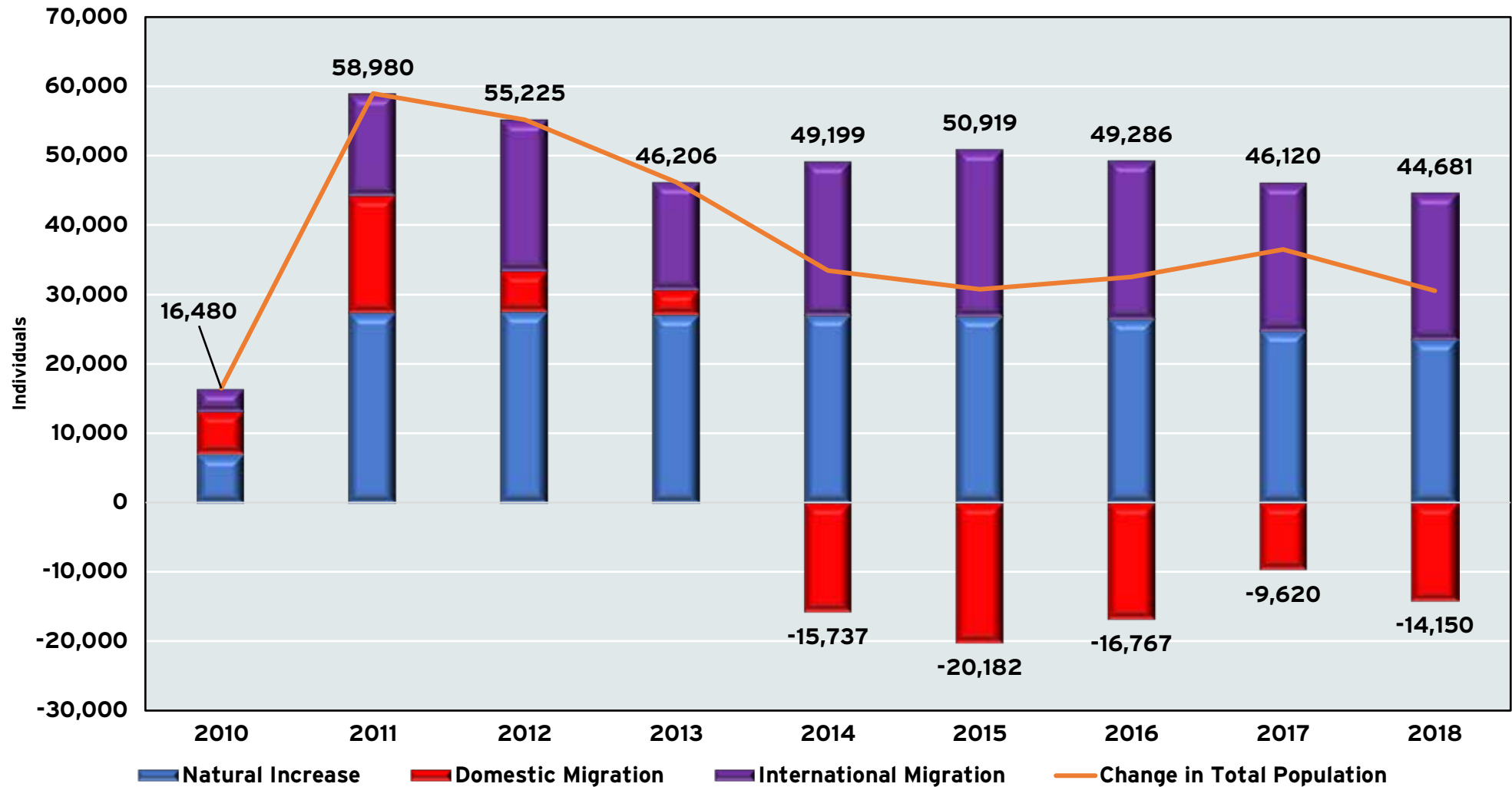
Source: U.S. Census Bureau, 2018 Population Estimates. Northern Virginia consists of the Virginia portion of the Washington-Arlington-Alexandria, DC-VA-MD-WV, MSA. We use the 2018 Census geographical delineation files to assign counties and independent cities to Northern Virginia.

Northern Virginia and Hampton Roads present a tale of two metros. Northern Virginia's economic performance, while not stellar, has been largely positive this decade. Hampton Roads, until recently, has struggled to generate economic growth. Job growth and rising incomes attracted international migrants to offset the outflow of residents in Northern Virginia and partly offset domestic outmigration in Hampton Roads. The challenge for both metro areas is to stem the outflow of residents to other locations. For Northern Virginia, this challenge partly rests on the matter of the cost of living. For Hampton Roads, the challenge largely rests on the region's ability to generate economic growth in the coming years.

Real Gross Domestic Product: Waiting For New Data

Table 7 presents real (inflation-adjusted) rates of growth for gross domestic product, a measure of economic activity. The U.S. Department of Commerce's Bureau of Economic Analysis (BEA) produces the national, state, metropolitan area and county estimates of GDP, which provide a benchmark for economic activity over time. **The metro area estimates, especially those for 2018, should be viewed with an abundance of caution. Why? The BEA released the "advance" estimates for metropolitan-area GDP for 2018 in December 2019. The next revision to these estimates will be in December 2020, when the BEA releases the advance estimates for 2019 and revises its previous estimates. With such a lag, we advise the reader to examine the underlying trends and focus less on the estimates for a specific year, which are likely to change in the next release.**

The data released in December 2019 suggest that economic growth has continued across Virginia's metros. In fact, 2018 was the first year in the decade that all of Virginia's metros exhibited positive economic growth. This good news is tempered by the realization that only the Charlottesville metro area has grown at approximately the same rate as the nation over the decade. The remaining metros have lagged, some considerably, behind the nation's economic performance.
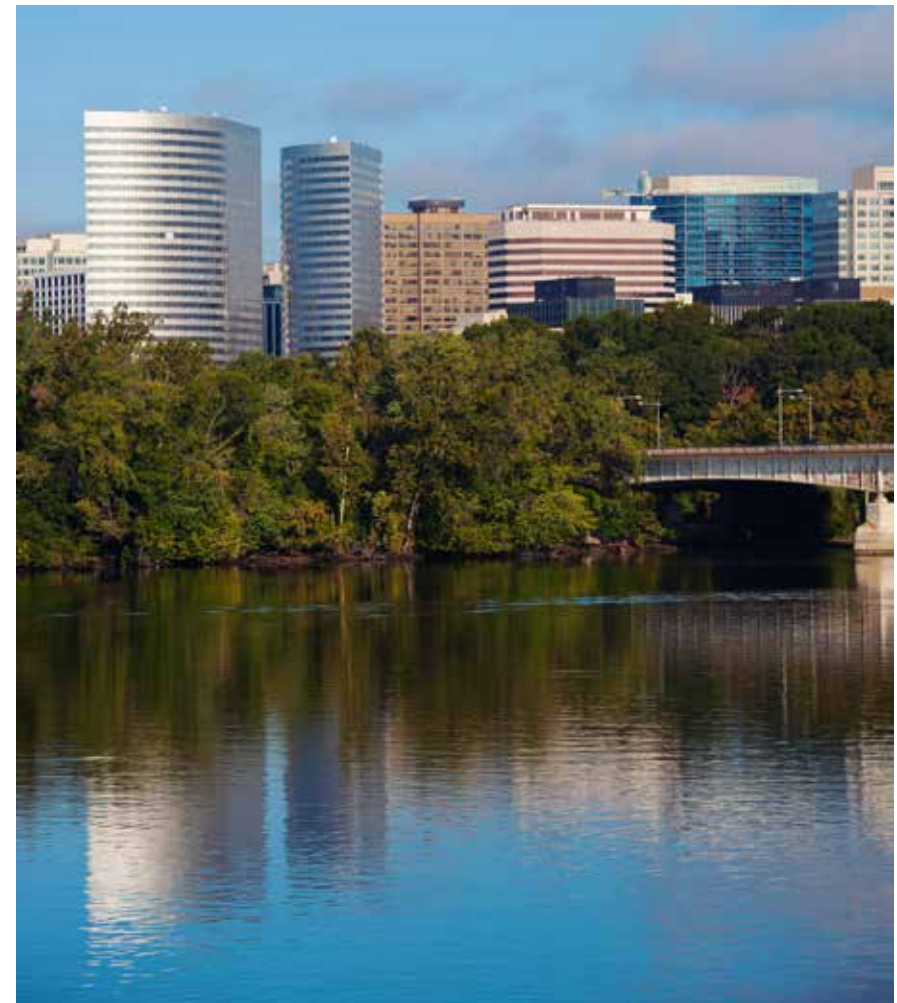
TABLE 7
REAL (INFLATION-ADJUSTED) GROSS DOMESTIC PRODUCT: YEAR-ON-YEAR RATES OF GROWTH, 2010-2018 VIRGINIA'S METROPOLITAN AREAS, VIRGINIA AND THE UNITED STATES
	Blacksburg	**Charlottesville**	**Harrisonburg**	**Lynchburg**	**Richmond**	**Roanoke**	**Staunton**	**Virginia Beach - Norfolk - Newport News**	**Washington - Arlington - Alexandria**	**Winchester**	**Virginia**	**United States**
2010	0.6%	3.9%	-1.4%	2.7%	2.4%	1.3%	1.4%	0.1%	4.2%	4.7%	2.7%	2.6%
2011	3.9%	1.1%	-1.7%	-1.5%	2.9%	0.4%	-3.9%	-1.1%	2.2%	-0.7%	1.0%	1.6%
2012	0.5%	2.9%	-0.5%	-2.7%	2.2%	-0.2%	-5.4%	-1.1%	0.8%	-2.1%	0.8%	2.2%
2013	0.8%	-1.5%	1.8%	-0.4%	1.9%	1.4%	1.8%	0.6%	-0.5%	-1.4%	0.4%	1.8%
2014	1.5%	1.6%	-0.5%	-0.7%	-0.5%	-0.5%	0.7%	-0.9%	0.9%	0.0%	-0.2%	2.5%
2015	3.4%	4.3%	-0.1%	0.6%	2.2%	2.1%	3.0%	1.7%	2.3%	3.8%	2.0%	2.9%
2016	0.2%	2.3%	-0.8%	-0.5%	0.0%	-2.2%	0.0%	-0.6%	2.3%	0.7%	0.4%	1.6%
2017	1.6%	4.4%	3.2%	0.8%	1.9%	-0.3%	2.9%	1.1%	1.5%	2.6%	1.8%	2.4%
2018	3.8%	2.2%	1.4%	2.5%	1.9%	2.2%	1.2%	2.2%	2.7%	2.8%	2.6%	2.9%
CAGR	2.0%	2.1%	0.4%	-0.3%	1.5%	0.4%	0.0%	0.2%	1.5%	0.7%	1.1%	2.2%

Source: Bureau of Economic Analysis, 2019. Base year for real GDP for the United States is 2012. CAGR is the Compound Annual Growth Rate. Washington-Arlington-Alexandria is the Washington-Arlington-Alexandria, DC-VA-MD-WV MSA. .

Final Thoughts

If one were to borrow a title from Charles Dickens, the most recent story of Virginia's metropolitan areas might be "Great Expectations." While the first half of the current decade saw lackluster economic growth at the state and regional level, more recent data suggest that there was an uptick in economic activity in 2018 and 2019. However, growth is not distributed evenly across the metro areas, but the signs, for now, are largely positive.

Increases in defense spending will drive economic growth in Hampton Roads and Northern Virginia over the coming months. Many of the smaller metropolitan areas are exhibiting signs of robust economic activity. More individuals are employed, and jobs are up across Virginia's metros. Unemployment rates are below 3% and workers have seen some moderate increases in their pay. The challenge appears to be a lack of workers to sustain job growth. Whether higher reservation wages due to the social safety net, disability rates, the opioid crisis — or all these factors combined — are playing a role in low labor force participation is worthy of further discussion.

Each year we ask what the future holds. If Congress is able to pass appropriations bills in a timely manner in 2019, then increases in federal spending through September 2020 are likely to boost the fortunes of those metropolitan areas closely tied to the federal government. Increasing uncertainty about these bills and the country's ongoing trade conflicts are dampening prospects for 2020, however, and Virginia's metros may enter the new year facing substantial headwinds. Barring an unexpected shock, a reasonable conclusion is that growth will also slow in Virginia and among its metro areas in 2020.

Virginia can act to improve regional outcomes. We continue to offer the following suggestions. Targeted investments in infrastructure are necessary to promote economic development and attract new businesses. Improving the quality of education, including investments in physical infrastructure, is necessary to produce a workforce that can compete in an increasingly globalized economy.

Virginia's antiquated tax structure must be reformed to compete with neighboring states. Regulatory relief, or at least regulatory clarity, is also a necessary component of economic growth. Lastly, regional collaboration should not just be a slogan. Virginia should continue to promote regional collaborations through efforts like GO Virginia. These recommendations may not be new, but until the Commonwealth acts, they bear repeating. Here's hoping that there are those throughout the Commonwealth who are listening.

THE VIRGINIA RETIREMENT SYSTEM: ASSESSING ITS CHALLENGES AND CHARTING ITS FUTURE
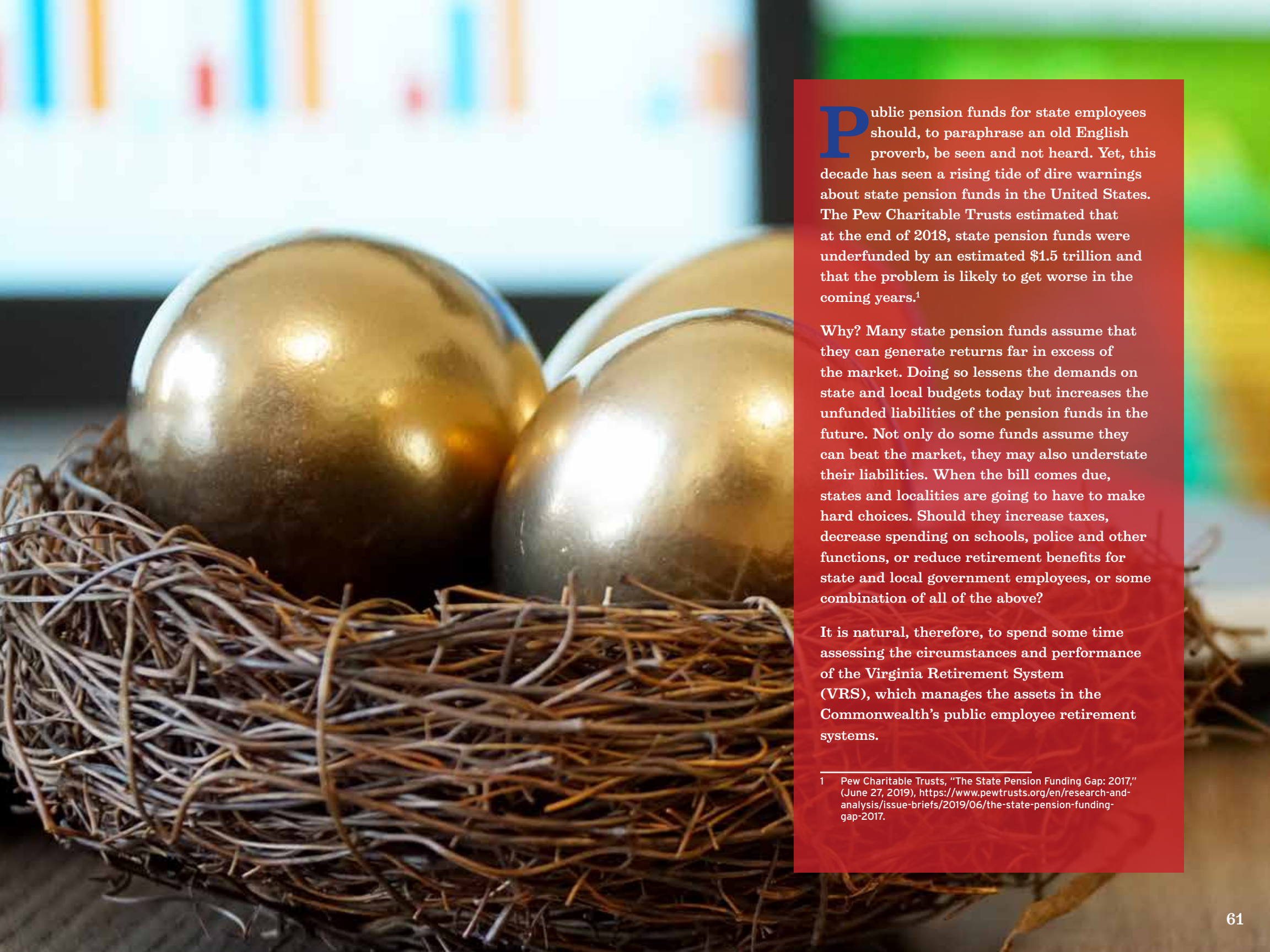
The funded status of the VRS plans has improved in recent years, in part because of strong investment performance.

– Joint Legislative Audit and Review
  Commission, December 2017

The VRS is actuarially sound.

– GRS Retirement Consulting report,
  July 9, 2018

Public pension funds for state employees should, to paraphrase an old English proverb, be seen and not heard. Yet, this decade has seen a rising tide of dire warnings about state pension funds in the United States. The Pew Charitable Trusts estimated that at the end of 2018, state pension funds were underfunded by an estimated $1.5 trillion and that the problem is likely to get worse in the coming years.[1]

Why? Many state pension funds assume that they can generate returns far in excess of the market. Doing so lessens the demands on state and local budgets today but increases the unfunded liabilities of the pension funds in the future. Not only do some funds assume they can beat the market, they may also understate their liabilities. When the bill comes due, states and localities are going to have to make hard choices. Should they increase taxes, decrease spending on schools, police and other functions, or reduce retirement benefits for state and local government employees, or some combination of all of the above?

It is natural, therefore, to spend some time assessing the circumstances and performance of the Virginia Retirement System (VRS), which manages the assets in the Commonwealth's public employee retirement systems.

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1   Pew Charitable Trusts, "The State Pension Funding Gap: 2017," (June 27, 2019), https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2019/06/the-state-pension-funding-gap-2017.

Our work in this chapter is an independent, noncommissioned, noncompensated analysis of specific issues relating to the VRS. The available evidence suggests that the VRS has been well managed and has outperformed many state pension funds. Fortunately for the members of the VRS and the taxpayers of Virginia, the VRS has avoided most of the difficulties that have afflicted many other state pension plans.

Our work benefited immensely from face-to-face conversations with VRS officials. We did not always find ourselves in agreement with the views of the VRS on all issues, but one must credit the VRS for its willingness to engage and to respond to our queries. More public agencies should emulate it in this regard.

We suggest four policy changes that would improve the performance of the VRS, reduce the likelihood that the Commonwealth will confront serious problems in the future and ultimately benefit its participants.[2] One of these changes would have the VRS rely more on low-cost, indexed public equity investments instead of paying analysts to actively manage the same funds. If the VRS had followed this strategy, we estimate it could have earned an additional $3.4 billion on its public equity portfolio between 1992 and 2017. There may be additional gains from indexing other segments of the VRS portfolio, but we do not deal with those possibilities in this chapter.

Some Background

The VRS manages and invests pension funds sent to it by public bodies in Virginia. On March 31, 2019, the VRS served more than 722,000 members, retirees and beneficiaries and held $80.4 billion in net assets. VRS payments to recipients included $4.75 billion in retirement benefits and another $416 million in other postretirement benefits.[3] The VRS ranks as the 15th-largest public pension systems in the United States.

Because the VRS is overseen by the Virginia General Assembly, it often ends up having to play the financial cards dealt it by legislators. These cards historically included inadequate funding by the General Assembly of the state's public employee pension plans. Consequently, the VRS is "underfunded"; that is, its current asset holdings, prudently invested, are insufficient to produce the income required to meet anticipated future obligations. **On June 30, 2018, the market value of the assets held by the VRS was equal to only 78.1% of its actuarially accrued liabilities.[4]**

On the plus side, however, the General Assembly has, in recent years, met its financial obligations to its pension funds. The General Assembly also (wisely, in our view) established an independent board to govern the VRS. There is widespread agreement that the independent board has improved the management and performance of the VRS, enabled it to attract and retain superior personnel, and increased its reputation among lawmakers, financial professionals and the public.

The General Assembly determines what kind of public employee retirement benefits Virginia offers. In recent years, it has exercised its authority to move the Commonwealth away from exclusive reliance upon "defined benefit" pension programs (that guarantee participants specific future benefits) toward hybrid programs that include both defined benefit provisions and "defined contribution" provisions. Under defined contribution programs, the Commonwealth places pension contributions into accounts that the participants subsequently own. The Commonwealth's financial liability ends there, a circumstance that is not true when employees are in defined benefit programs. In the latter case, the Commonwealth is obligated to fund previously agreed upon benefits over what sometimes can be long time periods.

Most new VRS participants, except for hazardous duty employees, now are automatically enrolled in the hybrid retirement plan. The federal government and the private sector moved in this direction some years ago. Now, all but a few private-sector employers provide defined contribution programs rather than defined benefit programs. While defined benefit pension programs contain some attractive features for both the Commonwealth and participants, they have become the source of significant fiscal stress in numerous states because the financial obligations

2   A July 9, 2018, audit of the VRS by GRS Retirement Consulting declared the VRS "actuarially sound," file:///H:/State%20of%20the%20Commonwealth%202018/Pensions/VRS%20Audit%20July%209,%202018.pdf.
3   Joint Legislative Audit and Review Commission, VRS Oversight Report (July 2019), http://jlarc.virginia.gov/pdfs/reports/Rpt521-2.pdf.
4   Virginia Retirement System, Comprehensive Financial Annual Report, 2018.

of the states to employees carry on long into the future. Defined benefit plans threaten to bankrupt states, such as Illinois. Hence, moving Virginia away from defined benefit pension programs is a change essential to the future fiscal stability of the Commonwealth and its local government units.

While each state has its own distinctive pension fund, there are common characteristics among these funds. Funds that have encountered financial difficulties have done so because of one or more of the following decisions:

1. Overly generous pension and attached health care provisions benefitting public employees,

2. Generous cost-of-living adjustments that exacerbate funding challenges,

3. Grossly inadequate funding of pension obligations by governors and legislatures,

4. Overly optimistic rate of return assumptions for their investable assets that match neither experience nor the likely future, and

5. Excessive investment of assets in costly actively managed funds that have performed poorly relative to the overall market.

If there is a lesson here, it is that problems in state pension funds characteristically are ignored by those in power, build slowly over time, and then emerge as full-blown crises. Timely action now on the part of the Commonwealth can reduce the risk that the VRS might drift into trouble in the future. Attempting to address the vulnerabilities of the VRS will be more difficult when the next economic recession inevitably appears.

Virginia's Public Employee Pension Systems

The Commonwealth maintains six different public employee pension systems: (1) the system that serves most state government employees, who are or were located in 227 state agencies; (2) the system that serves about 600 special governmental authorities, cities, towns and school divisions; (3) the state teachers' retirement system, which is the largest of the six; (4) the state police officers' retirement system (SPORS); (5) the Virginia law officers' retirement system (VaLORS); and (6) the judicial retirement system (JRS). The VRS manages all state pension funds, whose individual members (current or prospective retirees) totaled more than 722,000 in March 2019.

Graph 1 reports the net asset positions at the end of the 2018 fiscal year for each of the major pension systems that comprise the VRS. The VRS invests the money sent to it by jurisdictions that range from towns, cities and counties to school districts and economic development agencies. The combined assets of the different systems are invested jointly. However, the VRS only can invest funds that it receives from local government bodies. If an employer does not fully fund its contractual obligations to its current and former employees, then this is a problem that will accrue to the employer instead of the entire VRS system. According to the VRS, the average funding level of local government pension systems managed by the VRS was 92.2% in summer 2018.[5] However, funding levels varied – from the town of Haysi in Dickenson County, having assets valued at only 42.34% of its anticipated obligations; to Loudoun County, at 91.39%; to Newport News, at 125.69%.[6]

5   Information provided in a communication from the VRS to Old Dominion University's Dragas Center for Economic Analysis and Policy.
6   Virginia Retirement System, "Actuarial Valuation of Political Subdivisions," (June 30, 2017).

GRAPH 1

EMPLOYERS' NET PENSION LIABILITY OF THE MAJOR COMPONENTS OF THE VIRGINIA RETIREMENT SYSTEM (BILLIONS OF $)
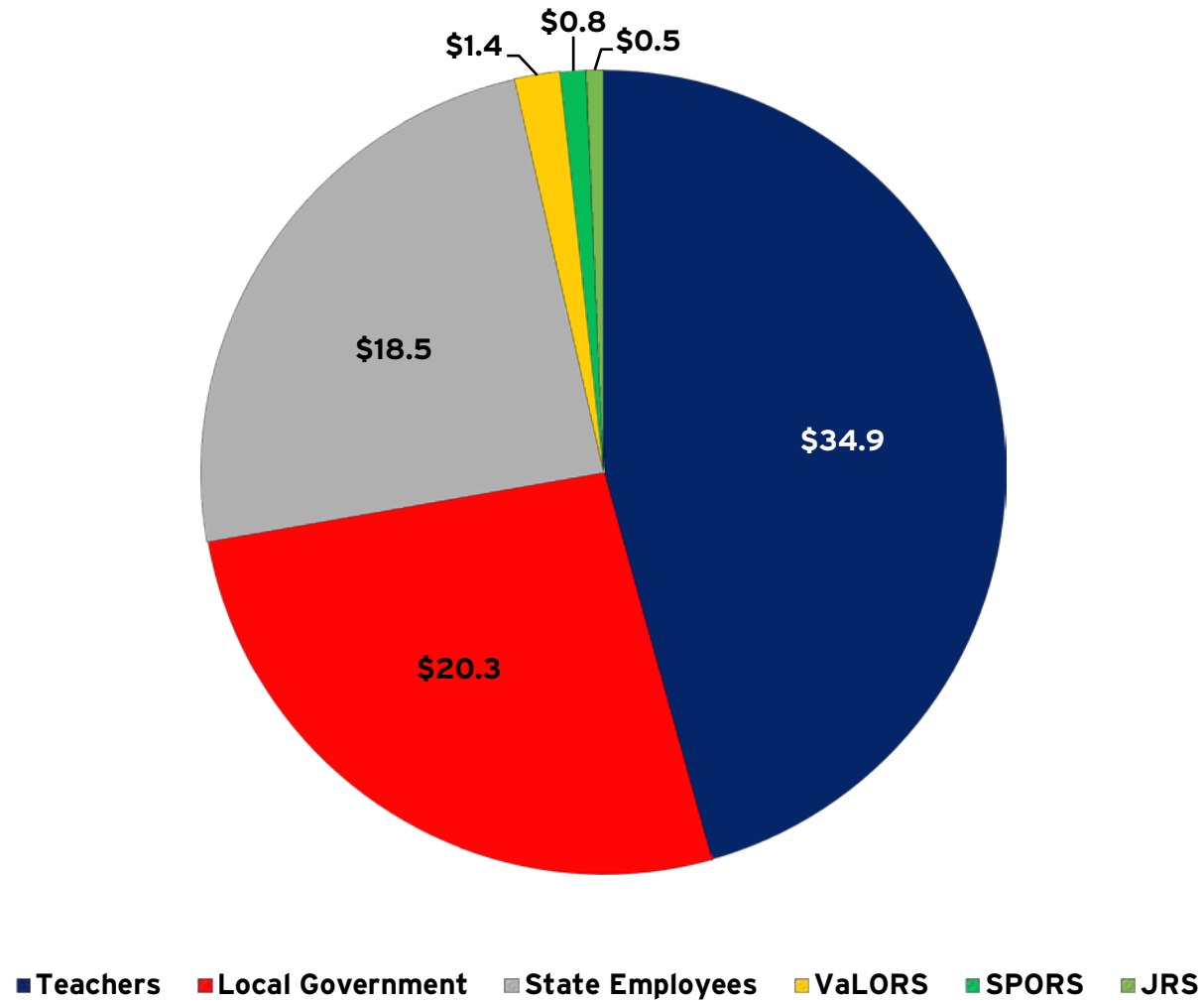
Source: Virginia Retirement System, Comprehensive Financial Annual Report (June 30, 2018)

Unfunded Liabilities

At first glance, the financial economics associated with pension funds are simple. Employers and employees contribute money to a fund that invests those funds to support payments to the employees, typically when they retire. To the extent that employers make more generous financial promises than they can keep to their employees concerning the size and duration of their retirement stipends, then employers and their employees either must contribute more money, or higher rates of return must be earned on the funds being invested on behalf of the employees. In Virginia, the benefits VRS participants receive are determined by state statute.

When the funds on hand to deal with anticipated future retirement obligations are insufficient to meet those obligations, then this is called an unfunded actuarial accrued liability (UAAL) in pension fund parlance. "Anticipated" is an important modifier in the previous sentence. Among other things, the moneys that must be paid out by pension funds depend on the salaries that employees will earn, when employees choose to retire, whether they are eligible by statute to claim disability, and how long they live. Alas, none of these events can be known with certainty.

Roughly two-thirds of Americans have left the labor force by age 66, and half leave the labor force between ages 61 to 65. Retirement ages tended to decline in the United States until the economic reverses of the Great Recession and changes in Social Security eligibility altered the calculations for many individuals. Data from the U.S. Census' 2018 American Community Survey tell us that the average retirement age for Virginians was 65.

The lengthening life span of Americans poses a significant challenge to the viability of many state pension funds. The expected life span of a newly born baby was 70.8 years in 1970 but had risen to 78.6 by 2017.[8] Simply put, when pension recipients live longer, a larger asset base is required to take care of them.

Public employee pension funds in most states have UAALs. Graph 2 reveals that as of June 30, 2018, the VRS had a UAAL in excess of $19.7 billion. Stated differently, the market value of the VRS's assets was 78.1% of its UAAL on that date. The 78.1% funding ratio represented a significant increase from the low of 60.1% on June 30, 2009, and a 4.7% increase from June 30, 2017. Now is not the time to declare victory, as a significant gap remains between assets and liabilities.

Things also could have been much worse. According to the Pew Charitable Trusts' most recent report on state pension funds,[9] states reported $4.1 trillion in liabilities and $2.9 trillion in assets in 2017. On average, states had only 69% of the assets needed to fully fund their pension obligations. Kentucky's funding level was only 34% in 2017, and four other states (Colorado, California, Illinois and New Jersey) were below 50%. Only eight states had sufficient assets to cover 90% of their obligations, while 24 states were below 70% funding.

The VRS has not always been actuarially underfunded. From 2000 to 2002, it possessed assets that exceeded 100% of its estimated future actuarial financial obligations. Several developments altered this. First, the rates of return earned by the VRS fell. The 16-month meltdown

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7   National Association of State Retirement Administrators, "Public Pension Plan Investment Return Assumptions" (February 2018), www.nasra.org/files/Issue Briefs/NASRAInvReturnAssumptBrief.pdf, and the Virginia Retirement System, "VRS Stress Test and Sensitivity Analysis" (June 2017).
8   Centers for Disease Control and Prevention, 2018.
9   https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2019/06/the-state-pension-funding-gap-2017.

in equity prices that began in October 2007 played a significant role.[10] Second, the VRS reduced its rate of discount two times during the succeeding decade (a point we discuss below), and this amplified its estimated future obligations. Third, enhanced benefits increased the VRS's obligations. Fourth, the Commonwealth failed to contribute the VRS board's actuarially determined contributions.

This final point is important. From 1993 to 2018, the General Assembly fully funded its own agreed-upon, legally required pension contributions to statewide retirement systems only six times (2001, 2005, 2006, 2016, 2017 and 2018). In 2003, the General Assembly made no contribution at all. From 1992 to 2016, the average level of annual funding compared to the amount required by statute during this period was 72%.[11] The modicum of good news is that the General Assembly fully funded its contributions in the most recent three years and is poised to do so again in 2019. Weakening economic growth and, consequently, state revenues, may place this streak in jeopardy in the near future.

The VRS reports that if the Commonwealth had made the contributions required of it by statute, then the VRS now would have almost 90% of its estimated future actuarial financial obligations rather than the current 79%.[12] This is a major reason why the gap between the market value of VRS assets and its actuarial accrued liability expanded (as one can see in Graph 2) during and after the Great Recession. The pension fund reforms begun by the General Assembly in 2010, plus more favorable investment results, have begun to redress this situation.

Nationally, there is broad agreement that state expenditures on Medicaid and pensions have crowded out expenditures on other items, such as education and transportation. The Wall Street Journal reported in 2018 that the proportion of state and local tax revenues devoted to Medicaid and public-sector pensions was the highest in almost 60 years.

Two-thirds of all additional revenues went to fund Medicaid and pensions between 2008 and 2016. In 2016, city and state governments spent about $105 billion on public employee pensions, dramatically up from about $29 billion in 2001.[13]

Increasing pension liabilities and funding gaps not only command a greater share of public resources (when states are faced with a pension crisis), but also time and attention. Facing significant funding gaps, pension contributions increased 424% in Illinois, 267% in Kentucky and more than 100% in New Jersey from 2007 to 2017.[14] Even with these increases, pension funding gaps continued to increase in each of these states.

The General Assembly recognized this possibility and related public employee pension issues when it created the Virginia Commission on Employee Retirement Security and Pension Reform in 2016. The commission has issued several recommendations consistent with the analysis presented in this chapter. The new commission also recommended legislation that would codify existing VRS practice to perform and publish the results of stress tests that assess the system's financial viability under a variety of economic scenarios. These reports were released in June 2017 and December 2018.[15] Thus, it is fair to say that neither the General Assembly nor the VRS has been ignoring the challenges in front of them. What is needed now is additional action.

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10 The S&P 500 Index fell from 1,516.80 on Oct. 12, 2007, to 735.09 on Feb. 13, 2009.
11 Virginia Retirement System, "VRS Stress Test and Sensitivity Analysis" (June 2017).
12 This statement was included in a communication from the VRS to Old Dominion University's Dragas Center for Economic Analysis and Policy, dated July 6, 2018.
13 Cezary Podkul and Heather Gillers, "Why Are States So Strapped for Cash? There Are Two Big Reasons," *The Wall Street Journal* (March 29, 2018), www.wsj.com/articles/why-are-states-so-strapped-for-cash-there-are-two-big-reasons-1522255521.
14 Pew Charitable Trusts, "The State Pension Funding Gap 2017," June 27, 2019.
15 Virginia Retirement System, "VRS Stress Test and Sensitivity Analysis" (December 2018), https://www.varetire.org/Pdf/Publications/VRS-Stress-Test-and-Sensitivity-Analysis-2018.pdf.

