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JOHN CHAMBERS COLLEGE OF
BUSINESS AND ECONOMICS
WEST VIRGINIA
ECONOMIC
OUTLOOK
2020 - 2024

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WEST VIRGINIA ECONOMIC OUTLOOK

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P.O. Box 6527, Morgantown, WV 26506-6527| (304) 293-7831

WRITTEN BY THE BUREAU OF BUSINESS AND ECONOMIC RESEARCH

Brian Lego | Lead Author and Research Assistant Professor

John Deskins, Ph.D. | Director and Associate Professor of Economics

Eric Bowen, Ph.D. | Research Assistant Professor

Christiadi, Ph.D. | Research Associate, Demographer

Dallas Mullett | Program Coordinator

Aidan Farnum | Graduate Research Assistant

Shaun Gilyard | Graduate Research Assistant

Danielle Kaminski | Witt Scholar

William Wagstaff | Witt Scholar

EXPERT OPINION PROVIDED BY

Mark Muchow | Deputy Cabinet Secretary, West Virginia Department of Revenue

Cover: *Harpers Ferry National Historic Park* — Photo by Alex Wilson |

Greetings!

I am happy to present the 2020-2024 West Virginia Economic Outlook to you. My intent is for this document to serve as a thorough and rigorous reference for where our state's economy is today and where it is likely heading in coming years. And my sincere hope is that you will find this document useful as you lead your business, government agency, or community organization through the economic opportunities and challenges we face in West Virginia.

Since 1948, our mission here at the Bureau of Business & Economic Research, a unit within WVU's College of Business & Economics, has been to serve the people of West Virginia by providing you, the state's business, policymaking, and advocacy communities, with reliable and timely data as well as rigorous applied economic analysis. We hope that the data and analysis we provide ultimately enables you to design and implement better business practices and public policies.

Our research is sponsored by public- and private-sector clients throughout West Virginia and nationally. For instance, our recent public-sector clients include the West Virginia Legislature, the West Virginia Department of Revenue, the West Virginia Higher Education Policy Commission, the American Cancer Society, and the Appalachian Regional Commission. We have also been engaged by several private-sector companies in the state.

Please feel free to call on me personally anytime concerning your economic research needs. We are always interested in pursuing new opportunities to provide research and data in areas such as public policy analysis, health economics, energy economics, economic development, economic impact analysis, economic forecasting, tourism and leisure economics, and education policy, among others.

To learn more about our research, to find contact information for myself or any of our staff, or to find an electronic version of this document, please visit our website at be.wvu.edu/bber.

Sincerely,

John Deskins
Director
Bureau of Business & Economic Research

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Executive Summary

West Virginia registered its strongest year of economic growth in more than a decade during 2018, marking the state's second year of recovery after a protracted economic downturn that lasted for much of the period between 2012 and 2016. The energy sector has driven most of West Virginia's economic rebound, particularly the abundance of natural gas pipeline construction activity occurring throughout the state. Most of the state's economic regions have seen conditions improve over the past couple of years but gains in jobs and output remain concentrated from a geographic perspective as a several counties account for have accounted for the lion's share of growth. Overall, this report provides a foundation to understand the long-run economic challenges and opportunities facing West Virginia.

Highlights related to **West Virginia's recent economic performance** are as follows:

- After losses of more than 26,000 jobs between early-2012 and late-2016, **the state has seen employment increase by roughly 12,000 since the beginning of 2017**.
- **Job growth has been heavily concentrated in nine counties and has been largely driven by natural gas pipeline construction activity and a rebound in the coal and natural gas industries.**
- **The state's unemployment rate has trended lower over the past year, falling to the upper-four-percent range.**
- **Only 54 percent of West Virginia's adult population is either working or looking for work.** This is the lowest rate of labor force participation among all 50 states. This low rate of labor force participation represents a significant hurdle for long-run economic prosperity.
- **Per capita personal income in West Virginia increased 5.5 percent in 2018, outpacing growth in all other states and surpassing the national figure by nearly two percentage points.** Currently, per capita personal income in West Virginia stands at 77 percent or so of the national average.
- **West Virginia's real GDP rose 2.4 percent in 2018, outpacing gains in more than 30 states.** Growth was driven in large part by growth in construction and energy extraction industries.
- Export activity from West Virginia has been quite volatile over the past decade. Exports increased at a healthy rate from late-2016 to early-2019 but have started to retreat over the last several months. **Expanding and diversifying the state's export portfolio is of vital importance to economic development in West Virginia over the long run**.

FIGURE ES.1: West Virginia and US Forecast Summary

	West Virginia		United States	
	2008-2018	2019-2024	2008-2018	2019-2024
Population (average annual growth, %)	-0.2	-0.2	0.7	0.7
Employment (average annual growth, %)	-0.2	0.2	0.8	0.6
Real GDP (average annual growth, %)	0.5	0.5	1.8	1.7
Unemployment Rate (annual average at end of time period, %)	5.3	4.9	3.9	4.5
Real Per Capita Personal Income (average annual growth, %)	1.2	1.3	1.3	1.7

Sources: US Census Bureau; US Bureau of Labor Statistics; US Bureau of Economic Analysis; WVU BBER Econometric Model; IHS Markit

The energy sector is an important driver of economic activity in the state:

- **Coal output improved for the second consecutive year in 2018, rising to 95 million short tons.** Production for 2019 is expected to remain roughly on par with the 2018 level. Coal output is expected to decline moderately over the next few years, with production slipping to 85 million tons by the end of the five-year forecast horizon.
- **Much of the improvement in coal production over the past two years or so has been through increased coal exports. Given the massive decline in domestic coal use over the past decade**, West Virginia coal production in the future will be much more sensitive to global energy and climate policy as well as changes in global economic growth.
- **Natural gas output has expanded at a double-digit rate since late-2016, though withdrawals have accelerated strongly during the last few quarters**. Growth is expected to slow over the next year or so but remain healthy over the five-year forecast horizon.

Highlights related to West Virginia's economic outlook are as follows:

- **Employment in West Virginia is estimated to increase 0.2 percent per year on average through 2024**, compared to an expectation of 0.6 percent for the nation.
- **We anticipate growth to occur in energy extraction activity over the forecast horizon, although the natural gas industry will account for most of these gains.**
- **After leading job growth in recent years, the construction sector will experience some volatility and some of the sector's expected gains over the near term are subject to considerable downside risk.** Public infrastructure investments will buoy construction activity in many regions.
- Manufacturing is expected to add jobs roughly on par with the overall pace of job growth over the forecast horizon, though **aerospace, automotive equipment and chemicals will be the sector's leaders in job growth going forward.**
- **The state's unemployment rate is expected to see limited changes over the forecast horizon.**
- **Real per capita personal income is expected to grow at an average annual rate of 1.3 to 1.4 percent over the next five years.** Transfer payments such as Social Security and Medicare benefits will be the fastest-growing segment of income.

The Mountain State's underlying demographics remain a major limiting factor to growth moving forward. Consider the following:

- **West Virginia's population has declined by nearly 51,000 since 2012. We project slight population losses in the coming five years.**
- **A positive shock to encourage in-migration is essential to lessen the severity of natural population decline in which deaths outnumber births.**
- The state has one of the nation's oldest populations and will see its age distribution continue to skew toward older age groups in coming years.
- West Virginia is relatively unhealthy and ranks at or near the bottom among the 50 states along many basic health outcome measures.
- **Economic development strategies should focus on ways to improve health outcomes, lower drug abuse, and advance education and vocational training opportunities in the state to make West Virginia's workforce more attractive to potential businesses.**

Economic performance is expected to remain extremely variable across West Virginia's counties. Consider the following:

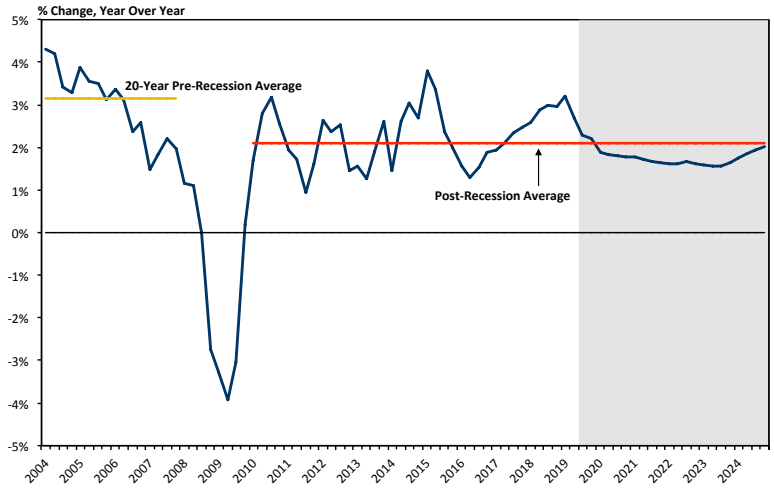
- Six counties are expected to lose jobs in coming years and expected growth rates among the remaining counties vary widely. **However, the highest rates of job growth will tend to be in the northern half of the state.**
- While the state overall is expected to lose population in coming years, **around a dozen counties are expected to add residents or remain stable** during the outlook period. Population gains will be heavily concentrated in North-Central West Virginia and the Eastern Panhandle.
- **Policymakers should be keenly aware of significant economic differences across West Virginia and ensure that economic development strategies consider each region's specific strengths and weaknesses.**

CHAPTER 1:
The United States Economy

OVERVIEW

The United States economy remains in a period of relatively steady economic growth around a decade after the end of the Great Recession.[1] Indeed, the nation is currently in the longest period of economic growth in its history and is experiencing historically low rates of unemployment. However, despite some strengthening in recent quarters, it appears that the economy's long-run rate of growth remains lower compared to the typical rate of growth before the Great Recession. As such, we expect a return to slower rates of growth over most of the forecast horizon. Further, several element of uncertainty exist that could significantly alter the economy's growth path, including a possible trade war and weak growth among our trading partners. In this chapter we: a) explore recent trends in the United States economy; b) provide a forecast of how the US economy is likely to evolve over the coming five years; and c) explore several major challenges that have the potential to threaten US economic stability and could alter the outlook.

FIGURE 1.1: United States Real GDP Growth



Sources: : US Bureau of Labor Statistics; IHS Markit.

RECENT TRENDS AND INTERMEDIATE-TERM ECONOMIC OUTLOOK

GDP As illustrated in Figure 1.1, economic output, as measured by real Gross Domestic Product (GDP), has grown consistently for over a decade now, placing the nation in its longest economic expansion in its history. However, growth has been slower than post World War II norms. In particular, the average annual rate of around 2.2 percent since the Great Recession ended in mid-2009 is weaker than the 20-year average for the economy leading up to the Great Recession. After the past year or so that has been stronger than recent averages, real GDP growth is expected to remain relatively strong through 2019, after which it is expected to again weaken. However, many questions remain surrounding the current state of our economy around the causes and consequences of this structural change in economic growth, several of which we address below.

CONSUMPTION Spending on consumer goods and services, which is by far the largest component of GDP, has shown a great deal of relative stability over recent years, as is typically the case. Going forward, the rate of growth in consumer spending is expected to be in line with pre-recession norms. The various factors that suppressed consumer spending for much of the past decade—such as reduction in household debt levels (which leaves less room for consumer goods), tight bank lending standards, weak house price appreciation, and low consumer confidence—have largely or completely abated. While consumer spending forms a strong base to the economy, it will not likely enhance the overall pace of economic expansion in the foreseeable future. In short, given the high degree of relative stability in consumption, efforts to promote economic growth should generally focus on other components of spending, such as investment.

INVESTMENT Spending on investment goods—capital goods that will enhance future productivity, such as industrial facilities and equipment—has been far more volatile over the recent business cycle. Total investment spending collapsed at an annualized rate of more than 20 percent at the nadir of the recent recession before staging a strong recovery over much of 2010 through 2012. Since that point, however, growth in investment spending has been more modest and was especially weak in 2016, due in large part to sharp capital spending reductions by energy companies in the face of low crude oil and natural gas prices. In contrast, investment activity has been stronger over the past couple of years and is expected to grow at a rate that exceeds the overall GDP growth rate over the next few years and is looked to as a more likely source of future economic growth. However, consistent with its volatile nature, capital investment activity is uncertain, and there are potential obstacles that could jeopardize businesses' willingness to pursue their investment plans as expected. We discuss several of these major concerns below.

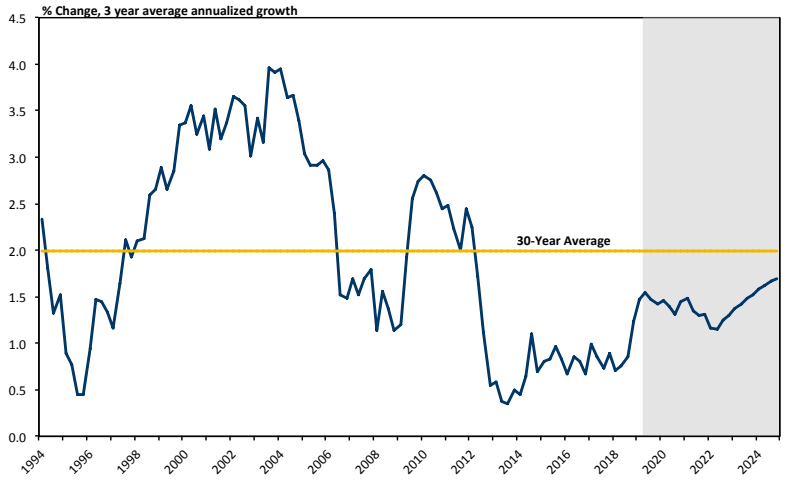
NET EXPORTS US net exports (exports minus imports), while a relatively small share of total output, have been nonetheless an important contributor to the volatility in GDP over recent years and are another potentially

1. This section represents the authors' review, analysis, interpretation, and summary of information presented in the International Monetary Fund's World Economic Outlook (2019) and IHS Economics' *US Economic Outlook* (2019).

important source of future economic growth. Much of the recent volatility in exports has been driven by weak economic growth in important US export markets, especially in the European Union, where economic output has not improved substantially over its 2007 level and in China, where growth has slowed considerably. Movements in global energy markets have also been an important contributor in several ways.

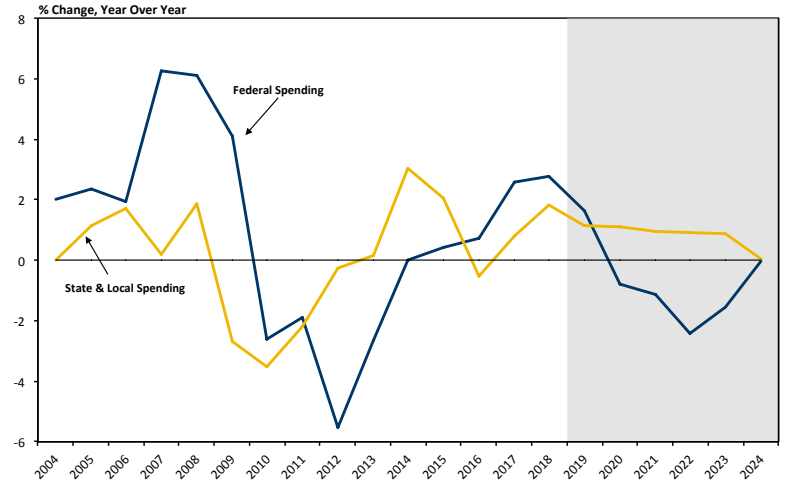
Net exports are expected to grow over the next two years, however, this is perhaps the most uncertain component of the national forecast given the myriad sources of potential economic pressure across the world, such as the potential for a trade war, the ongoing economic struggles in Europe, a continuing economic slowdown in China, sluggish economic growth in Japan, and political unrest in many other parts of the world.

FIGURE 1.2: Growth in Output per Hour in Nonfarm Business



Sources: US Bureau of Labor Statistics; IHS Markit.

FIGURE 1.3: Growth in United States Government Spending



Source: US Bureau of Economic Analysis; IHS Markit.
Note: Figure is adjusted for inflation, presented here in 2012$.

PRODUCTIVITY Worker productivity, as measured by output per hour worked, is the fundamental key driver of economic prosperity over the long run. For instance, very high levels of productivity fundamentally explain why nations such as the US and UK enjoy high standards of living while very low levels of productivity explain why nations such as Haiti and Zimbabwe suffer extremely low standards of living. In Figure 1.2 we illustrate the intermediate-run growth in productivity in the US over the last two decades or so. As illustrated, productivity growth has been has been low since 2013, although there has been a noticeable improvement recently. This increase is possibly driven by capital deepening and investment incentives provided by the Tax Cuts and Jobs Act of late-2017. Overall, however, productivity growth is expected to remain below the 30-year average, and the question of why this is the case continues to be hotly debated among economists and policymakers.

GOVERNMENT SPENDING The recent evolution of government spending in the US is reported in Figure 1.3. Total federal, state, and local government spending, which amounts to approximately one-third of US GDP, increased substantially during the recession. This rise was driven by a concerted economic stimulus effort that actively increased government spending and as safety net expenditures rose naturally as the economy went into recession. After the economic recovery began, inflation-adjusted federal government spending decelerated rapidly and started to decline outright, reaching an annual drop of nearly 6 percent by 2013. This decline was driven by the waning of federal government transfer policies as well as federal sequestration policies. In contrast, real federal government spending did pick up for 2018 and 2019, driven by several discretionary spending choices made by Congress over the past couple of years or so. Federal government spending, in contrast, is expected to shrink in coming years, placing downward pressure on economic growth in the short run.

By comparison, real state and local government spending trended higher over the past three years and will likely continue to grow at a small pace over the forecast period. However, state and local government expenditures should more slowly than overall GDP, indicating spending by the public sector at the state and local level will account for a proportionately smaller part of the nation's economy during the outlook period.

EMPLOYMENT Job growth was sluggish through much of the economic recovery. It is not uncommon for employment to recover more slowly than output, as businesses typically increase output through eliminating excess capacity, through capital investment, and through increasing worker hours, before adding new workers. However, employment has become

increasingly slow to recover in each of the last several business cycles: employment growth in each recession of the past two decades—in the early-1990s, the early-2000s, and through the recent cycle—has progressively slowed compared to earlier post-WWII recessions.

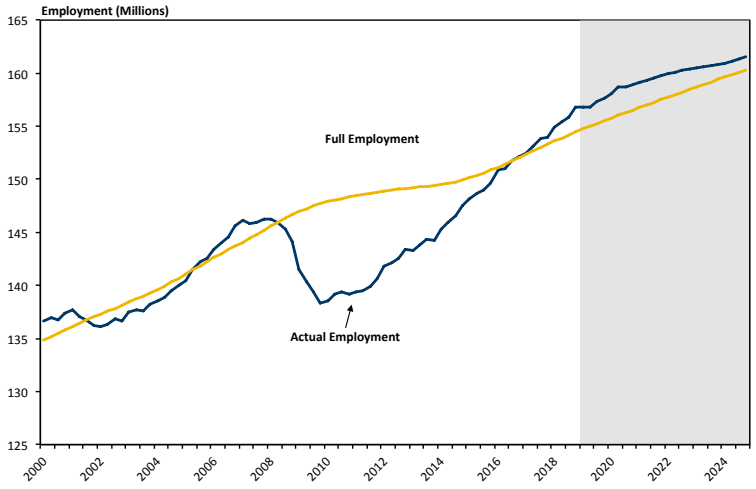
As depicted in Figure 1.4, total US employment from the household survey fell substantially during the recent recession, with losses in excess of 7 million jobs. Employment growth since early-2010 has been slow such that, the US did not achieve its pre-recession peak until late-2014.[2] Furthermore, the degree to which the US economy deviated from what is considered a full and sustainable level of employment (termed "full employment" in Figure 1.4) was the most severe of any recession since the Great Depression. In fact, the US economy only reached full employment in 2016, around seven years after job growth began. Employment growth for the nation as a whole has been consistently solid since the beginning of 2014. As such, now the economy is noticeably above its natural rate for the first time in over a decade with an extremely strong labor market. Employment growth has slowed appreciably in recent months and this is expected to remain the case; however this is driven by the general strength of the economy and tightness of the labor market rather than any adverse shock.

UNEMPLOYMENT Turning to the unemployment situation, the national unemployment rate peaked at around 10 percent in late-2009, as noted in Figure 1.5. This was the second-highest jobless rate experienced during the post-WWII era, exceeded only by the 1982/1983 recession (a peak of 10.8 percent in late-1982). The unemployment rate has improved very steadily over the past decade and now stands at less than four percent. The nation is now in one of the lowest unemployment environments of the post-WWII era and this is one of the strongest signs of strength in the current economy. The current rate is actually below what is considered to be the normal long-run rate of unemployment in the economy. The figure is forecast to remain at a very low level over the next five years.

Another important statistic is the share of all unemployed persons who have endured long unemployment spells (typically defined as 27 weeks or more). As illustrated, this figure rose substantially during the last recession, but has finally returned to long-run norms, in conjunction with improvement in the unemployment rate.

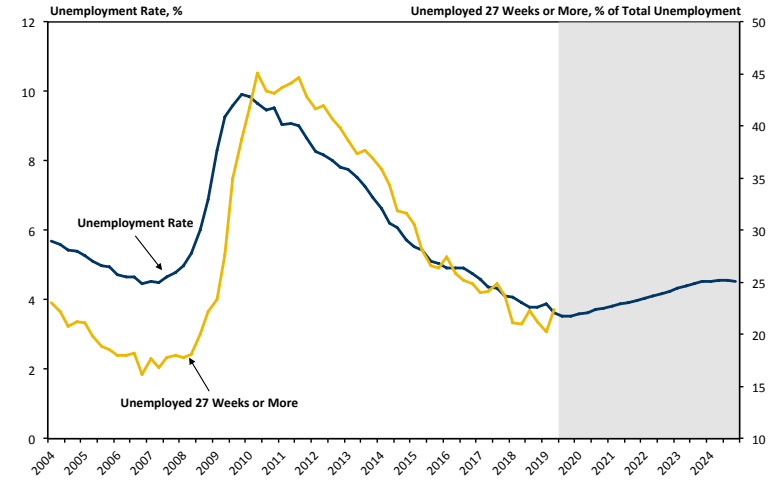
There are two common criticisms associated with the conventional unemployment rate reported in Figure 1.5. The first is that the figure does not account for workers who can only find part-time work but who would prefer a full-time opportunity, often referred to as "under-employed." The second relates to discouraged workers. Here, the idea is that if one is looking for work for an extended period of time and is ultimately unsuccessful at landing a job, the individual may become discouraged and quit looking for work altogether. When this happens, the person is no longer counted as "unemployed" or part of the labor force at all by the conventional measure, since the conventional measure only considers people we are actively looking for work. For both of these reasons, the conventional unemployment rate understates the overall severity of the unemployment situation.

FIGURE 1.4: United States Total Employment



Sources: US Bureau of Labor Statistics; IHS Markit

FIGURE 1.5: United States Unemployment Statistics



Source: US Bureau of Labor Statistics; IHS Markit
Note: Quarterly data used.

2. The statement that employment in the US economy is approximately equal to its 2007 high does not account for population growth over the period; doing so would darken the employment growth figure.

In Figure 1.6 we report the conventional unemployment rate (referred to as U-3) along with a measure that also includes discouraged workers and individuals who are only able to find part-time work due to economic reasons (U-6). It is important to note that these criticisms are legitimate and that what many would consider to be "true" unemployment is higher than the conventional statistic indicates. However, it is also important to note that the movement of the two figures over time is quite consistent and despite their level differences, the unemployment situation has improved demonstrably in recent years regardless of which metric is used.

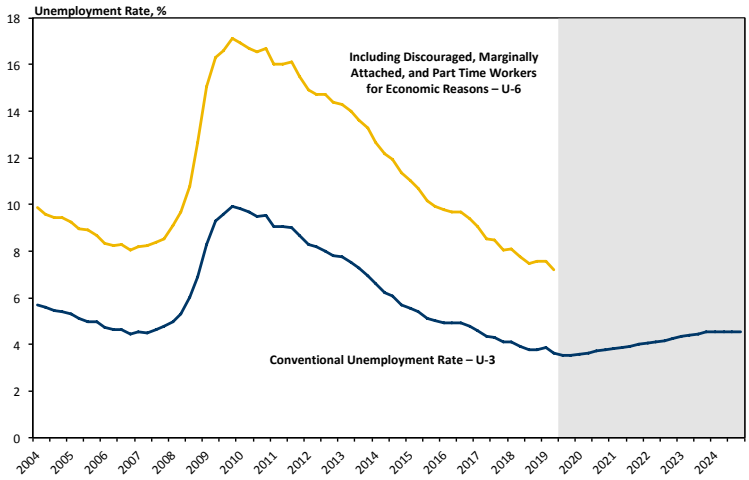
LABOR FORCE PARTICIPATION The labor force participation rate is a complementary measure to the unemployment rate. The labor force participation rate captures the share of the adult population that would like to work—termed "in the labor force"—while the unemployment rate captures the share of the labor force that is unable to find employment at any given moment in time. Ultimately, the labor force participation rate is a more fundamental descriptor of an economy's long-run employment situation.

In Figure 1.7 we report labor force participation for the US since 1950. As illustrated, the figure peaked in the late-1990s at 67 percent, fell substantially after 2008, improved slightly over the past couple of years, and now stands at 63 percent. The broad evolution of this figure is largely driven by demographic processes, namely the emergence and aging of "Baby Boom" generation. Notice that the figure began to rise substantially around 1965, when the first of the "Baby Boomers" turned 20 years old. This measure continued to rise through around 1998, when the first of this group turned 55 years old, but then began to decline substantially around 2008—the point when the leading edge of the Baby Boom approached conventional retirement age.

In addition to the baby-boomer effect, the post-WWII structural change in labor force participation rates was driven in large part by large increases in the female labor force that occurred through the mid-1990s. Overall, the recent declines in labor force participation likely present an impediment to the nation's long-run economic growth potential as fewer workers will be available to support retirees vis-à-vis private pension plans as well as Social Security and other federal programs. Furthermore, many economic challenges below might interact with a lower rate of labor force participation in the long run, leading to a significantly different performance for the US economy over the long term.

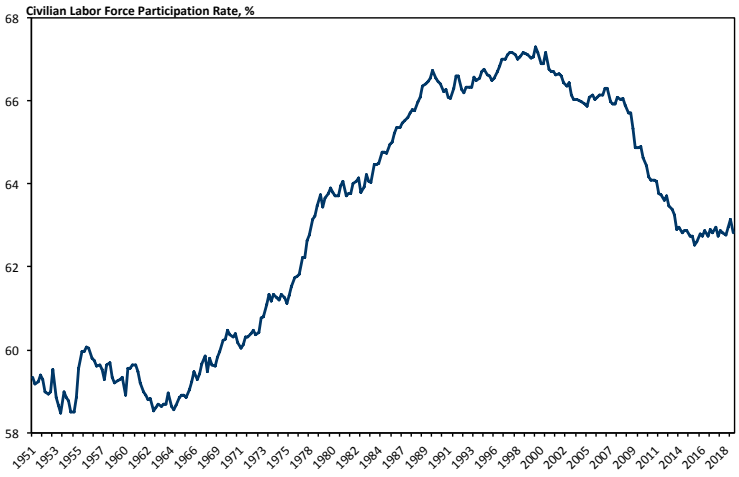
HOUSING As is well known, the catalyst for the recent financial crisis and economic recession was the dramatic decline that was suffered in the housing market from 2007 to 2009. Single-family housing starts have shown notable improvement over the past decade, rising from 475 thousand in early-2012 to around 830 most recently. As reported in Figure 1.8, we expect stability in single-family housing starts over the forecast period, removing this tailwind from the economy. Multi-family housing starts rebounded at a much stronger pace than the single-family side of the market, returning to pre-recession levels by 2013. Aggressive multifamily construction in several large cities in the post-recession years has now left these markets with moderate levels of excess supply. As a result, the forecast calls for stability in multifamily starts over the forecast period.

FIGURE 1.6: United States Unemployment Statistics



Sources: US Bureau of Labor Statistics; IHS Markit
Note: Quarterly data used.

FIGURE 1.7: United States Labor Force Participation Rate



Sources: US Bureau of Labor Statistics

CONSUMER CONFIDENCE Recessions typically have a catalyst in some exogenous shock (such as the bursting of a housing bubble or high oil prices), but falling consumer sentiment is often the key driver of demand during recessions. Typically, the initial recession catalyst reduces demand directly, and thereby output. This drop in output reduces confidence, which reduces demand further, and a vicious cycle ensues. On the upswing of the business cycle, an economic system is unlikely to ever achieve its full potential until confidence is restored. As reported in Figure 1.9, US consumer confidence was in free fall in 2007 and 2008, and hit its all-time low in 2009.[3] However, consumer confidence has generally moved higher, although in a jagged manner, over the past decade. Confidence is as high now as it has been at any point in the past 15 years or so.

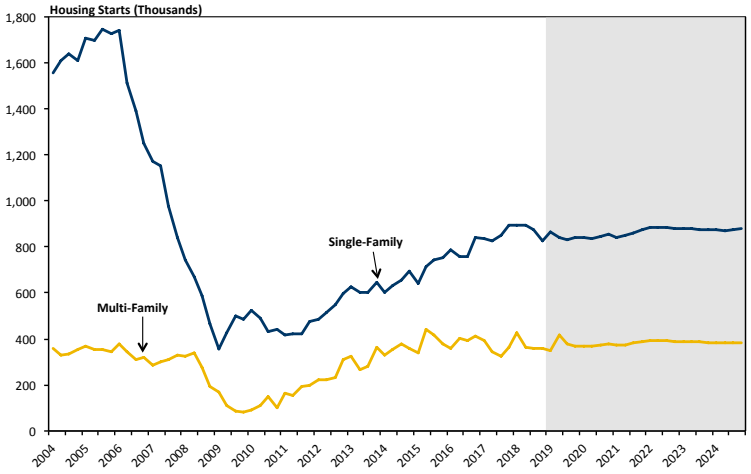
CHALLENGES FACING THE US ECONOMY

GLOBAL ECONOMIC SLOWDOWN While the US economic outlook is healthy overall, numerous potential threats to sustained growth exist. Prominent on this list is the possibility of a trade war and an economic slowdown among the nation's primary trading partners, either which could threaten US exports and could create instability along other dimensions. In Figure 1.10 we illustrate variation in economic growth rates for three major trading partners of the US. The figure shows the average annual rate of economic growth for five years leading up to the beginning of the global recession (grey bar), growth during the past several years (yellow bars), and expected growth over the coming five years (blue bars). As illustrated, economic growth is weakening in China and Canada, and it is weak in general in Europe. The Euro Area is expected to growth at a rate of 1.4 percent on average over the coming five years, which is noticeably less than what was observed in the years leading up to the recession. Even greater uncertainly exists in Europe now that the United Kingdom is in the process of leaving the European Union. The turbulence in Europe is especially disconcerting since the region receives nearly one-fifth of total US exports. Canada is only expected to grow at a rate of 1.7 percent, also noticeably slower than that of previous periods.

