



WEST VIRGINIA
ECONOMIC
OUTLOOK

2019-2023

2019-2023

WEST VIRGINIA ECONOMIC OUTLOOK

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Greetings!

I am happy to present the 2019-2023 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’s economy enjoyed its strongest year of growth in nearly a decade during 2017, emerging from several years of severe economic weakness. Most of the bounce back in the state’s economy is connected to the energy sector, not only from the increased production of coal and natural gas but also as a result of a massive build-out of new natural gas pipeline infrastructure throughout the state. Growth has broadened to include more of the state’s regions over the past year or so, but the overall magnitude of gains in jobs and output have remained concentrated in just a few areas as some portions of West Virginia continue to struggle with a range of weak economic fundamentals. Overall, this report provides a broad and detailed foundation to help you 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 growth of around 7,000 jobs since the recession’s end.
- Job growth since late-2016 has been heavily concentrated in eight counties and has been largely driven by growth in the state’s energy industries.
- The state’s unemployment rate has increased slightly over the past year and currently stands in the low-five-percent range; however the increase has been driven by more individuals returning to the labor market to look for work.
- Only 53 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 at a healthy pace in 2017, outpacing nearly all other states. Overall, per capita personal income in West Virginia stands at 75 percent of the national average.
- West Virginia’s real GDP grew at a healthy pace in 2017, outpacing more than 40 other states. Growth was largely driven by energy-related developments.
- Export activity from West Virginia has been quite volatile over the past decade. Exports have increased at a healthy rate since late-2016. Promoting the state’s export potential is of vital importance to economic development in West Virginia in the long run. Growth

has lagged the national average in recent years, leaving the per capita income level in West Virginia at roughly 75 percent of the national figure.

FIGURE ES.1: West Virginia and US Forecast Summary

	West Virginia		United States	
	2007-2017	2018-2023	2007-2017	2018-2023
Population (average annual growth, %)	-0.1	-0.1	0.8	0.8
Employment (average annual growth, %)	-0.3	0.4	0.6	0.7
Real GDP (average annual growth, %)	0.9	0.9	1.4	1.9
Unemployment Rate (annual average at end of time period, %)	5.2	5.0	4.4	4.3
Real Per Capita Personal Income (average annual growth, %)	1.1	1.4	0.9	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 to around 93 million short tons in 2017, from around 80 million short tons in 2016. Production for 2018 is on track to fall slightly short of the 2017 level, and production is expected to remain above 80 million tons throughout the five-year forecast horizon.
- Much of the improvement in coal production over the past two years has been through increased coal exports. West Virginia coal production is becoming increasingly dependent on export markets and potential growth in production is likely to come from overseas demand.
- Natural gas output has exhibited strong growth since late-2016. Production is expected to continue to grow at a healthy rate 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 0.4 percent per year on average through 2023, compared to an expectation of 0.7 percent for the nation as a whole.

- We anticipate slightly positive growth overall in energy over the forecast horizon; this growth will be driven by the natural gas industry.
- Construction is expected to add jobs at the fastest rate going forward, with much of the job growth occurring early in the forecast horizon due to natural gas pipeline construction. In the middle part of the forecast horizon, construction employment growth will be driven in part by public infrastructure investments.
- Manufacturing is expected to add jobs at an above-average rate over the forecast horizon, in large part due gains in chemicals, automotive components, and aerospace equipment.
- The state's unemployment rate is expected to improve slightly over the forecast horizon.
- Per capita personal income is expected to grow at an average annual rate of 1.4 percent over the next five years, somewhat less than the national rate. The fastest growing segment of income is non-wage income, such as Social Security benefits.

A key concern for the Mountain State moving forward relates to its underlying demographics. Consider the following:

- West Virginia's population has declined by nearly 40,000 since 2012. We project slight population losses in the coming five years, with larger losses expected in the long term.
- A positive shock to encourage in-migration is essential to lessen the severity of natural population decline in which deaths outnumber births.
- The state's population is significantly older than the nation as a whole, and will continue to age in coming years.
- The state's population 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, drug abuse, and education outcomes 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 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 and several more are expected to remain generally stable. 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 relatively steady period of economic growth seven years after the end of the Great Recession, however, it appears that the economy's long-run rate of growth has fallen by around one-third in recent years. As such, the recent economic recovery ultimately proved to be the most lethargic, by most measures, of any US economic recovery in the post-World War II era. Overall, we expect this modest and steady growth to continue for the coming years. 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 near-term; and c) explore several major challenges that have the potential to threaten US economic stability and could alter the outlook.

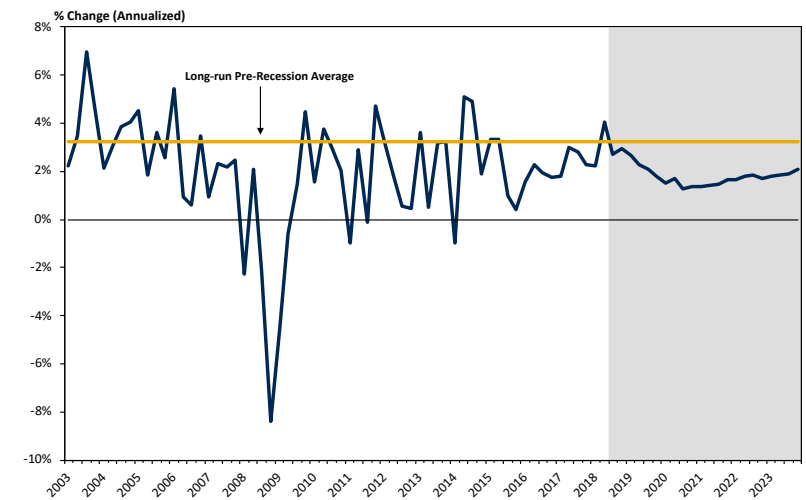
RECENT TRENDS AND SHORT-TERM ECONOMIC OUTLOOK

GDP As illustrated in Figure 1.1, economic output, as measured by real Gross Domestic Product (GDP), has grown at an average annual rate of around 2.1 percent since the Great Recession ended in mid-2009, noticeably weaker than the 2.5 percent per year averaged over the past three decades. While growth has been somewhat stronger over the past two quarters, generally speaking, the US economy has undergone a long-run structural change in the past decade or so characterized by measurably weaker growth compared to the 30-years before the start of the Great Recession and to an even greater extent if one broadens the time horizon to the entire post-WWII era.

Many questions remain around the causes of this structural change in economic growth, though we address some of these potential factors below. After a first half of 2018 that has been somewhat stronger than recent averages, real GDP growth is expected to remain strong through 2019, after which it is expected to again slow below the 30-year average.

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

FIGURE 1.1: United States Real GDP Growth



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

Note: Quarterly GDP data used. Figure is adjusted for inflation, presented here in 2009 \$.

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. Investment activity is expected to return to a healthier growth rate of nearly 4 percent annually through 2022 and is looked to as a modest potential 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 important source of future economic growth.

1. This section represents the authors' review, analysis, interpretation, and summary of information presented in the International Monetary Fund's World Economic Outlook (2017) and IHS Markit' US Economic Outlook (2017).

Net exports have shown extreme volatility over the past several years. The value of total US net exports collapsed at an annualized rate of nearly 30 percent during the pit of the recent recession, improved to around 15 percent growth in 2010, fell again from 2011 through 2013, and have grown since 2014, reaching a rate of more than 20 percent in 2015 before returning to around 4 percent in 2016. Net export growth is expected to come in at around 8 percent in 2017, improve over the following two years, and then slow again during the latter part of the forecast period.

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 by any significant measure over its 2007 level and in China, where growth

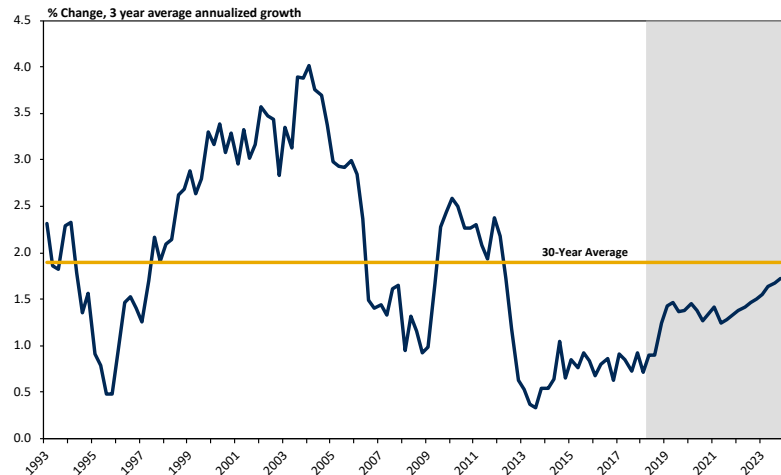
has slowed considerably. Movements in global energy markets has also been an important contributor in several ways. Unfortunately, in the same vein as investment activity, the health of US net exports is uncertain given the myriad sources of potential economic pressure across the world, such as the ongoing 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.

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 very low since 2013, but is expected to improve somewhat in the five-year forecast horizon. This expected increase is driven by capital deepening and investment incentives provided by the Tax Cuts and Jobs Act of late-2017. Overall, however, productive growth is expected to remain below the 30-year average, and they 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 to recent trends, real federal government spending is expected to be noticeably higher for 2018 and 2019, driven by several discretionary spending choices made by Congress over the past year or so. This growth in federal spending will likely serve as a positive driver of GDP growth over the period.

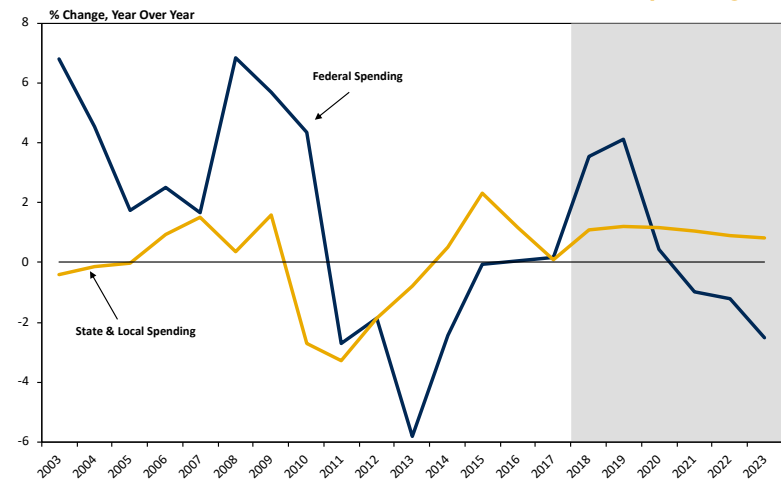
By comparison, real state and local government spending trended higher over the past three years and will likely continue to grow at a small pace over the forecast period. However, state and local government expenditures should more slowly than overall GDP, indicating spending by the public sector at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

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 2009 \$.

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. 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, with the addition of well over 200 thousand jobs in a typical month. Now the economy is noticeably above its natural rate for the first time in over a decade. We expect employment growth to average just over 200 thousand per month for the remainder of 2018 before slowing appreciably during 2019 and 2020.

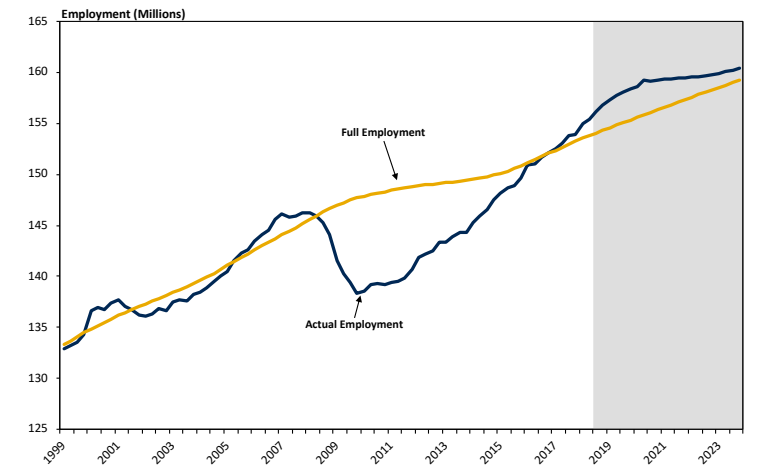
UNEMPLOYMENT Turning to the unemployment situation, the national unemployment rate peaked at around 10 percent in late-2009, as noted in Figure 1.5. This was the second-highest jobless rate experienced during the post-WWII era, exceeded only by the 1982/1983 recession (a peak of 10.8 percent in late-1982).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

It is worth noting that the share of all unemployed persons who have endured long unemployment spells (typically defined as 27 weeks or more) rose substan-

tially during the recent recession, and remains at a level that is still above the historic average. As illustrated, the share of all unemployed persons who have experienced long unemployment spells rose from 17 percent of unemployed persons in 2007 to nearly 45 percent by 2010. However, as illustrated, the figure has improved dramatically in recent years and is now at a typical level.

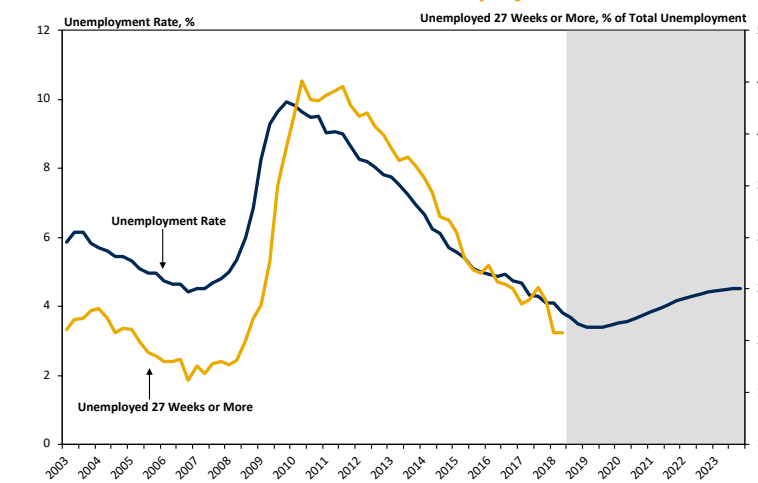
There are two common criticisms associated with the conventional unemployment rate reported in Figure 1.5. The first is that the figure does not account for workers who can only find part-time work but who would prefer a full-time opportunity, often referred to as “under-employed.” The second relates to discouraged workers. Here, the idea is that if one is looking for work for an extended period of time and is ulti-

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.

mately 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.

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 three 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 and has fallen substantially since 2008, now standing 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 could present a significant 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 several years, rising from 475 thousand in early-2012 to over 900 thousand by mid-2018. Figure 1.8 does show continued growth in construction activity over the next couple of years or so as starts breach 1 million by mid-2020 — the highest level in 13 years. Multi-family housing starts rebounded

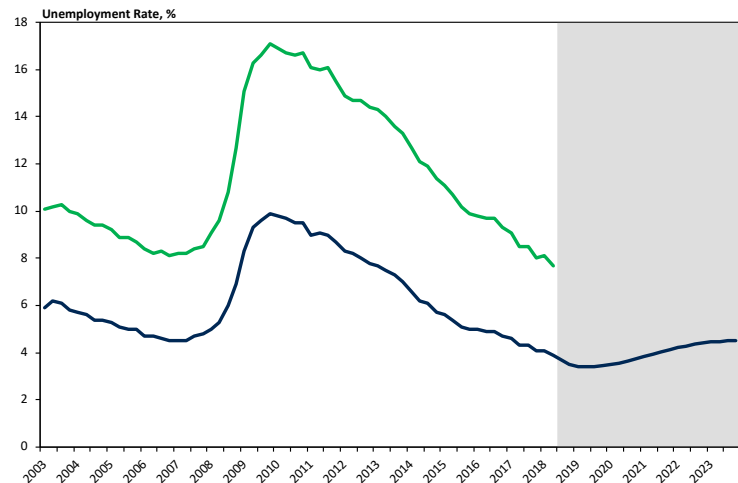
at a much stronger pace than the single-family side of the market, returning to pre-recession levels by 2013. Aggressive multifamily construction in several large cities in the post-recession years has now left these markets with moderate levels of excess supply. As a result, the forecast calls for the overall pace of multifamily starts to increase only slightly over the early part of the outlook period before holding steady at an annualized rate of 430,000 units.

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. However, despite a brief setback during the summer of 2011 when fears of a double-dip US recession emerged, consumer confidence has generally moved higher, although in a jagged manner, since 2009. Since 2015, confidence has been at least on par with pre-recession levels, and even slightly higher since 2017.

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 an economic slowdown among the nation’s primary trading partners, 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 economies in the world, which collectively account for around 60 percent of global economic output. 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. As illustrated, economic growth is weakening in all three regions, especially in China. The Euro Area is expected to growth at a rate of 1.8 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 uncertainty 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.

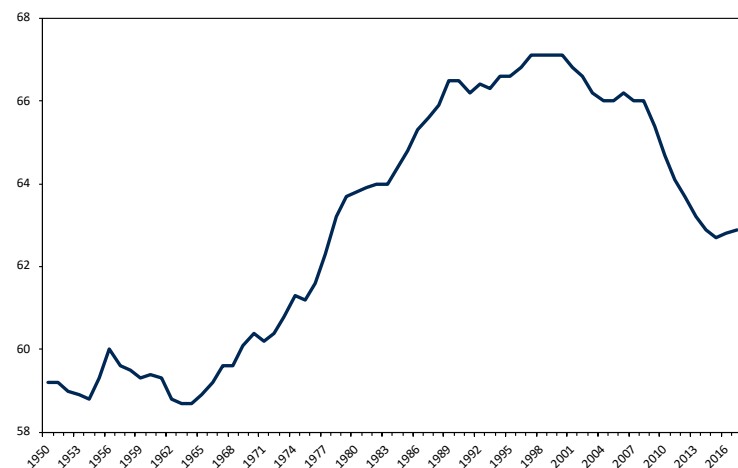
3. Economists have tracked consumer confidence since 1968.

FIGURE 1.6: United States Unemployment Statistics



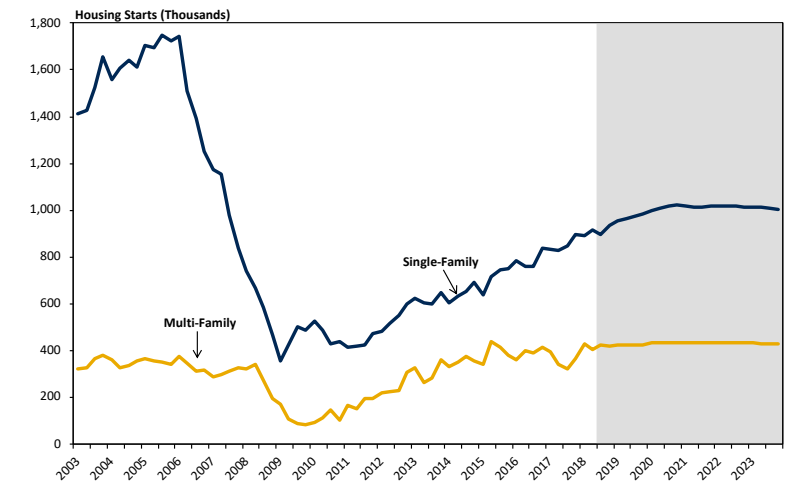
Sources: US Bureau of Labor Statistics; IHS Markit
 Note: Quarterly data used.

FIGURE 1.7: United States Labor Force Participation Rate



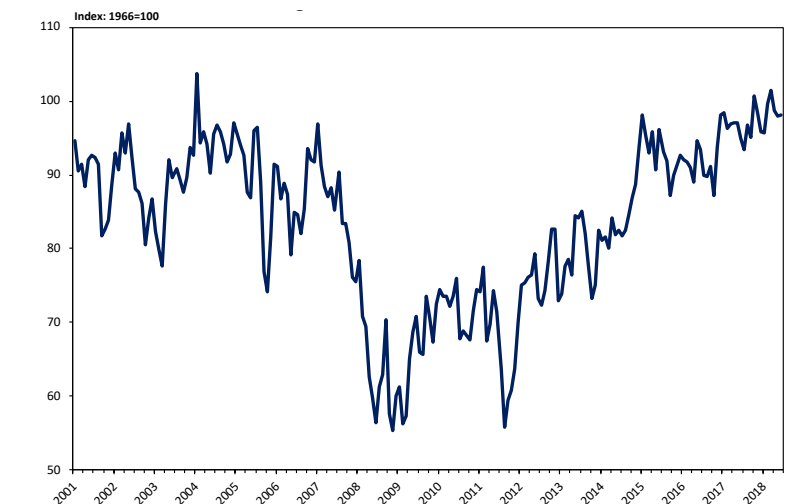
Sources: US Bureau of Labor Statistics

FIGURE 1.8: United States Housing Starts



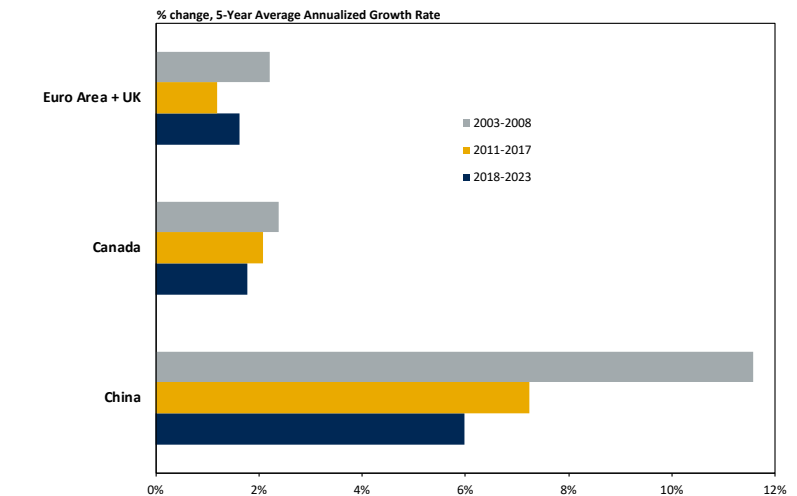
Sources: US Census Bureau; IHS Markit
 Note: Housing starts statistics use quarterly data.

FIGURE 1.9: Consumer Confidence



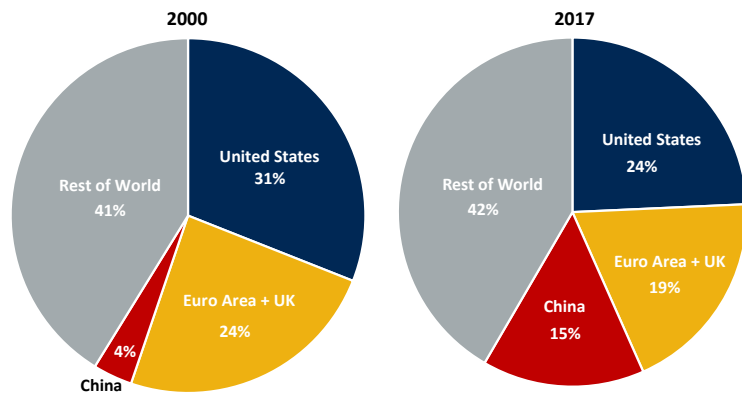
Source: Thomson Reuters and University of Michigan Surveys of Consumers.
 Note: Monthly data used.

FIGURE 1.10: Real GDP Growth – Select Economies



Source: International Monetary Fund World Economic Outlook

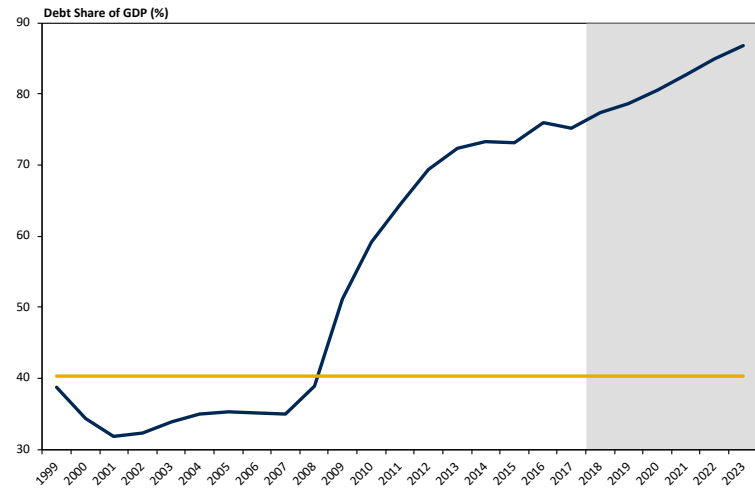
FIGURE 1.11: World GDP by Country



Source: International Monetary Fund World Economic Outlook

CHINA While GDP in China grew by an average annual rate of around 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 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.

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

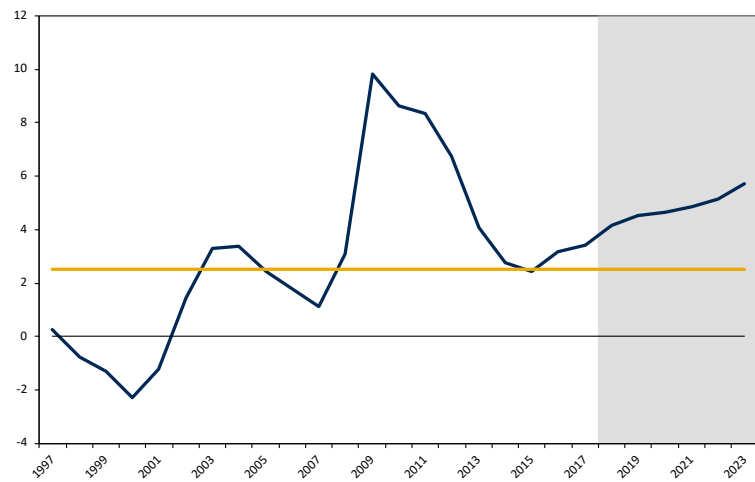


Sources: US Bureau of Economic Analysis; IHS Markit

Although the situation has improved markedly in recent years, issues related to the long-run sustainability of the US federal government budget remain a potential concern for long-run economic growth. As such, we explore US federal government budgetary issues through figures 1.12 through 1.15.