GRAPH 2

MARKET VALUE OF SYSTEM ASSETS AND ACTUARIAL ACCRUED LIABILITY IN BILLIONS OF DOLLARS: VIRGINIA RETIREMENT SYSTEM, 2008-2017
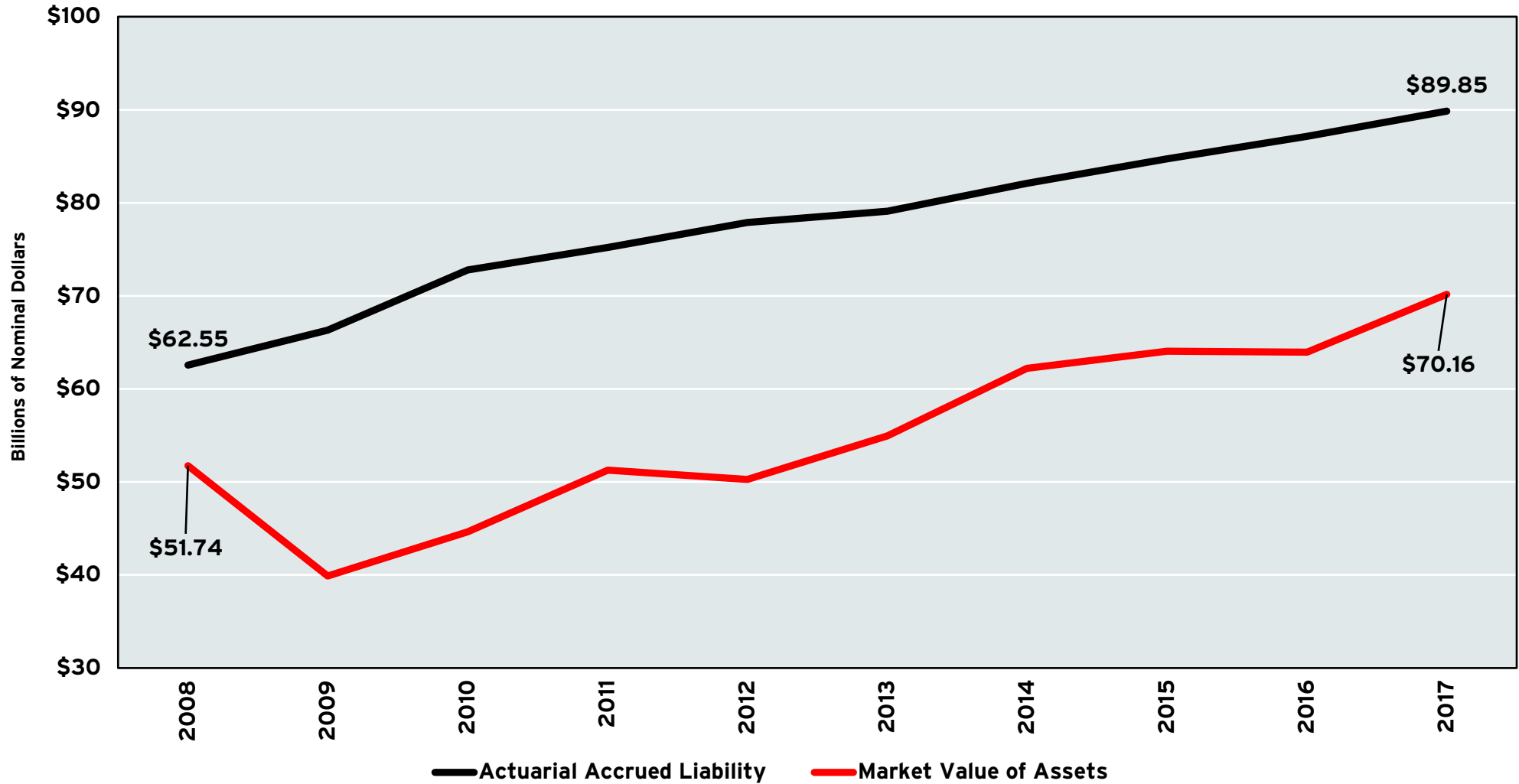
Source: Virginia Retirement System, Comprehensive Financial Annual Report, 2018, p. 267. Actuarial valuation date is June 30 of each year.

Evaluating The Performance Of The VRS

Public pension funds exist for a variety of reasons, some of which are not strictly economic. Management guru Peter Drucker is one of many who have argued that pension contributions by employers instill a sense of belonging in employees and increase their morale.[16] Improved morale may increase employee productivity, lower turnover and, ultimately, improve the bottom line.

It is well beyond the scope of this chapter to examine the morale of participants in the VRS. Instead, in evaluating VRS performance, we will focus on three variables: (1) the rates of return earned by the VRS on the funds entrusted to it; (2) the variability of those rates of return; and (3) the cost expended in achieving its performance. In a nutshell, we will ask: What is the average rate of return earned by the VRS, how variable has been that return and what has been the cost of achieving such?

One should understand that tradeoffs nearly always exist among the three criteria. Usually, it is not possible to increase rates of return on investable funds without also assuming additional risk. The other side of this coin is that it is very difficult to reduce investment risk without also sacrificing some return. Further, some investment strategies are more expensive to implement than others. Complicating this relationship is that one may not necessarily buy improved performance by paying skilled investment advisers to provide advice and counsel.

It is vital to recognize that an infinite number of return/risk/cost combinations exist. No single one of these combinations can be said to be absolutely "right" unless one has clearly identified preferences with respect to risk and return. For example, is it better to realize an average rate of return of 9% that is highly variable, or a 7% average rate of return that is quite stable?

Some pension fund choices effectively are predetermined. Suppose a public pension fund must earn at least a certain rate of return, say 7%. From the outset, this eliminates a set of conservative investment options. Stability of the returns earned on invested funds might also be an important criterion. It may be unacceptable for a pension fund to realize an average rate of return of 7% over a 10-year period via boom or bust strategies that generate 20.0+% rates of return in some years, but -5% rates of return in other years.

VRS management and its board of trustees ultimately choose (perhaps implicitly) a desired return/risk/cost combination. Presumably, this choice reflects the VRS's evaluation of accumulated past economic history as well as its estimates of future developments. Of course, subsequent economic fluctuations may result in the VRS, or any pension fund, experiencing a return/risk/cost combination very different from the one it selected.

Retrospectively, however, one can evaluate the results of any investment strategy and stack it up against known alternatives. Hindsight continues to be wonderful. On occasion, one might discover that identical results (say, a 7% certain rate of return) could have been obtained with less volatility than actually experienced, or perhaps achieved at a lower cost. This knowledge might inform a different set of choices in the future, though not necessarily. Consider the significant decline in public equity prices that occurred from 2007 to 2009, or the run-up in public equity prices that occurred subsequently. These were wrenching, but not necessarily unusual events. Making future investment decisions based on spells such as these could lead to less than optimal decisions if the same circumstances aren't duplicated in the future.

After-the-fact analyses of what the VRS or any investor should have done – had they known what was going to happen – are revealing, but not necessarily definitive, or always subjectively fair. Decision makers must act when required to do so and face uncertainty when they choose their course of action. On the other hand, if one focuses on choices that might have been made, and these alternatives consistently are superior to the choices made, then this dissonance is worthy of attention.

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16 His views are expressed in "Manage with Courage," the Drucker Institute (Sept. 28, 2018), www.drucker.institute/news-post/manage-with-courage.

We argue that the tendency of the VRS to downplay the superior rates of return and lower costs of many index funds over the past 10 to 25 years is a prime example. The VRS argues that the period 2008-2018 featured unusual economic conditions. Additionally, the VRS points out that the performance of the indexed public equity funds often has been more volatile than that of the total VRS portfolio. These points are legitimate, yet questions remain. Were the costs of actively managed funds offset by improved returns and increased stability or did the VRS pay too much for too little return relative to index funds?

The Assumed Rate Of Return

How does the VRS know how well its asset portfolio will perform in the future and will this be enough for the VRS to meet its obligations? The answer is, it doesn't, but neither does any other pension fund. The world is full of uncertainties. We could witness a stock market crash like the 22.61% single-day decline in the Dow Jones Industrial Average in 1987, or once again experience 17% average mortgage rates as we did in 1981.

The VRS does not know what is going to happen in the future and therefore must make astute, educated assumptions about how asset markets are going to behave. Prior to 2010, the VRS assumed it would average a 7.5% rate of return. Until October 2019, the VRS assumed its assets portfolio would average a 7% rate of return. However, the VRS board recently approved lowering a reduction in its assumed rate of return to 6.75%. This action is conditional on approval of the General Assembly and the governor in 2020.[17]

The 7% rate of return assumption may have been too generous. True, since 1900, the average total rate of return (assuming reinvested dividends) on the equities in the Dow Jones Industrial Average has been approximately 9.4% (about 4.8% in price appreciation and 4.6% from reinvested dividends). A problem is that this growth has been uneven. The 1965 closing value of the Dow Jones Industrial Average was 969; it was not until 1982 that this value was permanently eclipsed. Between 1929 and 2017, the Dow Jones Industrial Average declined in 21 of these 88 years.[18]

The obligations of public pension funds, however, do not diminish or end because the stock market has tanked. Consequently, pension funds such as the VRS must diversify their asset holdings so they can have greater confidence that their assets will generate income even if the stock market is in agony. Historically, this usually meant using some funds to invest in U.S. government bonds. Assets such as U.S. government bonds are almost universally regarded as among the most secure investments in the world. Risk of default is extremely low.

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17   Michael Martz, "Virginia pension contribution rates likely to rise as investment returns decline," Richmond Times-Dispatch, Oct. 18, 2019.
18   See "Observations," http://observationsandnotes.blogspot.com/2009/03/average-annual-stock-market-return.html, for Dow Jones Industrial Average rates of return data.

A problem is that bond yields typically reside well below the rates of return on investments in equities. Since 10-year U.S. government bond yields peaked at 16.81% in September 1981, they generally have declined since, and in late summer 2019, the yield on 10-year U.S. government bonds hovered around 1.5%.[19] Hence, if one desires safety and security, this need can be satisfied, but usually one must settle for lower rates of return.

Graph 3 provides annual average yields on 10-year U.S. government bonds over the past 30 years. The vertical distance between these yields and the 7% VRS rate of return assumption visually depicts the nature of the challenging task confronting the VRS. This challenge is only slightly reduced if the VRS's assumed rate of return is lowered to 6.75%. Faced with a long-term decline in yields for U.S. government bonds, the VRS must find ways to generate more significant returns. It does so by assuming risk, albeit knowledgeably and after due consideration.

Ultimately, the rates of return earned on investments reflect the sum of the real rate of return on capital (for which we will use the 10-year U.S. government bond as a proxy) plus a risk premium on the collections of assets in which one invests. Larry Summers, the former chair of the President's Council of Economic Advisors and former president of Harvard University, notes that real yields on inflation-adjusted 10-year U.S. government bonds have declined about 300 basis points over the past 10 years. He argues that investors (including pension funds) who believe they can earn 7% on a consistent basis are deluded. He opines that expected rate of return assumptions made by pension systems should be substantially lower today than they have been in the past; that is, lower than 7%.[20] The recent declines in U.S. government bond yields only magnify this conclusion.

In 2019, a growing consensus emerged in Virginia that the VRS's assumed rate of return of 7% was a "bridge too far," echoing, to some extent, the conclusion of Professor Summers. The VRS's auditing firm, GRS Retirement Consulting, and Commonwealth Secretary of Finance

Aubrey Layne noted the need to examine whether the VRS should lower its assumed rate of return.[21] The adoption of the 6.75% rate of return by the VRS board in October 2019 was another step in this direction. Given that a lower assumed rate of return will require additional contributions from the Commonwealth's budget, we now await action by the General Assembly and Gov. Ralph Northam.

19 "Daily Treasury Yield Curve Rates," www.treasury.gov/resource-center/data-chart-center/interest-rates/pages/textview.aspx?data=yield.

20 Summers made these observations at a National Bureau of Economic Research Conference, "New Developments in Long-Term Asset Management," held in Cambridge, Massachusetts, May 19-20, 2018. His specific comments can be found at https://vimeo.com/270659949.

21 Steven Haner, "State Employees Not Funding Their Own Retirement," *Bacon's Rebellion* (July 9, 2018), https://baconsrebellion.com/state-employees-not-funding-own-retirement. Michael Martz, "Virginia Retirement System Hits 7 Percent Investment Target for Year, But Target Could Change," *Richmond Times-Dispatch* (July 9, 2018), www.richmond.com/news/virginia/government-politics/virginia-retirement-system-hits-percent-investment-target-for-year-but/article_e4599466-d4ba-5fe3-830b-e419d3f1c58b.html. Michael Martz, "VRS Raises Investment Return to 7.5 Percent for Last Fiscal Year, Beating Recent Estimate But Still Falling Short of Its Goal," *Richmond Times-Dispatch* (Aug. 29, 2018), www.richmond.com/news/virginia/government-politics/general-assembly/vrs-raises-investment-return-to-percent-for-last-fiscal-year/article_95f05aa9-37a7-5bbb-82c9-7fdc22ef2858.html.

GRAPH 3

TEN-YEAR CONSTANT U.S. TREASURY CONSTANT MATURITY RATES:
ANNUAL AVERAGES, 1988-2019*
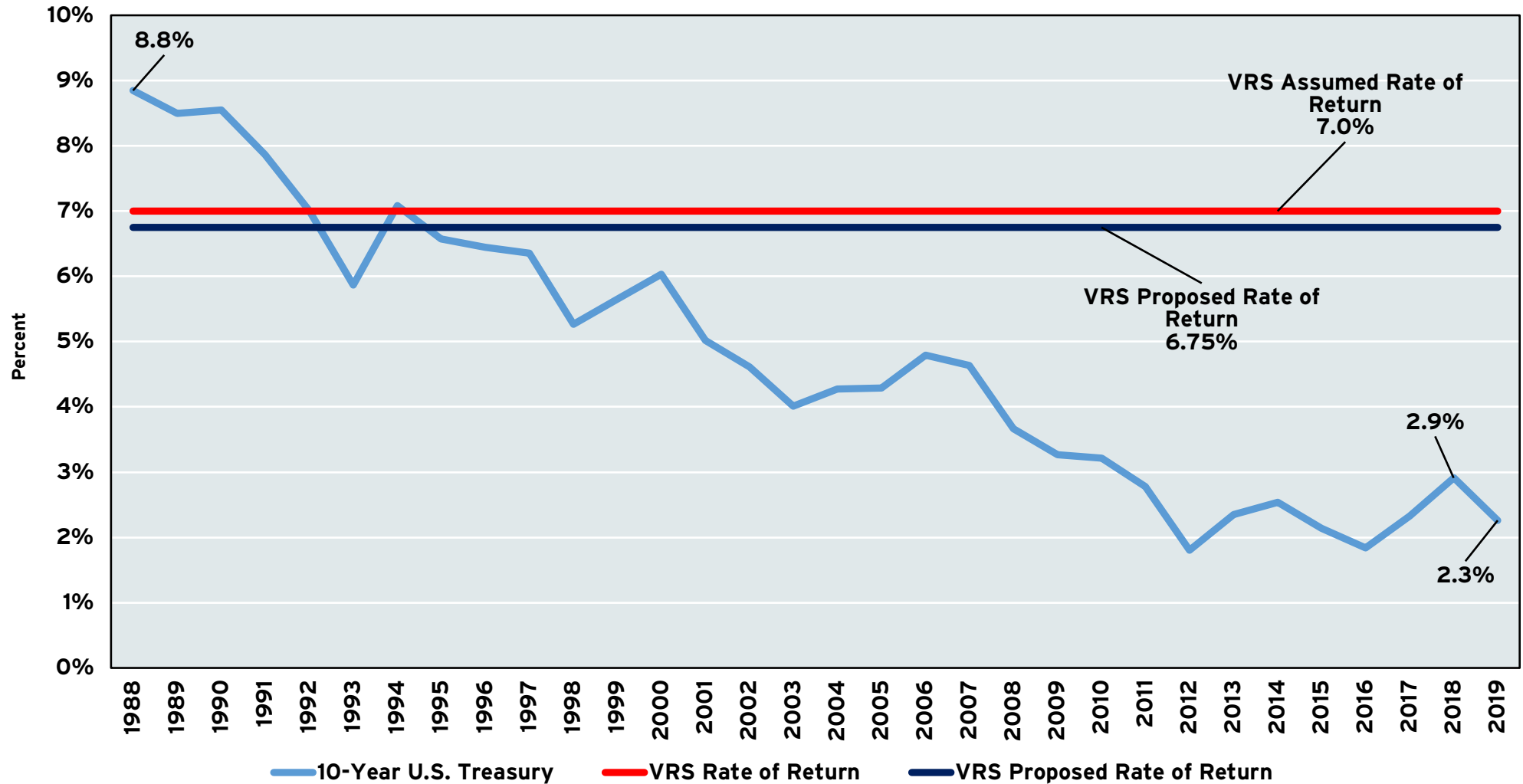
Source: Federal Reserve Bank of St. Louis (FRED), DGS10. *For 2019, the 10-year U.S. Treasury constant maturity rate is the average of the rate of the monthly rate data through August 2019.

The Actual Rates Of Return

How well has the VRS performed in terms of the rates of return it has earned on its assets? The answer depends on whom one asks and how one asks the question. The VRS provides different data and metrics over dissimilar time periods than some external authorities, such as the Pew Charitable Trusts, whose recent studies of state pension funds have captured much attention. Further, one must be careful to differentiate between the rates of return earned by the VRS on its public equity portfolio and those earned on its entire portfolio of assets, which include investments in other types of assets.

In a July 6, 2018, communication to Old Dominion University's Dragas Center for Economic Analysis and Policy, the VRS criticized the Pew Trust's choice of a 2006 to 2015 period as "cherry picking" and in face-to-face sessions contended that 15- to 25-year time horizons are more appropriate. VRS argues "apples and oranges" with respect to Pew's data and says Pew defines its rates of return differently than does the VRS. Regardless, if Larry Summers is on target and the United States has entered a period when interest rates and rates of return are going to remain below previously accustomed levels, then the rates of return the VRS likely can earn will decline.

Graph 4 shows annualized rates of return reported by the VRS on its total assets over a variety of time periods ending on June 30, 2018. These data tell us that the VRS often has earned more than the 7% it assumes, but also that the last decade was a trying one. The VRS Oversight Report dated December 2017 revealed that the VRS earned an average rate of return of only 4.9% on its asset portfolio for the 10-year period ending Sept. 30, 2017.[22]

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22 Joint Legislative Audit and Review Commission, *VRS Oversight Report* (December 2017), p. 2, file:///H:/State%20of%20the%20Commonwealth%202018/Pensions/JLARC%20Report%20on%20VRS%20Dec%202017.pdf.

GRAPH 4

**ANNUALIZED RATES OF RETURN EARNED BY THE VRS
ON ITS ASSET PORTFOLIO FOR PERIODS ENDING JUNE 30, 2018**

Period	Rate
1 Year	7.5%
3 Years	7.1%
5 Years	8.3%
10 Years	6.1%
15 Years	7.8%
20 Years	6.5%
25 Years	8.2%
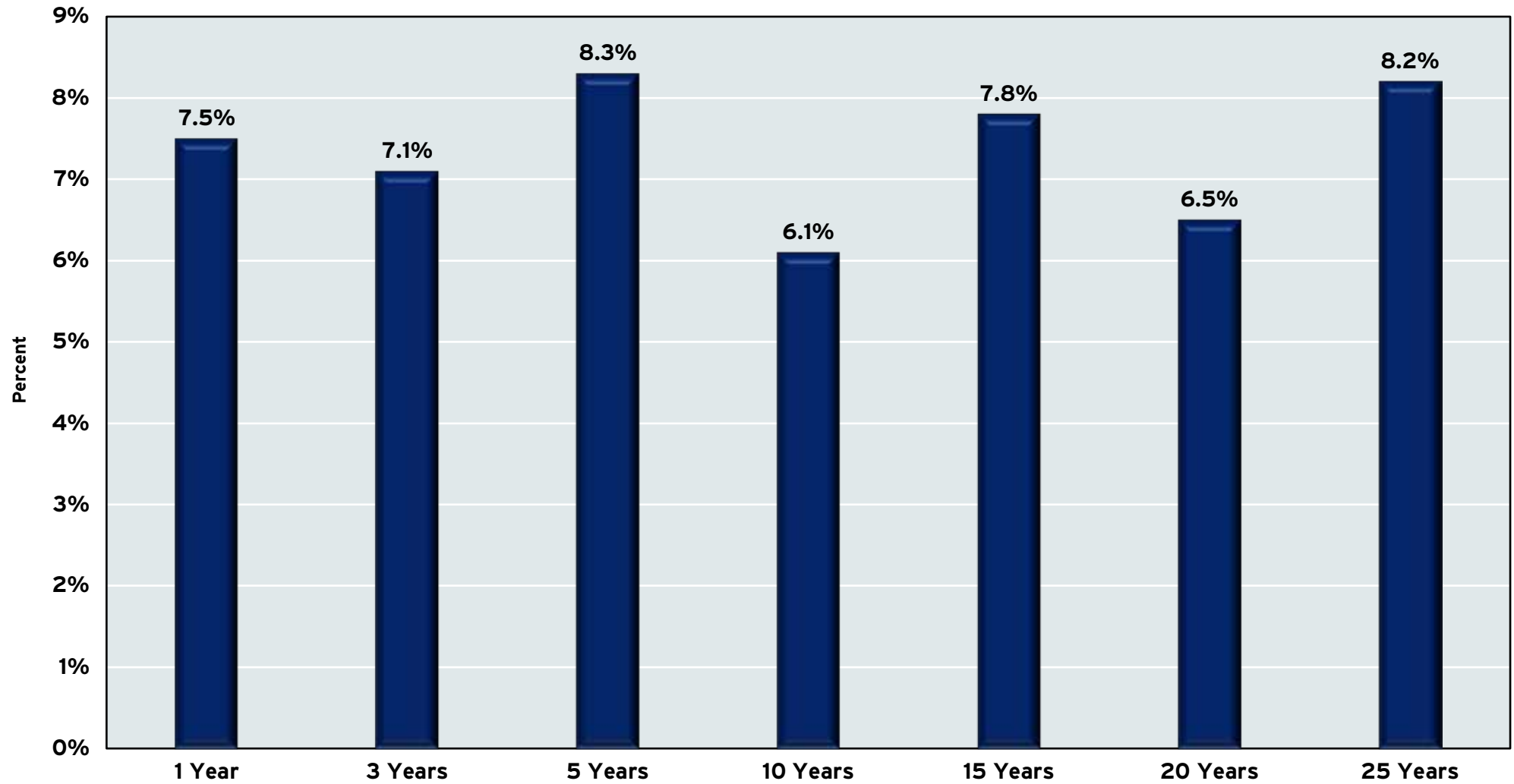
Source: Virginia Retirement System, Comprehensive Annual Financial Report, 2018, p. 134

The Pew Charitable Trusts, focusing on a different period (2006-2015), and perhaps utilizing different definitions, placed the VRS firmly in the middle of a 73-pension fund sample with an average rate of return that rose to 5.9%. Pew also provides information that allows us to compare the performance of the VRS with respect to other public pension funds over one-year, five-year and 10-year rates of return periods. Graph 5 displays these data, which include a 6.66% rate of return for the VRS between 2006 and 2015 as compared to a 6.6% average rate of return for 73 public-sector funds.

On Sept. 8, 2019, the VRS announced that it had realized a 6.7% rate of return for FY 2019. The private equity investment program had an annual return of 14%, followed by fixed income at 8.3% and real assets at 7.8%. The public equity program, however, only returned 3.9% and the multi-asset public strategies program lagged with a return of 2.2%. The VRS reported that the trust fund ended with approximately $82.3 billion in assets.[23]

The VRS's rate of return performance improves if one adopts a 25-year time horizon rather than the 10-year vantage seen in Graph 5. As noted, many at the VRS believe (and we concur) that the past 10 years have been atypical and that this helps explain the underwhelming 6.1% rate of return for the 10-year period ending June 30, 2018.[24] VRS professionals believe that the unprecedented, almost decade-long period of monetary easing witnessed in the United States after the Great Recession constitutes a financial aberration. They contend that quantitative easing favored public equity market performance and do not think that a similar investment environment is likely to reoccur in the foreseeable future. This is one reason why VRS personnel prefer to evaluate their performance looking backward for 25 years rather than adopting a 10- or 15-year perspective. However, the VRS's annual reports continue to stress 10-year rates of

return on its investments (see, for example, the investment section of the VRS 2018 annual report). If 25-year rates of return are the coin of the realm, then they should be given greater visibility in the VRS reports.

23 Virginia Retirement System, "VRS Realizes 6.7% Return for Fiscal Year 2019," https://www.varetire.org/news/2019/vrs-realizes-6.7-percent-return-for-fiscal-year-2019.asp.
24 Virginia Retirement System, Comprehensive Financial Report, 2018, p. 134.

GRAPH 5

VRS ANNUALIZED RATES OF RETURN: PEW CHARITABLE TRUSTS ESTIMATES, 2006-2015
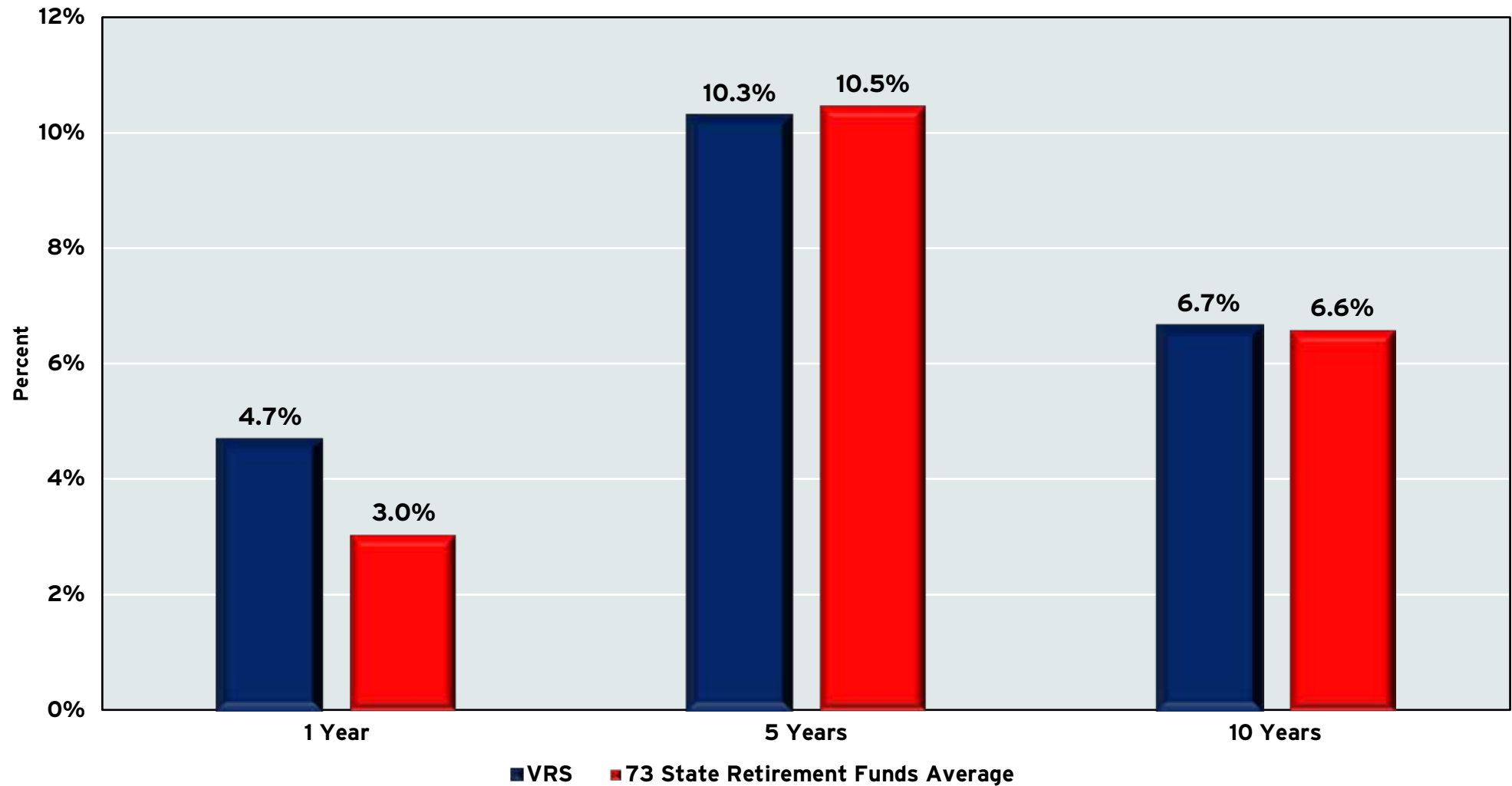
Source: Pew Charitable Trusts, "State Public Pension Funds Increase Use of Complex Investments" (April 2017). Note that the 73-state average is not weighted by asset size.

How Has The VRS Fared Compared To The Overall Market?

Let's adopt a 25-year time horizon. Consider the adjusted price per share of a specific no-load, low-cost mutual fund that imitates the entire U.S. public equity market. Vanguard's Total Stock Market Index Fund (VTSMX) grew at an annual average rate of 9.29% between June 1992 and June 2017.[25] Vanguard reports that the annual cost of VTSMX was 0.14%, thus the net cost annual average rate of return was 9.15%. Determining the net cost return of the stock market index allows a comparison with VRS's public equity portfolio.

Table 1 compares the performance of Vanguard's Total Stock Market Index Fund with VRS's Public Equity portfolio from June 1992 to June 2017.[26] Over this period, the annual rate of return of VRS's public equity portfolio was 8.56%, approximately 0.59% less than Vanguard's Total Stock Market Index Fund. One could argue that this is not an equal comparison since VRS's public equity portfolio holds non-U.S. equity assets, thus we caveat that our comparison approximates differences in rates of return.

Nevertheless, as illustrated in Table 1, Vanguard's Total Stock Market Index Fund outperformed VRS's public equity portfolio over every reported time period from 1992 to 2017. Recent data reinforce this observation, as Vanguard's Index rose 14.7%, compared to 9.7% for the VRS public equity portfolio from June 2017 to June 2018. These differences are not trivial.

From 1992 to 2017, the average holdings of VRS's public equity investments were approximately $23.1 billion and we estimate the

foregone rate average annual rate of return was 0.59% after taking into account expenses.[27] The VRS may have foregone $3.4 billion in returns by not indexing its public equity investments. We must, however, note that this estimate varies significantly year to year. We also must recognize that a stock market index fund may be more volatile than the VRS would prefer and that there is a recognizable tradeoff between risk and reward.

We provide some risk-adjusted analysis in Table 2. The VRS has graciously provided us data for a 25-year period, but we must point out that this period ends in 2017. The more volatile nature of VTSMX returns mitigates some of the differential, but this sum remains a steep price to pay for presumed risk aversion because the risk-adjusted rates of return on VRS public equity and VTSMX are almost identical. Since approximately one-third of all VRS assets are invested in public equity (and about 80% of this in domestic stocks), the VTSMX (or a similar) index seems an appropriate opportunity cost metric against which the VRS should be measured.

Some might view hedge funds as an alternate way for the VRS to generate enhanced returns. However, indexed public equity funds such as those offered by Fidelity and Vanguard have outperformed all but a few actively managed hedge funds, not just over the past decade, but now over the past 15 years, including a half decade when monetary easing was not present.[28] Further, this performance differential has held true with respect to many kinds of hedge funds: small cap, mid cap and large cap. This diminishes the attractiveness of hedge funds.

Some VRS personnel assert that over long periods of time, the cumulative return on its assets has been higher than a passively invested 70% equities/30% bonds mix, or the S&P 500 or the MSCI ACWI Investable Market Index (which captures global equity investments).[29] Table 2 explores this contention based on available data.

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25 The adjusted price per share is from the last business day of June of the respective years. We calculate the compound annual growth rate to obtain the average annual rate of return.

26 We choose this time period to maintain consistency with the annual performance data provided graciously by the VRS for the Total Fund and Public Equity portfolio.

27 Virginia Retirement System, Comprehensive Financial Reports, Investment Section, Various Years. This is a rough calculation based on the VRS having average public equity holdings of $23.1 billion over the 25-year period. 0.73% of $23.1 billion is $168.63 million and 25 years * $168.63 million = $4.22 billion.

28 Mark Perry, "More evidence that it's very hard to 'beat the market' over time, 95% of finance professionals can't do it," *AEI Ideas* (March 20, 2018), http://www.aei.org/publication/more-evidence-that-its-very-hard-to-beat-the-market-over-time-95-of-financial-professionals-cant-do-it.

29 The MSCI ACWI Investable Market Index (IMI) says it captures large, mid and small cap representation across developed markets (DM) and emerging markets (EM) countries. With 8,498 constituents, the index is comprehensive, covering approximately 99% of the global equity investment opportunity set, www.msci.com/documents/10199/4211cc4b-453d-4b0a-a6a7-51d36472a703.

TABLE 1

ANNUAL RATES OF RETURN:
VANGUARD'S U.S. STOCK MARKET FUND (VTSMX) AND VRS TOTAL FUND AND PUBLIC EQUITY PERFORMANCE, 1992-2017

	3 YEARS	5 YEARS	10 YEARS	15 YEARS	20 YEARS	25 YEARS
PERIOD	**2014-2017**	**2012-2017**	**2007-2017**	**2002-2017**	**1997-2017**	**1992 - 2017**
Vanguard VTSMX Return (Gross)	10.20%	14.46%	7.69%	9.34%	6.98%	9.29%
Vanguard VTSMX Return (Net of Fees)	10.06%	14.32%	7.54%	9.20%	6.84%	9.15%
VRS Public Equity Return	6.33%	11.64%	4.54%	7.84%	6.38%	8.56%
Net Difference	3.87%	2.68%	3.0%	1.36%	0.46%	0.59%

Sources: Virginia Retirement System, Comprehensive Financial Report, Various Years, and VRS communication to the Old Dominion University Dragas Center for Economic Analysis and Policy. Annualized returns for periods ending June 30 of the respective years. Daily share price data for VTSMX obtained from Yahoo Finance. The daily adjusted price per share for the last business day of June is used to calculate the compound annual growth rate (CAGR). Vanguard reports an expense ratio of 0.14% and this is deducted from the estimated CAGR to obtain a net of fees rate of return.

TABLE 2

COMPARING RATES OF RETURN, STANDARD DEVIATIONS AND SHARPE RATIOS
FOR VARIOUS ASSET GROUPS, 1992-2017

ASSET GROUP	MEAN ANNUAL RETURN	STANDARD DEVIATION OF RETURN	MODIFIED SHARPE RATIO	VALUE OF $100 AFTER 25 YEARS
VRS Total Fund	8.34%	8.84%	0.943	$740.83
VRS Public Equity	8.56%	14.04%	0.610	$779.37
MSCI ACWI IMI Total World	7.19%	11.20%	0.642	$567.36
FUSEX S&P 500	9.07%	15.61%	0.581	$876.26
Passive 70/30	7.65%	10.63%	0.720	$631.46
VTSMX Total U.S. Market	9.29%	15.07%	0.616	$921.53

Sources: VRS data are from the VRS, MSCI and FUSEX, and VTSMX data are from Yahoo Finance. MSCI, FUSEX and VTSMX means and standard deviations are computed on the basis of annual averages rather than annualized monthly averages. MSCI data have 0.25% annual expenses deducted, while the comparable deductions are 0.09% for FUSEX, 0.10% for 70/30 and 0.14% for VTSMX.

One can see in Table 2 that the 25-year compound average annual rate of return on the VRS total fund portfolio trailed that of the other asset groups described in Table 2; however, the standard deviation of the VRS's returns over the 25 years was also substantially less than the other asset groups. This means that the returns on VRS's total portfolio were less variable than those earned by the other asset groups. Over the 25-year (1992-2017) period examined, VRS's investment strategies resulted in a substantially higher modified Sharpe Ratio for its total fund than was true for all other asset groups. Sharpe Ratios measure return obtained per unit of risk assumed.[30] The data in Table 2 reveal retrospectively that the VRS has done well in terms of generating return per unit of risk in the realm of public equity. **This is long-term evidence that VRS investment policies have avoided excessively risky investments where public equities are concerned. At the same time, the VRS has earned respectable rates of return and maintained liquidity so that it can meet the demands of the day.**

What is a "good" Sharpe Ratio? The answer depends on the time period chosen because opportunities differ significantly in rising markets, as opposed to falling markets. Therefore, one cannot look at the VRS's 0.943 Sharpe Ratio in Table 2 and make many useful historical comparisons. It will suffice to say that the VRS's allocation of its assets performed well per unit of risk it decided to bear during this time period.