CHINA While GDP in China grew by an average annual rate of nearly 12 percent between 2003 through 2008, Chinese growth has decelerated sharply in recent years and is expected to hover around 6 percent annually in coming years. While this expected rate of growth still well exceeds the global average, it is much weaker when compared to what the country has experienced over most of the past two decades and is dangerously low given growth in the country's labor force. Should

3. Economists have tracked consumer confidence since 1968.

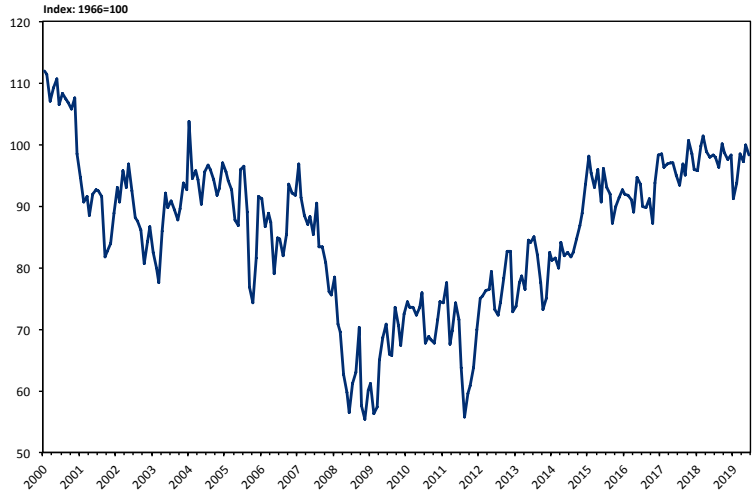
FIGURE 1.8: United States Housing Starts



Sources: US Census Bureau; IHS Markit

Note: Housing starts statistics use quarterly data.

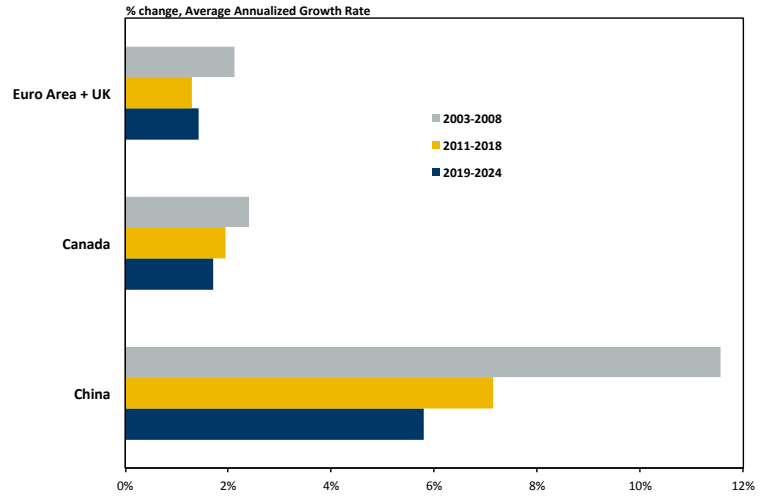
FIGURE 1.9: Consumer Confidence



Source: Thomson Reuters and University of Michigan Surveys of Consumers.

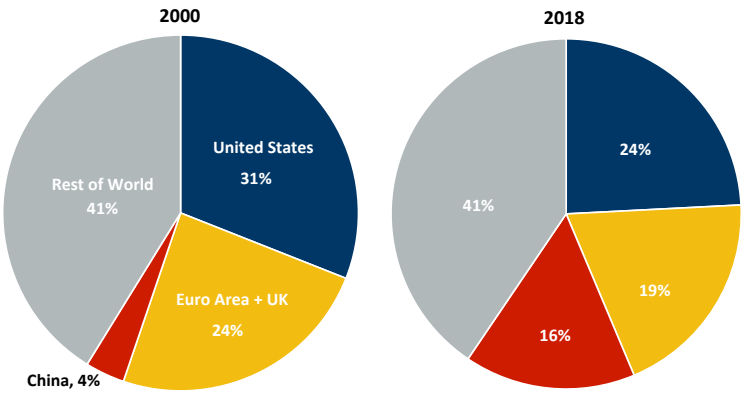
Note: Monthly data.

FIGURE 1.10: Real GDP Growth – Select Economies



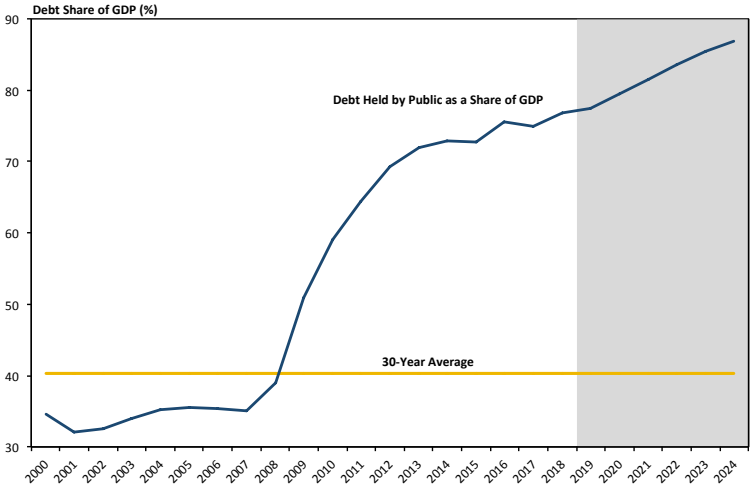
Source: International Monetary Fund World Economic Outlook

FIGURE 1.11: World GDP by Country



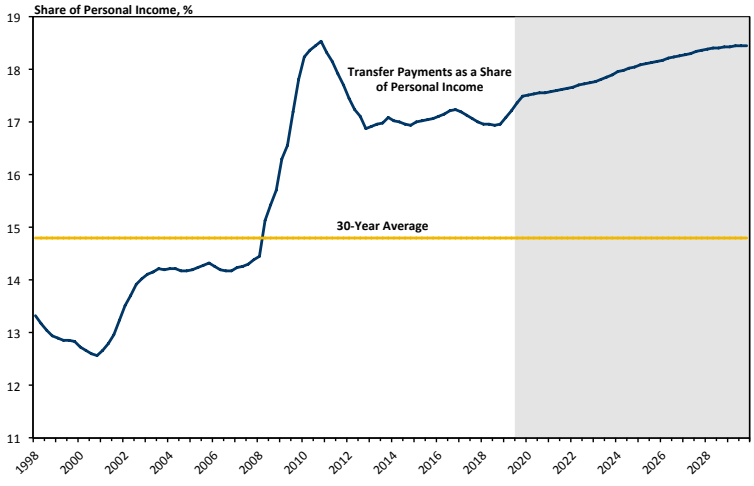
Source: International Monetary Fund World Economic Outlook

FIGURE 1.12: US Federal Debt Held by the Public as a Share of GDP



Sources: US Bureau of Economic Analysis; IHS Markit

FIGURE 1.13: US Transfer Payments as a Share of Personal Income



Sources: US Bureau of Economic Analysis; IHS Markit

Chinese growth slow further, it could impact the US economy, especially given that China accounts for more than 8 percent of US exports. In addition, concerns over the stability of the Chinese economy remain a pressing issue. Figure 1.11 illustrates the dramatic degree to which China has risen as a share of the global economy since 2000.

FEDERAL GOVERNMENT DEBT As depicted in Figure 1.12, federal debt held by the public, which was consistently below 40 percent of GDP between 2000 and 2007, began rising dramatically in 2008 as tax revenues plunged and the federal government ramped up spending in part to stimulate the weakening economy. Currently, the figure is in the upper-70-percent range, a rate that is nearly double the average from the past 30 years. The figure is forecast to grow noticeably over the next five years. However, assuming no changes in public policy, the figure is forecast to explode in the long run (not shown) given the aging of the US population and the additional public benefits that an older population receives (i.e., Medicare and Social Security).

A public debt level that surpasses a critical level can be detrimental to long-run economic prosperity if the public debt becomes large enough to drive interest rates high enough that they ultimately crowd out private-sector savings and investment activity — a key driver of productivity growth in the long-run. In a similar vein, while the historical average deficit/GDP ratio is around 2 percent, the ratio surged to nearly 10 percent in 2009 — its highest level since the World War II-era. After remaining at a very high level through 2012, the ratio fell substantially as the US economy improved and federal spending was reduced in response to the winding down of military operations in Iraq and budget sequestration. The deficit for 2018 is expected to be around 4 percent of GDP, and is forecast to rise in coming years. However, the deficit's size relative to the economy is expected to rise substantially over the longer-term (not shown in the figure) due to the reasons described above.

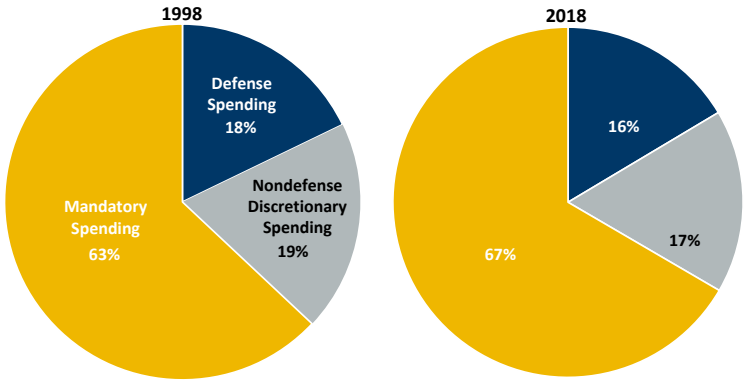
TRANSFER PAYMENTS The recent dynamic involving US federal government debt is closely related to the increase in transfer payments from the US federal government. Examples of transfer payments include Social Security, unemployment benefits, welfare benefits, Medicare, and Medicaid. As illustrated in Figure 1.13, transfer payments increased substantially in 2008, reaching a high of around 18.5 percent of personal income, compared to a 30-year average of 14.8 percent. This increase is attributable to two major factors: a) falling income and rising unemployment during the recession, and b) more generous public policy, such as the extension of unemployment benefits. After the recession's end, the share fell quickly, but has been rising again in recent years and now stands in the

lower 17-percent-range. The figure is expected to grow noticeably over the next few years. In the long-run, the figure is expected to rise again substantially with the aging of the US population, barring any policy changes that would include a reduction in benefits and/or an increase in the Social Security retirement age.

In Figure 1.14 we report the composition of US federal government spending for 1998 and 2018. As illustrated, mandatory spending, which includes transfer payment programs such as Social Security, Medicare, Medicaid, unemployment insurance, and the like, rose to 67 percent of all federal spending in 2018. This represents an increase of 4 percentage points since 1998 and comes largely as a result of an aging population. At the same time, defense spending fell to 16 percent of total spending, down slightly from 1998. Nondefense discretionary spending has fallen to just 17 percent of total spending. If the long-term debt burden is to be reduced, it will have to be accomplished through either higher taxes, or a reduction in one of these areas of spending, and each path carries its own set of concerns and difficult political realities.

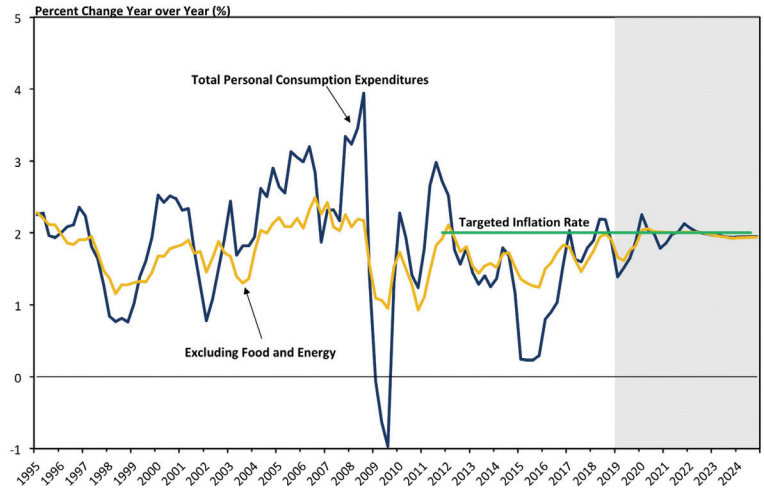
INFLATION As reported in Figure 1.15, inflation has been stable and modest by historic standards in the US since the mid-1980s, rarely moving outside of the 1 to 3 percent range. Inflation has been below its long-run average with only one exception since the Great Recession ended. Core inflation, which excludes food and energy prices from the equation (yellow line in figure), has been below the 2 percent figure that monetary policymakers explicitly state as a target since the beginning of 2012. The figure is expected to remain modest or on target throughout the forecast.

FIGURE 1.14: Components of US Federal Government Spending



Source: US Congressional Budget Office

FIGURE 1.15: United States Inflation Rates



Sources: US Bureau of Economic Analysis; IHS Markit Economics.

However, there is a chance that faster growth in price levels could eventually re-emerge. The US Federal Reserve (Fed) took unprecedented steps to stabilize the economy during and in the first few years after the Great Recession, and in so doing has increased the monetary base—primarily the volume of reserves held by banks—dramatically through its purchase of US Treasury Securities and other assets, such as private-sector mortgage-backed-securities. This monetary stimulus has not translated into higher inflation due to continued modest demand and banks' reluctance to lend. Inflationary pressures now have the potential to build as lending and the broader economy have improved. As such, the Fed has withdrawn liquidity from the monetary system so as not to create an environment for inflation to build. The uncertainty stems from the fact that monetary policy across the globe is in uncharted territory given the volume of the recent monetary stimulus, the nature of the asset purchases, and the persistence of negative interest rates in major economies such as the European Union and Japan and other areas.

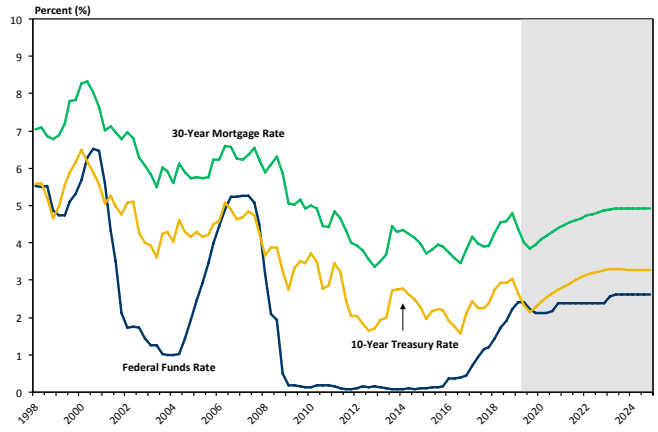
INTEREST RATES A related concern is interest rates in the US economy in coming years. We have observed the Fed's "normalization" process wherein the Federal Open Market Committee (FOMC) unwinds some of its previous asset purchase programs and other forms of monetary stimulus discussed above. Short-term interest rates have generally been on the climb in concert with hikes in the federal funds rate by the Fed over most of the past three years. However, the Fed reversed course earlier this year and again lowered interest rates out of fear that if conditions change and rates rise too rapidly, it could precipitate much weaker levels of investment and consumer spending growth. On the other hand, if the Fed waits until too late to allow rates to rise, inflation would be a

concern. Figure 1.16 reports the forecast for three key US interest rates, but some appreciable disagreement exists among FOMC members over how high and quickly short-term interest rates should be raised in the coming years.

INCOME INEQUALITY The final concern that we consider relates to rising income inequality in the US. In Figure 1.17 we illustrate the share of aggregate income in the US that is earned by households divided into quintiles. As illustrated, the lowest-income quintile, while representing 20 percent of households, earned around 3 percent of the total income in the nation in 2017. The second lowest-income fifth of households earned around 8 of the total income in the nation in 2017, and so on. The highest-income quintile earned nearly 52 percent of the nation's total income in 2017. Further, as illustrated, the income share for the highest quintile has risen by nearly 9 percentage points over the period illustrated, corresponding to a decline in the share earned by the other quintiles. In a similar vein, in figure 1.18 we report median income in the US over the long-run, compared with the average income for households in the highest-earning five percent (after accounting for inflation).

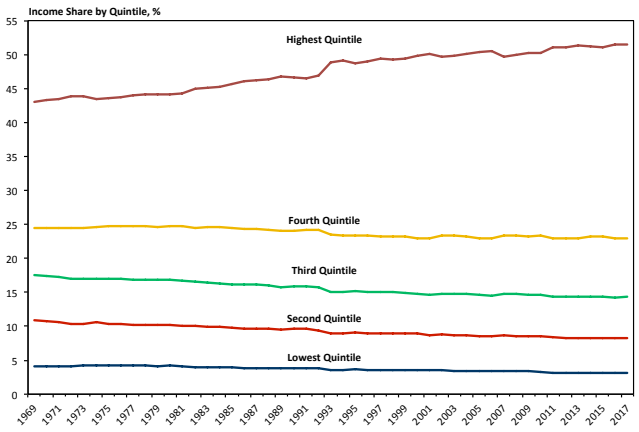
Overall, many individuals are concerned about the growing income concentration among higher income households and these individuals have often requested or proposed public policies that could reverse this trend. Finding an appropriate public policy response that balances promoting economic growth overall and achieving a socially-acceptable income distribution can prove to be challenging in many cases. However, it is clear that education plays an important factor in explaining the income distribution in the U.S. As reported in Figure 1.19, households where at least one resident holds a bachelor's degree earn far more than any other group, and the gap between those with a bachelor's degree and others has risen slightly over time.

FIGURE 1.16: Select United States Interest Rates



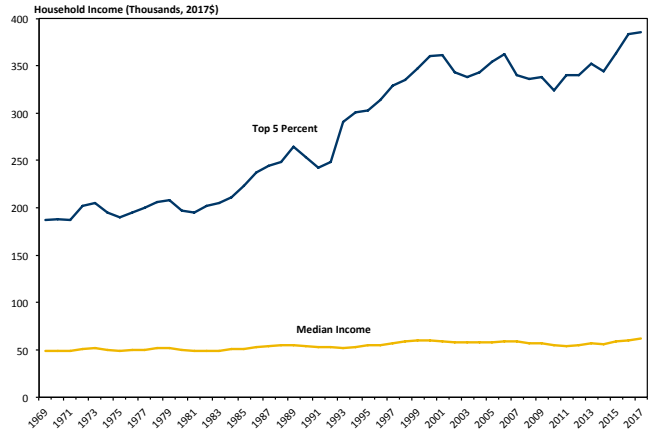
Sources: Federal Reserve Board of Governors; Freddie Mac; IHS Markit

FIGURE 1.17: : Share of Aggregate Income by Quintile



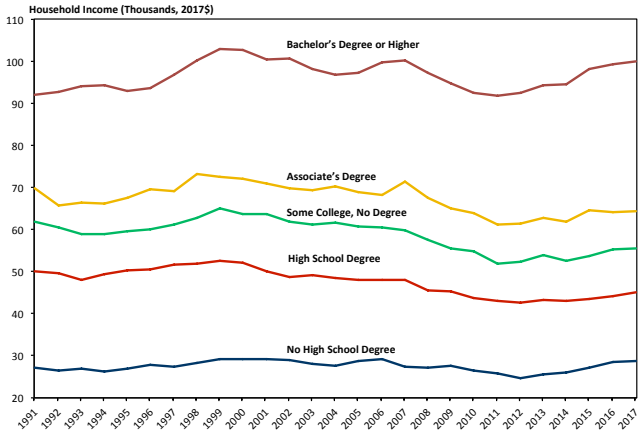
Source: US Census Bureau

FIGURE 1.18: : Income of the Top 5 Percent vs. Median Household Income



Source: US Census Bureau. Note: Median income represents the mean income of the third quintile.

FIGURE 1.19: Median Income by Householder's Educational Attainment



Sources: US Census Bureau

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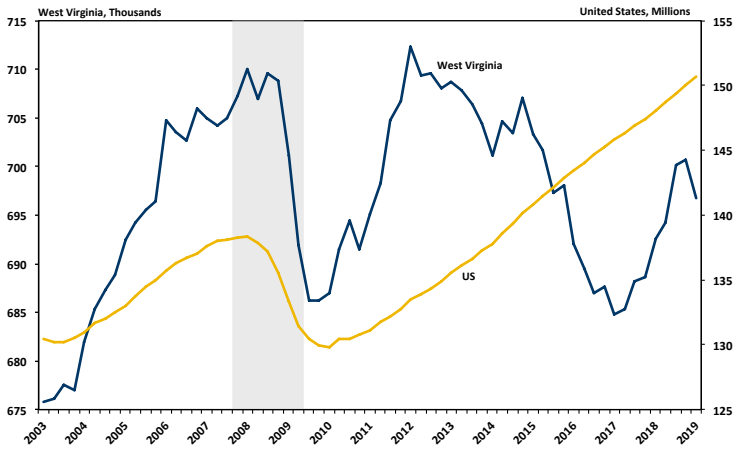
CHAPTER 2:
The West Virginia Economy

RECENT ECONOMIC PERFORMANCE

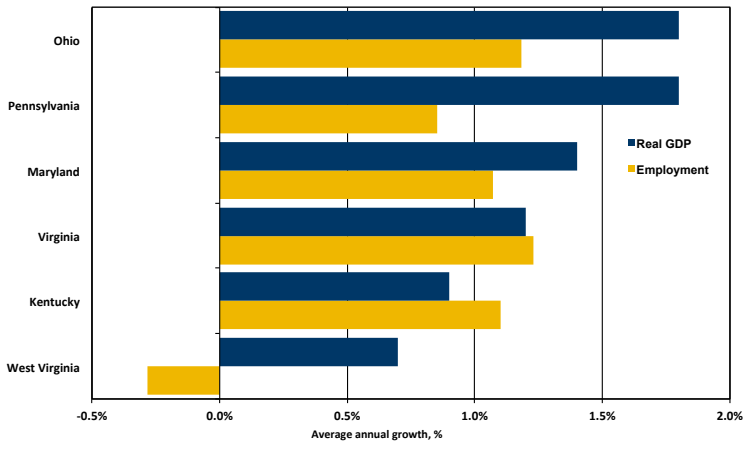
West Virginia posted its second consecutive year of strong economic growth in 2018. After seeing no measurable change in real economic output and a cumulative loss of approximately 27 thousand jobs over the course of an economic downturn that spanned nearly five full years, West Virginia's economy has recorded solid improvements across many key macroeconomic indicators since early-2017. At the same time, however, the state's economic rebound has been quite concentrated from industrial and geographic perspectives. Indeed, of the roughly 12 thousand jobs added on net between the first quarters of 2017 and 2019, more than 80 percent have come from industries connected to West Virginia's energy industries—namely the rebound in coal and natural gas production as well as the massive build-out in natural gas pipeline infrastructure. Finally, while many of the state's erstwhile-struggling economic regions have either stabilized or begun to see nascent signs of growth, an overwhelming majority of growth during the past two years has occurred in nine counties.

FIGURE 2.1: Total Employment



Source: US Bureau of Labor Statistics
*Shaded regions indicate recessions

FIGURE 2.2: Economic Growth in West Virginia and Adjacent States, 2012Q1-2019Q1



Sources: US Bureau of Labor Statistics; Bureau of Economic Analysis

When compared to the US economic backdrop, West Virginia economy has experienced one of the nation's most unique cyclical patterns over the past decade or so. For example, the current US economic expansion is officially the longest on record as tracked by the National Bureau of Economic Research's (NBER) Business Cycle Dating Committee. Though the current expansion has tended to lag the pace of growth observed in the typical US post-WWII economic expansion, West Virginia's economic performance has been even weaker still for a significant portion of this period. Whereas the US economy has seen a relatively steady pace of job growth over the past several years, West Virginia experienced a moderate economic downturn between 2012 and 2014 that was ultimately followed by a deep recession that stretched from early-2015 to mid-2016. As noted above, however, the state's economy has rebounded, but since the gains have tended to occur in more capital-intensive industries growth has been stronger in terms of real gross domestic product (GDP) rather than payrolls. As a result, total employment in West Virginia[1] remains nearly 2 percent below the state's peak level of employment that was achieved in early-2012.

STATE COMPARISONS While West Virginia has lagged national averages for growth in many economic indicators since 2012, the state has also lagged the economic performance seen in most states over this same period. For example, real GDP in West Virginia has increased 0.7 percent on an average annualized basis between the first quarters of 2012 and 2019, ranking 42nd overall and appreciably weaker than its neighboring states. West Virginia has been even more of an outlier nationally (and regionally) in terms of payrolls, as the state saw the worst performance of all 50 states and was one of only three states (Alaska and Wyoming) that has registered an outright decline in employment since early-2012.

Regional comparisons have become more favorable since West Virginia's economy began to recover in

1. Data sources are noted in each figure. All historic and forecast employment data for West Virginia come from the US Bureau of Labor Statistics Quarterly Census of Employment & Wages program. For an explanation of these data, including comparisons to the monthly CES payroll employment data, see http://www.bls.gov/cew/cewfaq.htm.

early-2017. Even though the state has experienced a pick-up in job growth, the 1.2 percent increase in payrolls since the first quarter of 2017 ranks 41st nationally and surpasses only Kentucky among states in the nearby region. In terms of real GDP, however, West Virginia's performance over the past two years really highlights the fact that a significant percentage of growth statewide has occurred in a few extremely capital-intensive industries. Overall, real GDP has increased 3.1 percent on an average annualized basis during the last 8 quarters, ranking 12th nationally and outpacing all our neighboring states by 0.4 to 1.5 percentage points.

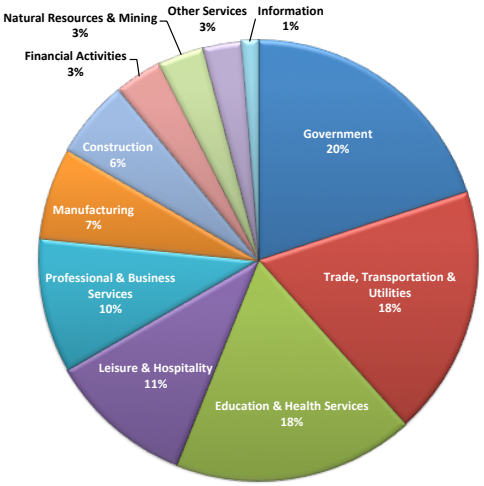
ENERGY SECTOR The extraction of coal and natural gas has long been a foundation in the state's cultural and economic heritage, and fluctuations in the production of these two energy commodities have remained a key component in shaping the peaks and valleys in the state's economic performance. Statewide coal production fell from an annualized rate of more than 128 million short tons in early-2012 down to just over 70 million short tons (annualized) in mid-2016, marking the state's weakest non-strike level of output in several decades. However, these losses didn't occur evenly across the state's two coal-producing regions as the higher-cost mines in Southern West Virginia and other parts of the Central Appalachian Basin took the brunt of market and environmental policy shifts in the US electric power sector as well as a massive drop-off in global met and steam coal demand. Indeed, of the nearly 15 thousand jobs lost in the state's coal industry between the first quarter of 2012 and third quarter of 2016, more than 12 thousand occurred in coal mines throughout southern West Virginia.

Though domestic coal demand continues to weaken due to the ongoing displacement of coal-fired generating capacity (primarily by natural gas), rebounding global demand for both steam and metallurgical coal has provided a significant boost to production. As with the downturn, mines in southern West Virginia have observed the largest gains in production and payrolls, with each increasing by more than one-third between late-2016 and mid-2019. Northern West Virginia has experienced an appreciably smaller rebound in production and employment during this same period as the region's high production capacity steam coal mines have lost customers following the retirement of several power plants in Pennsylvania, Ohio and other states.

While coal production has struggled much of the last decade or so, the natural gas industry has emerged as a major boost to economic activity over this same period. The total volume of gas withdrawals increased by more than 40 percent annually between 2010 and 2014 as shale gas exploration and development occurred in Doddridge, Wetzel, Marshall and a handful of other predominantly-rural counties in central northwestern West Virginia. Production growth slowed sharply by mid-2015 and was roughly flat for much of the next year or so as regional hub gas prices crashed due to a supply glut emerging from of insufficient pipeline takeaway capacity. Increasingly cash-strapped producers were forced to make significant cuts in costs as well as wring out efficiency gains from drilling with longer laterals, re-fracking existing wells and utilizing better equipment. Although the natural gas industry already ranked as one of the most capital-intensive industries nationally (and in WV), it became even more so during the 2015-16 downturn as industry employment declined by roughly 3,000 workers while production was generally unchanged.

Market conditions have firmed significantly for natural gas over the past two years as domestic demand continues to grow at a strong pace, particularly as natural gas continues to increase its share of electricity generation amid the retirement of coal-fired and nuclear power plants across the nation. In addition, the construction of multiple major natural gas pipeline projects in the Mid-Atlantic Region has alleviated the previous deficit in takeaway pipeline capacity that had constrained the ability to transport Marcellus and Utica shale gas to domestic and international markets where demand has rapidly increased. Overall, the volume of natural gas withdrawals in West Virginia has increased more than 40 percent since the beginning of 2017, surpassing 500 Bcf in two of the last three quarters and lifting the state to 7th nationally in terms of overall production. Job growth within the industry has been smaller, owing to the industry's high degree of capital intensiveness; nonetheless, total payrolls have increased by nearly 25 percent between early-2017

FIGURE 2.3: West Virginia Employment Distribution by Sector (2018)



Source: US Bureau of Labor Statistics

and mid-2019, recovering roughly half of the jobs lost in the industry's downturn.

