

An Overview of Coal and the Economy in Appalachia

Fourth Quarter 2020 Update

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Executive Summary

This report details major trends in coal production in the Appalachian Region over roughly the past fourteen years. Highlights of this research are as follows:

COAL PRODUCTION

- **OVERALL COAL PRODUCTION DECLINE:** The COVID-19 pandemic in 2020 weighed down on the already declining coal production across the US. Coal production fell by more than 65 percent overall in Appalachia between 2005 and 2020. This loss is significantly higher than the rate of decline in the nation of around 54 percent.
- **DRIVERS OF NATIONAL DROP IN COAL DEMAND:** Losses in coal production stem from a perfect storm of two major national factors that have depressed demand for coal: Significant reductions in the cost of natural gas - a competitor fuel to coal in the electric power industry - due to greatly enhance productive capacity and a regulatory environment that increased the cost of burning coal for electric power generators. The COVID-19 pandemic and overall volatility in international demand in recent years have also contributed to significant swings in production.
- **CONCENTRATION OF COAL PRODUCTION LOSSES:** Losses in coal production are heavily concentrated in the Central Appalachian Coal Basin, primary southern West Virginia and eastern Kentucky. This concentration of losses can be traced to low coal mine worker productivity in the region. After aggressive mining in Central Appalachia for more than a century, the remaining coal is more expensive to extract, compared to other coal basins, because it tends to be deeper in the ground and/or seams tend to be thinner.
- **COAL PRODUCTION FORECAST:** Our forecast calls for continued erosion in coal output in Appalachia over the long run. This results largely from the fact that natural gas and other fuels are expected to continue to account for a growing share of electricity generation domestically and many countries abroad. However, assuming that the COVID-19 pandemic wanes in 2021, we expect production losses to be much more gradual over the coming 20 years compared with what was observed over the past decade or so. We expect future losses to be most severe in Central Appalachia.

EMPLOYMENT and UNEMPLOYMENT

- **COAL INDUSTRY EMPLOYMENT and EMPLOYMENT DIVERSIFICATION:** Coal industry employment fell by around 54 percent between 2005 and 2020. These losses were concentrated in Central Appalachia. Further, the counties with the highest dependence on the coal industry tended to be rural counties in Central Appalachia. Overall, many of the counties that had the greatest dependence on the coal industry suffered the greatest losses in coal production and employment.
- **TOTAL PRIVATE SECTOR EMPLOYMENT:** Total private-sector employment in Appalachian coal-mining counties has been generally flat over the past decade. Further, total private-sector employment in the mining counties in Central Appalachia has fallen substantially in recent years. These facts provide evidence that the decline in coal, coupled with heavy reliance on coal in some counties, has led to broader negative spillover effects to regional economies. Total private-sector employment dropped substantially in 2020 in not only coal mining counties but also everywhere in the nation.

- **UNEMPLOYMENT:** Unemployment is higher in Appalachian mining counties, compared with non-mining counties in Appalachia and the rest of the U.S., but not by a great margin. All three areas have shown tremendous improvement in unemployment in recent years.

POPULATION, LABOR FORCE, and POPULATION AGE DISTRIBUTION

- **POPULATION AND LABOR FORCE:** Total population has fallen by over five percent in the coal mining counties of Central Appalachia in recent years, perhaps partly as a result of the decline in the coal industry. Although the overall population loss has been relatively modest, the drop has been especially pronounced in the prime working age population in the mining counties of Appalachia. The labor force has declined substantially in the coal mining counties of Central Appalachia.
- **POPULATION AGE DISTRIBUTION:** Partially as a result of the loss in prime working age residents, coal mining counties in Appalachia have experienced noticeable increases in share of individuals who are of retirement age.

INCOME and POVERTY

- **WAGES AND SALARY INCOME:** Wages and salary income per job tends to be higher in the mining counties of Appalachia, compared to non-mining Appalachian counties, likely the result, in part, of high wages in the coal industry. Wage and salary income tends to be lower in the coal mining counties of Central Appalachia, compared to Appalachia's other coal producing regions.
- **POVERTY:** Poverty has declined in both the mining and non-mining counties of Appalachia in recent years, but remains significantly higher than the nation. Central Appalachia tends to have the highest poverty rates within Appalachia by far.

EDUCATION and HEALTH

- **EDUCATION:** Although weak education outcomes represent a significant economic development challenge in Appalachia generally, the data do not reveal that the attainment of a bachelor's degree differs noticeably between the mining and non-mining counties of Appalachia. Rates of college attainment are by far the lowest in the coal producing counties of Central Appalachia, compared to counties in Appalachia's other coal producing regions.
- **HEALTH:** Poor health outcomes represent another significant economic development challenge in Appalachia. The data reveal that overall mortality rates are significantly higher in the mining counties of Appalachia compared to other counties. Further, mortality is highest in the mining counties of Central Appalachia, having increased noticeably in recent years.

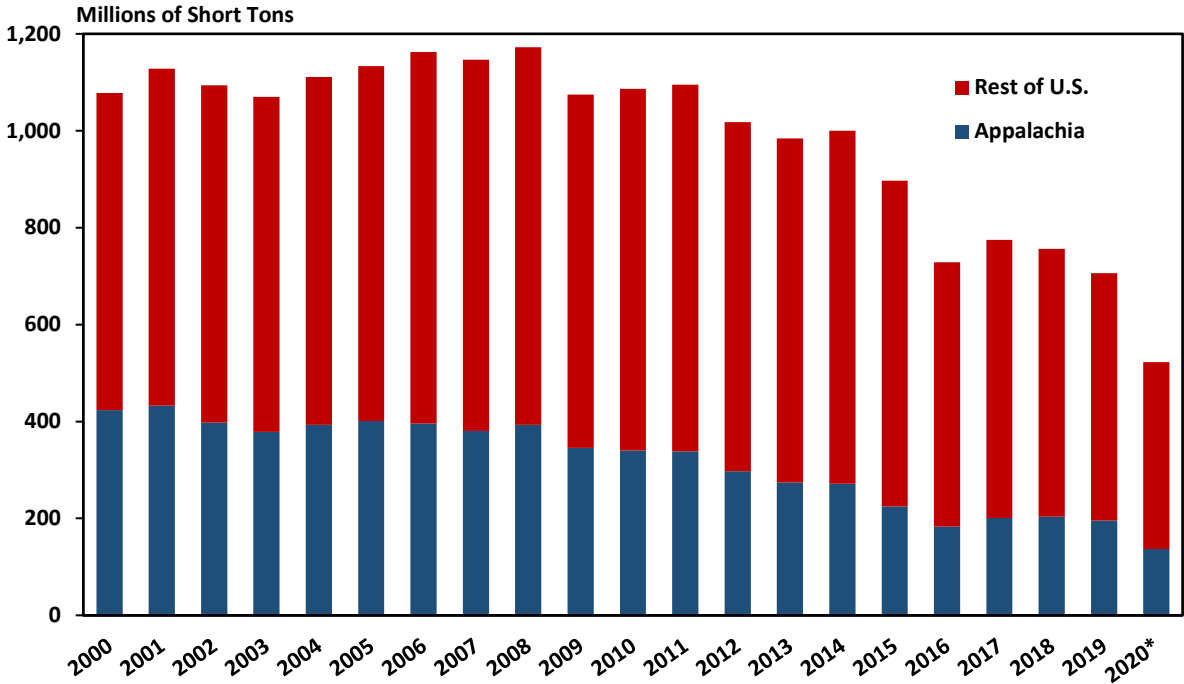
Chapter I: Coal Production in Appalachia

This report is an update of the previous report. In this report, we incorporate more recent data on coal production and employment that cover the periods through the third quarter of 2020 (for quarterly data series) or November 2020 (for monthly data series). Not all updated data cover 2020. For instance, the most recent data on demographic characteristics including population, wage and salary, education, poverty, and mortality still cover only the full year of 2019. Finally, in this report we update the coal production forecast.

Recent Trends in Coal Production

The coal industry in the United States and in Appalachia has undergone a severe downturn over the last decade as demand for coal has fallen across the United States. The COVID-2020 pandemic weighed down on the production even more. Between 2005 and 2020, coal production in the United States fell from about 1.1 billion short tons to an estimated 522 million short tons, a drop of about 610 million short tons or about 54 percent. The majority of this decline came in Appalachia, where coal production dropped by 264 million short tons, a drop of more than 65 percent (see figure 1).

Figure 1: Coal Mining Production, Appalachia and the Rest of United States



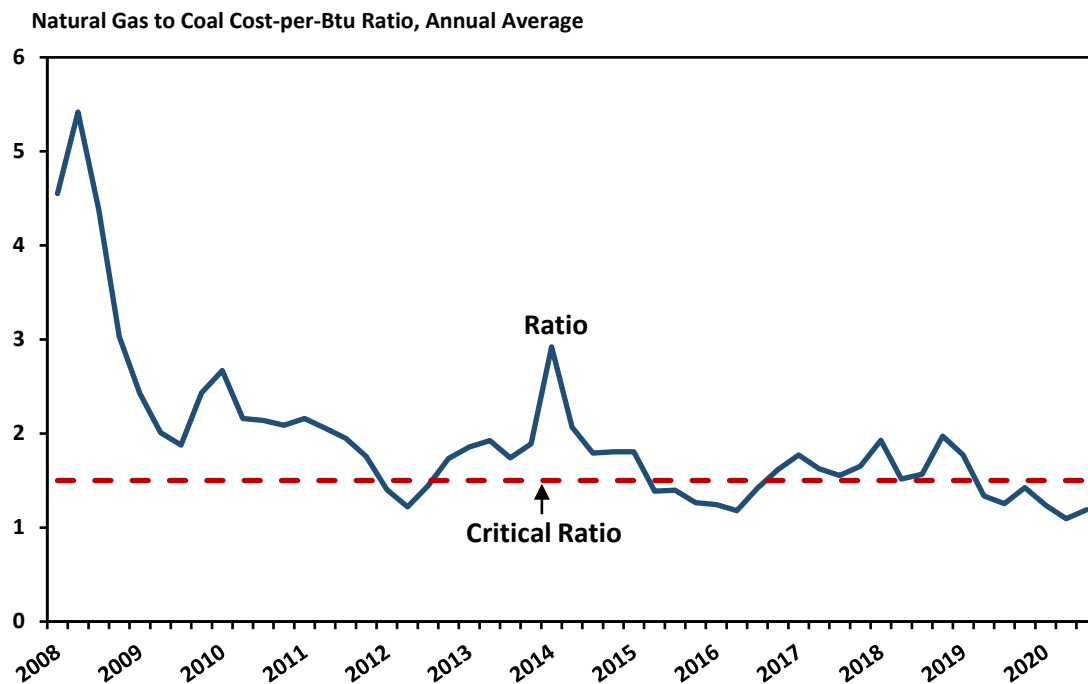
Source: U.S. Mine Safety and Health Administration (MSHA)
 Note: * = The 2020 production is estimated based on the annualized growth of the total coal production in the first 3 quarters of 2020.

NATURAL GAS PRICES: A major contributing factor to the fall in coal demand has been the decline of natural gas prices in the electric power sector, which constitutes the largest source of domestic

demand for coal. The price of natural gas—a competitor fuel to coal for electric power generation—has fallen significantly in recent years due to a surge in the nation’s productive capacity of natural gas. The widespread use of horizontal drilling and hydraulic fracturing techniques in shale formations, such as the Marcellus and Utica, has led to a dramatic increase in natural gas production—to the point that the US is now a net exporter of natural gas.