These points acknowledged, the VTSMX fund mimicking the entire U.S. stock market rather consistently outperformed the VRS in the public equity area and did so with an almost identical Sharpe Ratio. The major difference between the two is that the VTSMX generated both higher rates of return and higher standard deviations (greater volatility) than did VRS public equity. **Using hindsight, we can say the VRS would have ended up substantially better off at the end of the 25-year period had**

it opted to place significant proportions of its public equity investments in VTSMX or similar fund vehicles. This strategy also would have enabled the VRS to reduce its investment expenses, which totaled more than $457 million in FY 2018.[31]

We (along with many economists) believe the VRS should index substantially larger proportions of its investments. Reports from former members of the VRS board reveal that the VRS did index most or all its public equity investments between 1994 and 2001. Subsequently, a different composition of board members changed the investment course of the pension fund. All things considered, this was a costly decision – though perhaps understandable. Low-cost, indexed investments seldom have strong appeal to those whose livelihoods depend in whole or part on fee generation.

We understand that investment decisions must be made in an atmosphere of uncertainty. One doesn't know what is going to happen in the future and for this reason we would be surprised if the economic environment in the next 25 years matches what we observed from 1992 to 2017. Knowing this, one should be circumspect in critiquing the investment decisions made by the VRS over the past 25 years. In our view, the VRS made thoughtful decisions even though some of its decision makers may not have been familiar with the full implications of the empirical evidence presented in this chapter. There is room for evolution in this regard.

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30 The Sharpe Ratio for asset "i" is (Ri – Ci)/Đi, where R is the rate of return on the asset, C is a certainty rate of return such as a Treasury bill, and Đ is the standard deviation of the return. We omit Ci, a constant across asset classes in a specific time period, from our computations in order to underline the notion of units of return per unit of risk.
31 Virginia Retirement System, Popular Annual Financial Report as of June 30, 2018.

A Demanding Assignment: Risk Versus Return

We again note that there does not exist a single "right" combination of return and risk. Some investors accept copious amounts of risk in search of higher returns, while others conscientiously shy away from such scenarios. Conceptually, the VRS is torn between the two. It is currently expected to earn at least 7% on its investments even while it also is expected to maintain liquidity and avoid investments that might impair its ability to meet its long-term obligations and require taxpayer bailouts. Lowering the assumed rate of return to 6.75% will alleviate some of the pressure on the VRS, but, as noted earlier, some economists believe that assumed rates of public pension systems should be substantially lower than 7%.

Other major state pension funds have reached different conclusions than the VRS concerning their ability to outperform the market by means of actively managed funds. The largest public pension fund in the United States, the California Public Employees Retirement System (CalPERS), decided to back away from investments in hedge funds because of high fees and disappointing returns.[32] Subsequently, the New York City Employees Retirement System (NYCERS) voted to end its $1.4 billion investment in hedge funds with the comment that "the funds charge enormous fees for high-risk investments yet yield tepid results."[33]

One must assume that CalPERS and the NYCERS have the ability to hire very talented people to select their investments, yet their hedge funds underperformed as they have in the rest of the world. Clearly, these two well-situated pension systems do not appear to share the VRS's optimism that they can "beat the market" over the long run in the area of public equities. Partially in defense of its stance, the VRS informed us that only 10.8% of its portfolio was devoted to hedge fund investments in July 2018.[34] We believe this percentage should be even smaller.

This brings us to a critical, but unavoidable, question. Should we expect the VRS to outperform public equity market indexes – and to do so with less volatility than the market – over the next decade? And, at the same time, should we expect the VRS to maintain reasonable liquidity?

If these are our expectations, then they present the VRS with a very demanding assignment. Our considered answer to these questions is: "Probably not." Why not? Very few asset managers (active or not) exhibit the consistent ability to earn higher than average rates of return and do so at lower than average levels of risk. Indeed, portfolio theory suggests this is impossible unless one is lucky, has inside information or possesses a stylized trading advantage such as a superfast computer connection that may provide a millisecond advantage over competitors in the speed of completing trades.

VRS and JLARC data tell us that the VRS did not earn its target 7% rate of return between 2008 and 2018, but neither did most other state pension funds. This stimulated most pension funds nationally to consider investments in collections of assets that they believe will deliver higher expected returns. Included in these asset mixes have been land, businesses, currencies, commodities and options market activities. These portfolios often carry with them additional expected risk even though they deliver diversification.[35]

We believe it is unreasonable to expect the VRS on a consistent basis to outperform some or all other pension funds, hedge funds in general, or the market as measured by indexes such as the S&P 500 or Vanguard's VTSMX. While it is entirely reasonable to expect the VRS to "beat the market" in a year or even over several years, the preponderance of evidence is that it is quite difficult to outperform the market in the long term. To assume otherwise is to potentially invite financial peril.

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32 Dan Fitzpatrick, "Calpers Pulls Back from Hedge Funds," *The Wall Street Journal* (July 23, 2014), www.wsj.com/articles/calpers-pulls-back-from-hedge-funds-1406156915.

33 DC37, ASCME, AFL-CIO, "New York City's Retirement System Pulls Out of Hedge Funds" (April 14, 2016), https://dc37blog.wordpress.com/2016/04/14/new-york-citys-retirement-system-pulls-out-of-hedge-funds.

34 This statistic was contained in an exchange between the Old Dominion University Dragas Center for Economic Analysis and Policy and the VRS in July 2018.

35 This demonstrates that diversification, per se, does not automatically reduce risk. Assets must have negative co-variances in order for them to reduce risk (as measured by volatility) in a portfolio.

The Target Rate Of Return (Rate Of Discount): More

The Code of Virginia, Section 51.1-124.30:1, requires the VRS to assess its sensitivity and vulnerabilities to a variety of possible economic scenarios including reductions in its rates of return, changing benefit levels, and so on. Reports of these test results are submitted to the General Assembly, the most recent one dated December 2018. These are complex, though quite valuable, documents because they pose a series of "What if?" scenarios involving both good and bad developments. Among these are negative scenarios that include reductions in the rates of return the VRS earns on its investments, and reduced contributions from the General Assembly. Matters such as the long-term savings that could be realized if more rapid paydown of VRS's unfunded liabilities were undertaken are also given consideration. The most recent report may be accessed at www.varetire.org/Pdf/Publications/VRS-Stress-Test-and-Sensitivity-Analysis-2018.pdf.

Pension funds must make some assumption about the rate of return they expect to earn on their invested funds in order to assess their financial viability. In 2017, the median assumed rate of return for state pension funds was 7.15%. Yet, from 2006 to 2016, the median rate of return was only 5.8%. The VRS target rate for this period was 7%, but data from the Pew Charitable Trusts suggest that the VRS's actual return was 5.6%.[36] During a different 10-year period ending on Sept. 30, 2017, Virginia's Joint Legislative Audit and Review Committee (JLARC) said the VRS earned only 4.9% on its asset portfolio. And, in yet another 10-year period, this one ending March 31, 2018, JLARC reported that the VRS earned a 5.9% rate of return on its invested assets. Another report, dated July 9, 2018, stated that the 5.9% rate of return exceeded the VRS's benchmark return of 5.5% by 0.4%. Finally, the VRS reported a 6.1% rate of return on its total fund for the 10-year period ending June 30, 2018.[37]

A review of the publicly available data strongly suggests that a 7% rate of return target is overly optimistic. South Dakota, which is considered one of the more stable state pension systems, assumes a rate of return of 6.5%. The recent decision to lower VRS's assumed rate of return to 6.75% will, if approved by the General Assembly and the governor, more closely align VRS's assumptions with performance. However, it would also increase the present value of its future obligations.

One can quibble with the categories and measurement criteria the VRS utilizes to evaluate its performance. The organization usually selects as benchmarks funds or groups of funds rather than indexes of entire markets against which to measure its performance.

36 Pew Charitable Trusts, "State Public Pension Funds Increase Use of Complex Investments" (April 2017).
37 Virginia Retirement System, Comprehensive Annual Financial Report for the Year Ended June 30, 2018.

Since a decisive majority of hedge and actively managed funds have not done as well as the overall public equity market in recent years, the VRS can "beat the funds," and beat benchmark performance metrics based upon the funds, even though it may not "beat the market" in the form of indexes such as VTSMX. It appears that some of the VRS's benchmarks are not as demanding as they plausibly should be.

The VRS must array its future obligations and then discount them to find what these mean today (that is, find the "present value" of its anticipated future liabilities). In 2005, the VRS reduced its target rate of return to 7.5%, and then again in 2010 to 7%. Higher target rates of return, when used as a rate of discount, diminish the estimated value of the VRS's future financial obligations. When it decreased its target rate of return to 7%, this reflected financial reality (the rate of return the VRS could expect to earn), but simultaneously increased the present value of its future financial obligations.

Following the statutory requirement which requires a pay-as-you-go methodology or contributions on a current disbursement basis, the VRS utilizes a lower rate of discount for its Line of Duty Act obligations, which relate to eligible survivors of individuals killed or disabled in the line of duty, or their survivors. In 2017, its liabilities were discounted at a 3.56% rate. However, these obligations account for less than 1% of the overall VRS obligation portfolio.

If state pension funds were held to the same accounting standard as private-sector pension funds, then the Governmental Accounting Standards Board (GASB) says it would use what is termed a "blended rate" of discount that combines a risk-free local or U.S. government bond yield with higher-risk assets such as long-term corporate bonds.[38]

This could result in a discount rate as low as 4% and, in the case of the VRS, would substantially increase the present value of its future financial obligations. Alicia Mundell, a well-known pension expert at Boston College, and three of her colleagues modeled the impact of lower discount rates on 126 public pension plans using FY 2010 data. She found that even a modest decrease in discount rates would have caused the funds' funding percentages to fall from 77% of anticipated future financial obligations to only 63%.[39] There is consensus among economists that most public-sector pension funds understate their future financial obligations because they discount their future financial liabilities at unrealistically high rates.[40]

The recent VRS board decision to adopt a 6.75% assumed rate of return will more closely align expectations to performance but also increases the present value of the VRS's future financial obligations. This illustrates the difficult position of VRS management. Unrealistic expectations lower the present value of future financial obligations and commitments from the Commonwealth's budget, but also increase the risk that the VRS will fall short of the funds needed to meet future obligations. More closely aligning expectations with historical performance is a more prudent course of action and decreases future financial risk. However, lowering the rate of return has the immediate effect of increasing the present value of future obligations, making the VRS appear even more underfunded than it is now, and requires additional contributions from the Commonwealth's budget.

We applaud the decision of the VRS board to lower the assumed rate of return to 6.75%. Undoubtedly, this decision will precipitate a realistic and lengthy discussion about the viability of the Commonwealth's pension funds and the nature of the pensions offered to public-sector employees.

38 Sheila Weinberg and Eileen Norcross, "GASB 67 and GASB 68: What the New Accounting Standards Mean for Public Pension Reporting," Mercatus Center, George Mason University (June 15, 2017), www.mercatus.org/publications/gasb-67-68-public-pension-reporting.
39 Alicia H. Mundell, Jean-Pierre Aubry, Joshua Hurwitz and Laura Quinby, "How Would GASB Proposals Affect State and Local Pension Reporting?" (June 2012), https://ssrn.com/abstract=2316838.
40 Alicia Mundell et al.

Asset Mix

In order to moderate swings in the value of its asset portfolio, the VRS diversifies its holdings across many different asset classes, including equities, bonds, real estate, commodities and other assets. Like most informed investors, the VRS subscribes to the old maxim, "Don't put all of your eggs in one basket." In fact, the mathematics and economics associated with this important advice are complex, and economists Harry Markowitz and James Tobin won Nobel Prizes for providing and explaining it. For example, they clarified the principles illustrating how investors could minimize the risks associated with earning a rate of return such as 7%.[41] Minimizing risk, of course, is not synonymous with eliminating risk.

The salient point to remember is that the higher the average rate of return one hopes to earn, ordinarily the higher the level of risk one must assume. The cost of earning a higher than average rate of return may be increased volatility and likely there would be some years when rates of return are negative. For example, in 2000, 2001 and 2002, the annual rates of return on the stocks in the Standard and Poor's 500 Index were -9.03%, -11.85% and -21.97%, respectively.[42]

Such extended declines in value exert great financial pressure on pension funds, which generate about 60% of their benefit payments from the dividends and capital gains produced by their investments. The 37.4% decline in equity values that occurred in 2000-2002 made it very difficult for any investor to generate capital gains and perhaps constitutes an argument in favor of asset diversification.

These uncertainties can be compounded by pension funds' exposure to fluctuations in foreign exchange rates for investments that may be denominated in currencies such as yen or euros.[43] While the American economy accounts for about one-quarter of the value of the world's economic activity, the most rapidly growing economies are located elsewhere, and hence some of the world's prime investment opportunities exist outside of the United States. Such opportunities titillate investors with the promise of higher returns, but often carry with them higher levels of risk.

Given these circumstances, and the uncertainties concerning life spans and the like, what's a public pension fund portfolio manager to do? He or she needs to generate that 7% rate of return, but even this may turn out to be insufficient if the state fails to make the contributions to the pension fund for which it is obligated.

Graph 6 reports how the VRS was deploying its $80.4 billion in assets on March 31, 2019. Conventional investments in equities (stocks) and fixed-income instruments such as bonds accounted for 56% of the value of the VRS's portfolio. What the VRS terms credit strategies accounted for 14% of its portfolio, while real assets claimed 14%, private equity, 11%, and what the VRS labels strategic opportunities, 3%.

The VRS's asset deployment is not unusual. Most public pension funds have responded to their funding and rate of return challenges by investing their asset portfolios more aggressively. They seek higher rates of return on their investments, but in order to obtain the promise of such, ordinarily they must accept higher risks. Nearly all pension funds (the VRS included) now invest funds in a broad variety of assets. These include actively managed funds that in turn invest in risky collections of assets (often with borrowed funds), private equity firms that are not publicly listed on a stock exchange, real assets such as real estate, and commodities that could range from pork bellies to aluminum. The VRS, however, reports that its commodities investments are minimal.

If a pension fund directs more dollars toward alternative assets, then usually this fund needs to hire more internal talent to conduct this business and also pay more to outsiders such as hedge fund managers, who it is believed have the ability to generate higher rates of return. The March 31, 2018, JLARC assessment of the VRS reported that the VRS

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41 Markowitz and Tobin also showed how investors could maximize the rate of return they earned given whatever level of risk they were willing to tolerate. Harry M. Markowitz, "Portfolio Selection," *Journal of Finance, 7* (1952), 77-91. James Tobin, "Liquidity Preference as Behavior Towards Risk," *Review of Economic Studies*, 25 (1961), 65-86.

42 Robert Alan Schwartz, "Annual Returns of the SEP 500 From 1928 to 2015," *Seeking Alpha*, https://seekingalpha.com/instablog/605212-robert-allan-schwartz/4831186-annual-returns-s-and-p-500-1928-2015.

43 Any investor can sell such risks to others (essentially buy an insurance policy) by purchasing options. Most pension funds do so, but similar to insurance policies, there is a cost attached to such behavior. Of course, any investor also can choose to buy these risks as well, and this could result either in gains or losses.

internally manages 100% of its fixed income investments and 40% of its public equity investments, but only 6% of its real asset investments. All other assets are managed by external experts whom the VRS must pay for their services.

In 2016, the Pew Charitable Trusts reported that median state pension plans expended $70.9 million on expenses to administer the pension system, significantly less than the $390.9 million in expenses for the VRS. However, this may be misleading, as Virginia has one system while other states have several systems. Taking this potential critique into account, we find that the VRS's total investment expenses were 0.58% of its total investments. These costs were primarily driven by external management fees. The VRS's external management expenses were 0.52% of its total investments, above the national median of 0.34%. While the VRS's external management expenses are higher than the national median, its performance in this regard is significantly better than some other state pension funds. The Arizona Public Safety Personnel Retirement System, for example, had management fees equal to 2.23% of investment assets in 2016. On the other hand, Utah, which invests 42% of its portfolio in alternative investments (real estate, hedge funds, etc.), only paid external management expenses equal to 0.13% of its total investments. These data suggest that the VRS could lower its external management costs.

GRAPH 6

VRS ASSET ALLOCATION BY CATEGORY, MARCH 31, 2019
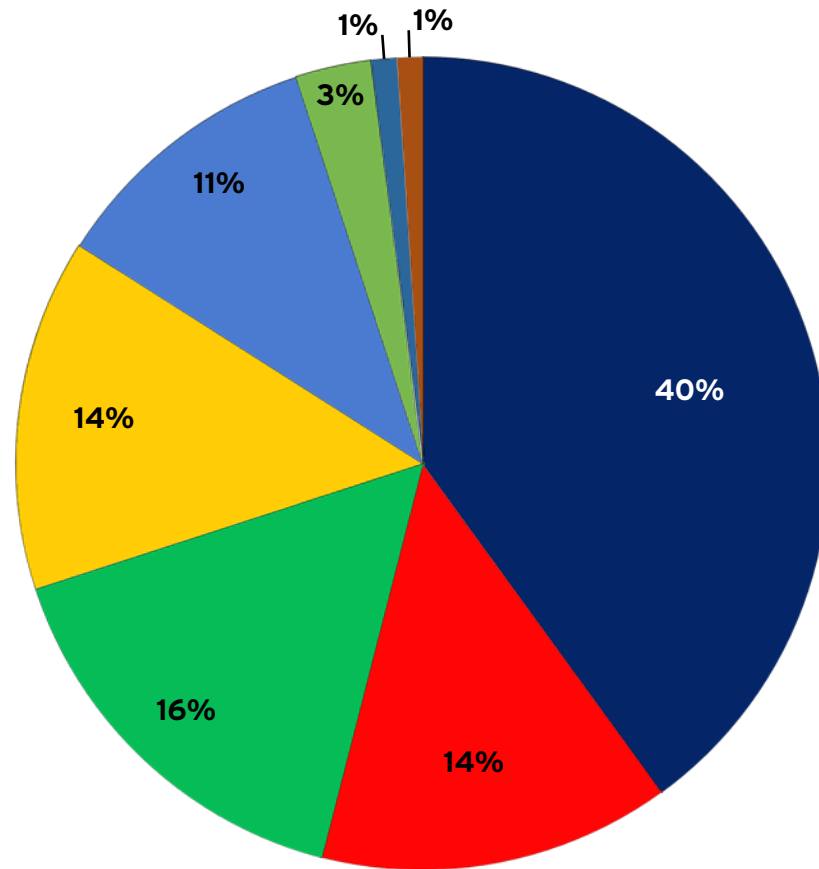
■ Public Equity ■ Credit Strategies ■ Fixed Income ■ Real Assets ■ Private Equity ■ Strategic Opportunities ■ Cash ■ Other

Source: Joint Legislative Audit and Review Commission, VRS Oversight Report (July 2019)

However, we must take care to note that the Pew data conflict with the VRS's and JLARC's assertions that the VRS's investment expenses have been lower than the national average. The VRS has also expressed serious concern about Pew's definitions and its findings. Reasonable people can disagree on these points.

It is not clear precisely how the VRS compensates its external fund managers. An industry standard, however, is "2 and 20," which translates to annual fees that are 2% of all managed assets plus 20% of any profits generated after some minimum hurdle has been met. The New York Times labeled this a "Heads We Win, Tails You Lose" arrangement.[44] The VRS reported in July 2018 that it kept 80% of returns in excess of an 8% annualized return, with the remaining 20% paid to the external investment managers who generated the return. As of July 2018, these arrangements resulted in the VRS keeping $21.9 billion in excess returns and $3.8 billion being paid out to external managers "since inception."[45]

However, a consensus has emerged nationally that "reported fee data are often unreliable and complete fee information is unknown even to the pension fund."[46] Fee arrangements sometimes are amazingly Byzantine.[47] Thus, when a recent study of state pension funds by the American Federation of Teachers concluded that 12 large public employee pension funds could have saved $3.8 billion annually by reducing their reliance upon hedge and actively managed funds, one must treat such data as rough approximations.

There is no disagreement, however, that the VRS's investment management expenses have risen recently (JLARC says 48% between FY 13 and FY 17),[48] presumably for two reasons. First, the VRS has been investing greater proportions of its funds externally rather than in the public equities and fixed income instruments it manages internally,[49] and

this results in higher fee payments. Second, rising equity prices during this period may also have resulted in higher fee payments.

An irony attached to this circumstance is that for a decade or more, the typical hedge or actively managed fund consistently has underperformed public equity markets overall. Put differently, a typical investor could have invested in an equity index fund marketed by a well-established provider such as Fidelity or Vanguard, then lapsed into a deep coma, and woken up a decade later to find that he or she consistently had outperformed the actively managed funds. In a typical year, 60% to 80% of hedge and actively managed funds do not perform as well as the S&P 500 average. In 2018, the average hedge fund lost 5.23%, while the S&P 500 fell only 4.38%.

Graph 7 reports similar annual information for the 2009-2018 period. Note the 10-year losing streak of hedge funds versus the S&P 500 Index. From 2002 to 2017, 92.33% of actively managed large cap funds failed to outperform the S&P 500; 94.81% of actively managed mid cap funds failed to outperform the S&P MidCap 400 Index; and 95.73% of actively managed small cap funds failed to outperform the S&P SmallCap 600 Index.[50] Fidelity, which on March 31, 2018, managed $2.09 trillion in mutual fund assets,[51] offers its FUSEX 500 Index Fund, which is designed to replicate the equities in the S&P 500. FUSEX returned 9.42% annually over the past 10 years and its expense ratio was a miniscule .09%.[52] This compares to the VRS's 6.66% annual rate of return over the 2006-2015 period (but 4.9% for the 10 years ending Sept. 30, 2017) and investment expenses of 0.55%. The VRS could have increased its rate of return by 2.76% and reduced its expenses by .46% had it indexed its investments solely in public equities (not a strategy we would recommend for a variety of reasons, but an interesting comparison nonetheless).

44 As reported by the American Federation of Teachers, "The Big Squeeze" (2017), www.aft.org/sites/default/files/bigsqueeze_may2017.pdf.
45 Joint Legislative Audit and Review Commission, VRS Oversight Report (July 2018). It is not clear from the report what time period or periods "since inception" comprises.
46 American Federation of Teachers. Pew agrees.
47 Gretchen Morgenson, "The Deal's Done. But Not the Fees," The New York Times (May 24, 2014), www.nytimes.com/2014/05/25/business/the-deals-done-but-not-the-fees.html.
48 Joint Legislative Audit and Review Commission, VRS Oversight Report (December 2017), p. 7, http://jlarc.virginia.gov/pdfs/reports/Rpt504.pdf.
49 The supposition of the American Federation of Teachers.
50 Mark Perry, "More evidence that it's very hard to 'beat the market' over time, 95% of finance professionals can't do it," AEI Ideas (March 20, 2018), http://www.aei.org/publication/more-evidence-that-its-very-hard-to-beat-the-market-over-time-95-of-financial-professionals-cant-do-it.
51 www.fidelity.com/about-fidelity/fidelity-by-numbers/corporate-statistics.
52 Fidelity 500 Index Fund, https://fundresearch.fidelity.com/mutual-funds/composition/315911206 (accessed April 9, 2018).

GRAPH 7

**BARCLAY HEDGE FUND INDEX VERSUS THE S&P 500 AVERAGE:
ANNUALIZED RATES OF RETURN, 2009-2018**
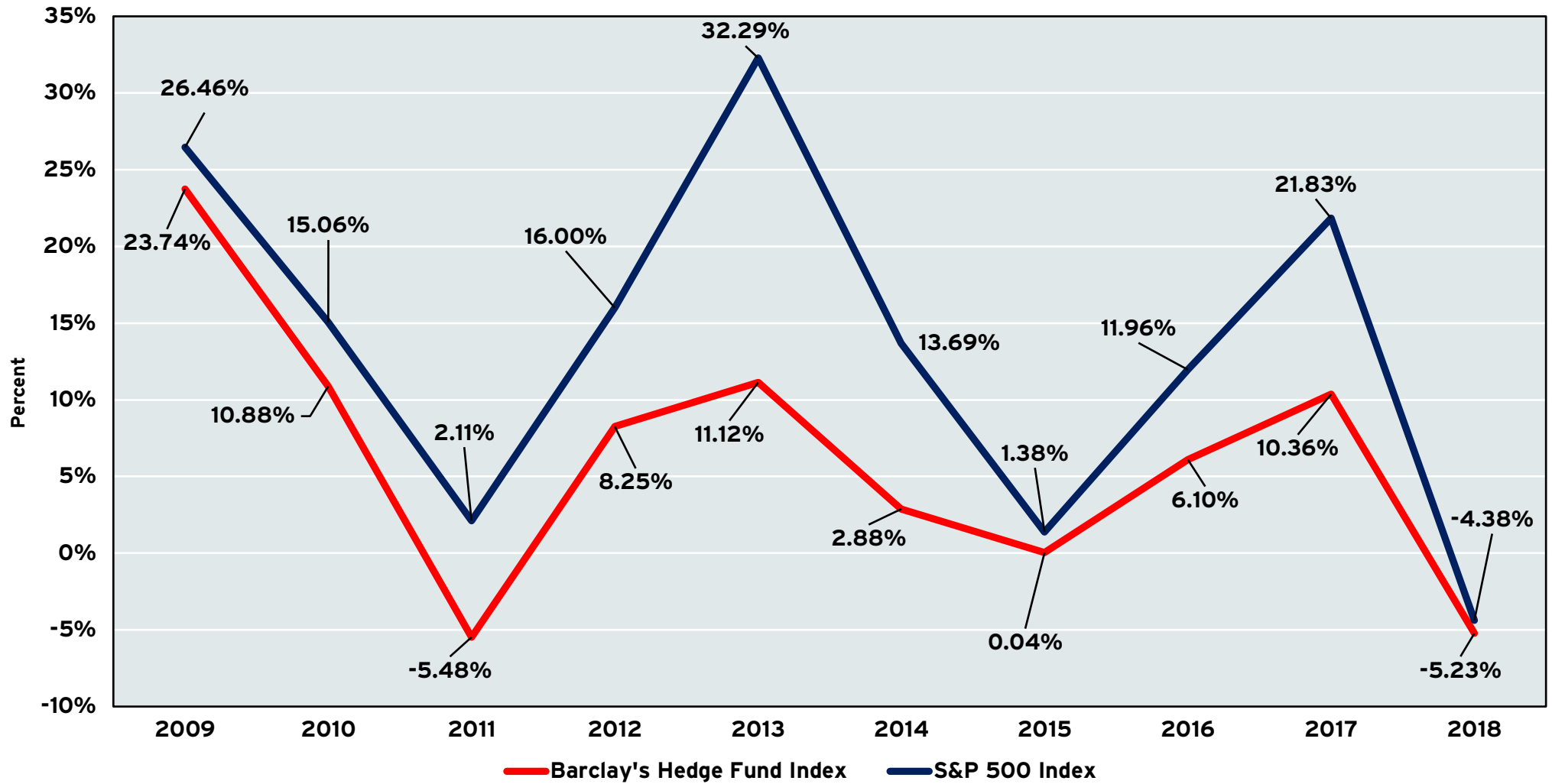
Sources: Barclay's Hedge Fund Index, www.barclayhedge.com/research/indices/ghs/Hedge_Fund_Index.html, and Ycharts, S&P Annual Total Return, https://ycharts.com/indicators/sandp_500_total_return_annual

The lesson is that most public pension funds have the potential to reduce their expenses if they opt to use indexed public equity funds rather than their own staff or external fund managers. We recognize moving in this direction is anathema to many at the VRS, but the potential savings command attention.

There is an interesting analog to this discussion. University endowments bear some similarity to pension funds in terms of the return vs. risk dilemma, though they can more easily reduce payments to endowment account holders than can pension funds. In recent years, university foundations and endowments have engaged in many of the same investment strategies as pension funds. The results have been less than spectacular. Over the past decade, university endowments returned an average of 4.6% on their investments. This trailed the 5.3% rate of return that a simple 60/40 stock/bond index fund mix would have returned or the 5.4% rate of return that a simple 70/30 stock/bond index fund mix would have returned.[53] That is, they could have done better by "indexing" (investing in funds that imitate entire markets or segments of markets rather than investing in specific stocks or bonds, to minimize their trading and offer much lower management costs as one consequence).

Investment professionals who make their living from the fees they earn from actively investing funds on behalf of their clients often supply a blizzard of reasons why their services are valuable, if not irreplaceable. Some of their arguments do resonate. For example, whole market index funds such as those offered by Fidelity and Vanguard[54] do not contain assets or companies that are new on the scene, or are not publicly traded, and thus one could miss potentially superb opportunities if one only indexes the public firms via a fund such as the FUSEX 500.

Nevertheless, the arguments put forward by active investment professionals can tend to be self-serving. They make their living by convincing the VRS and other pension funds to hire them to manage their portfolios. Each is a master at explaining why they and their approach to investing are different – why they will succeed even while others rather consistently fall short.

Ultimately, evidence should rule the day. Consider that a 10% reduction in annual investment costs for the VRS would translate to savings of approximately $45 million annually. A 0.1% increase in the rate of return the VRS realizes on its public equity investments similarly would add about $40 million to its coffers. These are possibilities that should not be ignored.

We do not argue that the VRS should index all its investments, or avoid all higher cost fund managers, though today it is possible to index nearly any significant asset – commodities, real estate, international assets and currencies in addition to equities and bonds. We agree that index investments don't always outperform actively managed assets and some specific active investment strategies may exploit less well-known asset segments and possible market inefficiencies to outperform indexes. In addition, indexed investments could be more volatile than some actively managed investments. Again, the salient point is that a significant majority of actively managed funds fail to do as well as the market on a consistent basis. Hence, we recommend that the VRS index a larger proportion of its public equity portfolio and that it assess carefully the extent to which indexing might be useful in other asset classes as well.

The VRS responded to this suggestion in a July 6, 2018, email: "Private equity has been great for VRS. Indexing these funds would adversely impact the plan." We largely agree with this conclusion because data supplied by the VRS indicate that what it labels its "private equity" investments (as opposed to "public equity") often have generated higher rates of return and exhibited lower variability than VRS's public equity investments. Sound principles of diversification make some private equity investments a good idea for the VRS. We would insert a caveat, however. The VRS's private equity investments may involve it investing in funds that purchase public firms, take them private, then disgorge many of their assets and ultimately lead them into bankruptcy. Some label this vulture capitalism,[55] and decry it, but in recent years it often has been a profitable strategy.

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53 A nontechnical rendition of this situation may be found at James B. Steward, "College Endowments Opt for Alternative, and Less Lucrative, Route," *The New York Times* (Feb. 22, 2018).

54 The VRS commented to us via email that "VRS provides index funds for cheaper than Fidelity because we are doing so with internal staff." However, these individuals and their activities are not gratis. They have opportunity costs and hence the comparison with Fidelity and Vanguard is not apt.

55 "Vulture Capitalist," *Investopedia*, www.investopedia.com/terms/vulturecapitalist.asp.

Defined Benefit Versus Defined Contribution Pension Programs

Earlier, we sketched the differences between defined benefit, defined contribution and hybrid public pension programs. Historically, most public employee pension programs have been defined benefit rather than defined contribution in nature.

Many public employees prefer defined benefit programs because such programs guarantee them a specific income for the remainder of their lives. Further, depending on the length of their service and their highest earning years, defined benefit programs may produce very respectable retirement incomes for them, especially if accompanied by cost-of-living escalators that usually are not present in defined contribution programs. Also, depending on how the funds in a defined contribution program are invested, a recipient's income from that program could increase or decrease.

Taxpayers and citizens find the problem with defined benefit retirement obligations is that they frequently become fiscally burdensome. Longer life spans mean that government pension obligations extend well beyond the time periods originally anticipated. Lower interest rates make it more difficult for pension funds to earn respectable rates of return on traditional low-risk assets such as U.S. government bonds. We have seen this has pushed pension funds into adopting riskier investment mixes involving more equities, commodities and real estate in an attempt to generate higher rates of return.

Pension contributions account for increasing proportions of the budgets of state and local government units. States such as Illinois face disastrous fiscal situations, substantially because of their burgeoning public employee pension obligations. California's Gov. Jerry Brown gained attention in early 2018 when he expressed his hope that California courts would rule

that pension benefits promised to state employees could be rolled back by the state. His changing stance on this matter reflected fiscal reality: in FY 2017, California spent double the amount on pensions as it spent in FY 2009.[56] It is worth noting that from the standpoint of taxpayers, Virginia's plans are more modest than those of California.

The General Assembly has taken positive steps to extend the reach of hybrid retirement programs. Since Jan. 1, 2014, most new state employees, teachers and local employees enroll in a hybrid plan that combines defined benefit and defined contribution features. On March 31, 2018, 24% of the total active VRS membership was participating in a hybrid plan.[57]

A problem here is that 43% of hybrid plan participants do not make contributions other than those required of them.[58] This means that they forfeit a generous matching contribution offered by the Commonwealth and damage their long-term financial status.

The General Assembly can assist by continuing to mandate policy "nudges." The Commonwealth's hybrid plan currently contains an auto-escalation feature whereby every three years, participants' voluntary contributions are increased by 0.5% if they aren't already contributing the maximum 4%. Those who contribute the 4% match receive a 2.5% contributory match from the Commonwealth. Thus, if they do not choose to contribute 4%, then they are leaving money on the table and diminishing their eventual retirement stipend. If VRS participants who are not contributing the 4% maximum use the internet to log into their VRS accounts, then they are politely informed that they are not serving themselves well and immediately provided with opportunities to increase their contributions so that they can capture the Commonwealth's matching funds.

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56 Romy Varghese, "California's Brown Raises Prospect of Pension Cuts in Downturn," *Bloomberg* (Jan. 10, 2018), www.bloomberg.com/news/articles/2018-01-10/california-s-brown-raises-prospect-of-pension-cuts-in-downturn.
57 Joint Legislative Audit and Review Commission, VRS Oversight Report (July 2018).
58 Virginia Retirement System, Popular Annual Financial Report as of June 30, 2018.

The Commonwealth might, however, require more generous contributions from new participants at the start, but permit them to revoke this guidance after several years.[59] Experience in other states suggests that large proportions of individuals who are so nudged become accustomed to the higher level of contributions and continue them even when they no longer are required to do so. In the long term, nudges stimulate what most authorities regard as optimal economic choices for participants, though they are not choices most participants initially make if they have the freedom to do otherwise.

The Commonwealth's long-term goal should be to move additional classes of employees entirely into defined contribution programs similar to those now available to faculty and to have all other employees enrolled in the hybrid plan. It should walk this path because this constitutes an important step toward guaranteeing that Virginia will avoid the public employee pension problems that have afflicted so many other states.[60]

The experience of the federal government in this regard is instructive. Fiscal stress in the 1980s pushed the U.S. government in the direction of enrolling all new federal workers in Social Security if they were not already participants, diminishing the generosity of its existing defined benefit program, and creating a defined contribution program with matching employer/employee contributions. The now mandatory program has proved to be popular with federal employees and has controlled the expansion of the government's future financial obligations (Gale et al. for Brookings, 2016).