CONSTRUCTION While coal and natural gas extraction has certainly bolstered statewide economic growth in recent quarters, construction activity directly associated with the natural gas industry has been the major underlying cause of accelerating growth in jobs, output and incomes since early-2017—but especially since the beginning of 2018. From early-2012 to late-2016, the state's construction sector experienced a sizable decline in activity as payrolls fell to their lowest levels since the early-1990s. Even with the ramping up of construction at Procter & Gamble's $500 million manufacturing facility in Berkeley County, along with a host of major commercial developments in North-Central West Virginia and addition of midstream natural gas assets (pipeline expansions/reversals, cryo-processing, etc), the sector continued to struggle overall as significant portions of the state experienced considerable economic turmoil for much of this period.

By early-2017, work was already progressing on three major lateral lines that extended the Rover II project into West Virginia while site preparation and land development was underway for the Mountaineer XPress, Atlantic Coast (ACP) and Mountain Valley (MVP) pipeline projects. Pipeline construction activity in West Virginia likely peaked in the third quarter of 2018 as work on each of these projects was taking place, as Rover II was completed shortly thereafter and entered service in late-2018 while the Mountaineer XPress was in the late stages of construction prior to coming on-line in March 2019. In addition, the ACP and MVP projects were ramping up construction at that time as well throughout large portions of West Virginia's geographic footprint. Altogether, construction sector payrolls peaked at nearly 44,000 during the third quarter of 2018, but employment has dipped to a level of roughly 37,000 workers as of mid-2019.

At the same time, the MVP and ACP projects have experienced numerous legal challenges, several court-ordered delays and stoppages since the projects were announced, and each one faces uncertainty regarding their ultimate completion. The MVP remains under construction and is approximately 85 percent complete, with a likely in-service time of early-2020, but several aspects of the project are still under judicial and regulatory review that could still threaten completion of the project or prompt further delays. By contrast, the ACP remains effectively shut down following a December 2018 decision and subsequent rulings this year by the US Fourth Circuit Court to rescind several of the project's critical permits. As of the preparation of this report, the project's developers have appealed the case for review by the US Supreme Court.

MANUFACTURING West Virginia's manufacturing sector recorded its largest year-to-year gain in employment since 2011 and its largest percentage increase in economic output since the mid-2000s. While the state's chemicals sub-sector lost jobs for the year and has seen employment generally trend lower the past two decades, it did contain the single-largest addition of manufacturing jobs for West Virginia vis-à-vis Procter & Gamble's newly-opened (and still-expanding) facility in Berkeley County. The state's automotive parts supply chain production has been a steady source of job production in recent years due in large part to capital investments at Toyota's powertrain manufacturing plant in Putnam County, as well as the recent opening of Hino Motors Manufacturing's truck assembly plant near Parkersburg.

The rebound in statewide coal and natural gas production has directly affected the manufacturing sector as well, as fabricated metals, machinery and electrical equipment manufacturers have boosted payrolls over the past two years amid rising customer orders. After several years of tight balance sheets and cost cutting activity, mines and drilling companies had to replace aging capital equipment as production has picked up while increased underground coal production has raised demand for roof bolts, augurs and power equipment. Cement and concrete manufacturers have also increased hiring activity to some degree thanks to increased highway and infrastructure repair activity across the state as well as the beginning of several major roadway projects related to the Roads to Prosperity program.

Some setbacks have occurred over the past couple of years for the state's manufacturing sector. A broader slowdown in new housing demand and ongoing disputes with Canada over the Softwood Lumber Agreement have hurt the state's wood products and furniture producers. Mylan Pharmaceuticals has laid off hundreds of workers at its generic medicine manufacturing plant in Monongalia County, and the recent announcement by Pfizer that it will purchase Mylan and merge it with Upjohn has only created additional uncertainty for the facility. Finally, while technically located in Allegany County, Maryland, the recent decision by Verso Corporation to shutter its paper mill and eliminate 675 jobs in the second quarter of 2019 will likely hurt manufacturing activity in the adjacent counties in West Virginia as the plant sourced a lot of capital equipment and machinery from the region along with locally-produced lumber products.

SERVICE SECTORS Although goods-producing sectors have accounted for most of the state's net job growth since the beginning of 2017, but a few service-providing sectors have provided a boost to the state's overall performance. For example, healthcare

services payrolls increased by more than 1,300 (1.1 percent) during 2018 and gains continued during the first quarter of 2019. Most of the sector's growth can be linked to WVU Medicine's expansion of its main facilities at JW Ruby Memorial Hospital in Morgantown as well as the building of its presence in other parts of the state via mergers and joint venture agreements with other regional hospitals. The sector did see some negative news emerge in recent months as Alecto Healthcare Services announced a $37 million loss and indicated it would close Ohio Valley Medical Center in Wheeling and East Ohio Regional Hospital in Belmont County, Ohio, resulting in the elimination of nearly 1,100 jobs in the fourth quarter of 2019. WVU Medicine has indicated that it will attempt to offset these losses by increasing services at Reynolds Memorial Hospital and adding new local urgent care facilities.

The massive increases in pipeline construction activity also bolstered the professional and business services sector as the engineering services industry expanded significantly during the first half of 2018 as work on the separate pipeline projects ramped up. In addition, the relocation of The Health Plan into Wheeling increased the sector's footprint in the state, providing a bump of 500 relatively high-wage jobs in the process. Transportation and warehousing services have recorded solid growth in employment over the past several quarters, with much of this increase associated with companies providing hauling fracking sand, brine and other materials to drilling sites. Also, increased coal production since late-2016 has also led to improvements in demand for trucking, barge and rail traffic from mines, particularly with shipments to export terminals.

Unfortunately, several private service-providing sectors have suffered through prolonged periods of weakness and significant job losses. Some of this weakness can be linked to the state's poor economic performance between 2012 and 2016, as the protracted downturn in the coal industry throughout Southern West Virginia prompted a massive loss in incomes and eventually precipitated large declines in population. Consequently, retailers saw significant declines in consumer purchasing power and the underlying base of potential shoppers.

However, the retail sector's struggles in recent years are structural in nature that have affected a broad swatch of the sector, as several major retail chains that operate numerous stores in West Virginia have declared bankruptcy or have closed store locations. Some of these losses can be attributed to normal churn in the retail sector, but continued growth in online commerce platforms such as Amazon along with the increased use of online purchases (often with direct-to-home delivery services) for groceries, clothing and other non-traditional ecommerce options has emerged as a major structural change in consumer behavior to affect the retail trade sector in a short period of time. Overall, given these headwinds related to the state's economic struggles and shifts in underlying consumer behavior, retailers have cut payrolls by roughly 5,700 in West Virginia since the beginning of 2016.

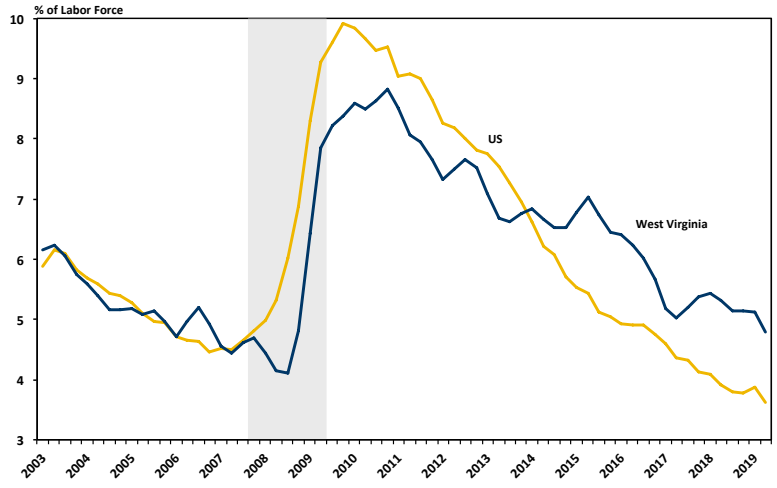
Portions of the leisure and hospitality sector have had to cope with these broader structural changes in consumer preferences, as well as the declines in purchasing power for households in several parts of West Virginia due to persistently weak labor market conditions. Healthy income and job gains observed in expanding areas such as the Eastern Panhandle, North-Central West Virginia and, to a lesser extent, the Northern Panhandle have boosted spending activity and prompted the opening of new hotels, restaurants and other establishments, helping to offset losses seen elsewhere in the state. The state's gaming industry has continued to struggle with a broader decline in interest in racing as well as the increased level of competition created by newer venues in neighboring states, but the addition of sportsbook gaming services has provided a moderate boost in demand over the past year or so. Moreover, the hosting of the World Scout Jamboree gave a sizable mid-summer boost to tourism activity in the New River Gorge Area as the event brought in more than 41 thousand scouts and other attendees to the Summit Bechtel Family National Scout Reserve in Fayette/Raleigh counties.

GOVERNMENT West Virginia's underlying economic and demographic struggles have had a significant negative impact on many aspects of state government as well as numerous local city and county governments throughout the state. Local governments were particularly hard hit during the state's steep recession as many cities and counties not only experienced steep losses in severance taxes as coal production fell sharply and natural gas prices and output weakened, but also struggled with drops in B&O, property tax, local sales and other types of revenue as several major mining companies and all their affiliate companies entered bankruptcy or were severely financially impaired enough not to pay taxes and other liabilities. In addition, the losses filtered down the supply chain to manufacturers, wholesalers and other companies that did business with mining companies experienced revenue losses of their own. Losses in population only exacerbated problems for many areas, as local school systems saw funding declines due to the state formula. Altogether, local government payrolls declined by roughly 2,500 between early-2016 and late-2018.

The state government's fiscal situation eroded significantly over the course of the 2012-2016 economic downturn, with much of the revenue drop-off tied to

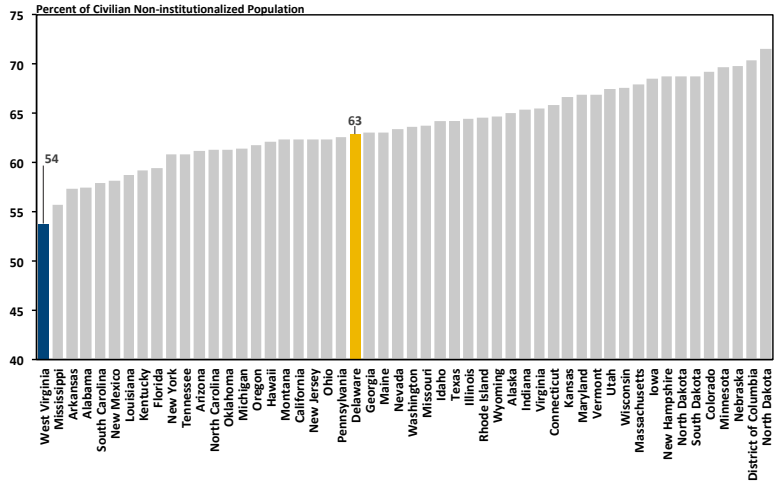
eroding coal and natural gas severance tax collections as well as some previous changes in tax policy. State government employment fell by nearly 2,000 between mid-2016 and late-2018. With that said, the state's budget condition has improved considerably thanks in large part to revenue growth linked to the massive increases in natural gas pipeline construction and the rebound in coal and natural gas severance collections. Overall, the state finished FY2019 with a $511 million increase (12 percent) in revenue from the previous fiscal year, though the surplus was relatively small as the baseline revenue target was raised several times. Although hiring activity has not picked up, the rebound in tax collections has enabled the state to increase pay rates for state workers each of the last two years and ramp up back-logged maintenance and repair for deteriorating highways and other infrastructure.

FIGURE 2.4: Unemployment Rate



Source: US Bureau of Labor Statistics
*Shaded regions indicate recessions

FIGURE 2.5: Labor Force Participation Rate, 2018



Source: US Bureau of Labor Statistics

LABOR MARKET DYNAMICS West Virginia's unemployment rate has shown a great deal of volatility in recent years, reflecting a combination of the state's economic difficulties as well as some of its underlying demographic trends. After peaking at 8.8 percent in late-2010, the state's jobless rate fell more than two percentage points and generally tracked broader national trends through the latter half of 2013. However, the unemployment rate then mostly hovered in the mid- to upper-6 percent range into early-2016 as healthier labor markets in some portions of the state saw their gains offset by those grappling with significant energy industry job losses.

Pipeline construction activity, improvements in coal and natural gas production and the continued positive momentum seen in the state's healthier economic regions have helped the jobless rate edge lower over the past year or so. In fact, the unemployment rate averaged 4.8 percent during the second quarter of 2019, marking the lowest reading on this metric since the fourth quarter of 2008.

Some of the downward trend in West Virginia's unemployment rate can be explained by relatively healthy economic conditions within areas such as the North Central and Eastern Panhandle regions. Unfortunately, this factor played a relatively small role as labor force attrition was the chief underlying cause. For example, West Virginia's labor force declined by more than 30,000 participants between early-2012 and mid-2017 and well over two-thirds of that drop-off came from a decline in the number of the unemployed. This implies labor force attrition accounted for a sizable portion of the measured decline in the jobless rate, which is corroborated by increased net outflows of migrants to other states during this time frame.

The growing opioid epidemic has likely had an appreciable effect on workforce participation in recent years, particularly among workers in younger age groups. In addition, West Virginia faces other workforce-related problems that hurt participation for portions of the state's population, such as poor health outcomes or human capital limitations for available jobs. As of 2018, West Virginia's labor force participation rate was the lowest among all states at nearly 54 percent, just as it has since data collection began in the 1970s. Age distribution does explain some of the state's workforce participation deficit, but the underlying causes extend to other issues since the state also lags well behind others among the prime working age population (25-54 years of age).

INCOME Per capita personal income, without accounting for inflation, in West Virginia reached approximately $40,600 in 2018, representing a 5.5

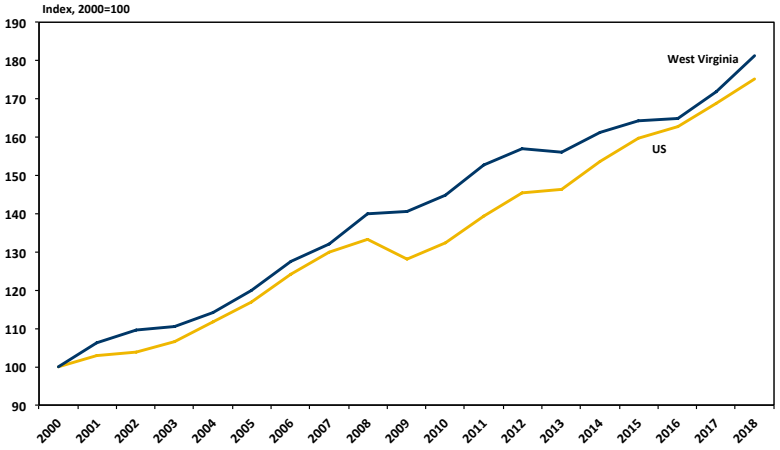
percent increase from the previous calendar year. West Virginia's per capita income growth ranked first nationally for the year, which proceeded the seventh fastest rate of growth (4.2 percent) in 2017. This strong growth continued into the first quarter of 2019 as per capita income growth ranked first overall (6.3 percent annualized) and surpassed the second fastest-growing state by a full percentage point. While the state's overall per capita personal income level ranks 49th overall, the recent strong rate of income growth have enabled West Virginia to reduce its income deficit compared to the national average and shrink the amount needed to surpass New Mexico.

WAGES Surging demand for labor in the coal, natural gas and construction sectors had a noticeable impact on wage growth in West Virginia during 2018. The statewide average annual wage jumped 6.3 percent (without adjusting for inflation) for the full calendar year, reaching roughly $46,000. Although the utilities sector continued to receive the highest average annual wage at just over $93,000, the construction sector accounted for a significant portion of overall wage growth as the upsurge in workers involved with pipeline construction pushed sector wages up nearly 25 percent. Professional and business services registered a healthy rate of wage growth at more than 7 percent, due in large part to ramped-up hiring of high-paying engineers working on natural gas pipeline projects. West Virginia's second-highest wage sector, natural resources and mining, recorded a 4.1 percent gain in wages versus 2017.

The fact that changes in wage income differ from growth in per capita personal income can be explained by faster (or slower) growth in other sources of personal income. For example, transfer payments to individuals, such as Social Security benefits, are a component of total income but are not counted as wages. Other forms of non-wage income, such as investment returns, pensions and earnings from the self-employed can affect year-to-year changes in personal income as can adjustments to tax withholdings by state or federal governments and income earned in other states by commuters.

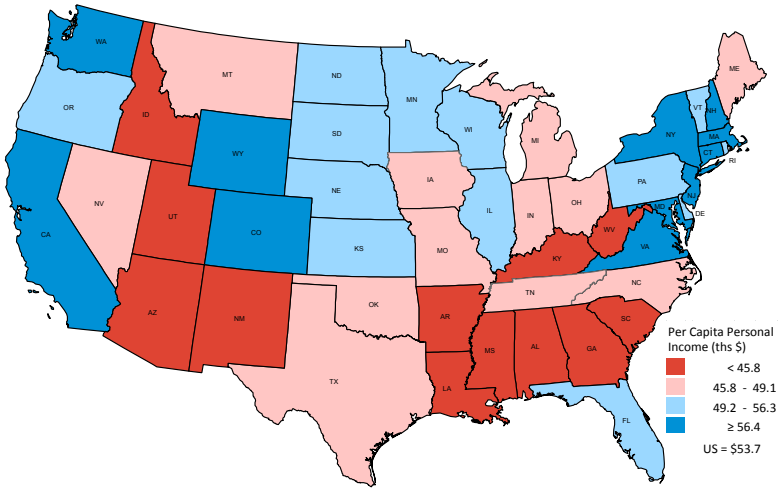
GDP Volatility within West Virginia's energy sector has led to significant differences in real GDP growth between the state and the nation in the past decade. After outperforming the national average at times during portions of the economic recovery that proceeded the Great Recession, the overall value of goods and services produced within the state declined in each year between 2014 and 2016 and overall growth lagged the national average in every year between 2012 and 2018. However, the state has recorded periods of strong growth in real GDP over the past several quarters, with

FIGURE 2.6: Per Capita Personal Income Growth



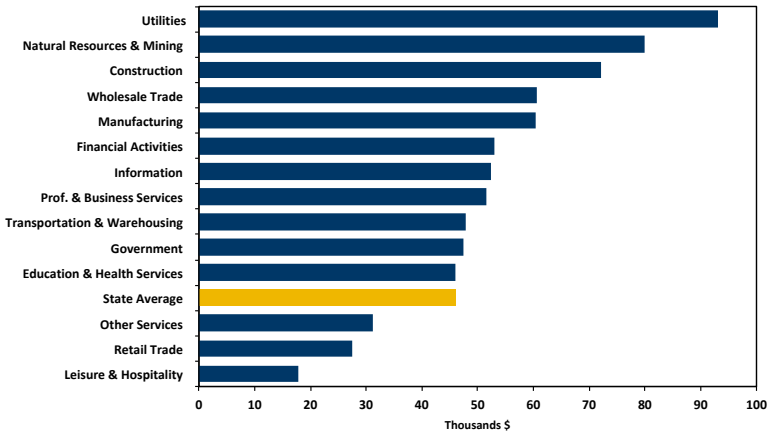
Source: US Bureau of Economic Analysis

FIGURE 2.7: Per Capita Personal Income (2018)



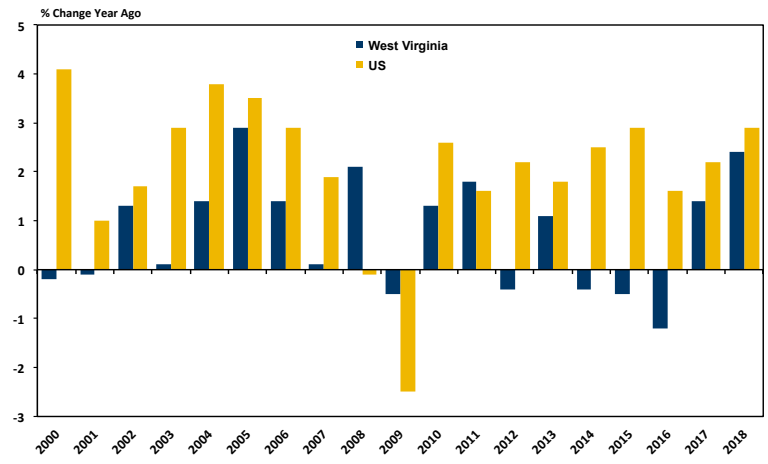
Source: US Bureau of Economic Analysis

FIGURE 2.8: Average Annual Salary by Sector (2018)



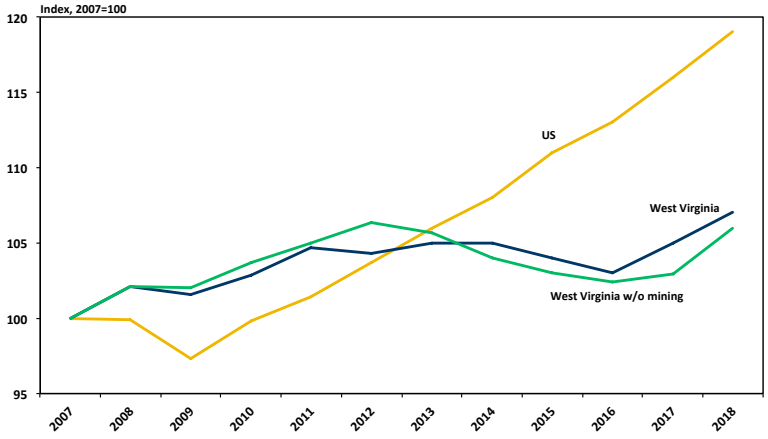
Source: US Bureau of Labor Statistics

FIGURE 2.9: Real Gross Domestic Product Growth



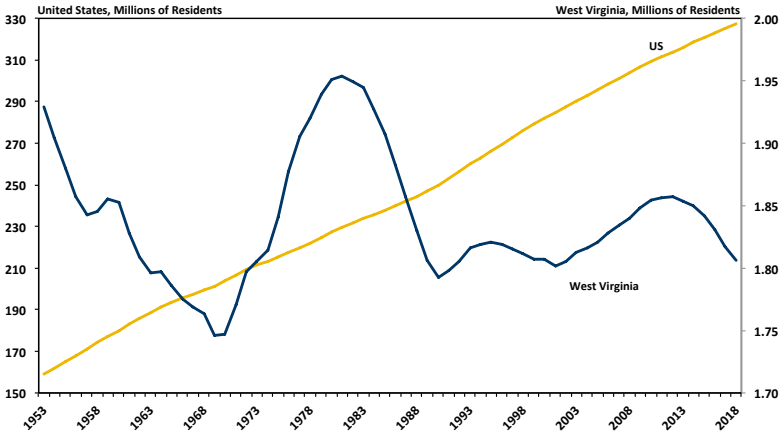
Source: US Bureau of Economic Analysis

FIGURE 2.10: Real GDP Growth



Sources: Bureau of Economic Analysis; WVU Bureau of Business & Economic Research

FIGURE 2.11: Total Population



Source: US Census Bureau

an annualized increase of 5.7 percent between the first quarters of 2018 and 2019—ranking first nationally and 0.7 percentage points above the second fastest-growing state over this specific period.

Not surprisingly, most of the upsurge in real GDP growth since the beginning of 2018 has come from the recent gains in natural gas production, strong export demand for coal and pipeline construction activity. Indeed, the mining and construction sectors have accounted for two thirds of the net increase in real GDP over the past year or so. Manufacturing, healthcare and professional and business services have accounted for a large share of the remaining balance of real GDP since the beginning of 2018.

RECENT DEMOGRAPHIC TRENDS

POPULATION West Virginia's population declined in 2018, marking the sixth consecutive annual loss in residents and equals a cumulative decline of nearly 51,000 residents over this period. Both the absolute and percentage declines in total population have surpassed what occurred in the mid- to late-1990s, but still lag the massive population losses West Virginia experienced during the 1980s. Indeed, the state's population contracted in number by an average of 16,000 people per year across the decade and nearly 25,000 annually in the second half of the decade.

With below-replacement birth rates, a disproportionate share of residents over the age of 65, and higher-than-normal death rates among many age groups, West Virginia experiences a natural decline in residents each year as deaths outnumber deaths. Moreover, this rate of natural decline has increased sharply in recent years as death rates among several age groups has surged, due in part to the dramatic increase in drug overdose deaths. Given the state's underlying demographic characteristics for age and trends in mortality and births, any substantial improvement or deterioration in population growth largely come from changes in (domestic) migration flows. Given West Virginia's poor economic performance compared to states in the nearby region as well as performance during a healthy backdrop for the US economy, net migration flows have accounted for an increasing share of the state's population declines.

According to the US Census Bureau, 45 of the state's 55 counties lost residents between 2017 and 2018. Kanawha County saw the largest absolute decline in population (-2,800). The state's most populous county did not register the largest percentage loss but was among 5 counties in the state that posted at least a 1.5 percent decline on a year-over-year basis in 2018. Berkeley County remained the state's fastest-growing county in absolute and percentage terms, adding more

than 2,100 residents (1.8 percent) for the year. Pleasants County registered the second fastest-rate of population growth during 2018, though the overall change was small as Pleasants ranks as the fifth smallest county in the state. Among the state's largest counties, Monongalia and Jefferson provided the largest positive contribution to West Virginia's population total.

AGE DISTRIBUTION One of the defining demographic characteristics of the state's population is its age structure. West Virginia's median age increased slightly in 2018 to 42.7 years, placing it 4.5 years higher than the national figure and ranking fourth highest among all 50 states. Another sign of the state's skewed age distribution is the fact that more than 27 percent of the state's residents are aged 60 or older, exceeding the national figure by more than five percentage points.

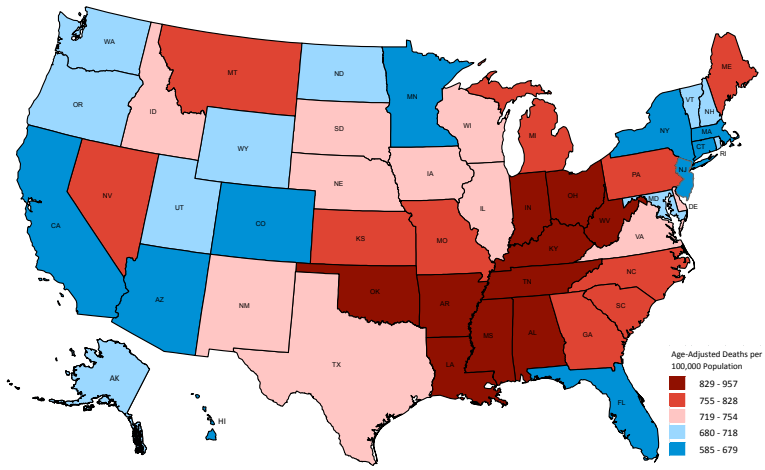
HEALTH In addition to containing a higher-than-average share of elderly residents, West Virginia's population also tends to be less healthy than other states in the US. According to the Centers for Disease Control, the overall mortality rate, even after adjusting for age, in West Virginia is the second highest in the nation. High incidences of heart disease, cancer and diabetes have been key contributors to the state's high mortality rate, as well as behavioral or lifestyle factors such as relatively little physical activity during leisure time. In addition, the opioid epidemic has had a very dramatic impact on West Virginia's mortality rate over the past five years, particularly among residents in the 25 to 34 and 35 to 44 age groups. For example, the number of deaths in West Virginia among people between the ages of 25 and 44 increased from 1,140 in 2012 to 1,375 in 2017, even as the number of residents in this age group fell from more than 452 thousand down to 435 thousand. However, non-drug-related causes of death registered only a negligible increase over this five-year period, indicating that drug-induced deaths have accounted for essentially all the upturn in deaths statewide.

FIGURE 2.12: Summary Population Profiles

	West Virginia	United States
Total Population (2018)	1,805,832	327,167,434
% Population Under 18 (2018)	20.2%	22.4%
% Population 65 Years + (2018)	20.2%	16.0%
Population with Less than High School Diploma (2017, % of pop. 25 yrs. +)	12.9%	12.0%
Population with High School Diploma, No College (2017, % of pop. 25 yrs. +)	41.2%	27.1%
Population with Some College (2017, % of pop. 25 yrs. +)	25.7%	28.9%
Population with Bachelor's Degree or Higher (2017, % of pop. 25 yrs.+)	20.2%	32.0%
Median Age (2018)	42.7	38.2
Average Household Income (2017)	$59,557	$84,525
Average Household Size (2017)	2.50	2.74
Labor Force Participation Rate (2018)	53.8%	63.1%

Sources: US Census Bureau; Bureau of Labor Statistics

FIGURE 2.13: All-Cause Mortality Rates, 2017



Source: Centers for Disease Control

WEST VIRGINIA OUTLOOK

EMPLOYMENT GROWTH Expectations for the US and broader global economies will directly influence West Virginia's economic performance during the outlook period.[2] Should the US economy deviate from its current expected path (enter a recession, see growth accelerate, etc.) or global demand for the state's energy commodities and manufactured goods weaken as a result of ongoing trade disputes between the Trump Administration and several US trading partners, the state's anticipated path of growth could fail to match expectations.

The forecast calls for West Virginia's economy to expand at a rate of just over 0.2 percent annually during the five-year outlook period slated to end in 2024. However, the state's rate of job growth will be volatile over the next couple of years as construction activity on the Mountain Valley Pipeline project winds down during the next few quarters, resulting in the loss of several thousand jobs in construction and other sectors associated with the project. The Atlantic Coast Pipeline project is expected to re-start during the second half of 2020, but the bulk of job gains will likely occur during early-2021 as several thousand workers will need to be hired back to complete the project.

2. All forecast estimates for this document are derived from the West Virginia University Bureau of Business & Economic Research Econometric Model, unless otherwise noted. The model is based on an analysis of more than 100 variables that characterize the West Virginia economy.

Another source of uneven job growth during 2020 and 2021 will be the 2020 US Census, as the addition of thousands of enumerators and survey processors will boost statewide payroll levels during the second and third quarters. Even after averaging out the up-and-down movements in payroll levels over the next few years, West Virginia's overall pace of job growth during the forecast horizon will lag the national average (0.6 percent per year) over the next five years. Finally, without any unexpected positive contributions to the state's economy, West Virginia's total level of employment is not expected to reach the all-time peak level achieved in 2012 through the outlook period.