As a result of these natural gas production increases, the ratio of natural gas prices to coal prices for electricity generation has fallen significantly since 2008, as shown in figure 2. In that year, natural gas cost about five times as much as coal, but that ratio fell to around 1.2 in 2020, which is already below 1.5, a level found to be where natural gas competes effectively with coal (Lego and Deskins, 2018).

Figure 2: Ratio of the Cost of Fuel for Electricity Generation between Natural Gas and Coal



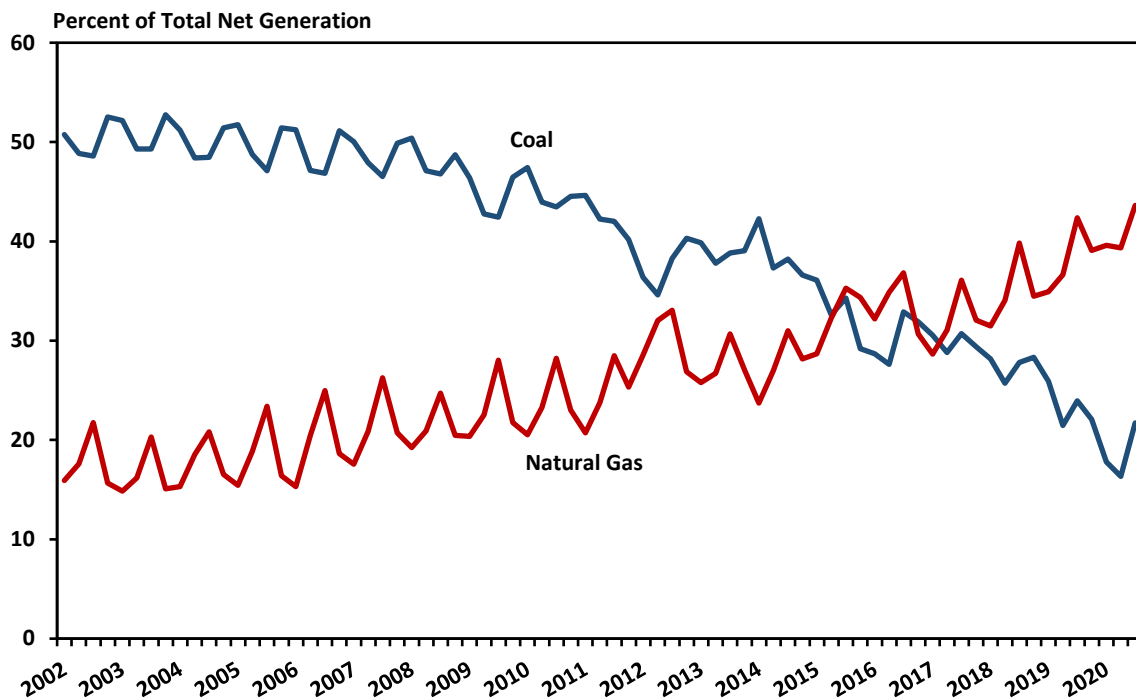
Source: U.S. Energy Information Administration
Note: Quarterly data.

ENVIRONMENTAL REGULATIONS: While natural gas prices provide the most important factor in declining coal demand in the electric power sector, the federal environmental regulatory climate has also increased the cost of burning coal through a series of regulations. In particular, the Mercury and Air Toxics Standards (MATS) Rule, which was implemented in April 2015, rendered some older, high-emission plants unprofitable to operate. Estimates by Beasley et al. (2013) indicate that the MATS rules were expected to contribute to the retirement of about four gigawatts of coal-fired electric generating capacity, constituting about 22 percent of the 17GW of retirements forecast by the authors at the time. Coal retirements between 2013 and 2015 totaled nearly 28GW, the majority of which—16.5GW—came in 2015 when the MATS rules required compliance. Coal capacity retirements continued over the

next four years, with another 44.6 GW of coal capacity retired between 2016 and 2019. More than 14 GW of coal capacity was retired in each of the years 2018 and 2019. Preliminary data show that approximately 5.6 GW was retired in the first two quarters of 2019.

From the perspective of electric power generators, these two dynamics have increased the relative cost of burning coal while decreasing the relative cost of burning natural gas. As a result, the share of national electric power generation derived from coal has fallen significantly while the share derived from natural gas has increased correspondingly, as illustrated in figure 3.

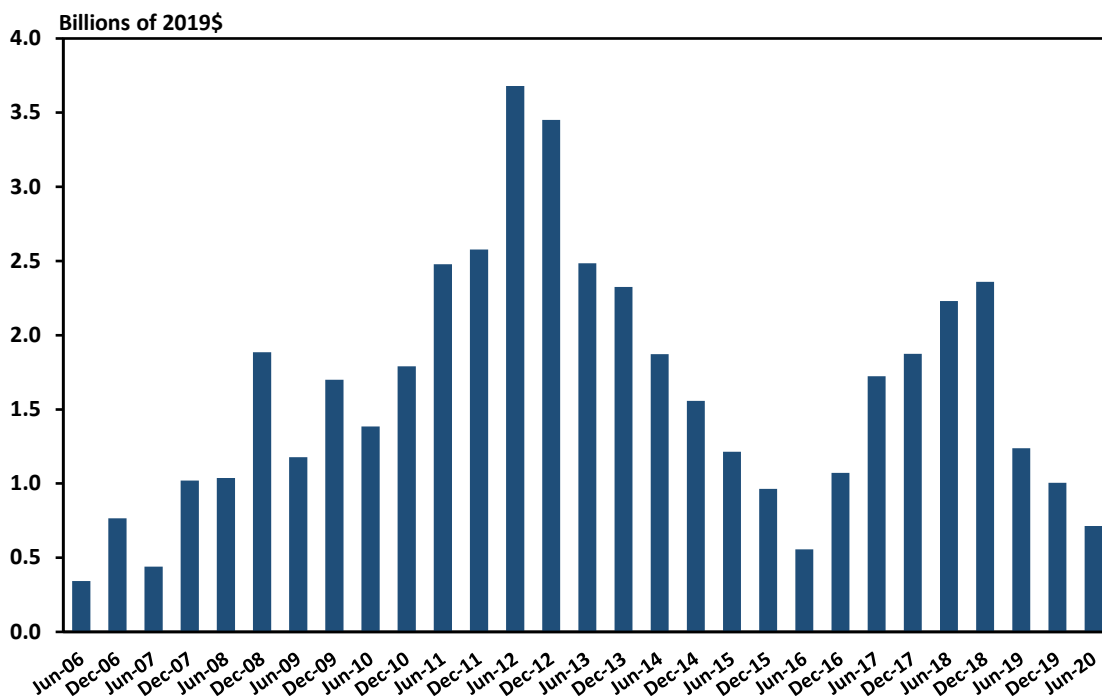
Figure 3: Share of U.S. Electricity Generation from Coal and Natural Gas



Source: U.S. Energy Information Administration (EIA)
Note: Quarterly data.

EXPORTS: In addition to the issues associated with natural gas and the environmental regulatory climate, international demand for US coal exports has been very volatile in recent years.¹ Coal exports from West Virginia, for instance, fell from approximately \$7.9 billion (in 2019\$) in 2012 to \$1.4 billion in 2016, as shown in figure 4, and thus contributed to overall declines. Coal exports did improve significantly after that and reached \$4.5 billion in 2018, but dropped again to \$2.2 billion in 2019. Exports are inherently volatile due to the vast number of factors that influence worldwide demand for coal. For example, a major flood event for the Australian state of Queensland during 2010-2011 shut in a large share of the nation’s thermal and coking coal production for many months. Demand from the Asia-Pacific region that would have traditionally been met by Australia—along with a few other major producing countries in Asia—was temporarily replaced in part by output from Central Appalachian mines (which includes Southern West Virginia). Additionally, the COVID-19 pandemic year that forced economic lockdown in the world market likely lower the demand for coal as well. Through the first half of 2020, West Virginia’s total coal export was more than \$700 million. This was more than \$500 million or more than 42 percent lower than total production through the first half of 2019.

Figure 4: West Virginia Coal Exports

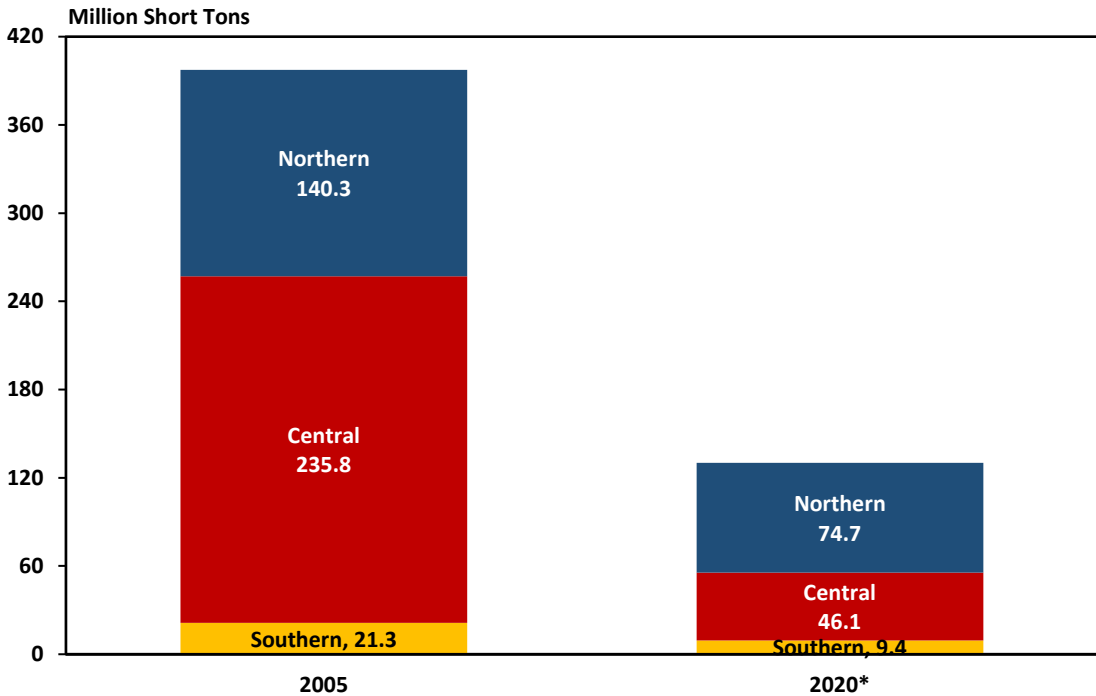


Source: US Department of Commerce TradeStats

¹ For a more thorough discussion of these issues, see Lego and Deskins (2018).

PRODUCTION BY REGION: Upon examining coal production losses more closely across the three major basins within the Appalachian Region, the three regions combined saw coal production dropped from 397 million short tons to 130 million short tons between 2005 and 2020², a drop of more than 65 percent. The Central Appalachia Coal Basin has endured the largest drop-off in output over the past decade by a large margin. As illustrated in figure 5, the Central Appalachian Basin saw coal output plunge by 80 percent, compared to a 56 percent decline for the southern Appalachian Basin and a decline of 47 percent for the Northern Appalachian Basin. Indeed, whereas Northern Appalachian mines produced only a fraction of what was produced in Central Appalachia in 2005, Northern Appalachian mines now exceed Central Appalachian production by around two-third.