Portability

The lack of portability of state pension funds is an area where the Commonwealth does not treat state employees as well as it should. Excepting those state employees who opt to participate in an alternative pension system such as TIAA-CREF, vested[61] state employees who wish to "cash out" their Virginia retirement account (perhaps because they are moving to a job outside of state government) may receive back their contributions to the VRS plus interest, but not those contributions made by the Commonwealth. This assumes the departing employee has not become separated because of job performance or misconduct.

The alternative is for employees to leave their contributions with the VRS and to have their ultimate pension payment be based upon their current salary, which typically does not turn out to be an attractive choice. VRS credits only 4% of interest to withdrawn employee contributions, even though it assumes it is earning substantially higher rates of return. One well-positioned observer of this arrangement told us, "In a world of increasing labor mobility, such a system is disgraceful." We agree. The Commonwealth should: (1) allow vested employees who leave state employment to retain the Commonwealth's contributions; and (2) credit those contributions with a rate of return other than 4%, for example, a rate closer to the VRS's long-term rate of return on its investments. If the VRS earns the 7% rate of return it currently assumes, then it still will have earned a surplus on this account that it is not returning to departing employees.

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59 See Richard Thaler and Cass Sunstein, *Nudge: Improving Decisions about Health, Welfare and Happiness* (New Haven: Yale, 2008).
60 Initially, this policy might be more expensive to Virginia than either the current hybrid program or a defined benefit program. If in the long term, however, it reduces the Commonwealth's financial liabilities and eliminates the possibility that Virginia in the future might imitate states such as Illinois and Connecticut, then it will have been worthwhile. Numerous states have asserted that "it can't happen here," only to find that changing economic and political conditions have rendered their predictions null. Pew has reported that the public employee pension plans of the 50 states were underfunded by $1.4 billion in 2016. Pew Memorial Trusts, "The State Pension Funding Gap: 2016," www.pewtrusts.org/en/research-and-analysis/issue-briefs/2018/04/the-state-pension-funding-gap-2016.
61 Employees "vest" after five years of service credit.

Summarizing Proposals For Change

We applaud the VRS for being a transparent, generally well-managed operation. Its quality stewardship has enabled Virginia to avoid the unfortunate pension experiences of many other states. Ronald E. Schmitz, VRS's chief investment officer, reported recently that "the VRS investment staff continues to generate good performance" and in general, we agree.

Our measured judgment is that the VRS is an intelligently managed operation that has avoided most of the problems that have afflicted public employee pension systems in other states. An even-handed view of the VRS leads to the conclusion that it deserves higher than average scores for its performance. However, careful, nonpolitical direction and the changes we outline here are needed to guide Virginia's pension funds through the challenges of coming decades. With this in mind, we believe the General Assembly and the VRS should implement the following four changes in public employee pensions.

First, the VRS should index larger proportions of its asset portfolio and especially do so inside its domestic public equity portfolio, where approximately one-third of all its assets reside. The evidence in this area speaks loudly – indexed public equity funds consistently have outperformed most actively managed public equity funds; this has been true for the last 15 years. Further, if we lengthen our time horizon to 25 years, Vanguard's low-cost VTSMX indexed fund reflecting the entire U.S. stock market has generated a higher rate of return than the VRS has within its own public equity sphere and has achieved this with essentially the same Sharpe Ratio. We understand that managers of hedge funds and active investors persistently contend that they are exceptions to accumulated empirical evidence and therefore have the ability to produce both above-average returns and below-average volatility. Even though this might prove true for a certain period, it is unlikely to persist, and hence, following such advice is a bet Virginia would be wise to decline.

Second, the Commonwealth should accelerate the movement of state employees from defined benefit programs into defined contribution and hybrid retirement programs. However, while doing so, the VRS needs to find more effective ways to increase the voluntary contributions that participants make to their personal hybrid programs. Additional statutory "nudges" should be considered. Enhanced participation would benefit VRS members and simultaneously reduce the Commonwealth's future financial risks and exposure. With respect to this latter point, the VRS estimates that the hybrid retirement program would reduce risk to employers within the defined benefit program by about one-third.[62]

Third, gradually, perhaps over a period as long as 20 years, the VRS should reduce its target rate of return (rate of discount). This would result in larger estimates of the future pension fund financial obligations of the VRS but would be consistent with the way private firms are required to assess their portfolios and estimate their future financial obligations. Because this action would necessitate some combination of larger state and local government pension contributions, larger employee contributions or diminished benefits, it would require extensive conversations with the General Assembly.

Fourth, the Commonwealth should improve the portability of the state employees' VRS accounts. As things stand, vested employees who depart state employment receive only their own contributions (not those of the Commonwealth) plus a 4% rate of interest on their contributions. The alternative for these individuals is to leave their contributions with the VRS, which means that ultimately, they would receive pension payments based on what their salary was when they departed. Ordinarily, this is not an attractive choice. The Commonwealth can and should do better in an era characterized by high levels of employee mobility.

Should the Commonwealth not move in these directions, then the probability increases that it will experience future public pension problems. By no means do we see disaster looming on the horizon; however, very few analysts foresaw the financial implosion of 2008-2009. Considered in this light, our recommendations represent fiscally prudent courses of action.

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62   Joint Legislative Audit and Review Committee, VRS Overview Report (July 9, 2018), at p. 48, http://jlarc.virginia.gov/pdfs/oversight/VRS/2018_VRS-Pres.pdf.

MARIJUANA IN VIRGINIA

Virginia should decriminalize possession of small amounts of marijuana, address past convictions and start moving toward legal and regulated adult use. ... It is time for Virginia to embrace a better, smarter and fairer approach to cannabis.

– Mark R. Herring, Attorney General for
  the Commonwealth of Virginia,
  June 15, 2019
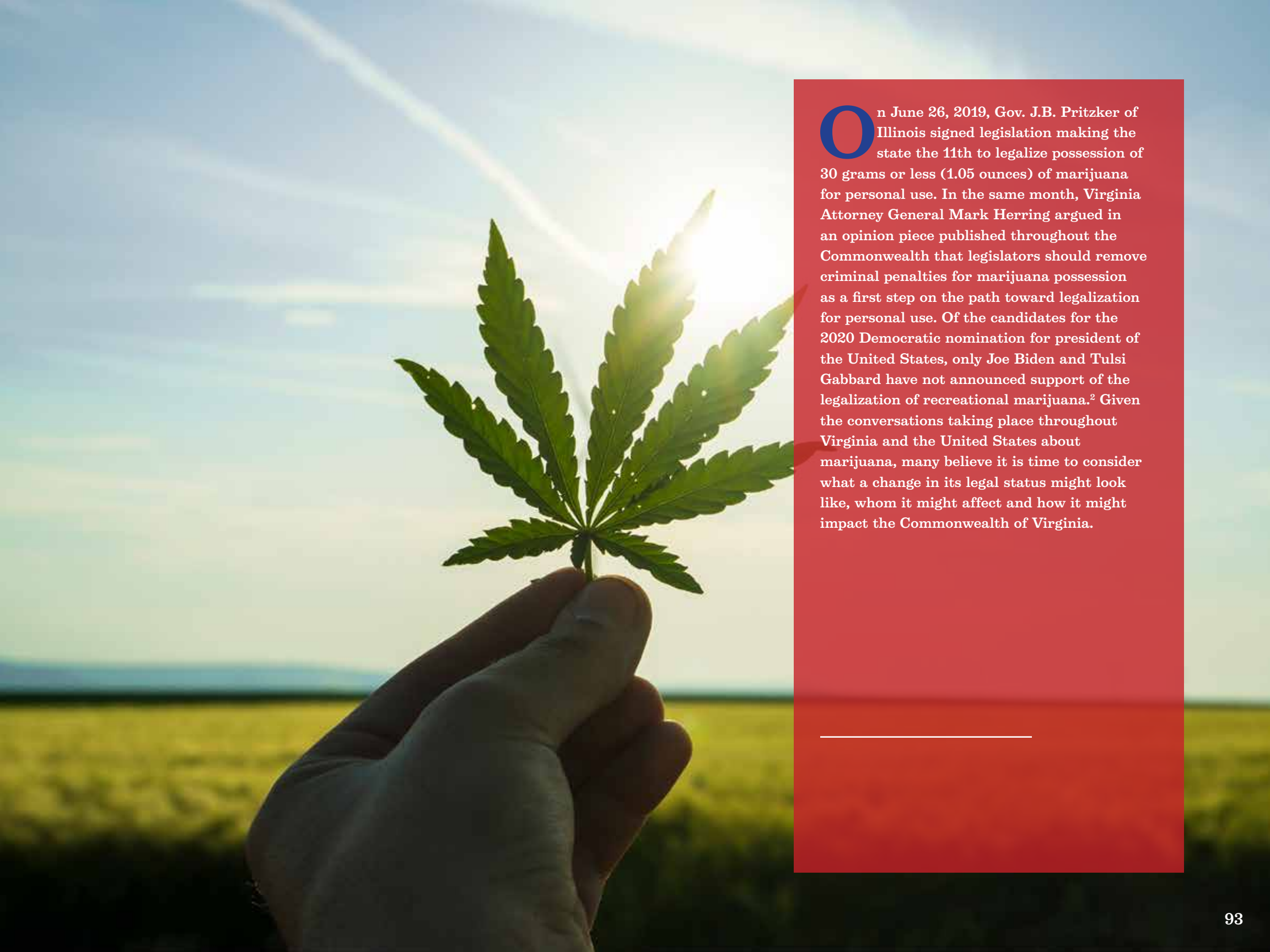
On June 26, 2019, Gov. J.B. Pritzker of Illinois signed legislation making the state the 11th to legalize possession of 30 grams or less (1.05 ounces) of marijuana for personal use. In the same month, Virginia Attorney General Mark Herring argued in an opinion piece published throughout the Commonwealth that legislators should remove criminal penalties for marijuana possession as a first step on the path toward legalization for personal use. Of the candidates for the 2020 Democratic nomination for president of the United States, only Joe Biden and Tulsi Gabbard have not announced support of the legalization of recreational marijuana.[2] Given the conversations taking place throughout Virginia and the United States about marijuana, many believe it is time to consider what a change in its legal status might look like, whom it might affect and how it might impact the Commonwealth of Virginia.

Even though a majority of adult Americans have used marijuana in their lifetime and over a third of young adults in Virginia used it in the previous year, marijuana possession is almost always unlawful in the Commonwealth of Virginia.[3] Section 18.2-250.1 of the Code of Virginia states: "It is unlawful for any person knowingly or intentionally to possess marijuana unless the substance was obtained directly from, or pursuant to, a valid prescription or order of a practitioner while acting in the course of his professional practice, or except as otherwise authorized by the Drug Control Act." A conviction of the violation of this section for the first offense can result in confinement of no more than 30 days, a fine of up to $500, or both. A second or subsequent conviction results in a Class 1 misdemeanor, which could lead to maximum confinement of 12 months, a maximum fine of $2,500, or both.

Haley Smith is a young resident of Virginia who suffers from Dravet syndrome, a rare form of epilepsy that causes frequent seizures that will continue for the duration of her life. In 2014, Haley suffered more than 1,000 life-threatening seizures. Her mother, Lisa, took up the fight for medical marijuana for her daughter by supporting legislation in Richmond. Lisa Smith, accompanied by fellow parents in the group Parents for Medical Marijuana, advocated for the legalization of marijuana for medical treatments. In a Jan. 28, 2015, story on WTKR-TV, news anchor Barbara Ciara said, "Lisa doesn't want her daughter's legacy to be she took her last breath waiting on the slow wheels of legislation to legalize the medicine she needs to live."[4] In a similar vein, Stephanie Anderson of Richmond is considering cannabidiol (CBD) oil as an alternative treatment for her son's ADHD. She wants her son to have safe and legal access to CBD products. "I've been hesitant to try CBD from online sources, so the idea of having in-state pharmaceutical processors puts my mind at ease."[5]

Virginia has a limited qualification for the possession and personal use of marijuana. As a result of HB 1251 (2018) and SB 1B 1557 (2019), doctors, physician assistants and licensed nurse practitioners can issue a written certification for oils that contain tetrahydrocannabinol (THC) or cannabidiol. These oils can be found in a variety of products, potentially including (but not limited to) creams, baked goods and gummies. Each dispensed dose cannot exceed 10 milligrams of THC. Virginia's law also only provides for an "affirmative defense." The certification may not prevent an arrest for marijuana possession and can only be raised during a criminal prosecution.[6]

Marijuana use in Virginia falls below the national average. In the 2014-2016 National Survey of Drug Use and Health, 6.7% of residents 18 and older in Virginia reported using marijuana in the past month, two percentage points lower than the United States (8.7%). Adults in Virginia were also less likely to have used marijuana in the past year (11.5%) than adults nationwide (13.7%). Not surprisingly, marijuana use in Virginia was the highest among adults ages 18 to 25. Almost 20% of young adult Virginians have used marijuana in the past month and nearly a third have used it in the past year.

While more than 50% of Virginians in recent surveys supported legalization of the personal use of small amounts of marijuana, the Code of Virginia is quite clear: possession of marijuana is illegal in almost every circumstance. A first offense for possession can result in an arrest that is resolved by either a court summons or confinement. From 2010 to 2018, there were nearly 200,000 marijuana possession arrests in Virginia. Over 80% of these arrests were for a single offense; that is, no other offense was charged at the time of arrest.

In 2018, there were 219.3 marijuana possession arrests per 100,000 white residents and 771.9 arrests per 100,000 black or African American residents in Virginia.[7] While some argue that decriminalization could reduce these inequities, evidence from decriminalized states suggests that these disparities may persist.

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4   https://wtkr.com/2015/01/28/virginia-mom-fights-for-cannabis-cure-for-ailing-daughter/.
5   http://richmondfreepress.com/news/2019/apr/19/medical-marijuana-dispensaries-open-va/.
6   https://www.mpp.org/states/virginia/.
7   National Survey of Drug Use and Health, 2017 National Estimates. We follow the U.S. Census Bureau's conventions with regard to race. Individuals choose to self-identify race and may self-identify more than one race. For more information, see: https://www.census.gov/topics/population/race/about.html.

Legalization, on the other hand, has dramatically reduced the number of possession arrests in several states but also has resulted in increases in the number of traffic accidents and emergency department visits.

In this chapter, we will look at how perceptions about marijuana have changed over time and who uses marijuana. We'll consider who is arrested for possession, discuss the differences between decriminalization and legalization, and provide an estimate of the financial impact of marijuana legalization in Virginia. If change is coming, it's best to be prepared.

Marijuana And Hemp: A Primer

Marijuana (cannabis) and hemp plants look alike to the untrained eye.[8] Hemp has many uses, including for clothing, rope and livestock feed. Marijuana, on the other hand, is primarily a recreational substance. Both marijuana and hemp contain tetrahydrocannabinol (THC). It is the main psychoactive agent in marijuana. When ingested, THC stimulates the parts of the brain that respond to pleasure, leading to the release of dopamine.[9] Hemp, however, must legally have a THC content of less than 0.3%, well below the 18.7% average THC level in marijuana sold for recreational purposes in Colorado.[10]

Hemp, unlike marijuana, can be legally produced, processed, distributed and sold throughout the United States as of Jan. 1, 2019.[11] The change in hemp's legal status has allowed hemp growers access to banking, water rights and crop insurance, among other institutional rights and protections.[12] Farmers can now grow hemp and sell to processors, which is potentially good news for a sector that has struggled recently in Virginia with the decline in the demand for tobacco products.

While hemp is now legal, marijuana remains a subject of tension between the federal government and many state and local governments. **As of July 2019, 33 states (plus the District of Columbia, Guam, Puerto Rico and the U.S. Virgin Islands) have legalized medical marijuana, 15 states have decriminalized marijuana possession for personal use and 11 states (plus the District of Columbia) have legalized marijuana for recreational purposes. There is not a common legal framework among the states.[13]**

By July 2019, more than 800 hemp growers had registered with the Virginia Department of Agriculture and Consumer Services. Elaine Lidholm, director of communications for VDACS, noted that these farmers expect to plant 8,500 acres of hemp.[14] One of the first to invest in the plant on a large scale is race car driver and cattle farmer, Matt Hagan, from Montgomery County. "They say we're going to be one of the biggest in the state of Virginia and that means we're taking one of the biggest risks in the state of Virginia. Everybody says, 'You're either going to be the biggest dummies on the block or we'll be popping champagne bottles.' I don't know," Hagan laughed. According to Hagan, a single hemp plant can cost the farmer anywhere from $3 to $6. To comply with federal and state laws, each plant must be inspected to ensure that the crop does not exceed legal THC limits.[15]

8   For the purposes of the chapter, we refer to cannabis as marijuana.
9   https://www.webmd.com/mental-health/marijuana-use-and-its-effects#1.
10 https://www.nbcnews.com/storyline/legal-pot/legal-weed-surprisingly-strong-dirty-tests-find-n327811.
11 https://www.agriculture.senate.gov/2018-farm-bill.
12 https://www.vox.com/policy-and-politics/2018/12/12/18136408/hemp-marijuana-legalization-trump-congress-farm-bill.
13 https://medicalmarijuana.procon.org/view.resource.php?resourceID=000881.
14 https://www.roanoke.com/news/local/virginia-s-commercial-hemp-rush-launches-after-changes-in-laws/article_8e34b861-8bf6-54d6-a82d-c0475d2774d2.html.
15 https://www.wdbj7.com/content/news/Christiansburg-farm-becomes-largest-producer-of-hemp-in-Virginia-511285691.html.

In some states, such as Colorado and California, where recreational marijuana possession is legal for adults, the production and sale are taxed and regulated, and there are medical marijuana laws. In other states, such as New Mexico and North Dakota, possession does not result in confinement and medical marijuana is provided for in the law. In some states, including North Carolina, possessing small amounts of marijuana may result in an arrest or fine. Virginia allows the prescription of cannabis oil products but not medical marijuana. Lastly, in certain states, such as Alabama, possession of marijuana in any form for almost any reason is illegal under state law. All of this, of course, can create confusion, as individuals may purchase marijuana legally in one state and travel to another state only to find they are now in violation of state law as well as federal law.[16]

With all this in mind, we must remember that the federal government considers marijuana an illegal substance. The U.S. Drug Enforcement Administration (DEA) classifies marijuana as a Schedule I drug, with no currently accepted medical use and a high potential for abuse.[17] Marijuana is grouped together with heroin, lysergic acid diethylamide (LSD), 3,4-methylenedioxymethamphetamine (ecstasy), methaqualone (Quaaludes) and peyote. Marijuana's classification as a Schedule I drug effectively outlaws most medical research on products with THC. Marijuana producers and dispensaries are also largely shut off from financial networks and, in many cases, must conduct business in cash.

We find marijuana's classification curious, since the Centers for Disease Control and Prevention (CDC) notes that a fatal overdose from marijuana is "unlikely." An overdose, however, can lead to adverse reactions, including confusion, anxiety and paranoia.[18] To place this into context, the CDC reported that there were 70,237 fatal overdoses in 2017 in the United States. Opioids were involved in 47,600 of the overdose deaths that year (67.8% of all drug overdose deaths).[19] Fentanyl, which is a Schedule 2 drug, accounted for 28.8% of the overdose deaths. Heroin (Schedule 1), cocaine (Schedule 2) and methamphetamine (Schedule 2) accounted for

25.1%, 17.8% and 10.6% of deaths, respectively. There were no reported deaths from marijuana overdose in 2017.

We must be careful to note that these observations focus on overdose fatalities. Marijuana use can cause impaired driving, and there is no widely accepted field test for marijuana intoxication. Prolonged substance abuse is also possible with marijuana. Withdrawal symptoms may be exacerbated in individuals with a mental illness;[20] however, there continues to be fierce debate as to the impact of marijuana use on anxiety and depression. Many claims and counterclaims remain untested in the United States due to the federal government's classification of marijuana as a Schedule 1 substance.

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16 For more information, see the National Conference of State Legislatures and the Marijuana Policy Project.
17 U.S. Drug Enforcement Agency. For more information, see https://www.dea.gov/drug-scheduling.
18 For more information, see https://www.cdc.gov/marijuana/faqs/overdose-bad-reaction.html.
19 Centers for Disease Control and Prevention (2018), https://www.cdc.gov/drugoverdose/data/statedeaths.html.
20 Randi Melissa Schuster, Madeleine Fontaine, Emily Nip, Haiyue Zhang, Ailish Hanlya and A. Eden Evins, "Prolonged cannabis withdrawal in young adults with lifetime psychiatric illness," *Preventive Medicine* 104 (2017).

Cannabidiol (CBD)

Hemp and marijuana contain another active component that, unlike THC, has gained acceptance in recent years. Cannabidiol, or CBD, does not result in a "high" after ingesting or applying to the body. Claims that CBD reduces anxiety and seizures, and provides pain relief, have sparked interest in and usage of CBD products.[21] CBD often comes in the form of oil but also can be found in creams, or even gummies. With the 2018 Farm Bill's passage, if CBD products are derived from hemp under the THC guidelines contained in the law, these products can be consumed and are transportable nationwide. Any products derived from hemp or marijuana with THC levels greater than allowable limits remain illegal at the federal level. To say this creates confusion is an understatement. CBD products derived from hemp may have excess THC levels if quality controls are not sufficiently stringent.[22] For now, the watchwords for CBD products are "buyer beware."

In 2018 and prior to the passage of the 2018 Farm Bill, Virginia legalized the production and use of CBD oils and set explicit guidelines for the cultivation and production of CBD-related products. The Commonwealth also created a framework for legal prescriptions, although CBD products (absent of THC) were already widely available without prescription.[23] Virginia has since passed a law conforming state regulation of hemp to federal guidelines regarding oversight and the THC content of hemp. The absence of previous legal oversight of hemp led to large variation in quality and active ingredients for products that may perhaps share the same names or labels.[24]

Owners and pharmacists at local drugstores in Williamsburg have become conscious of the rising demand for and curiosity surrounding CBD oil. Henry Ranger, a local business owner, learned of CBD oil while working for a larger chain pharmacy that didn't stock the product. He was unable to begin exploring the growing industry until he opened his own business. Kelly Kale, another small-business owner, advises that consumers should understand the difference between pharmaceutical CBD and that sold by online shops because with the pharmaceuticals "we can guarantee from bottle to bottle and from batch to batch that it is exactly the same product." While many Virginians have been thankful for remedies from CBD oils, it should be noted that these local business owners are aware of the paucity of research to validate their customers' claims of effectiveness.[25]

Even though CBD is legal in Virginia, the production and distribution of CBD products is still in its infancy. The Virginia Board of Pharmacy selected five CBD distributors, one for each of the five health services areas (HSA) in Virginia, illustrated in Figure 1. The five distributors include Pharmacann (HSA I), Dalitso (HSA II), Dharma (HSA III), Green Leaf (HSA IV) and Columbia Care (HSA V).[26] Columbia Care, a firm that already operates dispensaries in multiple states, produces products and services for patients who are part of a medical marijuana program.[27, 28] At the time of this writing, the expectation is that Columbia Care will open its facility in Portsmouth in late 2019 (Table 1).

FIGURE 1

HEALTH DISTRICTS AND HEALTH SERVICES AREAS OF VIRGINIA

SOURCE: Virginia Division of Health Statistics
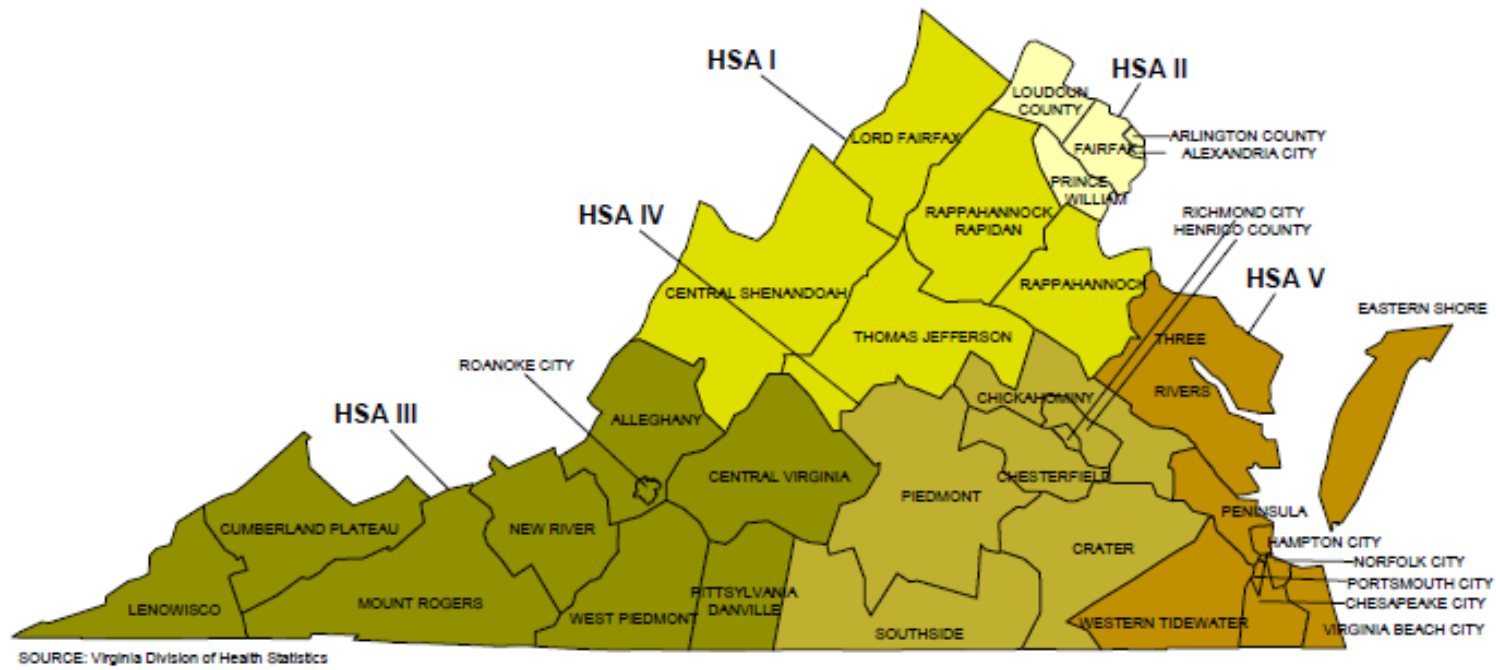
TABLE 1
MEDICAL MARIJUANA DISPENSARIES, VIRGINIA

HSA	HSA NAME	DISTRIBUTOR	CITY	EXPECTED OPENING DATE
HSA I	Northwest	PharmaCann	Staunton	End of 2019
HSA II	Northern	Dalitso, LLC	Manassas	End of 2019
HSA III	Southwest	Dharma Pharmaceuticals	Bristol	End of 2019
HSA IV	Central	Green Leaf Medical	Richmond	End of 2019
HSA V	Eastern	Columbia Care	Portsmouth	Late 2019

Source: http://richmondfreepress.com/news/2019/apr/19/medical-marijuana-dispensaries-open-va/

Portsmouth businessman Johnny Garcia is working to be a part of the expanding CBD industry. He has invested in an industry that plans to plant more than just roots in Portsmouth. As noted previously, another company, Columbia Care, will open a medical marijuana facility in Portsmouth by the end of 2019 where the plants will be cultivated and processed into prescription pills. Garcia co-owns Cativa CBD, which will process and manufacture certain CBD products, including body cream and sublingual tablets. Garcia said the company he co-owns plans to build two facilities in Portsmouth. Construction was set to begin in October.[29]

From Hippie Culture To Culturally Acceptable

I didn't inhale it, and never tried it again. – Bill Clinton

When I was a kid, I inhaled frequently. That was the point. – Barack Obama

Graph 1 illustrates how swiftly perceptions about marijuana have changed in the United States. In 1969, only 12% of those surveyed thought marijuana should be legalized. Even at the turn of the current century, only 31% of respondents were in favor of legalization. By 2013, a majority of respondents were in favor. And, in 2018, almost two-thirds of Americans reported they thought marijuana should be legalized. The most recent survey found broad support for legalization among millennials (74%), Gen Xers (63%) and baby boomers (54%).

Recent surveys of Virginians reflect the national data. Polls by Quinnipiac University in 2015 and 2017 found that a majority of Virginians supported adults being able to legally possess small amounts of marijuana. The 2017 Quinnipiac poll also found that an overwhelming 92% of Virginians supported marijuana use for medical purposes with a doctor's prescription.[30] A March 2018 Christopher Newport University poll revealed that 76% of Virginians favored decriminalizing possession of small amounts of marijuana.[31]

Public perceptions of marijuana are changing because more Americans have used marijuana. The National Survey of Drug Use and Health (NSDUH) collects data at the national, state and sub-state level on drug use, abuse and mental health. The latest survey illustrates the rise in marijuana's popularity relative to other drugs. The percentage of respondents who reported using marijuana in their lifetime increased from 42.7% in 2002 to 48.2% in 2017 (Graph 2). Across the same time period, reported use of LSD declined while cocaine usage increased slightly. Usage

29 https://www.pilotonline.com/business/vp-bz-cativa-cbd-portsmouth-20190909-dv6n3byg6fbfpiv5itbs4zq7ja-story.html.
30 https://poll.qu.edu/virginia/release-detail?ReleaseID=2451 (2017 VA poll).
31 https://bloximages.newyork1.vip.townnews.com/pilotonline.com/content/tncms/assets/v3/editorial/c/77/c77f8ee9-f7c3-5208-810e-5a45e762a3ee/5a7b20dfb8755.pdf.pdf.

of crack cocaine remained unchanged. It appears that marijuana has reached a tipping point, where a majority of the population has tried it, supports its legalization for personal use and overwhelmingly supports its use for medical purposes.

As marijuana use by adults has increased over time and is now legalized or decriminalized in a number of states, we compare its use in the previous month with two of the most popular legal substances: alcohol and cigarettes (Graph 3). Since 2002, while alcohol usage in the past month by Americans 18 and older has increased only at an average rate of 0.1% a year, cigarette use has declined at an annual rate of 2.3% a year.[32] Reported marijuana use grew at a 3.4% annual rate over the period. The increasing acceptance of marijuana coincides with the decline of use of cigarettes and tobacco.

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32 We estimate the compound annual growth rate (CAGR) to determine the average annual growth or decline in each substance over the period in question. CAGR is equal to (End Value/Start Value)^(1/Number of Periods) – 1.

GRAPH 1

PEW RESEARCH POLL ON LEGALIZING MARIJUANA:
UNITED STATES, 1969-2018
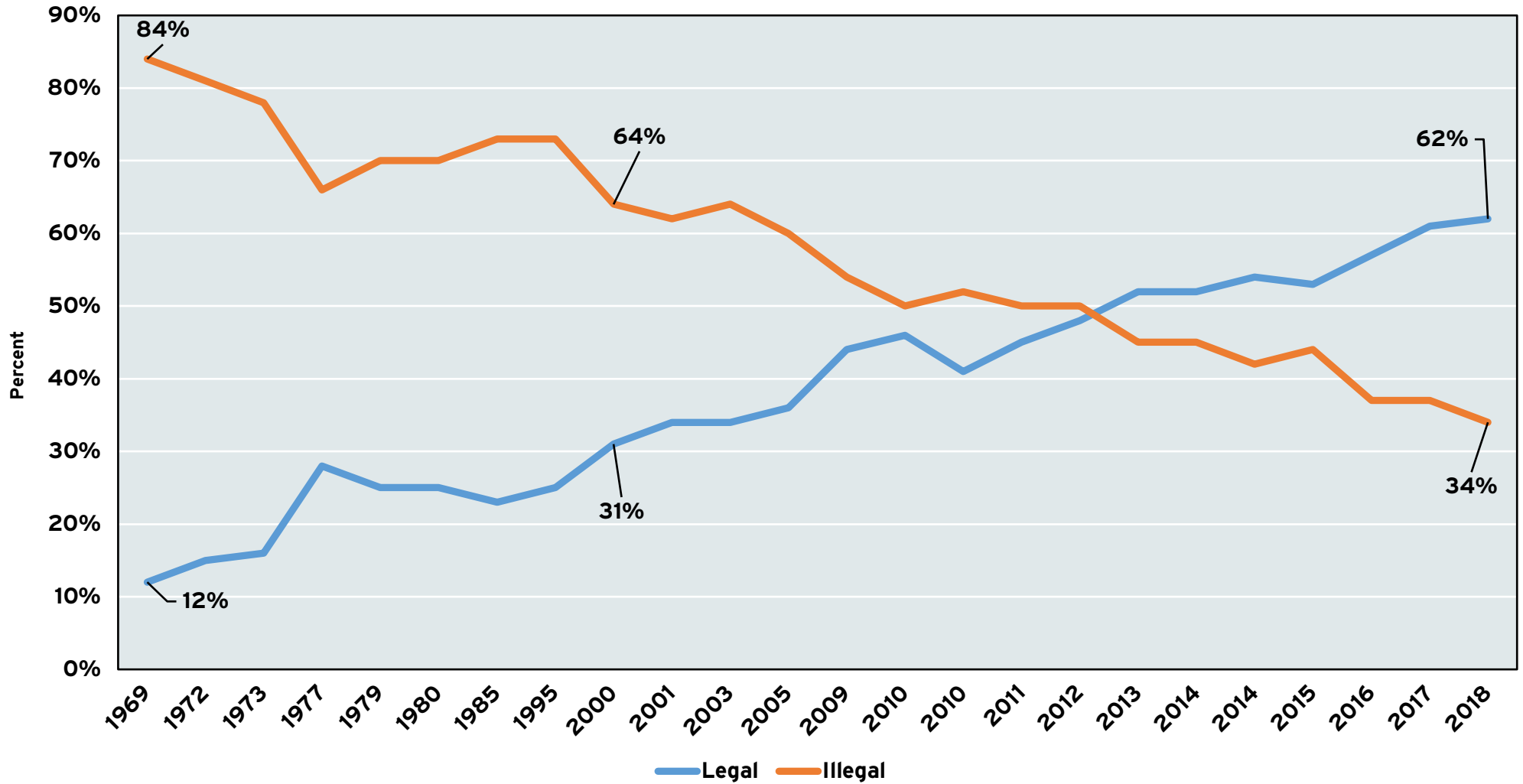
Source: Pew Research Center (2018)