CONSTRUCTION West Virginia's construction sector will account for most of the state's volatility in job growth over the next few years, largely because of the anticipated completion of several natural gas pipeline projects. The MVP and accompanying $500 million Hammerhead Pipeline project, which will connect gas production flowing from Southwest Pennsylvania to the MVP at Wetzel County, West Virginia, are expected to enter service during roughly the same period in the first half of 2020. The MVP (and Hammerhead) has been subjected to further legal challenges and brief stoppages to correct erosion controls, particularly the portion of the project in Virginia, but we assume both will be completed leading to further retrenchment in construction sector payrolls as the pipelines become operational.

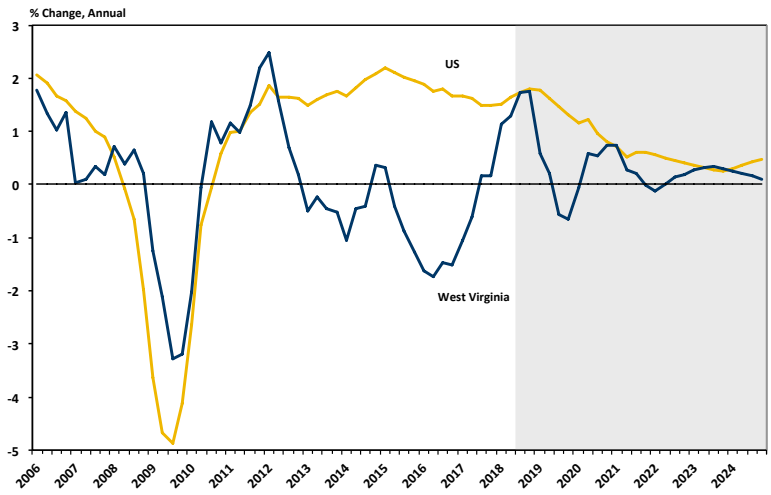
As of this report's publication the ACP remains delayed indefinitely; however, we assume the project will re-start at some point during the second half of 2020, either due to regulatory/legislative changes by the Trump Administration or Congress as well as the possibility of a positive ruling in favor of the project by the US Supreme Court. Of course, additional delays are possible even if legislative, regulatory or judicial relief is provided and given the large run-up in projected costs to the pipeline's developers, further delay caused by mandated changes in the path or some other reason could jeopardize the project's ultimate completion.

Nonresidential construction activity will be located primarily in the Eastern Panhandle and North-Central West Virginia, but additional developments in a handful of areas will buoy the sector as the downshift in pipeline construction activity continues over the next two years or so. While Procter & Gamble's new $500 million manufacturing facility in Berkeley County is mostly complete on the exterior, additional work on configurations for some of the facility's production lines will continue until the plant becomes fully operational by late-2020. In addition, further growth remains likely for the facility's on-site supply chain network once these other production lines enter operation and we also anticipate the P&G plant to spur additional development in transportation and warehousing activity along the I-81 corridor in the coming years.

Other major projects still underway that should buoy nonresidential construction activity over the next couple of years are the $150 million ROXUL insulation materials manufacturing plant in Jefferson County, the ongoing buildout of WVU Medicine facilities and the WestRidge Development in Monongalia County. Furthermore, Hino Motors Manufacturing announced it will be investing an additional $40 million investment into its recently-opened truck assembly plant in Parkersburg, which will enable full cab assembly to occur at the plant. Finally, Toyota indicated it will expand its operations in Putnam County with an $111 million investment to double its hybrid transaxle capacity to 240,000 units.

Public Infrastructure investment will provide a boost to the construction sector for the next several years. While repair and maintenance work has picked up significantly over the past year or so, but thousands of road miles within the state are still in line for surfacing, ditching and other routine activities because of protracted delays caused by West Virginia's weak fiscal situation as well as shortages of labor and equipment in several of the state's highway districts. Aside from the short-term lift provided by ramping up routine maintenance and report work, the Roads to Prosperity will be the primary mechanism to support new highway construction activity at least through 2022. The multi-billion obligation bond-supported program will support projects such as the $210 million I-70 bridge repair and replacement in Ohio County, the $176 million Corridor H upgrade in Tucker County as well as several other major projects throughout the state.

FIGURE 2.14: Employment Growth Forecast



Source: Bureau of Labor Statistics; WVU BBER Econometric Model; IHS Markit
Note: Shaded region represents the forecast period

Materials and labor costs do pose a significant risk to the construction sector for the foreseeable future. More natural gas pipeline capacity remains planned for the Mid-Atlantic Region and given the ongoing construction of the Shell ethane cracker in Beaver County, Pennsylvania, and a strong likelihood of another such facility in Belmont County, Ohio, competition for skilled labor demand could lead to considerable inflation in wage rates as projects vie for workers in highly-specialized engineering and other occupations. US trade policy disputes with China and other major trading partners could also raise costs going forward, as the Trump Administration's push to implement tariffs on products ranging from steel to apparel have been met concerns and retaliatory tariffs in some instances. Should these tensions continue to escalate with China or lead to a broadening of trade disputes between other countries, prices for a range of goods could rise significantly, including steel and other materials used to build bridges and highways.

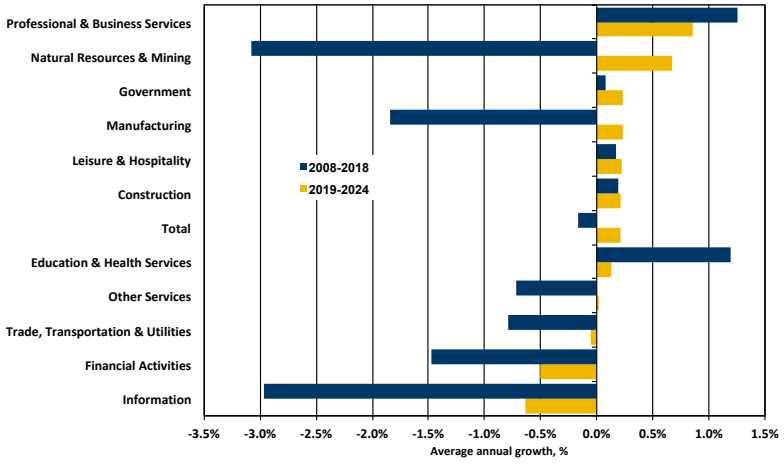
MINING EMPLOYMENT West Virginia's mining sector is expected to post payroll and real output growth of 0.7 and 2.0 percent per year, respectively, during the outlook period. However, just as they have trended in different directions over the past decade or so, West Virginia's coal and natural gas industries will continue to have diverging performances over the course of the forecast horizon. West Virginia's natural gas industry is expected to add jobs at a healthy pace of 4.7 percent per year during the outlook period, though productivity enhancements within the industry suggest payrolls could come in below this pace during the next five years. The volume of marketed natural gas production in West Virginia is expected to total more than 2.6 trillion cubic feet (Tcf) in 2024, a 4.6 average annual gain from 2019 levels.

Strong upside potential remains for even higher levels of natural gas production during the outlook period. For example, international demand for liquefied natural gas (LNG) continues to rise as countries attempt to diversify electricity generation beyond coal and the coincident addition of LNG export terminals and pipeline infrastructure will enable more West Virginia-produced shale gas to enter global markets. Furthermore, the state's abundant reserves of natural gas liquids (ethane, butane, etc) offer opportunities for development of downstream manufacturing activity that are not as readily available in Ohio and Pennsylvania. The addition of at least one (likely two) ethane cracker in the tri-state region could enhance further exploration and development of NGLs within West Virginia, while also possibly facilitating the addition of a storage hub and one to two more ethane crackers.

By comparison, the forecast calls for coal production and employment to decline by 2.3 and 1.7 percent on an annual basis, respectively, during the outlook period. Production will dip back below 95 million short tons on a consistent basis by mid-2020 and continue falling below 90 million short tons by 2021. The expected addition of the Leer South mine in Barbour County is expected to buoy statewide output once its longwall starts full production in late-2021, producing an estimated 3 million short tons of coking coal. Nonetheless, broader market conditions both domestically and globally indicate coal production from higher-cost mining operations in the state, particularly those in southern West Virginia, will face significant pressure as market prices retreat from current high levels.

Appreciable downside risks exist for the state's high-production steam coal operations in northern West Virginia, as the domestic power sector continues to see utilities retiring coal-fired generators and replacing them with advanced combined-cycle natural gas plants at a brisk pace. Indeed, as much as 7 GW of coal-fired power plants in Ohio, Pennsylvania, West Virginia and other states that source coal from mines in northern West Virginia (and elsewhere) is either planned to or at risk of being retired within the next three years. Absent any new domestic or export customers to serve as an offset, these retirements could precipitate the loss of at least 5 million short tons of coal shipments from West Virginia mines. For a more detailed discussion of the state's coal industry outlook, along with a closer examination of regulatory and market issues affect the industry, see chapter 3 of this report.

FIGURE 2.15: West Virginia Employment Growth Forecast by Sector



Sources: Bureau of Labor Statistics; WVU BBER Econometric Model

MANUFACTURING Although at just 0.2 percent per year, the manufacturing sector's expected job growth during the outlook period represents a significant contrast from much of the last decade. Most of the sector's major segments will post at least moderate job growth over the next five years, but anticipated job losses in fabricated metals, primary metals and an array of small durables and nondurables manufacturing segments will offset these gains. Aerospace equipment is expected to be the fastest-growing manufacturing sub-sector in terms of adding jobs going forward, due to the combined effects of Northrop Grumman's announcement to expand the Allegheny Ballistic Laboratory in Mineral County as well as the continued growth of the aircraft parts and broader aviation industry in North Central West Virginia.

Recent growth in the state's auto parts manufacturing industry is expected to continue. Hino Motors Manufacturing recently announced that its newly-opened truck assembly plant in Parkersburg will receive an additional $40 million investment that will add up to 250 jobs at the facility. In addition, Toyota continues to expand its footprint in the Kanawha Valley with the planned investment of more than $100 million to double hybrid transaxle production, creating more than 100 jobs at the plant in Putnam County.

The state's more established chemicals manufacturing production that operates in the Kanawha and Ohio River valleys are expected to see conditions at least stabilize during the forecast period. Ongoing development of natural gas resources in the Marcellus and Utica Shale plays provide a low-cost feedstock to these businesses. At the same time, the construction of the Shell ethane cracker should facilitate some growth in regional petrochemicals and plastics production, and the potential addition of the Appalachian Storage Hub and at least one more ethane cracker in the tri-state area would likely precipitate further growth prospects for the state's chemicals industry.

However, the largest known sources of job creation within the chemicals industry, and for the manufacturing sector overall, will come from the Procter & Gamble facility in Martinsburg and the ROXUL plant in Jefferson County. The P&G facility began limited production of Bounce earlier this year and currently has 1,100 workers employed at the facility, but another 250 to 300 employees are expected to be added through late-2020 as the remainder of the facility's product lines are placed into full operation. Another source of new activity for the chemicals subsector will be ROXUL, an insulation materials manufacturer that is currently constructing a facility in Jefferson County that will employ approximately 150 workers when operations begin in early-2020.

While expectations for the chemicals subsector are generally positive, some downside risk does exist. Most of this risk centers around the state's success in diversifying beyond the upstream and midstream activity in the natural gas industry and into downstream uses that facilitate growth in petrochemicals manufacturing. However, Pfizer's purchase and planned merger of Mylan Pharmaceuticals with its Upjohn brand could pose some downside risk to Mylan's large production facility in Monongalia County. In some instances, mergers precipitate job losses at one or both companies involved in the transaction as the new company tries to eliminate redundant activities.

SERVICE SECTOR GROWTH Professional and business services sector is expected to add jobs at the fastest pace of any major sector in West Virginia over the next five years, increasing at a rate of 0.9 percent per year. Due to its strong connections with the energy industry, however, growth will be volatile over the next couple of years as natural gas pipeline construction projects wind down and coal production begins to taper off. Longer term, however, healthy prospects for the natural gas industry should bolster demand for engineering, legal and other consulting services, especially as the upcoming opening of the Shell ethane cracker marks the first step in fostering development of downstream manufacturing activity.

After registering the second largest percentage increase in payrolls over the past ten years, education and health services will see gains slow considerably to just shy of 0.2 percent annually over the next five years, slightly lagging overall job growth during the outlook period. In the near term, the impending closure of the Ohio Valley Medical Center will lead to the loss of 700 to 800 jobs in late-2019, but we expect at least half of those jobs will be re-gained in subsequent quarters as Wheeling Hospital and Reynolds Memorial absorb services and workers lost to the closure. Longer term, given the state's underlying demographic trends, namely a large share of elderly residents and generally poor health outcomes for many of the state's cohorts, latent demand for healthcare services will remain strong during the outlook period. At the same time, expectations for additional population losses for many of the state's regions suggest the number of providers could decline as the high costs of serving areas with lower population densities lead to smaller facilities in multiple towns and/or counties to consolidate into larger regional operations.

The state's wealth of natural amenities will buoy West Virginia's status as a regional tourism destination and efforts to increase the state's tourism options and national visibility could boost the sector's importance going forward, especially in areas of the state that possess a lot of scenic attraction and have experienced

structural declines in the coal industry over the years, such as the New River Gorge Area. Overall, the leisure and hospitality sector is expected to register job growth between 0.2 and 0.3 per year during the outlook period. One source for upside potential in the sector could come from tourism, namely developing higher-value recreational opportunities that increase visitor spending. Many of the state's tourist options are lower-margin activities such as camping, hiking or other outdoor activities with limited impact on the broader economy. Ventures such as agro-tourism, "foodie" and microbrew tours and other destination-style attractions would increase spending activity but could also leverage whitewater rafting and other types of adventure tourism that are already available.

Retail trade is expected to remain mostly stable over the next few years before seeing payroll levels weaken over the latter portion of the outlook period. Healthier income and job growth compared to the 2012 to 2016 economic downturn should alleviate the poor spending environment retailers experienced due to job losses in high-wage industries and a shrinking base of customers caused by rapid population declines. Unfortunately, sustained gains in retail payrolls are more probable for the state's growing economic regions, but even in these cases growth will be limited due to the ongoing shift in consumer spending away from traditional brick-and-mortar retail and over to direct-to-customer shipping online platforms such as Amazon, even for food, clothing and other goods once thought to be more immune from online purchasing. Also, traditional retailers are emphasizing their own online platforms for direct shipping and in-store consumer pick up.

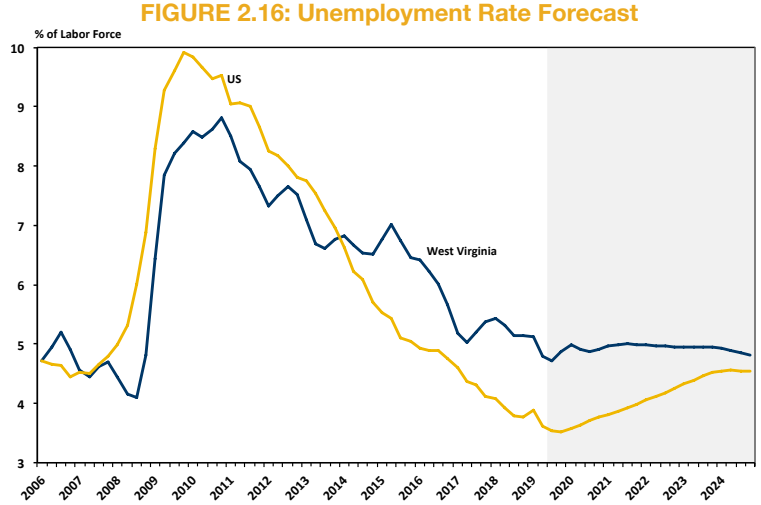
The transportation and warehousing sector is expected to see payrolls expand 0.3 to 0.4 percent annually over the next five years. Continued development along major transportation corridors, such as I-81 in the Eastern Panhandle and I-79/I-68 in North-Central West Virginia. Furthermore, transportation companies that provide services to natural gas rigs and well sites will benefit from the anticipated growth in drilling activity that should help to offset further losses in the tonnage of coal shipped by barge, truck and rail. The state's utilities sector will likely see some job losses during the forecast horizon, though most of the decline will be associated with the anticipated closing of Pleasants Power Station in mid-2022. Three natural gas-fired power plants are expected to be built in Monongalia, Harrison and Brooke counties, though most of the jobs impact will occur during the construction phases as modern natural gas power plants employ fewer people in comparison to coal-fired generators.

The public sector is projected to post a moderate increase in payrolls during the forecast horizon. Although the state experienced a surge in revenue collections during FY2019, FY2020 will likely be weaker as the rebound in severance tax collections has stalled and the surge in income and sales tax revenue associated with natural gas pipeline construction activity has started to fade. Federal government payrolls are expected to increase somewhat during the outlook period but will see significant increases in 2020 reflecting the addition of enumerators and survey processors across the state. Local government employment is expected to rise slightly as municipal governments that had been forced into layoffs due to plunging severance, property and B&O tax collections should see conditions stabilize, while growing regions such as the Eastern Panhandle and North Central see additions in local government payrolls to provide for increased school enrollment and public service demand.

UNEMPLOYMENT After averaging 5.3 percent in 2018, West Virginia's unemployment rate is forecast to average just below 4.9 percent during 2019. Assuming no substantial revisions in the underlying labor force data, the state's jobless rate will increase slightly between late-2019 and mid-2020 before ultimately settling just shy of 5 percent for the remainder of the outlook period.

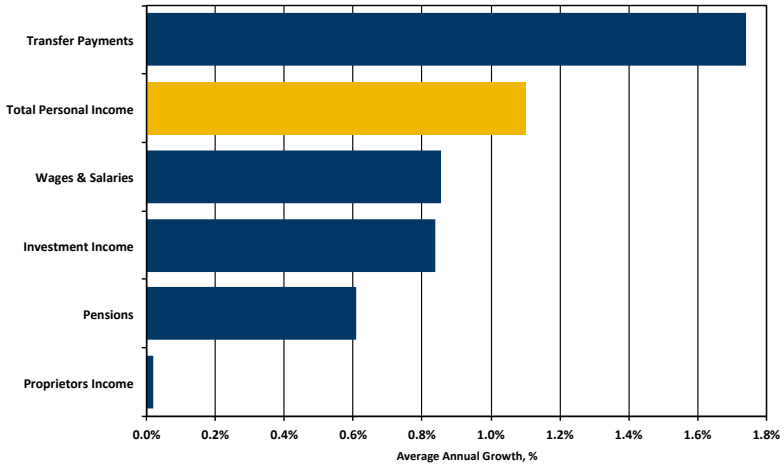
INCOME Following a 2.5 percent increase in 2018, inflation-adjusted per capita income is expected to increase 2.3 percent in 2019. Real per capita income growth will be much slower at 0.8 percent in 2020 as the winding down of natural gas pipeline construction activity prompts a large enough decline in wages and salaries to weigh on total income. Growth in real per capita income is expected to average nearly 1.4

FIGURE 2.16: Unemployment Rate Forecast



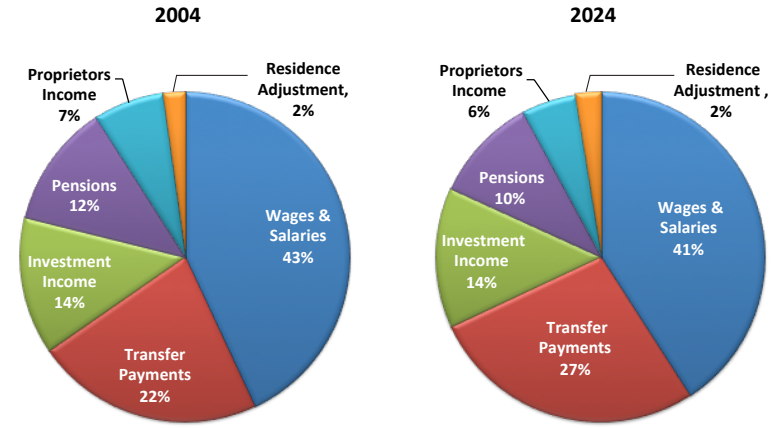
Sources: Bureau of Labor Statistics; WVU BBER Econometric Model; IHS Markit
Note: Shaded region represents the forecast period

FIGURE 2.17: Forecast Growth by Major Source of Real Personal Income, 2019-2024



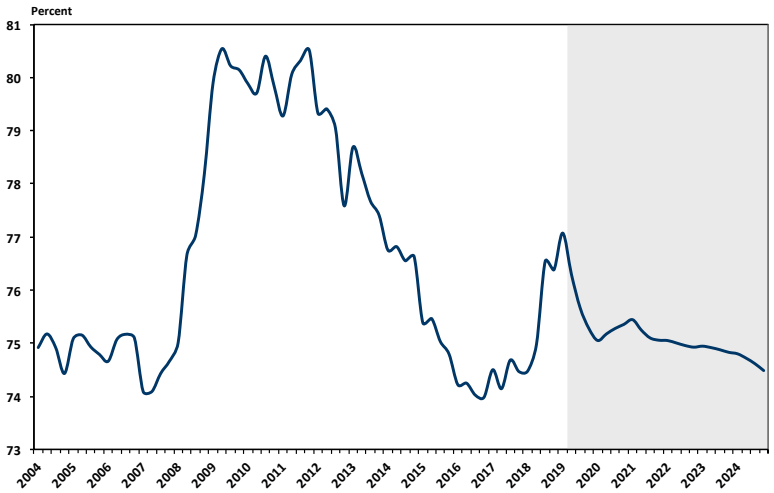
Source: WVU BBER Econometric Model

FIGURE 2.18: Share of Personal Income by Component



Sources: Bureau of Economic Analysis; WVU BBER Econometric Model

FIGURE 2.19: West Virginia Per Capita Personal Income Relative to US Average



Source: Bureau of Economic Analysis; WVU BBER Econometric Model; IHS Markit
Note: Shaded region represents the forecast period

percent between 2021 and 2024. In terms of the major underlying components of personal income, transfer payments are expected to record the fastest rate of growth during the five-year outlook period mostly due to the state's aging population boosting federal transfer payments from the Medicare and Social Security programs. However, safety net programs such as Social Security disability, Medicaid, SNAP and TANF will account for an appreciable share of income in several of the state's persistently economically distressed regions. By 2024, transfer payments are expected to account for more than 27 percent of income, an increase of more than five percentage points versus 2004.

The forecast calls for real wages and salaries to increase by an annual average of nearly 0.9 percent annually between 2019 and 2024, though gains will be volatile through 2021 considering the expectations for uneven job growth over the next few years. Investment income (dividends, interest and rent) is expected to slow to a pace of just over 0.8 percent annually during the forecast horizon, as it will likely be difficult to maintain the generally healthy performance of equity markets seen in recent years. Changes in royalty payments to households with mineral rights in shale gas-rich counties will generally depend upon wholesale gas prices, but the forecast assumes gas prices will rise slightly as demand continues to increase in domestic and international markets. Though rates have declined in recent months, they are assumed to drift higher over the long term providing a lift to interest payments from savings, money market and other interest-bearing accounts.

Growth in West Virginia's real per capita personal income will lag the national average by a small margin during the outlook period. Consequently, with the state expected to see real per capita income rise by 1.4 percent versus 1.7 for the nation, the state's average income ratio with the US will fall from 77 percent currently down to just below 75 percent by the end of the outlook period.

GDP Total real GDP for West Virginia is expected to rise between 0.5 and 0.6 percent annually through 2024. The oil and gas industry will likely pace broader output growth by a large margin, with an expected gain of 4.0 percent per year during the forecast horizon. After rebounding strongly in 2017 and 2018, real output from the state's coal industry will dip by nearly 1 percent per year between 2019 and 2024. The manufacturing sector is expected to post real output growth of 1.4 percent or so during the outlook period, with most of it arising from transportation (aerospace + autos), chemicals and plastics manufacturing industries. Real GDP for the construction sector will be volatile over the next two years or so given the completion of the MVP and expected re-start of the ACP project, but public

infrastructure investments and several nonresidential construction projects in North Central and other regions should buoy the sector.

POPULATION Due to what is expected to be an improvement in its relative economic performance, the fast rates of population declines seen in recent years will likely come to end during the outlook period. Deaths will continue to exceed births in most counties in West Virginia and the margin will widen in some parts of the state over the next five years. At the same time, counties that struggled with steep losses in employment and income should see population levels decline more slowly or even stabilize as labor market conditions improve more broadly. This should at least slow the tide in net-outflows from migration for some counties. At the same time, the state's primary economic growth centers in the Eastern Panhandle and North Central regions will continue to receive the lion's share of people migrating into West Virginia. Overall, total population for the state will contract at a rate of 0.1 to 0.2 percent per year, leaving the total number of residents at roughly 1.78 million by the end of the outlook period.

AGE DISTRIBUTION The state's population will continue to become increasingly concentrated in the 65-and-older age group. Most of this increase should occur as residents in the 60 to 64 years of age cohort age in place and return migration of older residents moving back to West Virginia to receive long-term medical care or to live closer to family members. Over the longer term, these processes will eventually lead to nearly one fourth of the state's population being at least 65 years of age.

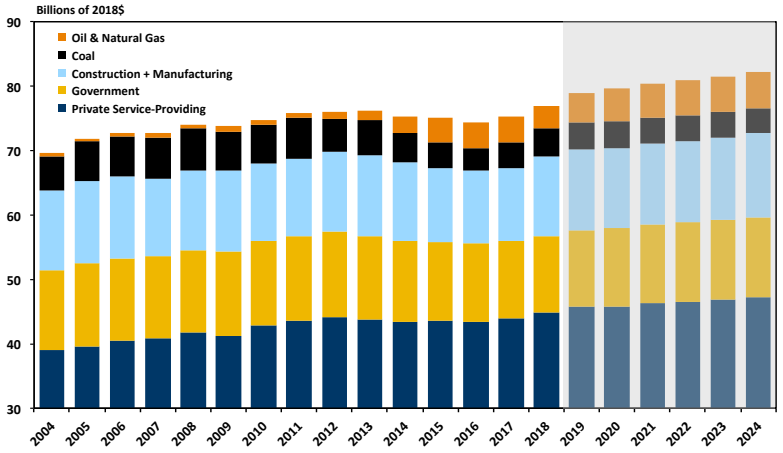
WEST VIRGINIA'S EXPORTS

Led by a surge in metallurgical and thermal coal shipments, goods exports from West Virginia provided a considerable boost to the state's economy in 2018. Total exports rose to $8.2 billion in 2018, up from $5.3 billion in 2016 (measured in 2018 dollars), marking an overall increase of nearly 55 percent in inflation-adjusted terms. The total dollar value of exports equated to nearly 11 percent of state economic output in 2018. Export totals in the first half of 2019 indicate a noticeable drop-off is likely for the full calendar year, with much of that weakness owed to a downshift in the global seaborne coal market as well as a broadening of trade disputes between the Trump Administration and several major US trading partners.

WEST VIRGINIA EXPORT COMMODITIES

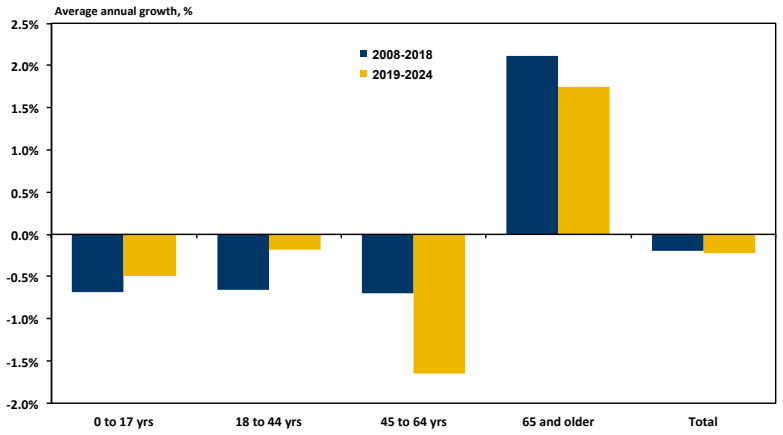
COAL EXPORTS West Virginia's fortunes in export markets have historically been driven by foreign coal demand. In 2003, exports of minerals and ores, which in West Virginia's case are made up almost entirely by bituminous coal, totaled less than $300 million in inflation-adjusted dollars—or 10 percent of all exports.

FIGURE 2.20: GDP Forecast by Sector



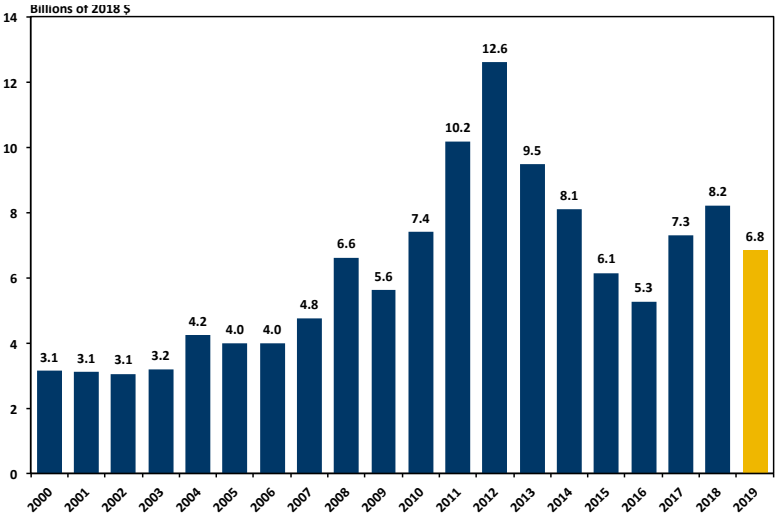
Source: Bureau of Economic Analysis; WVU BBER Econometric Model

FIGURE 2.21: West Virginia Population Growth by Age Group



Sources: US Census Bureau; WVU BBER Econometric Model

FIGURE 2.22: West Virginia Exports

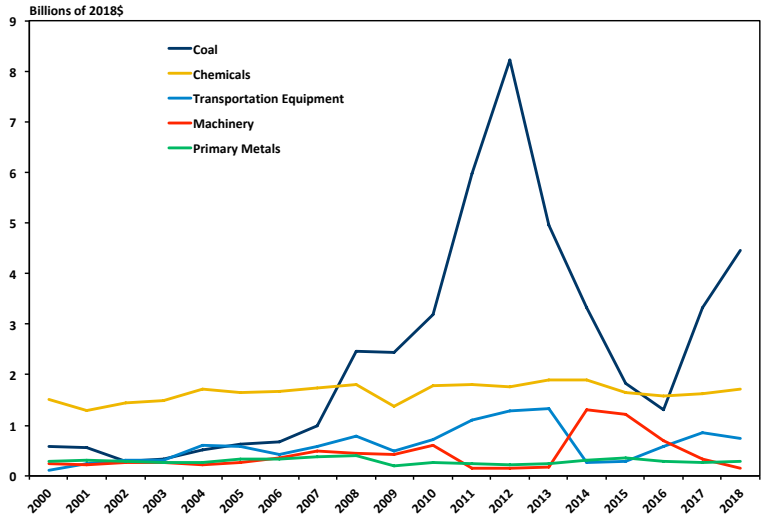


Source: International Trade Administration
Note: Data for 2018 is an annualized estimate based on Q1 and Q2.