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).

FIGURE 1.13: Federal Deficit Share of GDP

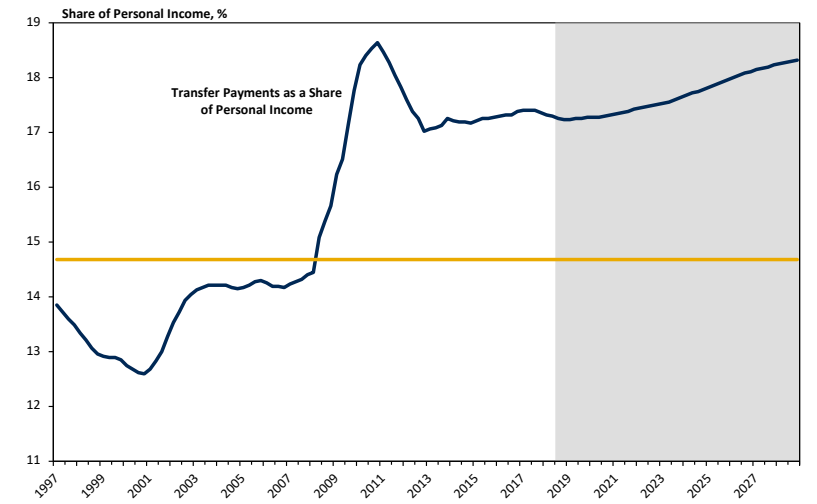


Sources: US Bureau of Economic Analysis; IHS Markit

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 1.14, transfer payments increased substantially in 2008, reaching a high of around 18.5 percent of personal income, compared to a 30-year average of 14.7 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. Since recovery began, the share has fallen to around 17.3 percent of personal income and is expected to remain stable 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.

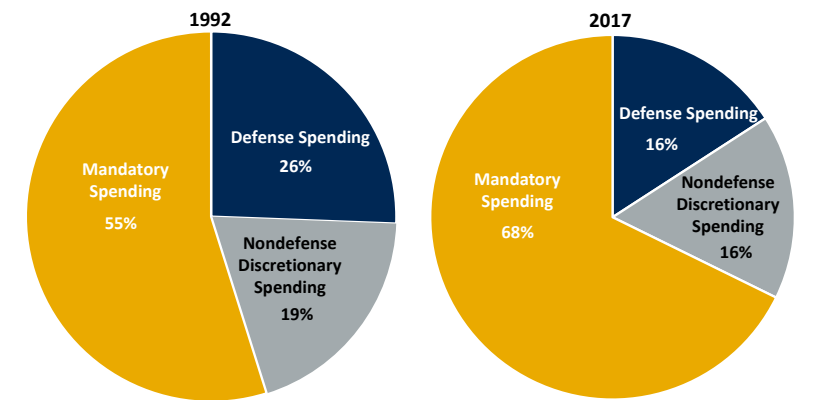
FIGURE 1.14: US Transfer Payments as a Share of Personal Income



Sources: US Bureau of Economic Analysis; IHS Markit

In Figure 1.15 we report the composition of US federal government spending for 1992 and 2017. As illustrated, mandatory spending, which includes transfer payment programs such as Social Security, Medicare, Medicaid, unemployment insurance, and the like, rose to 68 percent of all federal spending in 2017. This represents an increase of roughly 13 percentage points since 1992 and comes largely as a result of an aging population. At the same time, defense spending fell to 16 percent of total spending, down from 26 percent in 1992. Nondefense discretionary spending has fallen to just 16 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.

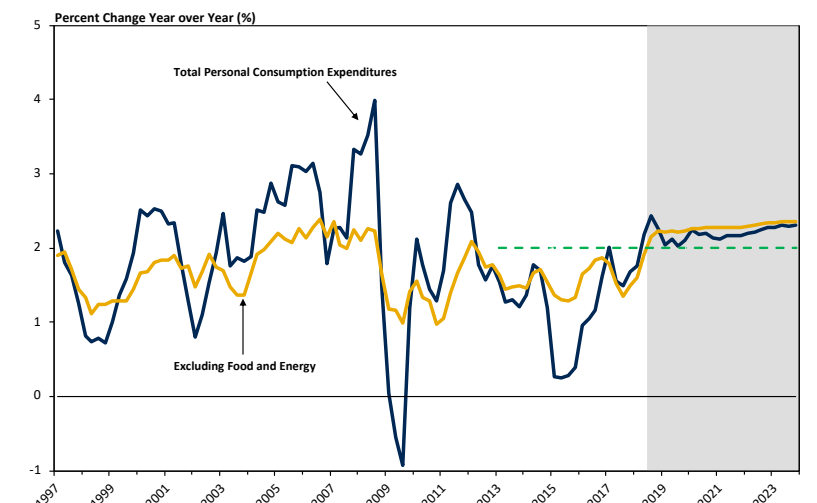
FIGURE 1.15: Components of US Federal Government Spending



Source: US Congressional Budget Office

INFLATION As reported in Figure 1.16, inflation has been stable by historic standards in the US since the mid-1980s, rarely moving outside of the 1 to 3 percent range. While overall inflation did reach a slight spike of close to 4 percent for a brief period in 2008 due to surging oil prices in the first half of that year, inflation has been below trend for the most part 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. However, the forecast indicates that either measure of inflation will rise in the near term to a point that slightly exceeds the target rate and remain at that level through the outlook period. This forecast is based on market-based expectations (such as Treasury Inflation-Protected Securities) and the consensus of economic forecasts.

FIGURE 1.16: US Personal Savings as Share of Disposable Income



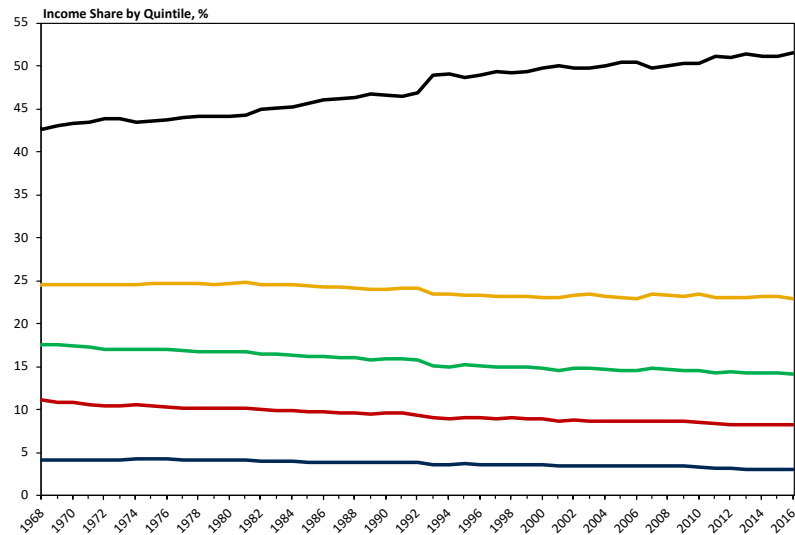
Sources: US Bureau of Economic Analysis; IHS Markit

FIGURE 1.17: United States Inflation Rates



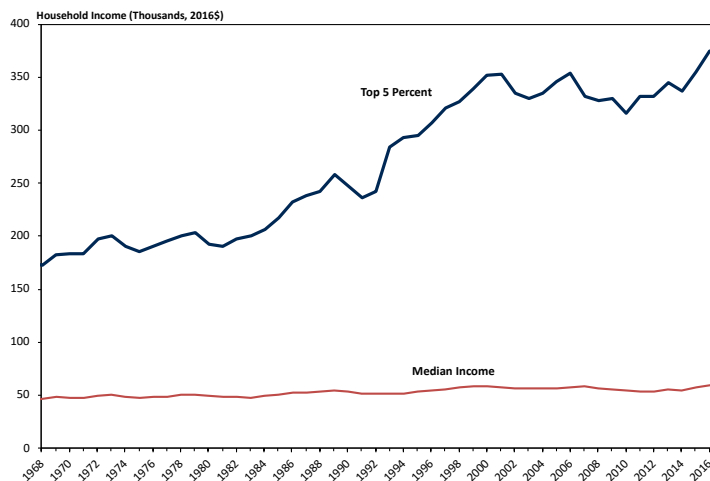
Sources: US Bureau of Economic Analysis; IHS Markit

FIGURE 1.18: Select United States Interest Rates



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

FIGURE 1.19: Share of Aggregate Income by Quintile



Source: US Census Bureau

However, there is a chance that faster growth in price levels could 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 is now in the process of withdrawing 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.

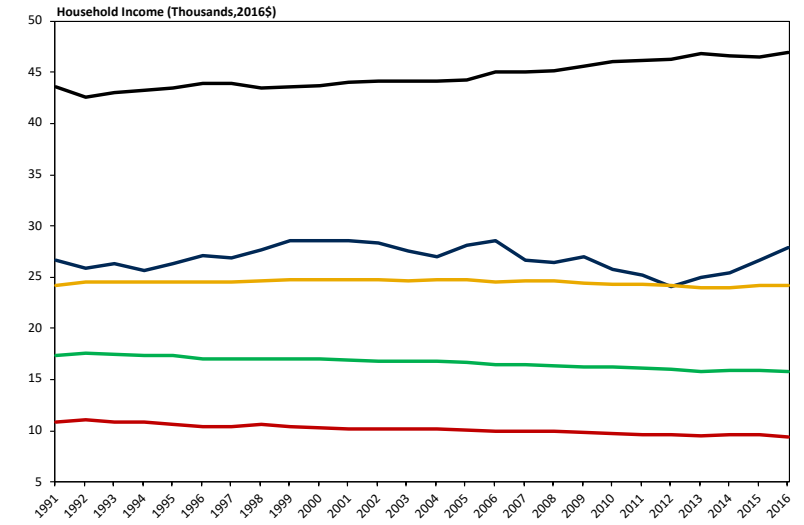
INTEREST RATES A related concern is the inevitable rise in interest rates in the US economy in coming years. This rise will, in part, stem from the Fed’s ongoing “normalization” process wherein the Federal Open Market Committee (FOMC) unwinds some of its previous asset purchase programs and other forms of monetary stimulus discussed above. Short-term interest rates have been on the climb in concert with recent hikes in the federal funds rate by the Fed, but the long of the rate curve has budged little from its range of the past few years. 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 1.17 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 1.18 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 2016. The second lowest-income fifth of households earned around 8 of the total income in the nation in 2016, and so on. The highest-income quintile earned nearly 52 percent of the nation’s total income in 2016. 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 1.19 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 US. As reported in Figure 1.20, 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 1.20: Income Gap



Sources: US Census Bureau

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CHAPTER 2: The West Virginia Economy

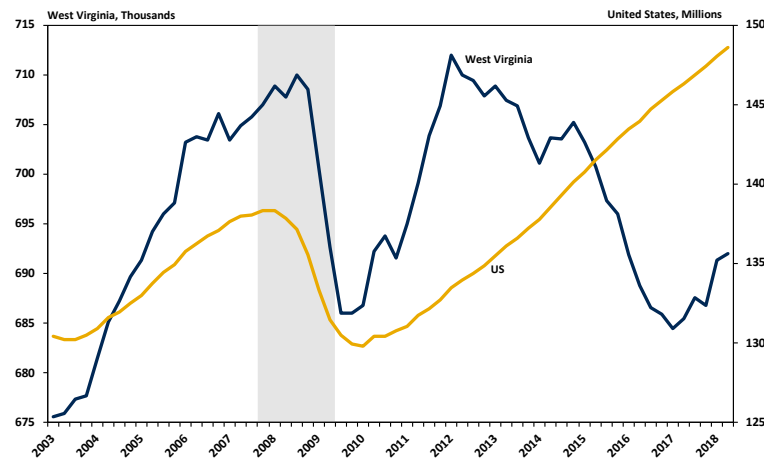
RECENT ECONOMIC PERFORMANCE

West Virginia's economy enjoyed its strongest year of growth in nearly a decade during 2017, emerging from several years of economic weakness that also included a significant recession that spanned the second half of 2015 and first half of 2016. Most of the bounce back in the state's economy is connected to the energy sector, not only from the increased extraction production of coal and natural gas but also as a result of a massive build-out of new natural gas pipeline infrastructure throughout the state. Growth has broadened to include more of the state's regions over the past year or so, but the overall magnitude of gains in jobs and output have

remained concentrated in just a few areas as some portions of West Virginia continue to struggle with a range of weak economic fundamentals.

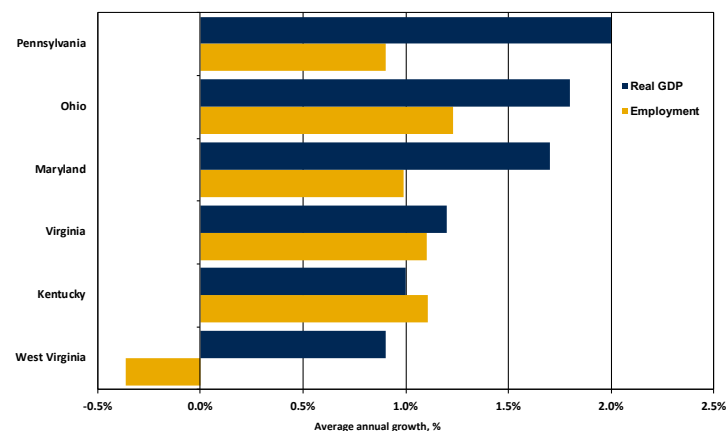
Compared to the nation, West Virginia's economy has followed a dramatically different path over the past decade or so. Indeed, the current US economic expansion recently became the second-longest in the nation's history as tracked by the National Bureau of Economic Research (NBER). Even though the expansion has been weak when compared to growth registered during the typical post-WWII economic expansion, West Virginia's economic performance has been even weaker still for a significant portion of this time period. Total employment for the nation as a whole has increased by more than 11 percent (or 15 million jobs) since the beginning of 2012, but within West Virginia payrolls are down by roughly 20,000 over this time period, which includes a gain of 7,500 since the beginning of 2017.

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, 2013Q1-2018Q1



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

STATE COMPARISONS While West Virginia's economy has certainly lagged the nation as a whole based on most major economic indicators, the state has trailed its neighboring states in terms of growth for much of the past several years. For example, between the first quarters of 2013 and 2018, West Virginia has seen real GDP increase at an average annualized rate of 0.9 percent in real GDP, trailing the next slowest-growing state in the region (Kentucky at 1.0 percent). In fact, Pennsylvania and Ohio, which both possess above-average exposure to energy markets, have seen real GDP increase at least twice as fast over the past five years. The state's comparative labor market performance has been even weaker compared to its neighbors as West Virginia is the only state in the region to record an outright loss in payrolls.

Since emerging from recession in mid-2016, the state has enjoyed a comparatively strong pace of economic growth over the past several quarters that have enabled it to close its performance gap versus the nation and neighboring states. Real GDP in the state has increased by 4.6 percent over the past seven quarters, ranking 12th nationally and outpacing the next fastest-growing state (Pennsylvania) by more than one-half of a percentage point.

ENERGY SECTOR Just as the state has experienced in most previous business cycles, changes in energy production have been a key component in determining the depths or heights of the state's economic performance.

4. 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>.

Overall, the coal and natural gas industries combined to account for more than 16,000 of the 23,000 jobs lost statewide between early-2012 and mid-2016. The coal industry accounted for the wide majority of those losses over this time period as production plummeted due to the combined effects of rapid declines in domestic demand from power plants caused by the emergence of natural gas as a competitor fuel and environmental policy changes. Moreover, export demand plunged as well due to significant overcapacity in global (Chinese) steel production and a sharp deceleration in thermal coal demand. After production totaled roughly 158 million short tons in 2008, coal production fell to an annual total of just below 80 million short tons in 2016. Employment declined largely in concert, as payrolls (excluding contractors) plunged from 26,000 in early-2012 to 11,300 in mid-2016.

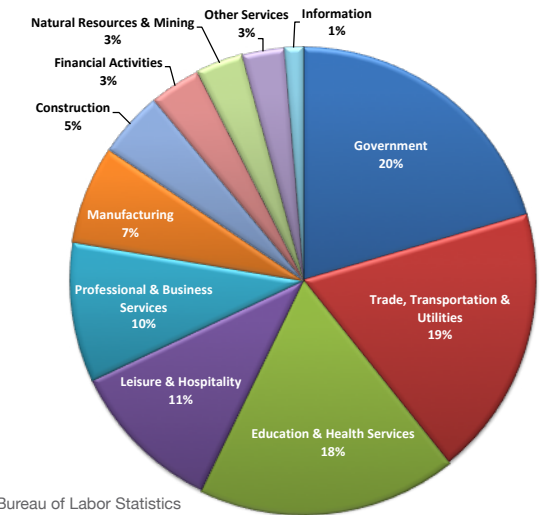
Since that point, however, the industry's performance has improved measurably as production and payrolls have increased in both of the state's coal-producing regions. Given that coal continues to face significant challenges in the US from natural gas and additional retirements of coal-fired generators, Northern West Virginia has experienced a noticeably smaller bounce back in activity. Southern West Virginia production and employment has recovered to a much greater extent as global export demand has surged for both metallurgical and thermal coal.

Unlike coal, West Virginia's natural gas industry did not actually reach its peak in terms of employment or production growth until late-2014. From that point until the first quarter of 2017, however, the industry registered only a 19 percent cumulative increase in marketed production after seeing withdrawal volumes effectively double over the space of the previous seven quarters. Drilling and exploration companies and field service support firms ended up shedding roughly 3,000 workers over this time frame, leaving employment roughly at the same overall level observed in mid-2009.

Final demand for natural gas has generally been on the rise over the past several years, particularly in the electric power sector. However, 2015 and 2016 were characterized by a bear-market pricing environment in the Appalachian Basin, leaving little opportunity for gas producers to justify much in the way of new exploration and capital investment. At the same time, production did not see any sustained declines since many companies maintained or expanded withdrawal volumes via re-fracking of existing wells and targeted new well developments.

5. For a more thorough discussion of West Virginia's coal industry, along with an analysis of future trends and possible scenarios for coal production over the long term, see Chapter 3 of this report as well as BBER report Coal Production in West Virginia: 2017-2040.

FIGURE 2.3: West Virginia Employment Distribution by Sector (2017)



Source: US Bureau of Labor Statistics

Furthermore, aggressive cost-cutting and technological improvements allowed producers to keep output at least stable and service debt obligations they accrued in previous years. To that effect, well productivity rates increased rapidly during the natural gas industry's slowdown. From late-2014 to late-2016, new well production in the Appalachian Basin more than doubled from 7.2 to 16.1 billion cubic feet per day.

Just as conditions within the coal industry have improved, market conditions have firmed significantly for the natural gas industry since early-2017 as demand has continued to increase, both domestically and internationally, and new pipeline infrastructure in the Mid-Atlantic is alleviating supply bottlenecks. After increasing 17 percent in 2017, production during the first half of 2018 has increased an estimated 16 percent on a year-over-year basis. Drilling and support services payrolls saw their first quarter-to-quarter gain for the first time in nearly 3 years during early-2017, and have risen nearly 16 percent in the that time frame.

CONSTRUCTION AND MANUFACTURING In addition to direct impacts on their own industries, the coal and natural gas industries play a sizable role in influencing construction activity in several portions of West Virginia. Between early-2012 and late-2016, the state's construction sector saw payrolls decline by nearly 20 percent, even with the ramping up of construction at Procter & Gamble's new \$500 million manufacturing facility in Berkeley County, several major commercial developments in the I-79/I-68 corridor as well as the construction of midstream and wastewater recycling facilities for the natural gas industry. However, construction employment has increased by nearly 4,500 workers since the beginning of 2017, and a majority of these gains can be linked to various stages of progress being

made on four major natural gas pipeline projects that span substantial portions of the state. These projects include the Atlantic Coast, Mountain Valley, Mountain-er Xpress and Rover pipelines. TransCanada's Eastern Panhandle Expansion Project is also another noteworthy pipeline project in progress, and though it is much smaller in scope relative to the others, it makes natural gas available to a region of the state with limited access for industrial and commercial users.

All of these projects have faced significant legal challenges, length regulatory reviews and court-ordered work stoppages of varying lengths. In fact, the Mountain Valley and Atlantic Coast pipelines were ordered to halt construction along their entire paths (save for specific exceptions on critical points in West Virginia). Mountain Valley Pipeline's revised filing was recently approved by FERC, but the company funding the project had already released half of its workforce, which will delay work on the pipeline from being re-started immediately. The Atlantic Coast Pipeline has not done so as of the publication of this report, but both stoppages will likely have a significant impact on construction sector payrolls over the near term.

West Virginia's manufacturing sector registered moderate declines in employment and output during 2017, though a few segments did buoy the sector's performance and post gains versus the previous year. Indeed, the state's auto parts manufacturers remained the strongest component, having doubled the number of workers and real output since 2010. Though they did see an overall decline for the calendar year, subsectors with strong connections to West Virginia's coal and natural gas industries, namely fabricated metals and machinery manufacturers, did see conditions improve as the year progressed. The initial opening of Procter & Gamble's manufacturing facility did provide a bump to the chemicals industry in early-2018, but this was offset by sizable layoffs at Mylan and a continued downward trend in payrolls at some of the aging chemicals manufacturing plants throughout the Kanawha and Ohio River valleys.

SERVICE SECTORS Although goods-producing sectors have accounted for the majority of net job growth in West Virginia since the beginning of 2017, a few service-providing sectors have helped the state's overall performance in the past year or so. Healthcare services payrolls were only slightly higher in terms of the annual average during 2017, but hiring activity picked up during the second half of the year and continued into the first half of 2018. Overall, hospitals and other healthcare facilities for the calendar year as a whole added nearly 1,500 jobs since the first quarter of 2017.

After a weak performance in 2016, the professional and business services sector posted a 1.1 percent gain in employment as the upturn in coal and natural gas production boosted demand for contract labor, engineering, legal and other support-type services. Transportation and warehousing services, particularly the trucking component, also benefited from the bounce back in upstream activity in coal and natural gas, as well as the surge in pipeline construction.

Unfortunately, these private service-providing sectors were the limited bright spots as several industries have struggled for several years as a result of the energy sector's downturn, but also due to broader losses in wages and population. Furthermore, West Virginia's retail trade sector has struggled significantly not only as a result of the state's overall weak economic backdrop from the past several years, but also due to structural changes that have affected retailers throughout the US. Indeed, several major retailers have entered bankruptcy or struggled with poor sales performance due to shifting consumer behavior and competition from online platforms such as Amazon.

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 as a result of 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.

GOVERNMENT West Virginia's underlying economic and demographic struggles have also had a significant impact on the state's public sector, though conditions do appear to have stabilized in recent quarters. Indeed, the state government just recorded its first surplus in several fiscal years after sustained weakness in severance, income and sales tax revenue led to appreciable cuts in inflation-adjusted spending. Local governments coped with similar budgetary issues as the state, but have had to implement deeper payroll cuts due to falling property and B&O tax revenue collections caused by population declines and broader losses in business activity. On a positive note, federal government payrolls in West Virginia have increased over the past two years, largely as a result of hiring by the US Treasury in the Parkersburg area and the Eastern Panhandle and the FBI at its Criminal Justice Information Services Division in Harrison County.

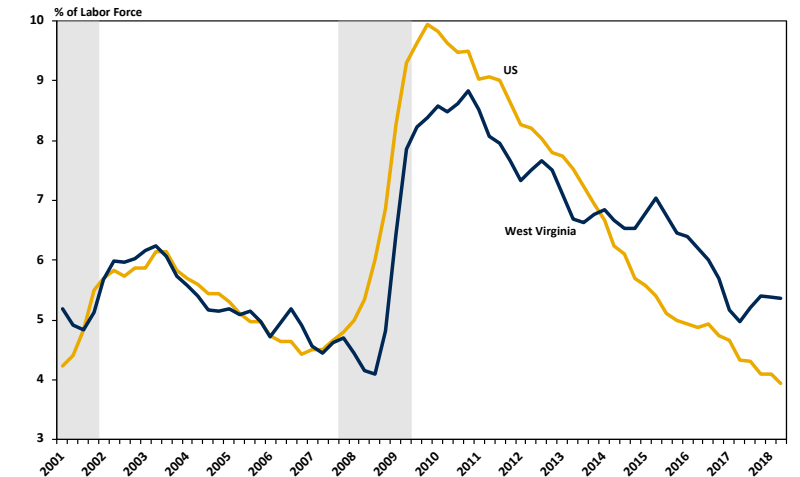
LABOR MARKET DYNAMICS West Virginia's unemployment rate has shown a great deal of volatility in recent years, reflecting a combination of the state's economic difficulties as well as some of its underlying demographic trends. After peaking at 8.8 percent in late-2010, the state's jobless rate fell more 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.

The improvements in the coal and natural gas industries over the past several quarters, along with the continued momentum provided by West Virginia's stronger-performing regions, did push the jobless rate down to 5 percent in the second quarter of 2017—its lowest point since early-2009. The unemployment rate has increased since mid-2017, averaging 5.4 percent during the first half of 2018, but this actually reflects moderate improvement in the underlying health of the state's labor market as increased job growth has encouraged more individuals to re-join to the workforce.

Fundamental economic improvements within certain regions in the state help to explain the downward trend in the unemployment rate over the past several years, but other factors have played a larger role. For example, West Virginia's labor force declined by more than 30,000 between the first quarter of 2012 and the second quarter of 2017 and more than two-thirds of those losses came from a decline in the number of the unemployed. This implies labor force attrition accounted for the measured decline in the jobless rate, which is not surprising given the large net outflows of migrants seen in recent years from West Virginia to other states. In addition, the growing opioid epidemic has likely had an appreciable effect on workforce participation in recent years, along with other health- and human capital-related limitations faced by a significant proportion of the state's population. As of 2017, West Virginia's labor force participation rate was the lowest among all states at just over 53 percent — ranking last among the states, 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).