GRAPH 2

SELECTED TYPES OF ILLICIT DRUG USE IN LIFETIME AMONG PERSONS AGES 18 OR OLDER: UNITED STATES, 2002-2017
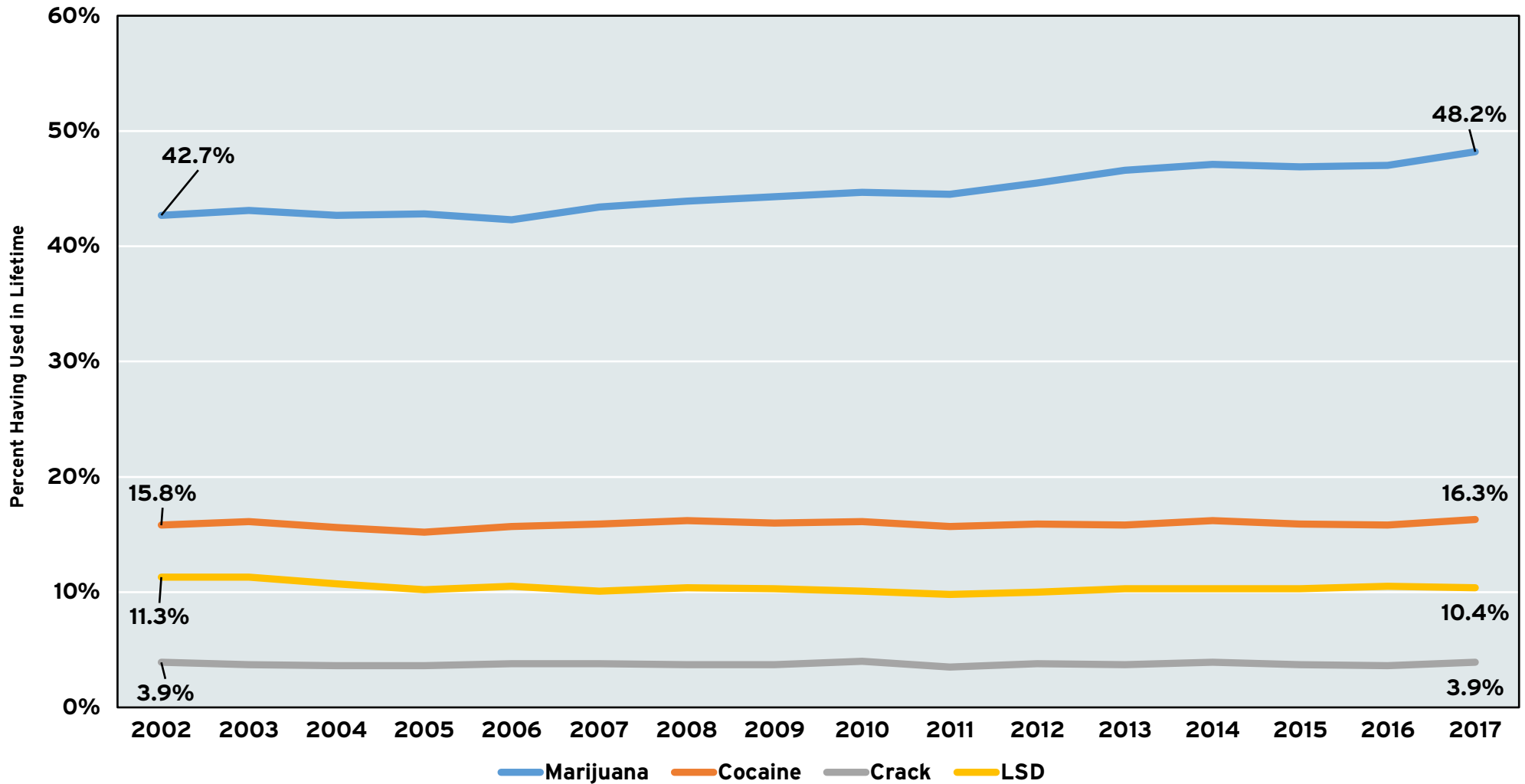
Source: Substance Abuse and Mental Health Services Administration, 2017 National Survey of Drug Use and Health, Table 7.7B

GRAPH 3

USE OF ALCOHOL, CIGARETTES AND MARIJUANA IN THE PREVIOUS MONTH AMONG PERSONS AGES 18 OR OLDER: UNITED STATES, 2002-2017
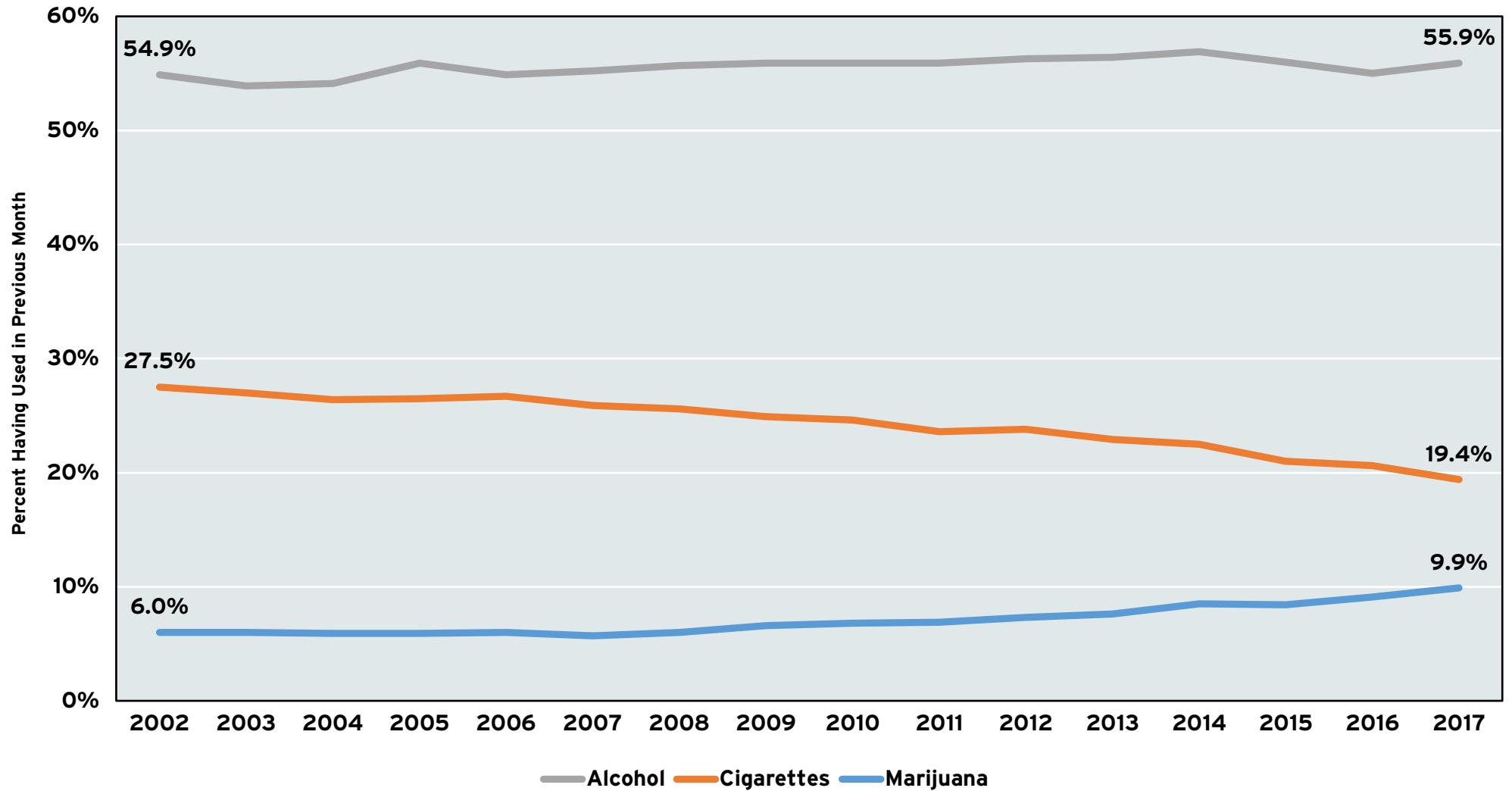
Percent Having Used in Previous Month

54.9% ... 55.9%

27.5% ... 19.4%

6.0% ... 9.9%

2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017

Alcohol — Cigarettes — Marijuana

Source: Substance Abuse and Mental Health Services Administration, 2017 National Survey of Drug Use and Health, Tables 7.9B and 7.18B

Diving into the national data, more than 53% of males and almost 44% of females reported having used marijuana at least once, with 18% of males and 12% of females reporting having used it in the past year. Examining respondents by race yields an interesting observation: Whites are more likely than African Americans or Hispanics to have used marijuana in their lifetime (Table 2). On the other hand, African Americans used marijuana in a slightly greater proportion in the past year and month than whites or Hispanics.

TABLE 2 MARIJUANA USE BY RACE, AGES 18 AND OLDER: UNITED STATES, 2017			
	LIFETIME	PAST YEAR	PAST MONTH
White	53.8%	15.8%	10.1%
Black or African American	45.5%	17.9%	12.2%
American Indian	63.8%	24.2%	15.6%
Native Hawaiian	45.9%	11.7%	9.7%
Asian	20.6%	7.2%	3.8%
Two or More Races	59.9%	24.1%	16.7%
Hispanic or Latino	36.0%	13.1%	8.5%

Source: Substance Abuse and Mental Health Services Administration, 2017 National Survey of Drug Use and Health, Tables 1.32B, 1.33B and 1.34B

Marijuana use increases with education and falls with employment (Table 3). While some may believe marijuana is used predominantly by "slackers," the survey evidence suggests that usage is highest among those who have attended some college. College graduates and those who did not graduate from high school report the same usage over the previous year, although college graduates have the lowest usage rates in the previous month. On the other hand, marijuana usage rates are the highest among the unemployed. **It may be that continued marijuana use lowers employability, which, in turn, leads to increased use. However, 1 out of 10 full-time employed respondents reported using marijuana in the past month.**

TABLE 3 MARIJUANA USE BY EDUCATION AND EMPLOYMENT, AGES 18 AND OLDER: UNITED STATES, 2017			
	LIFETIME	PAST YEAR	PAST MONTH
Less than high school	35.2%	13.3%	9.3%
High school graduate	45.2%	15.2%	10.7%
Some college/ associate degree	54.6%	18.3%	11.9%
College graduate	49.3%	13.3%	7.5%
Full-time employment	54.6%	16.6%	10.4%
Part-time employment	51.1%	19.7%	13.0%
Unemployed	53.3%	27.4%	17.6%
Other	36.7%	10.1%	6.8%

Source: Substance Abuse and Mental Health Services Administration, 2017 National Survey of Drug Use and Health, Tables 1.32B, 1.33B and 1.34B

Is Marijuana A Gateway Drug?

As an increasing number of Americans are using marijuana on a more frequent basis, the debate whether marijuana is a gateway drug continues to boil. A 2015 study examined the responses of 6,624 survey participants who used marijuana prior to any other drug.[33] Almost 45% of individuals who had used marijuana in their lifetimes progressed, at some point, to other illegal substances. Other potential indicators of substance abuse include being male, living in an urban area, never being married, being separated or divorced, having a psychiatric disorder or a family history of substance abuse, and using marijuana at an early age.

These findings echoed previous studies suggesting that a significant (but not dominant) proportion of marijuana users experimented with other illegal drugs at some point in their lives.[34] There are several arguments why this progression from marijuana to other drugs may occur. First, marijuana users (in states where it is illegal) are exposed to other illegal drugs because the supply channels overlap. Second, marijuana provides a pleasurable experience that may encourage experimentation with other illegal substances. Marijuana use may also "condition" the brain to be more sensitive to the pleasurable effects of other drugs. Finally, if one is under the influence of marijuana, there is a potential loss of self-control and increased likelihood of experimentation with other drugs.[35] However, the National Institute on Drug Abuse also recently noted that the majority of people who use marijuana do not go on to use other substances.[36] While there is strong evidence that marijuana may act as a gateway drug for some users, the same also may be said about two legal substances, alcohol and tobacco. Cigarette use, for example, may increase the risk of cocaine addiction.[37] A 2012 study of high school students found that alcohol, not marijuana, was the gateway drug. Alcohol use led to tobacco, marijuana, and other substance use.[38]

An alternative to the gateway hypothesis is that people who are more likely to use drugs start with readily available substances (alcohol, marijuana, tobacco). A portion of these individuals then, whether through social interaction or "priming the brain," then transition to other substances. If marijuana was not available, individuals would start elsewhere, and some would eventually transition to "harder" drugs. From this perspective, marijuana, by itself, is not a gateway drug. Individual characteristics and social conditions determine whether there is a transition path to other substances, not the use of marijuana.

Regardless of whether one accepts or rejects the argument that marijuana is a gateway drug, there is a degree of commonality among these arguments. At some point, some people will use marijuana along the path

toward using other drugs. Whether the starting point is alcohol, tobacco or marijuana, we need to recognize that awareness, intervention and treatment may be more effective earlier rather than later. For the majority of marijuana users, however, the evidence suggests that marijuana (for now) is not a door to harder drugs.

Who Uses Marijuana In Virginia?

Given that the national survey data suggest more than 50% of Americans have used marijuana in their lifetimes and almost 10% in the previous month, how many residents of Virginia use marijuana? Since the 2002-2004 survey, the percentage of those who used marijuana in Virginia in the previous year increased from 9.1% to 12.3% in 2012-2014 before falling to 11.5% in the most recent survey available (Graph 4). Usage in the previous month also increased from 5.4% to 6.7%. The use of marijuana in Virginia, however, is well behind that of Colorado, where nearly 1 in 4 respondents 18 and older used marijuana in the previous year.

We compare marijuana use across the health services areas within Virginia in Graph 5. Eastern Virginia (HSA 5) had the highest proportion of adults 18 and older who used marijuana in the past year and was only slightly behind HSA 4 (Central) in terms of usage in the previous month. Northern Virginia (HSA 2) had the lowest reported usage of marijuana in the Commonwealth.

34 A. Agrawal, M.C. Neale, C.A. Prescott and K.S. Kendler, "A twin study of early cannabis use and subsequent use and abuse/dependence of other illicit drugs," *Psychological Medicine*, 2004; 34(7):1227– 1237. K. Van Gundy and C.J. Rebellon, "A Life-course Perspective on the 'Gateway Hypothesis,'" *Journal of Health and Social Behavior*, 2010; 51(3):244–259.

35 T.J. Dishion and L.D. Owen, "A longitudinal analysis of friendships and substance use: bidirectional influence from adolescence to adulthood," *Developmental Psychology*, 2002; 38(4):480-491. M. Ellgren, S.M. Spano and Y.L. Hurd, "Adolescent cannabis exposure alters opiate intake and opioid limbic neuronal populations in adult rats," *Neuropsychopharmacology*, March 2007; 32(3):607-15.

36 https://www.drugabuse.gov/publications/research-reports/marijuana/marijuana-gateway-drug.

37 A. Levine, Y. Huang, B. Drisaldi, et al., "Molecular mechanism for a gateway drug: epigenetic changes initiated by nicotine prime gene expression by cocaine," *Science Translational Medicine*, 2011; 3(107):107ra109. doi:10.1126/scitranslmed.3003062.

38 T. Kirby and A.E. Barry, (2012), "Alcohol as a Gateway Drug: A Study of US 12th Graders," *Journal of School Health*, 82: 371-379. doi:10.1111/j.1746-1561.2012.00712.

GRAPH 4

USAGE OF MARIJUANA IN PREVIOUS YEAR AND PREVIOUS MONTH, AGES 18 OR OLDER: VIRGINIA, 2002-2016
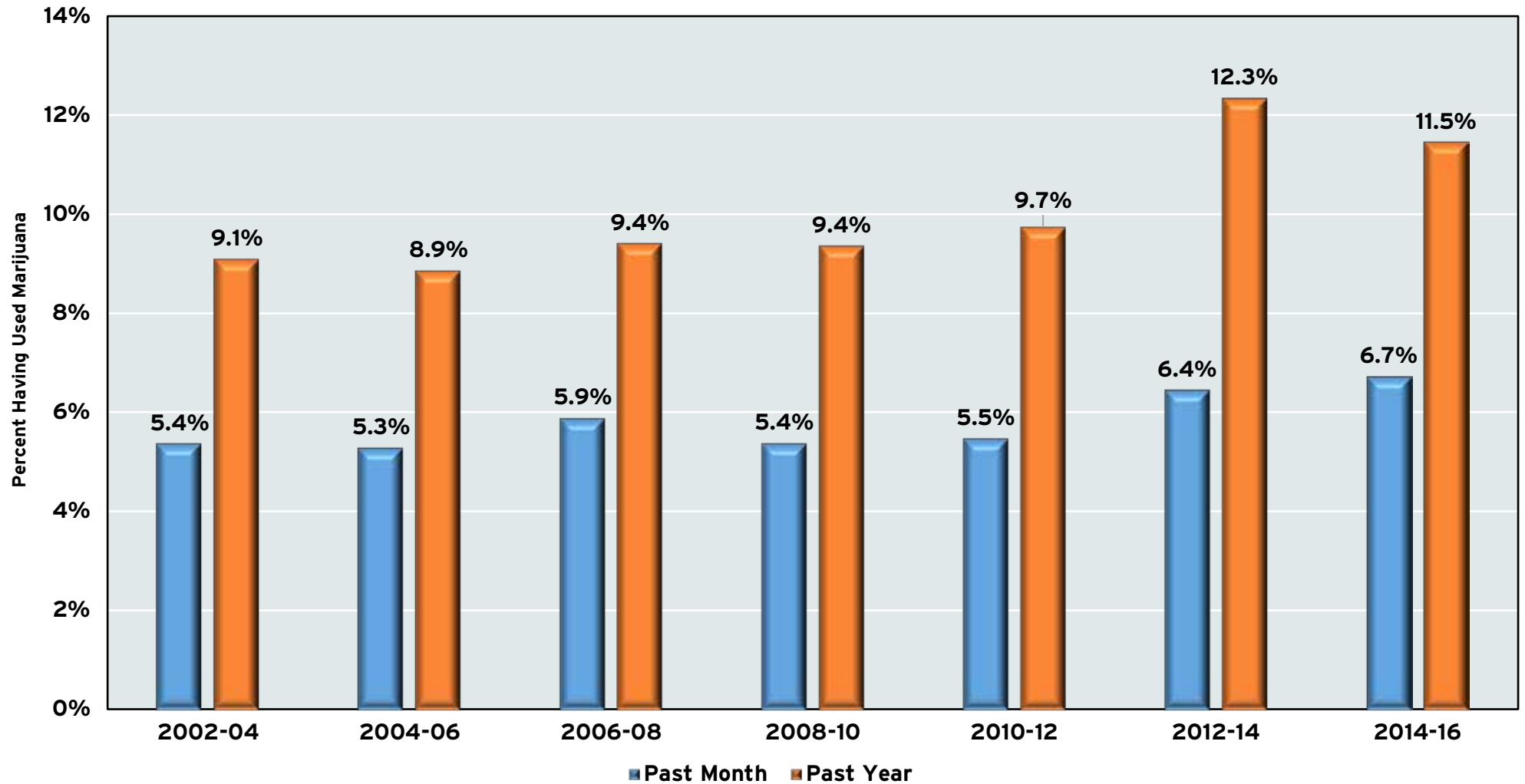
Source: National Survey of Drug Use and Health, Substate Surveys, various years, Virginia: https://pdas.samhsa.gov/saes/substate

GRAPH 5

MARIJUANA USE BY VIRGINIA HEALTH SERVICES AREA, 2017: 18 YEARS AND OLDER

Source: National Survey of Drug Use and Health, 2014-2016 Substate Survey: https://pdas.samhsa.gov/saes/substate

Lastly, we examine usage of alcohol, tobacco and marijuana in Virginia by Health Services Area in Table 4. Alcohol is clearly the substance of choice, with 56% of adults replying that they had used alcohol in the previous month. Almost 27% of adults 18 and older replied that they had used some form of tobacco in the previous month. While alcohol and tobacco usage in Virginia mirrors the nation, marijuana usage falls below the national average. Nearly 8% of individuals ages 18 and older replied that they had used marijuana in the previous month in Virg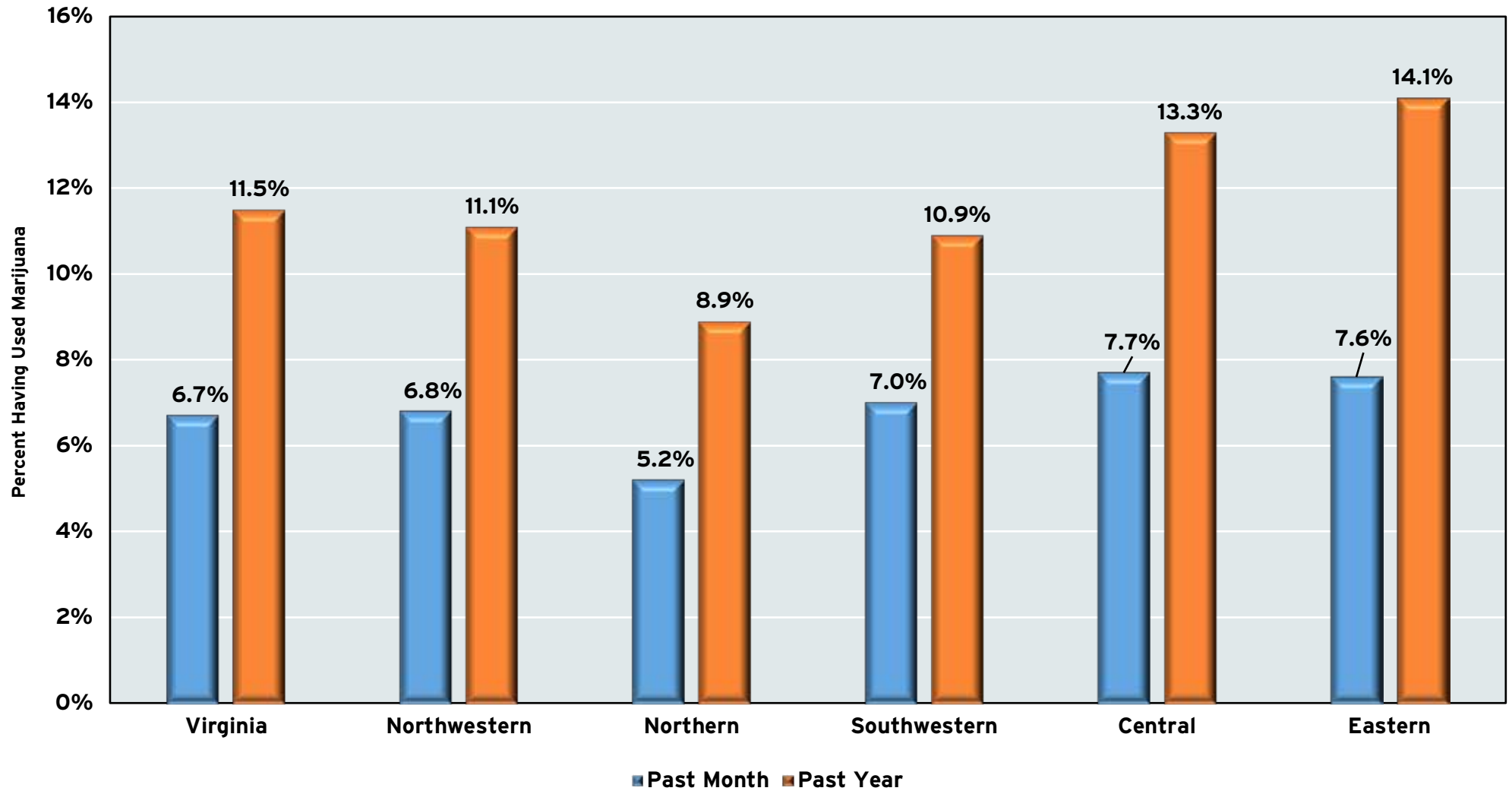inia HSA 4, the highest rate in the state. All HSAs in Virginia have marijuana use percentages below the national average.

TABLE 4

USAGE OF ALCOHOL, TOBACCO AND MARIJUANA IN THE PREVIOUS MONTH: AGE 18 AND OLDER, HSAs IN VIRGINIA, 2016

	ALCOHOL	TOBACCO	MARIJUANA
United States	55.9%	26.1%	8.7%
Virginia	56.0%	26.6%	6.7%
Northwest (HSA I)	56.4%	27.1%	6.8%
Northern (HSA II)	60.6%	16.9%	5.2%
Southwestern (HSA III)	46.5%	37.2%	7.0%
Central (HSA IV)	56.9%	28.7%	7.7%
Eastern (HSA V)	56.4%	28.9%	7.6%

Source: National Survey of Drug Use and Health, 2014-2016 Substate Survey. Available at https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHsubstateAgeGroupTabs2016/NSDUHsubstateAgeGroupTabs2016.pdf.

Marijuana Possession And Arrests

Because marijuana possession is illegal in Virginia, the law requires that individuals in possession of marijuana, in almost every circumstance, be subject to a law enforcement action. The Virginia State Police (VSP) collects and makes publicly available crime data from law enforcement agencies within the state. In general, two types of data are captured: incident and arrest data. Since the VSP notes that arrest data are the primary measure of police activity as it relates to crime, we use arrest data in this section.[39]

This decade, law enforcement officers made almost 390,000 arrests for drug-related crimes in Virginia. Fifty-nine percent of these arrests from 2010 to 2018 were for marijuana-related crimes, and marijuana possession or concealment was the charge in a preponderance of the arrests. Graph 6 illustrates that for each year this decade, more than half of all drug arrests were for marijuana possession or concealment.

A potential critique is that an individual could be arrested for multiple offenses – that is, assault and marijuana possession or theft and marijuana possession. The marijuana offense would be incidental, overshadowed by the more egregious crime. To examine whether this critique is valid, we filtered the data to exclude arrests where the number of offenses was two or more or where the arrest type was not for a drug or narcotics offense. Of the 198,388 arrests for marijuana possession or concealment from 2010 to 2018 in the Commonwealth, 84.3% were for a single drug or narcotics offense. Marijuana possession was the primary driver of total drug arrests in Virginia.

Regardless of one's opinion about the legal status of marijuana in the Commonwealth, the data clearly illustrate that the majority of drug arrests in Virginia this decade were for the possession or concealment of marijuana. Furthermore, the Virginia State Crime Commission (VSCC) also estimated that 84% of marijuana possession arrests from 2007 to 2016

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39 As noted by the Crime in Virginia Report (2018), "Although law enforcement arrest policies vary, particularly with respect to juveniles, agencies are instructed to count one arrest each time an individual is taken into custody for committing one or more offenses. A juvenile arrest is counted when an offense is committed and the circumstances are such that if the juvenile had been an adult, an arrest would have been made." The Crime in Virginia data are publicly available at: https://va.beyond2020.com/.

were first-time arrests.[40] Even though it is rare for an offender to receive confinement for a first-time offense, the VSCC found that on one day in July 2017, 127 inmates were in jail solely for a marijuana charge. The estimated cost to taxpayers was more than $10,000 a day to incarcerate these inmates. In a recent opinion piece, Virginia Attorney General Mark Herring stated that marijuana enforcement costs amounted to at least $81 million a year.[41] This figure does not include the "opportunity costs" of enforcement – that is, the effort and attention that could be redirected to other crimes.

We now turn our attention to arrests in Virginia metropolitan areas. In Graph 7, we present the arrests per 100,000 residents for possession or concealment by racial group in Virginia metro areas. We divide the number of arrests by the population of each racial group to allow a direct comparison. We note that an individual could be arrested multiple times in a year for the same offense, so the arrests closely (but do not perfectly) correspond to the arrest rate for the population of each group.

We first remind the reader that national surveys do not show a stark difference in marijuana usage by race. For the most recent survey in 2017, whites were about seven percentage points more likely than blacks or African Americans to have used marijuana in their lifetime. Blacks or African Americans, on the other hand, were about two percentage points more likely to have used marijuana in the previous year or month. In 2018, there were 219.3 arrests of individuals who identified as white per 100,000 white residents and 771.9 arrests of individuals who identified as black or African American per 100,000 black or African American residents of the Commonwealth. Blacksburg had the largest racial disparity of marijuana arrests in 2018: arrests per 100,000 residents were 241.0 and 1,528.6 for whites and blacks or African Americans, respectively.

The disparity between white and African American arrests per 100,000 residents is apparent for every metropolitan area in the Commonwealth. Even though arrests per 100,000 residents in Charlottesville and Lynchburg were well below the state average in 2018, the disparity between white and African American arrests relative to the population of each group was still prevalent. Relative

to the population of each race in Charlottesville, for example, African American arrests per 100,000 were more than three times higher than white arrests per 100,000. In Hampton Roads, African American arrests per 100,000 were 5.4 times higher than white arrests per 100,000. While the arrest rates may fluctuate from year to year, the disparities between the arrest rates of whites and African Americans are persistent over time.

There are several possible explanations for the disparities in arrests relative to the population of each racial group. First, the arrest data do not capture the residence of the offender. If a significant number of out-of-state offenders were being arrested in Virginia or one of its metro areas, this possibly could bias the arrest data. However, the volume and persistence of the disparities across jurisdictions cast doubt on this argument. Second, explicit racial bias may occur, which would lead to a higher number of encounters for African Americans, and thus a higher number of arrests. However, the increasing prevalence of mobile phones, police body cameras and civil rights monitoring may cast doubt on this hypothesis. Third, unconscious racial bias may result in more frequent "chance" encounters that, in turn, lead to arrests. The argument, for example, that "driving while black" is a form of profiling continues to reverberate throughout popular culture and there is mounting empirical evidence that profiling occurs.[42] Fourth, policing decisions may lead to the concentration of scarce resources in areas overrepresented with minority populations. More police presence to deter crime creates more contacts with residents, which, in turn, leads to more arrests. Fifth, there is a possibility (however remote) that marijuana usage rates in some of Virginia's metro areas differ dramatically from the nation and thus the disparities in arrests reflect these differences in use. Finally, it is entirely possible that there is no single reason, and that the disparities are a result of many socioeconomic factors. While these debates are outside the scope of this chapter, we recognize these discussions are worth having to improve the Commonwealth. We must also recognize that these disparities are, in part, driving the discussion of what to do about marijuana in Virginia.

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40 Virginia State Crime Commission (2017), http://vscc.virginia.gov/reports.asp. The data may overrepresent the percentage of first-time arrests and should be viewed as an upper bound on first-time arrests.
41 https://www.dailypress.com/news/opinion/local-voices/dp-edt-oped-herring-decriminalize-marijuana-0616-story.html.
42 https://www.economist.com/graphic-detail/2019/03/15/black-drivers-in-america-face-discrimination-by-the-police.

GRAPH 6

**ARRESTS FOR MARIJUANA POSSESSION OR CONCEALMENT:
TOTALS AND AS A PERCENTAGE OF ALL DRUG ARRESTS IN VIRGINIA, 2010-2018**
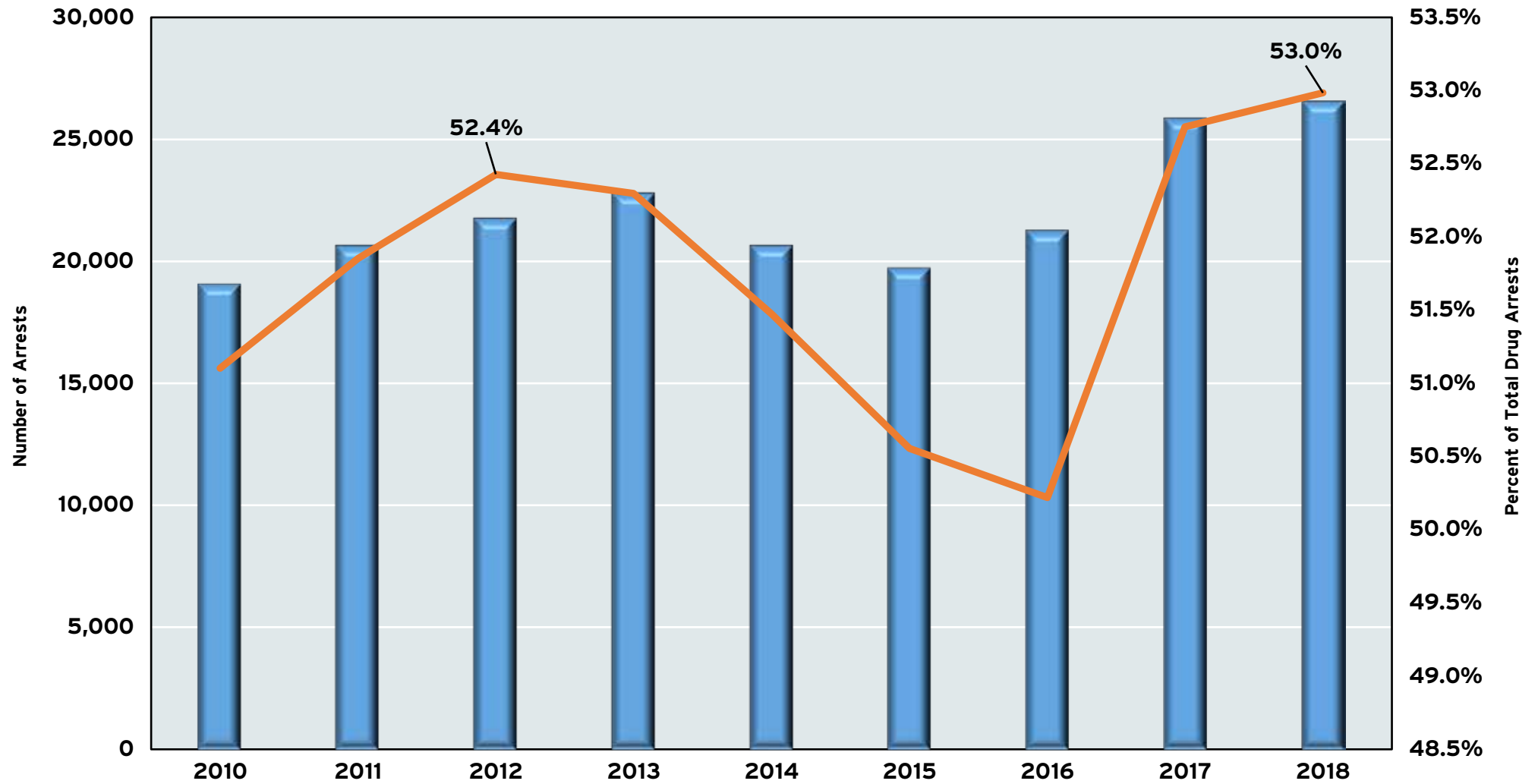
Source: Virginia State Police, Virginia Crime Data: Arrest Drug Activity, Various Years; Marijuana Arrests for Possessing/Concealing and Totals for Arrest Drug Type for Records with Drug Identifier

GRAPH 7

ARRESTS FOR MARIJUANA POSSESSION OR CONCEALMENT PER 100,000 POPULATION: SELECTED VIRGINIA METROPOLITAN AREAS, 2018

Arrest Rate Per 100,000 Population

Metro Area	White Arrests Per 100,000	Black or African American Arrests Per 100,000
Blacksburg	241.0	1528.6
Charlottesville	106.4	373.9
Harrisonburg	220.6	1185.9
Lynchburg	106.0	507.7
Richmond	191.5	797.2
Roanoke	333.7	1253.8
Staunton	125.3	551.6
Hampton Roads	114.3	621.0
Washington-Arlington	272.6	989.9
Winchester	136.1	614.8
Virginia	219.3	771.9

■ White Arrests Per 100,000   ■ Black or African American Arrests Per 100,000

Sources: Virginia State Police (2019), Crime in Virginia Microdata; U.S. Census Bureau, Population Estimates by Race (2018); and the Dragas Center for Economic Analysis and Policy, Old Dominion University. All possession and concealment arrests are included in the analysis.

Decriminalization Versus Legalization

With a growing number of legislators and government officials calling for action to change the consequences of marijuana possession or the legal status of marijuana possession for personal use in Virginia, we briefly review the differences between the two broad policy actions: decriminalization and legalization.[43] There are significant legal and policy differences between legalization and decriminalization, including the amount of marijuana in question, which may vary from an ounce (in most legalized states) or less (in most decriminalized states). Furthermore, either of these actions would occur in an environment where the federal government still classifies marijuana as a Schedule 1 substance.