Figure 5: Coal Production, Appalachian Coal Producing Regions

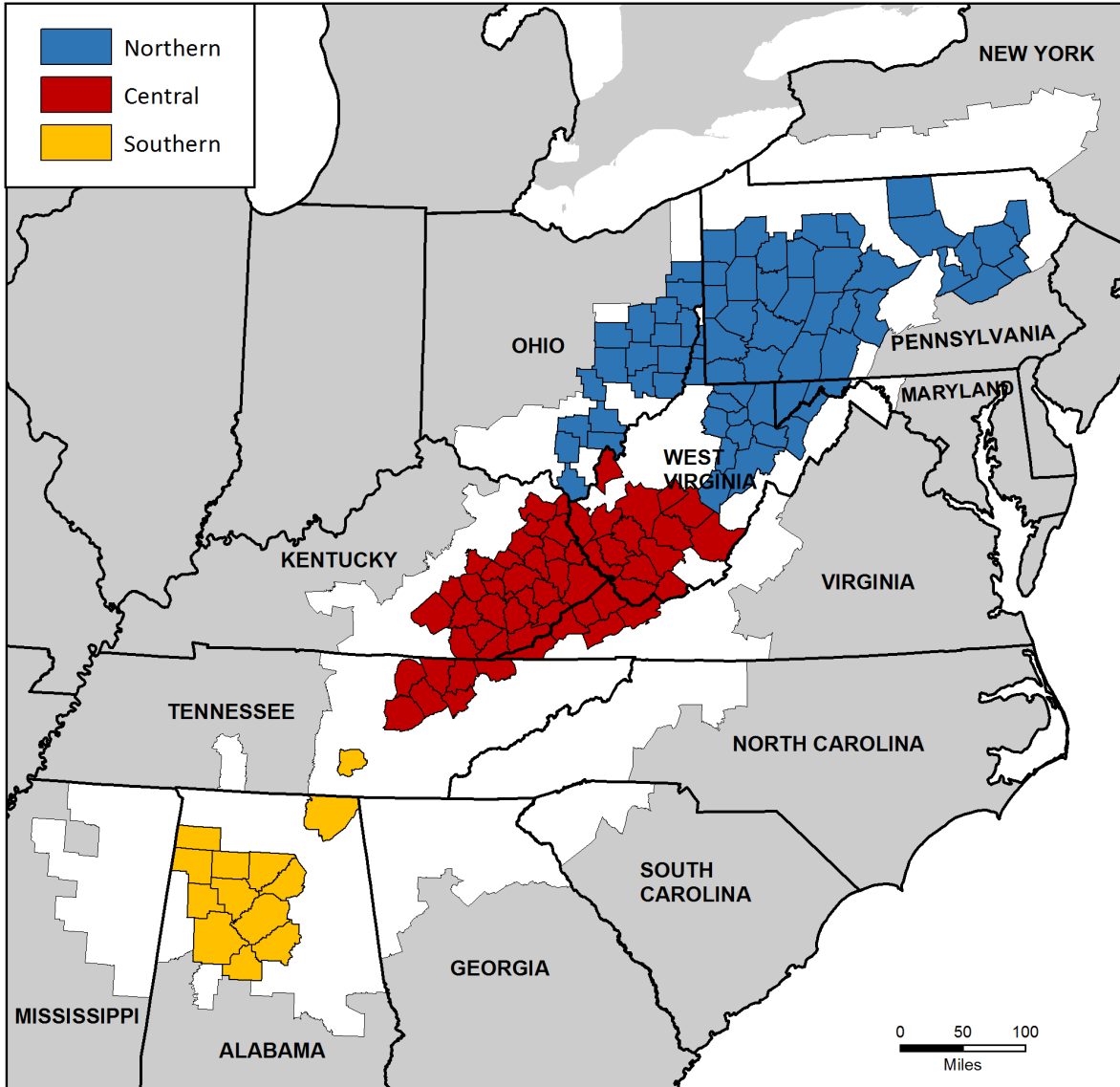


Source: U.S. Mine Safety and Health Administration

Note: * = 2020 production is estimated based on the annualized growth rate of the total production in the first 3 quarters of 2020. Appalachian coal-producing regions include only Appalachian coal-mining counties, defined as those that, based on MSHA data, have non-zero coal production or more than 10 coal-mining jobs in any year between 2005 and 2020.

² The 2020 production is estimated based on the annualized growth of the total coal production in the first 3 quarters of 2020, last four quarters from Q4-2019 through Q3-2020.

Figure 6: Coal Producing Regions in Appalachia

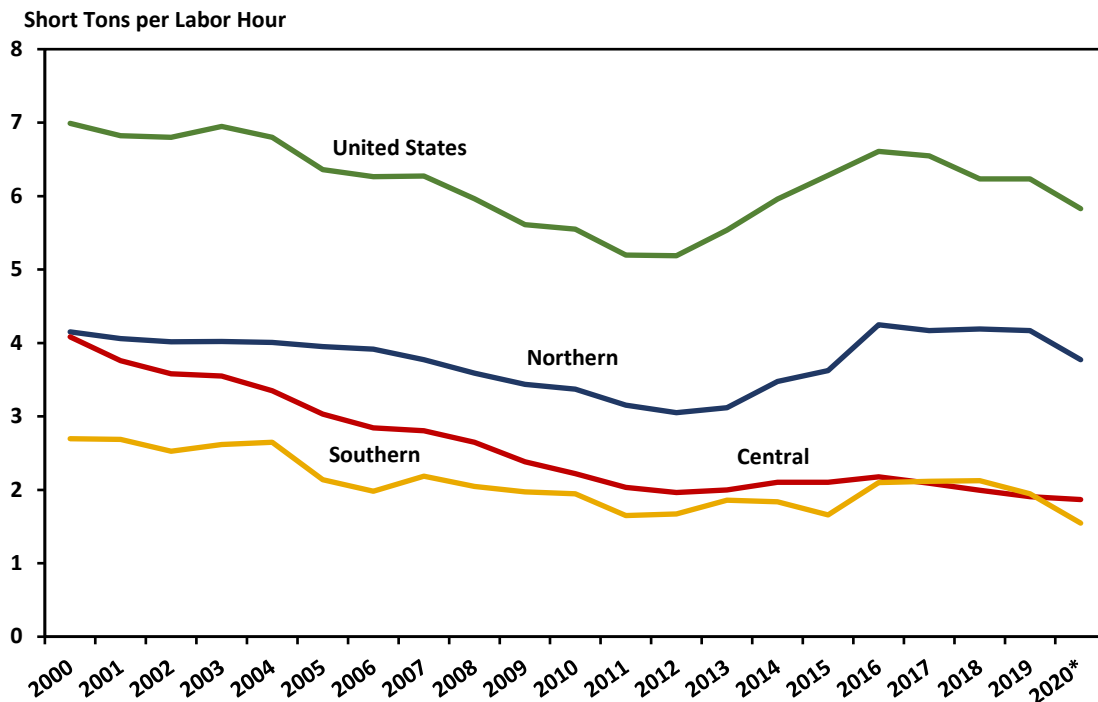


Source: U.S. Energy Information and Administration (EIA)

Note: The figure includes only counties that, based on MSHA data, have non-zero coal production or more than 10 coal-mining jobs from 2005 through 2020. Two Mississippi coal-mining counties are by EIA definition not part of the Appalachian coal-producing regions and as a result are excluded from the analysis.

COAL MINE WORKER PRODUCTIVITY: A key driver of the relative decline in coal production across the Appalachian Region’s three basins is worker productivity. As illustrated in figure 7, coal mine worker productivity fell by about half in the Central Appalachian Basin from the early 2000s until 2012. The productivity rose slightly through 2017 but started declining again through 2020 to 1.9 short tons per labor hour. Since the coal in this region has been mined aggressively for more than a century, remaining reserves tend to be deeper underground and/or within thinner seams that require more units of labor to extract. This places a significant production cost premium on the Central Appalachian Basin’s lower-value thermal coal reserves when compared to northern Appalachia and other basins in the United States, and its large metallurgical reserves when compared to nations such as Australia, Indonesia and South Africa. Thus, declining domestic and global coal demand will be manifest most noticeably in areas with higher-cost production—like Central Appalachia.

Figure 7: Coal Mining Worker Productivity, US and Appalachian Coal Producing Regions

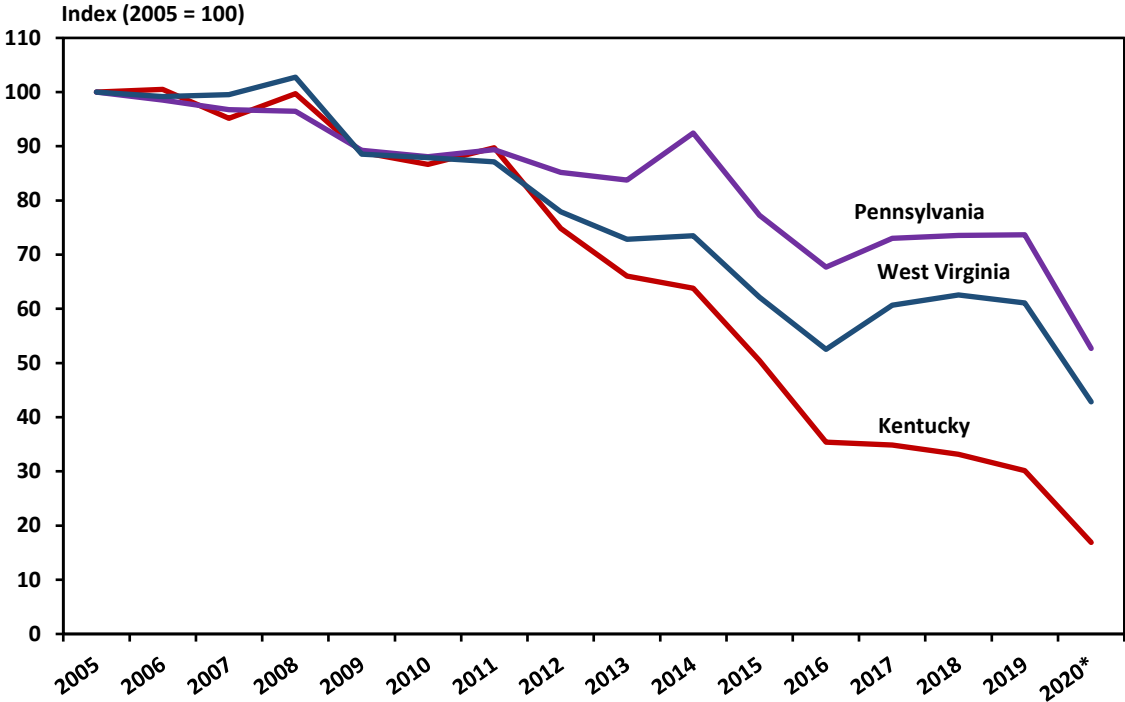


Source: U.S. Mine Safety and Health Administration

Note: Appalachian regions include only Appalachian coal-mining counties. * = the 2020 productivity represents the average productivity of the first 3 quarters of 2020.

PRODUCTION BY STATE: In figure 8 we examine the progression over time of coal mine output for the region’s top coal-producing states of West Virginia, Kentucky and Pennsylvania. As mentioned above, the decline in mined coal tonnage over the past decade or so has been felt in every major U.S. coal basin, but the impact has been felt much more within the Appalachian Region’s major coal-producing states. Furthermore, reflecting the differences in productivity and extraction costs discussed earlier, the rate of decline in coal output observed for each state has varied dramatically. For example, coal production in Pennsylvania during 2019 was approximately 26 percent lower than its 2005 levels while coal output for West Virginia and Kentucky has slumped by 39 and 70 percent, respectively, compared to nearly 15 years earlier. All three states were adversely impacted by the Coronavirus pandemic beginning in early 2020, which is partly responsible for the decline seen between 2019 and 2020. Compared to total coal production in the first three quarters of 2019, the coal production in the first three quarters of 2020 declined by nearly 30 percent in Pennsylvania, 31 percent in West Virginia, and 47 percent in Kentucky.