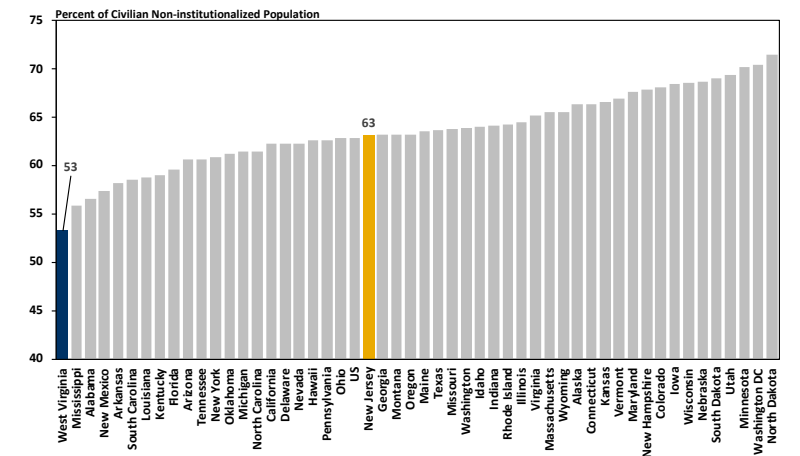
INCOME Per capita personal income, without accounting for inflation, in West Virginia reached approximately \$37,900 in 2017, representing a 3.4 increase over the previous calendar year. West Virginia's per capita income growth actually ranked second nationally and

FIGURE 2.4: Unemployment Rate



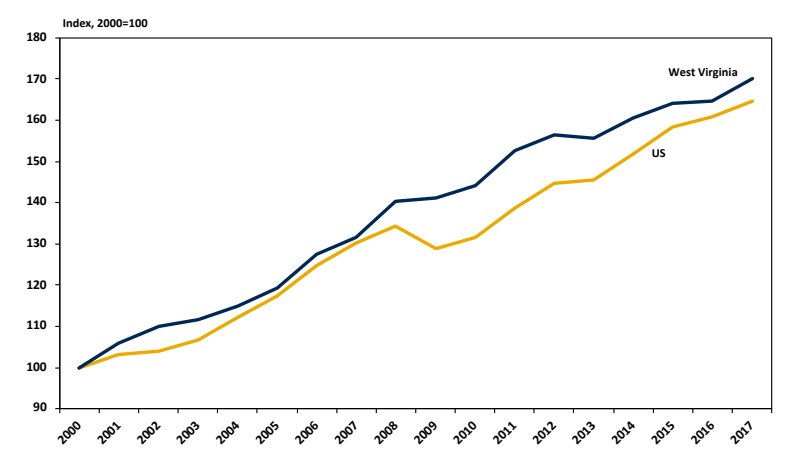
Source: US Bureau of Labor Statistics
*Shaded regions indicate recessions

FIGURE 2.5: Labor Force Participation Rate, 2017



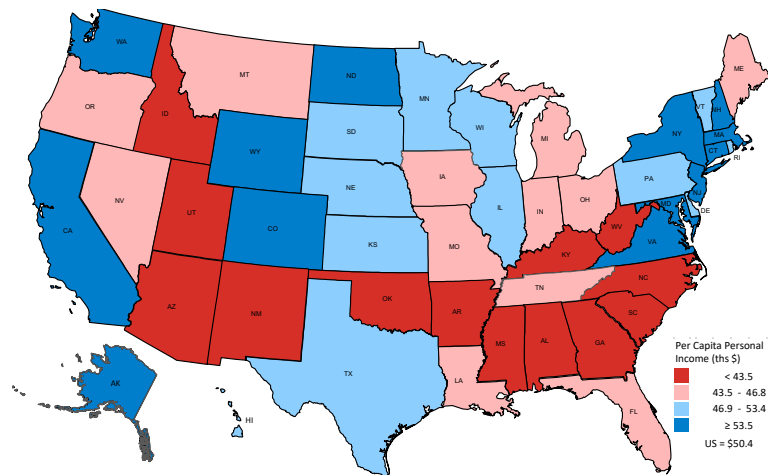
Source: US Bureau of Labor Statistics

FIGURE 2.6: Per Capita Personal Income Growth



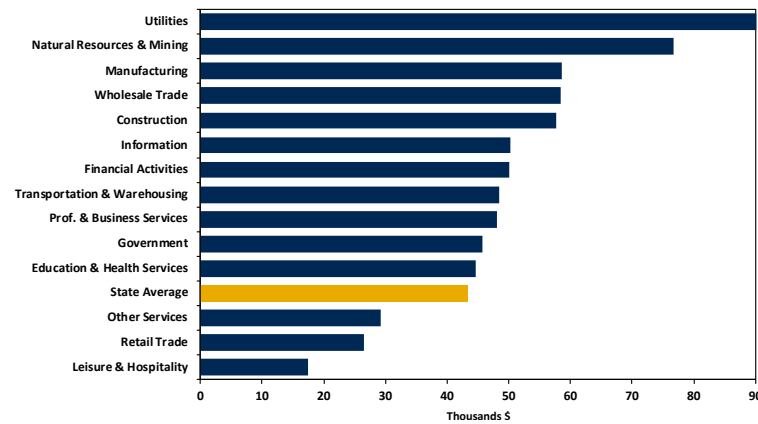
Source: US Bureau of Economic Analysis

FIGURE 2.7: Per Capita Personal Income (2017)



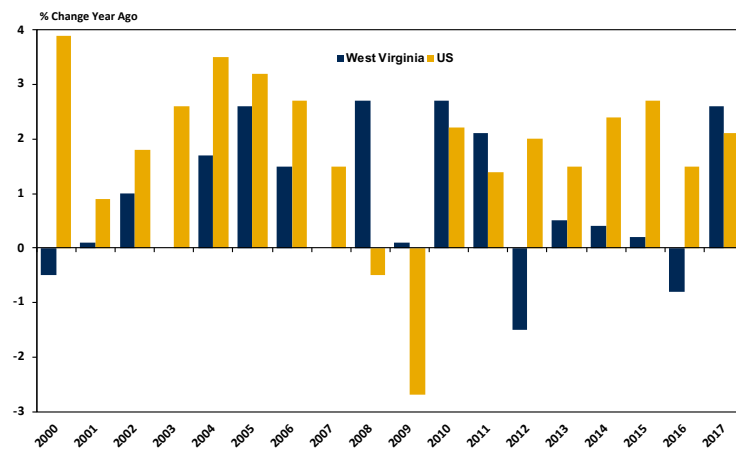
Source: US Bureau of Economic Analysis

FIGURE 2.8: Average Annual Salary by Sector (2017)



Source: US Bureau of Labor Statistics

FIGURE 2.9: Real Gross Domestic Product Growth



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

also allowed the state to increase its per capita income level as a share of the US average from 74.5 to 75.3 percent. Unfortunately, this represents a reading several percentage points lower compared to 2011 and puts West Virginia's per capita income as a share of the national average generally in line with its average reading in the post-WWII era.

WAGES Surging demand for labor in the coal, natural gas and construction sectors had a noticeable impact on wage growth in West Virginia during 2017. The statewide average annual wage jumped 4.2 percent (without adjusting for inflation) for the full calendar year, reaching \$43,400. Workers in the utilities sector continued to receive the highest average annual wage at just over \$90,000. Wage growth within the natural resources and mining sector surpassed 7 percent, recovering more than half the decline posted in 2015 and 2016. The sector remains the second-highest paying within the state at an average annual wage of approximately \$76,700.

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 as a whole in the past decade. After easily outperforming the national average during the Great Recession and early stages of the economic recovery, the overall value of goods and services produced within the state has actually declined in two of the last six calendar years and only just surpassed its late-2011 peak during the third quarter of 2017. West Virginia did rank 10th nationally in terms of real GDP growth during 2017 at 2.6 percent and was actually first overall on a per capita basis at 3.3 percent.

Coal and natural gas, along with construction, have contributed to most of the state's rebound in output growth over the past several quarters. Indeed, these sectors have accounted for 2.9 percentage points of the 3.5 percent increase in real GDP since the fourth quarter of 2016. Their outsized contributions to statewide economic growth are not surprising given the

capital intensiveness within each industry and the downstream impacts they have in some of the state's more rural economic regions, but these increases also illustrate few other industries have the capacity to buoy the state's economy at present when the energy industry is struggling. For example, real statewide output excluding the mining sector has actually posted two years of successive growth, but construction accounted for most of the 2017 gain and healthcare services contributed to the lion's share of non-mining real GDP growth in 2016.

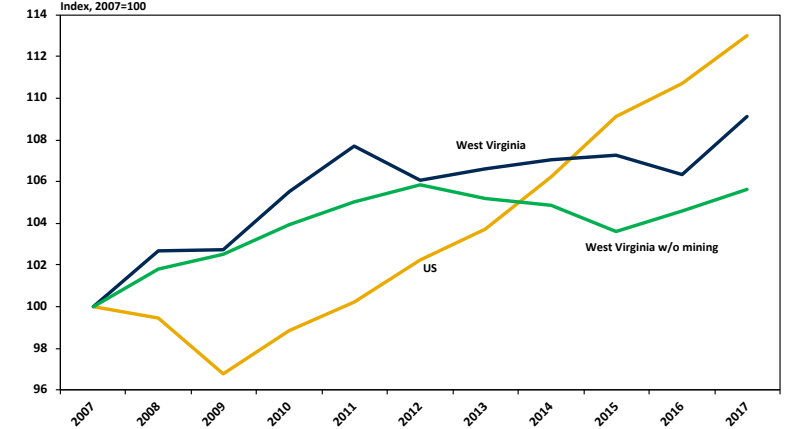
RECENT DEMOGRAPHIC TRENDS

POPULATION West Virginia's population declined in 2017, marking the fifth consecutive annual loss in residents and equals a cumulative decline of more than 39,500 residents over this time period. Both the absolute and percentage declines in total population have surpassed what occurred in the mid- to late-1990s. However, the current episode of population losses remain significantly smaller in scale to the massive drop-off in population the West Virginia experienced during the 1980s — when the state's population fell by 18,000 people annually.

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 births. 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 the state's relative economic performance over the past five years, net migration flows have become increasingly negative, with a net outflow of more than 10,500 recorded between 2016 and 2017.

According to the US Census Bureau, 45 of the state's 55 counties lost residents between 2016 and 2017. 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 the 21 counties in the state that posted at least a 1 percent decline on a year-over-year basis in 2017. In fact, three counties (McDowell, Mingo and Webster) each saw their population totals decline by more than 2.4 percent from 2016. Berkeley and Jefferson counties experienced the largest absolute and percentage gains in population between 2016 and 2017, and along

FIGURE 2.10: Real GDP Growth



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

FIGURE 2.11: Total Population



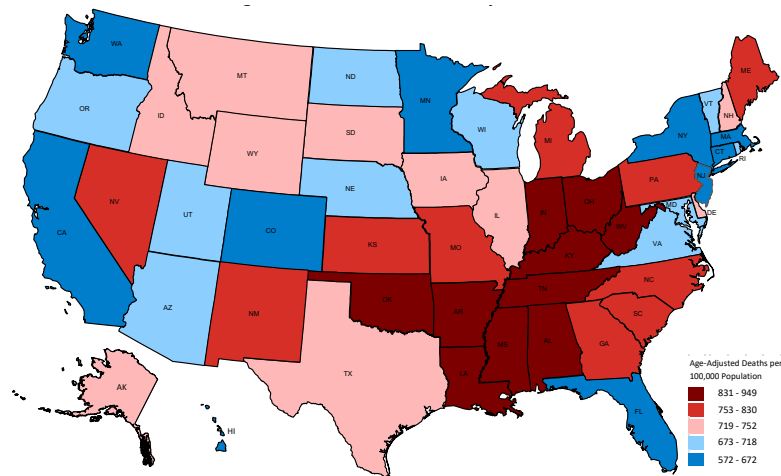
Source: US Census Bureau

FIGURE 2.12: Summary Population Profiles

	West Virginia	United States
Total Population (2017)	1,815,857	325,719,178
% Population Under 18 (2017)	20.3%	22.6%
% Population 65 Years + (2017)	19.4%	15.6%
Population with Less than High School Diploma (2016, % of pop. 25 yrs. +)	14.0%	12.6%
Population with High School Diploma, No College (2016, % of pop. 25 yrs. +)	39.7%	27.2%
Population with Some College, No Degree (2016, % of pop. 25 yrs. +)	25.5%	29.0%
Population with Bachelor's Degree or Higher (2016, % of pop. 25 yrs.+)	20.8%	31.2%
Median Age (2017)	42.5	38.0
Average Household Income (2016)	\$60,164	\$81,346
Average Household Size (2016)	2.50	2.74
Labor Force Participation Rate (2017)	53.3%	62.9%

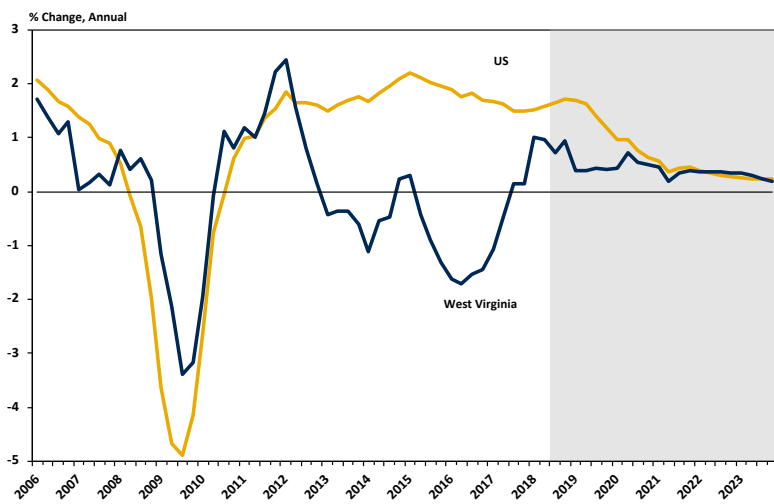
Sources: US Census Bureau; Bureau of Labor Statistics

FIGURE 2.13: All-Cause Mortality Rates, 2016



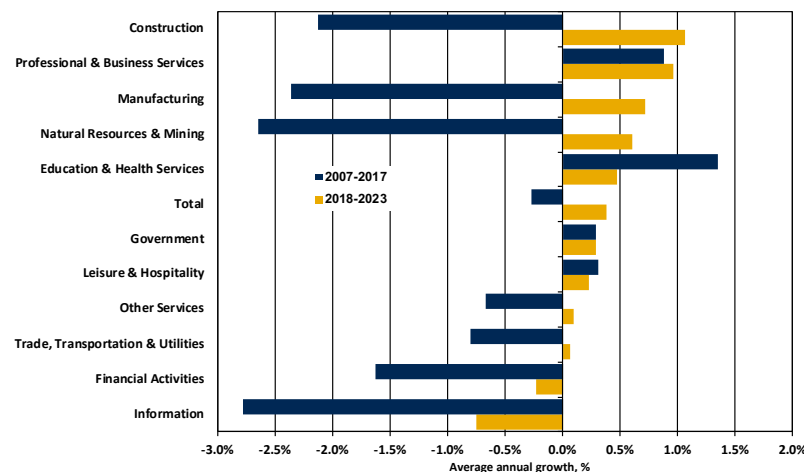
Source: Centers for Disease Control

FIGURE 2.14: Employment Growth Forecast



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

FIGURE 2.15: West Virginia Employment Growth Forecast by Sector



Sources: Bureau of Labor Statistics; WVU BBER Econometric Model

with Monongalia County, have buoyed the state's overall population numbers for well over a decade.

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 2017 to 42.5 years, placing it more than 4 years higher than the nation as a whole and ranking fourth highest among all 50 states. Another sign of the state's skewed age distribution is the fact that 27 percent of the state's residents are aged 60 or older, which comes in at a full seven percentage points or so above the nation as a whole.

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 comparatively high mortality rate, as well as behavioral or lifestyle factors such as relatively little physical activity during leisure time. Mortality rates among men aged 18-45 have risen at a particularly fast pace in recent years, with the total number of deaths among this cohort increasing by 236 since 2012 even as the total size of this cohort has declined in number by nearly 15,000 over the same time period.

WEST VIRGINIA OUTLOOK

EMPLOYMENT GROWTH Expectations for the US and broader global economies during the forecast horizon will directly influence West Virginia's economic performance over the coming years. Should the US economy perform differently (i.e., enter into a recession or see growth accelerate) or global demand for the state's energy commodities and manufactured goods deviate from their expected paths, growth could surpass or fail to match expectations.

Overall, the forecast calls for the state's economy to remain on path to economic recovery and grow at an average rate of 0.4 percent annually during the five-year outlook period slated to end in 2023. This rate of growth does represent an improvement over the significant number of job losses recorded between 2012 and 2016, but will constitute a below-average rate of growth compared to the nation as a whole (0.7 percent annually) over the next five years. Also, absent any unexpected positive contributions, the state is not expected to reach its previous peak level of employment achieved in 2012 during the five-year outlook period.

6. 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.

CONSTRUCTION West Virginia's construction sector is expected to register the fastest rate of job growth during the outlook period, increasing payrolls at an average annual pace of 1.1 percent through 2023. However, most of this growth will likely occur over the next few years, with small increases over the latter part of the forecast horizon. We do anticipate a pull-back in construction sector payrolls and output during the third quarter as a result of the stoppages to the Atlantic Coast Pipeline and Mountain Valley Pipeline projects. FERC's late-August 2018 approval of the Mountain Valley Pipeline's revised plan will likely allow construction to re-start by the fourth quarter, but full activity for both projects is not expected until the first quarter of 2019.

The forecast assumes that all of these pipelines will be completed by mid-2020 and will place immediate downward pressure on construction sector payrolls as work crews are released. Lengthier delays for these projects would change the timelines and push their impacts further into the future and cancellations of one (or more) project would certainly cause significant changes to the projected path of construction activity in the state during the outlook period.

One source of upside potential for construction sector growth vis-à-vis the state's energy industry during the forecast horizon (and beyond) in West Virginia is the \$84-billion memorandum of understanding signed between the state and China Energy, which covers a 20-year investment horizon. At present, limited information is available regarding the projects that will be funded through the agreement, but discussions have included a range of possibilities for additional mid-stream assets as well as the creation of new downstream assets for natural gas, such as power plants, crackers, etc. Trade tensions between the US and China have emerged in recent months as the Trump Administration has imposed tariffs on a wide range of Chinese-produced goods and protracted disagreements over trade between the two governments could lead to the delay or cancellation of any projects since China Energy is a majority state-owned enterprise.

Nonresidential development will also underpin the sector's solid performance during the outlook period, though most of the construction activity will be located primarily in the Eastern Panhandle and North-Central West Virginia. The Procter & Gamble manufacturing facility will continue to be built out to accommodate all of the lines of production in the coming years and should spawn the addition of other co-located supply chain operations over the next few years. A planned \$150 million ROXUL insulation materials manufacturing plant in Jefferson County, the ongoing buildout of WVU Medicine facilities and the WestRidge Development in Monongalia County, as well as the redevelopment

of the Coldwater Creek facility in Wood County for the Hino Motors Manufacturing truck assembly plant represent other major nonresidential projects slated to occur over the next two years or so.

After a protracted period of limited activity, infrastructure development is slated to improve during the forecast horizon. Improving state finances thanks to a recovery in severance and income tax collections have helped the fiscal outlook and raised public desire to repair deteriorating roads, bridges and other infrastructure. However, the chief mechanism supporting new infrastructure projects over the next several years will be the Roads to Prosperity program, which will utilize bonds backed by revenue from increased gas and motor vehicle taxes as well as DMV fees to fund 600+ projects.

Construction costs do pose a significant risk to the program from a financial perspective, and could cause some projects to face delays or have their parameters scaled back. First, construction of natural gas pipelines and other energy infrastructure (such as the Shell ethane cracker in Pennsylvania) has created some labor shortages, which could bid wages much higher and cause labor costs to exceed their original projections by a significant margin. In addition, demand for steel has increased because of the pipeline construction activity and supplier prices have been pushed higher due to the Trump Administration's new tariffs on steel products from several major steel-exporting countries, both of which will lead to higher-than-expected prices for steel products used in bridges and other infrastructure.

MINING EMPLOYMENT West Virginia's mining sector is expected to post payroll and real output growth of 0.6 and 1.1 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 oil and natural gas industry is expected to add jobs at a robust rate of 8 percent per year during the outlook period. Natural gas production volumes are expected to increase at a slower pace of 6.6 annually. This difference reflects, at least in part, the stage of the industry's recovery in 2018 is such that operators are still able to ramp up production from existing plays before making aggressive expansions in exploration and development.

Growing prospects for LNG exports, the addition of new midstream storage and distribution assets, such as cryo-processing facilities and pipeline infrastructure, plus the upcoming construction of downstream facilities such as new natural gas-fired power plants and the Shell ethane cracker in Pennsylvania (along with the strong possibility of a PTT Global Chemical

ethane cracker in Ohio) will all combine to generate strong job growth throughout the industry in West Virginia as drillers expand production to fill rising end-market demand. The main caveat with this projected job growth is that since some of these jobs could ultimately be classified under the umbrella of contract labor rather than official natural gas industry jobs, the measured rate of job growth could be lower during the outlook period. Regardless, the anticipated gains in activity at the up-, mid- and downstream levels will result in healthy job growth for West Virginia's natural gas industry.

By comparison, the forecast calls for coal production and employment to decline by 2.5 and 3.8 percent on an annual basis, respectively, during the outlook period. Production should remain around 90 million short tons (annualized) into mid-2019 or so thanks to healthy export demand for metallurgical and thermal coal, which will particularly benefit production at labor-intensive mines in southern West Virginia. However, mines in southern West Virginia will see production begin to decline steadily as the forecast progresses as the current level of global coal demand tapers off and market prices fall back down to the point that many of these operations become uncompetitive due to their high costs. In addition, mines in both regions, but particularly northern West Virginia, that are more dependent on domestic demand for thermal coal will continue to face pressure as more coal-fired generating capacity that sources coal from West Virginia mines is slated for retirement or conversion to natural gas in the coming years. For a more detailed discussion of the short- and long-term outlook for the state's coal industry, along with an examination of upside and downside risks and their potential impacts, see chapter 3 of this report and Coal Production in West Virginia: 2018-2040.

MANUFACTURING In contrast to the last couple of

decades, the manufacturing sector is expected to record net job growth over the forecast horizon at a rate of 0.7 percent per year. Most of the sector's major segments will post at least moderate job growth over the next five years, nonmetallic minerals, fabricated metals and primary metals will likely continue to shed jobs, though real output will grow for two of the three. Auto manufacturing is expected to remain the fastest-growing segment of West Virginia's manufacturing sector. The completion of the Hino Motors Manufacturing truck assembly plant in the Parkersburg area stands as the largest source of growth for this subsector, but previous expansions by Toyota and growth at other parts suppliers in the Kanawha Valley will likely yield additional gains during the outlook period.

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 provide opportunities to expand the industry's footprint in the region further, and the potential addition of one or two more would only precipitate further prospects for development of the state's chemicals industry. Moreover, projects that could flow from the \$84-billion China Energy agreement provide significant upside potential for the state's chemicals industry, along with several other segments of the manufacturing sector.

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 more than 450 workers employed at the facility, but roughly 400 employees are expected to be added through late-2019 as more product lines are added at the facility. Additional hiring activity is also likely as P&G consolidates operations to Berkeley County from older facilities that are scheduled to close over the next couple of years. In addition, the plant is expected to have at least 700 workers once production is fully ramped up. The ROXUL plant, which will produce insulation materials, is expected to hire 150 employees once it begins operations in early-2020.

SERVICE SECTOR GROWTH Goods-producing industries are expected to record the fastest rates of growth over the next five years, but several private service-providing sectors will account for measurable gains during the outlook period. The professional and business services sector is expected to add jobs on net

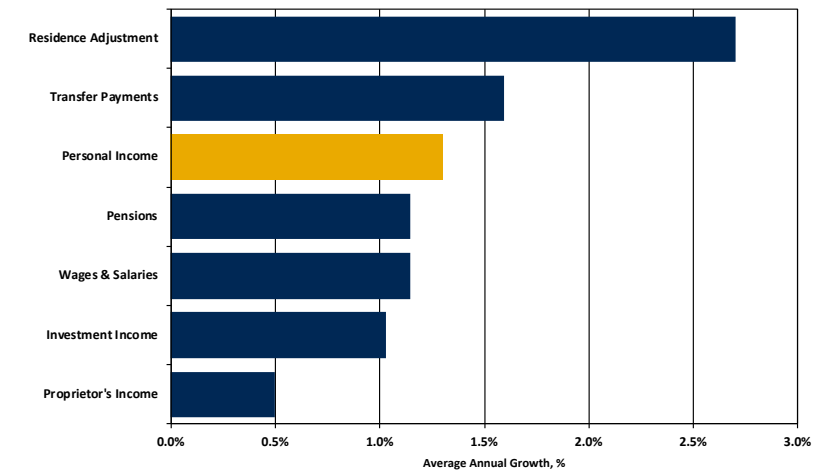
at a pace of more than 1 percent per year. Most of this growth will likely come from increased contract labor utilization by coal companies, natural gas producers and field support services firms; however, improved prospects for the natural gas industry will bolster demand for engineering, legal and other consulting industries that were forced into cutting payrolls during the natural gas industry's weak period in 2015 and 2016. Thanks to steadily growing demand for health care from the state's large, and growing, contingent of elderly residents, education and health services will see employment grow at an average annual pace of nearly 0.5 percent.

Leisure and hospitality is expected to post job gains of between 0.2 and 0.3 percent per year through 2023. 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 have experienced secular declines in coal production, such as the New River Gorge Area. The World Scout Jamboree in 2019 and the National Scout Jamboree in 2021 will bolster the sector, though the impacts will be short-term in nature and mostly localized to Fayette and Raleigh counties. In addition, the introduction of sports betting should provide a lift to the state's gaming industry as West Virginia was one of the first states to offer these services, but the effect will be temporary as more states open up sportsbook offerings.

Retail, along with portions of leisure and hospitality, will register moderate growth thanks to gains in real per capita income and expanding retail opportunities in the state's growing regions. These improvements will offset continued population losses or stagnant growth in other parts of the state. On the downside, however, structural changes in the broader retail sector will weigh on the sector's overall potential as brick-and-mortar establishments navigate competition from web-based retail platforms such as Amazon.