DECRIMINALIZATION: DIPPING A TOE INTO THE LEGALIZATION POOL

Decriminalization reduces or eliminates the criminal penalties for possessing small amounts of marijuana for personal use. Marijuana possession is typically punished with a civil or criminal fine for the first offense. Subsequent offenses may result in the same fine, an increased fine or an increased fine and confinement. Subsequent offenses may remain civil (noncriminal) or result in a criminal offense. As illustrated in Table 5, the penalties for a first offense of the possession of recreational amounts of marijuana vary from $50 in New Mexico to $300 in Minnesota and Nebraska. Of those states that have decriminalized possession of recreational amounts of marijuana, North Carolina's approach is considered among the most punitive, as the offender may be issued a summons or arrested. A recent investigation in Charlotte found that African Americans are more prone than whites to be arrested than cited for possession.[44]

What is common among the states that have decriminalized marijuana is that it remains illegal to consume it in public, to cultivate it for personal use, or to distribute or sell recreational amounts of marijuana. If one is in possession of more marijuana than allowed in the statute, penalties can range from a criminal misdemeanor to a felony. In Delaware, for example, possession of more than one ounce is punishable by up to three months in jail and a $575 fine. In Connecticut, possession of more than half an ounce is punishable by up to one year in jail and a $2,000 fine.

One motivation for decriminalization is that it (generally) removes the criminal penalty for first-offense marijuana possession for personal use. Lowering the penalty for possession not only should benefit the individual, but also should lower the number of arrests and thus the expenditure of resources for enforcing marijuana laws. Examining data collected by the Federal Bureau of Investigation (FBI), we compare arrest rates for marijuana possession per 100,000 residents for Virginia and selected decriminalized states for 2010 and 2017 (Graph 8).[45]

Among the states in Graph 8, Connecticut and Maryland recently changed the penalty for the first offense for marijuana possession for personal use. Since 2011, possession of a half-ounce or less in Connecticut is a civil violation. Arrests for possession fell from 8,322 in 2010 to 1,946 in 2017, a decline of 76%. Maryland decriminalized possession of 10 grams or less of marijuana in 2014. Arrests for possession dropped from 23,390 in 2010 to 15,170 in 2017, a decline of 35%. It is worth noting that Maryland's arrest rate per 100,000 residents for marijuana possession in 2017 remains among the highest among decriminalized states. Decriminalization has reduced arrests but not as dramatically as proponents would argue.

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43 We do not include a discussion of removing the jail sentence for possession of marijuana. The Virginia State Crime Commission noted in 2017 that jail time is rarely imposed for many possession charges. Furthermore, removing the prospect of jail time would remove the right of indigent defendants to counsel.
44 https://www.charlotteobserver.com/news/local/crime/article60170981.html.
45 As a person may be arrested multiple times a year, the arrest data do not show the number of individuals arrested, but rather the number of times individuals are arrested.

TABLE 5

SUMMARY OF STATE DECRIMINALIZATION LAWS AS OF JUNE 2019

STATE	AMOUNT OF MARIJUANA	CIVIL OR CRIMINAL FIRST OFFENSE	FIRST OFFENSE/ CONVICTION	SECOND OFFENSE/CONVICTION
Connecticut	0.5 ounce or less	Civil	$150 fine	$200 to $500 fine
Delaware	One ounce or less	Civil	$100 civil fine if 18 or older	Same as first offense for 21 and older, $100 criminal fine for ages 18-20
Hawaii	Up to 3 grams (0.105 oz.)	Civil	Up to $130 fine	Same as first offense
Maine	2.5 ounces or less Six plants	Civil	No penalty for 21 and older Under 21: $350 to $1,000 fine	Same as first offense
Maryland	10 grams (0.35 oz.) or less	Civil	$100 fine	Second offense: $250 fine Subsequent: $500 fine
Minnesota	42.5 grams (1.5 oz.) or less	Criminal misdemeanor	$300 fine	Same as first offense
Mississippi	30 grams (1.06 oz.) or less	Civil	$100 to $250 fine	Within two years - $250 fine and 5 to 60 days in jail
Missouri	10 grams (0.35 oz.) or less	Criminal misdemeanor	$250 to $1,000 fine	Up to one year in jail and a fine up to $2,000
Nebraska	One ounce or less	Civil	$300 fine	Second offense: $400 fine, up to 5 days in jail Third offense: $500, up to 7 days in jail
New Hampshire	0.75 ounce or less	Civil	Adults: $100 fine	Second offense: $100 fine; Third offense: $300 fine; Fourth offense within 3 years: up to $1,200 criminal fine
New Mexico	0.5 ounce or less	Civil	$50 fine	Same as first penalty
New York	One ounce	Civil	$50 fine	Same as first penalty
North Carolina	0.5 ounce or less	Criminal misdemeanor	Up to $200 fine, possible suspended sentence	Second to fifth offense: up to $200 fine, 0-15 days in jail, suspended
Ohio	100 grams (3.5 oz.) or less	Civil	$50 fine	Same as first penalty
Rhode Island	One ounce or less	Civil	18 or older: $150 fine	Third conviction within 18 months - misdemeanor punishable by $200 to $500 fine and/or six months in jail

Sources: Marijuana Policy Project (2019) and the Virginia State Crime Commission (2017), various state laws (2019). Information current as of June 2019. https://www.mpp.org/issues/decriminalization/state-laws-with-alternatives-to-incarceration-for-marijuana-possession/.

GRAPH 8

NUMBER OF MARIJUANA POSSESSION ARRESTS PER 100,000 RESIDENTS: SELECTED DECRIMINALIZED STATES AND VIRGINIA, 2010 AND 2017
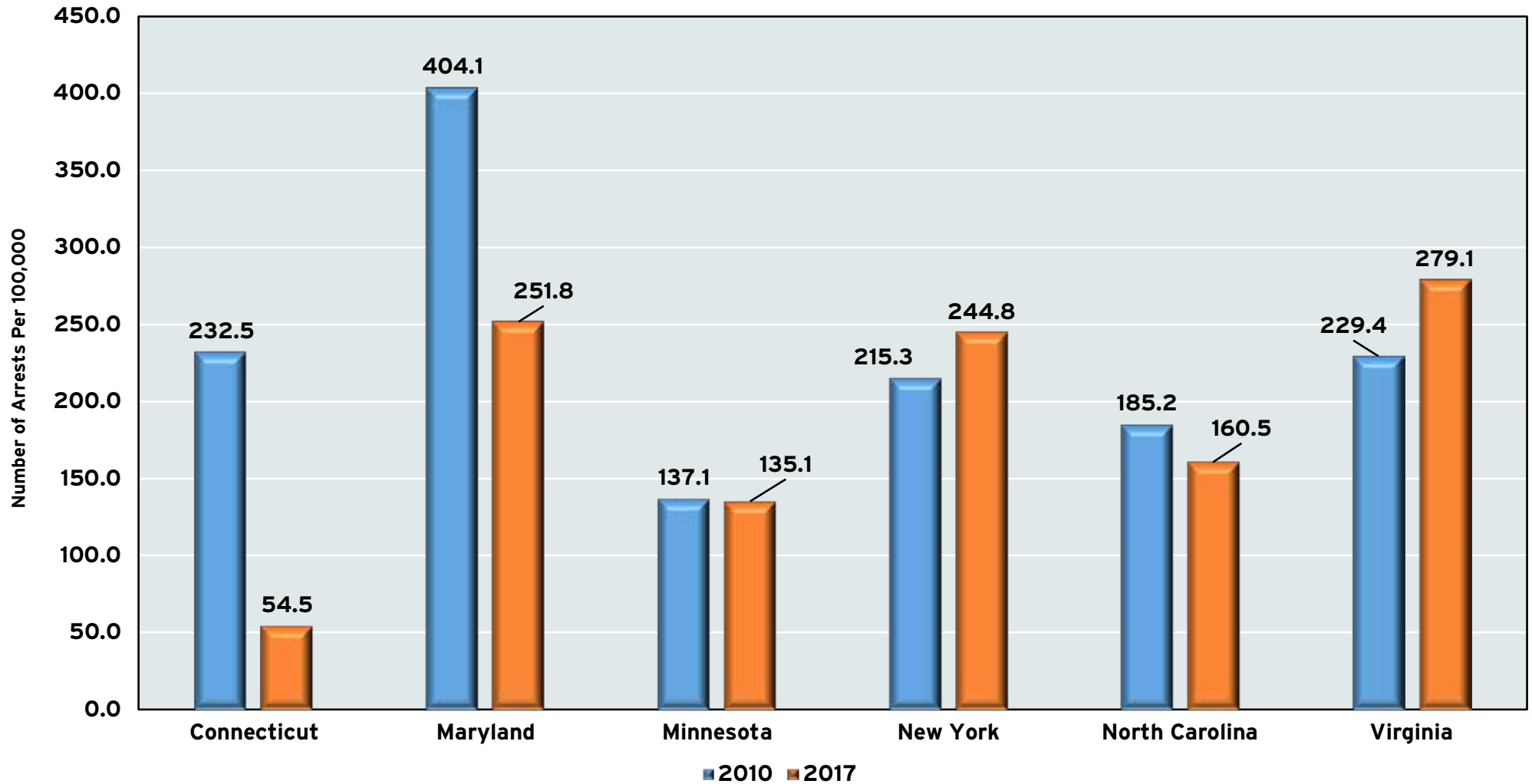
Sources: Federal Bureau of Investigation, National Incident-Based Reporting System, Marijuana Possession Arrests, and the U.S. Census Bureau, 2018 Population Estimates

Even if decriminalization reduced arrests by the same proportion as in Connecticut, two problems would remain: the disproportionate burden of the civil penalties relative to income and the lack of public defense for indigent offenders. And, even if the civil fine is relatively low, there are additional court costs to consider (as anyone who has had to appear in court for a traffic ticket can attest). Failure to pay could lead to other fines and even jail time. **As a percentage of income, the civil penalties would be the greatest burden on those with the least means to pay them.**

Another concern is that the shift from criminal to civil penalties removes the obligation for the state to provide counsel to defendants who otherwise could not afford a legal defense. We interviewed Gregory Underwood, commonwealth's attorney for the city of Norfolk, who directed his prosecutors to dismiss all marijuana-possession cases. He noted, "Decriminalizing marijuana possession would strip the poor of the right to be appointed lawyers who could test the constitutional basis for their citations and the sufficiency of the evidence against them. In a decriminalized system, the wealthy could afford to hire lawyers to defend them. The poor would be on their own, and they would face an even higher comparative rate of conviction than they do now."

LEGALIZATION: JUMPING IN WITH BOTH FEET?

Table 6 lists the 11 states (and the District of Columbia) that have legalized the possession of marijuana for personal use. Legalization completely removes the civil and criminal penalties for marijuana possession for personal use in one's private residence. Legalization, however, typically does not entirely remove the penalties for public consumption. Possession of amounts that are greater than the legal limit may result in a fine, arrest, or both. The sale and distribution of marijuana is typically tightly regulated by the state and is only allowed in state-licensed dispensaries. Person-to-person private transactions are, in general, subject to a criminal charge, ranging from a misdemeanor to a felony, depending on the amount being sold.

Proponents of legalization argue that it is more equitable than decriminalization, frees up more law enforcement and judicial resources and brings a shadow economy into the light. Legalization at the state level allows the state to regulate the production and sale of marijuana within its boundaries. Legalization also allows states and local governments to levy taxes on the production and sale of marijuana and marijuana-infused products. The Colorado Department of Revenue, for example, has recorded more than $6 billion in marijuana sales since January 2014 and has collected over $1 billion in revenue from taxes, licenses and fees since February 2014.[46]

Unlike decriminalization, where the supply side of the market remains illegal, legalization removes the risk of arrest from legal growers, processors and retailers. Transparency in supply and competition among suppliers increases, enhancing the potency and dropping the price of marijuana. According to the Colorado Department of Revenue, the average retail price of a pound of marijuana fell from $1,876 in January 2014 to $850 in July 2019, a decline of nearly 50 percent.[47] According to Beau Kilmer, director of the RAND Drug Policy Research Center, the fall in prices in Washington and Colorado means that the cost of getting high by using marijuana is less than a couple of dollars, significantly less than the cost of the amount of alcohol to achieve a similar effect.[48]

To provide an equal comparison with the decriminalized states, we examine the change in marijuana possession arrests from 2010 to 2017 for states that have legalized the possession of marijuana for personal use (Graph 9). To say that the declines in arrests have been dramatic might be an understatement. California, which reported 55,911 possession arrests in 2010, had only 3,741 arrests in 2017. Shaun Rundle, deputy director for the California Peace Officers' Association, argued that legalization might factor into police behavior. "If someone is going to be out of jail [in] six months and back on the streets – and six months is even unlikely these days – then the agencies need to divert their time and resources to the most dangerous and violent crime prevention."[49]

46 Colorado Marijuana Sales Data and Marijuana Tax Data (2019), available at: https://www.colorado.gov/pacific/revenue/colorado-marijuana-tax-data.
47 https://www.colorado.gov/pacific/sites/default/files/AMR_PriorRates_Oct2018Edit.pdf.
48 https://www.rand.org/blog/2018/12/navigating-cannabis-legalization-20.html.
49 https://www.mercurynews.com/2018/07/11/prop-64-didnt-legalize-every-cannabis-crime-but-arrests-are-falling-fast/.

		TABLE 6		
		SUMMARY OF STATE LEGALIZATION LAWS AS OF JUNE 2019		
STATE	**YEAR OF LEGALIZATION**	**AGE**	**LEGAL AMOUNT OF MARIJUANA**	**PUBLIC CONSUMPTION**
Alaska	2014	21 years or older	1-4 ounces, six plants in private	Civil violation, $100 fine
California	2016	21 years or older	Up to 1 ounce, six plants	Criminal misdemeanor to loiter in public with intent to commit marijuana offenses
Colorado	2012	21 years or older	Up to 1 ounce, six plants	Civil violation to display or use more than 2 ounces, $100 fine
District of Columbia	2014	21 years or older	Up to 2 ounces, six plants	Criminal misdemeanor, citation and release
Illinois	2019	21 years or older	10 grams (0.35 oz.) or less	Civil violation, $200 fine
Maine	2016	21 years or older	Up to 2.5 ounces, three plants	Civil infraction, $100 fine
Massachusetts	2016	21 years or older	Up to 10 ounces in private, up to 1 ounce in public, six plants	Civil infraction, $100 fine
Michigan	2018	21 years or older	Up to 10 ounces in private, up to 2.5 ounces in public, fewer than 12 plants	Civil infraction, $100 fine
Nevada	2016	21 years or older	Up to 1 ounce, six plants	Criminal misdemeanor, $600 fine
Oregon	2014	21 years or older	Up to 1 ounce in public, up to 8 ounces in private, four plants	No fine or penalty for up to 1 ounce in public
Vermont	2018	21 years or older	Up to 1 ounce, six plants	Civil violation, $100 fine
Washington	2012	21 years or older	1 ounce or less for private consumption	Civil penalty, 1 ounce or less, $100 fine

Sources: National Organization for the Reform of Marijuana Laws (2019), various state laws (2019). Information current as of June 2019, https://norml.org/legal/legalization. Vermont Marijuana Laws (2019), https://statelaws.findlaw.com/vermont-law/vermont-marijuana-laws.html. National Conference of State Legislatures (2019), Marijuana Overview (2019). Information current as of May 2019, http://www.ncsl.org/research/civil-and-criminal-justice/marijuana-overview.aspx. Illinois laws become effective in 2020.

GRAPH 9

PERCENT DECLINE IN MARIJUANA ARRESTS:
SELECTED LEGALIZATION STATES, 2010-2017

State	Percent Decline
California	-93.3%
Washington	-85.6%
Alaska	-83.3%
Massachusetts	-81.1%
Nevada	-80.6%
Maine	-72.0%
Oregon	-70.4%
Colorado	-59.9%
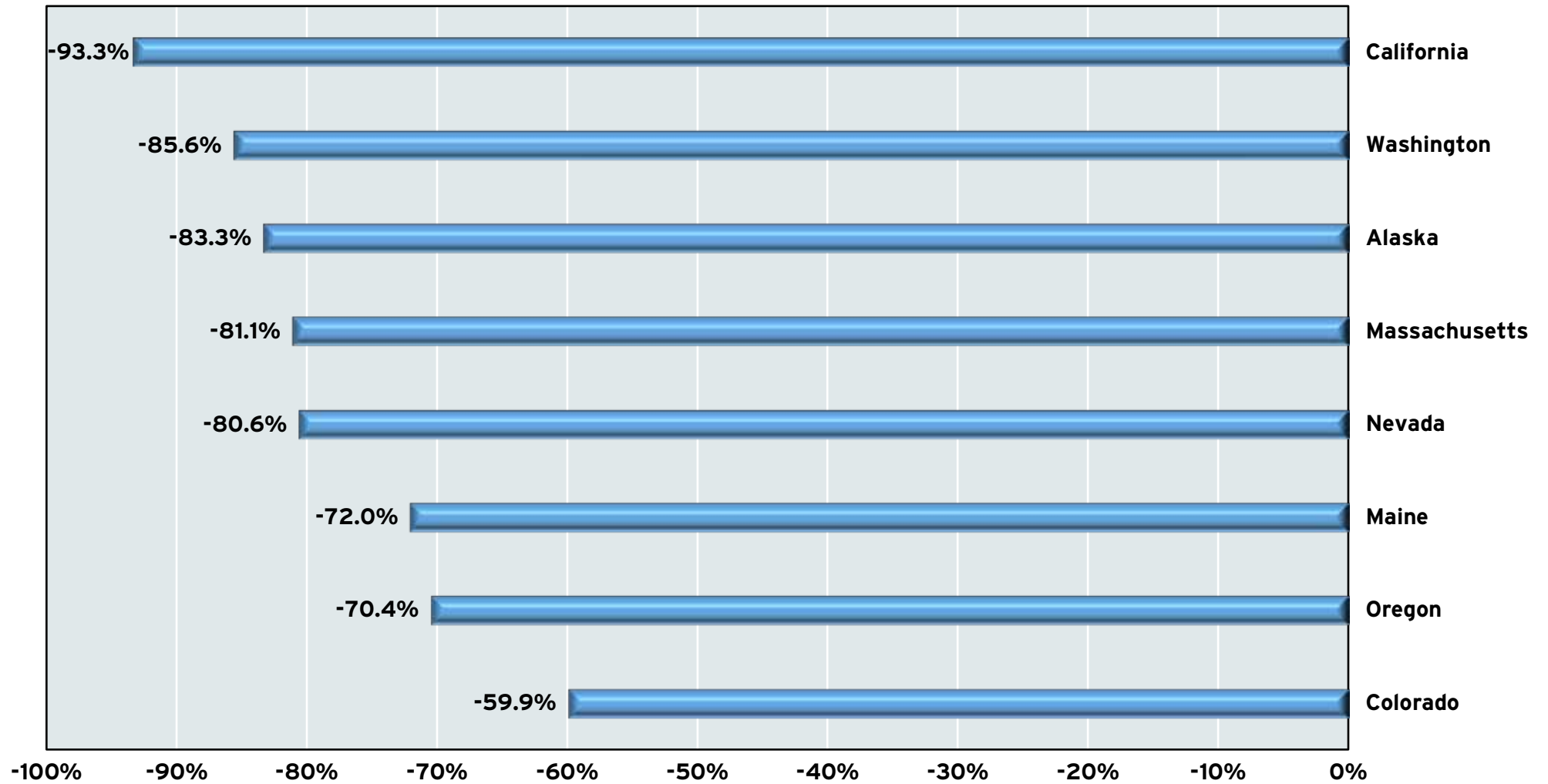
Source: Federal Bureau of Investigation, National Incident-Based Reporting System, marijuana possession arrests. Michigan and Vermont legalized marijuana in 2018 and data are not yet available regarding the change in arrests.

Would Legalization Be A Revenue Windfall For Virginia Cities And Counties?

If Virginia decided to legalize marijuana for personal use, the state would likely be able to tax its production and sale. Marijuana legalization would also likely reduce the number of arrests for possession; however, we reasonably would expect that law enforcement resources would be reallocated to deal with other crimes. Let's take a quick look at what the revenue impact might be from marijuana legalization.

We assume that adults in Virginia would respond to legalization by consuming more marijuana. The question is: How much? We use the responses of adults in Colorado and Oregon to arrive at our low and high estimates (Table 7). Legalization likely would result in approximately 9% to 11% of the adult population in Virginia using marijuana on a monthly basis.

What might legalization in the Commonwealth look like? Virginia House Bill 2371, introduced earlier in 2019, proposed to legalize recreational marijuana. The proposed excise tax in Virginia would have been 9.7% (combined with the 5.3% normal sales tax levy, it would total 15%) with an additional 5% local excise tax option. Although the bill failed in committee, we use it as a framework to estimate the potential tax revenues for the state.[50]

While we do not have data on how much Virginia residents currently spend on marijuana, we do have survey data on how much marijuana consumers in other states spend. Headset Inc., a Seattle-based cannabis market intelligence firm, recently estimated that the average marijuana consumer spends about $645 a year, or approximately $54 a month.[51] After legalization and assuming that residents of Virginia respond like those in Colorado or Oregon, Table 8 estimates that marijuana sales could approach $360 million to $450 million a year, resulting in approximately $55 million to $67 million in excise tax revenues for the state. Of course,

our estimate does not include jobs that would be created to produce, distribute and sell marijuana for personal use. Our estimates also do not factor in the costs to society, to include the potential for increases in car accidents, hospitalizations and absenteeism. Our estimates suggest that marijuana legalization would generate a modicum of additional tax revenue, but should not be viewed as a means to improve Virginia's financial stability.

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50 https://lis.virginia.gov/cgi-bin/legp604.exe?191+sum+HB2371.
51 https://www.headset.io/blog/what-does-the-average-cannabis-consumer-look-like.

TABLE 7

CHANGE IN MARIJUANA USE IN THE PAST MONTH FOR ADULTS 18 AND OLDER, COLORADO, OREGON AND VIRGINIA

	COLORADO LOW RESPONSE	OREGON HIGH RESPONSE	VIRGINIA LOW RESPONSE	VIRGINIA HIGH RESPONSE
Before legalization	12.9%	12.6%	7.6%	7.6%
After legalization	16.6%	20.0%	9.8%	12.1%
Percent change	28.7%	58.7%	28.7%	58.7%

Source: National Survey of Drug Use and Health. Colorado liberalization went into effect in January 2014 and Oregon in July 2015. Comparison is between the last full year with data available prior to change versus the next full year post liberalization. Colorado is 2012-2013 and 2015-2016. Oregon is 2013-2014 and 2016-2017. Virginia usage for preliberalization is from 2014-2016.

TABLE 8

EXCISE TAX REVENUE ESTIMATES FOR THE LEGALIZATION OF MARIJUANA, VIRGINIA

	LOW ESTIMATE	HIGH ESTIMATE
Estimated Annual Tax Revenue	$54,963,877	$66,967,482
Population 18 and Older	6.5 million	6.5 million
Usage in the Previous Month	8.7%	10.6%
Monthly Marijuana Consumers	565,472	688,966
Average Monthly Spending	$54	$54
Estimated Monthly Spending	$30,535,487	$37,204,157
Estimated Annual Spending	$366,425,847	$446,449,882

Source: Dragas Center for Economic Analysis and Policy, Old Dominion University (2019)

Final Thoughts

The decision of whether to maintain the status quo, decriminalize or legalize the personal possession of marijuana will reverberate throughout the state's economy. Maintaining the status quo is a policy choice under increasing pressure at the state and local levels. The attempts of the commonwealth's attorneys of Norfolk and Portsmouth to dismiss some (Portsmouth) or all (Norfolk) misdemeanor possession cases are a sign that the region is moving from conversation toward action on marijuana.

If, as evidenced by the increasing number of states decriminalizing and legalizing the personal use of marijuana, change does come to Virginia, what would it mean? **First, marijuana is not a cure for the ills of the state's budget.** While Colorado has generated $1 billion in marijuana taxes, fees and licenses, this was over almost five years. It's an additional revenue source, not a replacement for income or other taxes.

Second, many of the claims about marijuana and CBD-infused products are unproven and research will take time to investigate them. CBD-infused products do appear to have some medicinal benefits for pain relief. Whether or not these products have benefits for anxiety, depression, gout, weight loss, weight gain and a host of other physical ailments remains to be seen. The rush of CBD-based products to markets appears to follow similar fads of the past. As for marijuana, the health benefits are also mixed, with some studies showing benefits, others not. Claims that marijuana use reduces opioid overdoses, for example, are promising and intriguing, but require further research to determine whether the relationship exists.

Third, marijuana decriminalization or legalization does not eliminate the black market for marijuana. When marijuana is decriminalized, there are still no legal outlets for consumers to purchase it, so the black market may grow as penalties for consumers decrease. When marijuana is legalized, the legal dispensaries are taxed and regulated, and the quality of marijuana increases relative to what is available on the black market.[52] Most consumers are willing to pay more, but not too much more, and some consumers may find legal prices are too high when compared to the black market. Part of the problem is the federal classification of marijuana, which presents significant barriers to the operation of marijuana businesses. Another is that the black market is not taxed like the legal market, so it can offer cheaper (but riskier) prices. If the federal government were to change its position on marijuana, some of these barriers might go away. Increased competition within and among states would lower prices and reduce the size of the black market.

Fourth, the Commonwealth's interdependence with the federal government and the military means that many residents have a job that requires a drug test, security clearance, or both. Even if marijuana were completely legalized for personal use in the U.S., the military and individuals working for or with the federal government in sensitive positions would likely continue to face restrictions on the use of marijuana. Transportation industries, to include airlines, rail and trucking, would undoubtedly have restrictions on marijuana similar to the current restrictions on alcohol consumption. As more than 60% of traffic through the Port of Virginia moves by truck and another 30% by rail, marijuana decriminalization or legalization could potentially have far-ranging impacts on the availability of truck drivers and public safety.

Fifth, while marijuana legalization does not appear to increase the rate of use by minors, there is strong evidence that marijuana potency increases with legalization. Emergency department and urgent care visits by minors for adverse reactions to marijuana increased almost three-fold in Colorado after legalization.[53] Even though minors may not legally consume marijuana, a resale market exists, creating the increased likelihood of adverse reactions or prolonged substance abuse. Care must be taken to recognize that sales competition would likely lead to increased THC content. Illinois, which recently signed marijuana legalization into law, has a unique tax structure where the tax rate on marijuana is dependent upon THC content, perhaps attenuating future demand for high-THC marijuana.

Sixth, decriminalization or legalization will create new burdens on law enforcement. A 2018 study by the Insurance Institute for Highway Safety
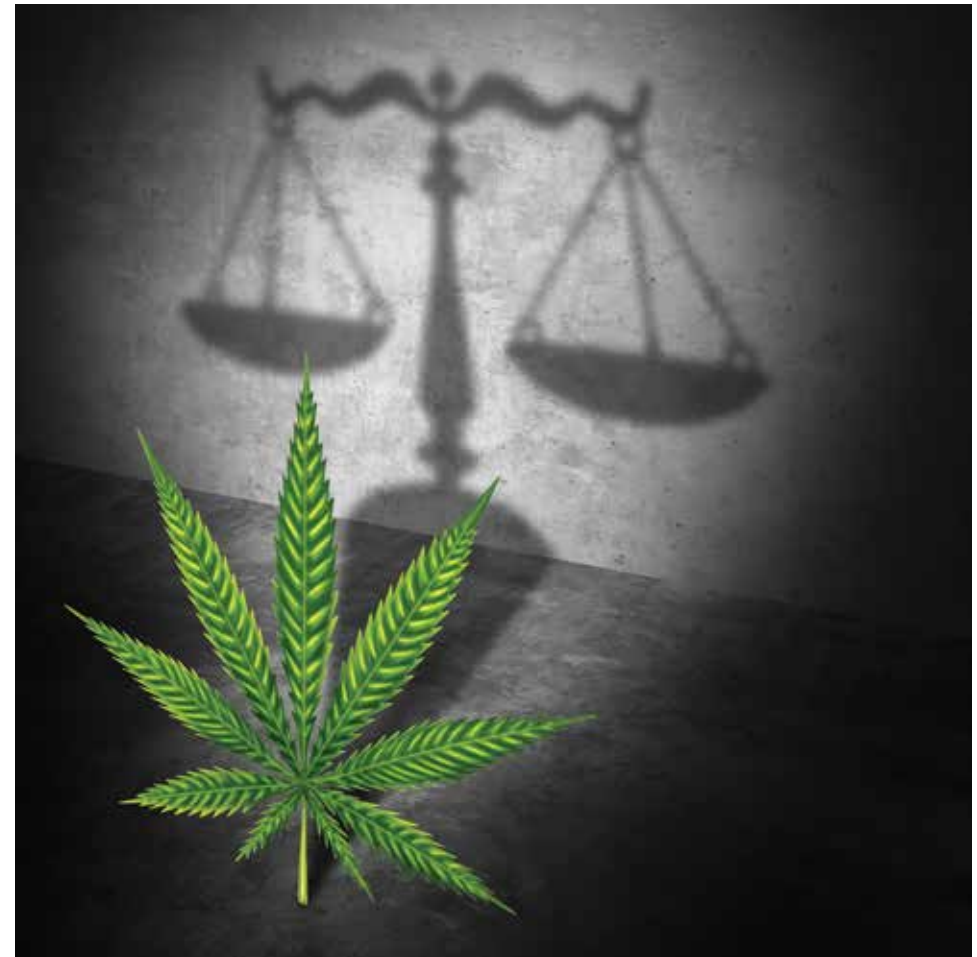
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52 Michael Armlung, Derek Reed, Vanessa Morris, Elizabeth Aston, Jane Metrik and James MacKilop (2018), "Price elasticity of illegal versus legal cannabis: a behavioral economic substitutability analysis," *Addiction* 114 (1), 112-118.
53 https://www.ncbi.nlm.nih.gov/pubmed/29609916.

and the Highway Loss Data Institute found that car crashes increased by as much as 6% in Colorado, Nevada, Oregon and Washington after these states legalized marijuana for recreational use.[54] Adults 18 to 20 still can be cited in legalized states and the prevention of sales to minors is an obvious concern. New law enforcement training, procedures and equipment would be needed to adapt to a new normal.

Lastly, marijuana legalization is likely to be more efficient than decriminalization in addressing inequities in enforcement. The racial and socioeconomic disparities in arrests for marijuana possession in Virginia are troubling and worthy of discussion. Evidence from decriminalized states, however, suggests that these disparities persist even after decriminalization. Furthermore, because civil fines do not graduate with income, the burden of civil penalties is higher on those with lower incomes. Decriminalization removes the provision of a legal defense from those least able to afford one, which may increase disparities in judicial outcomes. Decriminalization should not equate "punishable by fine" with "legal for people with means."

Marijuana is coming (and it's already here). The exact date is unknown, but the momentum is clear. We should not shy away from discussing what may occur and keep in mind that challenge and opportunity are two sides of the same coin. In the words of Winston Churchill, "To improve is to change; to be perfect is to change often."

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54 https://www.iihs.org/news/detail/crashes-rise-in-first-states-to-begin-legalized-retail-sales-of-recreational-marijuana.

FEDERAL SPENDING IN THE COMMONWEALTH: A PRIMER

Republicans know that government spending creates jobs. They just want that spending to be funneled to their projects and districts ... and they certainly don't want to say it out loud.

**– Former Gov. Jennifer Granholm,
  D-Michigan**

The idea that more taxes and more government spending is the best way to help hardworking middle-class taxpayers - that's an old idea that's failed every time it's been tried.

– Sen. Marco Rubio, R-Florida

It should be no surprise that federal spending plays a significant role in the performance of the Virginia economy. In 2016, contractors in the Northern Virginia cities and counties of the Washington, D.C.-Arlington-Alexandria Metropolitan Statistical Area (MSA) accounted for almost 52% of procurement spending for the entire metro area.[1] Meanwhile, more than 81,000 military service members and almost 60,000 federal civilian employees worked in the Virginia Beach-Norfolk-Newport News MSA (Hampton Roads) in 2017. In fiscal year (FY) 2018, federal government awards in Virginia totaled $109 billion,[2] or $12,866 per Virginian – among the highest in the nation. The Commonwealth economy is fueled, in part, by spending decisions in the halls of Congress and the White House.

Federal spending impacts the lives of many Virginians on a daily basis. Federal dollars flow into the Commonwealth as direct payments to retirees, veterans and the disabled. Federal grants pay for research on everything from the impact of the opioid crisis to how to plan for sea level rise. Federal funds may even pay part of the costs for the construction of sidewalks in low-income neighborhoods in Lynchburg.[3]

1   Keith Waters, (2017), "Federal procurement spending in the Washington Region: 2008-2016," Report, The Stephen S. Fuller Institute, George Mason University.
2   An award is money the federal government has promised to pay a recipient. Funding may be awarded to a company, organization, government entity or individual. It may be obligated (promised) in the form of a contract, grant, loan, insurance, direct payment, etc.
3   https://wset.com/news/local/lynchburg-mayor-pushing-for-99-million-sidewalk-project-in-a-low-income-area.

In many cases, the most visible expenditures of federal funds in Virginia are the purchase of products and services from the private sector, ranging from the building of ships in Newport News to contracts for information technology services in Arlington.

How dependent is Virginia on federal dollars? The answer depends on the measure. In FY 2018, for example, California received $311.7 billion in federal awards, Pennsylvania $209.1 billion, Texas $206.4 billion, Virginia $109 billion and Kentucky $89.6 billion. Absolutely, other states received significantly more in federal awards than the Commonwealth. However, if we adjust for population, Kentucky received $20,126 per capita, Pennsylvania $16,333, Virginia $12,866, California $7,885 and Texas $7,293.

While comparing the size of federal spending across states provides a measure of its magnitude, this does not convey the share of overall economic activity that arises from such spending. Gross domestic product (GDP) is a broad measure of economic activity that provides an estimate of the final value of goods and services in an area over a specific period of time. In 2017, Virginia's nominal GDP was $510.4 billion, of which $31.6 billion (6.2%) was attributed to federal civilian activity and $19.1 billion (3.7%) to military activity.[4] In other words, the economic activity of the military and federal civilian sectors directly contributed approximately 9.9% to Virginia's GDP that year.

In 2017, Virginia ranked fourth among U.S. states in the share of GDP attributed to military and federal civilian activity. Only Maryland, New Mexico and Hawaii had a higher share of GDP from these sources. To put this into perspective, the average for the nation for military and federal civilian activity as a percentage of GDP was 3.9% in 2017. Regardless of the measure, Virginia ranks among the top states in terms of total federal spending.

What makes the Commonwealth different is how federal spending flows into the state. As a percentage of federal awards in 2018, for example, contract awards were only 8.1% of total federal awards for Pennsylvania, 18.5% for California and 22.7% for Texas. Contracts were 53.6% of all awards for Virginia. **Virginia's federal fortunes are more directly tied to the ebb and flow of federal contract spending than many other states.**

Federal procurement spending,[5] that is, the purchase of goods and services from private-sector firms, flows throughout the Commonwealth. Even though the majority of federal procurement spending is concentrated in Hampton Roads and Northern Virginia,[6] nine of Virginia's metropolitan areas had federal procurement spending over $500 per capita in FY 2017. To examine how changes in federal spending affect the economies of Hampton Roads and Northern Virginia, we focus on the impact of the Budget Control Act of 2011 (BCA) on Department of Defense (DOD) spending. These two metro areas account for the majority of federal procurement spending in the Commonwealth and were significantly impacted by the BCA and its subsequent modifications.

We estimate that defense procurement spending declined by $1.5 billion in the Hampton Roads metropolitan area, from FY 2011 to FY 2014, due to the BCA. GDP in Hampton Roads was approximately 3% lower than it would have been in the absence of the cuts in defense spending. In Northern Virginia, defense procurement spending declined 29% from 2011 to 2017. The decline in spending lowered economic activity in the region by over 4%. These declines explain, in part, the tepid performance of Virginia's economy in the first half of the current decade.