Figure 8: Coal Mining Production, Select Appalachian States



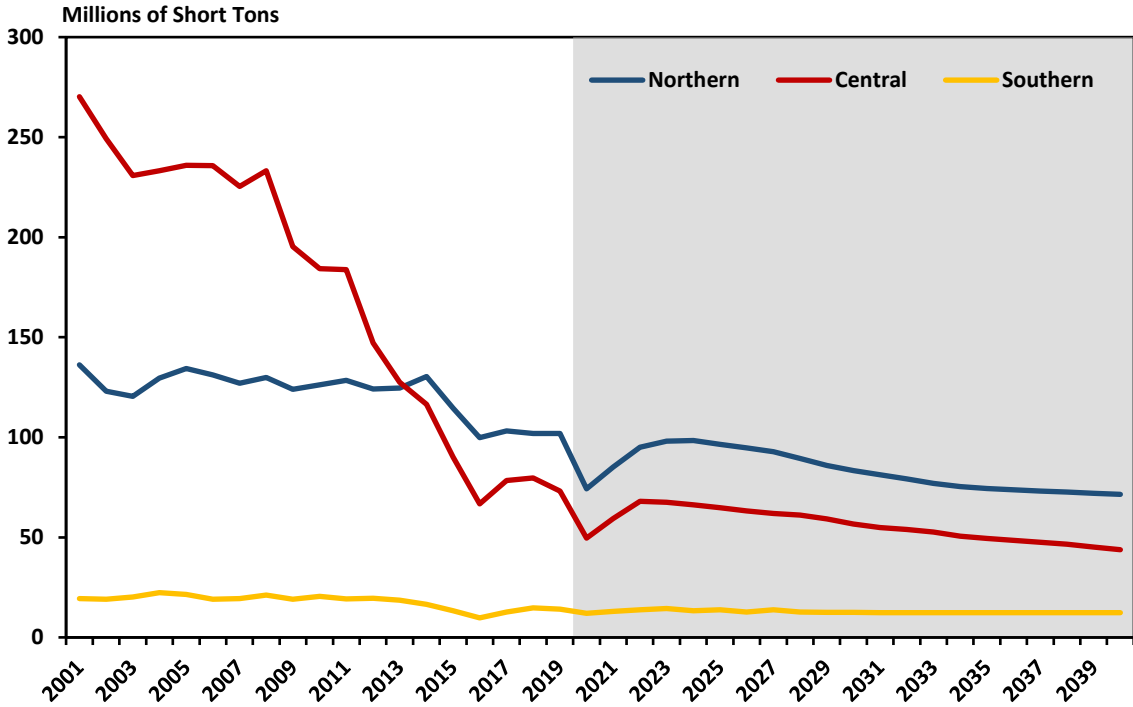
Source: U.S. Mine Safety and Health Administration (MSHA)

Note: * = The 2020 index represents total-production in the first 3 quarters of 2020 divided by total-production in the first 3 quarters of 2005.

Coal Production Forecast

REGIONAL COAL PRODUCTION OUTLOOK: In this section, we turn to the 20-year outlook for coal production in Appalachia. Coal production is expected to drop further in 2020 to below the previous lowest level in 2016. Assuming the COVID-19 pandemic continues to ebb in 2021, we expect coal production will rebound, before declining gradually over the longer term. We anticipate moderate declines in Northern and Southern Appalachia’s overall level of coal output, with more substantial declines in Central Appalachian coal production. The mix of coal mined in each area will help to drive some of the underlying differences in performance. The Central Appalachian Coal Basin is expected to see a production decline of nearly 40 percent over the coming two decades because of its higher costs compared to other coal basins in the U.S. and abroad, plus the fact that natural gas and other fuels continue to account for a growing share of baseload electricity generation domestically and many countries abroad. Northern Appalachian coal production is expected to fall by a smaller 30 percent as lower production costs for several high-capacity steam and met coal operators in the region enable coal output to remain relatively competitive in domestic and overseas markets. Southern Appalachian production is expected to fall by nearly 13 percent over the two-decade period.

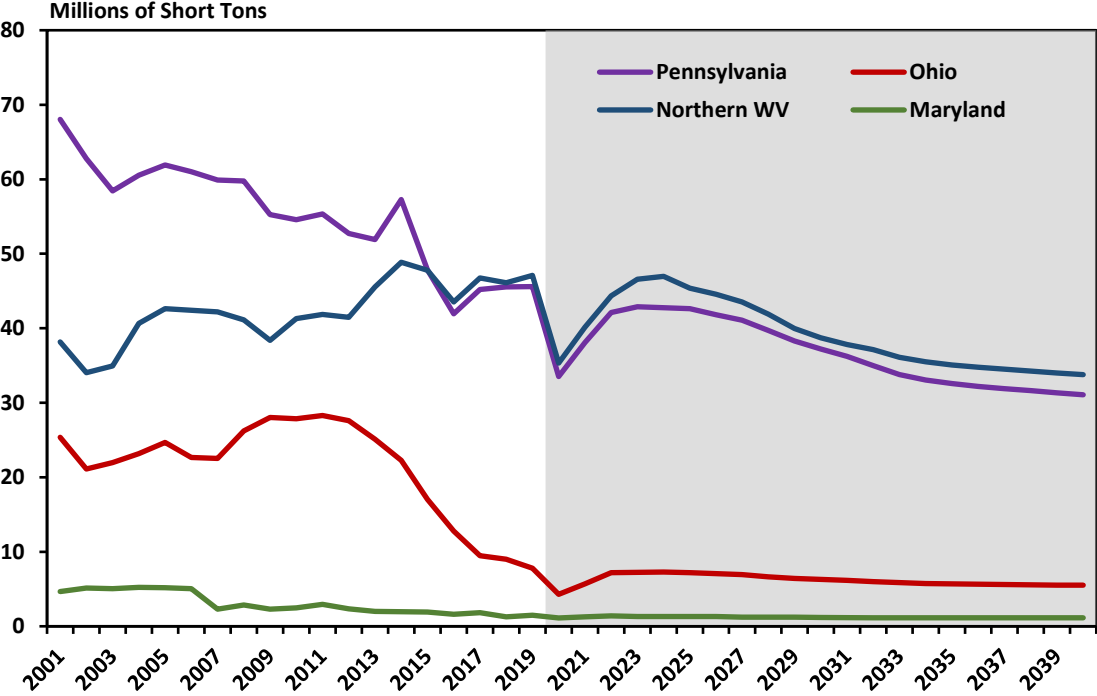
Figure 9: Coal Production Forecast, Individual Appalachian Coal Basins



Sources: U.S. Energy Information Administration; WVU Bureau of Business & Economic Research
 Note: Shaded area indicates forecast.

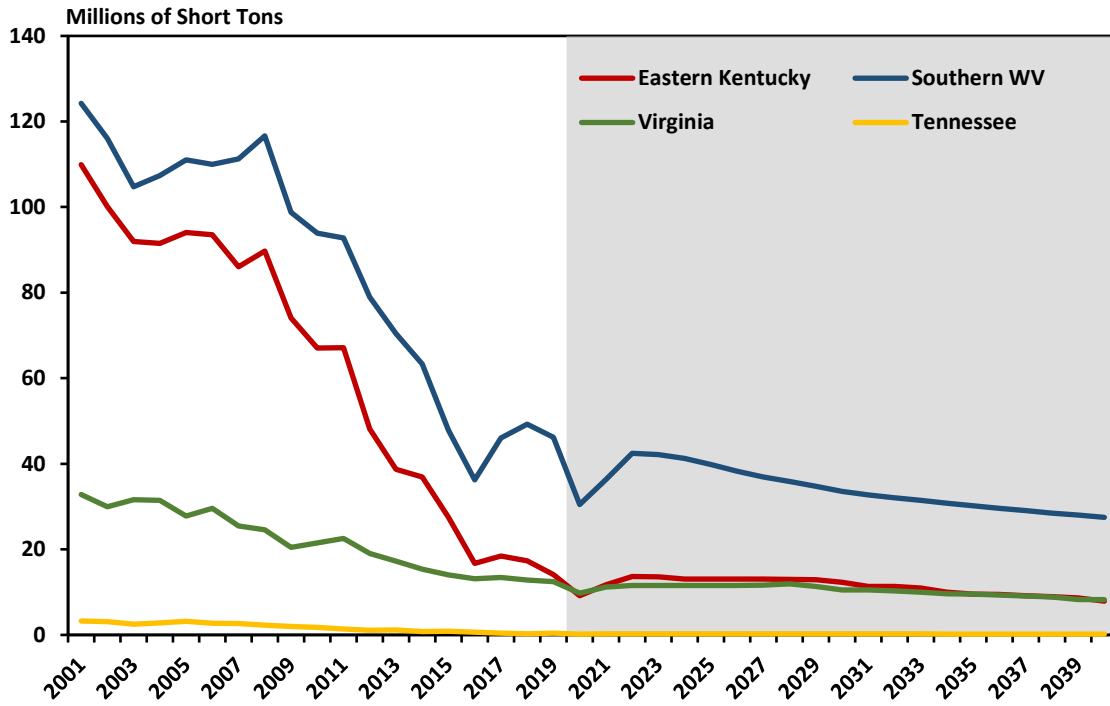
STATE OUTLOOKS: In figures 10, 11, and 12, we provide a forecast of coal production for each of the states (or portions of states) that lie within the Appalachian Region. Under the same assumption that COVID-19 pandemic wanes in 2012, we anticipate the Northern Appalachian Coal Basin, Pennsylvania and Ohio will see a relatively modest continued downward trend in coal output as their electricity generation portfolios shift further away from coal (to a lesser extent in Ohio). In figure 11, we expect declines for all four regions over the long term, with declines that are most pronounced for coal produced in southern West Virginia. For all four areas, will see production trend lower over the next 20 years as dwindling reserves make more coal increasingly uncompetitive on price under most market conditions that prevail outside of global boom cycles. For southern Appalachia, the recent improvement in metallurgical coal output from Alabama’s mines will likely wane over the next few years and then stabilize. However, there is always significant uncertainty given volatility in global steel demand. Longer term, global economic growth will inevitably push steel demand higher, but capacity constraints at regional ports and production cost disadvantages compared to global coal powers such as Australia will limit growth overall.