By 2012, this share reached roughly two-thirds of the overall export base by climbing to over $8 billion. International coal shipments from West Virginia fell rapidly between 2013 and late 2016, but have since rebounded, totaling $4.5 billion for calendar year 2018.

Global demand for coal appears to have weakened in recent quarters. During the first half of 2019, preliminary data show the value of coal export shipments from West Virginia has fallen by 47 percent compared to the previous year. A significant portion of this drop has been caused by the price side of the equation as global coking coal prices have fallen by nearly one-fourth since the beginning of the second quarter, mostly due to trade disputes and broader concerns over future growth in steel demand.

FIGURE 2.23: West Virginia Top Five Exporting Industries



Source: International Trade Administration

FIGURE 2.24: Top 10 Export Products from West Virginia, 2018

Export Category	Export Value (millions of $)	Share of Total West Virginia Exports (%)
Bituminous Coal	4,350	53.5%
Reciprocating Piston Engines	409	5.0%
Civilian Aircraft, Engines and Parts	229	2.8%
Polyamides	207	2.5%
Aluminum Alloy Plates	143	1.8%
Polyethers	140	1.7%
Propylene Copolymers	133	1.6%
Polyacetals	111	1.4%
Polyesters (NESOI)	107	1.3%
Acylic Aldehydes	82	1.0%
All Export Commodities	8,217	-

Source: US Census Bureau

CHEMICAL EXPORTS While exports from the state's chemicals industry briefly overtook coal as the largest export source in 2016, it has fallen back into the previous ranking it held between 2008 and 2015 as the number two export industry in each of the last two years. Chemicals exports have been remarkably stable thanks to steady levels of demand for the wide array of commercial- and industrial-use resins and polymers produced by chemicals manufacturers throughout the Ohio and Kanawha Valleys. Overall, chemicals exports amounted to more than $1.7 billion during 2018. As with West Virginia's primary commodity export, shipments from the chemicals sub-sector abroad have declined during the first half of 2019 compared to the first six months of last year, though by a smaller margin at 9 percent.

EXPORTS OF OTHER MANUFACTURED GOODS Aside from coal and chemicals, exports of other goods totaled about $2.1 billion in exports in 2018, down about 9 percent from 2017. Industrial machinery and an array of transportation equipment comprise a significant share of the goods exported by West Virginia companies. Exports of machinery plunged 57 percent in 2018 but appears to be on an upswing in 2019 as year-to-date export shipments have jumped 61 percent. Transportation equipment posted a 10 percent loss in market value of exports during 2018, though an improvement is expected for 2019 after a 9 percent increase in export value through the first six months of the year. Exports of primary metals (mostly aluminum alloy plates) typically rank fourth or fifth among leading export industries and fall within a relatively small range. Shipments rose 6.6 percent in 2018 but appear poised for a similar decline for 2019 as tariffs on aluminum have weighed on global demand.

NATURAL GAS EXPORTS One commodity export that will likely account for a growing share of West Virginia's export base over the long term is liquefied natural gas (LNG). A new LNG export terminal at Cove Point, Maryland—the second LNG export terminal in the United States, and the first outside the Gulf Coast region—is expected to draw the bulk of its volume from the growing shale gas regions in Appalachia. The terminal opened in March 2018 and has shipped a total of 265 billion cubic feet since entering service, accounting for roughly 16 percent of total LNG exports from the US over this period. New pipeline infrastructure throughout the Mid-Atlantic region has expanded opportunities to export West Virginia gas from the new terminal.

Despite high transportation costs, prices for LNG produced from shale gas deposits in the US are

competitive for buyers from many European and Asian markets. In addition, continued tensions with Russia have set the stage for US LNG exports to gain global market share as Europe looks to diversify its natural gas supplier base. Expanded midstream and downstream natural gas infrastructure in the Mid-Atlantic region, vis-à-vis proposed ethane crackers in Ohio and Pennsylvania, will also provide additional opportunities for export growth as these facilities will only enhance the development prospects of gas resources throughout the Appalachian Basin.

WHERE DO WEST VIRGINIA EXPORTS GO?

Exports connect West Virginia's economy to countries around the world. West Virginia businesses exported to more than 140 countries during 2018, with most of the state's exports going to familiar destination countries in North America, Europe, and Asia. Canada was the leading destination market for goods and commodities produced in the state, as our northern neighbor received more than $1.3 billion in exports, or 16 percent of all West Virginia exports.

India has aggressively increased its imports of steam coal from West Virginia over the past two years as the rapidly-growing South Asian country builds out its electricity generation capacity with coal-fired power plants. Exports to Asia have increased more than 380 percent in value, totaling more than $1 billion during 2018. China slipped to the state's sixth-largest export market in 2018, totaling $484 million in shipments. In similar fashion to India, exports to Ukraine have increased rapidly over the past few years and most of the increase has come from coal. Exports to the Eastern European nation have nearly tripled since 2015 as Ukrainian steel manufacturers had to acquire new coking coal sources after the Crimea was annexed by Russia. The Netherlands also remains a key export market for West Virginia, ranking third overall as the country serves as a key transit point for the continent's other Northern European countries purchases of coking and steam coal.

International trade is in a phase of major uncertainty due to a building trade conflict between the US and China and the emergence of disputes between other trading partners (such as Japan and South Korea). We anticipate export demand for coal will weaken over the remainder of 2019 and slowly begin to stabilize in 2020, barring any worsening of trade relations. The longer-term export demand picture for coal is more mixed as many countries in Europe phase out coal use in the utility sector and developing countries such as India, though requiring massive amounts of coal to produce steel and generate electricity, are expected to shift their energy consumption portfolios into other fuel sources. Other commodities and manufactured goods produced in the state have generally positive long-term outlooks, but the near term will be negatively affected by a strong dollar and growing trade tensions between the US and several of the nation's major trading partners.

FIGURE 2.25: Top Destination Countries for West Virginia Exports

Destination Country	Export Value (millions of $)	Percent Change 2015-2018
Canada	$1,302	- 26%
India	$1,075	382%
Netherlands	$675	68%
Ukraine	$667	202%
Brazil	$493	60%
China	$484	6%
Belgium	$327	44%
Japan	$284	- 13%
South Korea	$273	43%
Mexico	$235	28%

Source: US International Trade Administration

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CHAPTER 3:

West Virginia's Economy, Industry Focus

ENERGY

Performance in West Virginia's energy sector was mixed in 2018, as the coal and utilities industries largely treaded water, while the state's natural gas industry saw rapid employment gains. Coal production and employment grew slowly, with gains coming largely because of higher export volumes to South Asia and Eastern Europe. Domestically, coal demand continued to fall as power producers shifted production to lower-priced natural gas generation. Employment in the Utilities industry was flat, though declining utilization at the state's coal-fired power plants poses challenges for the industry in the future.

Employment in natural gas extraction and drilling rose at a steady pace in 2018, as gas production continued to increase at a double-digit rate. However, the primary gains in the sector came in pipeline construction, where employment more than doubled due to work on major interstate pipeline projects. As these pipeline projects are completed over the next few years, employment in this sector should return to more typical patterns.

COAL

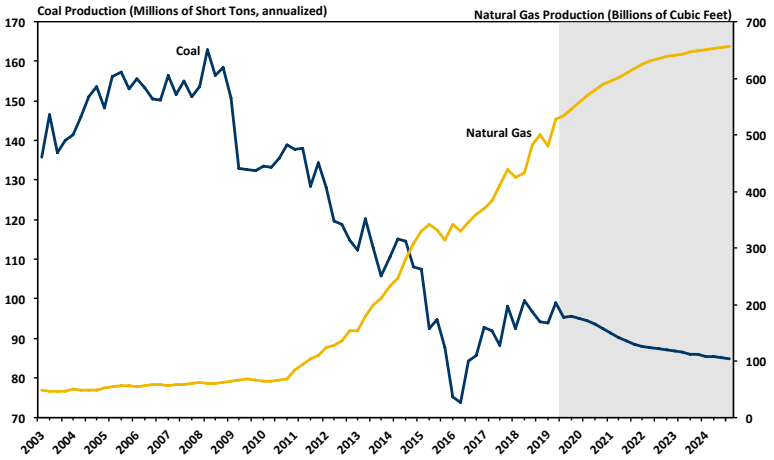
The state's coal industry held on to gains experienced in the previous year as strong export demand—particularly for metallurgical coal—continued to buoy the industry. However, domestic demand for the state's steam coal remains challenging in the near term as regional utilities continue to retire coal-fired power generation capacity as they switch to natural gas-fired generation.

Total coal production in the state rose by nearly 3 million tons in 2018, to 96 million tons, a gain of about 3 percent over 2017's total of 93 million. Production continued to grow in the first half of 2019, during which production was approximately 51 million tons, a gain of 1.5 percent over the same period in 2018.

Coal employment—including mining and support activities—rose by a little under 200 jobs between 2017 and 2018, a gain of about 1.4 percent. At about 14 thousand jobs, employment in the industry remains substantially lower than its recent peak in 2011, when nearly 25 thousand workers were employed in the industry. Preliminary employment data from the US Mine Safety and Health Administration indicate that employment remains flat in the first half of 2019.

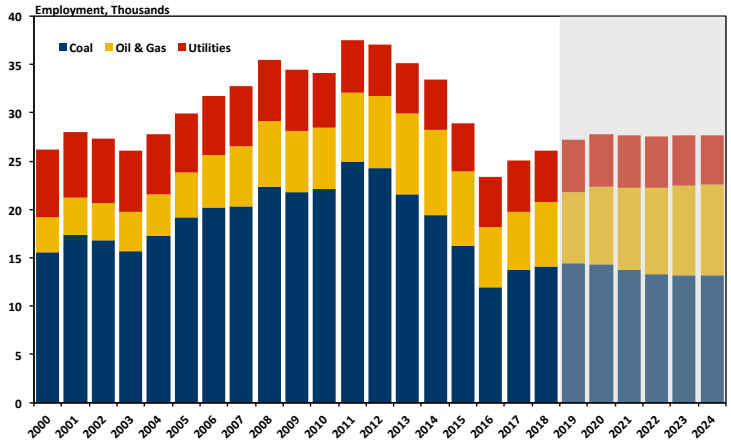
REGIONAL TRENDS All of the state's production and employment gains came in the Southern West Virginia coalfields in 2018, while the Northern mines had minor losses on both measures. The state's southern coal production benefitted from a surge in export volume during the 2018 year, primarily in metallurgical coal, which is primarily sourced from the southern part of the state. However, production in the state's southern coalfields remains substantially lower than pre-recession totals, which were more than double current volumes.

FIGURE 3.1: West Virginia Coal and Natural Gas Output



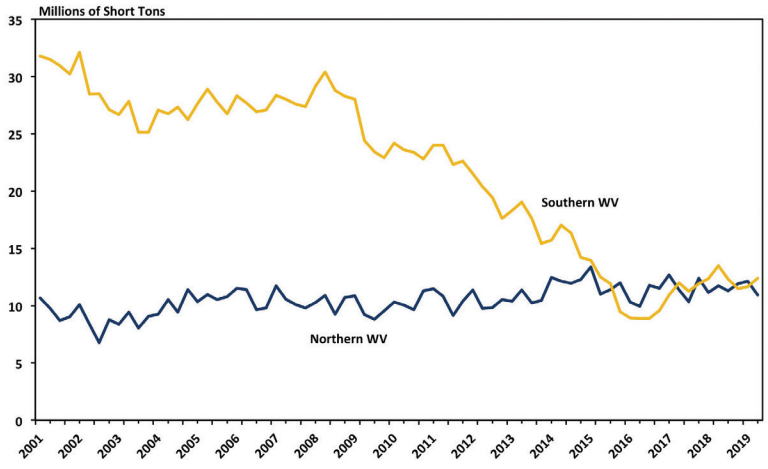
Sources: US Energy Information Administration; WVU BBER Econometric Model

FIGURE 3.2: West Virginia Energy Sector Employment



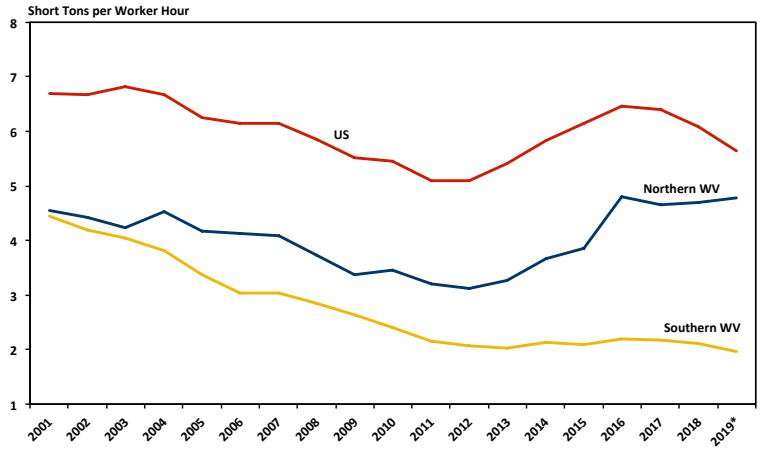
Sources: US Bureau of Labor Statistics; WVU BBER Econometric Model

FIGURE 3.3: West Virginia Regional Coal Production



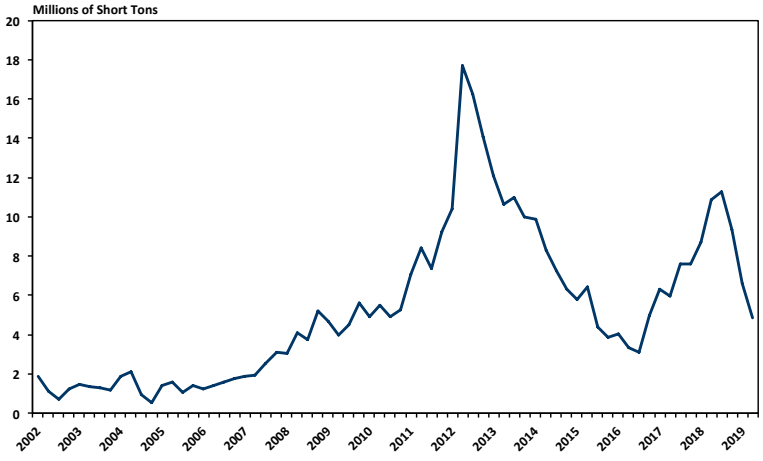
Source: US Energy Information Administration

FIGURE 3.4: Average Coal Mining Productivity



Source: US Mine Safety and Health Administration
Note: Data through second quarter 2019

FIGURE 3.5: Coal Exports from West Virginia



Source: US International Trade Administration

Productivity in terms of production per miner hour continued to slide in the southern part of the state, falling below 2 tons per miner hour so far in 2019. Productivity continues to be higher in the northern part of the state, coming in just above 4.6 tons per miner hour in each of the last four years.

EXPORTS Coal exports saw an additional spike in 2018, adding to a positive trend in 2017. Total export volume rose by nearly 13 million tons in 2018, a gain of more than 46 percent over 2017 levels. The dollar value of exports rose by about $1.2 billion, to $4.4 billion, a gain of about 37 percent. India and Ukraine both added substantial export volume in 2018, with the value of exports to India rising by more than $300 million, a gain of 53 percent. Ukraine also increased its imports of the state's coal by 45 percent, a gain of more than $200 million.

The export gains of 2018 appear to be returning to earlier levels in the first half of 2019, which indicates lower demand for the state's coal overseas. According to preliminary data, total export volume in the first two quarters of 2019 was about 11 million tons, a decline of more than 8 million tons from the same period in 2018, a drop of nearly 42 percent. So far in 2019, domestic demand for the state's coal has made up for these export declines; however, declining exports could signal longer-term difficulties for the industry.

FORECAST We anticipate that declining domestic demand at power plants supplied by West Virginia mines, combined with a falloff in exports, will push coal production lower over the next five years. We forecast that coal production will gradually taper from 2018's level of 96 million tons to approximately 85 million tons by 2024, a decline of about 2 percent per year on average. Mining employment is expected to decline by about 1,200 jobs over five years, a drop of 1.7 percent per year on average. The decline would have been larger in absolute and percentage terms absent the expected opening of the Arch Leer South mine in Barbour County, which is expected to add 600 jobs once its longwall is built out in late-2021.

NATURAL GAS[1]

Core natural gas industry employment—including drilling, extraction, and support activities—rebounded in 2018, a significant improvement over the declines experienced in the state over the previous three years. During the same period, natural gas production growth continued at a double-digit pace, nearly matching gains seen in the previous year. However, these gains

1. Portions of this section are taken from the forthcoming BBER report *Natural Gas Production in West Virginia: 2019–2040*.

were dwarfed by employment gains in pipeline-related construction, brought on by large-scale interstate pipeline projects across the state.

STATEWIDE PRODUCTION TRENDS Statewide natural gas production totaled just shy of 1.8 Tcf in 2018, a 12 percent increase from the prior year. Withdrawals have been especially strong over the past few quarters, climbing 22 percent from mid-2018 through the middle of 2019. These production gains moved West Virginia above more traditional gas producers in the Rocky Mountain states for the first time.

Greater drilling activity led to a gain of more than 600 jobs in the core natural gas industry, a gain of more than 10 percent over 2017. However, employment increases were limited to drilling and support services, which both saw increases nearing 20 percent, while extraction jobs fell by about 8 percent.

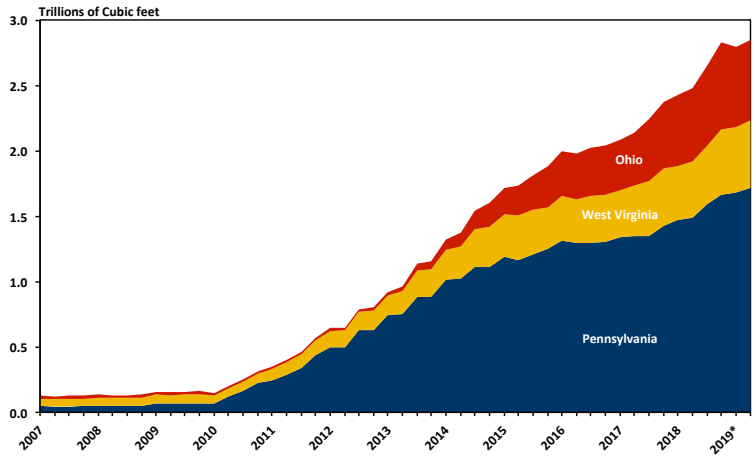
COUNTY PRODUCTION TRENDS In 2018, 93 percent of the state's gas volume was withdrawn from horizontally-drilled wells and nearly two-thirds of output came from five counties situated in the northwestern part of the state. Doddridge County accounted for nearly a quarter of gas production at more than 430 billion cubic feet (Bcf). Tyler and Ritchie counties each had more than 200 Bcf, with Wetzel, Marshall, and Harrison counties totaling above 100 Bcf. Of the largest producers, Brooke, Tyler, and Monongalia counties all had growth rates above 50 percent.

PIPELINE CONSTRUCTION Pipeline capacity registered its largest annual increase in 2018, with nearly 5 Bcf/day in capacity entering service during the year. Phase II of the Rover Pipeline was the single-largest new project affecting the state and entered full service after finalization of the Sherwood and CGT laterals in the fourth quarter of 2018. Other notable projects entering service during 2018 that lifted takeaway and throughput capacity for the state include the West Bound Xpress expansion and Leach Xpress reversal project. An additional 3 Bcf/day of pipeline capacity came on-line during the first quarter of 2019 as the Mountaineer Xpress Project officially entered service. Overall, total natural gas pipeline capacity (outflow) in West Virginia has doubled since the beginning of 2014, and with projects such as the Mountain Valley Pipeline (MVP), Hammerhead Pipeline, Atlantic Coast Pipeline (ACP), Supply Header Project, Equitrans Expansion, Eastern Panhandle Expansion, an additional 6 Bcf/day of capacity could be added within the state during the next couple of years—contingent upon the outcome of legal challenges that are in progress for most of these projects.

The large-scale interstate pipeline projects led to massive increases in pipeline construction jobs in the state. Employment in the pipeline construction industry more than doubled from under 4,000 jobs in 2017 to nearly 10,000 jobs in 2018, a gain of more than 160 percent. We expect that as planned pipeline capacity expansions winds down, employment in this industry will return to more typical patterns.

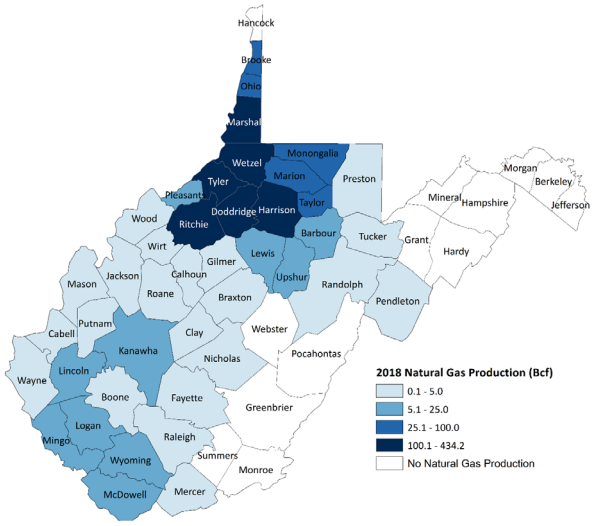
FORECAST We forecast oil and gas employment will continue growing at a rapid pace over the next five years as production levels continue to rise. We anticipate that employment in this industry will rise by almost 2,000 jobs from 2019 to 2024, constituting an average annual growth rate of 4.7 percent. We forecast that production will rise to 2.6 Tcf by 2024, a gain of

FIGURE 3.6: Natural Gas Production In Marcellus/Utica States



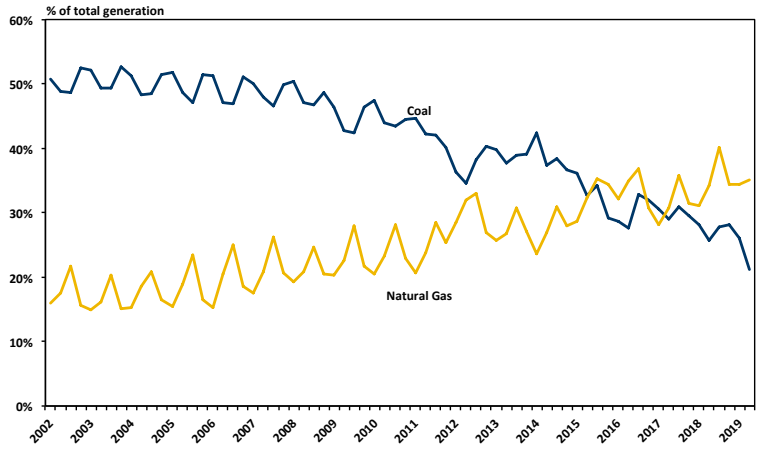
Source: US Energy Information Administration
Note: 2019 Q2 Estimated from partial data.

FIGURE 3.7: Natural Gas Production by County



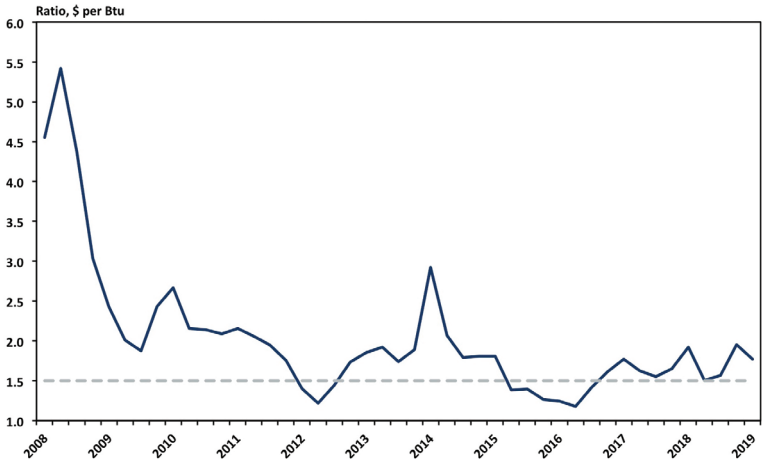
Source: WV Department of Environmental Protection

FIGURE 3.8: Share of US Electric Power Generation by Fuel Type



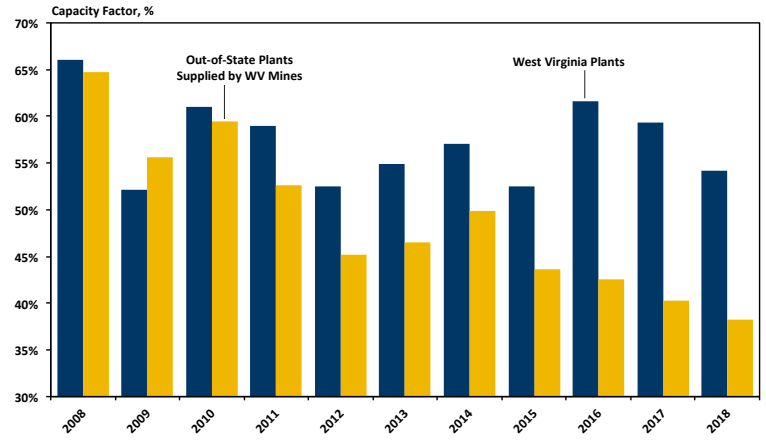
Source: US Energy Information Administration

FIGURE 3.9: Ratio of Natural Gas to Coal Price Paid by Utilities



Source: US Energy Information Administration

FIGURE 3.10: Capacity Utilization for Power Plants Supplied by WV Coal Mines



Source: US Energy Information Adminstration, Author Calculations

about 4.5 percent per year on average over the five-year period. Production is expected to grow most rapidly between 2019 and 2022, at which point growth is forecast to slow to under 2 percent per year.

West Virginia's electric power industry saw modest growth in 2017, but the industry continues to face headwinds on the national level as coal-fired power plants lose market share to natural gas power plants. However, recent moves by the Trump administration may provide a more favorable regulatory environment for coal-fired power plants over the near term.

ELECTRIC POWER GENERATION

West Virginia's Electric Power Generation industry saw little movement in 2018, ending the year with roughly the same number of jobs as in 2017. However, the state's coal-fired power plants continue to face headwinds as electricity demand shifts to natural gas and renewable fuels.

Employment in the state's electric power generation industry was just under 4,000 workers in 2019, essentially the same as the previous year. Though employment was static, total power generation in West Virginia fell to 67 million megawatt hours (MWh), which was down about 9 percent from the year before. About 92 percent of the state's power generation came from coal in 2018, which was a decline of 1 percentage point from 2017 as natural gas and renewables produced a larger share of the state's power.

The decline in electric power generation led to a reduction in the state's utilization of existing generation capacity. Average utilization rates—as measured by plant-level capacity factors[2]—fell from 59 percent in 2017 to just over 54 percent in 2018. Reduced capacity factors indicate falling demand for generation from the state's coal-fired power plants. Capacity factors are also falling at out-of-state coal plants supplied by West Virginia's coal mines. Falling utilization rates could indicate the potential for additional capacity retirements over the near term.

NATIONAL TRENDS Coal-fired power plants continued to lose national market share to natural gas and renewable generation in 2018. Power generation nationwide from coal fell to just over 27 percent of total generation in 2018, a decline of nearly 3 percentage points from the year before. Natural gas picked up most of that gain, rising to 35 percent of total generation from 32 percent the year before, with non-hydro renewables

2. Capacity factor measures the amount of generation as a share of potential generation if the plant were run at maximum capacity year-round.

rising about half a percentage point to reach 10 percent of total power generation for the first time.

Fuel costs for Natural Gas power plants continued to be favorable in comparison to coal in 2018. The price per million Btu of natural gas averaged about $1.75 for every $1 of expenditure on coal. These relatively low fuel costs, combined with low capital costs and greater flexibility of gas-fired generation, continued to spur investment in natural gas power plants.

REGIONAL AND NATIONAL TRENDS Regionally, FirstEnergy's decision whether to close the Pleasants Power Station in Pleasants County is indicative of the struggles the coal-fired fleet faces in the state. FirstEnergy subsidiary Allegheny Energy Supply announced in January 2018 that it planned to retire the plant by the end of that year after plans to transfer the plant to another subsidiary, MonPower, was blocked by the US Federal Energy Regulatory Commission. But the plant got a reprieve in October when the company announced it would extend the operation of the plant at least until May 2022.

In July 2019, the West Virginia State Legislature passed a law exempting the station from paying $12.5 million in business and occupation (B&O) taxes to prevent an early closure of the plant and the loss of 160 jobs. FirstEnergy plants in Ohio also will remain open following a decision by the state's Public Service Commission to charge additional payments on ratepayers' bills. At the same time, FirstEnergy Solutions announced it would accelerate the retirement of the Bruce Mansfield plant in Pennsylvania. Two natural gas power plants in Brooke and Harrison counties are continuing the process of construction, while a third plant—Moundsville Power in Marshall County—is now listed as postponed in federal databases. Longview Power in Monongalia County has also proposed to build nearly 1,300 MW combined-cycle natural gas capacity and 70 MW of solar generation on its campus along with its 710 MW coal generation.