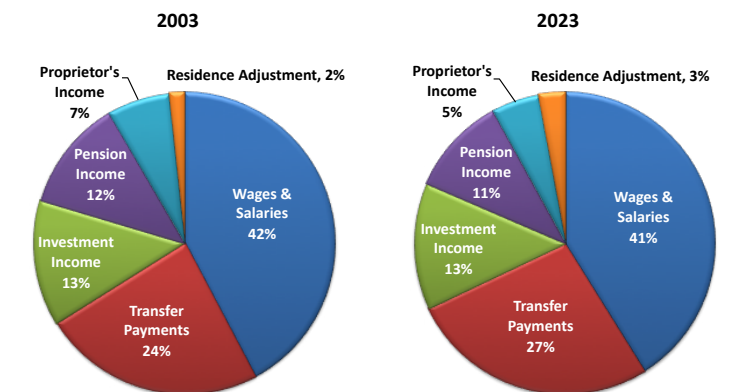
The transportation and warehousing sector is expected to see payrolls expand 0.5 percent annually over the next five years. Continued development along major transportation corridors, such as I-81 in the Eastern Panhandle and I-79/I-68 in North-Central West Virginia. Furthermore, transportation companies 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 over the near term as the Pleasants Power Station is expected to close in 2019, absent emergency measures from the federal government. Upside potential for growth remains a possibility as three natural gas-fired power plants have been proposed for construction in

FIGURE 2.17: Forecast Growth by Major Source of Real Personal Income, 2018-2023



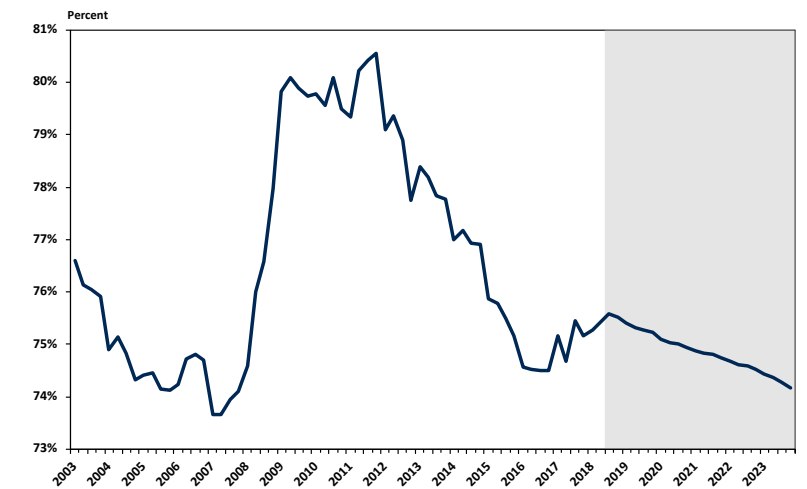
Source: WVU BBER Econometric Model

FIGURE 2.18: Share of Personal Income by Component



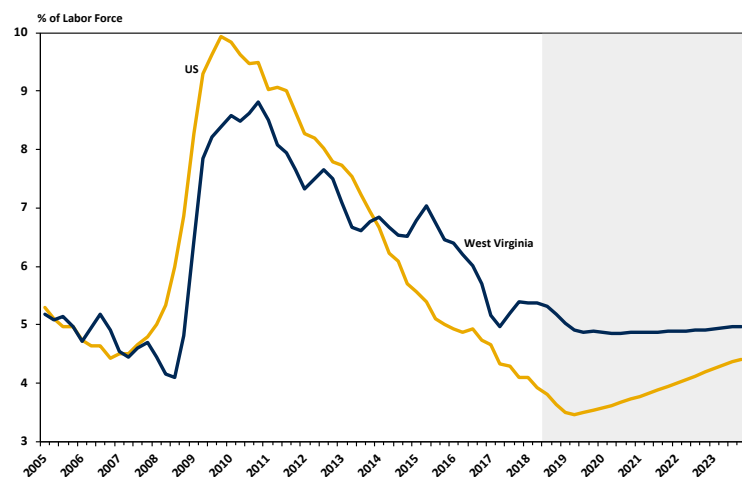
Sources: Bureau of Economic Analysis; WVU BBER Econometric Model

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



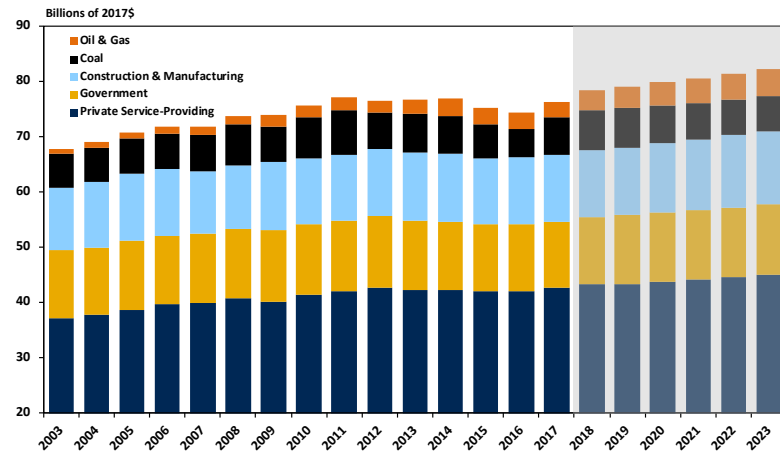
Source: Bureau of Economic Analysis; WVU BBER Econometric Model; IHS Markit
Note: Shaded region represents the forecast period

FIGURE 2.16: Unemployment Rate Forecast



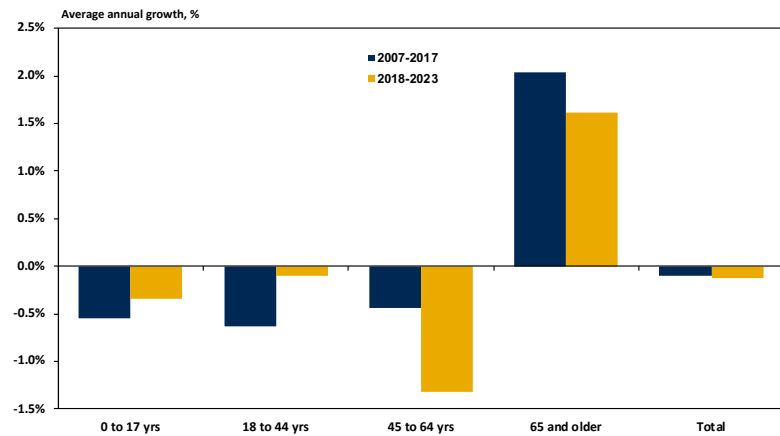
Sources: Bureau of Labor Statistics; WVU BBER Econometric Model; IHS Markit
Note: Shaded region represents the forecast period

FIGURE 2.20: GDP Forecast by Sector



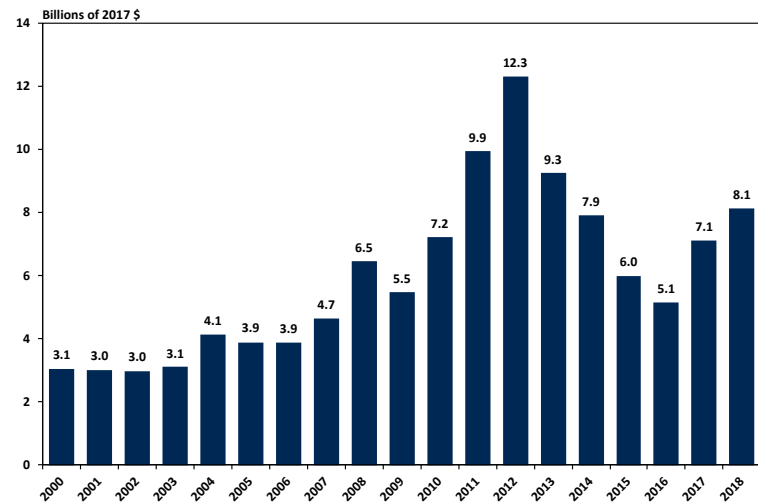
Source: Bureau of Economic Analysis; WVU BBER Econometric Model

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.

Marshall, Harrison and Brooke counties, though all three have been tied up by lawsuits and regulatory appeals.

The public sector is projected to post a moderate increase in payrolls during the forecast horizon as the state's protracted budget issues appear to be over for now thanks to rebounding severance tax collections and a pick-up in income tax revenue associated with the upturn in job growth. Some of the state's local governments will continue to cope with shrinking tax bases and structurally-lower coal severance tax collections forward, but those counties located in natural gas-rich areas and along the path of any newly-built pipelines should see benefit from higher B&O collections. Finally, expanding areas such as the Eastern Panhandle and North Central West Virginia will likely need to expand their local public sectors as school enrollments increase and residents demand more services.

UNEMPLOYMENT After averaging 5.2 percent in 2017, West Virginia's unemployment rate is forecast to average 5.3 percent for calendar year 2018 as a whole. Assuming no dramatic revisions in the underlying labor force data, the state's jobless rate will likely drift lower into the upper-4 percent range by late-2019. Sustained job growth across more regions in West Virginia will lower the ranks of those already in the labor force, but these improved labor market signals will incentivize some erstwhile discouraged workers to re-join the workforce. These factors will put offsetting upward and downward pressure on the jobless rate, which will ultimately remain in the upper-4 percent range for the remainder of outlook period.

INCOME Following a 1.4 percent increase in 2017, inflation-adjusted per capita income is expected to increase an additional 1.7 percent in 2018 and another 2.2 percent in 2019. Gains will taper off over the latter portion of the outlook period, with average annual growth of 1.1 percent between 2020 and 2023. In terms of the major underlying components of personal income, transfer payments will increase at the fastest pace during the five-year period as the state's age structure continues to shift toward older age groups and below-average income levels in a few regions keep upward pressure on Medicaid and other safety net spending. By 2023, transfer payments will likely account for 27 percent of income, an increase of three percentage points from 2003.

Real wages and salaries will grow 1.1 percent between 2018 and 2023, lagging growth in broader personal income. Investment income (dividends, interest and rent) is expected to slow to a pace of just over 1 percent annually during the forecast horizon, as it will likely be difficult to maintain the generally healthy performance of equity markets seen over the past 18 months or so. Royalty payments to households with mineral rights in

shale gas-rich counties will boost this non-wage source of income, as will higher interest rates provide 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 as a whole, the state's average income ratio with the US will decline to 74 percent by the end of the outlook period.

GDP Total real GDP for West Virginia is expected to rise between 0.8 and 0.9 percent annually through 2023. The oil and gas industry will likely pace broader output growth by a large margin, with an expected gain of 6.2 percent per year during the forecast horizon. After recording solid gains in 2017 and 2018, real output for the state's coal industry will slip 2 percent per year on average between 2019 and 2023. The manufacturing sector is expected to post real output growth of 1.7 percent or so during the outlook period, with most of it arising from the chemicals industry. Construction sector real GDP will continue to expand at a strong pace over the next two years or so due to pipeline construction and publicly-funded infrastructure investment activity, but slow significantly beyond 2020.

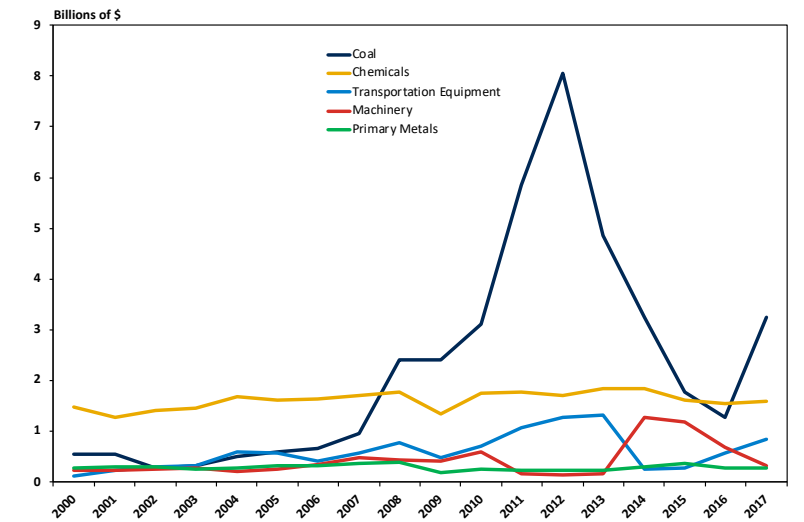
POPULATION Due to what is expected to be an improvement in its relative economic performance, the fast rates of population declines seen in recent years will likely come to end during the outlook period. Deaths will continue to exceed births in most counties in West Virginia and the margin will actually 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 benefit from more stable labor market conditions. 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 a net gain of migrants. Overall, total population for the state as a whole will contract at a rate of 0.1 percent per year, but population totals are expected to remain steady between 2020 and 2023.

AGE DISTRIBUTION The state's population will continue to become increasingly concentrated in the 65-and-older age group. Most of this increase will occur as residents in the 60 to 64 years of age cohort age in place, but the state will also experience a net gain of older residents via in-migration as older residents that live in retirement destination states return to West Virginia to receive long-term medical care or to live closer to family ties. Over the longer term, this aging-in-place process will eventually lead to more than 23 percent being at least 65 years of age.

WEST VIRGINIA'S EXPORTS

Led by an uptick in metallurgical and thermal coal sales, international exports have surged in the last few quarters, providing a boost to the state's economy. Total exports rose to \$7.1 billion in 2017, up from \$5.1 billion in 2016, a gain of nearly 40 percent. Export totals in the first half of 2018 indicate continued growth through the end of the year. West Virginia businesses exported approximately \$4.1 billion in goods to trading partners during the first half of 2018, a gain of 9 percent compared with the first six months of 2017. These gains further cement the importance of export markets to the state's economy over the last decade. The total dollar value of exports equates to roughly 9 percent of state economic output in 2017.

FIGURE 2.23: West Virginia Top Five Exporting Industries



Source: International Trade Administration
Note: Data are adjusted for inflation and expressed in 2016 dollars

FIGURE 2.24: Top 10 Export Commodities, 2017

Export Commodity	Export Value (millions of \$)	Share of Total West Virginia Exports (%)
Bituminous Coal	3,240	45.6%
Reciprocating Piston Engines	520	7.3%
Gears, Ball or Roller	226	3.2%
Civilian Aircraft, Engines and Parts	195	2.7%
Polyamides	171	2.4%
Aluminum Alloy Plates	145	3.1%
Polyethers	119	1.7%
Propylene Copolymers	106	1.5%
Polyacetals	98	1.4%
Polyesters (NESOI)	86	1.2%
All Export Commodities	7,110	-

Source: US Census Bureau

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 nearly \$320 million in inflation-adjusted dollars — or 10 percent of all exports. 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 \$3.2 billion for calendar year 2017.

Coal exports from West Virginia continued to rise in the first half of 2018 thanks to underlying growth in global steel production and expansion in thermal coal ship-

Aside from coal and chemicals, all other manufactured goods totaled about \$2.1 billion in exports in 2017, down about 1 percent from 2016. Industrial machinery and an array of transportation equipment comprise a significant share of the goods exported by West Virginia companies. Machinery manufacturing exports declined by more than half in 2017, falling from \$676 million to about \$327 million. Transportation equipment was up by almost 50 percent, rising from \$564 million to more than \$835 million. Combined, these two industries shipped \$1.2 billion in various components for auto engines, machinery and civilian aircraft parts in 2017. 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 about 19 percent so far in 2018, compared with the first half of 2016.

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, which opened for in March, has shipped a total of nearly 70 billion cubic feet of natural gas so far in 2018, which constitutes roughly 16 percent of total LNG exports this year. New pipeline infrastructure throughout the Mid-Atlantic region should also lead to significant increases in exports of West Virginia gas in the coming years. However, these pipelines have faced delays that may limit exports in the near term.

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 141 countries during 2017, with most of the state’s exports going to familiar destination countries in North America, Europe, and Asia. Canada was easily the largest destination market for goods and commodities produced in the state, as our northern neighbor received more than \$1.5 billion in exports, or 21 percent of all West Virginia exports.

A surge in imports to India led to the South Asian country becoming the second-largest destination market for West Virginia products in 2017. Export value more than tripled to more than \$712 million, a gain from \$220 million the previous year. India now constitutes just over 10 percent of total exports from the state. China slipped to the third rank in destination markets in 2017, with exports of about \$535 million, or approximately 7.5 percent of total exports. Exports to Ukraine rose significantly in 2017, as supply chains for that country shifted following the conflict in the eastern part of the country. The eastern European country now ranks fourth in total exports from West Virginia. The Netherlands also remains an important destination country, though it serves as a transit point to other Northern European countries rather than an end market for goods exported from West Virginia.

As exports begin to recover from the declines of the last two years, international demand for commodities and manufactured goods produced in West Virginia will play a major role in supporting the state’s economy going forward. We anticipate export demand for coal will decelerate over the next several quarters, but will remain well above the levels that prevailed during 2015 and most of 2016. 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

Exports Destination Country	Export Value (millions of \$)	Percent Change 2013-2016
Canada	\$1,536	- 23%
India	\$713	285%
China	\$535	-4%
Ukraine	\$461	67%
Netherlands	\$389	-37%
Brazil	\$369	-22%
South Korea	\$313	99%
Italy	\$252	- 41%
Belgium	\$248	8%
Mexico	\$238	0%

Source: US International Trade Administration

ments to a few markets in Eastern Europe and South Asia. Overall, the value of coal export shipments from the state has risen 10 percent between the first half of 2017 and 2018, rising by more than \$350 million on a year-to-date basis.

CHEMICAL EXPORTS While exports from the state’s chemicals industry overtook coal as the largest export source in 2016, it has fallen back into its traditional role as the number two export industry in 2017. Chemicals exports tend to be much more stable thanks to steady demand growth 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 \$1.6 billion during 2017. Growth continued in the first half of 2018, rising by about 7 percent compared with the same period in 2017.

EXPORTS OF OTHER MANUFACTURED GOODS



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CHAPTER 3: West Virginia's Economy, Industry Focus

ENERGY

West Virginia's energy sector had a strong, albeit somewhat uneven, recovery in 2017 after large-scale employment declines over the last five years in the coal industry and a slowdown in gas production between 2015 and 2016. Coal employment grew by nearly 1,900 jobs in 2017 on the strength of gains in exports to Europe and South Asia. However, the coal industry still faces long-term structural problems due to declining demand from domestic power producers. The natural gas industry returned to a growth path in 2017, with production rising more than 16 percent over 2016 totals, though employment has yet to follow these gains.

Work stoppages on new natural gas pipeline construction projects could limit growth in the very near term, but we expect continued growth over our five-year forecast horizon. The utilities industry saw modest growth in 2017; however, continued competition from natural gas-fired power plants has reduced profitability for some of the state's coal-fired power plants. Meanwhile, new federal regulations that scale back environmental standards could help the state's coal-fired power plants over the longer term, though a great deal of uncertainty remains due to the high likelihood of legal challenges as well as potential shifts in political power related to the 2018 and 2020 elections.

COAL

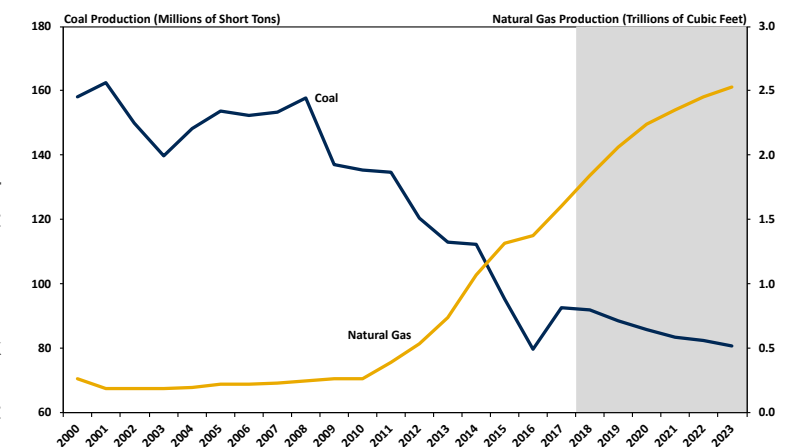
West Virginia's coal industry has recovered somewhat from the depths of 2016 largely due to overseas demand for thermal and metallurgical coal. However, long-run structural challenges remain in the industry over the next five years of our forecast.

Coal production was up by 12 million tons in 2017, rising from about 80 million tons in 2016 to over 92 million in 2017, a gain of nearly 16 percent. Coal production appears to be leveling out in 2018, as total production is down slightly in the first two quarters compared with the same period the previous year. As of July, total coal production year-to-date was about 46 million tons, compared with under 47 million in the first two quarters of 2017, a decline of 1.3 percent.

Production increases have led to a rebound in coal employment in 2017 (see Figure 3.2). Employment in the coal industry — including coal mining and support services — rose by nearly 1,900 jobs in 2017 to just

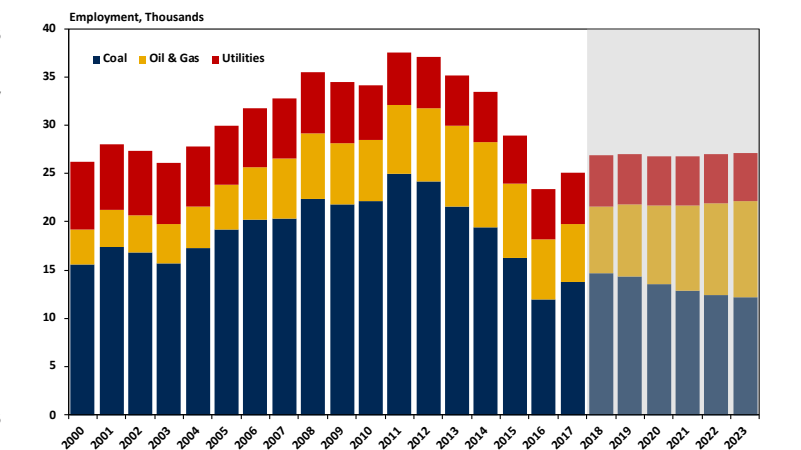
under 13,900, a gain of more than 15 percent. Preliminary employment numbers from the US Mine Safety and Health Administration show jobs continuing to rise in the first half of 2018, with employment up by about 3 percent over 2017 figures.

FIGURE 3.1: West Virginia Energy Sector Employment



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

FIGURE 3.2: West Virginia Energy Sector Employment



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

REGIONAL TRENDS The decline in coal production since late 2011 has been primarily centered in the state's southern coal region — part of the Central Appalachian coal basin. However, the recent upturn has primarily been felt the southern counties of West Virginia, as shown in (see Figure 3.3). Approximately three-quarters of the recent production gains in the state were in the southern counties of West Virginia, which produced about 44.6 million tons in 2017 compared with 36.2 million in 2016, amounting to an 8.4 million ton increase or a gain of 23 percent. The state's northern counties produced about 46.7 million tons in 2017, a gain of 3.2 million over 2016's total of 43.5 million, amounting to a 7.3 percent increase. Approximately 1,500 of the job gains in 2017 were in the

state's southern region, amounting to about 80 percent of the employment gains. Jobs have continued to increase in the southern counties in the first half of 2018 as well, with about 600 jobs added since the beginning of the year. Gains in the southern counties have come despite continued low productivity in the state's southern mines relative to northern mines, as shown in (see Figure 3.4). Worker productivity has been consistent at about 2.15 tons per miner hour since 2011, compared with about 4.6 tons per miner hour in the northern counties in 2017 and 2018.

EXPORTS Exports have been a bright spot for the coal industry in recent quarters. The total value of coal exports more than doubled in 2017 from \$1.3 billion in 2016 to more than \$3.2 billion in 2017 (see Figure 3.5). Exports continued to rise in the early part of 2018, with sales nearly one-third higher than the same period in 2017.

To a large degree, demand from India drove the run-up in exports in 2017 and has continued to do so for much of 2018-to-date. Demand for West Virginia's coal by the South Asian country tripled in 2017, moving from \$162 million to more than \$636 million. West Virginia also began exporting heavily to Ukraine, as supply chains for that country shifted following the conflict in eastern Ukraine. Total sales to Ukraine nearly tripled in 2017, rising from \$119 million in 2016 to nearly \$459 million in 2017, a gain of about 285 percent.

FORECAST Coal production is forecast to finish the year at approximately the same as last year's total followed by a gradual decline through 2023. Total coal production in West Virginia is expected to fall from 92 million tons in 2017 to just over 80 million tons by 2023 (see Figure 3.1). We forecast coal employment to end higher in 2018 at about 14,700 jobs, up about 1,000 jobs from 2017. Employment is expected to follow the decline in production over the next four years, ending at about 12,100 jobs by 2023, a decline of about 2,600 jobs or nearly 2.5 percent per year on average.

NATURAL GAS

After a slowdown in the latter part of 2015 and 2016, natural gas production returned to a rapid growth trajectory in 2017. However, delays for several of the major pipelines being constructed in West Virginia (and the broader Appalachian Basin) may hamper the state's growth potential in the very near term.

SHALE GAS PRODUCTION TRENDS Natural gas production rose by more than 16 percent year-over-year from 2016 to 2017, to just over 1.6 trillion cubic feet (Tcf), as shown in (see Figure 3.1). The outlook so far in 2018 also looks favorable, with gas production in the first quarter growing more than 15 percent over the same period in 2017. West Virginia's production growth

compared favorably with neighboring states that overlie the Marcellus and Utica shale formations (see Figure 3.6). Pennsylvania's production growth rate slowed considerably in 2017 to less than 3 percent, compared with more than 10 percent growth in 2016. Total production in Pennsylvania was approximately 5.5 Tcf, still more than twice the production in West Virginia. Ohio's production rose by about 24 percent in 2017, moving from about 1.4 Tcf to almost 1.8 Tcf in 2017.

Production responded to a rebound in natural gas prices, which had fallen below \$2 per thousand cubic feet (Mcf) during 2016 as measured at the Henry Hub. Prices averaged nearly \$3 per Mcf in 2017, and hit \$3.09 per Mcf in the first quarter of 2018 (see Figure 3.7). Prices at the Tennessee Zone 4 hub, which serves gas producers in the Marcellus and Utica regions, rose by about 53 cents per Mcf on average in 2017 to \$2.02 per Mcf, a gain of more than 36 percent over the average 2016 price of \$1.49 per Mcf. The spread between the Henry Hub and Marcellus prices remained fairly steady at about 94 cents.