Understanding how changes in procurement spending affect economic activity in Virginia is key to improving our economic resiliency. The federal government's fiscal position is unsustainable in the long term and defense spending is the largest discretionary component of the federal budget. Preparing for possible reductions in defense spending is not inviting disaster; it is recognizing that what has come before may happen again.

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4   Bureau of Economic Analysis, Table SAGDP2N Gross domestic product (GDP) by state, 2017. Data for 2018 were not available for the federal civilian and military sectors as of October 2019.

5   Our measure of federal procurement spending is based on the individual federal procurement contracts from USAspending.gov. Some large federal contracts take place across fiscal years, therefore we use the original contract awards and subsequent modifications in conjunction with the starting and ending date to create a spending path for each contract. Each contract-spending path is constructed by allocating the award equally over the relevant time frame.

6   We define Hampton Roads as the Virginia Beach-Norfolk-Newport News, VA-NC, metropolitan statistical area, and Northern Virginia as consisting of the following independent counties and cities: the counties of Arlington, Clarke, Culpeper, Fairfax, Fauquier, Loudoun, Madison, Prince William, Rappahannock, Spotsylvania, Stafford and Warren; and the cities of Alexandria, Fairfax, Falls Church, Fredericksburg and Manassas Park.

Not Just Northern Virginia And Hampton Roads: Federal Spending Across Virginia

According to the Bureau of Economic Analysis, federal government consumption and investment expenditures accounted for 6.6% of U.S. GDP in 2017, while federal civilian and military activities contributed 9.2% of Virginia's GDP in 2017. Table 1 illustrates the contribution of federal spending to GDP, by selected categories, for each of Virginia's metropolitan areas in 2017.

Total federal spending ranged from a low of 0.1% of metro GDP in the Winchester MSA to a high of 26.7% of metro GDP for Northern Virginia. A number of metropolitan areas had nontrivial amounts of federal procurement spending, illustrating how the impact of the federal government is spread across the Commonwealth. As one might expect, federal civilian wages were highest in Northern Virginia, while military wages were highest in Hampton Roads.

It's easy to lose sight in those large headline numbers for Northern Virginia and Hampton Roads that federal spending is an important driver of economic activity in other regions. For example, the Richmond, Charlottesville and Roanoke metro areas had 4% or more of their GDP coming from federal spending in 2017. However, the spending originates from different sources, with Charlottesville's coming from overall procurement spending, while Richmond and Roanoke get approximately 2.5% of GDP from federal civilian wages. With over 10% of economic activity in 2017 associated with federal government procurement contracts, Northern Virginia and Hampton Roads' economic fortunes wax and wane, to some extent, on federal government spending and, in particular, DOD procurement spending.

TABLE 1

CATEGORIES OF FEDERAL SPENDING AS A PERCENTAGE OF GDP: SELECTED METROPOLITAN STATISTICAL AREAS, VIRGINIA AND THE UNITED STATES, 2017

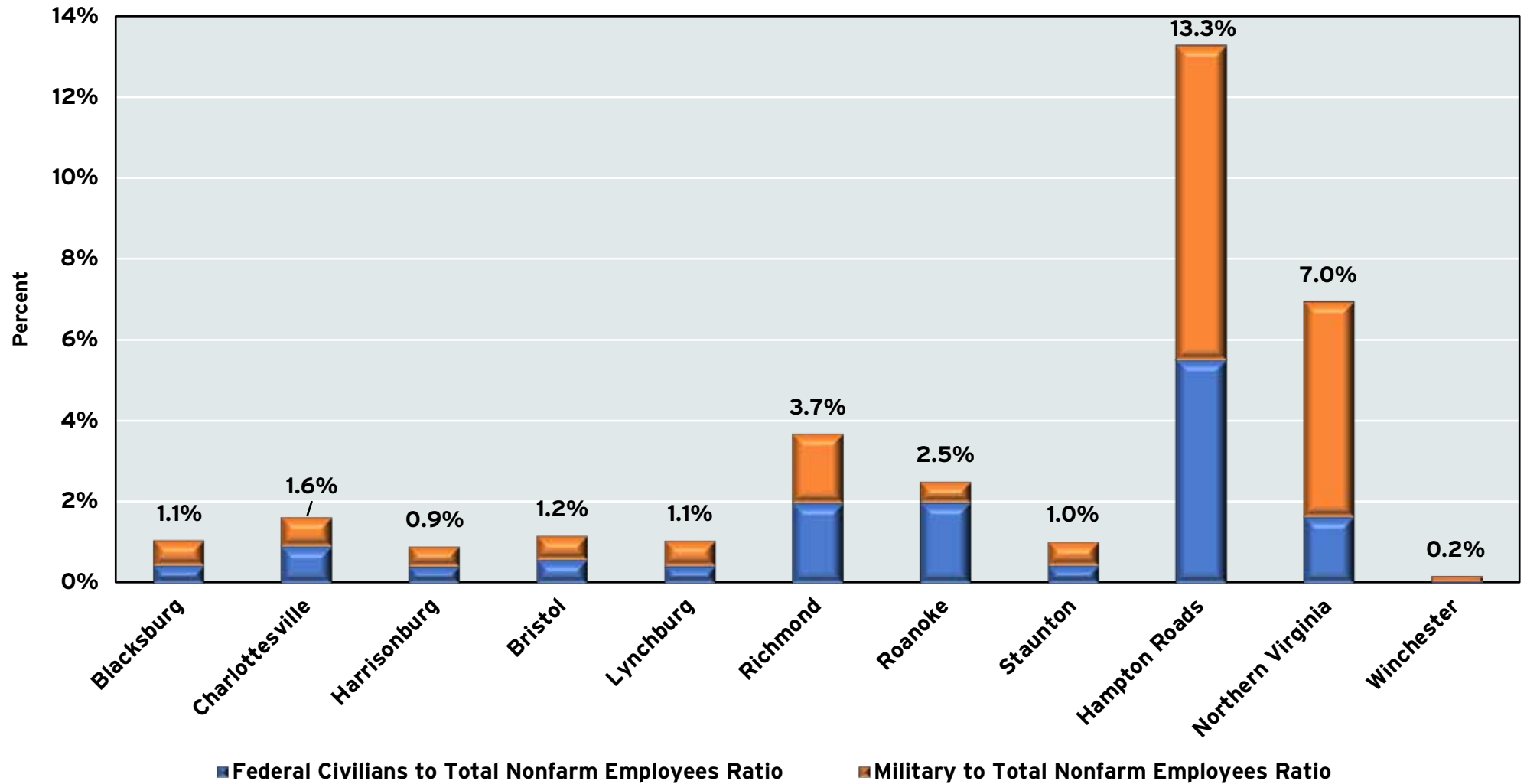|	TOTAL FEDERAL SPENDING	TOTAL PROCUREMENT SPENDING	FEDERAL CIVILIAN WAGES	MILITARY WAGES
United States	4.2%	1.8%	1.7%	0.7%
Virginia	18.2%	10.5%	5.2%	2.5%
Blacksburg	3.4%	2.5%	0.6%	0.4%
Charlottesville	4.5%	2.4%	1.3%	0.7%
Harrisonburg	1.5%	1.0%	0.4%	0.2%
Lynchburg	3.0%	2.2%	0.5%	0.3%
Richmond	5.0%	1.3%	2.4%	1.3%
Roanoke	4.0%	1.0%	2.7%	0.2%
Staunton	0.7%	0.0%	0.5%	0.2%
Hampton Roads	25.3%	10.3%	6.9%	8.1%
Northern Virginia	26.7%	14.0%	11.5%	1.2%
Winchester	0.1%	0.0%	0.0%	0.0%

Sources: USA Spending (2019); Bureau of Economic Analysis (2019); and the Dragas Center for Economic Analysis and Policy, Old Dominion University

Graph 1 displays the ratio of military and federal civilian jobs to total nonfarm jobs for Virginia's metropolitan areas in 2017. Hampton Roads and Northern Virginia had the highest percentages of nonfarm payrolls associated with the federal government that year, followed by Richmond and Roanoke.

GRAPH 1

RATIO OF MILITARY AND FEDERAL CIVILIAN EMPLOYEES TO TOTAL NONFARM EMPLOYEES: METROPOLITAN AREAS IN VIRGINIA, 2017

■Federal Civilians to Total Nonfarm Employees Ratio   ■Military to Total Nonfarm Employees Ratio

Sources: Bureau of Economic Analysis (2019) and the Dragas Center for Economic Analysis and Policy, Old Dominion University

Graph 2 illustrates the composition of federal procurement contracts in Virginia in FY 2017. Federal agencies negotiated more than $53 billion in procurement contract spending with private-sector firms. To put this into context, that is approximately 75% of the total 2017 GDP for the state of West Virginia. The Department of Defense accounted for almost two-thirds of all federal procurement contracts, almost 10 times higher than the next department or agency. This illustrates the distinctive relationship between the Commonwealth and the DOD; not only is Virginia home to the world's largest Navy base, but a majority of federal funds flowing into the Commonwealth are for contracts for goods and services, followed by transfer payments to individuals.

Table 2 presents federal procurement contract spending awards per capita for FY 2017 for Virginia's metropolitan areas, Virginia and the United States. Northern Virginia had the highest level of procurement spending per capita, over two times that of the next metro area, Hampton Roads. The separation between Hampton Roads and the next metro area illustrates the disparity in federal procurement spending. In Hampton Roads, procurement spending per capita was four times that of the Charlottesville MSA.

Of particular interest is the degree of dependency on DOD procurement spending. While Northern Virginia had the highest procurement spending per capita, this spending was almost evenly split between DOD and non-DOD sources. In FY 2017, 57% of procurement spending in Northern Virginia originated from the DOD. For Hampton Roads, on the other hand, 90% of procurement spending in FY 2017 flowed from DOD sources. The differences suggest that future changes in DOD and non-DOD procurement spending would have different impacts in these metro areas.
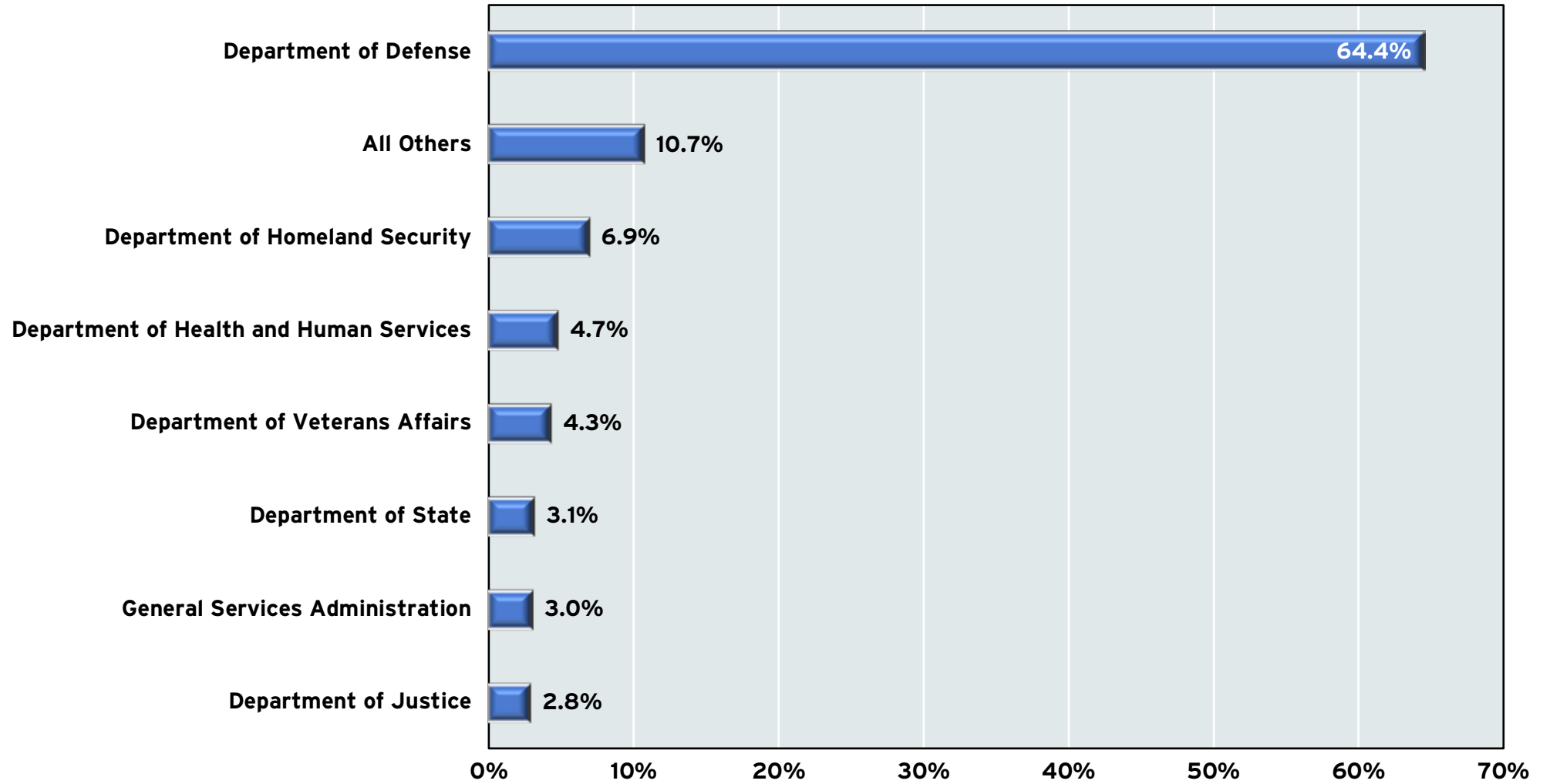
TABLE 2			
FEDERAL PROCUREMENT CONTRACT AWARDS PER CAPITA: METROPOLITAN AREAS IN VIRGINIA, FISCAL YEAR 2017			
MSA	**DOD PROCUREMENT SPENDING PER CAPITA**	**NON-DOD PROCUREMENT SPENDING PER CAPITA**	**TOTAL PROCUREMENT SPENDING PER CAPITA**
United States	$755	$341	$1,096
Virginia	$4,081	$2,253	$6,334
Northern Virginia	$7,530	$5,611	$13,141
Hampton Roads	$5,260	$561	$5,821
Charlottesville	$1,085	$343	$1,428
Blacksburg	$831	$161	$992
Richmond	$687	$182	$869
Lynchburg	$794	$57	$851
Bristol	$747	$25	$772
Harrisonburg	$487	$116	$603
Roanoke	$328	$194	$522
Staunton	$6	$12	$18
Winchester	$0	$0	$0.6

Sources: USA Spending (2019); Bureau of Economic Analysis (2019); and the Dragas Center for Economic Analysis and Policy, Old Dominion University

GRAPH 2

PERCENTAGE OF FEDERAL PROCUREMENT CONTRACTS BY DEPARTMENT AND AGENCY: VIRGINIA, FISCAL YEAR 2017

Department/Agency	Percentage
Department of Defense	64.4%
All Others	10.7%
Department of Homeland Security	6.9%
Department of Health and Human Services	4.7%
Department of Veterans Affairs	4.3%
Department of State	3.1%
General Services Administration	3.0%
Department of Justice	2.8%

Sources: USA Spending (2019) and the Dragas Center for Economic Analysis and Policy, Old Dominion University

What Do Federal Contracts Buy In Virginia?

Firms in Virginia provide products and services for almost all of the U.S. federal agencies. However, many of these agencies receive a relatively small proportion of the overall procurement spending in the Commonwealth. The DOD is the Commonwealth's largest customer and accounted for 64% of the federal government's procurement purchases in Virginia in 2017.

Graph 3 shows the assortment of goods and services the DOD procured in Virginia in FY 2011, 2015 and 2017. The categories ranged from the construction of ships, small crafts, pontoons and floating docks to high-tech research and development services. The composition of the expenditures in these categories has stayed relatively constant over the last decade.

There is a clear distinction in DOD procurement patterns between metropolitan areas in Virginia. Hampton Roads, for example, has military ship construction roots that date back to the early 1800s and the region's forte has been to maintain, train and assemble forces and systems. Naval Air Station Oceana is the Navy's East Coast master jet base, home to F/A-18 Hornets and Super Hornets. The base, including Dam Neck Annex, has about 10,500 active Navy personnel, as well as 10,000 family members and 4,500 civilian personnel.[7] Hampton Roads' active-duty forces primarily focus on being prepared to support the nation's military objectives.

Private-sector firms with DOD procurement contracts in Hampton Roads focus on assembling, maintaining and supporting the operations of people and weapons systems. Shipbuilding, along with maintenance, repair and rebuilding of equipment (often related to ships), almost exclusively takes place in Hampton Roads. Huntington Ingalls Industries in Newport News is far and away the largest firm in these categories and in procurement contracts as a whole in the region. The Newport News facility is the nation's sole designer, builder and refueler of nuclear-powered aircraft carriers and one of only two shipyards with the ability to design and build nuclear-powered submarines.
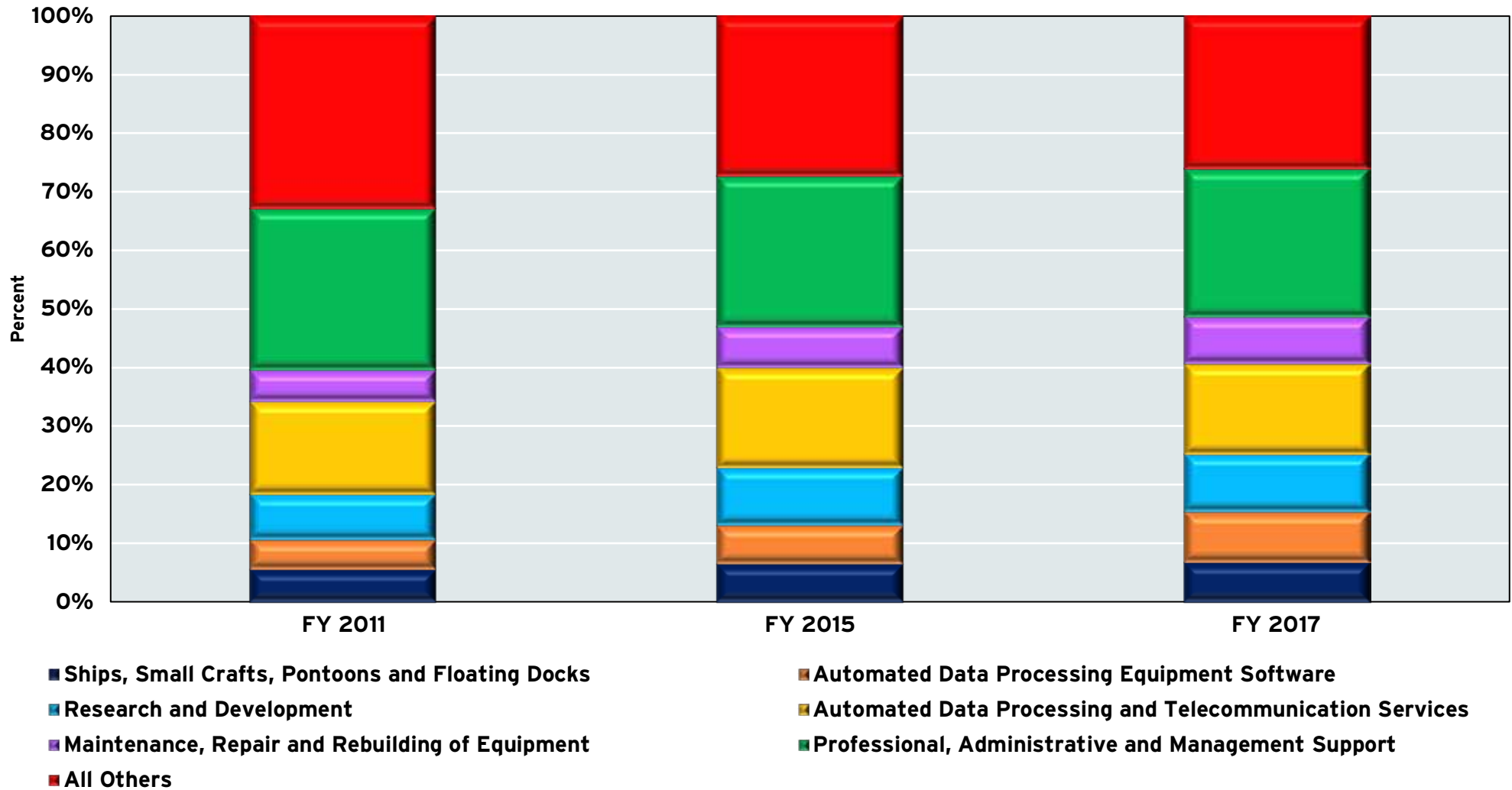
Three different major DOD spending categories – automated data processing services, automated data processing equipment and software, and professional, administrative and management support – all have strong footholds in Northern Virginia. These largely technology-based service industries do have spending sprinkled in other places. Hampton Roads, for example, accounts for approximately 13% of the spending in these areas. Companies in this technology-based industry service government contracts and conduct business with other private-sector firms. In general, Northern Virginia focuses more on services, while Hampton Roads concentrates more on products.

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7   https://www.cnic.navy.mil/regions/cnrma/installations/nas_oceana.html.

GRAPH 3

BREAKDOWN OF VIRGINIA DEPARTMENT OF DEFENSE CONTRACTS BY CATEGORY, FISCAL YEARS 2011, 2015 AND 2017

- ■ Ships, Small Crafts, Pontoons and Floating Docks
- ■ Research and Development
- ■ Maintenance, Repair and Rebuilding of Equipment
- ■ All Others
- ■ Automated Data Processing Equipment Software
- ■ Automated Data Processing and Telecommunication Services
- ■ Professional, Administrative and Management Support

Sources: USA Spending (2019) and the Dragas Center for Economic Analysis and Policy, Old Dominion University

A Shift In People And Money: 1983-2008

To understand how changes in Department of Defense procurement spending influence economic activity in Virginia, we need to look at how DOD spending has evolved over time in the Commonwealth. From 1983 to 2008, there was a shift in how federal funds flowed into Virginia. Graph 4 illustrates how federal civilian and military employment changed over this period. The number of military personnel stationed in the Commonwealth peaked at almost 214,000 service members in 1989, declining steadily to approximately 161,000 in 2008. From 1983 to 2008, the number of military personnel in Virginia fell by almost 25%.

The number of federal civilian employees in Virginia climbed from approximately 170,000 in 1983 to slightly over 192,000 in 1992. By 2001, the number of federal civilian employees had fallen 18.3% to approximately 157,000. The number of employees then steadily increased, eclipsing 176,000 in 2008. Even with the increase after 2001, the total number of federal civilian employees in Virginia was 8.2% below the peak of 1992.

While the number of federal personnel (military and civilian) was well below the historical peak in 2008, procurement spending continued to rise in Virginia from 1983 to 2008. Graph 5 displays the 156% increase in DOD procurement and 700% increase in non-DOD procurement spending in the Commonwealth over this period. **Graphs 4 and 5 reveal a stark contrast in the evolution of federal spending from 1983 to 2008: fewer military personnel and civilian employees, more contracts.**

The rise in federal procurement contracts reflected a philosophical change to the question of whether the federal government should produce goods and services or contract with the private sector to produce goods and services. Debates over outsourcing were largely settled in favor of proponents of the argument, and an increasing number of functions were contracted out to the private sector. What began with janitorial and food service functions evolved to encompass what was once considered core functions of the federal government, to include intelligence and asset protection.
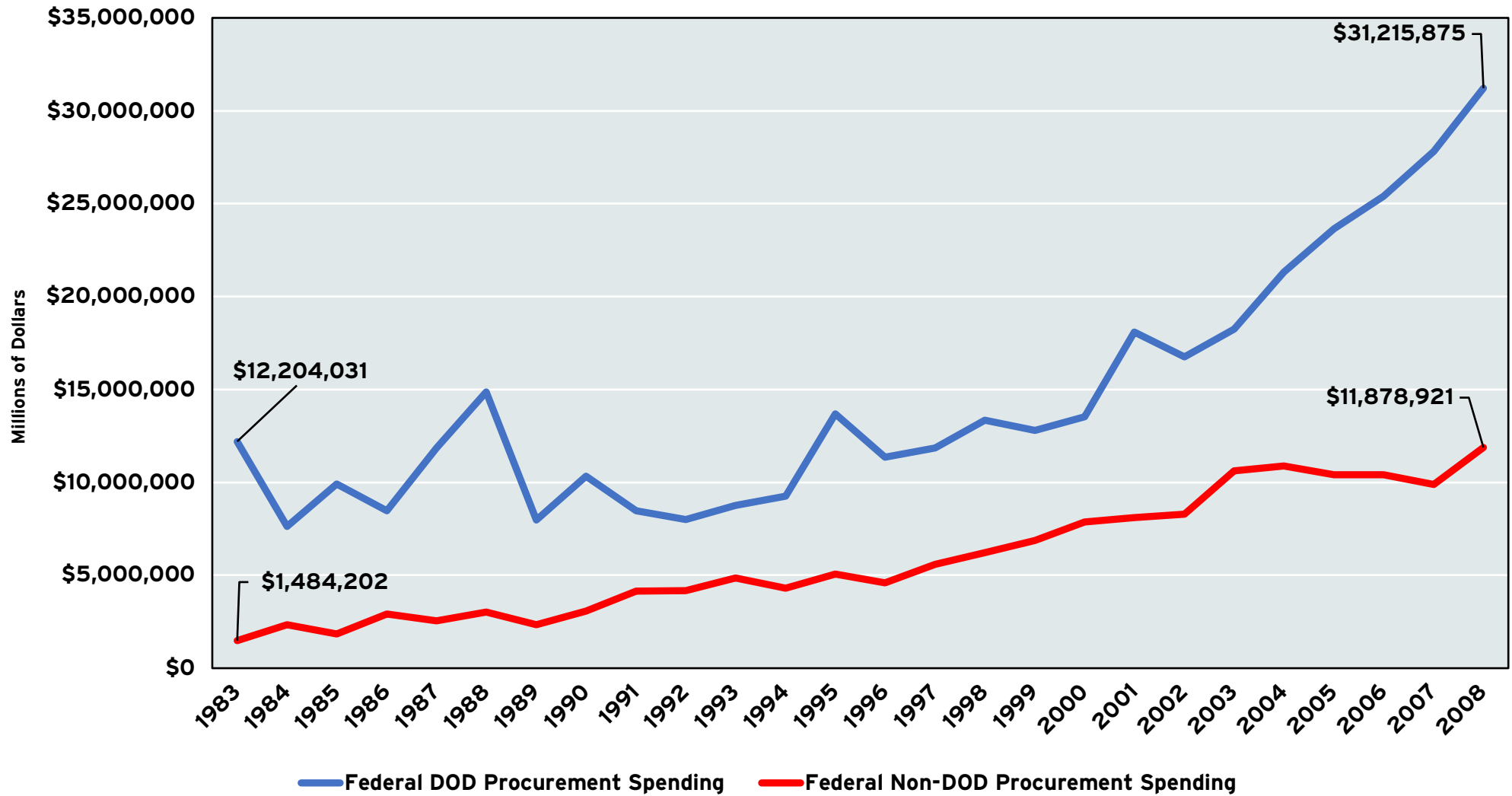
GRAPH 4

**TOTAL FEDERAL CIVILIAN AND MILITARY EMPLOYMENT:
VIRGINIA, 1983-2008**
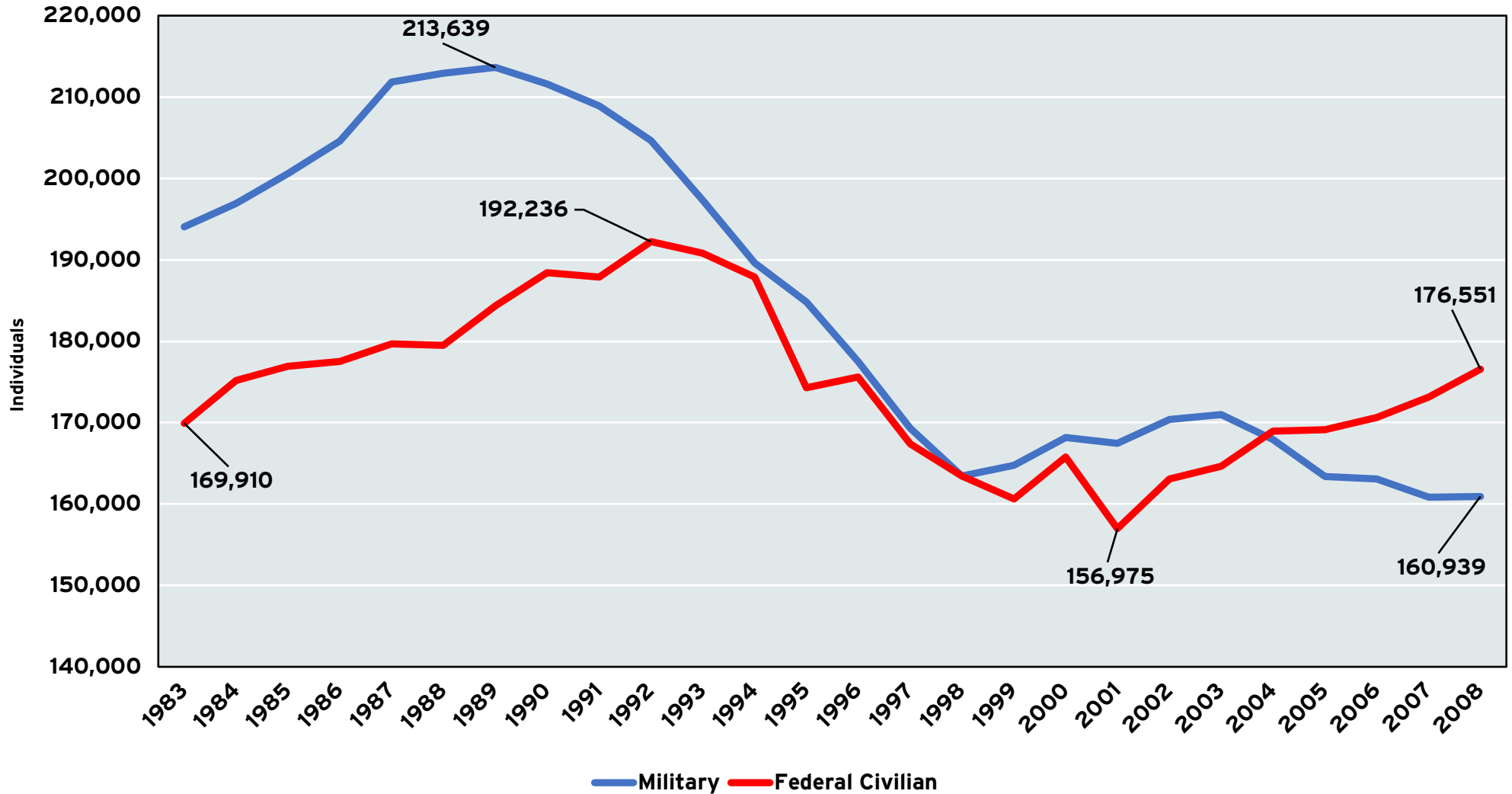
Source: Bureau of Economic Analysis, 2019

GRAPH 5

**DOD AND NON-DOD PROCUREMENT SPENDING:
VIRGINIA, 1983-2008**

Sources: Consolidated Federal Funds Report, Bureau of Economic Analysis and Bureau of Labor Statistics (BLS). Procurement spending is adjusted for inflation to 2000 dollars with the BLS Urban Consumer Price Index.

The Budget Control Act Of 2011

Each non-exempt account within a category shall be reduced by a dollar amount calculated by multiplying the enacted level of sequestrable budgetary resources in that account at that time by the uniform percentage necessary to eliminate a breach within that category.

> – Section 101 of the Budget Control Act of 2011 modifying Section 251(a)(2) of Balanced Budget and Emergency Deficit Control Act of 1985

The Northern Virginia and Hampton Roads metropolitan area economies were (and remain) the most dependent in the Commonwealth on federal spending. In this section, we examine how declines in federal spending from the Budget Control Act of 2011 impacted the economies of these metros. While the threat of sequestration has receded for now, understanding how declines in federal spending might impact the Commonwealth in the future is important to address concerns about economic resiliency.

The BCA stemmed from a showdown between members of Congress on raising the debt ceiling. The political debate centered on the appropriate level of government spending and the size of the national debt. The passage of the BCA averted the debt ceiling crisis but also brought the word "sequestration" back into the American lexicon. Sequestration entails removing, or "sequestering," funds that have been approved by Congress and otherwise would have been spent. The modern notion of sequestration dates back to the mid-1980s. The Gramm-Rudman-Hollings Act of 1985 (revised in 1987 and again in 1990) was the most recent incarnation of sequestration prior to the passage of the BCA.

The BCA set statutory limits on defense discretionary and nondefense discretionary spending for FY 2012 to FY 2021. Table 3 illustrates the initial limits on discretionary defense spending. The BCA also established the Joint Select Committee on Deficit Reduction, which was charged with coming to an agreement to reduce the deficit by $1.2 trillion over the 10-year period. Failing an agreement, the BCA contained a provision to automatically impose reductions to the discretionary spending limits for each year through FY 2021. Furthermore, the BCA required the automatic sequestration of nonexempt mandatory spending programs if discretionary spending appropriations exceeded the spending limits it established.

Table 3 illustrates the initial BCA limits on defense discretionary spending and the subsequent reduction in January 2012, when the Joint Select Committee failed to reach an agreement on how to reduce the deficit. While the American Taxpayer Relief Act of 2012 delayed the FY 2013 sequester from January 2013 to March 2013, the Department of Defense faced a sequester of appropriations in FY 2013. To say this was disruptive would be an understatement. The delay in the start of the sequester meant that many civilian employees were furloughed, maintenance was delayed and operations were slowed significantly in some areas.

The BCA focused on discretionary defense and nondefense federal spending. Thus, Social Security and Medicaid were exempt from the spending caps. However, the BCA included a 2% limit on any reductions in spending for Medicare and certain health care programs in the nondefense spending cap. Furthermore, the BCA excluded military personnel pay from the discretionary defense spending limit. This created important differences in how the BCA caps impacted the DOD and all nondefense agencies.

Table 3 also shows the modifications of the BCA spending caps this decade. The most recent change, the Bipartisan Budget Act of 2019, increased the discretionary defense cap by $90 billion for FY 2020 and $81 billion for FY 2021. Under current law, there are no caps for defense and nondefense discretionary spending past FY 2021. Congress can return to regular order for the budget process, although recent practice suggests that the process is neither regular nor orderly.

TABLE 3

DEFENSE DISCRETIONARY BUDGET AUTHORITY LIMITS UNDER THE BUDGET CONTROL ACT (AS AMENDED), AUGUST 2011 – CURRENT

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
BCA	Aug 2011	$555	$546	$556	$566	$577	$590	$603	$616	$630	$644
BCA Sequester	Jan 2012	$555	$492	$501	$511	$522	$535	$548	$561	$575	$589
ATRA	Jan 2013	$555	$518	$497	$511	$522	$535	$548	$561	$575	$589
BBA 2013	Dec 2013	$555	$518	$520	$521	$522	$536	$549	$562	$576	$590
BBA 2015	Nov 2015	$555	$518	$520	$521	$548	$551	$549	$562	$576	$590
BBA 2018	Feb 2018	$555	$518	$520	$521	$548	$551	$629	$647	$576	$590
BBA 2019	Aug 2019	$555	$518	$520	$521	$548	$551	$629	$647	$667	$672

Source: Congressional Research Service, "The Budget Control Act: Frequently Asked Questions. Updated Oct. 1, 2019," CRS Report, R44874

Examining The BCA's Impact On Virginia

Graph 6 shows how the Budget Control Act and the subsequent modifications impacted federal personnel in Virginia. Military personnel continued to decline, falling to slightly more than 137,000 in 2017. The 11% decline in military personnel from 2009 to 2017 was primarily the result of a smaller force structure in Hampton Roads. On the other hand, the federal civilian workforce grew by almost 15,000 employees (8%) over the same period. Overall, federal civilian and military employment declined by approximately 2,500 from 2009 to 2017.