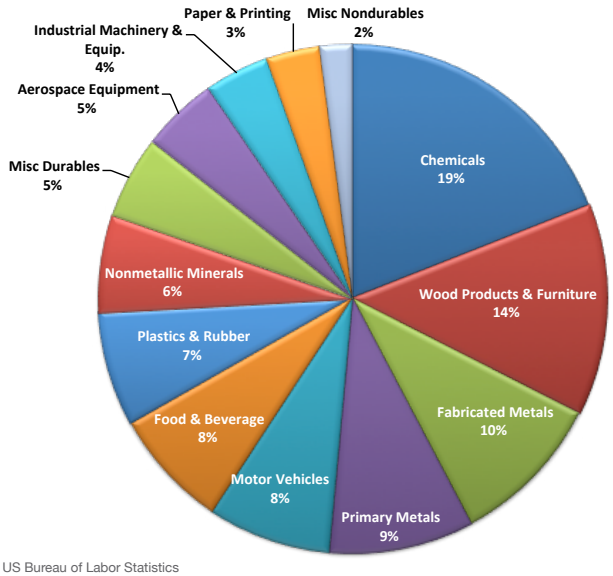
FORECAST As FirstEnergy has not officially extended the life of the Pleasants Power Station past 2022, our forecast assumes the loss of employment at the plant and associated industries mostly occur in that year. This pushes our forecast for the Utilities sector down by about 200 jobs by 2024, which constitutes a decline of about 0.8 percent per year on average.

MANUFACTURING IN WEST VIRGINIA

After losing more than 25,000 jobs between 2001 and 2016, West Virginia's manufacturing sector has entered a period of relative stability overall over the past couple of years, with some segments recording solid growth in jobs and output. Even with the losses that occurred over that 15-year period, manufacturing activity has remained a key component in shaping the state's economic fortunes as some regions maintain a large manufacturing footprint. In addition, given that global economic growth will be driven in large part by developing countries abroad, the sector connects the state to the global economy vis-à-vis exports of manufactured goods. Overall, the manufacturing sector accounts for 7 percent of all jobs and roughly 10 percent of total economic output in the state, but a few regions within West Virginia retain a sizable dependence on manufacturing activity where as much as one-fourth of the economic base come from industries with significant historical relevance.

CHEMICALS The chemicals sub-sector accounts for roughly one-fifth of jobs in West Virginia's manufacturing sector's jobs as well as nearly 40 percent of the value of the sector's economic output. Most of the state's chemical manufacturers lie along the Kanawha and Ohio River valleys and produce numerous organic and inorganic compounds that are primarily used in industrial applications, but composite materials such as resins and synthetic fibers also factor into the industry's portfolio of products. In addition to these companies, Monongalia County contains large manufacturing and research operations for generic drug producer Mylan Pharmaceuticals, though the drug-maker did take a hit as it cut 15 percent of its workforce (~400 employees) from its Morgantown operations last year. Also, the size of the company's presence in Morgantown going forward has become less certain after the July 2019 announcement by Pfizer to purchase and combine its Upjohn unit with Mylan's operations and spin them off into a new company.

FIGURE 3.11: Share of Total Manufacturing Employment (2018)



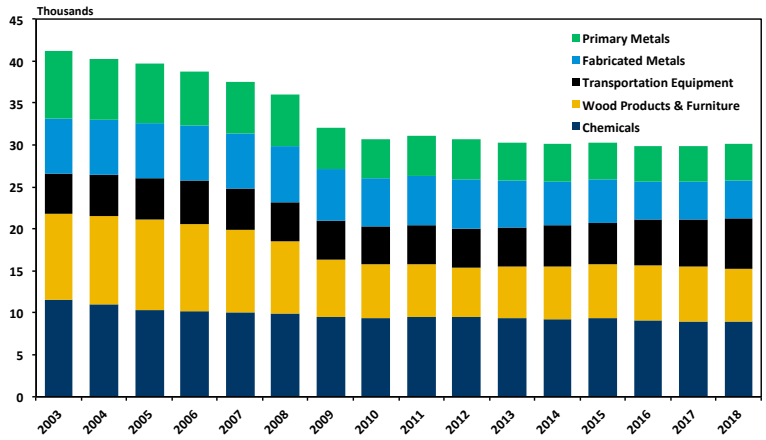
Source: US Bureau of Labor Statistics

The news of most significance for the sub-sector during the last few years, and for the manufacturing sector in general, has been the construction and recent opening of Procter & Gamble's $500 million facility in Berkeley County. Currently, the plant contains 1,100 workers to produce Bounce, Swiffer, Dawn as well as several types of shampoos and conditioners. The company continues to build out the remainder of facility as it works toward making all production lines fully operational by late-2020, which should add up to nearly 300 workers. Aside from jobs and output, the chemicals industry heavily factors into the state's global economic reach, represented the state's second-largest export industry behind coal and largest source of manufactured goods exports with a market value of $1.7 billion during 2018.

OTHER MANUFACTURED PRODUCTS Other than the chemicals industry, other key segments of the state's manufacturing sector include wood products, fabricated metals, transportation equipment (both auto parts and defense and non-defense aerospace) and primary metals, i.e. steel and aluminum. Combined, these industries accounted for more than three-fourths of the sector's output and two-thirds of all manufacturing jobs found in the state during 2018.

Many of West Virginia's manufacturers are procyclical in nature, in that they follow movements in the broader US business cycle. However, several manufacturing subsectors are closely linked to gains and losses in activity within the state's coal and natural gas industries or to fluctuations in national housing markets. Consequently, the state's manufacturing base has experienced a significant amount of volatility over the past decade and many parts of the sector have moved in noticeably different directions.

FIGURE 3.12: West Virginia Manufacturing Employment by Industry



Sources: US Bureau of Labor Statistics

West Virginia's wood products and furniture industry struggled mightily due to a multi-year plunge in homebuilding activity across much of the US, leading to a 45 percent drop-off in payrolls and employment at the state's sawmills, cabinetry, flooring, and other building materials manufacturers between 2007 and 2013. The state's wood products and furniture subsectors registered steady growth in jobs and output between the beginning of 2014 and the early stages of 2018 as low interest rates and pent-up demand bolstered new single-family home construction by 44 percent. Since then, however, homebuilding activity has weakened as supply-related issues such as labor shortages and a trade dispute with Canada over the Softwood Lumber Agreement have combined with weaker demand arising from significant erosion in new home affordability. While not specifically part of the state's wood products sector, Verso Corporation's mid-2019 closure of its paper mill in Allegany County, Maryland, will have a ripple effect on the sector since the paper mill used debarked and cut wood sheets to eventually produce glossy paper for magazines and other publications.

While fabricated metals production tends to track overall manufacturing activity nationally, the subsector serves as a direct supplier/servicer to the state's coal industry as manufacturers produce roof bolts for underground mines or service mining equipment for surface and underground operations. Not surprisingly, the subsector has struggled significantly since 2012 as coal production has fallen by such a large margin at many mines in southern West Virginia. The subsector did experience a bounce back in jobs and real GDP that coincided with the export-induced rebound in coal production across many steam and coking coal mines operating in the state's southern producing region.

TRANSPORTATION EQUIPMENT The state's transportation equipment subsector is made up of a growing auto parts supply chain scattered throughout the Kanawha and Mid-Ohio River valleys as well as a mix of civilian and defense aerospace equipment production. Auto parts manufacturing has easily represented the fastest-growing portion of West Virginia's manufacturing base, and in fact is the only one to record job and output growth over the past decade. Overall, auto parts plants have added jobs at a rate of nearly 6 percent annually since 2008 and although much of this growth can be attributed to Toyota's large-scale investments at its powertrain manufacturing facility in Putnam County, West Virginia's burgeoning auto parts supply chain has also seen a new truck assembly plant built for Hino Motors Manufacturing's in Parkersburg and investments made by NGK Spark Plugs, Allevard Sogefi and Gestamp.

Although the state's aerospace industry has struggled at times over the past decade, conditions have improved during the past couple of years. Indeed, aviation services and aircraft parts construction firms have increased their presence in North Central West Virginia thanks to increased demand for commercial aircraft nationally as well as efforts to build out the region's commercial travel options. Moreover, the Applied Ballistics Laboratory (ABL) in Mineral County has recorded some job gains in the past year or so thanks to new contract awards for building and testing advanced rocketry and the facility should see additional expansions as Northrop Grumman has announced that it will hire several hundred workers in the next few years.

SECTOR OUTLOOK

When compared to the past 10 years, the forecast calls for West Virginia's manufacturing sector to face appreciably better conditions for the next five years. Overall, manufacturing employment is expected to rise at a pace of nearly 0.2 percent per year. Transportation equipment, consisting of both the aerospace equipment and motor vehicles and parts industries, will lead the state's growth in new manufacturing jobs during the outlook period.

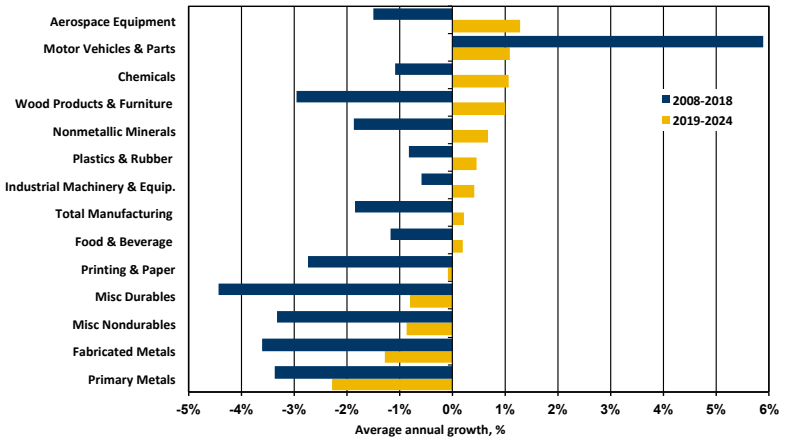
The commercial aircraft parts and aviation services industry in North Central is slated for additional growth going forward as Pratt & Whitney, Bombardier and others invest in regional operations. At the same time, Northrop Grumman recently announced its intentions to hire as many as 500 workers over the next several years as the company expands the ABL facility to work on new rocket-based technologies for defense programs. West Virginia's auto manufacturing industry is expected to add jobs at an overall rate of roughly 1 percent annually over the next five years, with most of the increase attributed to Toyota's $110 million investment at its plant in Buffalo to double production of hybrid transaxles and the additional $40 million upgrade by Hino to its recently-opened truck assembly plant.

CHEMICALS GROWTH The chemicals subsector is expected to make the largest absolute contribution to the sector's growth over the next five years but will also see the second-fastest rate of growth overall going forward. The largest contributor to the subsector's growth going forward will be two plants in the Eastern Panhandle. The first of these is the $500 million P&G facility that opened in early-2018 and will continue to build out its product line operations through the latter half of next year. Insulation materials manufacturer ROXUL is building a new $150 million facility in Jefferson County that is expected to come on line by mid-2020, though the project currently faces some legal challenges that could alter the timeline for the plant's opening should they affect previous permit approvals. These two projects are expected to yield a gross increase of nearly 500 jobs by 2021 and could eventually result in larger gains as broader supply chains are developed over time in I-81 corridor.

Continued growth in natural gas exploration and development will provide stimulus to the chemicals subsector as well, particularly as downstream development efforts in the tri-state area come closer to reality with the upcoming completion of Shell's ethane cracker in Beaver County, PA. In addition, talks continue to move forward with PTT Global Chemical's plans to build an ethane cracker plant in Belmont County, Ohio, as Bechtel was named the engineering, procurement and construction contractor for the project. Finally, Domestic Synthetic Fuels announced earlier this year that it plans to build a $1.2 billion coal and natural gas conversion plant that will synthesize ultra-low sulfur diesel, gasoline and other liquid fuels by catalyzing coal with hydrogen cracked from natural gas.

WOOD PRODUCTS Wood products and furniture manufacturers are expected to increase payrolls 1 percent annually, though most of the anticipated gains will be somewhat uneven. The addition of several whiskey barrel manufacturing facilities in the Greenbrier Valley along with upgrades to their supplying mills will provide a boost. In addition, although the US housing market has lost momentum, underlying fundamentals for housing demand remain positive and the forecast does call for some homebuilding activity to pick up between 2020 and 2022. This should facilitate demand for framing lumber and finished products like cabinetry and flooring during this time frame.

FIGURE 3.13: West Virginia Manufacturing Industry Employment Growth Forecast

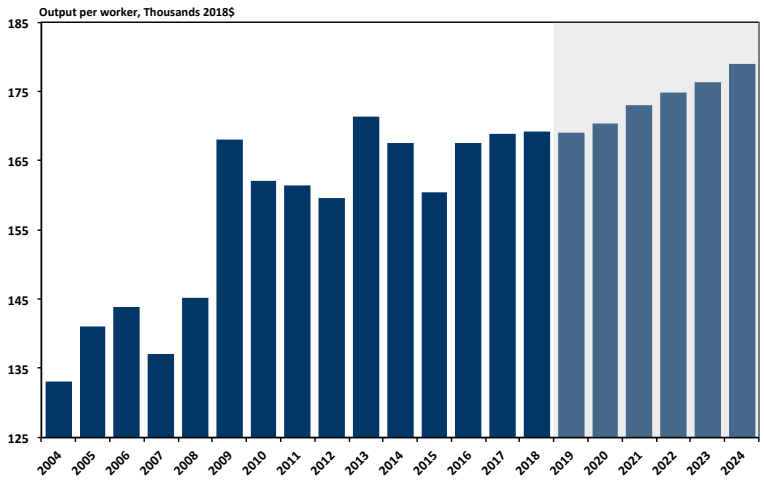


Sources: US Bureau of Labor Statistics; WVU BBER Econometric Model

OTHER SUBSECTORS Moderate gains in output and employment are expected for the nonmetallic minerals subsector during the outlook period, though most of these gains will occur during the first few years of the forecast horizon reflecting increased spending on highways and other public infrastructure. The fabricated metals industry is expected to see employment post an average annual decline of more than 1 percent over the next five years. While jobs and output will likely be stable in 2019 and 2020 as statewide coal production remains in the 90-million-ton range, mine roof bolt manufacturers and machine shops will register declines over the balance of the outlook period as coal tonnage from mines falls appreciably, particularly those in southern West Virginia.

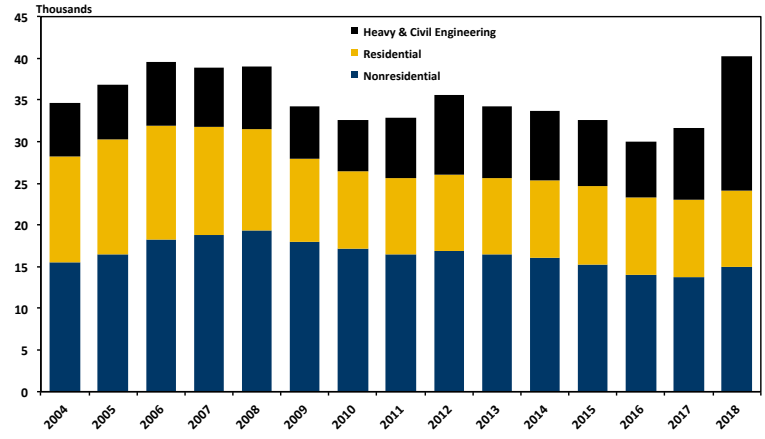
The primary metals subsector is expected to register the largest percentage job losses, though output levels will likely remain more stable during the outlook period.

FIGURE 3.14: West Virginia Manufacturing Sector Productivity



Source: US Bureau of Labor Statistics; Bureau of Economic Analysis; WVU BBER Econometric Model

FIGURE 3.15: West Virginia Construction Employment by Type



Source: US Bureau of Labor Statistics

Although the construction and expansion of several steel and aluminum plants in Kentucky, Indiana and other states suggest positive momentum for the US metals sector will continue, these newer plants are expected to be more efficient and have contractual demand obligations lined up already. Constellium, which produces aluminum alloy sheets at its Ravenswood facility, will likely enjoy steady gains in business activity thanks to its recent capital investments at the plant and business agreements with Airbus. However, most of the metals subsector's capacity nationally (and within West Virginia) operates at much higher cost levels compared to many Asian and Eastern European producers. Consequently, we anticipate the subsector's older, less efficient mills in West Virginia (as well as other states) will continue to face significant problems competing with imported steel goods. The global trade environment poses a major downside risk to the metals manufacturing subsector's near-term performance as steel and aluminum have been front and center in terms of tariffs being imposed by the Trump Administration along with the retaliatory measures implemented by other nations. Should international trade relations continue on their current course, this could lead to a weakening of the global economy and a downturn in global steel demand.

PRODUCTIVITY Real manufacturing output is expected to rise at an average annual rate of nearly 1.4 percent between 2019 and 2024, representing a significant multiple of job growth over the same period. which represents over twice the rate of job growth expected for the sector over the next five years. Productivity growth is expected to be weak in 2019 and 2020 due in large part to the jobs created by the openings/expansions for companies such as P&G, Toyota, Hino, Fiorentini and Rockwool among others. Nonetheless, the average value of real output per manufacturing worker in West Virginia is expected to reach an all-time high by mid-2021.

CONSTRUCTION IN WEST VIRGINIA

After major declines in payrolls and output between early-2012 and late-2016, the onset of several natural gas pipeline projects led to a massive jump in construction sector employment between mid-2017 and late-2018. Indeed, the sector added nearly 12,000 workers (increase of nearly 40 percent) and total real wages doubled from $1.8 billion to $3.4 billion over this period. The completion of two projects in late-2018 and early-2019, along with the entire shutdown of another during the fourth quarter of 2018, did lead the sector to lose more than 5,000 jobs in the first quarter of 2019.

Of course, given that these job gains were connected to natural gas pipeline projects, the heavy and civil engineering subsector accounted for essentially all

the construction sector's payroll and output growth. Residential construction payrolls have hovered around 9,200 for the last few years despite an upward trend in new home construction. Nonresidential construction employment jumped by nearly 9 percent during 2018, driven by major projects such as the Procter & Gamble facility in Berkeley County, Hino Motors in Wood County and ongoing commercial development in North Central West Virginia.

Residential Construction

According to data from McGraw-Hill, nearly 2,300 single-family homes were started during 2018. Although this represent a 6 percent drop-off in new home construction activity from the previous calendar year, most of the weakness was felt in the second half of the year, falling roughly in line with what occurred nationally. In addition, homebuilding activity in the state has trended higher since 2011 and has recorded more consistent gains since the second half of 2014. Preliminary data indicate the pace of single-family starts did pick up during the first half of 2019, averaging more than 2,700 new units started during the first two quarters of the year. Building permits data suggest some additional positive momentum for new home construction over the next several quarters as well, with the year-to-date total of permits authorized increasing more than 7 percent compared to the same period in 2018.

Multifamily construction activity typically represents less than one fourth of total housing starts statewide, largely due to the state's low population density and high homeownership rate. Apartment construction peaked in 2007 and has been relatively limited outside of a few large apartment and student housing projects associated in Monongalia County.

Nonbuilding Construction Activity

Nonbuilding construction activity has surged in West Virginia over the past two years, but virtually all the growth can be connected to the ongoing build-out of natural gas pipeline takeaway capacity for the Appalachian Shale Basin. Although West Virginia did record gains in pipeline capacity additions during the early-2010s, including the Texas Eastern Transmission (TETCO) expansion, West Side (Smithfield III) reversal and a couple of other projects, overall takeaway capacity remained a limiting factor for the industry as a significant portion of the Marcellus Shale play's production volume was effectively trapped in the region. More appreciable increases in pipeline mileage within the region occurred between 2015 and 2017 following the completion of the Ohio Valley Connector, Broad Run Reversal projects, as well as other expansion and reversal projects.

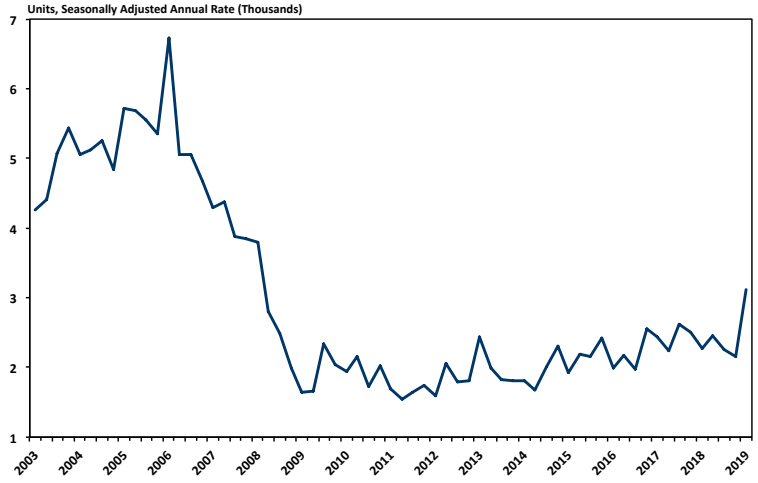
Despite these notable capacity increases, the state has seen massive increases in takeaway pipeline capacity over the past year or so with 8 Bcf/day entering service between the first quarters of 2018 and 2019. Phase II of the Rover Pipeline was the single-largest project in terms of capacity affecting the state after finalization of the Sherwood and CGT laterals in the late-2018, but the West Bound Xpress expansion and Leach XPress reversal added even more throughput capacity for natural gas. In addition, the Mountaineer Xpress project officially entered service during the first quarter of 2019. In total, natural gas pipeline capacity in West Virginia has doubled since the beginning of 2014, and with projects such as the Mountain Valley Pipeline (MVP), Hammerhead Pipeline, Atlantic Coast Pipeline (ACP), Supply Header Project, Equitrans Expansion, Eastern Panhandle Expansion, more than 6 Bcf/day could be added within the state during the next couple of years. In addition to the installation of hundreds of miles of different diameter pipe, the projects require extensive amounts of associative tasks such as tree clearing, excavation and erosion control management. Moreover, compressor station facilities that cost $75-$100 million each must be built at certain points to ensure pressure is high enough to move the gas.

House Prices

West Virginia's housing market tends to be much less volatile over most business cycles, compared to the nation. Indeed, while the state did see house prices deflate in response to the bursting housing bubble, house price declines were more muted compared to most US states. The overall peak-to-trough decline in home prices in the state was 7 percent compared to an 18 percent decline for the US.[3] Just as the declines were smaller, house price appreciation has also been noticeably weaker over the past several years. Prices for existing single-family homes in West Virginia have

3. The measure for house prices used in this section is the Federal Housing Finance Agency's All-Transactions Index, which is available at the state level and for all metropolitan statistical areas. Alternative measures of house prices are available and to see differences that might exist between them, readers can visit https://www.fhfa.gov/Media/PublicAffairs/Pages/Housing-Price-Index-Frequently-Asked-Questions.aspx

FIGURE 3.16: West Virginia Single-Family Housing Starts



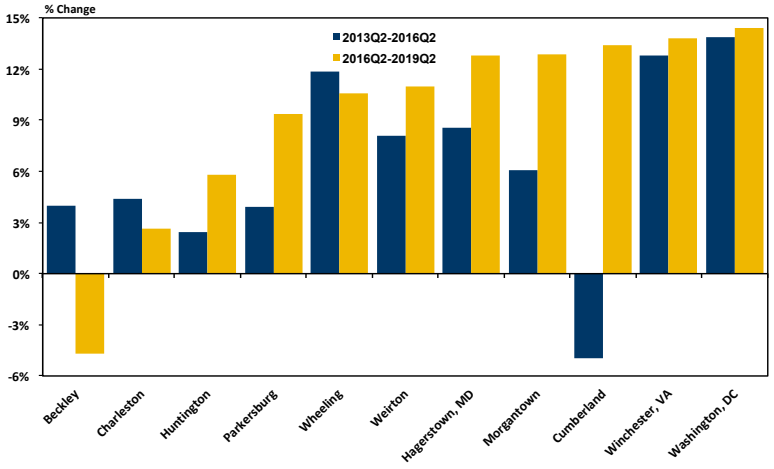
Source: McGraw- Hill Construction, IHS Markit

increased nearly 16 percent compared to a 49 percent gain for the nation since mid-2012.

Of course, changes in house prices have varied quite dramatically in recent years for the state's different regions, reflecting local supply conditions and underlying demand for homes. After experiencing a dramatic run-up in prices during the bubble years, West Virginia counties that were part of the Hagerstown (Berkeley and Morgan counties), Winchester (Hampshire County) and Washington, DC (which includes Jefferson County) metro areas saw prices plunge by as much as 36 percent. The rate of price declines registered in the state's other counties that lie within metro areas was significantly smaller in the aftermath of the housing market, ranging from a 2 percent drop in Morgantown (Monongalia and Preston) to a 10 percent loss in Weirton-Steubenville (Brooke and Hancock counties).

Similarly, house price appreciation for the state's major housing markets has followed different tracks over the past three years or so. According to data from the Federal Housing Finance Agency (FHFA), the Beckley metro area has been the only primary market to record outright declines in house prices over the past three years, while the Charleston, Huntington and Parkersburg metro areas posted cumulative percentage gains in the single digits since mid-2015. In general, those counties that are adjacent to larger, more robust economies in the Northern Virginia/MD/DC area, such as Berkeley, Jefferson and Hampshire counties, and situated in the North Central and shale gas boom regions recorded the fastest pace of growth in house prices.

FIGURE 3.17: Single-Family House Price Growth by Metro Area



Sources: Federal Housing Finance Agency — All transactions House Price Index

Sector Outlook

The forecast calls for the construction sector to see job growth average just 0.2 percent per year through the end of 2024. However, growth will likely be quite uneven during the outlook period as the winding down of the MVP over the remainder of 2019 and early-2020 weighs heavily on payrolls over the very near term. Payrolls are expected to increase at a strong pace in late-2020 through mid-2021 once the ACP, Hammerhead and other midstream natural gas infrastructure projects in the state pick back up, though this is subject to considerable risk due to the ongoing legal issues surrounding the ACP.

The construction sector is expected to receive some support over the next few years from increased public infrastructure investment. Recent weakness in severance tax collections, the disappearing windfall of revenue created by pipeline construction activity and sizeable increases in baseline spending on some areas will hamper the state's fiscal situation over the next couple of years. However, some of the increased baseline budget spending has been targeted at repairing highways and other infrastructure that have undergone limited maintenance and repair for an extended period. Furthermore, the addition of more than $1 billion in road bond funds will provide support for numerous major infrastructure projects in the state over the next several years, including crucial portions of Corridor H, I-70 bridge repair in the Northern Panhandle and highway capacity in North Central West Virginia.

The extent to which infrastructure boosts overall construction activity is subject to some downside risks. Aside from the potential constraints caused by a possible broadening of global trade disputes, labor cost inflation could prove to be significant during the next few years. Specifically, the massive amounts of natural gas midstream construction already occurring in West Virginia and neighboring states, along with the Shell ethane cracker's construction and possibly the PTT Global Chemical facility, will likely bid up wages for highly-skilled construction trades occupations and further constrain the state's already-limited pool of labor for these jobs.

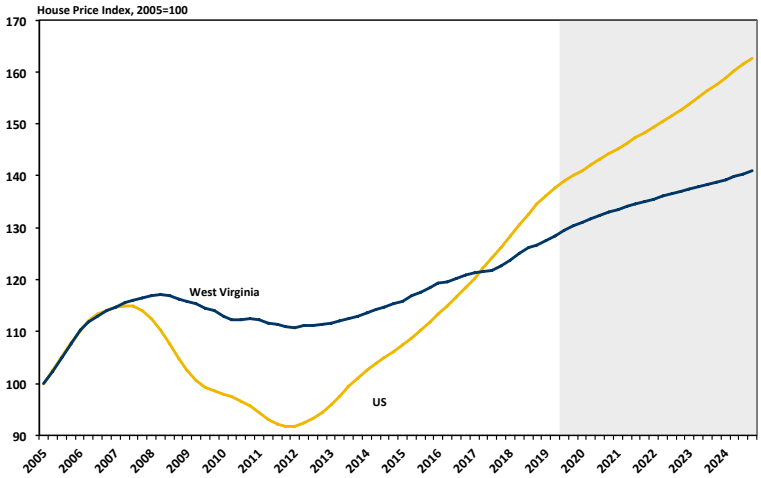
Continued growth in the tri-state area's natural gas industry will continue to advance and produce additional opportunities for new commercial and industrial activity, particularly as the Shell ethane cracker moves closer to completion and prospects for the planned cracker facility in Belmont County, Ohio. In addition, North-Central West Virginia will likely remain a key area for commercial construction developments, including projects in and around the (currently under construction) WestRidge Business Park, a new

children's hospital facility at J.W. Ruby Memorial as well as new buildings and upgrades to facilities on WVU's downtown campus and athletic facilities.[4]

The Eastern Panhandle is also expected to be a key area for construction over the longer term, as the P&G facility and will likely help to facilitate the development of the region's manufacturing and distribution supply chain. Furthermore, the Eastern Panhandle Expansion pipeline project will improve the area's attractiveness as it opens access to natural gas supplies for industrial and commercial customers. Finally, the Eastern Panhandle will also remain the state's fastest-growing area in terms of population over the next five years.

In terms of the residential construction activity statewide, the forecast calls for single family housing starts are expected to increase at an average annual rate of more than 2 percent for the state as whole between 2019 and 2023. These gains will be centered in the state's strongest economic regions, such as the Eastern Panhandle and North-Central WV, and this underlying demand for housing created by rising income levels and consistent in-migration of new residents will bolster house prices by a rate of more than 2 percent annually during the outlook period.

FIGURE 3.18: West Virginia Single-Family House Prices



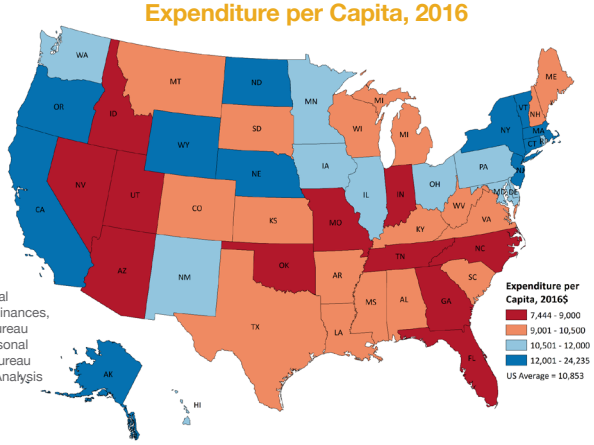
Sources: Federal Housing Finance Agency; WVU BBER Econometric Model; IHS Markit

4. One of these projects, Reynolds Hall, to house the John Chambers College of Business & Economics, is one project the authors watch with great anticipation.