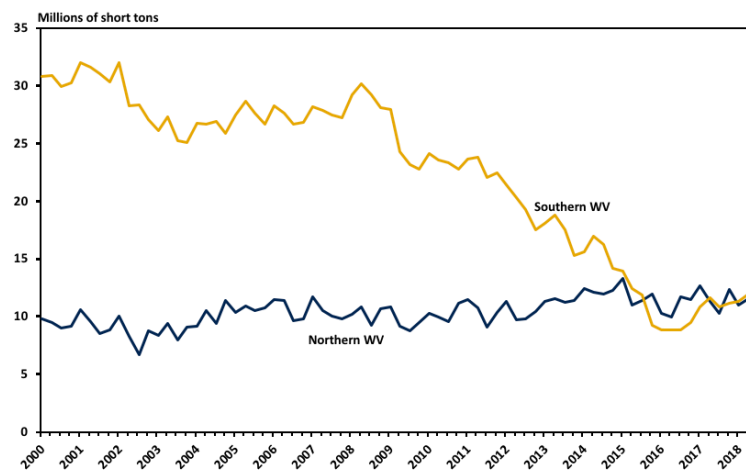
Employment in the natural gas industry fell slightly in 2017, from about 6,250 jobs in 2016 to just over 6,650 jobs in 2017, a decline of nearly 3 percent. The yearly job totals mark the lowest point for the oil and gas industry since the shale gas boom began in 2010.

COUNTY PRODUCTION Doddridge County continued to be the state's top producer of natural gas in 2017, producing more than 380 billion cubic feet (Bcf), compared with 335 Bcf in 2016 — a gain of nearly 14 percent (see Figure 3.8). Brooke County in the state's northern panhandle was the fastest-growing county, gaining more than 86 percent from just over 9 Bcf in 2016 to nearly 17 Bcf in 2017. Monongalia County's production grew more than 50 percent, from nearly 29 Bcf in 2016 to 44 Bcf in 2017, putting it among the state's top-10 producing counties for the first time.

PIPELINE CAPACITY West Virginia added 640 million cubic feet (MMcf) per day of outgoing state-to-state pipeline capacity in 2017, rising to 17.1 billion cubic feet per day from 16.5 Bcf per day in 2016. An additional 17 Bcf per day of capacity is either under construction in the state or proposed to begin within the next three years, of which approximately 8 Bcf per day is expected to originate in the state.

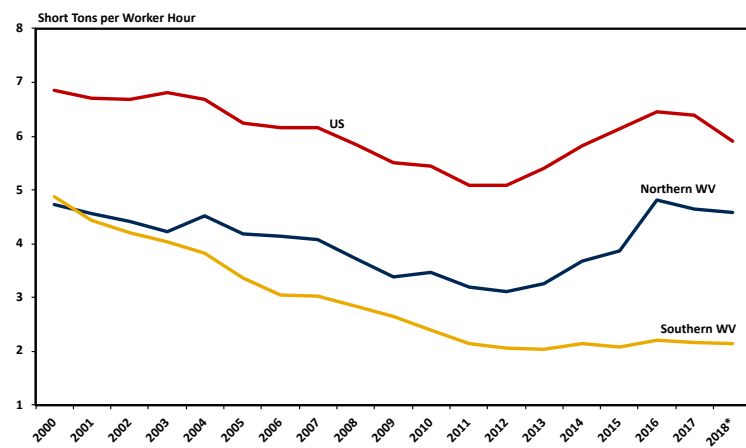
However, two large-scale mid-stream pipeline projects designed to deliver natural gas from the Marcellus region to markets in the northeast and southeast have been put on hold following court decisions and rulings by the Federal Energy Regulatory Commission (FERC). After receiving an initial go-ahead for construction in June, the Mountain Valley Pipeline (MVP) — a 2 Bcf

FIGURE 3.3: West Virginia Regional Coal Production



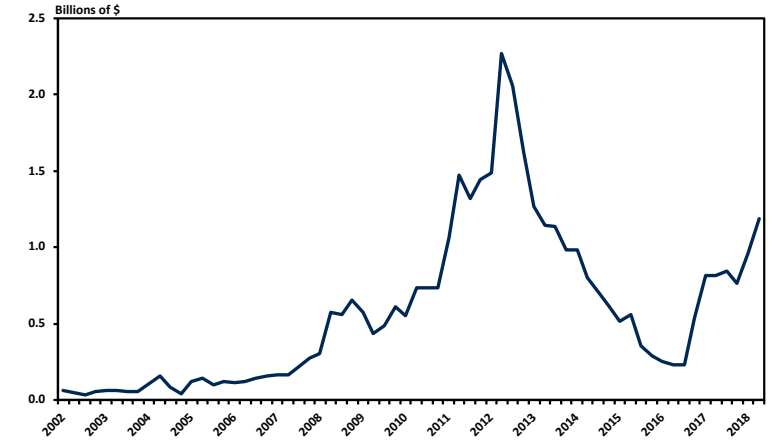
Source: US Energy Information Administration

FIGURE 3.4: Average Coal Mining Productivity



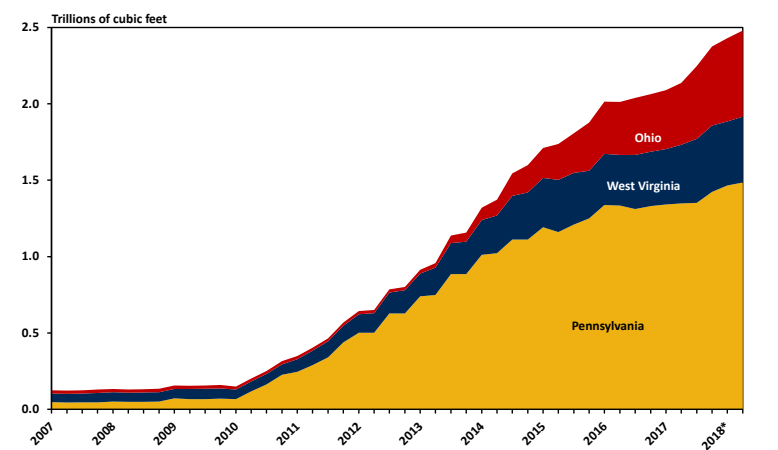
Source: US Mine Safety and Health Administration
Data through first quarter 2017

FIGURE 3.5: Coal Exports from West Virginia



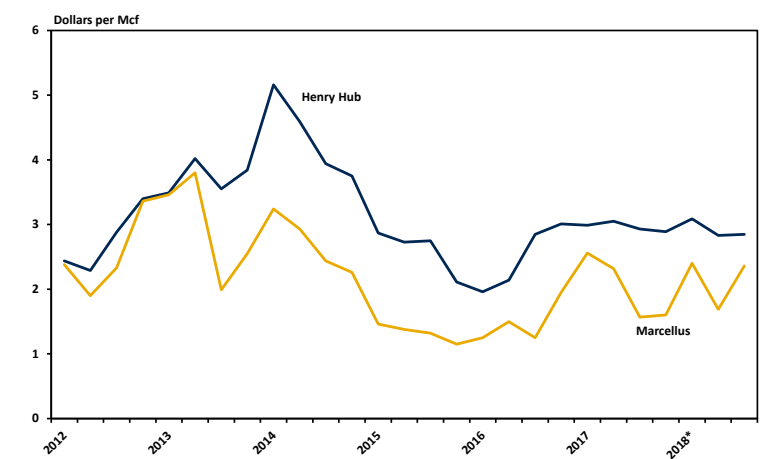
Source: US International Trade Administration

FIGURE 3.6: Natural Gas Production In Marcellus/Utica States



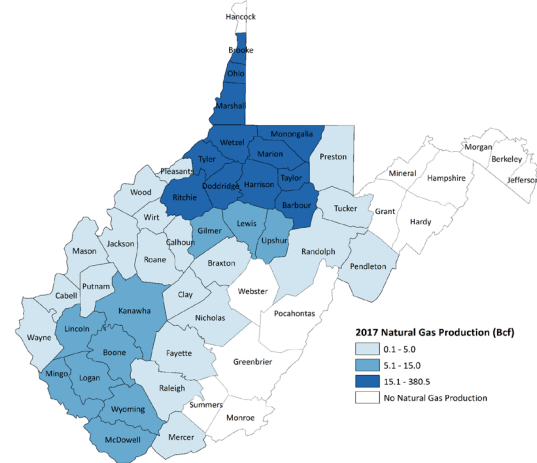
Source: US Energy Information Administration
Note: 2018Q2 Estimated from partial data.

FIGURE 3.7: Marcellus and Henry Hub Natural Gas Spot Prices



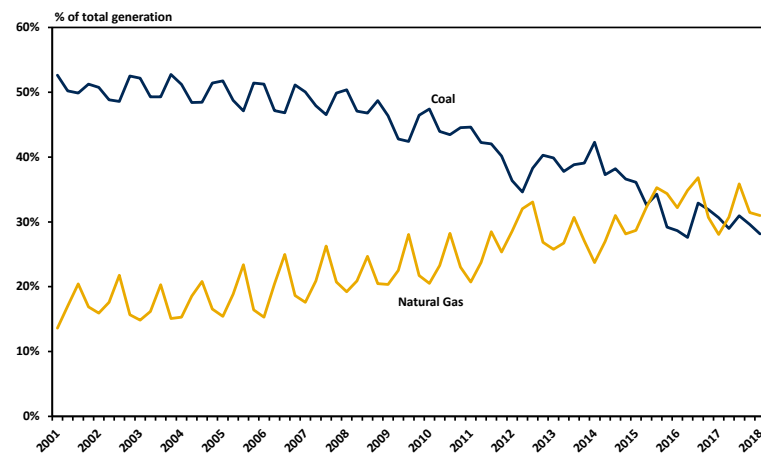
Source: Bloomberg
*Note: 2018 Q3 data through mid-August

FIGURE 3.8: Natural Gas Production by County



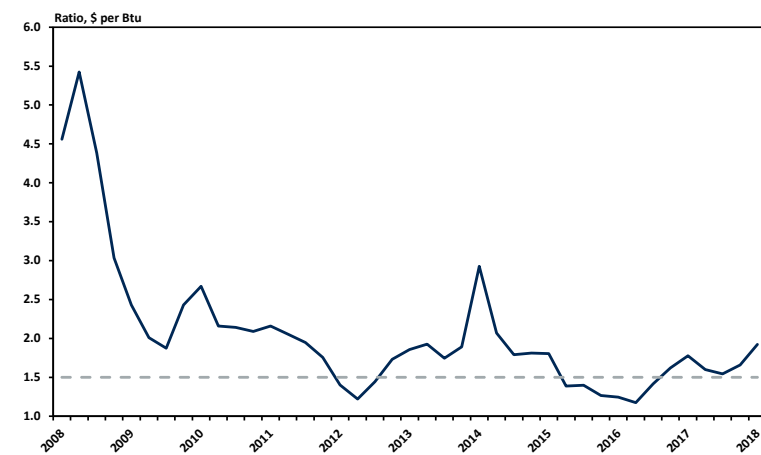
Source: WV Department of Environmental Protection

FIGURE 3.9: Share of US Electric Power Generation by Fuel Type



Source: US Energy Information Administration

FIGURE 3.10: Coal and Natural Gas Fuel Price Ratio Paid by Utilities



Source: US Energy Information Administration
2017 ratio based on first quarter data

per day line set to run from Wetzel County to Virginia — and the Atlantic Coast Pipeline (ACP) — a 600-mile pipeline that runs from Harrison County to North Carolina—were both put on hold in August. A ruling by the Fourth Circuit Court of Appeals threw out permits for the MVP for construction through four miles of the Jefferson National Forest, stating that the US Bureau of Land Management and US National Forest Service (NFS) had not adequately studied the environmental impacts of the pipeline on the forest.

Following the Court’s decision, FERC placed a stop work order on the pipeline, but later allowed developer EQT to continue work on the first 77 miles of the project. As a result of these findings, EQT announced that it would idle about half of its construction workforce on the project until work could resume on the rest of the pipeline. Construction on the ACP has also been put on hold following a decision in the Fourth Circuit Court to vacate permits issued by the NFS and US Fish and Wildlife Service.

FORECAST We forecast that natural gas production will continue to climb at a rapid rate over the next five years. Natural gas production is forecast to increase from 1.6 Tcf to more than 2.5 Tcf by 2023, an average annual increase of nearly 10 percent. This rate of increase, though rapid, is down considerably from growth over the last five years, which averaged more than 32 percent per year. Employment in the oil and gas sector is also expected to rise by approximately 10 percent per year on average over the next five years. We forecast that employment in the sector will rise from about 6,000 jobs in 2017 to nearly 10,000 jobs by 2023.

The developments surrounding permitting for the MVP and ACP pipeline projects may negatively impact our forecast for the natural gas industry. Construction halts on these two pipelines delays implementation of a combined 3.5 Bcf per day of outgoing pipeline capacity in the region. These pipeline delays may also affect regional natural gas prices and potentially production over the short term.

UTILITIES

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.

WEST VIRGINIA UTILITY TRENDS Coal-fired power generation held steady at about 30 percent of total US net generation in 2017, compared with about 31.5 per-

cent for natural gas (see Figure 3.9). Natural gas prices remain low compared with coal, as shown in (see Figure 3.10), indicating that natural gas will continue to offer a strong alternative source of fuel for power generation in the near term. The US Energy Information Administration predicts that coal’s market share will continue to fall over the next five years, and will constitute about 27 percent of total electricity generation by 2023. The EIA forecast shows that while natural gas will hold steady during this period, renewable energy will constitute a larger share of total power generation going forward.

Capacity utilization at West Virginia’s coal-fired power plants has been on a downward trend since 2008. As shown in (see Figure 3.11) the average capacity factor for coal-fired power plants in the state fell in 2017 to 0.49, meaning that they operated at 49 percent of potential capacity. This was down from 0.51 in 2016, and only about one percentage point above the low in 2015 when three power plants were retired in the state. Of potential concern for the state’s coal mining industry is the low utilization rate at coal plants outside West Virginia that are supplied by mines within the state. The average capacity factor for those plants fell to 0.44, the lowest rate recorded since the middle of the Great Recession in 2008.

One power plant particularly at risk for closure is the Pleasants Power Station in Pleasants County. FirstEnergy Solutions, which owns the plant, announced in February that it plans to close the plant by the end of the year after its bid to sell the power station to sister-company MonPower was rejected by the US Federal Energy Regulatory Commission. Approximately 190 workers are employed at the plant.

Permitting continues for three proposed natural gas power plants in Marshall, Brooke, and Harrison counties. In February, the West Virginia Public Service Commission approved a siting certificate for Brooke County Power to build an 830 megawatt natural gas plant in Brooke County. Moundsville Power has also received a siting certificate for its plant in Marshall County, while the plant in Harrison County is under review. Lastly, the 200-megawatt Kanawha River plant in Kanawha County was officially retired in December of 2017, after having been shut down two years earlier.

FEDERAL REGULATORY POLICY The Trump administration has announced two new initiatives in 2018 that have the potential to improve the finances of the state’s utilities. First, the Trump administration announced plans to implement emergency rules designed to prevent the closure of some nuclear and coal-fired power plants. Second, the US Environmental Protection Agency issued the Affordable Clean Energy (ACE) Rule, which replaces the Obama Administra-

tion’s Clean Power Plan and sets up less restrictive rules to reduce greenhouse gas emissions from the nation’s power plants.

In June, the Trump administration issued an order to the Department of Energy to prepare steps to prevent the retirements of “fuel-secure power facilities.” While the order was not specific about what action should be taken, news reports and leaked documents indicate that the DOE is considering requiring additional payments to coal and nuclear plants that are deemed vital to the resiliency of the electric grid when parts of the generating infrastructure is unavailable in an emergency, such as weather or potential attack. The order would affect primarily coal and nuclear power plants, which have fuel supplies that can be stockpiled on site. The memo justifies these extra resiliency payments under the DOE’s authority under the Federal Power Act that can issue emergency orders due to shortages of electric energy. As of this writing, the Energy Department has not issued any rules in support of the Trump administration’s order, and thus we have few details on how the program would work in the current electricity market.

On August 21, the EPA issued the ACE Rule, which is designed to comply with court-ordered requirements to regulate greenhouse gas emissions (GHGs) in the electric power sector. The rule replaces the Obama Administration’s Clean Power Plan, which took an expansive view of the EPA’s responsibility to reduce GHGs in the nation’s utilities. The Clean Power Plan set restrictions on CO2 emissions from power plants and allowed states flexibility in determining how those requirements should be met. Significantly, the CPP assumed states would reduce GHGs through a mass-based system, where total emissions would fall through a combination of efficiency gains and replacement of higher emission coal-fired power generation with low- and non-carbon producers, such as natural gas, renewables, and nuclear power. However, the CPP was challenged in court, with opponents — including West Virginia — arguing that the EPA had exceeded its authority by regulating emissions outside the confines of the power plants themselves. Because of the court challenges the CPP was never implemented.

The new ACE rule eliminates the broad-based requirements of the CPP in favor of more limited regulation of GHGs in electric power sector. The new rule has three primary principles. First, the ACE rule takes the approach that the EPA authority is limited to so-called “inside the fence” regulations. Thus, the ACE eliminates the CPP’s mass-based emissions targets in favor of improving efficiency at existing power plants through the use of upgrades at the plant level. Second, under the ACE rule, states would be the primary overseer of power plant regulations. States would be

required to develop plans for emissions reductions by defining a number of technological improvements on an individual plant level that would be designed to improve the heat rate of the plant, thus generating the same amount of energy with lower emissions. Lastly, the ACE rule relaxes regulations for new source review, which requires existing plants to be brought up to current environmental standards when they make significant upgrades to the plant. The ACE rule exempts certain upgrades from new source review, which would allow older plants to make upgrades without bringing the entire plant up to current environmental standards. The EPA's regulatory impact analysis of the new ACE standards finds that relative to the CPP, the new rule will reduce compliance costs for utilities, while increasing CO2 and other emissions from coal-fired power plants.

FORECAST Employment in the electric power sector in West Virginia grew by about 130 jobs in 2017, growing from 5,166 jobs to 5,299 jobs, a gain of 2.6 percent (see Figure 3.2). We forecast that utility-industry employment will decline somewhat over the next five years to end the period at about 5,040 jobs. This decline represents a loss of about 250 jobs in the sector, or about 1 percent per year on average. The combination of the emergency fuel-secure power facility order and ACE rule may materially affect our forecast for the utilities and coal sectors. However, we have few details on the emergency rule, and the ACE rule was issued too late to consider in our forecast.

MANUFACTURING IN WEST VIRGINIA

West Virginia's manufacturing sector has experienced a great deal of turbulence, both within just the past decade but also stretching back several decades. Nonetheless, manufacturing activity continues to play an important role in shaping the state's economic fortunes as it accounts for a substantial share of jobs and output in some regions of the state and also 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 several regions within West Virginia retain a sizable dependence on manufacturing activity as a handful of industries retain their historical relevance.

CHEMICALS The chemicals industry accounts for one-fifth of the manufacturing sector's jobs and more than 40 percent of the value of its total 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 during the second quarter of 2018.

More recently, the opening of the Procter & Gamble facility in Berkeley County did help to expand the industry's economic footprint in the state, as the plant produces Bounce fabric detergents and will eventually expand into other product lines later this year and in 2019. 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 with a market value of nearly \$1.6 billion exported abroad.

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 2017.

As is the case in most states, many West Virginia manufacturers are sensitive to the broader US business cycle, but the state also has a high exposure to manufacturing subsectors that are closely linked to very specific industries such as coal or housing. 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. 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. While the closure of some old sawmill operations in several parts of the state have weighed on the subsector overall, steady growth in new single-family home construction at the national level has helped to engineer solid gains in jobs and output for the subsector during the past five years.

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 in West Virginia's southern coal-producing region has fallen by such a large margin. The bounce back in southern West Virginia coal production in 2017 and 2018 has provided a bump in jobs and output, but both metrics remain 20 and 25 percent below their 2012 levels, respectively.

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 doubled their payrolls since 2010 thanks in large part to expansions at Toyota's Putnam County engine and transmission plant. Additions by Hino, NGK Spark Plugs, Allevard Sogefi and Gestamp have also bolstered the industry's

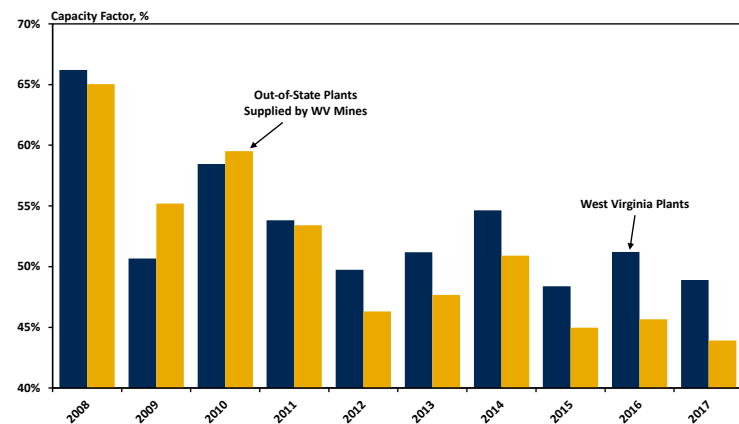
presence in recent years and enhanced the region's base of higher-wage manufacturing jobs. By comparison, the state's aerospace industry has experienced episodes of significant job losses over the past decade, but conditions have since stabilized and both Orbital and Pratt & Whitney have boosted payrolls moderately since mid-2016.

SECTOR OUTLOOK

When compared to the past 10 years, the forecast calls for West Virginia's manufacturing sector as a whole to face appreciably better conditions for the next five years. Overall, manufacturing employment is expected to rise at a pace of nearly 0.7 percent per year. Motor vehicles and parts production will remain West Virginia's fastest-growing segment of the manufacturing sector over the next five years, with a substantial of these gains coming from Hino Motors Manufacturing addition of a \$100 million truck assembly plant in the Parkersburg area that will add 250 jobs by mid-2020.

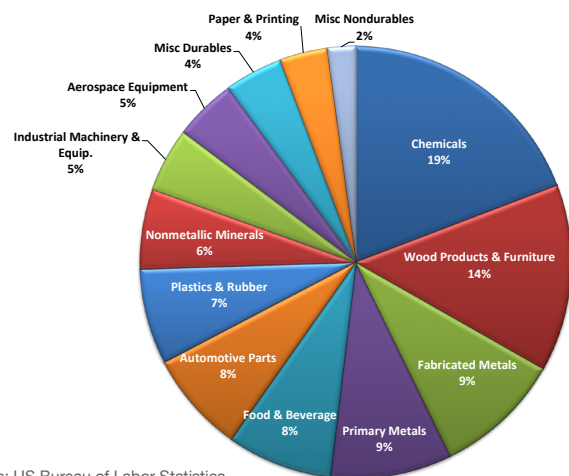
CHEMICALS GROWTH The chemicals subsector is expected to make the largest absolute contribution to the sector's growth over the next five years, but will also see the second-fastest rate of growth overall going forward. The largest contributor to the subsector's growth going forward will be two plants in the Eastern Panhandle. The first of these is the \$500 million P&G facility that opened earlier this year and is scheduled to expand production to other consumer product lines over the next couple years. In addition, insulation materials manufacturer ROXUL is expected to construct a new \$150 million facility in Jefferson County that will begin production by early-2020. These two projects are expected to yield a gross increase of nearly 1,000 jobs by the latter portion of the outlook period and could eventually result in larger gains as broader supply chains are developed over time.

FIGURE 3.11: Capacity Utilization for Coal Plants Supplied by West Virginia Mines



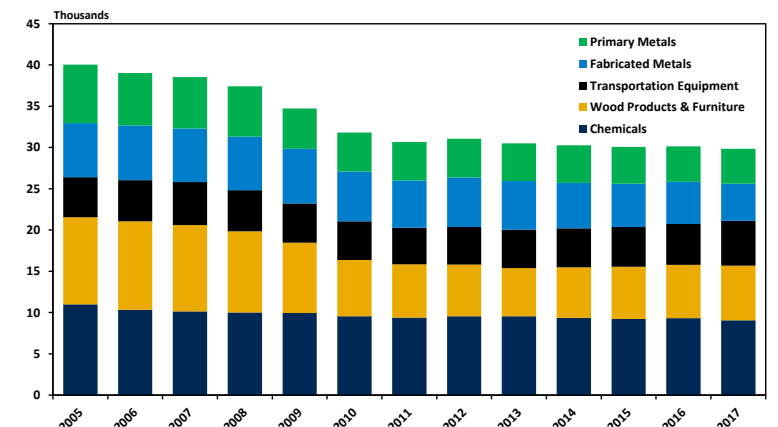
Source: US Energy Information Administration, Author Calculations

FIGURE 3.12: Share of Total Manufacturing Employment (2017)



Source: US Bureau of Labor Statistics

FIGURE 3.13: West Virginia Manufacturing Employment by Industry



Sources: US Bureau of Labor Statistics

Continued growth in natural gas exploration and development will provide stimulus to the chemicals subsector as well, particularly as downstream development efforts come closer to reality with the eventual completion of Shell's ethane cracker in Beaver County, PA, and the ongoing talks by PTT Global Chemical to build an ethane cracker plant of its own in Belmont County, Ohio. Moreover, the \$84 billion China Energy memorandum deal will only provide even greater upside potential for the state's chemicals manufacturers as funding at this level, even over its 20-year time horizon, would help with the development of a range of downstream manufacturing industries that create value added opportunities from natural gas resources.

WOOD PRODUCTS Wood products and furniture manufacturers are expected to enjoy a solid rate of growth, though most of the subsector's anticipated gains will likely be concentrated in the early portion of the outlook period, thanks in part to the addition of a new mill and whiskey barrel manufacturing facility in Greenbrier County. The US housing market recovery remains in place and should continue to create demand for raw lumber and finished products like cabinetry and flooring. However, some downside risks have emerged that could hinder gains going forward. First, disputes with Canada over the Softwood Lumber Agreement have created turmoil in US lumber markets, raising prices for framing lumber for new homes. In addition, with housing affordability already on the decline, a rising interest rate environment could make new home purchases even less affordable for first-time or subprime borrowers.