Graph 7 illustrates the dramatic impact of the Budget Control Act on Department of Defense procurement spending in Virginia. DOD procurement spending peaked at $49.4 billion in FY 2011 and subsequently declined to $34.6 billion in FY 2017. Even though non-DOD procurement spending increased by about $1.0 billion from FY 2011 to FY 2017, DOD procurement spending declined by $14.9 billion over the same period. The net loss of approximately $13.8 billion in DOD procurement spending undoubtedly took some of the wind out of the Commonwealth's economic sails.

Table 4 further breaks these categories down between products, services, and research and development (R&D) for fiscal years 2011, 2014 and 2017. Between FY 2011 and FY 2017, DOD product spending declined by 27.1% (-$3.7 billion), while DOD services plummeted 33.9% ($-10.8 billion). DOD R&D fell 11.7% and non-DOD R&D dropped 37.9%, a troubling development given Virginia's desire to engage in innovation and research. There are two small measures of good news, however, which can be seen in Table 4. Non-DOD product purchases increased by 12.2% ($309 million) and non-DOD service spending increased by 7.6% ($1.0 billion) over the same period.

TABLE 4

VIRGINIA PROCUREMENT SPENDING BY PRODUCTS, SERVICES, AND RESEARCH AND DEVELOPMENT, FISCAL YEARS 2011, 2014 AND 2017 (IN BILLIONS OF $)

SPENDING CATEGORY	2011	2014	2017	PERCENT CHANGE 2011-2014	PERCENT CHANGE 2011-2017
Products DOD	$13,717	$10,280	$9,995	-25.1%	-27.1%
Products Non-DOD	$2,527	$2,736	$2,836	+8.3%	+12.2%
Services DOD	$31,818	$23,384	$21,044	-26.5%	-33.9%
Services Non-DOD	$14,387	$15,512	$15,475	+7.8%	+7.6%
Research and Development DOD	$3,825	$3,700	$3,376	-3.3%	-11.7%
Research and Development Non-DOD	$1,099	$812	$683	-26.1%	-37.9%

Sources: USA Spending and the Dragas Center for Economic Analysis and Policy, Old Dominion University. Data are adjusted for inflation to 2018 dollars with the Urban Consumer Price Index from the Bureau of Labor Statistics.
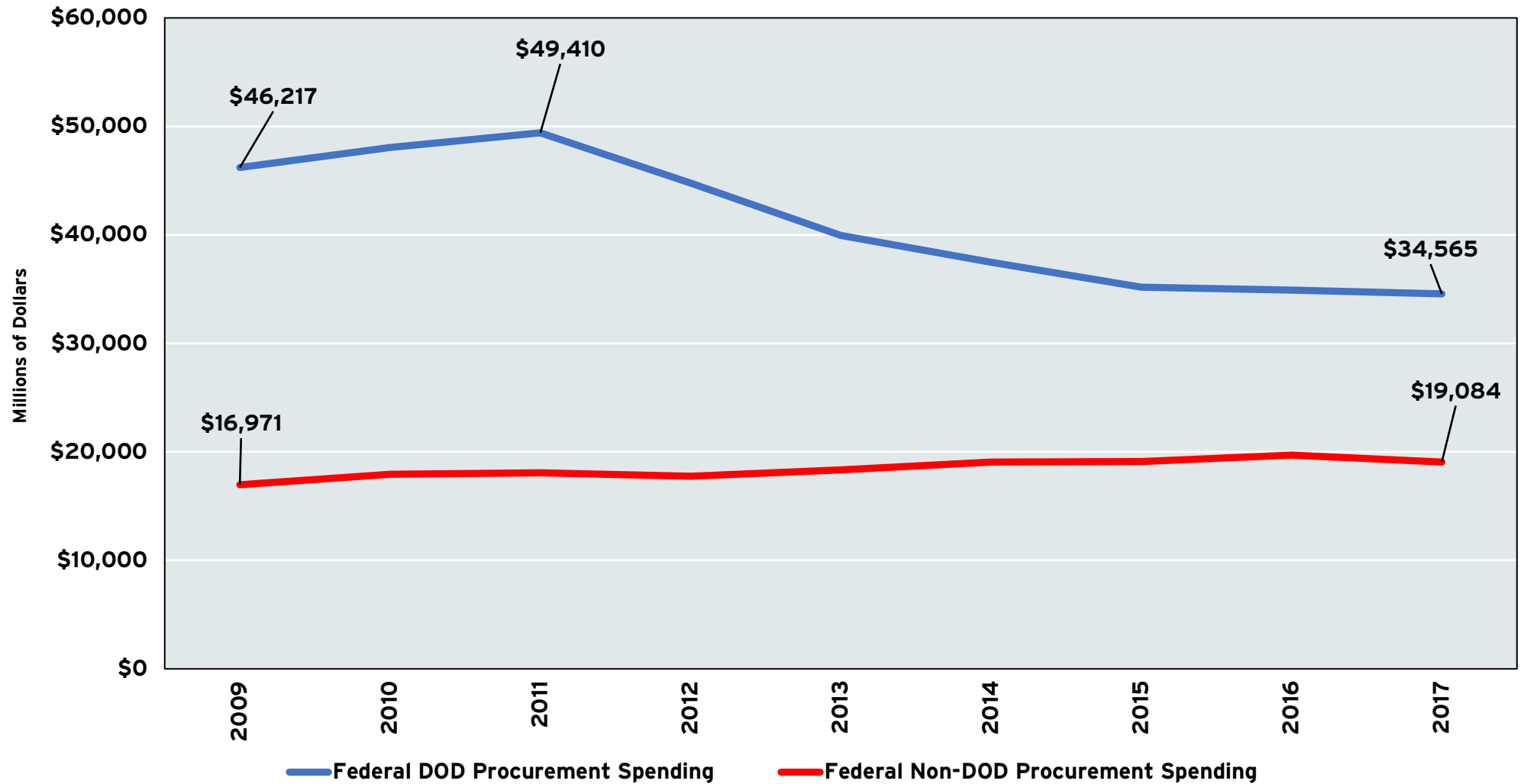
GRAPH 6

TOTAL FEDERAL CIVILIAN AND MILITARY EMPLOYMENT: VIRGINIA, 2009-2017
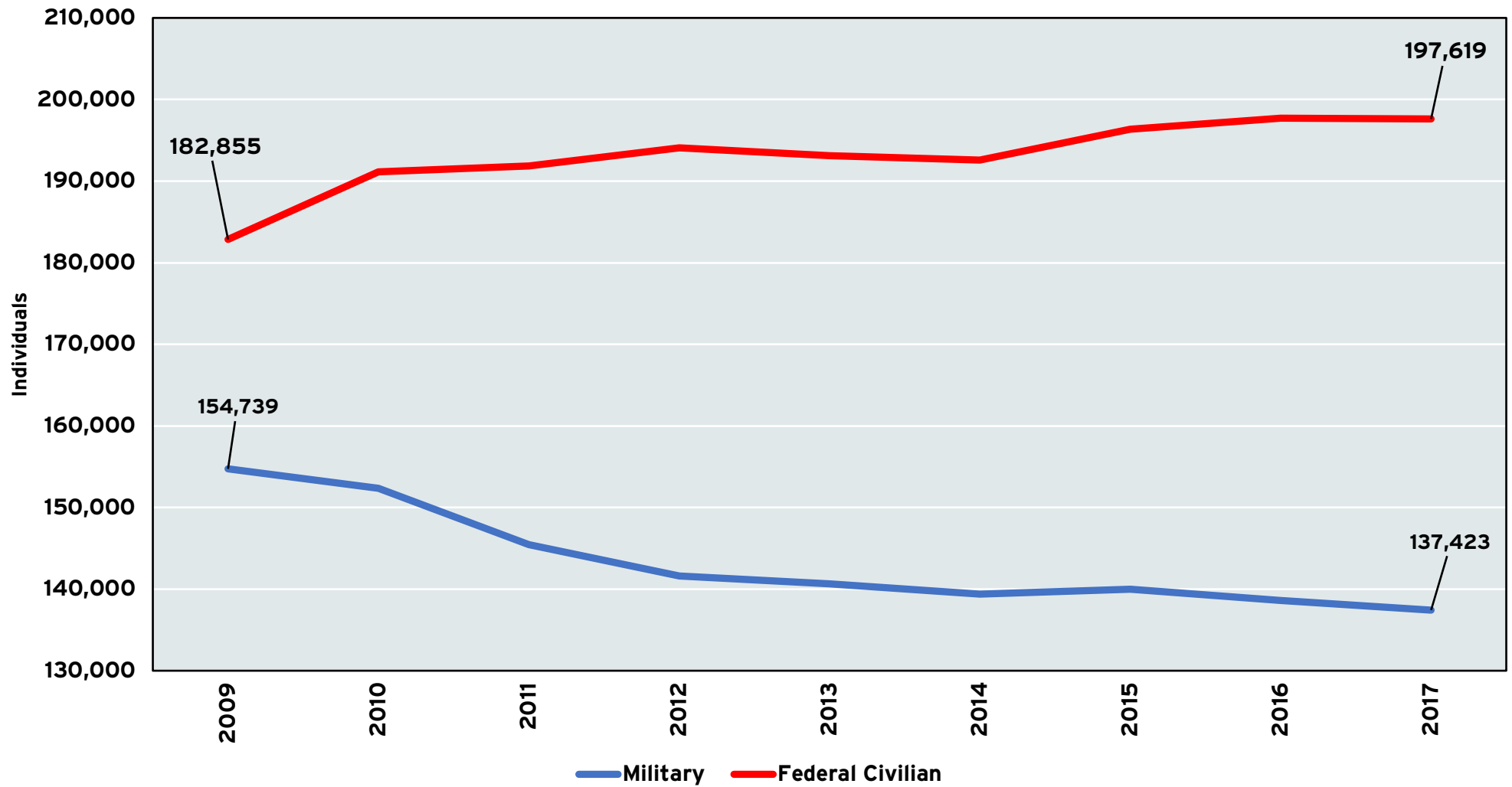
Source: Bureau of Economic Analysis, 2019

GRAPH 7

**DOD AND NON-DOD PROCUREMENT SPENDING:
VIRGINIA, FISCAL YEARS 2009-2017**

Sources: Consolidated Federal Funds Report, Bureau of Economic Analysis, and Bureau of Labor Statistics. Procurement spending is adjusted for inflation to 2000 dollars with the Urban Consumer Price Index from the Bureau of Labor Statistics.

A Primer On Economic Impact Analysis

To estimate the impact of sequestration and the subsequent caps on federal spending, we quantify the direct, indirect and induced economic impacts. We focus our analysis on changes in defense procurement spending from the Budget Control Act for Hampton Roads and Northern Virginia.

To understand our approach, it is helpful to imagine a pebble dropped into a puddle of water to visualize how the economy reacts to a change in procurement contracts. The impact represents the initial round of economic activity on output, earnings and employment. The initial round of economic activity ripples through the rest of the economy like the waves moving through the puddle. These ripples represent the indirect and induced impacts that come about through the interconnectedness of the local economy. The indirect economic impact comes from economic activity by suppliers to firms that have won Department of Defense procurement contracts. On the other hand, the induced impact comes from income and employment in industries directly and indirectly affected by direct procurement contracts.

These spillovers can create a total economic impact from DOD spending that is much larger than the direct impact on a firm that wins a contract. The notion of an economic multiplier summarizes the total economic impact of a change in economic activity. For example, if a firm wins a $1 million DOD contract (direct impact) that generates $300,00 in indirect economic impacts and $200,00 in induced economic impacts, then the economic impact multiplier effect is ($1,000,000 + $300,000 + $200,000) / $1,000,000 = 1.5.

There are two important considerations when evaluating economic multipliers. First, the size of the multiplier inherently depends on how much of the economic activity continues to recycle within the region. If, for example, shipbuilding and repair firms source most of their materials from outside of the region (a "leakage"), then the actual multiplier effect will necessarily be smaller. Second, the multiplier effect, where spending spills over to a variety of other sectors, is great when the direct impact is positive, however; it is equally painful when there is a reduction in direct economic activity.

To estimate the impact from DOD procurement spending on employment and output in the Hampton Roads and Northern Virginia metropolitan areas, we use defense-spending data from USAspending.gov and the JobsEQ software developed by Chmura Economics and Analytics. The JobsEQ software uses regional input-output tables to measure the connectedness of economic activity in the region.

The Economic Impact Of The BCA On Hampton Roads

As Hampton Roads and Northern Virginia received the lion's share of Department of Defense contracts prior to the passage of the Budget Control Act, we focus our analysis on the BCA's economic impact on these two metropolitan areas. First, we start with estimates of how the BCA impacted the Hampton Roads economy. Federal spending in Hampton Roads is concentrated in the manufacturing sector with the construction and maintenance of ships. Manufacturing procurement contracts comprised 56% of DOD contracts in 2011 and 52% in 2017. Graph 8 depicts the total economic impact of DOD spending on output in Hampton Roads, while Graph 9 shows the impact on employment. In 2011, the $10.4 billion in direct DOD procurement spending created a total output of $15 billion. This level plummeted in 2014.

As illustrated in Graph 8, direct DOD procurement spending declined from approximately $10.4 billion in FY 2011 to about $8.6 billion in FY 2014. As a result, the estimated economic impact of DOD spending in Hampton Roads declined from $15 billion in FY 2011 to $12.3 billion in FY 2014, an economic loss of $2.7 billion. In other words, the impact of the BCA equaled about 3% of the region's annual GDP.

Furthermore, the defense sector rebounded only slightly by 2017, with direct defense spending reaching about $8.9 billion. The total

economic impact of **DOD** spending increased from a low of $12.3 billion in **FY 2014** to $12.8 billion in **FY 2017.**

Graph 9 shows a similar detrimental employment effect from 2011 to 2014 and 2017. Overall, total employment from DOD procurement spending declined by 13,000 private-sector jobs from 2011 to 2014. By 2017, the total estimated employment loss had declined to approximately 8,000 jobs. If there is good news to report, it is that the increases in DOD spending in fiscal years 2018 and 2019 should raise the DOD's overall economic impact in Hampton Roads. Whether the DOD's overall contribution returns to the peak observed prior to the BCA remains an unanswered question.

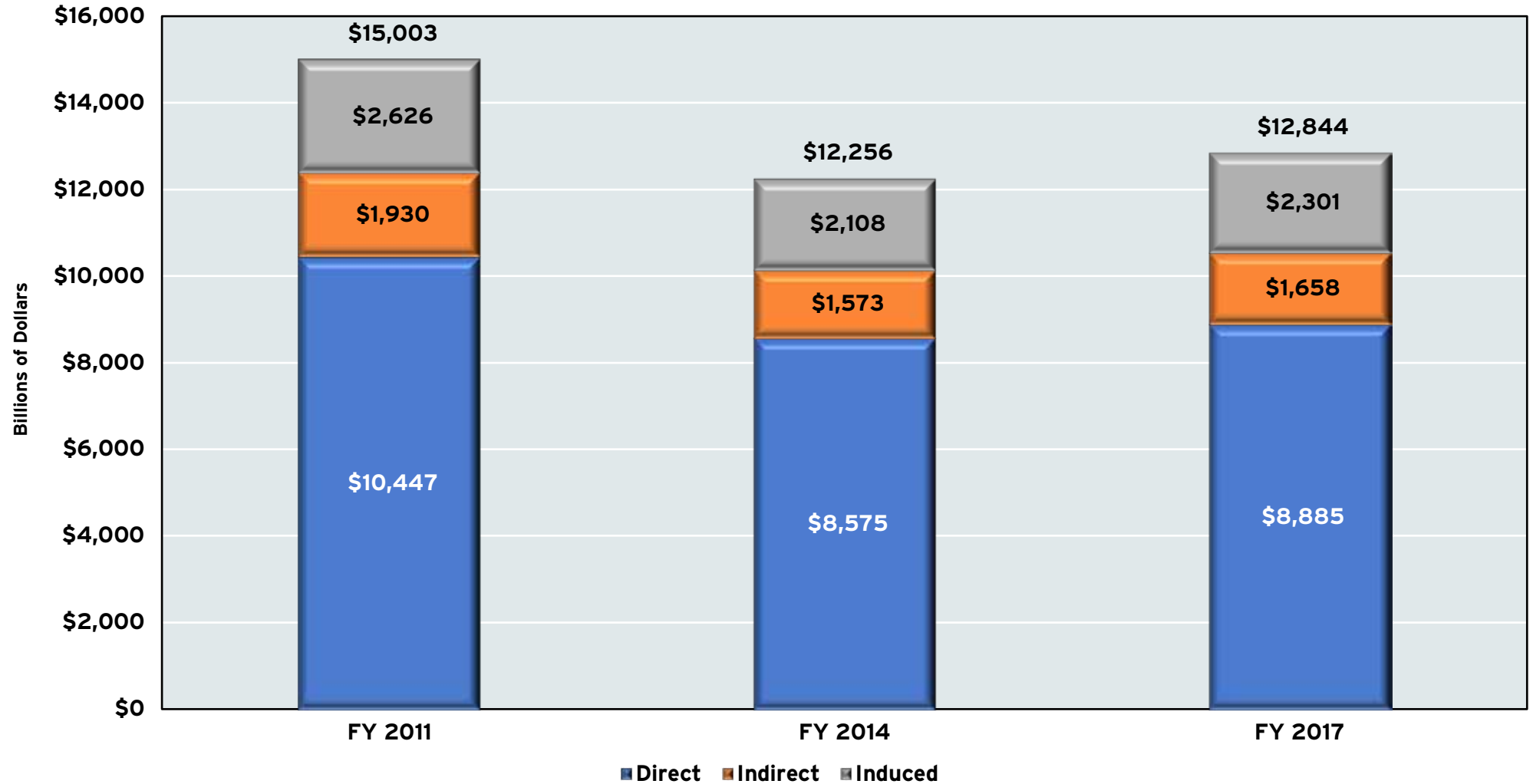# The Economic Impact Of The BCA On Northern Virginia

Northern Virginia had 61% of its procurement spending on professional, scientific and technical services in FY 2011. Graph 10 shows the total economic impact on output in Northern Virginia from declining Departmentof Defense spending, while Graph 11 shows the labor market impact. **The headline numbers are even starker in Northern Virginia than they are in Hampton Roads. Direct DOD procurement spending declined by $9.1 billion, leading overall output to decline between 2011 and 2017 by $14 billion, a 29% drop. This represented a drop of approximately 4.5% from Northern Virginia's GDP. By the same token, total employment declined by 28%, or 58,000 jobs.**
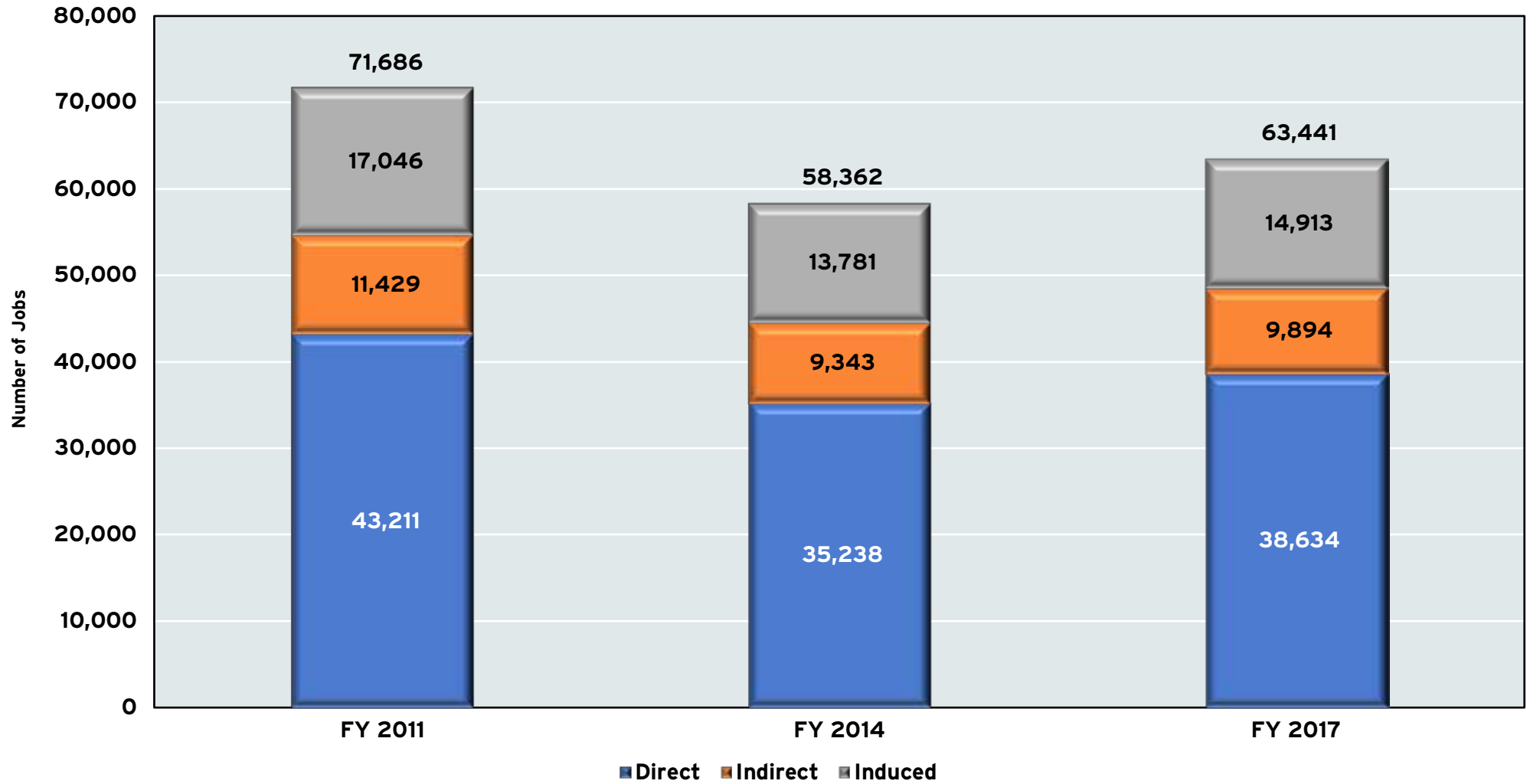
GRAPH 8

ESTIMATED ECONOMIC IMPACT OF DEFENSE PROCUREMENT SPENDING ON OUTPUT IN HAMPTON ROADS, FISCAL YEARS 2011, 2014 AND 2017

Billions of Dollars

$16,000
$14,000
$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$0

FY 2011 — $15,003
- Induced: $2,626
- Indirect: $1,930
- Direct: $10,447

FY 2014 — $12,256
- Induced: $2,108
- Indirect: $1,573
- Direct: $8,575

FY 2017 — $12,844
- Induced: $2,301
- Indirect: $1,658
- Direct: $8,885

■Direct ■Indirect ▨Induced

Sources: USA Spending, JobsEQ and the Dragas Center for Economic Analysis and Policy, Old Dominion University
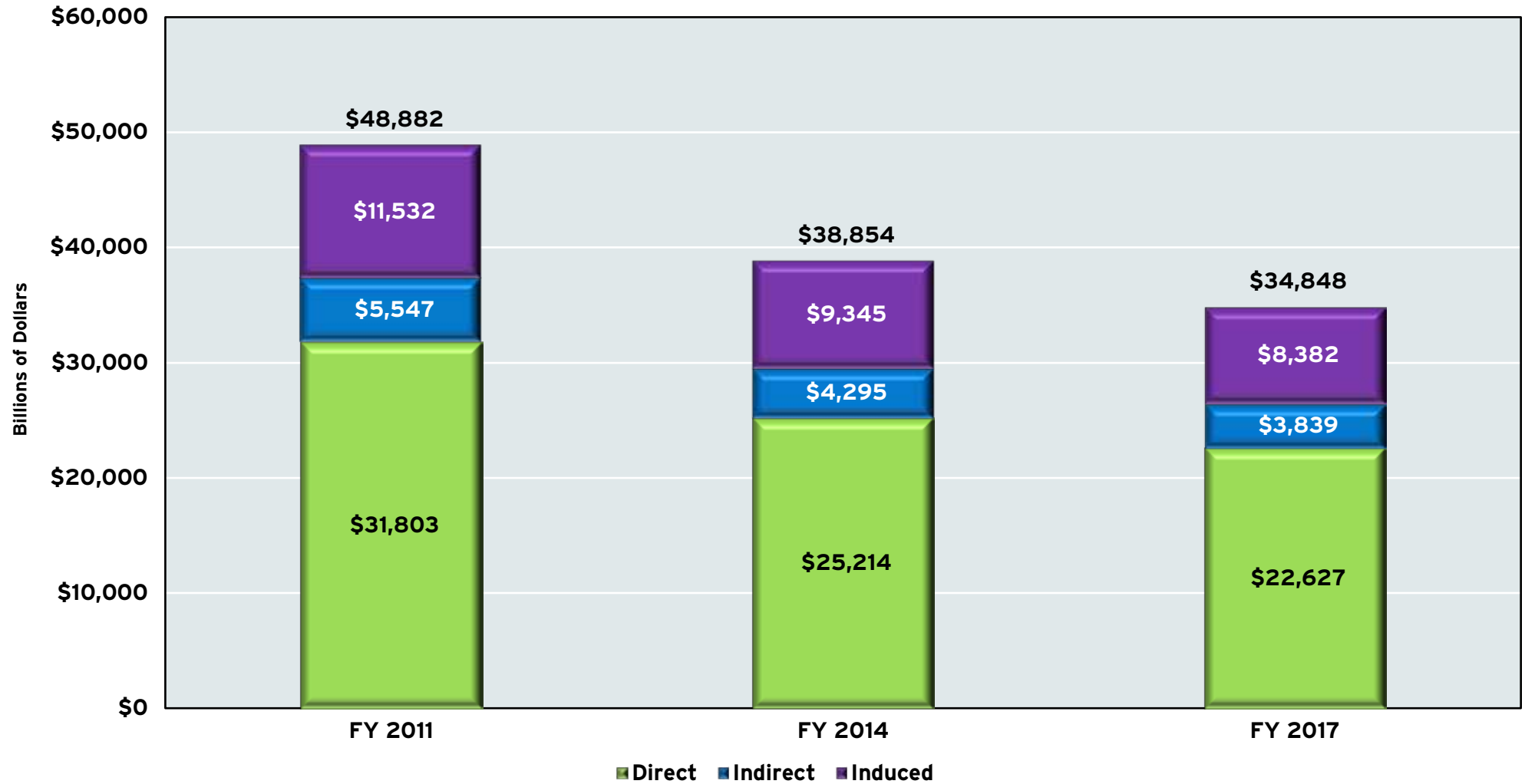
GRAPH 9

ESTIMATED ECONOMIC IMPACT OF DEFENSE PROCUREMENT SPENDING ON EMPLOYMENT IN HAMPTON ROADS, FISCAL YEARS 2011, 2014 AND 2017

Sources: USA Spending, JobsEQ and the Dragas Center for Economic Analysis and Policy, Old Dominion University

GRAPH 10

ESTIMATED ECONOMIC IMPACT OF DEFENSE PROCUREMENT SPENDING ON OUTPUT IN NORTHERN VIRGINIA, FISCAL YEARS 2011, 2014 AND 2017

Billions of Dollars

FY 2011: $48,882
- Induced: $11,532
- Indirect: $5,547
- Direct: $31,803

FY 2014: $38,854
- Induced: $9,345
- Indirect: $4,295
- Direct: $25,214

FY 2017: $34,848
- Induced: $8,382
- Indirect: $3,839
- Direct: $22,627

Direct   Indirect   Induced

Sources: USA Spending, JobsEQ and the Dragas Center for Economic Analysis and Policy, Old Dominion University

GRAPH 11

ESTIMATED ECONOMIC IMPACT OF DEFENSE PROCUREMENT SPENDING ON EMPLOYMENT IN NORTHERN VIRGINIA, FISCAL YEARS 2011, 2014 AND 2017
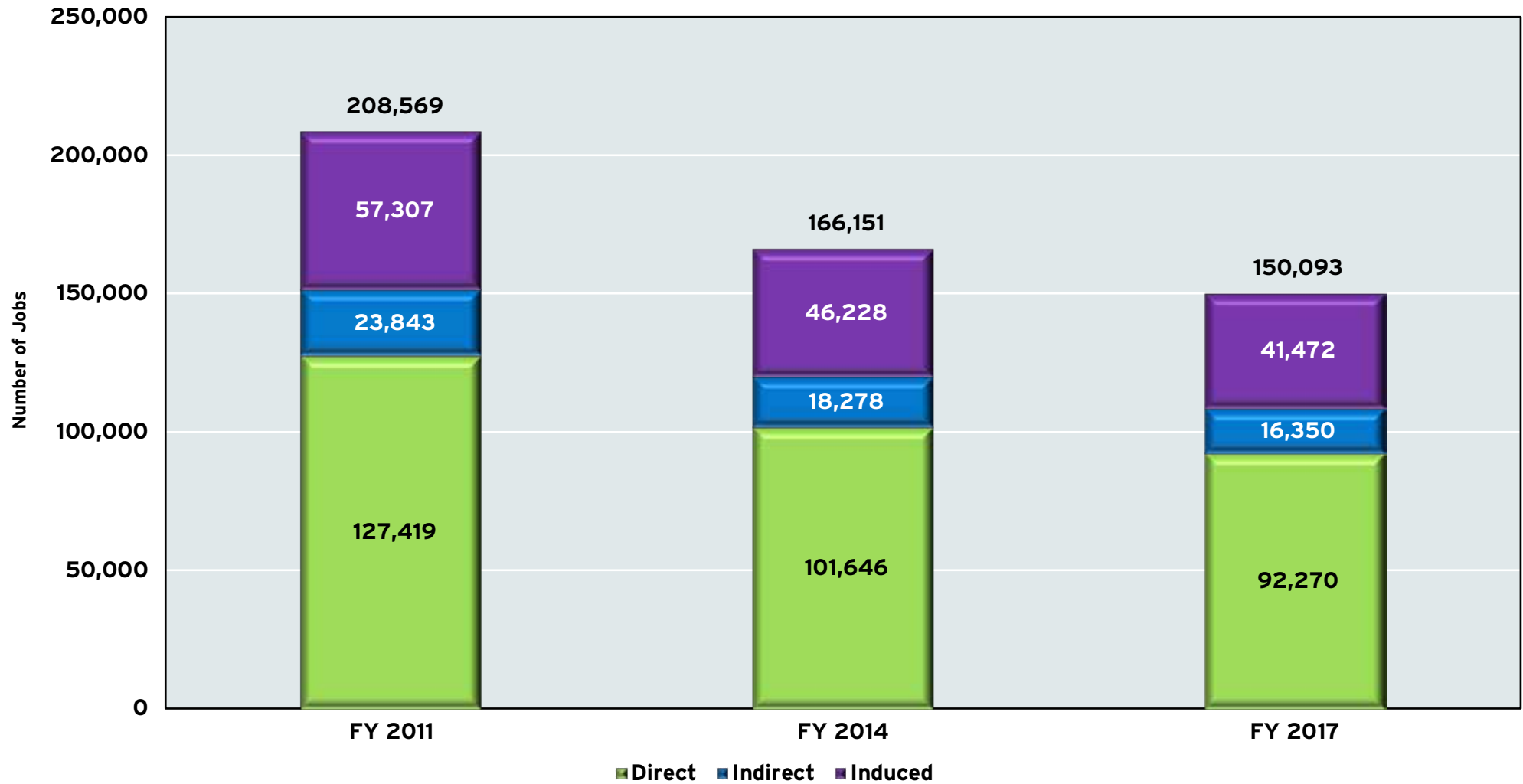
Sources: USA Spending, JobsEQ and the Dragas Center for Economic Analysis and Policy, Old Dominion University

Final Thoughts

Federal contracting is big business in the Commonwealth, particularly for the metropolitan areas of Northern Virginia and Hampton Roads. While aircraft carriers and the Pentagon are highly visible, many federal contracts are outside the media spotlight and only capture public attention when something goes wrong. We would be wrong to conclude that only Northern Virginia and Hampton Roads benefit from federal government procurement spending. Each metro area in Virginia has a hand in the federal cookie jar to some degree.

One unfortunate consequence of the Commonwealth's dependence on federal spending is that it can get its hand caught in the cookie jar. The BCA, sequestration and subsequent spending caps revealed Virginia's vulnerability to a slowdown in federal, and in particular, DOD, procurement spending. Northern Virginia and Hampton Roads both have experienced double-digit declines in output and employment related to DOD spending. Only recently, with increases in DOD spending, have we seen economic activity rebound in Hampton Roads. Northern Virginia, which has a more economically diverse economy, has grown more robustly but still has struggled at times this decade.

It is clear that changes in fiscal policy in Washington have the power to create a recession in some of Virginia's metropolitan areas. This dependence on federal spending could hurt the economies of Hampton Roads and Northern Virginia more in the future if decreases in federal spending continue. Even though the Bipartisan Budget Act of 2019 increased the caps for discretionary spending for defense and nondefense purposes, with the rising nominal national debt, the choice to increase the debt or start to cut discretionary spending is near. The eventual decision to curtail discretionary spending will undoubtably hurt Virginia, due to defense being the largest discretionary spending option to cut.

While the ailment is the same for Northern Virginia and Hampton Roads, nevertheless the treatment is likely different for the two regions. Northern Virginia is making strides diversifying its workforce, with Amazon HQ2 in Arlington as a prime example. In contrast, Hampton Roads still has work to do in alleviating some of the structural challenges it faces, such as sea level rise, and dealing with its reliance on DOD spending. Taking steps to reduce its reliance on defense spending would be highly beneficial, due primarily to the predicted decrease in discretionary defense spending over the next decade. Hampton Roads would benefit from promoting policies that encourage innovation and an entrepreneurial spirit. This would help the region leverage the idea of dual-use products and services. Hampton Roads already has experience and expertise in procuring government contracts. However, firms would also benefit by looking for outlets for their products in the private sector. For example, a company working on the next generation of marine propulsion equipment might have developed its technology initially for the military, yet this technology could also have valuable private-sector applications. The military-to-civilian transition is important also for private firms, business lines and spurring innovation.

Regardless of one's view of the size and scope of the federal government, we must deal with the stark reality that federal government spending provides fuel for the economic engine that drives the Commonwealth. Over the last two decades, the federal government's share in Virginia's GDP has declined, but the federal government still accounted for approximately 1 out of every 5 dollars of economic activity in our state in 2018. Virginia's distinctive relationship with the DOD is a strength in times of increasing budgets, and a challenge in times of increasing uncertainty, or constrained DOD budgets. Hampton Roads and Northern Virginia illustrate how DOD spending, to paraphrase the Book of Job, gives and takes away. The challenge of the coming decade is to recognize that no budget can increase forever and that a downturn in DOD spending will eventually come again. Investments in creating a skilled workforce, making infrastructure improvements and remaining friendly to businesses constitute a wise course of action. These policies not only complement Virginia's relationship with the federal government, but also improve the Commonwealth's attractiveness to private investment and job creation.