Figure 10: Coal Production Forecast by State, Northern Appalachia



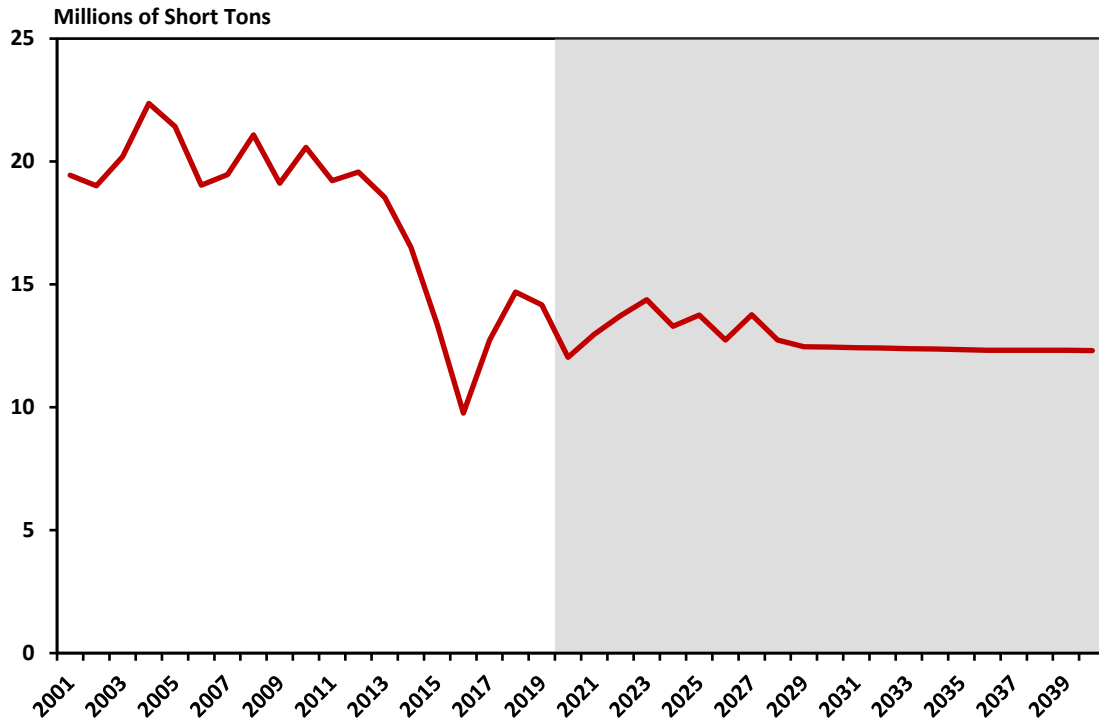
Sources: U.S. Energy Information Administration; WVU Bureau of Business & Economic Research
 Note: Shaded area indicates forecast.

Figure 11: Coal Production Forecast by State, Central Appalachia



Sources: U.S. Energy Information Administration; WVU Bureau of Business & Economic Research
Note: Shaded area indicates forecast.

Figure 12: Coal Production Forecast, Southern Appalachia



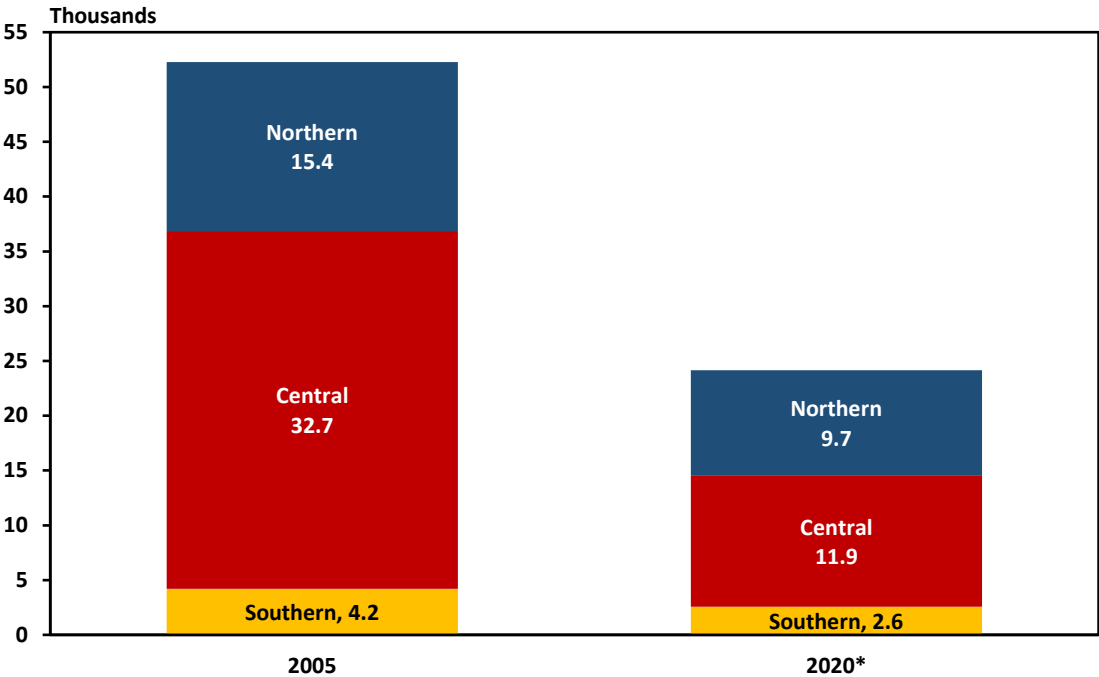
Sources: U.S. Energy Information Administration; WVU Bureau of Business & Economic Research
Note: Shaded area indicates forecast.

Chapter 2: Economic Performance in Appalachia’s Coal-Producing Region

Employment and Unemployment in Appalachia

Figure 13 compares coal employment levels within each of the Appalachian Region’s three coal basins during 2005 and 2020. Here we see that overall employment in the industry has declined by around 54 percent over the period, noticeably less compared with the more than 65 percent drop in production described in Figure 5 above. The Central Appalachian Coal Basin accounts for most of the measured disparity in coal production and employment declines observed over the past 15 years. However, in the last five years Northern Appalachian mines have begun to feel the impact of coal demand declines. Employment in Northern West Virginia declined by about 59 percent between 2015 and 2020, with similar declines in Pennsylvania (35 percent) and Ohio (77 percent).

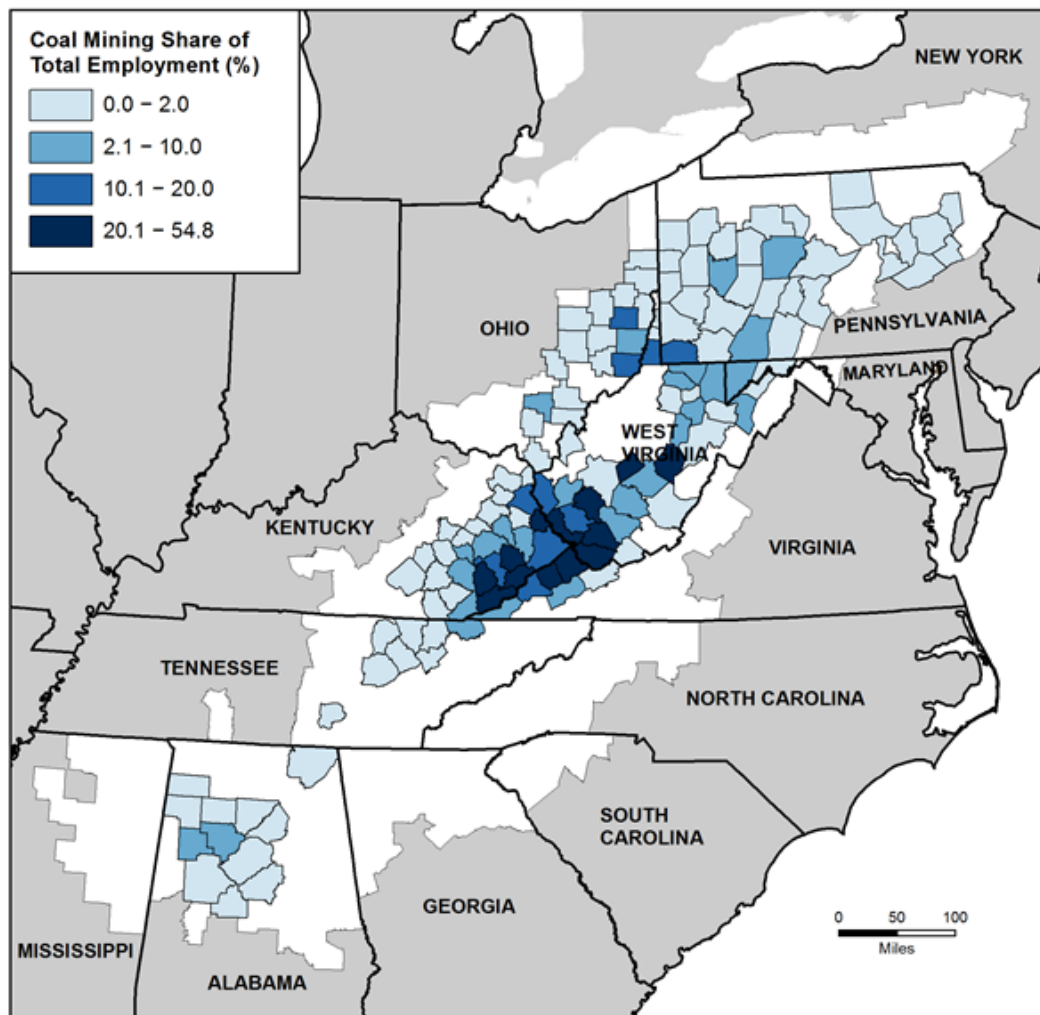
Figure 13: Coal Mining Employment, Appalachian Coal Producing Regions



Source: U.S. Mine Safety and Health Administration
Note: Appalachian coal-producing regions include only Appalachian coal-mining counties. * = the 2020 employment represents the average employment of the first 3 quarters of 2020.

EMPLOYMENT DIVERSIFICATION BY COUNTY: In figure 14 we illustrate coal mining employment as a share of total employment for each coal-producing county in Appalachia in 2005. Here we see extremely wide variation across counties. The large majority—86 of the 137 coal producing counties—saw less than 2 percent of their total employment in coal. Twenty-eight of the counties saw an employment share of between 2 and 10 percent. However, 10 counties had a coal mining employment share of between 10 and 20 percent while 13 counties have more than 20 percent of their employment in coal. The higher concentration tend to cluster in the rural counties in Central Appalachia—in particular eastern Kentucky and southern West Virginia—and all of the counties with an employment share of more than 20 percent are in Central Appalachia. Overall, one general conclusion from this overview is that the largest loss in coal production has tended to occur in the areas with the highest dependence on coal mining jobs, pointing to high levels of economic stress as the economy adjusts to lower levels of coal production.

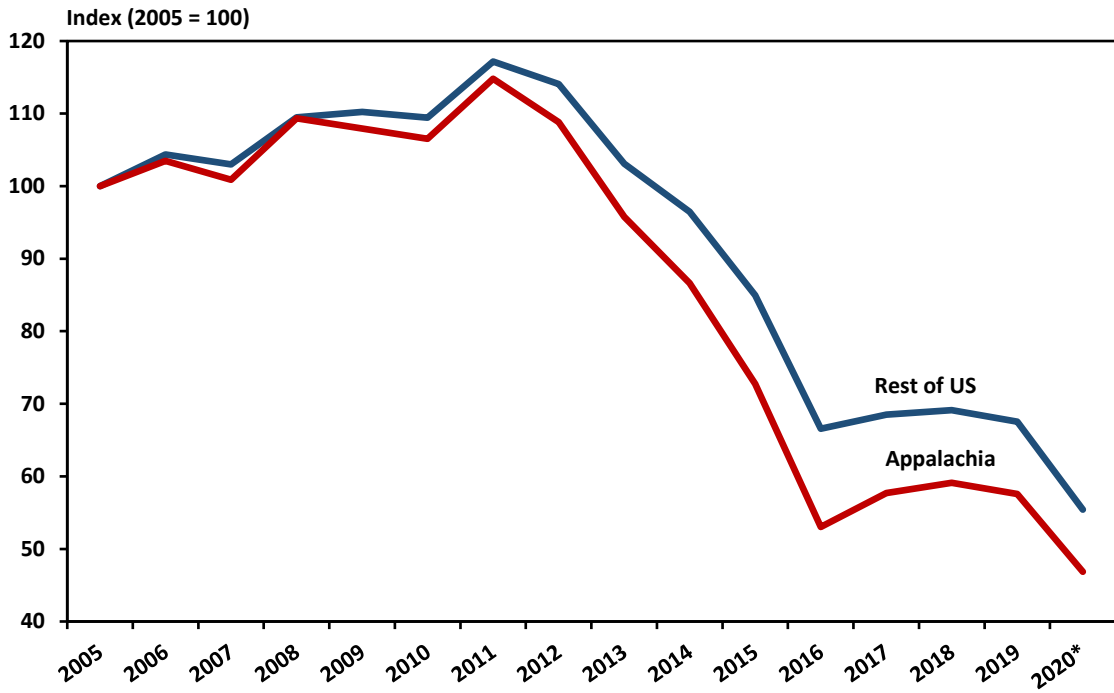
Figure 14: Coal Mining Share of Total Employment, 2005



Sources: U.S. Mine Safety and Health Administration and U.S. Bureau of Labor Statistics
 Note: Figure includes only Appalachian coal-mining counties.