The fabricated metals industry is expected to see an average annual decline of 1 percent in employment over the next five years. While jobs and output will likely see moderate growth in 2018 and 2019 as the coal industry continues to benefit from healthy export demand,

the longer-term loss in coal production will weigh on the mine roof bolt manufacturers and machine shops during the rest of the outlook. Similarly, while moderate declines in output and employment are expected for manufacturers in the nonmetallic minerals subsector over outlook period as a whole, increased infrastructure spending via the state government's Roads to Prosperity program and federal highway funds will generate some growth over the next few years.

Just as with the other two segments of the manufacturing sector that are expected to lose jobs during the five-year forecast period, West Virginia's primary metals subsector will see moderate growth over the next couple of years before reverting back to a longer-term trend of job losses. Constellium's capacity additions at its Ravenswood plant for the Airbus contract will benefit the subsector. In addition, the Trump Administration's recent decision to impose higher tariffs on steel and aluminum from numerous countries has boosted hiring and production at less-efficient domestic manufacturers for now, while domestic producers are also garnering additional business from the substantial new oil and gas pipeline infrastructure activity occurring in several parts of the US.

PRODUCTIVITY Real output for the manufacturing sector as a whole is expected to rise at an average annual rate of 1.8 percent during the outlook period, which represents over twice the rate of job growth expected for the sector over the next five years. Productivity growth is expected to remain sluggish through early-2020 due in large part to job gains by P&G, ROXUL, Hino and others as these manufacturers open and/or expand operations in West Virginia. Even with these short-term weakness in average worker productivity growth, the average real value of output per manufacturing employee 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, West Virginia's construction sector has recorded a major rebound in activity since the beginning of 2017. Indeed, since slumping to its lowest level in more than two decades during the fourth quarter of 2016, the construction sector has added more than 4,500 workers (16 percent) and increased real wages by 37 percent.

Not surprisingly, most of this growth has occurred within the heavy and civil engineering subsector, which has recorded massive increases in activity over the past year or so due to natural gas pipeline construction activity throughout the state. Residential construction payrolls ticked higher in 2017 and gains continued through the first half of 2018 as the state's expanding

regions have supported an increase in homebuilding activity. Nonresidential construction has remained stable at a relatively low level over the past couple of years, with ongoing construction at the P&G facility in Berkeley County and commercial development in North-Central West Virginia representing most of the growing portion of nonresidential activity in the state.

Residential Construction

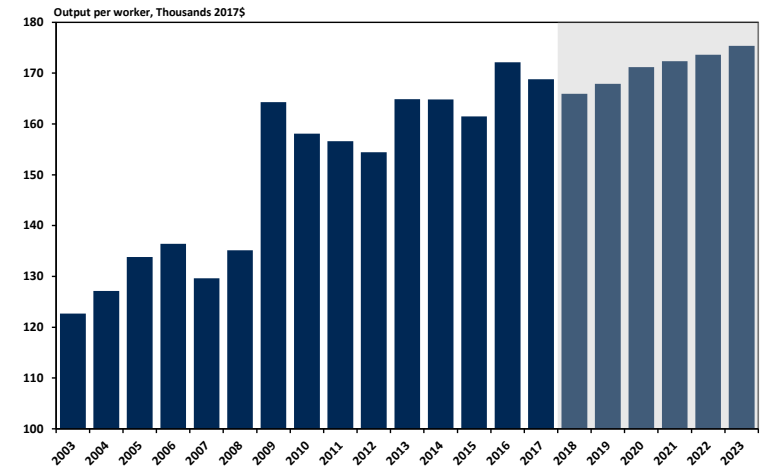
According to data from McGraw-Hill, nearly 2,300 single-family homes were started during 2017, representing a 10 percent increase over 2016. Despite some volatility, the pace of homebuilding has remained on an upward trend since early-2011. New home construction continued to increase into 2018, averaging more than 2,350 single-family units started on a seasonally adjusted annualized basis during the first six months of the year. The average rate observed through the first two quarters of 2018 is 6 percent ahead of its 2017 year-to-date pace and marks the best reading for new single-family housing starts since 2008. Building permits for single-family units indicate this pace should improve further over the remainder of the year. Multifamily construction activity is generally a smaller share of the overall residential market, primarily 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 student-related housing construction projects associated with WVU in Monongalia County.

Nonbuilding Construction Activity

After a significant lull in activity between 2012 and 2016, nonbuilding construction activity has surged in West Virginia over the past year or so. Indeed, an estimated \$6.3 billion worth of nonbuilding projects were started in the state during the last 12 months. Nonbuilding typically consists of infrastructure projects such as highways, bridges, and water/sewer systems, but also includes utility distribution systems such as natural gas pipelines. This latter category has accounted for virtually all of the growth the construction sector has posted, as the state has seen a flurry of natural gas pipeline occur over the past two year, but especially in the past year.

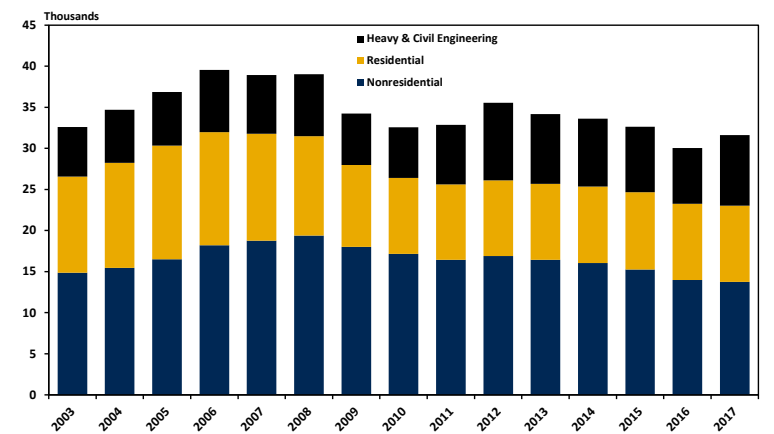
The Rover Pipeline project consists of three supply lateral pipelines that branch off of the main pipeline, two of which cross the Northern Panhandle and a third that begins in Doddridge County. This project is the closest to completion, but still has outstanding issues related to erosion controls that need to be addressed before the laterals can deliver natural gas. In addition to the Rover project, other major pipelines underway in West Virginia include the Atlantic Coast, Mountain Valley and Mountaineer XPress. The Atlantic Coast Pipeline is currently under a stop-work order for most segments of the entire length of the project, while the Mountain Valley was recently given approval to re-start

FIGURE 3.15: West Virginia Construction Employment by Type



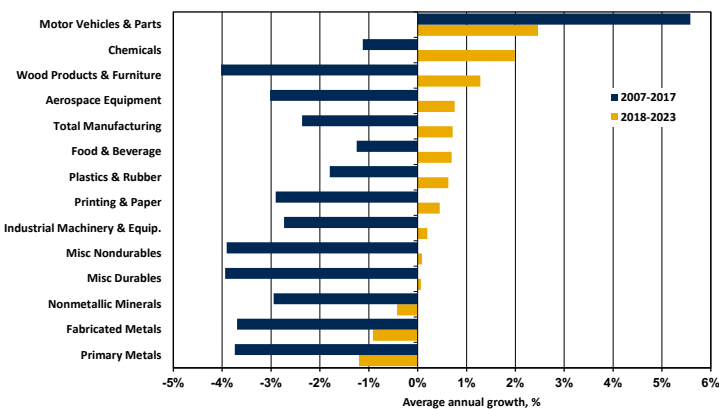
Source: US Bureau of Labor Statistics; Bureau of Economic Analysis; WVU BBER Econometric Model

FIGURE 3.16: West Virginia Single-Family Housing Starts



Source: US Bureau of Labor Statistics

FIGURE 3.14: West Virginia Manufacturing Industry Employment Growth Forecast



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

construction on most sections of the 304-mile project. Each of these projects involve the installation of several hundreds of miles of 36" and 42" pipe throughout West Virginia and extending into neighboring states. However, the projects require extensive work beyond the burying or raising of pipeline as tree clearing, excavation and a range of mandated erosion controls must occur before installation even begins and must be constantly monitored. Moreover, compressor station facilities that cost approximately \$100 million each must be built along the path of the pipeline at certain points to ensure sufficient pressure is available to move the gas. Altogether, these projects will require thousands of workers to complete and create a significant amount of additional economic activity along their construction paths over the next 4 to 6 quarters. These pipelines will also traverse many of West Virginia's most rural counties, many of which have experienced secular declines in their tax bases over time due to losses of their primary

industries and populations. The pipelines and compressor stations should provide a boost to local tax bases in these areas and help with funding public services. Also, the pipelines will alleviate the supply bottlenecks that have weighed on natural gas prices in the Appalachian Basin for many years and ensure more consistent pricing patterns compared to the national benchmark price.

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 far more muted when 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. Just as the declines were smaller, the gains have also been weaker

since housing markets began to recover in most parts of the country around mid-2012. Prices for existing single-family homes in West Virginia have rebounded by 15 percent compared to a 35 percent gain for the nation as a whole over the past 6 years.

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 bust located 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).

As house price appreciation has accelerated nationally, price growth has followed an appreciably different path for many of the state's largest markets. 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, Cumberland and Morgantown metro areas have seen the slowest price appreciation since mid-2015. Morgantown's slow rate of growth in house prices during the last three years reflects a slowdown in price gains, as the Mon-Preston area saw much larger increases in the preceding three-year period. Overall, house prices have increased at a relatively faster pace in West Virginia counties that are adjacent to high-growth areas such as Northern Virginia/MD/DC (Winchester, Hagerstown and Washington) or those seeing increases in property values as a result of the shale gas boom.

Sector Outlook

The forecast calls for the construction sector to see average annual growth of 1.1 percent through the end of 2023. However, growth is expected to be highly uneven during the outlook period. The timing for which work will re-start on the Atlantic Coast and Mountain Valley pipelines add a layer of uncertainty to growth for 2018 and 2019, but the forecast calls for payrolls to increase nearly 8 percent for calendar year 2018 and decline nearly 1 percent in 2019.

Although the P&G manufacturing facility and most of work related to the Atlantic Coast, Mountain Valley and Mountaineer XPress pipelines will likely be completed by the end of 2019, we do not anticipate any sharp declines in construction activity during the latter half of the outlook period. First of all, the natural gas industry's growth in the tri-state area will continue to advance and produce additional opportunities for new commercial and industrial activity, particularly as the Shell ethane cracker moves closer to completion. In addition, North-Central West Virginia will likely remain a key area for commercial construction developments, with the WestRidge Business Park, a new children's hospital at Ruby Memorial and a new building for the College of Business and Economics representing a few of the major projects slated for Monongalia County alone.

The Eastern Panhandle is also expected to be a key area for construction over the longer term, as the P&G facility and will 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 up 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. For the state as a whole, single-family housing starts are expected to increase.

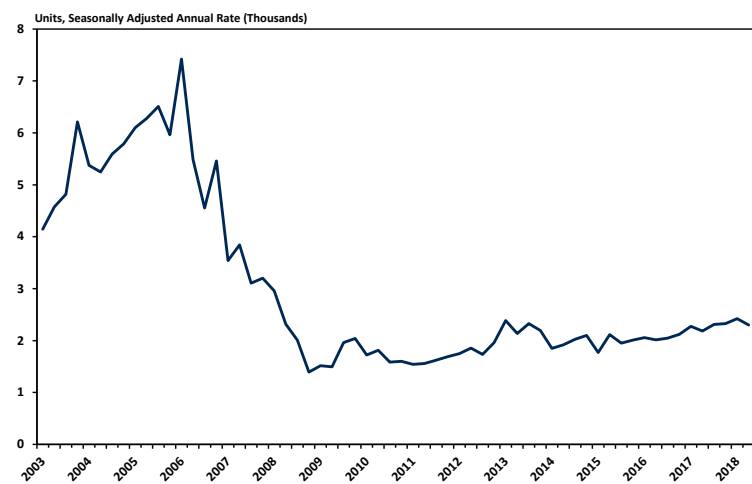
In terms of the residential construction activity, the forecast calls for single family housing starts are expected to increase at an average annual rate of more than 2 percent for the state as whole between 2019 and 2023. These gains will be centered in the state's strongest economic regions, such as the Eastern Panhandle and North-Central West Virginia, 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.

Public-sector infrastructure investment is an additional factor that should buoy construction activity during the early-2020s. The state's persistently-weak fiscal situation and uncertainty over federal funding kept many projects from moving past the proposal phase in recent years. However, the Justice Administration's Roads to Prosperity program, which will provide more than \$1.6 billion in bond-backed funds for a range of minor and major projects over the next few years, does allow for appreciable growth in infrastructure development across the state.

Downside risks do exist for the program and could jeopardize the extent to which infrastructure boosts overall construction activity. First of all, prices for steel products

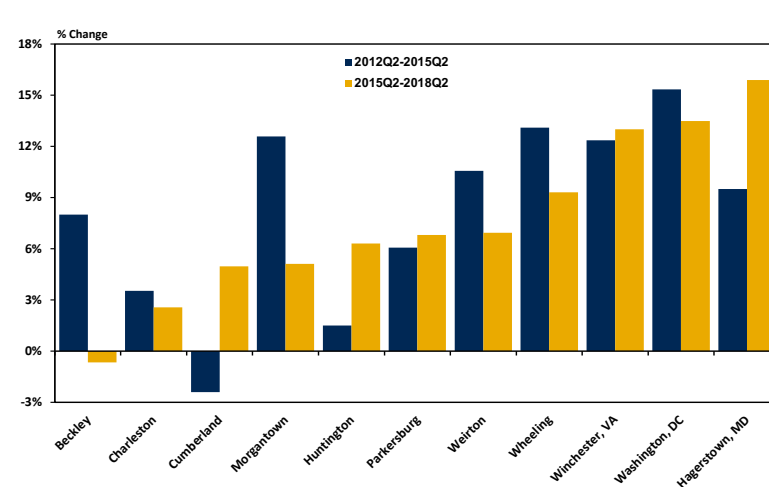
have increased sharply in 2018 as domestic demand for steel pipe from the oil and natural gas industries remains strong, both for drilling and distribution pipelines. In addition, the Trump Administration's passage of steel and aluminum tariffs from several major trading partners, along with their retaliatory tariffs on similar US-manufactured goods, has caused prices for the very metals necessary to build infrastructure to increase sharply. In addition to materials costs, labor cost inflation could prove to be significant during the next few years as the massive amounts of natural gas pipeline construction already occurring in the state, along with the Shell ethane cracker's construction, will likely bid up wages for higher-skilled construction trades occupations. Higher-than-expected bids have already emerged as a potential issue, with the lowest bid for a project on I-70 near Wheeling exceeding its projected cost estimate by more than \$100 million (60 percent).

FIGURE 3.17: West Virginia Single-Family Housing Starts



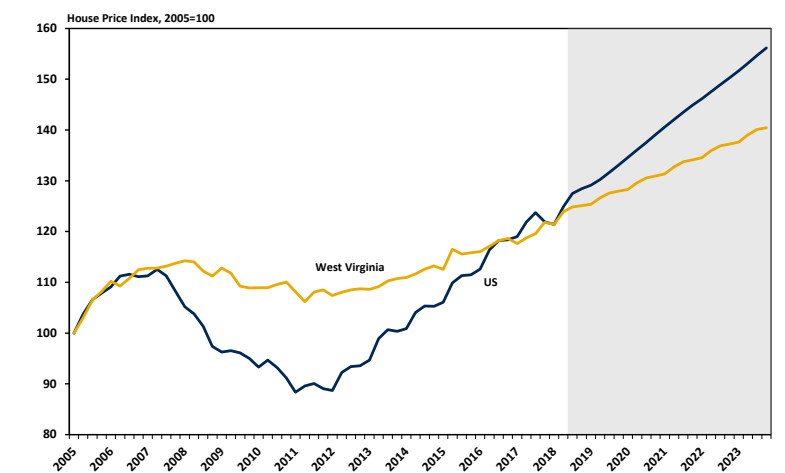
Source: McGraw-Hill Construction

FIGURE 3.18: Single-Family House Price Growth by Metro Area



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

FIGURE 3.19: Healthcare Sector Employment



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

7. 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>

8. This construction project is of particular importance to the authors and will be watched closely 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. Further, total state and local government spending in the state is equivalent to over 25 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.

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. Nineteen states have smaller state and local governments when measured by this metric. 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 equals more than 25 percent of state personal income, compared to the US average of 22 percent; indeed, only eight 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 33 percent of its overall government resources to education services, far 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 27 percent of their overall spending to this category, compared with a national average of 25 percent. West Virginia governments direct 9 percent of their expenditures to insurance trust expenditures for public employees, which is slightly below the national average of 10 percent. Further, governments in the state focus relatively heavily on transportation spending: in West Virginia 8 percent of total spending goes to transportation-related projects, compared to a national average of just under 6 percent.

EXPENDITURE GROWTH In Figure 4.4 we report the growth in state and local government expenditures per person in West Virginia over the past three decades. As illustrated, West Virginia governments have increased their aggregate size from around \$4,500 in total spending per capita in 1980 to nearly \$9,200 by 2014, in inflation adjusted terms. However, over the entire period West Virginia governments have remained below the national average in terms of spending per capita. Further, the degree to which West Virginia state and local government spending falls short of the national average has widened over the period.

OWN SOURCE REVENUE In Figure 4.5 we report state and local government own-source revenue per capita across the US states. Here West Virginia falls in the lower half of states based on this metric (20 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 4.6 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, 24 percent of total revenue received by West Virginia governments is a federal transfer, which is significantly higher than the national average of 17 percent. West Virginia governments are in alignment with most states in terms of their reliance on sales taxation: West Virginia governments derive 14 percent of their total revenues from sales taxation, which is almost exactly equal to the national average. Similarly, West Virginia governments derive 9 percent of their total revenues from individual income taxation, again, almost identical to the national average. In slight contrast, the reliance on the property tax in West Virginia — 8 percent of total revenues — falls short of the national average of over 13 percent.

STATE SHARE OF TOTAL SPENDING In Figure 4.7 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 sixth-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.

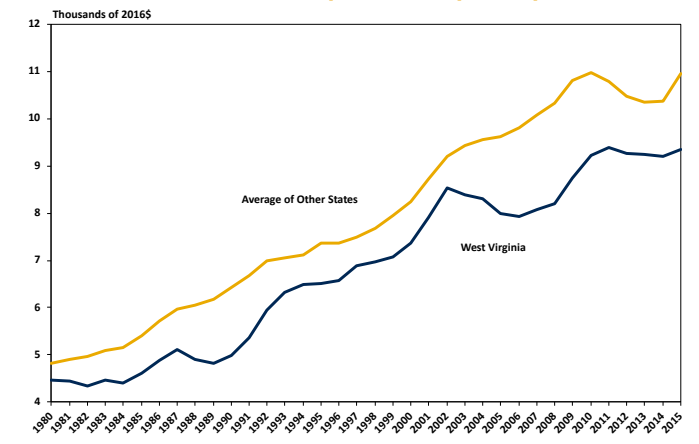
9. This percentage includes federal government employment in West Virginia, in addition to state and local government employment.

10. Census data on state government finances are for the 2015 fiscal year. Data for the 2016 fiscal year are not scheduled for release by the US Census Bureau until December of 2018.

PUBLIC ASSISTANCE IN WEST VIRGINIA

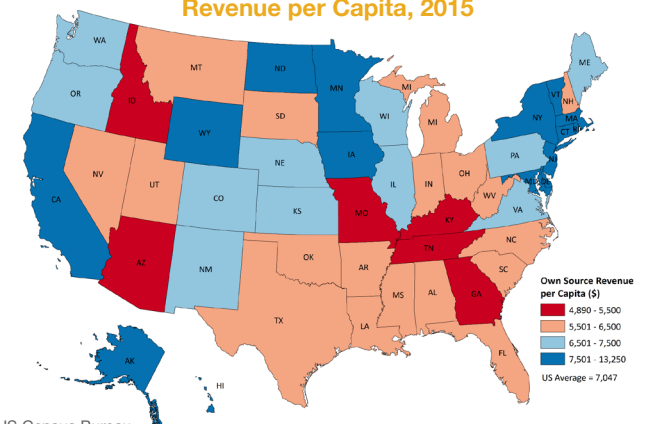
Total transfer payments made in West Virginia in 2015 amounted to more than 27 percent of personal income in the state, as depicted in Figure 4.8. That figure is higher than what has been observed over the past two decades or so, given recent economic suffering in the state. Further, transfer payments in West Virginia

FIGURE 4.4: Real State and Local Government Expenditures per Capita



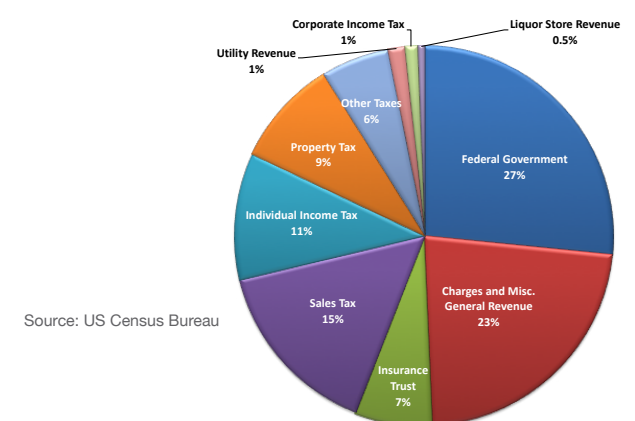
Source: US Census Bureau

FIGURE 4.5: State and Local Government Own Source Revenue per Capita, 2015



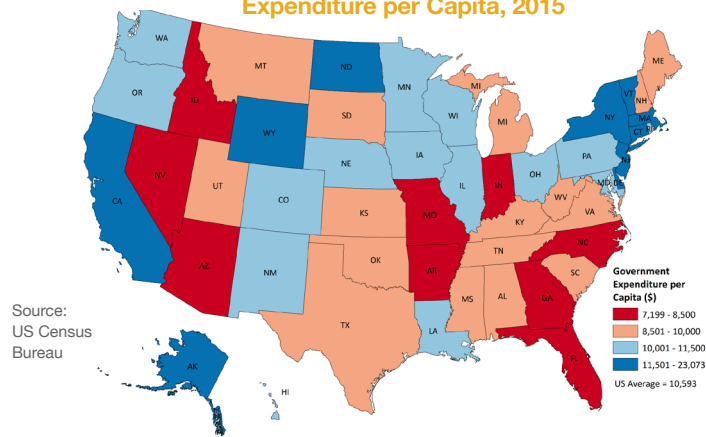
Source: US Census Bureau

FIGURE 4.6: West Virginia State and Local Government Revenue Composition, 2015



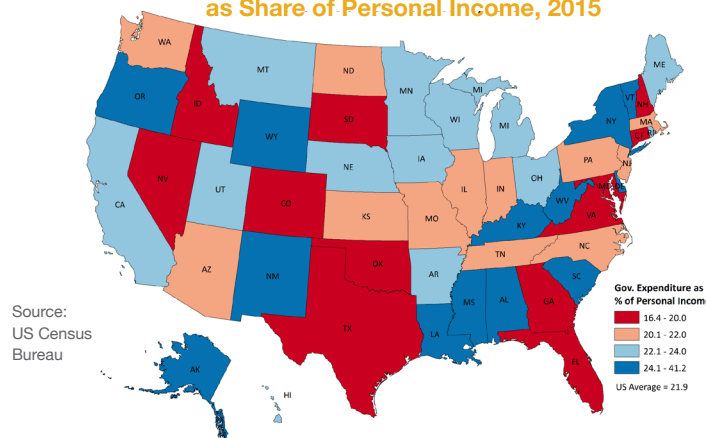
Source: US Census Bureau

FIGURE 4.1: State and Local Government Expenditure per Capita, 2015



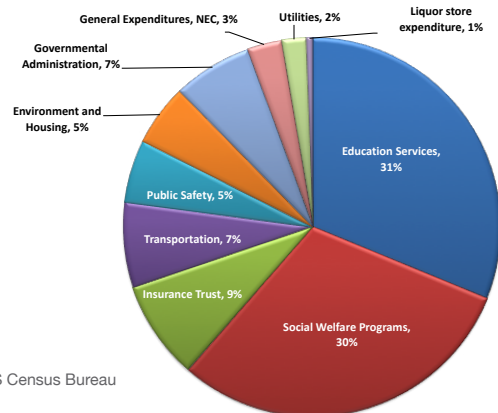
Source: US Census Bureau

FIGURE 4.2: State and Local Government Expenditure as Share of Personal Income, 2015



Source: US Census Bureau

FIGURE 4.3: West Virginia State and Local Government Expenditure Composition, 2015



Source: US Census Bureau

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 around 17 percent of personal income in 2015. Indeed, the 27 percent figure placed West Virginia highest among the 50 states in 2015 in terms of reliance on transfer payments.

In Figure 4.9 we disaggregate transfer payments into various broader categories. As illustrated, social security is by far the largest individual program, accounting for nearly 37 percent of total transfer payments made in West Virginia in 2015. Medicare and Medicaid came in second and third, accounting for around 23 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 less than three 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 various government retirement and disability programs, worker's compensation, family assistance programs, state unemployment insurance, and to a lesser degree, SNAP spending. Supplemental Security Income (SSI) spending has remained relatively constant over the period as a share of total transfer payments.

In Figure 4.10 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 4.11 and 4.12 illustrate the size of specific public assistance programs in West Virginia. In Figure 4.11, we report the number of individuals who receive benefits from specific public assistance programs in West Virginia. In Figure 4.12 we report the share of

the population receiving benefits from each program, and we offer a comparison to the national share. With 470 thousand recipients, Social Security benefits are enjoyed by the largest number of West Virginians, representing over one-fourth of the state's population. This figure is substantially higher than the corresponding figure at the national level of just under 19 percent, largely due to the state's older population.