CHAPTER 4:
Government in West Virginia

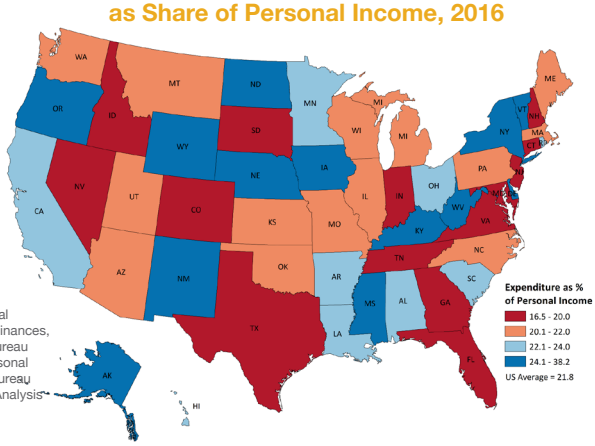
As reported in previous sections, government is the largest employer in West Virginia, accounting for one-fifth of all jobs in the state.[1] Further, total state and local government spending in the state is equivalent to nearly 27 percent of West Virginia's total personal income, and the US federal government transfers a significant amount of income into the state. Taken together, it is clear that government has a significant economic influence in the state, and as such, in this section we explore the role of government in West Virginia in two ways. First, we detail the size and composition of state and local government activity in the state. Second, we consider public assistance in West Virginia that is provided by the US Federal Government in conjunction with the State of West Virginia.

FIGURE 4.1: State and Local Government Expenditure per Capita, 2016



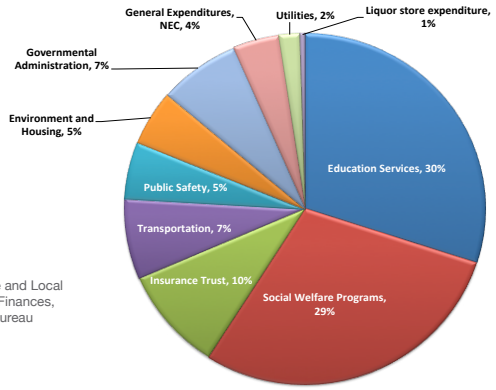
Source: State and Local Government Finances, US Census Bureau and State Personal Income, US Bureau of Economic Analysis

FIGURE 4.2: State and Local Government Expenditure as Share of Personal Income, 2016



Source: State and Local Government Finances, US Census Bureau and State Personal Income, US Bureau of Economic Analysis

FIGURE 4.3: West Virginia State and Local Government Expenditure Composition, 2016



Source: State and Local Government Finances, US Census Bureau

WEST VIRGINIA GOVERNMENT

GOVERNMENT SIZE As illustrated in Figure 4.1, West Virginia ranks in the lower half of US states in terms of the size of overall state and local government when measured as total spending on a per capita basis. Twenty-one states have smaller state and local governments when measured by this metric.[2] However, it is also important to consider government spending measured relative to state personal income, especially since personal income per person in West Virginia falls below the national average. As reported in Figure 4.2, West Virginia's state and local governments are larger than average when total spending is measured relative to personal income. Total state and local government spending in West Virginia is nearly 27 percent of state personal income, compared to the US average of 22 percent; indeed, only seven states have larger governments by this metric. Overall, the answer to the question "How large is state and local government in West Virginia?" is mixed depending on the metric used: The absolute size of the government is relatively small, but a relatively large portion of the state's limited resources are devoted to government expenditures.

EXPENDITURE COMPOSITION In Figure 4.3 we report the composition of state and local government spending in West Virginia. As illustrated, West Virginia devotes 30 percent of its overall government resources to education services, above the national average of around 28 percent. West Virginia also devotes a relatively large share of its government resources to social welfare programs, such as Medicare and the State Children's Health Insurance Program (SCHIP). West Virginia governments devote 29 percent of their overall spending to this category, compared with a national average of more than 26 percent. West Virginia governments direct 10 percent of their expenditures to insurance trust expenditures for public employees, which is about the same as the national average. Further, governments in the state focus relatively heavily on transportation spending: in West Virginia 7 percent of total spending goes to transportation-related projects, compared to a national average of just under 6 percent.

1. This percentage includes federal government employment in West Virginia, in addition to state and local government employment.

2. Census data on state government finances are for the 2016 fiscal year. Data for the 2017 fiscal year are not scheduled for release by the US Census Bureau until Fall 2019.

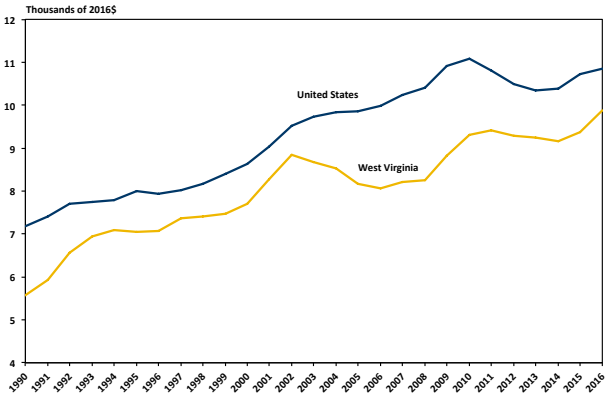
EXPENDITURE AND REVENUE GROWTH In Figure 4.4 we report the growth in state and local government expenditures per person in West Virginia over the past few decades. As illustrated, West Virginia governments have increased their aggregate size from around $5,600 in total spending per capita in 1990 to nearly $9,900 by 2016, in inflation adjusted terms. However, over the entire period West Virginia governments have remained below the national average in terms of spending per capita. In Figure 4.5 we report revenue collection for the state government only. Here we see the sharp improvement in state revenue for the 2019 fiscal year.

OWN SOURCE REVENUE In Figure 4.6 we report state and local government own-source revenue per capita across the 50 states. Here West Virginia falls in the lower half of states based on this metric (10 other states have lower own-source revenue on a per capita basis). The fact that West Virginia is relatively low in terms of own-source revenue, compared to total expenditures per capita, is driven by the fact that West Virginia receives an above-average share of its revenues from the US Federal Government.

REVENUE SOURCES Figure 4.7 illustrates the sources of West Virginia state and local government revenue. West Virginia receives the largest share of its total revenue from the US Federal Government. Overall, 28 percent of total revenue received by West Virginia governments is a federal transfer, which is significantly higher than the national average of 20 percent. West Virginia governments are in alignment with most states in terms of their reliance on sales taxation: West Virginia governments derive 15 percent of their total revenues from sales taxation, which is slightly below the national average of 16 percent. Similarly, West Virginia governments derive 11 percent of their total revenues from individual income taxation, about the same as the national average. In slight contrast, the reliance on the property tax in West Virginia—10 percent of total revenue—falls short of the national average of 15 percent.

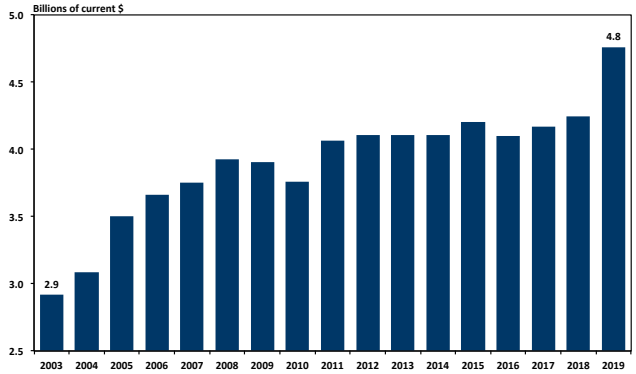
STATE SHARE OF TOTAL SPENDING In Figure 4.8 we report the share of total state and local government spending in a state that is directed from the state government. As illustrated, West Virginia is fifth-highest among the states in terms of this metric. This indicates that West Virginia is a relatively centrally structured state with the state government taking on relatively more responsibility, and leaving relatively less responsibility to the local governments, compared to the national average.

FIGURE 4.4: Real State and Local Government Expenditures per Capita



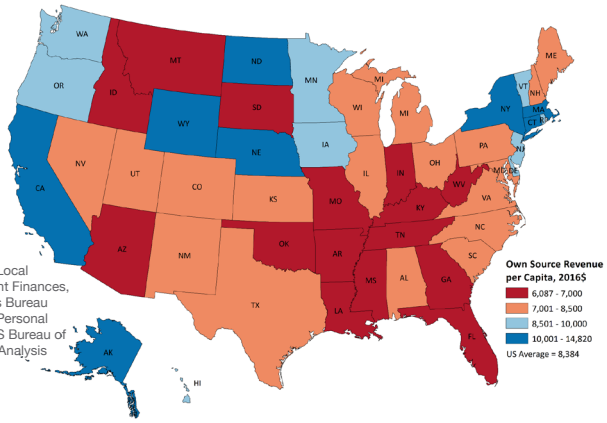
Source: State and Local Government Finances, US Census Bureau and State Personal Income, US Bureau of Economic Analysis

FIGURE 4.5: West Virginia Revenue Collection



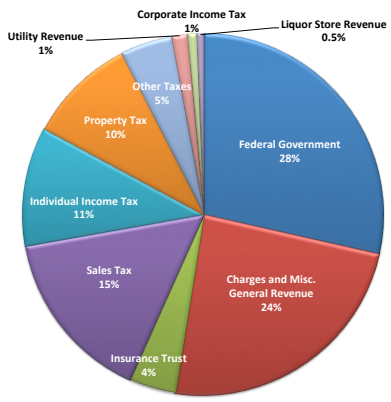
Source: West Virginia Department of Revenue

FIGURE 4.6: State and Local Government Own Source Revenue per Capita, 2016



Source: State and Local Government Finances, US Census Bureau and State Personal Income, US Bureau of Economic Analysis

FIGURE 4.7: West Virginia State and Local Government Revenue Composition, 2016



Source: State and Local Government Finances, US Census Bureau

PUBLIC ASSISTANCE IN WEST VIRGINIA

Total transfer payments made in West Virginia in 2018 amounted to nearly 28 percent of personal income in the state, as depicted in Figure 4.9. That figure is higher than what has been observed over the past two decades or so, given recent economic suffering in the state, although there has been a slight improvement recently. Further, transfer payments in West Virginia are substantially higher as measured against personal income when compared to the national average; for the nation as a whole, transfer payments were equivalent to 17 percent of personal income in 2018. Indeed, the 28 percent figure placed West Virginia highest among the 50 states in 2018 in terms of reliance on transfer payments.

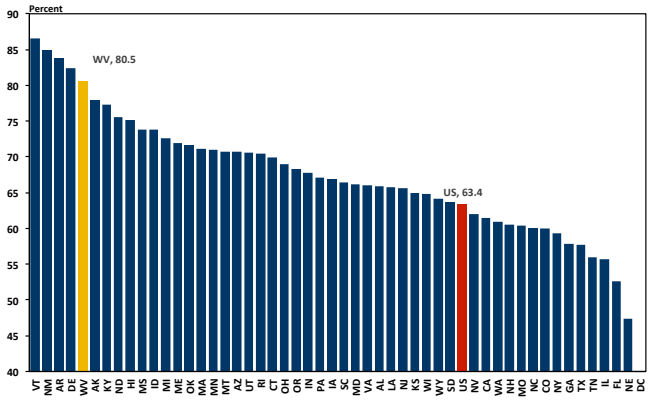
In Figure 4.10 we disaggregate transfer payments into various broader categories. As illustrated, social security is by far the largest individual program, accounting for over 36 percent of total transfer payments made in West Virginia in 2017. Medicare and Medicaid came in second and third, accounting for around 24 and 20 percent of total transfer payments, respectively. All other transfer programs pale in comparison to these three when represented as a share of total expenditures in the category. The Supplemental Nutrition Assistance Program (SNAP) in the state comes in a distant fourth in terms of its spending share, accounting for just over two percent of total transfers.

It is interesting to note how the composition of transfer payments has evolved over the past two decades. Spending on Medicare and Medicaid has increased substantially since 1990 as a share of total transfer payments. Social Security spending has fallen in relative terms, along with all of the various other government retirement and disability programs reported.

In Figure 4.11 we illustrate the composition of transfer payments nationally. The figure illustrates a significant degree of similarity to the pattern observed in West Virginia in terms of the size of relative programs and in terms of the evolution of spending patterns over time.

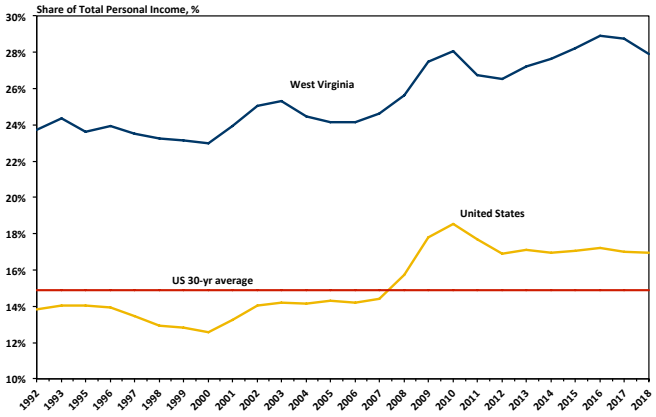
Figures 4.12 and 4.13 illustrate the size of specific public assistance programs in West Virginia. In Figure 4.12, we report the number of individuals who receive

FIGURE 4.8: State Government Spending as a Share of Total State and Local Expenditures, 2016



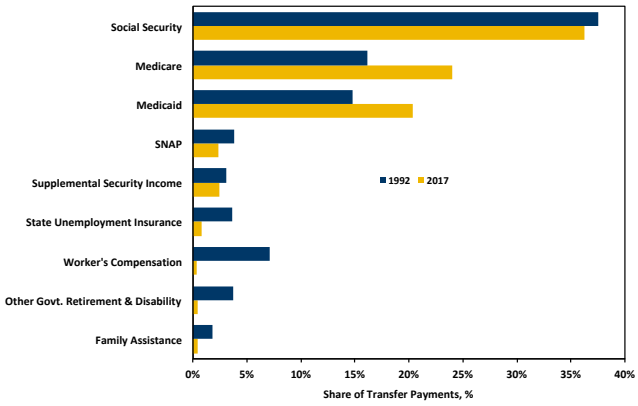
Source: State and Local Government Finances; US Census Bureau

FIGURE 4.9: Transfer Payments as a Share of Personal Income



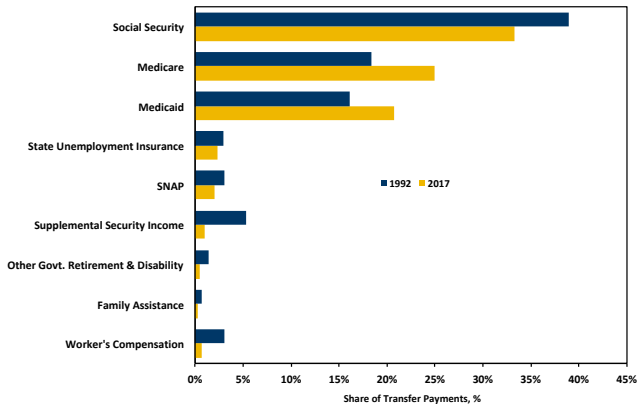
Source: US Bureau of Economic Analysis

FIGURE 4.10: Distribution of Transfer Payments by Program, West Virginia



Source: US Bureau of Economic Analysis. Note: Select programs are reported in chart.

FIGURE 4.11: Distribution of Transfer Payments by Program, United States



Source: US Bureau of Economic Analysis. Note: Select programs are reported in chart.

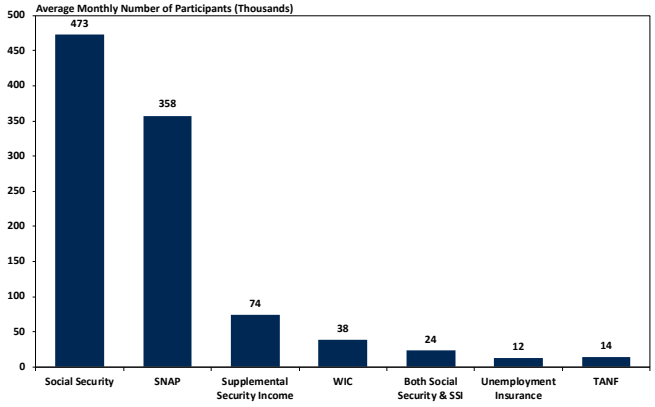
benefits from specific public assistance programs in West Virginia. In Figure 4.13 we report the share of the population receiving benefits from each program, and we offer a comparison to the national share. With 473 thousand recipients, Social Security benefits are enjoyed by the largest number of West Virginians, representing 26 percent of the state's population. This figure is substantially higher than the corresponding figure at the national level of 19 percent, largely due to the state's older population.

The SNAP program has the second highest number of recipients at nearly 358 thousand, or nearly 20 percent of the state's population. This figure is also higher than the national figure of nearly 14 percent. Participation in all other transfer programs in West Virginia pales in comparison to these largest two. Supplemental Security Income comes in at a distant third with 74 thousand West Virginians participating in a typical month in 2017. A larger share of West Virginians participate in all of these transfer programs compared to the nation, with the exceptions of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).

Figures 4.14 and 4.15 examine the receipt of unemployment insurance benefits in West Virginia. As illustrated, the duration of unemployment insurance benefits fell significantly between 2010 and 2012, both nationally and in West Virginia, but grew slightly in the next few years due to worsening employment conditions in the state at that time. However, recent economic improvements have led to reductions in the figure in West Virginia to the lowest level observed in nearly a decade. For 2017, the average unemployment insurance recipient received benefits was around 14.5 weeks, slightly less than the comparable figure for the US of 15.3 weeks.

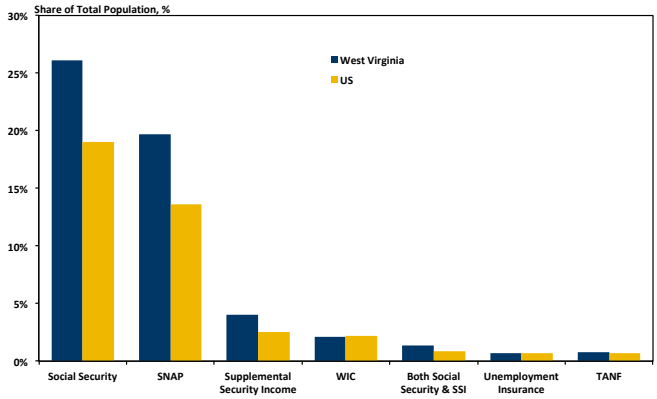
In Figure 4.15 we illustrate the average weekly unemployment insurance benefit amount. As illustrated, benefits have risen in nominal terms since 2001, except for a drop during 2009-2010 and again in 2017 as the economy improved. Overall, the typical West Virginian who received unemployment insurance benefits during 2018 received around $291 per week, compared to around $356 per week nationally.

FIGURE 4.12: Participation in Transfer Programs in West Virginia, 2017



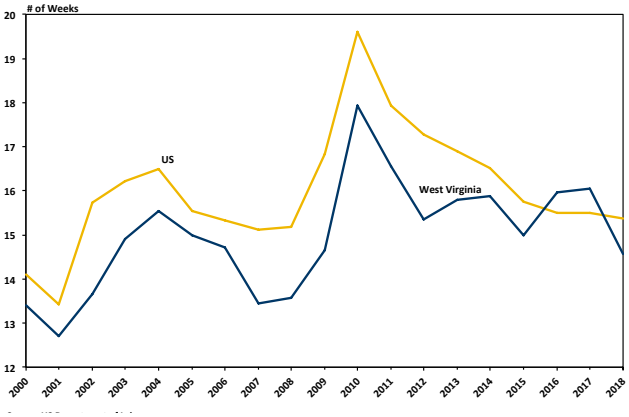
Sources: US Department of Labor; US Social Security Administration; US Department of Agriculture; US Department of Health and Human Services. Note: SNAP figure represents participation in the Fiscal Year of 2016.

FIGURE 4.13: Participation Share in Transfer Programs, 2017



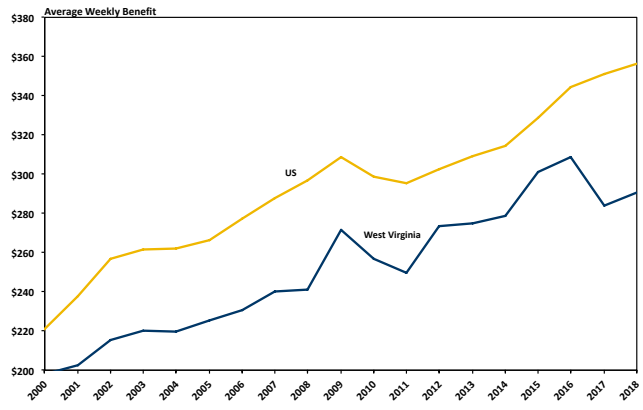
Source: US Department of Labor; US Social Security Administration; US Department of Agriculture; US Department of Health and Human Services. Note: SNAP figure represents participation in the Fiscal Year of 2016.

FIGURE 4.14: Average Weekly Duration Collecting Unemployment Insurance



Source: US Department of Labor

FIGURE 4.15: Average Weekly Unemployment Insurance Benefits



Source: US Department of Labor

GUEST INSIGHT:

West Virginia Fiscal Forecast

MARK MUCHOW,
Deputy Cabinet Secretary,
West Virginia Department of Revenue

The West Virginia economic expansion continued in both 2018 and 2019 with some acceleration in the rate of employment growth and wage growth. Economic activity in both the construction sector and energy sector lead the way. In addition, the State's economy and the State's treasury both benefited from the impact of federal fiscal stimulus, mainly in the form of significant federal income tax rate reductions that first became effective in 2018. The rate of economic expansion began slowing in both the U.S. economy and the West Virginia economy by mid-2019, led by slower global growth and weaker energy markets. In addition, the short-term economic and revenue feedback from federal fiscal stimulus related to broad income tax rate cuts began waning following the completion of the tax filing season for 2018. Economic growth will be more modest in Fiscal Year 2020, with some likelihood of at least modest government revenue decline.

A stronger West Virginia economy helped generate General Revenue Fund growth of 12.2 percent in Fiscal Year 2019. State revenues grew faster than the overall economy as the energy and construction sectors were the major sources of growth and both pay above average wages. The natural gas pipeline industry invested several billion dollars in pipeline construction projects in the State and employed up to 7,000 highly paid workers during peak construction in mid-2018. These activities were major contributors to annualized payroll employment growth averaging roughly 1.5 percent in both 2018 and the first half of 2019. Higher employment and wages led to growth of 9.9 percent in income withholding tax revenues and 8.8 percent growth in sales tax revenues in Fiscal Year 2019. In addition, West Virginia tax revenues were enhanced through its severance taxes on energy production. Severance tax collections grew by more than 30 percent due to a combination of higher natural gas and oil production, higher coal production, greater coal exports and higher energy prices. Finally, a significantly lower federal corporate income tax rate was a major contributing factor in an 80 percent jump in West Virginia corporate income tax collections.

State government finances across the country benefited from additional income realizations associated with the implementation of federal tax reform at the beginning of 2018. The implementation of lower federal tax rates resulted in some shifting of both individual income and corporate income into the 2018 tax year. Income shifting resulted in higher than normal increases in annual tax revenues for 2018 returns, particularly during the final quarter of Fiscal Year 2019. In West Virginia, Individual income tax return revenues surged by nearly 34 percent in the final quarter of the fiscal year. Non-resident withholding tax revenues from pass-through entities jumped 147 percent and Corporation Net Income Tax revenues rose 92 percent in the final quarter of Fiscal Year 2019. Despite the huge rise in year-end tax payments, quarterly estimated income tax collections fell slightly from the prior year, an indication that a sizeable portion of the initial revenue gains associated with lower federal tax rates were short-term.

Foreign good exports were a significant contributing factor to West Virginia's economic growth throughout 2017 and 2018. Led by a sharp increase in the value of coal exports, overall West Virginia exports grew by nearly 14 percent or roughly $1 billion in 2018. The value of coal exports rose from an annualized trough of $1.1 billion as of October 2016 to an annualized peak of $4.5 billion by January 2019. Coal severance tax collections rose by nearly 19 percent in Fiscal Year 2019 mainly in response to increasing export sales. However, an oncoming global economic slowdown and associated lower steel demand began exerting downward pressure on exports at the beginning of 2019. As a result, the value of foreign good exports from West Virginia fell by $1 billion in a five-month period between February and June of 2019.

Coal production fell during the first seven months of 2019 by roughly 4.6 percent from the same period in the prior year. Coal production and coal revenues are both expected to decrease in Fiscal Year 2020 as a result of declining exports and a shrinking domestic steam coal market. Our November 2018 forecast of Fiscal Year 2020 revenues incorporated a 5 percent decline in coal sales with relatively stable pricing from the 2018 level of nearly 95.8 million tons. The current outlook suggests a slightly steeper decline in coal sales along with some decline in coal prices over the coming year.

By the end of 2018, major natural gas pipeline construction activities were largely halted by separate rulings of federal courts blocking progress on both the Atlantic Coast and Mountain Valley pipeline projects with significant short-term economic consequences for West Virginia. Direct employment levels for these projects fell by at least 4,000 between last summer and this summer. The delay in the completion of these projects could also be a contributing factor to the current trend of falling regional

natural gas prices. On their web site, Mountain Valley Pipeline continues to project completion of their project by the fourth quarter of 2019. Our November 2018 forecast of Fiscal Year 2020 revenues incorporated the assumption of additional pipeline construction activity during Fiscal Year 2020.

A slowdown in global economic growth and greater than expected growth in domestic natural gas and oil production from various shale plays in the United States contributed to a trend of lower oil and natural gas prices in recent months. The weighted average Dominion South price for natural gas fell from $2.76 per million Btu in 2018 to an average of roughly $2.50 per million Btu during the first half of 2019. The average price subsequently fell toward $2.00 per million Btu in July and to less than $1.70 per million Btu by mid-August. The natural gas severance tax revenue estimate for FY 2020 was based on an average well-head price of $1.98 per million Btu. Lower energy prices would result in lower severance tax collections for the State in FY 2020.

The combination of conservative budgeting practices and continued improvement in economic activity contributed to a revenue collection surplus of $8.2 million and a net budgetary surplus of more than $36.8 million at the close of Fiscal Year 2019. Out of this budgetary surplus, $18.4 million was deposited in the Revenue Shortfall Reserve Fund and $18.4 million was appropriated by the Legislature in the Fiscal Year 2020 Budget Bill. Due to strong revenue growth of more than $511 million in Fiscal Year 2019, revenue estimates were revised upward by a total of more than $308 million. Most of the additional revenues were appropriated by the Legislature for one-time needs. Significant one-time appropriations included $105 million to a Public Employee Insurance Agency Stabilization Fund, $104 million to the State Road Fund for secondary road maintenance and $39 million to the Revenue Shortfall Reserve Fund.

The official Fiscal Year 2020 General Revenue estimate of more than $4.71 billion, developed in November 2018 and updated in March 2019, is more than $46 million below actual Fiscal Year 2019 General Revenue Fund collections of nearly $4.76 billion. In addition to General Revenues, the State budget relies on roughly $418 million in the estimated State share of lottery funds deposited in either the Lottery Fund, the Excess Lottery Fund, or the General Revenue Fund in Fiscal Year 2020. The Lottery Fund component is down slightly from the prior year following a long-term decline since a peak established in 2007 but is generally expected to stabilize over the coming years.

The West Virginia economy is expected to continue growing in the coming year. Significant public highway construction activity funded with bond proceeds under the Governor's Roads to Prosperity Program will provide some stimulus, especially in the construction sector. Certain manufacturing industry expansions around the State should also provide some employment growth along with continued growth in the health care sector. However, tax revenue growth will be constrained by declining energy prices, sluggish exports and less activity in the area of natural gas pipeline construction. In addition, the initial positive gains in State revenues associated with the implementation of federal tax reform are likely to wane over time.

The base budget expenditures for Fiscal Year 2020 from General Revenues and lottery revenues are $5.131 billion, $258 million higher than the base budget expenditures included in the Fiscal Year 2019 budget of $4.873 billion. In the Fiscal Year 2020 base budget, the largest funding increase totaling more than 40 percent of the overall $258 million increase is for salary increases for teachers, school service personnel, higher education and other State employees. Additional funding of $63 million is appropriated to Public Education as a result of education reform legislation requiring more State funds for general school aid, wrap around services and specialized field placements among other uses. However, these additional costs were largely offset by reductions in the State Aid to Schools formula due to decreasing school enrollment associated with declining school-age population. Corrections and regional jail service costs rose by roughly $40 million. An additional $10 million is allotted for increasing access to career education and workforce training mainly through community colleges. An increase in hourly compensation for appointed counsel in public defender cases was approved at a cost of nearly $5.5 million per year.

The Legislature also acted to enhance pension benefits for State police and to raise the minimum retirement benefit for certain other retirees at an estimated annual cost of roughly $4 million. The State budget also continues to benefit from increases in its Federal Medicaid Assistance Percentage (FMAP). Over a three-year period, West Virginia's FMAP rate increased from 71.8 percent in Federal Fiscal Year 2017 to 74.9 percent in Federal Fiscal Year 2020. The increase in federal matching share in Fiscal Year 2020 was attributable to a multiple year decline in the ratio of West Virginia per capita income to U.S. per capita income as measured during Calendar Years 2015 through 2017 when the State's economy experienced a downturn. West Virginia per capita income grew faster than U.S. per capita in 2018 and, therefore, future FMAP rates will decrease beginning in Federal Fiscal Year 2021 with a gradual ramp up in State financial responsibility for Medicaid.