COAL EMPLOYMENT BY REGION: In figure 15 we provide an overview of how coal employment has dropped in Appalachia versus the rest of the nation. Here we observe a decline in Appalachia that is considerably larger than the national decline, consistent with the analysis of production above. Some of the decline from 2019 to 2020, nationally and regionally, can be attributed to the COVID-19 pandemic.

Figure 15: Coal Mining Employment, U.S. and Appalachia

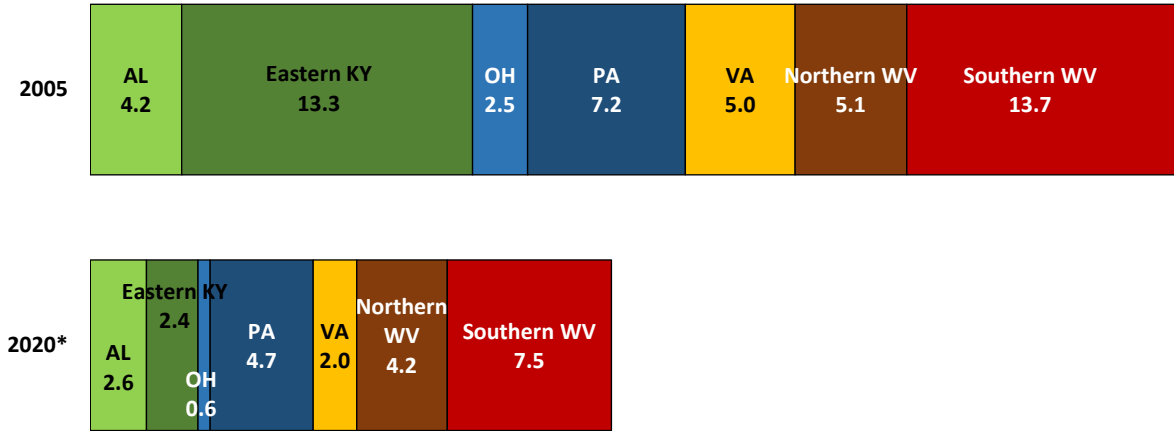


Source: U.S. Mine Safety and Health Administration (MSHA)

Note: * = The 2020 employment represents the average employment of the first 3 quarters of 2020.

COAL EMPLOYMENT BY STATE: In figure 16, we presented a more in-depth examination of recent changes in coal employment for the coal-producing states in Appalachia. As discussed above, with the differences in production for the region’s major coal-producing states, eastern Kentucky registered the largest drop in coal employment between 2005 and 2020 (82 percent), where a portion of the decline can be attributed to the COVID-19 pandemic.

Figure 16: Coal Mining Employment by Appalachian State

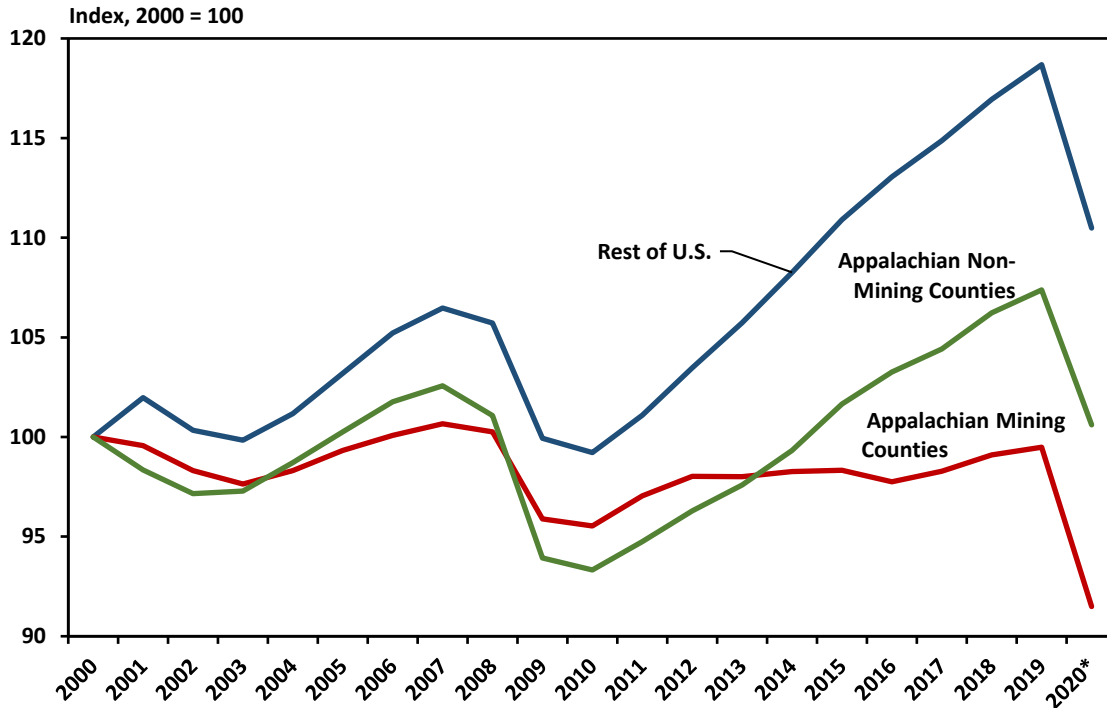


Source: U.S. Mine Safety and Health Administration

Note: Figure includes only Appalachian coal-mining counties. * = The 2020 employment represents the average employment of the first 3 quarters of 2020.

OVERALL EMPLOYMENT IN APPLACHIA: With figure 17 we turn to an examination of broader trends in employment in Appalachia. In particular, here we present total private-sector employment for various regions in Appalachia. As depicted, total private-sector employment in the mining counties has been virtually flat since 2012. This evidence suggests that the loss in coal employment has led to broader spillover effects which have suppressed overall economic growth in the relevant regions. The sharp decline observed between 2019 and 2020 can be attributed, in part, to the COVID-19 pandemic.

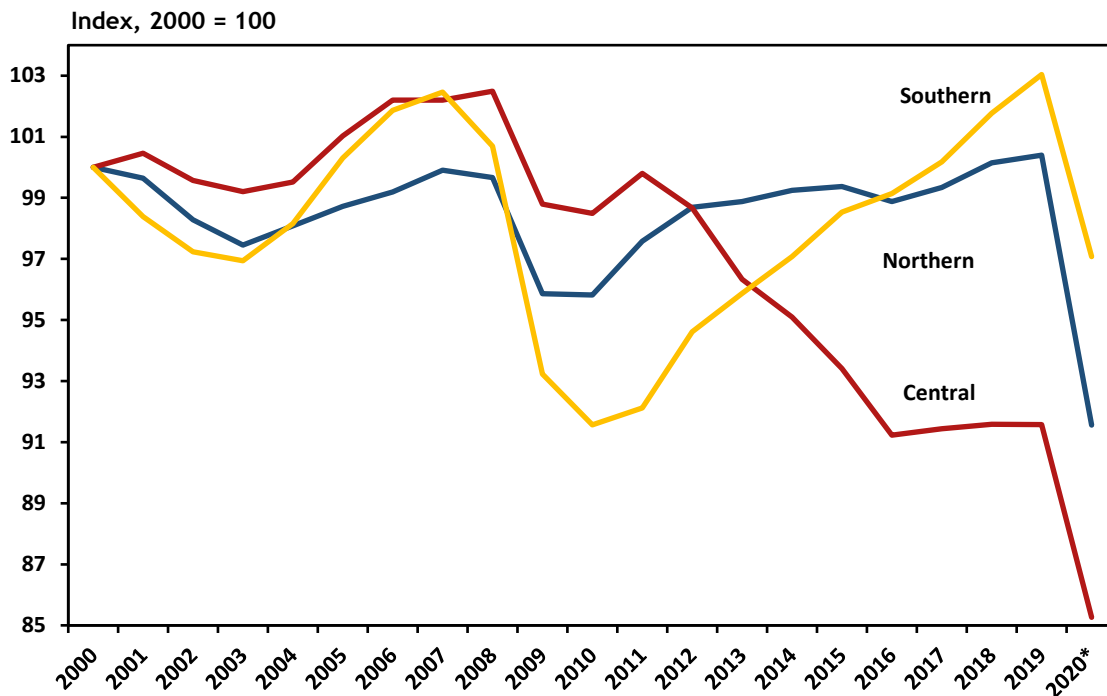
Figure 17: Private Sector Employment, Select Appalachian County Groups



Source: Quarterly Census of Employment and Wages (QCEW), U.S. Bureau of Labor Statistics. * = The 2020 employment represents the average employment of the six months of 2020.

OVERALL EMPLOYMENT BY APPLACHIAN REGION: In figure 18 we report total private-sector employment for the coal producing counties in each Appalachian sub region. While the coal producing counties of northern Appalachia have experienced stable employment over the past four years or so, a significant loss in total private-sector employment has occurred in Central Appalachia. Coal mining counties in Southern Appalachia have grown at a relatively healthy pace since the end of the national recession in 2010 or so, indicating relatively small negative spillover effects from the coal industry. In 2020, however, private sector employment in the three regions dropped substantially, driven mainly by the COVID-19 pandemic that forced a temporary economic lockdown across the nation.

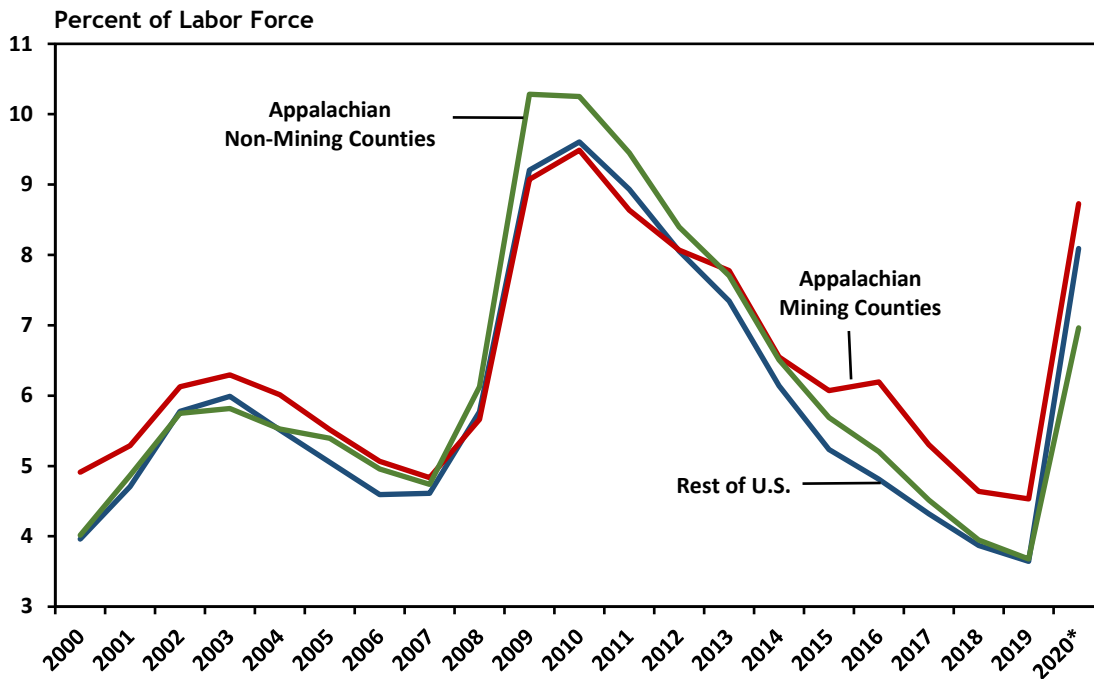
Figure 18: Private Sector Employment, Appalachian Coal Producing Regions



Source: Quarterly Census of Employment and Wages (QCEW), U.S. Bureau of Labor Statistics. * = The 2020 employment represents the average employment of the six months of 2020.