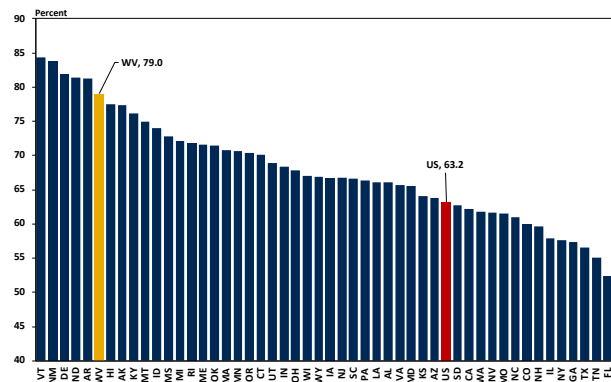
The SNAP program has the second-highest number of recipients at nearly 358 thousand, or about 20 percent of the state's population. This figure is also higher than the national figure of around 14 percent. Unemployment insurance benefits were received by 18 thousand individuals in the typical month in West Virginia in 2015, representing about one percent of the state's population, which is slightly higher than the national figure of about 0.7 percent. Income from the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) was received by 40 thousand West Virginians during the typical month in 2015. WIC is received by a smaller population share in West Virginia than the national average. Temporary Assistance to

Needy Families (TANF), was received by 15 thousand West Virginians during the typical month in 2015, which represents 0.8 percent of the state's population and is roughly equal to the proportion nationally.

Figures 4.13 and 4.14 examine the receipt of unemployment insurance benefits in West Virginia. As illustrated, the duration of unemployment insurance benefits fell significantly between 2009 and 2011, both nationally and in West Virginia. However, the figure rose again in West Virginia in 2013 and remains at an elevated level, due to worsening employment conditions in the state. For 2016, the average unemployment insurance recipient received benefits for just over 16 weeks, slightly longer than the comparable figure for the US of 15.5 weeks.

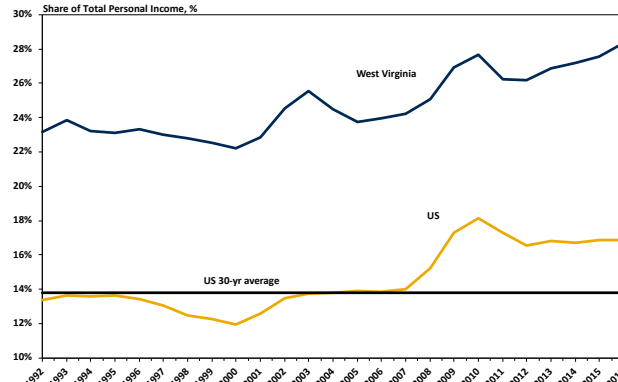
In Figure 4.14 we illustrate the average weekly unemployment insurance benefit amount. As illustrated, benefits have risen in nominal terms since 2001, except for a sharp drop during 2010-2011. Overall, the typical West Virginian who received unemployment insurance benefits during 2016 received around \$312 per week, compared to around \$342 per week nationally.

FIGURE 4.7: State Government Spending as a Share of Total State and Local Expenditures, 2015



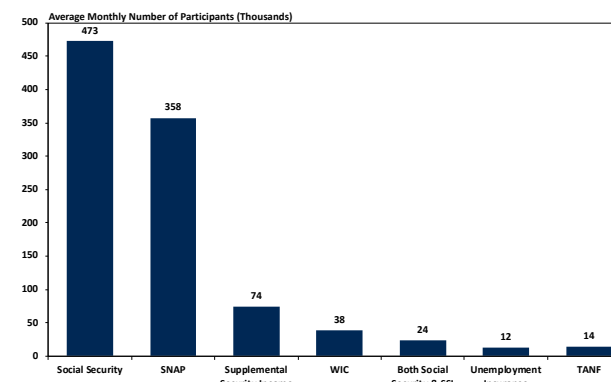
Source: State and Local Government Finances; US Census Bureau

FIGURE 4.8: Transfer Payments as a Share of Personal Income



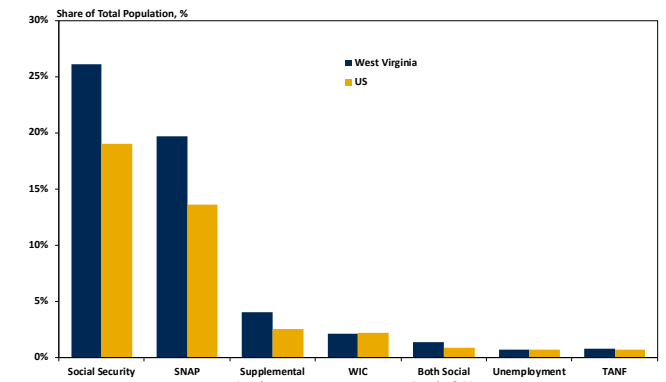
Source: US Bureau of Economic Analysis

FIGURE 4.11: Participation in Transfer Programs in West Virginia, 2015



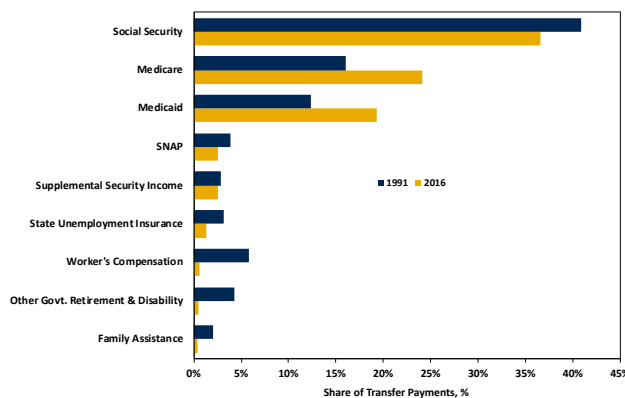
Sources: US Department of Labor; US Social Security Administration; US Department of Agriculture; US Department of Health and Human Services.

FIGURE 4.12: Participation Share in Transfer Programs, 2016



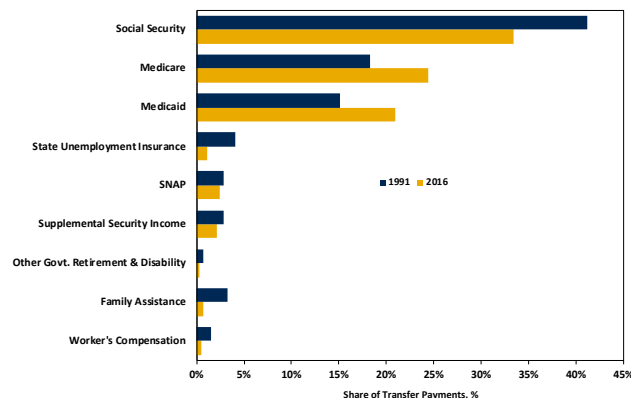
Source: US Department of Labor; US Social Security Administration; US Department of Agriculture; US Department of Health and Human Services.

FIGURE 4.9: Distribution of Transfer Payments by Program, West Virginia



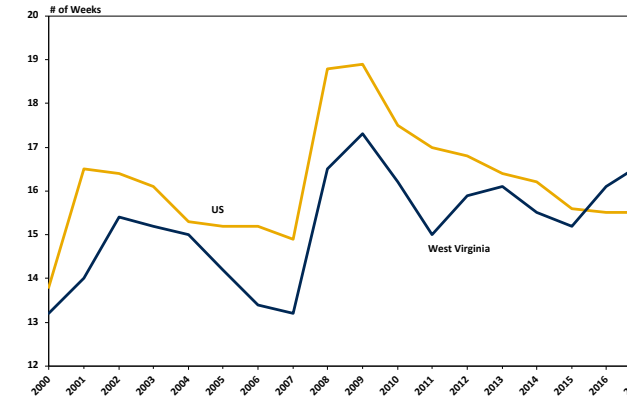
Source: US Bureau of Economic Analysis
Note: Select programs are reported in chart.

FIGURE 4.10: Distribution of Transfer Payments by Program, United States



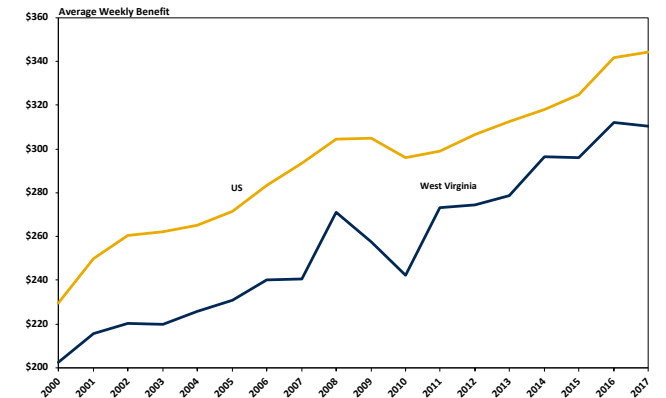
Source: US Bureau of Economic Analysis
Note: Select programs are reported in chart.

FIGURE 4.13: Average Weekly Duration Collecting Unemployment Insurance



Source: US Department of Labor

FIGURE 4.14: 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*

In 2017, the West Virginia economy rebounded from a prolonged period of decline with the initial spark of growth associated with a turnaround in foreign goods exports following a trough in late 2016. Non-manufacturing exports, mainly coal, grew from a 12-month trailing trend of just \$1.1 billion as of October 2016 to more than \$2.5 billion as of June 2017. Growth in coal exports contributed to a modest rebound in coal production and coal prices. In addition, oil and natural gas prices also began recovering from a sharp downturn in 2016. As a result, General Revenue Fund Severance Tax collections rose by 32 percent in Fiscal Year 2017. The additional Severance Tax revenues and revenue from Tobacco Products Tax rate increases were largely responsible for a 3.1 percent increase in General Revenue Fund collections following a prior year decline of 7.4 percent. However, the broader-based income and sales taxes failed to participate in the initial recovery during the second half of Fiscal Year 2017 as employment growth and wages remained relatively stagnant.

The West Virginia economic recovery expanded with some acceleration in tax collection growth

in Fiscal Year 2018. During the first half of the year, a 46 percent gain in Severance Tax collections led revenue growth due to improvements in energy prices and a rebound in coal production. The value of non-manufacturing goods exports, mainly coal, continued an upward trend with the 12-month trailing trend value rising from \$2.5 billion as of June 2017 to more than \$3.9 billion as of June 2018. Severance Tax collection growth slowed significantly during the second half of the year as markets stabilized. However, other tax sources picked up the slack as the breadth of economic growth spread beyond the mining sector to the construction, manufacturing and service sectors. Following several years of general stagnation, payroll employment reversed course and began rising in Fiscal Year 2018. Private sector employment growth began accelerating from 0.3 percent during the First Quarter to more than 1.0 percent during the second half of the year with gains in the areas of construction, mining, warehousing, transportation, professional services, health care services and leisure and hospitality.

A major contributing factor to the recent employment upswing is the current construction of several large-scale interstate natural gas pipeline projects in the region. These projects (along with enhanced public-sector highway expenditures and continued growth in foreign exports) are significant factors in recent economic expansion and tax collection growth. In addition, both the state and national economies benefited from the stimulus of federal tax reductions for most corporations and individuals associated with the enactment of federal tax reform at the end of Calendar Year 2017.

As a result, the cumulative fiscal year growth rate in Personal Income Tax collections accelerated from just 1.8 percent at the end of September to 6.1 percent by the end of June. The cumulative growth rate in wage and salary withholding tax collections accelerated from 4.5 percent at the end of September to 6.0 percent

by the end of June. The cumulative growth rate in Consumer Sales Tax collections accelerated from just 1.0 percent at the end of September to 2.7 percent by the end of June. The combination of conservative budgeting practices and continued improvement in economic activity contributed to a revenue collection surplus of \$20.2 million and a net budgetary surplus of more than \$36.1 million at the close of Fiscal Year 2018. Out of this budgetary surplus, nearly \$18.1 million was deposited in the Revenue Shortfall Reserve Fund and nearly \$13.8 million was appropriated by the Legislature in the Fiscal Year 2019 Budget Bill.

Fiscal Year 2018 General Revenue Fund collections totaled a record \$4.245 billion, an increase of 1.9 percent from the prior year. Discounting one-time revenues, net collections grew by 3.7 percent or \$125.3 million from the prior year. Personal Income Tax collections contributed the greatest share of net revenue growth with an additional \$111.7 million. Severance Tax collections rose by \$24.9 million and Consumer Sales Tax collections rose by \$24.7 million. Due largely to growth in foreign exports, State coal severance tax revenues were up 4.7 percent from the prior year. Natural gas severance tax collections and oil severance tax collections rose by 9.3 percent and 18.5 percent, respectively. The revenue growth associated with these major taxes was partially offset by a \$16.8 million decrease in Tobacco Products Tax collections and a \$6.2 million drop in Corporation Net Income Tax receipts. The decrease in Tobacco Products Tax collections was partially due to the inclusion of one-time floor stock tax collections in the prior year revenue totals.

The Legislature enacted Governor Justice's Roads to Prosperity Program effective at the beginning of Fiscal Year 2018, and the voters of the State overwhelmingly approved a Constitutional amendment in October 2017 to allow the State to issue up to \$1.6 billion in General Obligation (GO) Road Bonds over a period of

five years. As a result, state-sourced Road Fund revenues rose by 18.1 percent to a record \$848.1 million in Fiscal Year 2018. The additional \$130 million in funds were used for pay-go road construction and maintenance during the past year. The State successfully issued \$800 million in GO Road Bonds in May 2018 with the proceeds dedicated to a series of major road projects commencing in Fiscal Year 2019. Significant economic stimulus associated with the Roads to Prosperity Program began in Fiscal Year 2018 and should accelerate in Fiscal Year 2019 and Fiscal Year 2020.

The official Fiscal Year 2019 General Revenue estimate, developed in November 2017 and updated in March 2018, of nearly \$4.440 billion is nearly \$195 million above actual Fiscal Year 2018 General Revenue Fund collections of more than \$4.245 billion. In addition to General Revenues, the State budget relies on roughly \$424 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 2019. 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 economic momentum associated with higher employment growth, greater construction activity, stimulus from federal tax reform and stabilized energy markets is projected to carryover through Fiscal Year 2019. Significant concentrated investment in natural gas pipelines set to be completed by late 2018 or 2019 is a significant contributing factor to employment growth and income growth for the state in the early stages of Fiscal Year 2019. In addition to the benefits of direct investment by the pipeline companies themselves, both the natural gas industry and the State Treasury are also benefiting from slightly higher and more stable natural gas well-head prices associated with the added regional infrastructure. Current pricing trends suggest significantly less deviation for regional prices from national prices this year as compared with each of the past three years.

For example, the average August 2018 price at Dominion South is above \$2.50 per million BTU this year in comparison to less than \$1.70 per

million BTU last year. The November 2017 forecast incorporates average natural gas well-head prices of \$2.39 and \$2.64 per million BTU for Fiscal Year 2019 and Fiscal Year 2020, respectively. Barring any significant ill effects associated with potential trade disputes between the U.S. and other major trading partners, stable energy prices and an expanding international economy should result in relative stability for the coal industry and growth for the natural gas industry in the coming year. In the case of the coal industry, growth in foreign exports is currently offsetting decline in the domestic stream coal market. General Revenue Fund Severance Tax collections are expected to rise by 4.6 percent. Following a year of nearly 4.5 percent growth in the combined collections of the Personal Income Tax and Consumer Sales Tax due to moderate employment and income growth, combined General Revenue Fund Personal Income Tax and Consumer Sales Tax collections are expected to increase by roughly 5.0 percent in Fiscal Year 2019. As of the end of August 2017, year-to-date General Revenue Fund collections are \$106.4 million or 19.0 percent above prior year collections and more than \$65.8 million above estimate.

The base budget expenditures for Fiscal Year 2019 from General Revenues and Lottery revenues of \$4.881 billion are \$193.8 million higher than the base budget expenditures included in the Fiscal Year 2018 budget of \$4.687 billion. The Fiscal Year 2019 budget relies on roughly \$108 million in net one-time funding sources, an improvement over \$140 million in one-time funding sources in the original Fiscal Year 2018 budget. A sizeable portion of the one-time funds come from a larger than originally anticipated State matching share cash balance in the Medicaid Program along with the diversion of more than \$13 million in funds originally designated for deposit in the Old Workers' Compensation Debt Fund and an additional \$14 million from surplus Lottery funds. However, the net use of one-time funds is effectively reduced by more than one-third due to a Legislative decision to appropriate \$58 million less in the Fiscal Year 2019 Budget than the amount of the Governor's official revenue estimate.

In the Fiscal Year 2019 base budget, the largest funding increase

totaling more than half of the overall \$193.8 million increase was for salary increases for teachers, school service personnel, higher education and other State employees. Significant additional funds were also allocated to the Public Employees Insurance Program, child foster care improvements, other social service needs, and enhancements for the State Police. In addition to the benefit of growth in tax collections due to economic recovery, the State budget also benefited from higher-than-expected rates of return on its pension fund investments and an increase in its Federal Medicaid Assistance Percentage (FMAP). Due to a 15.8 percent return on investment in Fiscal Year 2017, the State was able to slightly reduce its appropriations to the unfunded portion of its retirement systems in the Fiscal Year 2019 Budget. Over a two-year period, West Virginia's FMAP rate increased from 71.80 percent in Federal Fiscal Year 2017 to 74.34 percent in Federal Fiscal Year 2019. The increase in federal matching share in Fiscal Year 2019 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 downturn. The increased FMAP effectively freed up roughly \$100 million in a single year for other purposes.

The basis of the current budget outlook for Fiscal Years 2019 and 2020 is a forecast of continuing growth in the state economy with steady future improvements in employment and wages. Payroll employment is expected to rise at an average annual rate ranging between 0.5 percent and 1.0 percent over the next two years. Wage and salary growth are expected to rise at annual growth rates of at least 4 percent. Natural gas prices are anticipated to generally stabilize around \$2.50 per million BTU with gradually slower growth rates in annual production for better long-term balance with demand. Growth in foreign exports should help stabilize overall coal sales in the short-term. However, the possibility of future foreign trade tariffs and a rise in the value of the dollar relative to various trading partner currencies both pose some risk to the outlook for both the coal mining and manufacturing sectors of the state. In addition, both the West Virginia electric power generation sector and steam coal suppliers continue to face the prospect of declining markets due to stiff competition from natural gas. Given that the recent upturn in the State's tax revenues is 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.

General Revenues are currently projected to grow at an average annual rate between 4.0 percent to 4.5 percent between Fiscal Year 2018 and Fiscal Year 2020. With the continuing aid of conservative budgeting practices, the state's recent reliance on significant one-time revenues for budget balance may come to an end as early as Fiscal Year 2020.

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 various regions and counties. As such, in this chapter we illustrate several key economic statistics performed during the past decade

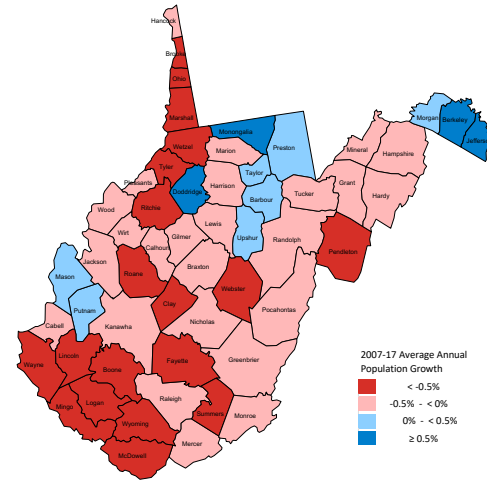
across each of the state's 55 counties and how these measures are expected to perform from a geographic perspective over the next five years.

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

the state, several 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

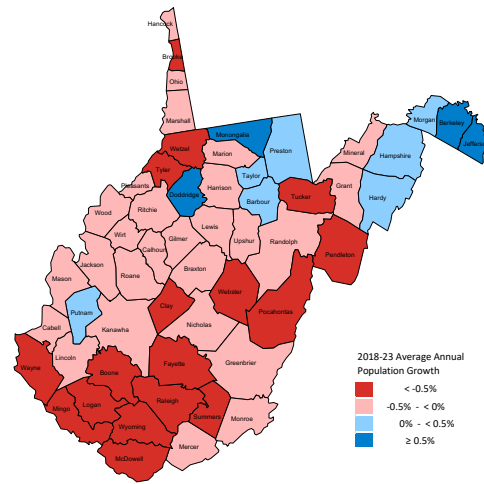
between 2018 and 2023 much less meaningful in terms of illustrating the underlying economic health of counties highlighted in gray.

FIGURE 5.1: Annual Population Growth, 2007-2017



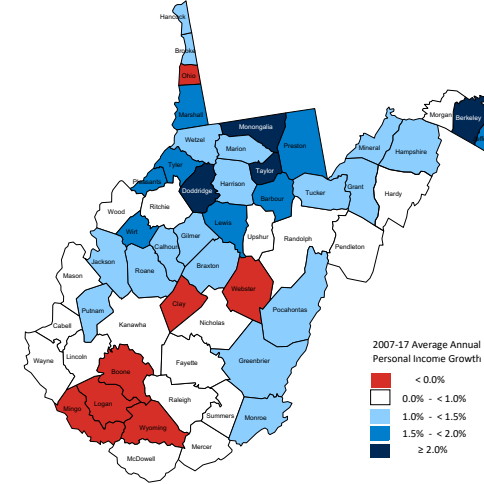
Source: US Census Bureau

FIGURE 5.2: Forecast Annual Population Growth, 2018-2023



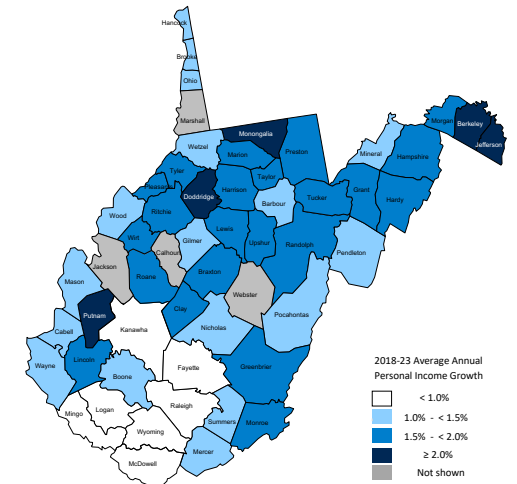
Source: WVU BBER County Econometric Model

FIGURE 5.5: Annual Real Personal Income Growth, 2007-2017



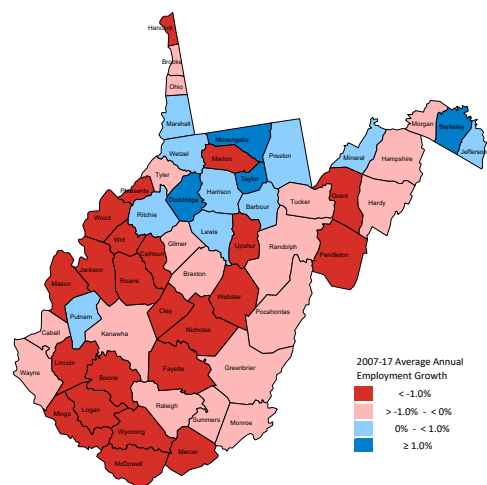
Source: Bureau of Economic Analysis

FIGURE 5.6: Forecast Real Personal Income Growth, 2018-2023



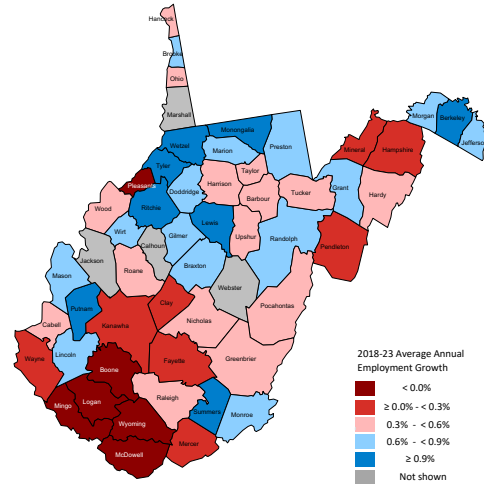
Source: WVU BBER County Econometric Model

FIGURE 5.3: Annual Employment Growth, 2007-2017



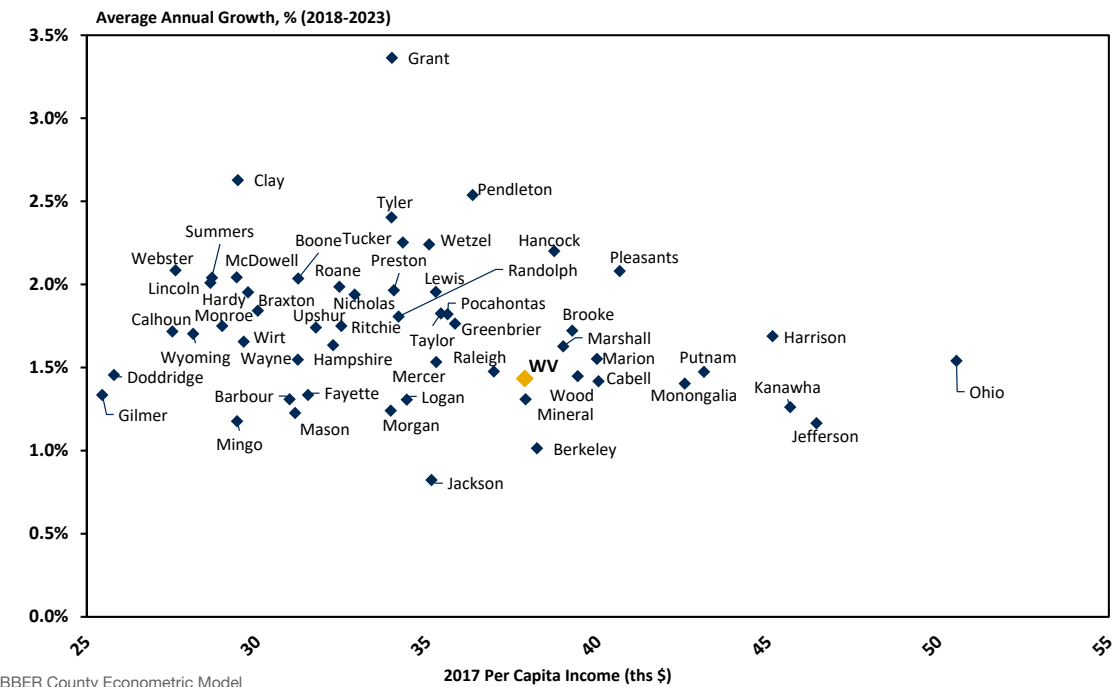
Source: US Bureau of Labor Statistics

FIGURE 5.4: Forecast Annual Employment Growth, 2018-2023

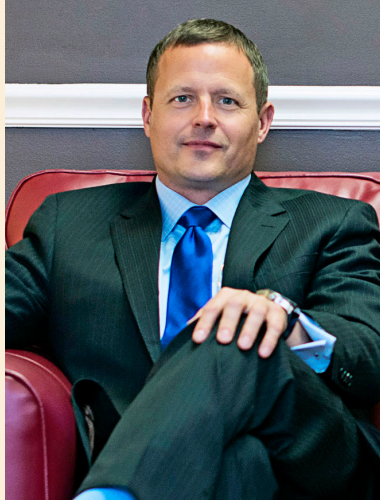


Sources: US Bureau of Labor Statistics; WVU BBER County Econometric Model

FIGURE 5.7: West Virginia County Real Per Capita Income



Source: WVU BBER County Econometric Model

GUEST INSIGHT:**Key Takeaways Learned from West Virginia Small Business Owners****JIM MATUGA***President, InnerAction Media*

For several years, I have quite frankly, grown weary of seeing West Virginia at the bottom of the “good lists” and at the top of the “bad lists” published annually in America — especially when it pertains to business and opportunity categories. I often wondered: What can be done to get the good news business stories out there to the rest of the country? As I talk with small and medium sized companies every day around the state, I thought: Maybe I can make a small difference in getting the positive word out there to not only our people, but to the rest of the country. My passion in life is helping companies thrive by effectively communicating a simple, clarified message to the right people. That is my calling and what I was born to do.