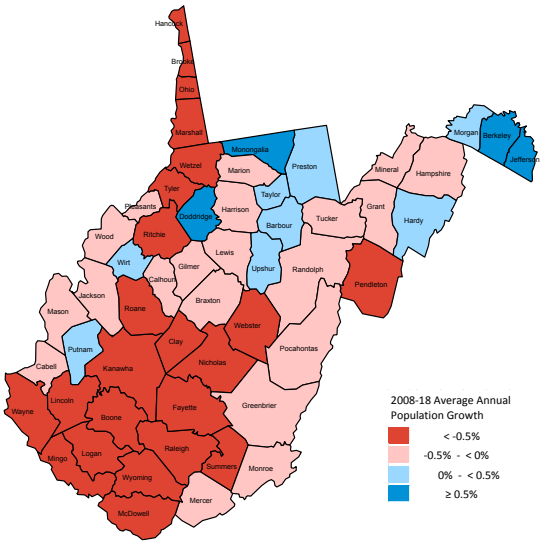
The basis of the current budget outlook for Fiscal Years 2020 and 2021 is a forecast of slowing growth in the State economy with a gradual decline in the rate of growth in employment and wages. The energy sector may pose a significant drag on tax revenues at least in the short-term due to falling prices and a global economic slowdown. However, a possible resolution of current trade disputes between various nations could lead to improvement in global economic growth in 2020 or 2021 with the possibility of renewed growth in energy sales and energy prices in the longer term. Given that the recent upturn in the State's tax revenues was driven heavily by growth in the mining, construction, and transportation sectors, revenue volatility will remain above average over the next two years with greater propensity for both significant upward and downward collection trends within short periods.

CHAPTER 5:
West Virginia's Counties

While statewide figures reflecting West Virginia's economy are important, it is important to recognize that they mask significant economic and demographic variations across the state's regions and counties. As such, in this chapter we illustrate several key economic statistics performed during the past decade across each of the state's 55 counties and how these measures are expected to perform from a geographic perspective over the next five years.

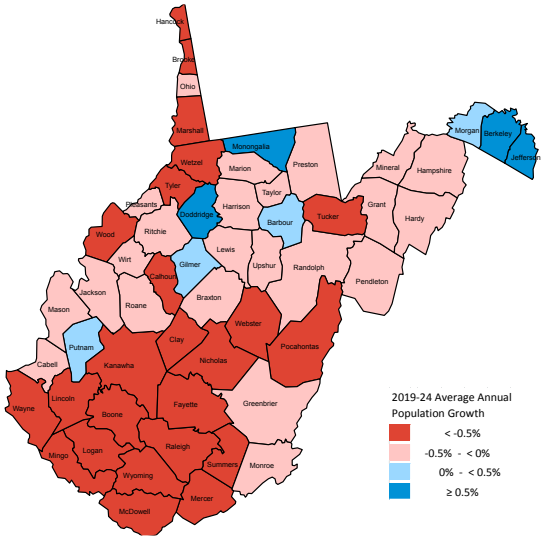
Due to massive increases in natural gas pipeline construction activity during 2018 and 2019 across

FIGURE 5.1: Annual Population Growth, 2008-2018



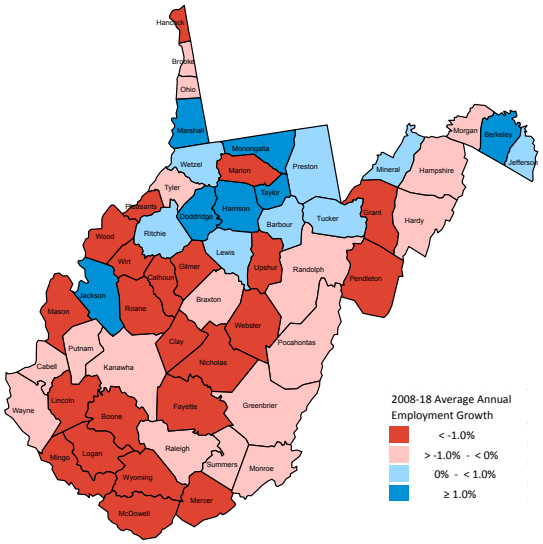
Source: US Census Bureau

FIGURE 5.2: Forecast Annual Population Growth, 2019-2024



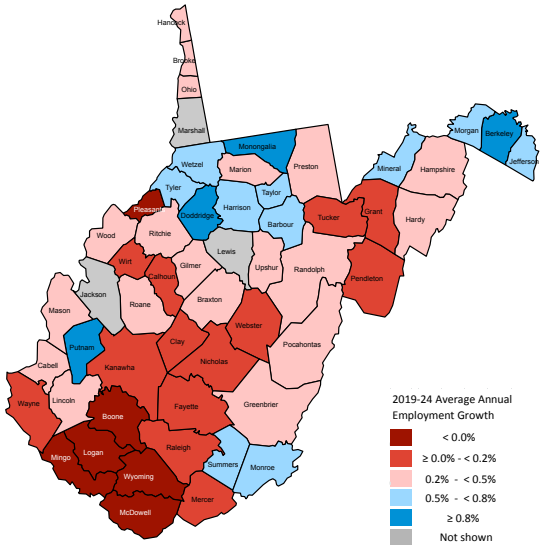
Source: US Census Bureau

FIGURE 5.3: Annual Employment Growth, 2008-2018



Source: US Bureau of Labor Statistics

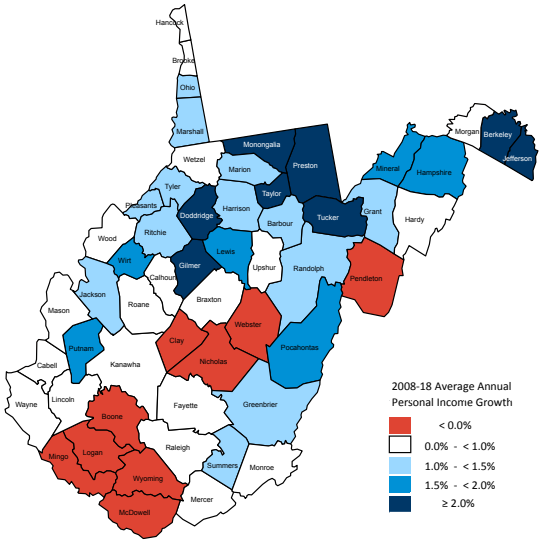
FIGURE 5.4: Forecast Annual Employment Growth, 2019-2024



Sources: US Bureau of Labor Statistics; WVU BBER County Econometric Model

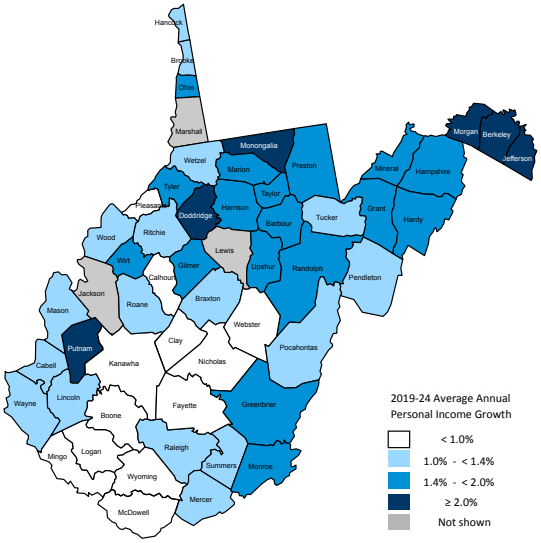
parts of the state, a few counties were not included in Figures 5.4 and 5.6. Although many counties will be affected, these specific counties are expected to have the largest declines in construction sector employment as the installation of pipelines, compressor stations and other structures is completed, making comparisons between 2019 and 2024 much less meaningful in terms of illustrating the underlying economic health of counties highlighted in gray.

FIGURE 5.5: Annual Real Personal Income Growth, 2008-2018



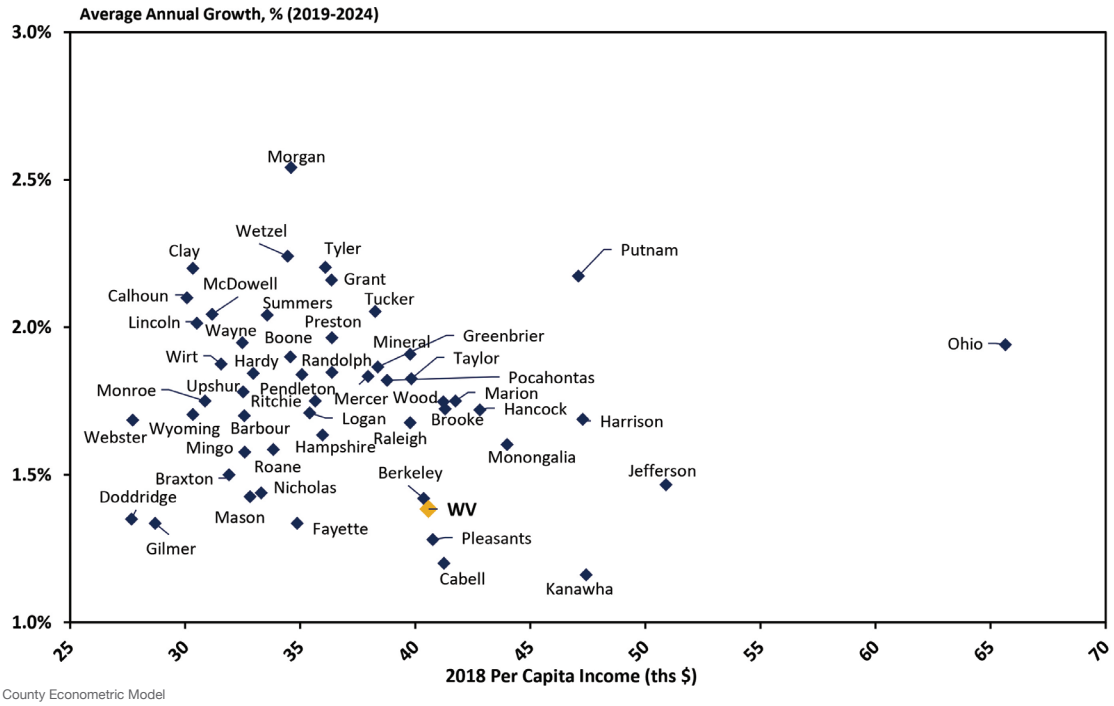
Source: Bureau of Economic Analysis; 2018 income data are preliminary.

FIGURE 5.6: Forecast Real Personal Income Growth, 2019-2024



Source: WVU BBER County Econometric Model

FIGURE 5.7: West Virginia County Real Per Capita Income



Source: WVU BBER County Econometric Model
*Note: 2018 personal Income data are preliminary; Jackson, Lewis and Marshall counties not included.

CHAPTER 6:
Human Capital in West Virginia

Earlier this year, we published an in-depth examination of human capital in West Virginia. The report does not test any particular hypothesis, but rather it should serve as a reference on key issues related to human capital in the state. Here we provide a brief overview of that report. The full report is available at https://researchrepository.wvu.edu/bureau_be/303/.[3]

INTRODUCTION

A primary long-run economic development challenge in West Virginia is a lack of available workers to support economic growth. The rate of labor force participation is a key statistic: In West Virginia, 54 percent of the adult population is either working or looking for work. This places West Virginia lowest among the 50 states along this metric, a full nine percentage points below the national figure. Further, since these data became available on an annual basis at the state level in the mid-1970s, West Virginia has consistently ranked 50th. This low rate of labor force participation represents one of the most severe impediments to economic progress in West Virginia as businesses that might potentially locate or expand in West Virginia would likely be deterred by a lack of available qualified workers.

The labor force participation deficit that West Virginia faces is likely driven, in large part, by a human capital deficit. That is, for instance, there are likely men and women in the state who would be in the labor force ideally, but simply do not look for work due to the low chance of being hired due to a deficit in their education, training, job readiness, etc. In essence, these men and women do not join the labor force because of poor educational outcomes. Indeed, West Virginia ranks at or near the bottom among the 50 states in terms of numerous educational outcome measure. The same reasoning likely also applies to poor health outcomes and, more recently, to drug abuse.

The purpose of this report is to provide the most comprehensive examination available that outlines the various factors relating to labor force and human capital in West Virginia. It will not test any specific hypothesis, but rather the report should serve as a reference on all significant issues related to human capital in the state. Hopefully, this research will inspire future work to better understand specific mechanisms related to improving education, health, and drug abuse outcomes.

We begin the report by reviewing the basic facts surrounding labor force participation in West Virginia to form the foundation of our in-depth review of human capital. Second, we consider population and migration trends in the state as these trends relate to the availability of human capital for economic development in the state or in a particular region. Next, we provide a closer examination of the three primary pillars of human capital – education, drug abuse, and health. Most of our analysis focuses on the supply of potential well-educated and well-trained, drug free, and healthy workers to fuel economic growth. As such, we turn to a consideration of several factors relating to the demand for workers in West Virginia. We close with a brief discussion of the economic impact that increasing labor force participation would have on the state.

LABOR FORCE PARTICIPATION

We begin with a focus on labor force participation because, in some sense, West Virginia's human capital deficiencies are manifest in the state's low rate of labor force participation. Key findings surrounding labor force participation are as follows:

- **Labor force participation in West Virginia is lowest among the 50 U.S. states**, lagging the nation by nine percentage points. Only 54 percent of adults in West Virginia are in the labor force.
- **West Virginia has significantly lagged the nation in terms of labor force participation for decades** – since at least 1940.
- **The labor force participation gap between West Virginia and the nation is present broadly across genders and age groups and therefore cannot be attributed to one particular segment of the population:**
    - The labor force participation gap between West Virginia and the nation is present for both genders, although the gap is slightly more pronounced among men.
    - West Virginia lags the nation in terms of labor force participation across all age groups. **The degree to which West Virginia lags the nation is most pronounced among those of prime working age** – those men and women aged 25 to 54.

3. This research was made possible through a generous research grant from Terry Stockman.

- Labor force participation has been relatively stable across age groups in West Virginia over the long run. **This stability may suggest that it may be difficult to find a policy that will significantly stimulate labor force participation in a short-run timeframe and that overcoming this challenge requires a long-run approach.**

- **Only the state's Eastern Panhandle region enjoys a higher rate of labor force participation than the nation. Otherwise, labor force participation tends to be higher in the more urban North Central and Metro Valley regions and lower in the state's more rural areas.**

POPULATION AND MIGRATION: PATTERNS AND TRENDS

We consider population and migrations trends; by examining how population is moving and evolving, we can obtain a better sense of where potential businesses might be able to find an appropriate workforce and therefore identify which regions potential businesses might be more attracted to.

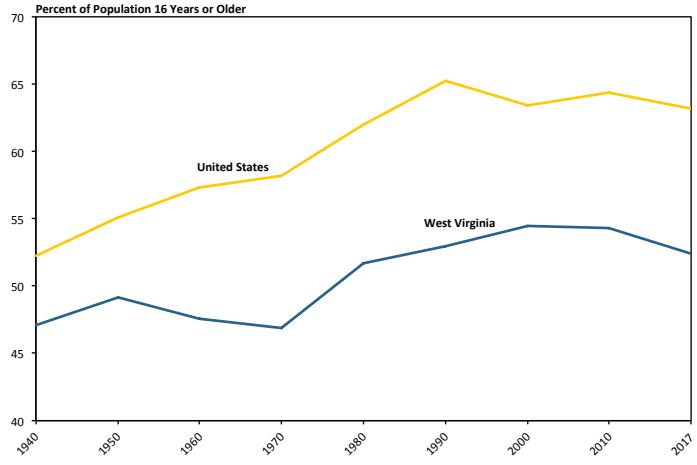
- Overall, West Virginia's population has declined by around 10 percent since 1950, a period over which the nation's population has more than doubled.

- West Virginia's population has aged significantly over recent decades with virtually no growth in the prime working age population and high growth among the elderly population.

- The state's Eastern Panhandle region is the clear outlier among the state's various region in that it has exhibited tremendous growth in recent decades, far surpassing national population growth. North Central West Virginia is the only other region in West Virginia to record population growth since 1980. Population growth in these regions is driven by both positive net migration and natural population growth (births exceeding deaths).

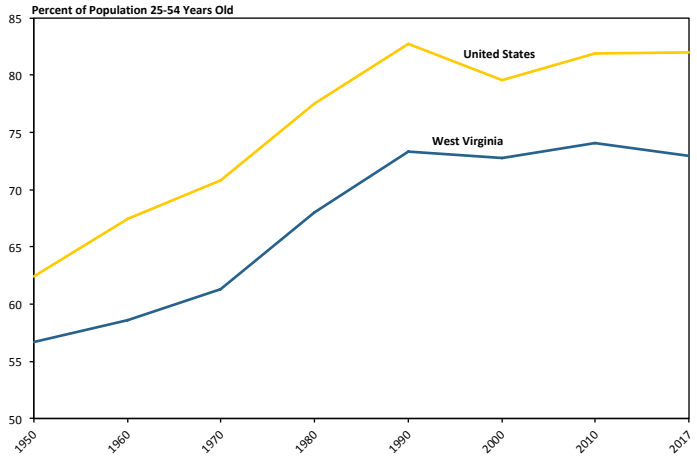
- West Virginia is consistently observing natural population decline – where births fall short of deaths. Only the Eastern Panhandle and North Central regions are experiencing more births than deaths.

FIGURE 6.1: Labor Force Participation, West Virginia and the U.S.



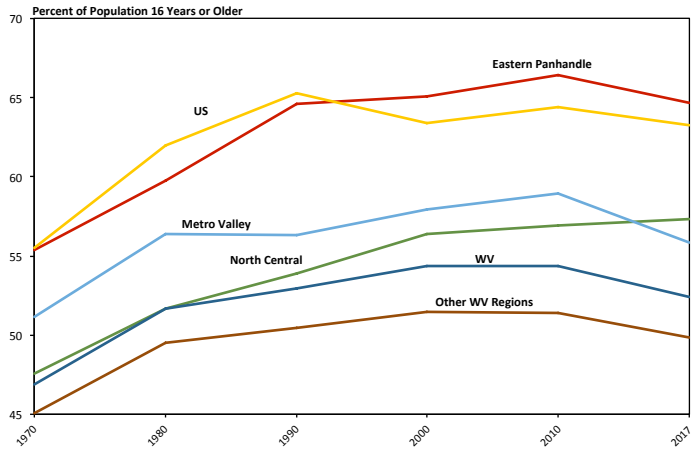
Source: 1940-2000 Decennial Censuses, 2010 and 2017 American Community Surveys, US Census Bureau
Note: 1940 rates represent the rates for civilian population 14 years or older.

FIGURE 6.2: Labor Force Participation, People 25-54 Years Old, West Virginia and the U.S.



Source: 1950-2000 Decennial Censuses and 2010 and 2017 American Community Surveys, US Census Bureau

FIGURE 6.3: Labor Force Participation by Region, 1970-2017



Source: 1970-2000 Decennial Censuses, 2010 and 2017 American Community Survey, 5-Year Estimates for Counties and 1-Year Estimate for WV and US, US Census Bureau

- In- and out-migration have been volatile in recent years. Only the North Central and Eastern Panhandle Regions have received substantial positive net migration flows in recent years. North Central West Virginia receives by far the largest number of net in-migrants from within West Virginia while the Eastern Panhandle receives by far the largest number of net in-migrants from other states.

- The largest net losses of out-migrants in recent years has come from the state's Southwestern and Southeastern regions.

EDUCATIONAL OUTCOMES

A key factor in explaining labor force participation in West Virginia is poor educational outcomes. It is likely that there are men and women who would like to work ideally, but do not look for work (and are therefore not part of the labor force) because they doubt that they will be able to find a job due to a lack of education and training and job skills.

- **West Virginia lags the nation in terms of educational attainment.** In particular, the share of the state's adult residents who hold at least a bachelor's degree stands at 20 percent, compared to 32 percent in the nation. West Virginia is last among the states in terms of this metric.

- **The state's North Central, Eastern Panhandle, and Metro Valley regions exhibit the highest rates of educational attainment, but every region of the state lags the nation.**

- **The number of high school- and college-aged men and women in West Virginia is shrinking. Further, the share of West Virginia high school graduate who go on to college has fallen slightly in recent years;** for the most recent year available, 55 percent of West Virginia high school graduates went on to college, compared to 67 percent in the nation. Altogether, these statistics suggest that it may become increasingly difficult to produce more highly educated and skilled young residents to attract potential businesses.

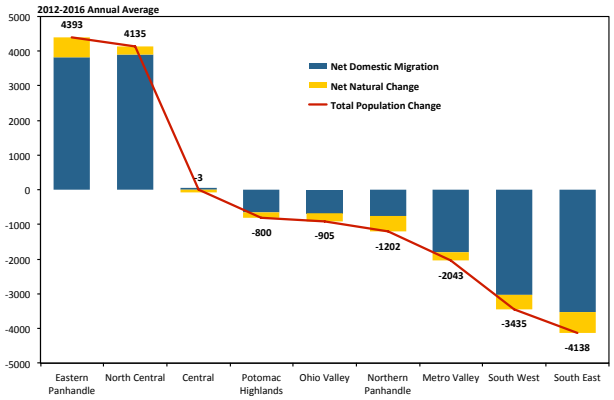
DRUG ABUSE AND HEALTH OUTCOMES

In a similar vein compared to education, it is likely that there are men and women in West Virginia who would work ideally, but they do not look for work, and are therefore not part of the labor force, due to some barrier related to drug abuse or health.

- **West Virginia leads the nation in the rate of drug related deaths.** In 2017, 58 people out of every 100,000 in West Virginia died due to drug misuse, a rate that is nearly triple the national figure. In 2017, the drug misuse death rate was nearly 10 points higher than the second highest state.

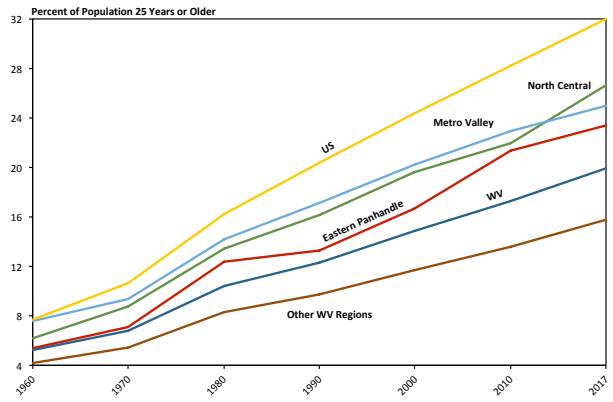
- **Drug abuse death is lowest in the state's North Central and Central regions.** The rate is highest in the state's Southwest and Southeast regions.

FIGURE 6.4: Population Change by Components



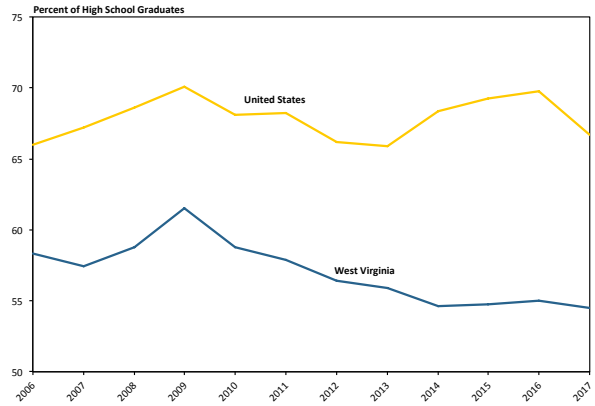
Source: Authors' calculations of the County-to-County Migration, 2016 American Community Survey, 5-Year Estimates, US Census Bureau

FIGURE 6.5: People with a Bachelor's Degree or Higher by Region



Source: 1960-2000 Decennial Censuses and 2010 and 2017 American Community Surveys, US Census Bureau

FIGURE 6.6: College Going Rate, West Virginia and United States



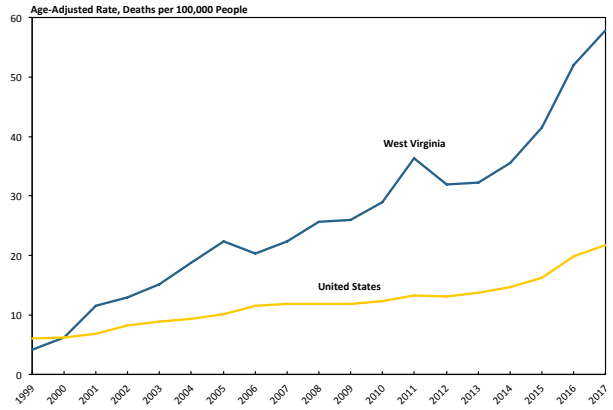
Source: US National Center for Education Statistics and West Virginia Higher Education Policy Commission

- **West Virginia posts the highest mortality rate among the 50 states** (after accounting for the age distribution of the population).
- **Overall mortality is lowest within the state's northern regions – primarily the North Central and Eastern Panhandle regions.**
- **West Virginia has the highest rate of disability among the 50 states.**
- **West Virginia posts the highest rate of smoking among the 50 states**, with lower rates of smoking in the state's northern regions and the Metro Valley, and highest rates in the state's Southwestern and Southeastern regions.
- In contrast to the other heath outcome measures mentioned above, **West Virginia posts the second lowest rate of excessive drinking among the 50 states.**

ECONOMIC GAINS FROM IMPROVING LABOR FORCE PARTICIPATION

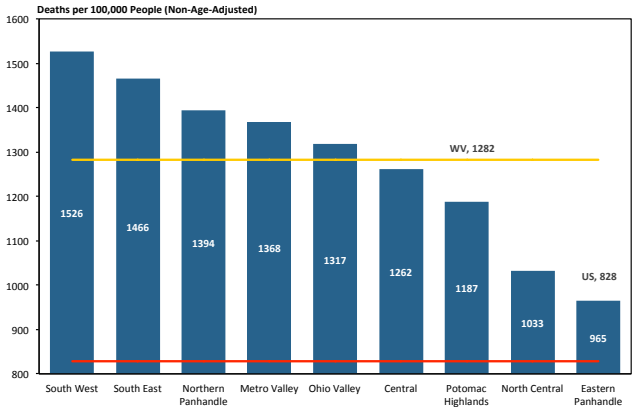
In our final section, we consider a hypothetical scenario in which the state were to observe a one percentage point increase in labor force participation. Assuming that only half of the men and women who enter the labor force actually obtain employment, **this hypothetical one percentage point increase in labor force participation would yield an estimated increase of 11,000 jobs and over $900 million in economic output annually.** The way that urban and rural areas in the US have developed over the last several years varies significantly. And these differences offer important implications for economic development strategies. In this chapter we provide a brief examination of how urban and rural areas in the nation have evolved differently over the past two decades. We hope that this information will spark further research and conversation about how to best promote economic prosperity for people who live in both types of area.

FIGURE 6.7: Drug Related Deaths, West Virginia and the U.S.



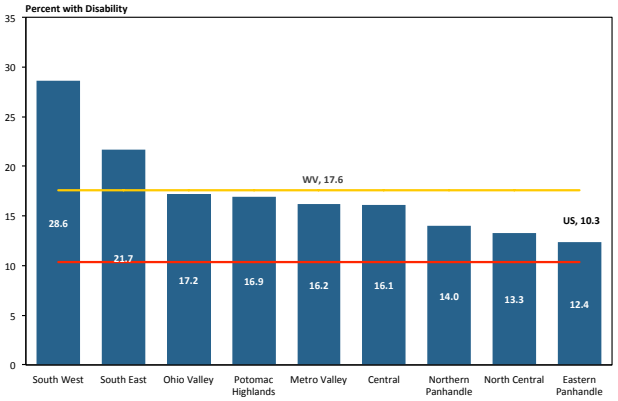
Sources: CDC Wonder, US Center for Disease Control and Prevention

FIGURE 6.8: Mortality by Region, 2017



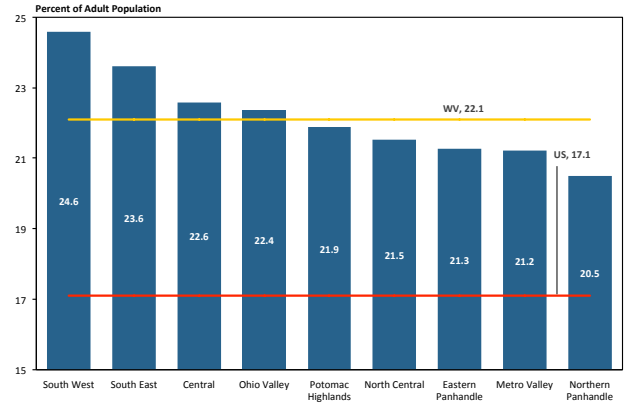
Source: CDC Wonder, US Center for Disease Control and Prevention and Population Estimates, US Census Bureau

FIGURE 6.9: Disability by Region, 2017



Source: 2017 American Community Survey, 1-Year Estimate for the US and WV, 5-Year Estimates for West Virginia counties, US Census Bureau Note: Universe: Civilian noninstitutionalized population 18 to 64 years old

FIGURE 6.10: Smokers by Region, 2016



Source: Region- and state-level rates are estimated based on the 2019 County Health Ranking county data, US rates are from the 2017 America's Health Ranking

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APPENDIX:

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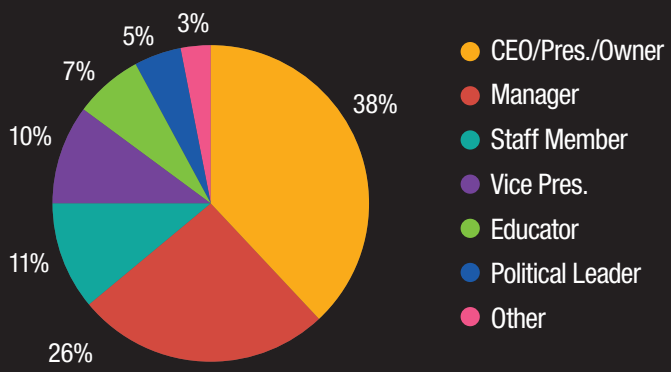

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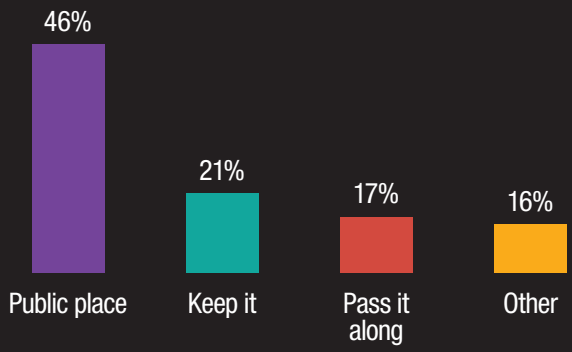

For more information, contact Kensie Hamilton Fauber at (304) 542-2247 or kmh@wvexecutive.com.

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Bureau of Business and Economic Research
PO Box 6527
Morgantown, WV 26506
304-293-7831
bber.wvu.edu