UNEMPLOYMENT IN APPLACHIA: In figure 19 we report the incidence of unemployment in Appalachia. The coal producing counties in Appalachia exhibit the highest rate of unemployment, although there unemployment is certainly low by historic standards and has improved substantially over the past decade. In figure 20 we report the unemployment rate for the coal producing counties in each Appalachian sub region. Here we do see that the mining counties of Central Appalachia exhibit the highest rate of unemployment, but even in that case the figure has improved substantially over the past decade and the figure is generally in line with historic norms. The substantial increase of unemployment rate in 2020 reflects the impact of the COVID-19 pandemic.

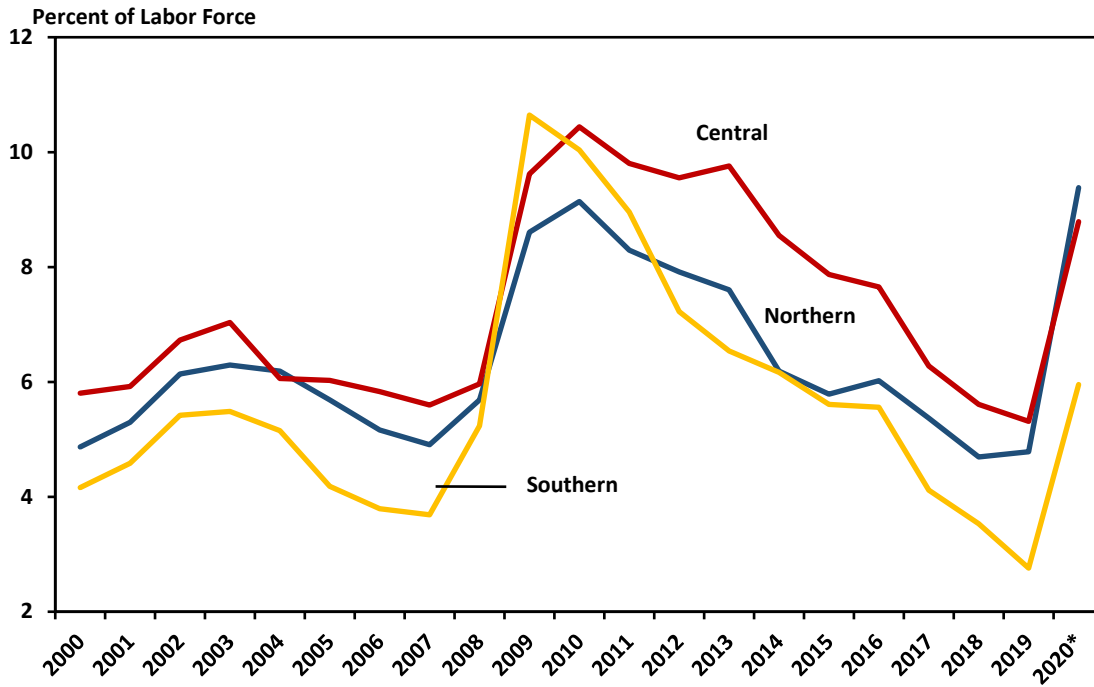
Figure 19: Unemployment Rate, Various Appalachian County Groups



Source: Local Area Unemployment Statistics, U.S. Bureau of Labor Statistics

Note: * = The 2020 rate represents the average of the first 11 months of 2020. * = The 2020 rates are averages of the first 11 months of 2020.

Figure 20: Unemployment Rate, Appalachian Coal Producing Regions



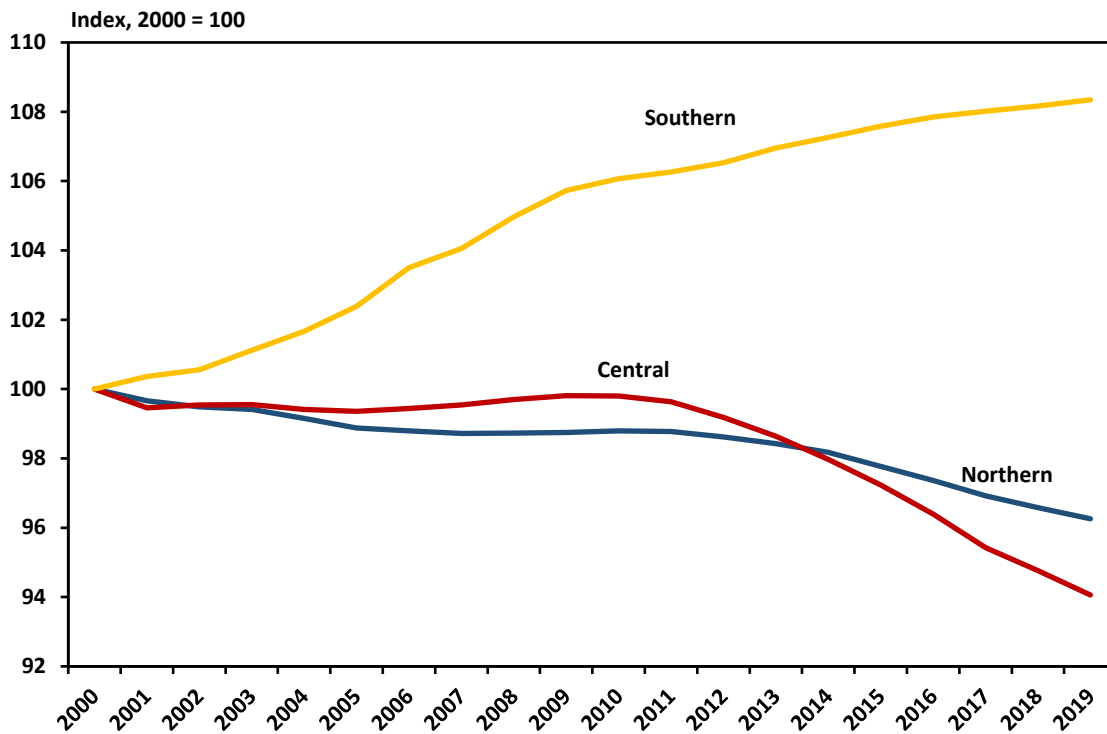
Source: Local Area Unemployment Statistics, U.S. Bureau of Labor Statistics

Note: Appalachian coal-producing regions include only Appalachian coal-mining counties. * = The 2020 rates are averages of the first 11 months of 2020.

Population and Migration in Appalachia

In this section we turn to population flows in Appalachia as they may be affected by the coal industry. Beginning with figure 21, we report the change in total population for the coal producing counties for each Appalachian sub region. Here we see, consistent with the trends discussed above, central Appalachia’s coal-producing counties have seen relatively sharp population declines over the past several years. This compares with a longer-term decay in the coal producing counties of northern Appalachia and strong growth in southern Appalachia.

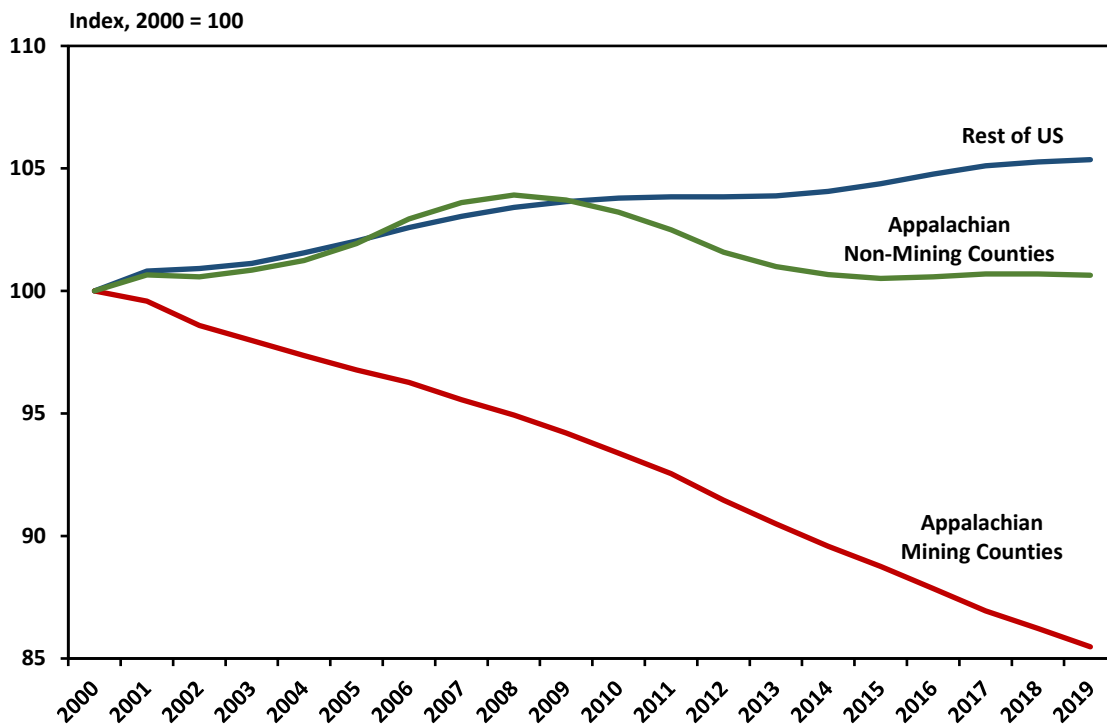
Figure 21: Total Population, Appalachian Coal Producing Regions



Sources: 2000-2009 Intercensal Population Estimates and Vintage 2019 Population Estimates, U.S. Census Bureau
Note: Appalachian coal-producing regions include only Appalachian coal-mining counties.

PRIME WORKING-AGE POPULATION: It is likely that coal losses that spur population losses will affect the prime working-age population more so than older segments of the population. In figure 22 we report the population change for various county groups in Appalachia. Here we see that mining counties in Appalachia have seen by far the worst prime-age population losses, whereas the prime-age population has generally been stable in the non-mining counties.