My belief is that the heart of West Virginia business and the future of our state is in the growth of small business and the unleashing of entrepreneurship opportunities.

That’s why Positively West Virginia (PWW) was born.

This new initiative launched January 2018 — Positively West Virginia. PWW was developed through InnerAction Media and is sponsored by The State Journal, United Bank, NCWV Media and Mylan. PWW features positive stories about West Virginia companies and their business leaders who are doing amazing things for the Mountain State. The goal of The Positively West Virginia Podcast is to educate and inspire business people and entrepreneurs across West Virginia and the USA that there really great things happening in West Virginia ... especially in the small and medium-sized business sectors.

The weekly podcast, which has published more than 35 episodes on iTunes since the beginning of 2018, has featured large corporations to small businesses and entrepreneurs who have something to share with others. The podcast’s (and print version of the stories) audience have learned many great lessons from this interview style podcast as all of the business owners are asked a series of questions that are most often pieces of advice.

Here are a few of the common threads we’ve found through the analysis of the show’s extensive content library so far:

What is the best thing about being in business in West Virginia? A common answer to this question, and we’ve heard this from many interviewees, “The people.” Many business owners mean the people they do business with, the quality of employees they have, people willing to help and the people who promote their company, product or service.

“I think the [best thing about doing business in West Virginia is] loyalty of clients and the work ethic of people in this state. They take pride in what they do,” said Chad Drainer, owner of Express Employment Professionals. “And, I’m able to provide these opportunities in my backyard.”

What was your worst business

moment? All business owners and entrepreneurs make mistakes. It’s how they and everyone else grows. The recurring answer we hear to this question is that an owner has made a mistake, and it broke down their core values, and it changed their lives and how they’ve done business.

What is one piece of advice you would give other business owners or entrepreneurs? When asking this question, business owners give a range of answers, including finding a mentor, contacting your local government agencies, learning how to be an effective leader, networking and leveraging those contacts, not expecting to grow rich overnight, engaging with your customers and maintaining your brand, and most importantly, valuing your employees and celebrating your company’s success.

Find a mentor. A mentor is someone who encourages you. A person who you can trust and bounce ideas off of. “There was a gentleman named David Curtis, a real estate broker and developer in Canaan Valley. He was introduced to me, and he said, ‘You would make a great sales agent,’” said Kim Landis, owner of Landis Realty, of the person who encouraged her to do what she does today.

Contact your local government agencies. Many business owners or entrepreneurs don’t take advantage of the local government agencies that can help their business, whether it’s for a small business loan or just resources. “There’s a lot of resources here that people probably don’t even realize,” said Becky Titchenal, owner of West Virginia Fruit and Berry.

These agencies include the Small Business Association (SBA), Emerging Leaders (through the SBA), Agriculture Business Development Division, WVU Extension and the Small Business Development Center (SBDC), also through the SBA.

The SBA offers free business counseling, business loans, home and business disaster

loans and federal government contracting. Through the SBA website, a business owner can plan, launch, manage and grow his or her business with the help of educational articles.

Emerging Leaders is a mini-MBA program designed to help established businesses gain momentum in revenue growth.

The Agriculture Business Development Division in the State Department of Agriculture promotes products grown in West Virginia to consumers. This division provides training and resources to business owners to help maximize their profit.

Entrepreneurs and business owners can also go to West Virginia’s Small Business Development Center to find training, confidential advising, advice and financial resources.

Learn how to be an effective leader. “Harness the power of your priorities, the power of your intentionality, and then leverage that

should meet someone, and you don’t believe this person knows anything or anyone that could help you with what you’re trying to do, still meet with them because it’s likely that they know the person you need to go talk to,” Masters said.

Think long term. After you’ve started a business, it’s not okay to just sit back and relax. You need to think about how you can grow your business. “I’m a details person,” said Nancy Bruns, co-owner of J.Q. Dickinson Salt Works. “I don’t let those important details slip by me. I want to make sure that we’re very consistent on our product and the face that we’re putting forward. You have to be consistent, and you have to be your best everyday.”

Don’t expect to grow rich overnight. “There’s no get rich quick scenario,” said Ray Sickles, owner of Gurkee’s Rope Sandals. “Look at what resources you have yourself.”

Engage with your customers,

Mckechnie, president of Mountain View Solar. “Understanding that your employees are valuable, and celebrating successes with them can boost employee advocacy. The first line of defense for word of mouth advertising.”

What is your long-term vision? On every podcast, each interviewee gets asked this question. The most common answer is to grow and support the people in West Virginia.

What are the five most popular books recommended on the podcast? “Total Money Makeover” by Dave Ramsey; “Rich Dad, Poor Dad” by Robert Kiyosaki; “Seeing the Big Picture” by Kevin Cope; “Holy Bible, A Framework for Understanding Poverty” by Ruby K. Payne; and “Spark: How to Lead Yourself and Others to Greater Success” by Angie Morgan.

Who are the five most popular people business owners would like to meet? Gordon Gee, Jim Justice, Woody Thrasher, Joe Manchin and Kent Leonhardt.

As Positively West Virginia continues on our journey to help share positive stories of companies and people doing amazing things all across the Mountain State, our hope is that we in some way inspire and educate people by sharing these wonderful success stories in West Virginia.

The Positively West Virginia Podcast is published every week on positivelywv.com/podcast and iTunes as well as a coordinating article published in print publications including The State Journal.

“My belief is that the heart of West Virginia business and the future of our state is in the growth of small business and the unleashing of entrepreneurship opportunities.”

power to control your calendar and the things you do with your time in order to be your best possible self,” said, Ed DeCosta, global speaker and executive coach for leadership, an acclaimed author and owner of Catalyst Associates.

Network, and learn how to leverage those contacts. “Build a strong networking system,” advised Jordon Masters, CEO and founder of Allegheny Genesis Holdings LLC and Micro Produce. “I probably wouldn’t have any of the stuff I have now. I wouldn’t have even gotten off the ground, gotten funding, if I didn’t know somebody who knew somebody.”

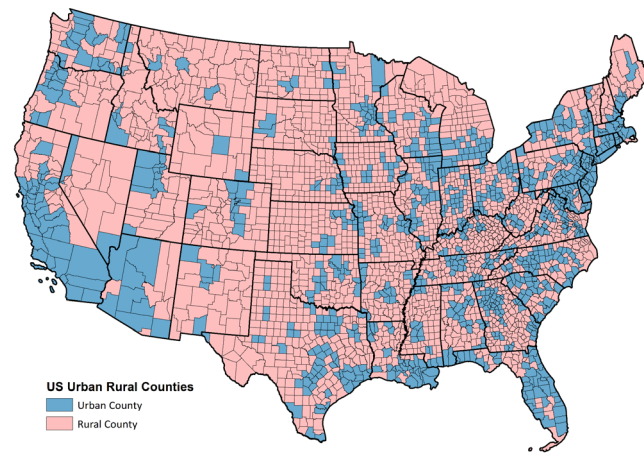
“If someone tells you that you

and maintain your brand. Brand recognition is important. To increase recognition, engage with your customers, whether that is responding to a complaint or answering a question. Leave them with an experience they won’t forget. “We’re committed to listening to our customers and our employees,” said Jim Hopkins, co-owner of Parkersburg Brewing Company.

Value your employees, and celebrate your company’s success. Employees are the backbone of a company. They make it work. “The biggest resource I have, the most expensive resource I have, and the one I value the most are our employees,” said Mike

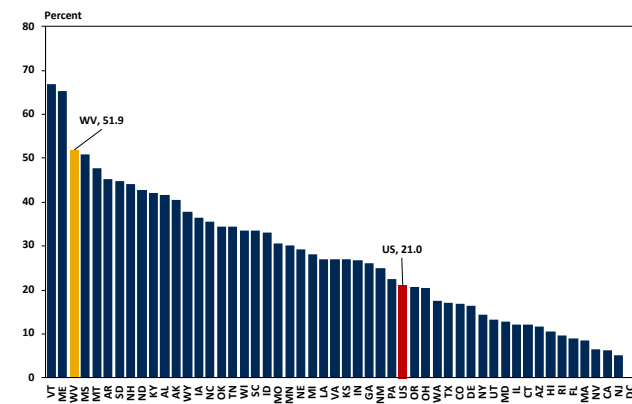
CHAPTER 6: Urban Versus Rural Economic Outcomes

FIGURE 6.1: Urban and Rural Counties



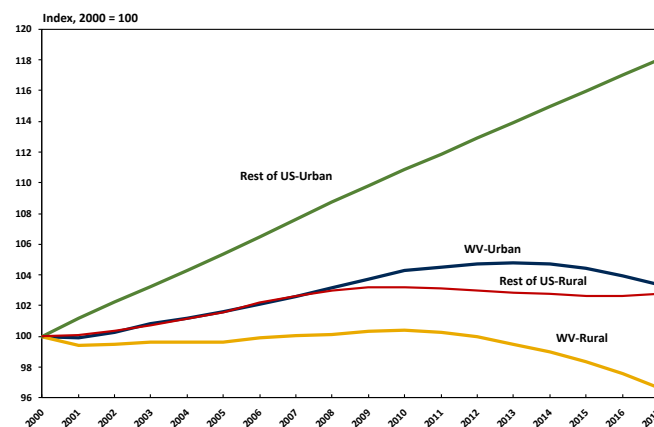
Source: US Census Bureau

FIGURE 6.2: Households Living in Rural Area by States, 2010



Source: 2010 Decennial Census, SF-1, US Census Bureau

FIGURE 6.3: Total Population



Sources: 2000-2010 Intercensal Estimates and 2017 Population Estimates, US Census Bureau

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.

In Figure 6.1, we report which counties are classified as urban versus rural across the continental US. There are several urban versus rural definitions available. We choose to classify a county as rural if it is not part of a metropolitan statistical area, according to the US Census Bureau, or if 90 percent or more of the households live in a rural area, also derived from Census data. In Figure 6.1, we report the share of all households in each state that lives in a rural area, based on the above definition. As reported, West Virginia comes in as the third-most-rural state in the nation. Nearly 52 percent of households in West Virginia live in a rural area, compared to 21 percent nationally.

POPULATION

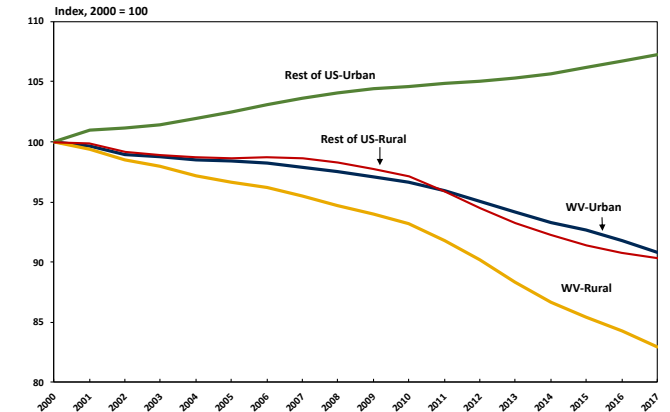
In the next few figures we examine how population movements have varied between urban and rural areas. All of the figures presented show trends for 1) Urban areas in West Virginia; 2) Rural areas in West Virginia; 3) Urban areas in the US excluding West Virginia; and 4) Rural areas in the US excluding West Virginia. In Figure 6.3 we illustrate the overall population change in the four areas since 2000. As reported, the urban US has grown by around 18 percent over the period. Urban West Virginia and the Rural US have both grown only slightly over the period. Rural West Virginia has declined by around three percent over the period.

In the next figure we examine population for the prime working-age population specifically (ages 25-54). Here we observe a similar pattern in which the Urban US has exhibited the highest rate of growth by far; the Rural US and Urban West Virginia have exhibited a similar pattern in terms of population change, each losing around 10 percent of its population; and Rural West Virginia has shown a sharp decline, falling by approximately 17 percent over the period.

In Figure 6.5 we illustrate the rate of natural population change for our four geographic groups. Natural population change is simply the difference between births and deaths, and therefore abstracts away from population movements that are driven by migration. Here we see a pattern of strong natural growth in the Urban US and very weak growth in the Rural US. West Virginia is experiencing natural population decline – where deaths outnumber births – and the effect is significantly more pronounced in the state’s rural areas.

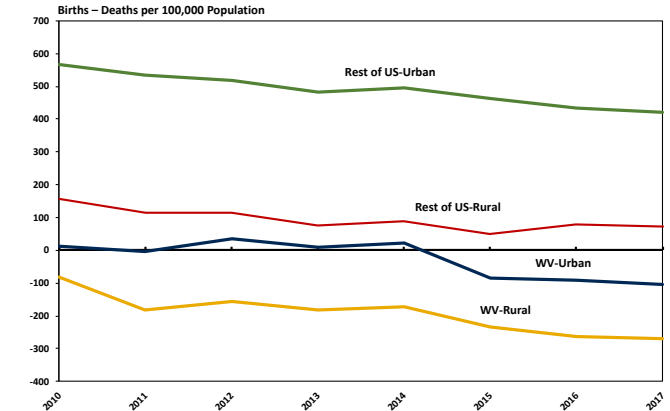
With Figure 6.6 we turn to the other component of population change – net migration. Similarly, we observe the fastest growth, by far, in the Urban US. While the Rural US has lost population between 2010 through 2016, the net migration figure turned slightly positive for 2017. Net migration has been negative for both regions of West Virginia, but the losses have been more severe in the state’s rural areas.

FIGURE 6.4: Population 25-54 Years Old



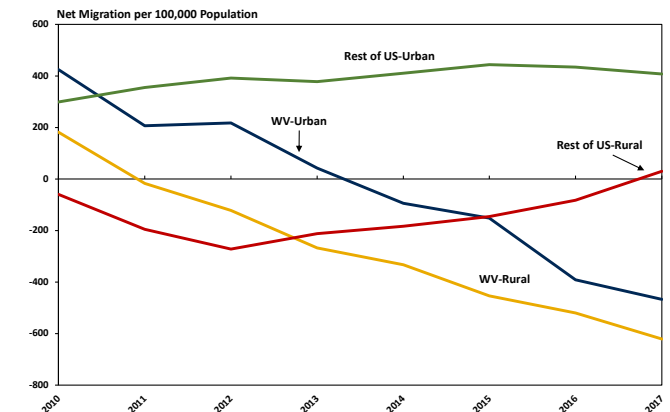
Source: 2000-2010 Intercensal Estimates and 2017 Population Estimates, US Census Bureau

FIGURE 6.5: Natural Population Change



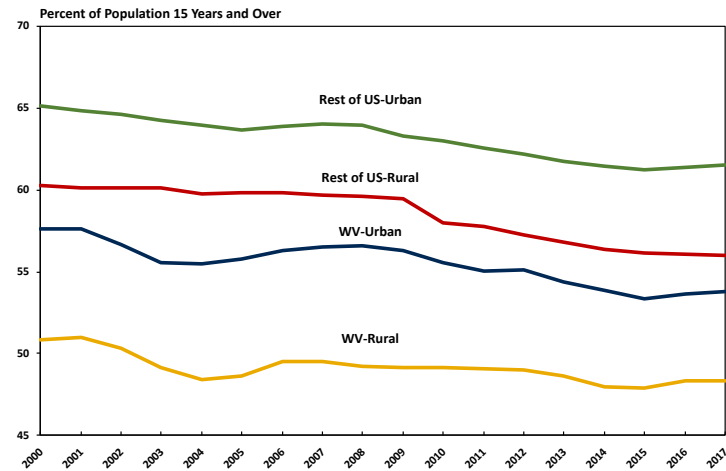
Source: 2017 Population Estimates, US Census Bureau

FIGURE 6.6: Net Migration



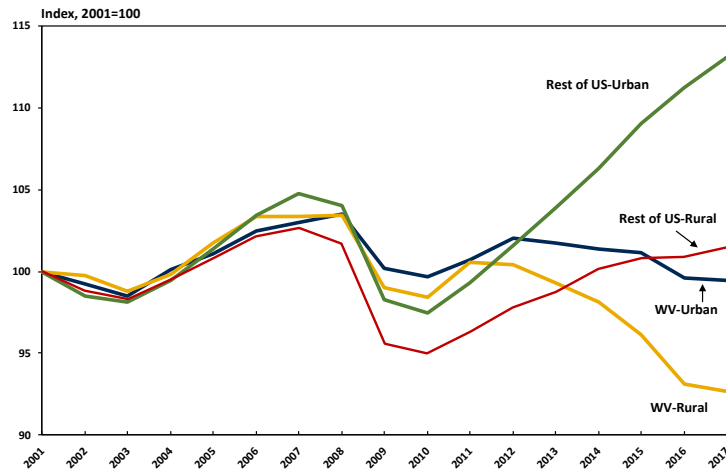
Source: 2017 Population Estimates, US Census Bureau

FIGURE 6.7: Labor Force Participation



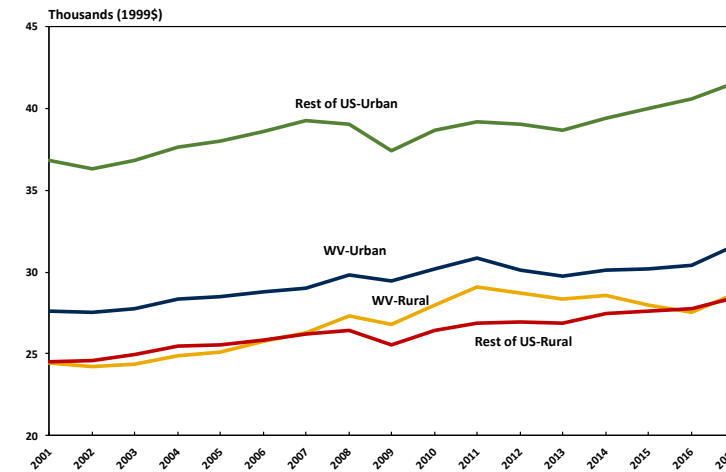
Source: Local Area Unemployment Statistics, US Bureau of Labor Statistics and Population Estimates, US Census Bureau
 Note: Labor Force Participation Rate (LFPR) is estimated as total labor force divided by population 15 years old and over

FIGURE 6.8: Total Private Sector Employment



Source: Quarterly Census Employment and Wages, US Bureau of Labor Statistics

FIGURE 6.9: Average Annual Wages



Source: Quarterly Census Employment and Wages, US Bureau of Labor Statistics
 Note: Wages are inflation adjusted, chained to December 1999 dollar.

LABOR MARKET AND EMPLOYMENT

Next we turn to labor market and employment outcomes. As illustrated in Figure 6.7, labor force participation is highest in the urban US at around 62 percent. Following a similar pattern to some of the above statistics, the rural US and urban West Virginia rank in the mid-range, at a rate in the mid- to upper- 50 percent range. Rural West Virginia posts the lowest rate of labor force participation, coming in at just under 50 percent. As discussed above, a low rate of labor force participation is a serious impediment to economic progress and it can place pressure on the public safety net.

In Figure 6.6 we illustrate total private-sector job growth for the four geographic areas. Interestingly, the four areas moved largely in conjunction through the early years of the period depicted. However, a significant divergence emerged during the Great Recession and during the economic recovery since. Overall, the urban US has exhibited the strongest growth by far, with cumulative private-sector job growth of around 13 percent from 2001 through 2017. While the rural US suffered the most during the Great Recession, employment for that area has made relatively strong gains during the recovery period is now nearly two percent above its 2001 level. Private-sector employment in urban West Virginia has been the most stable among the four areas and now stands within one-half-of-one percentage point from its 2001 level. Private-sector employment in rural West Virginia has fared the worst among the four areas and now stands at around 93 percent of its 2001 level.

We close our examination of urban-rural differences with a quick examination of wages. As illustrated in Figure 6.7, wages tend to be much higher for the urban US. Wages for rural areas – in West Virginia or otherwise – are much lower.

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2018 ECONOMIC OUTLOOK CONFERENCES

★ WHEELING

OCTOBER 23, 2018

Wheeling Area Economic
Outlook Conference

7:30am, Wheeling Island
Hotel-Casino-Racetrack

★ FAIRMONT

NOVEMBER 13, 2018

North Central Economic
Outlook Conference

8:00am, Robert H. Mollohan
Research Center

★ MARTINSBURG

NOVEMBER 14, 2018

Eastern Panhandle Economic
Outlook Conference

8:00am, Holiday Inn

OCTOBER 3, 2018

WV Economic Outlook Conference

7:30am, Embassy Suites

★ CHARLESTON

★ BECKLEY

OCTOBER 10, 2018

New River Gorge Area Economic Outlook Conference

8:30am, Black Knight Country Club

Presented by the West
Virginia University Bureau of
Business and Economic Research

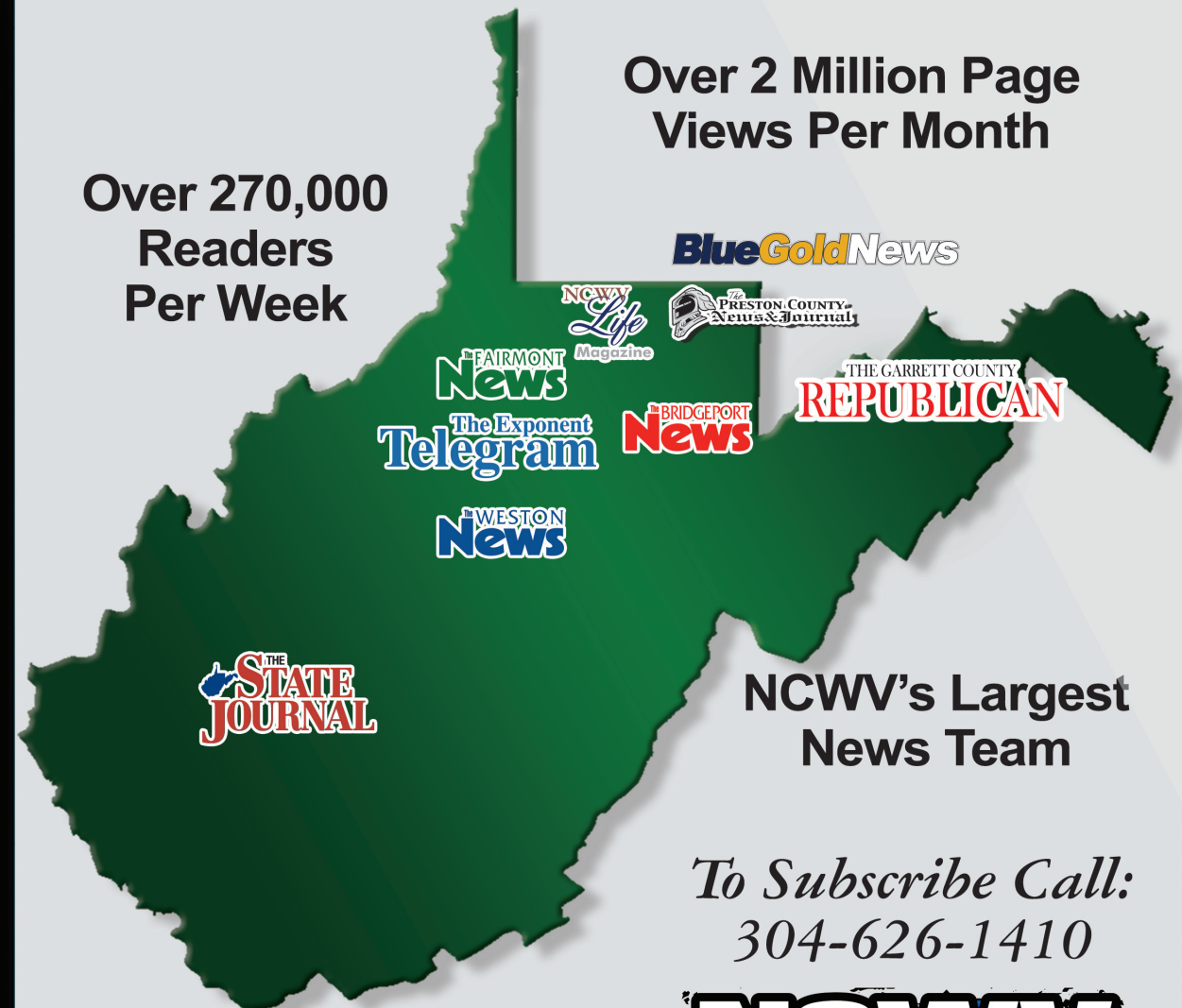
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