Figure 22: Population 25-54 Years Old, Various Appalachian County Groups

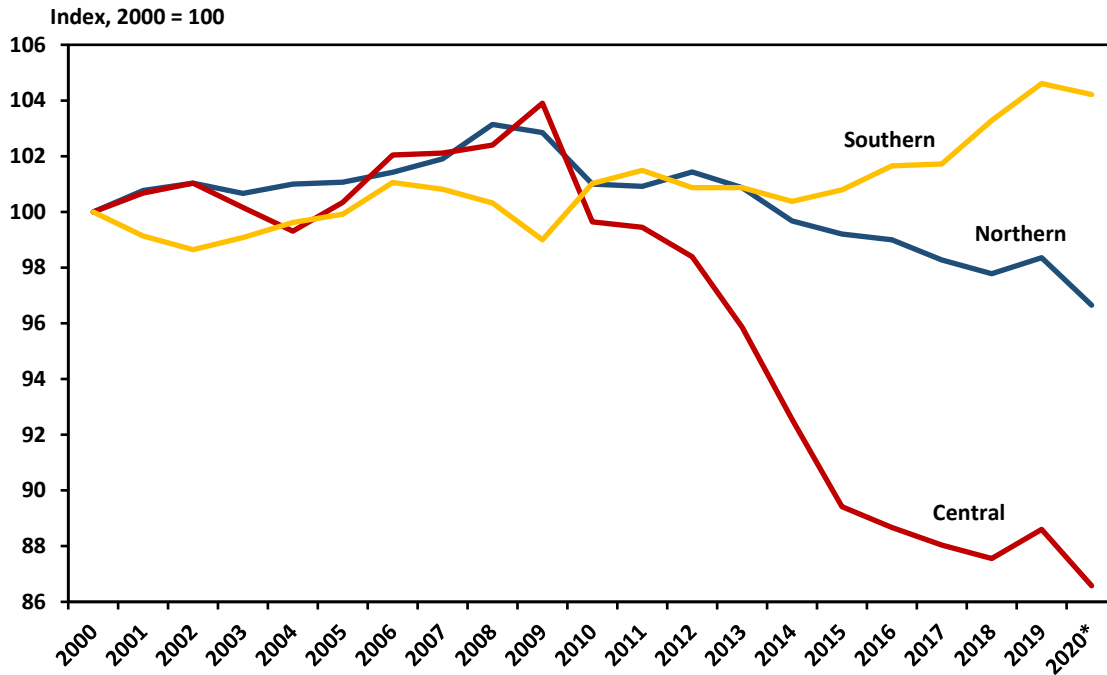


Sources: 2000-2009 Intercensal and 2019 Population Estimates, U.S. Census Bureau
 Note: Non-Appalachian Counties include counties within Appalachian states that are outside of Appalachia.

While not shown in a figure, data indicate that the prime-working age population losses have been most pronounced in recent years in the coal mining counties of Central Appalachia, although mining counties in Northern Appalachia have also seen a long-term decline in the prime working age population.

LABOR FORCE: In figure 23 we report the labor force for the various sub regions in Appalachia. Here we see an extremely sharp drop in the labor force in Central Appalachia, consistent with the working age population losses in the sub region. During 2019 all of the sub regions saw an increase in labor force participation, only to fall again in 2020 as the COVID-19 pandemic struck.

Figure 23: Civilian Labor Force, Appalachia Coal Producing Regions

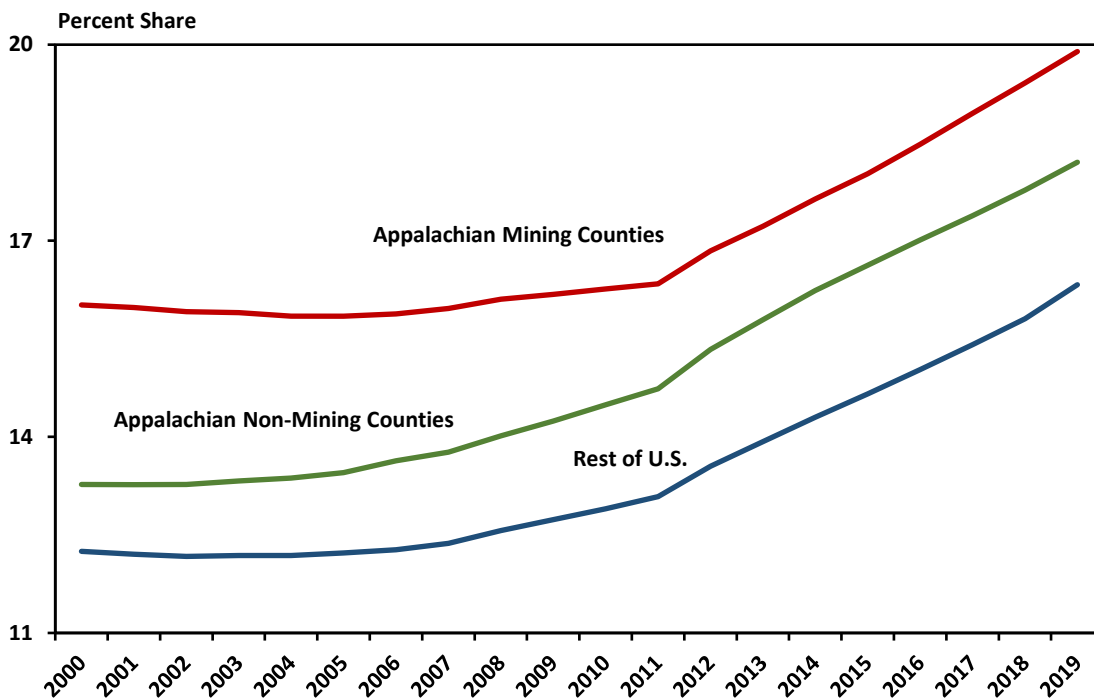


Source: Local Area Unemployment Statistics, U.S. Bureau of Labor Statistics

Note: Appalachian coal-producing regions include only Appalachian coal-mining counties. * = The 2020 rates are averages of the first 11 months of 2020.

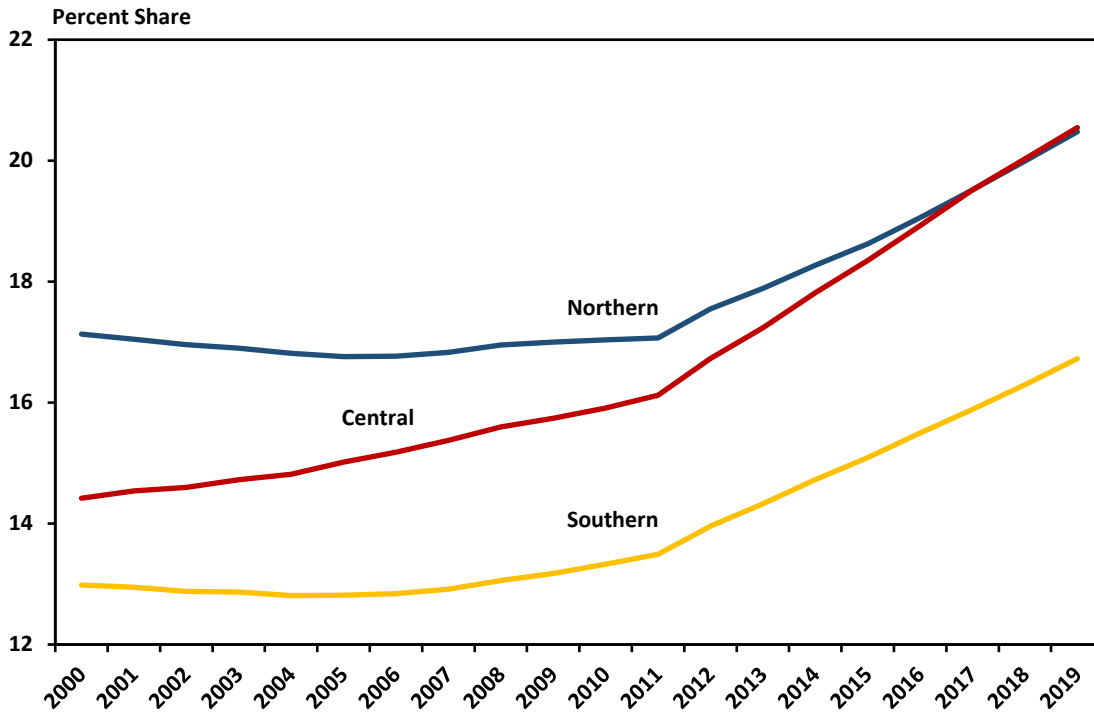
POPULATION DISTRIBUTION – RETIREMENT AGE: In light of population losses among the prime working age, it stands to reason the coal producing region of Appalachia is getting older on average. With figures 24 and 25 we explore the share of retirement-aged men and women living in Appalachia. In figure 24 we report the share of the population that is 65 years old or older across three geographic areas. As illustrated, coal mining counties have the highest retirement-aged population share. However, the figure has increased noticeably across all area groupings in recent years. In figure 25 we report the retirement-age population share by Appalachian sub region. Notice the substantial increase in the retirement age population share in Central Appalachia. Although not reported, the population share in the prime working age category have fallen largely in a parallel manner across the various geographic groupings.

Figure 24: Share of Population 65 Years or Older, Various Appalachian County Groups



Sources: 2000-2009 Intercensal Population Estimates and Vintage 2019 Population Estimates, U.S. Census Bureau

Figure 25: Share of Population 65 Years or Older, Appalachia Coal Producing Regions



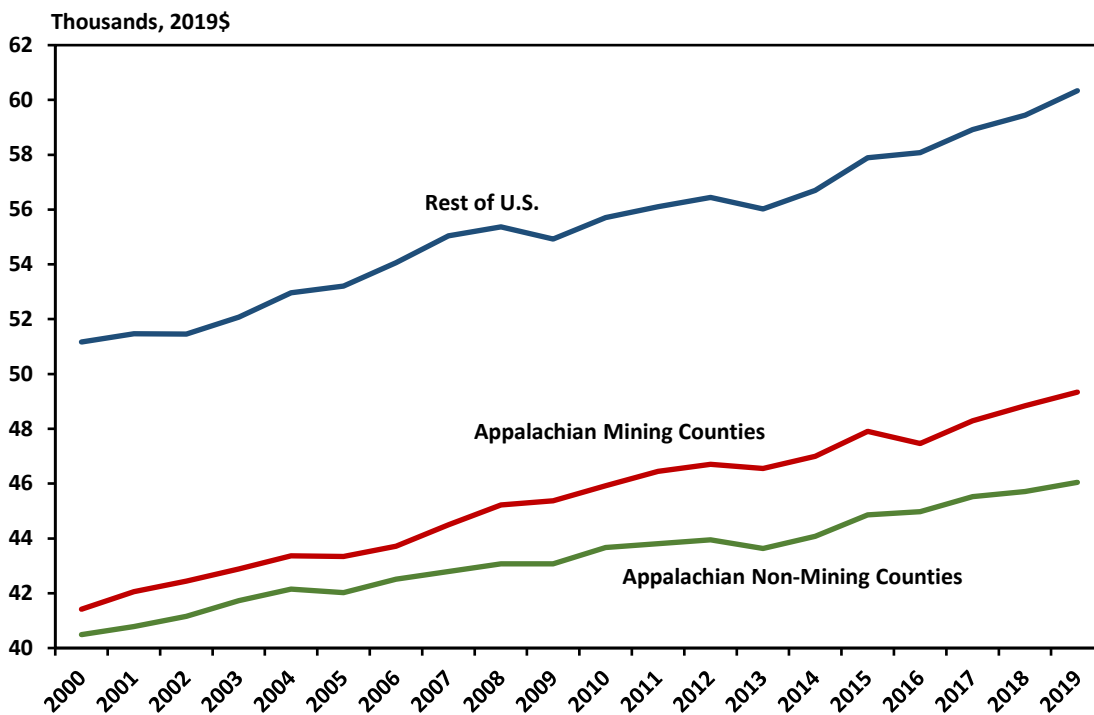
Sources: 2000-2009 Intercensal Population Estimates and Vintage 2019 Population Estimates, U.S. Census Bureau

Note: Appalachian coal-producing regions include only Appalachian coal-mining counties.

Wages and Salaries and Poverty in Appalachia

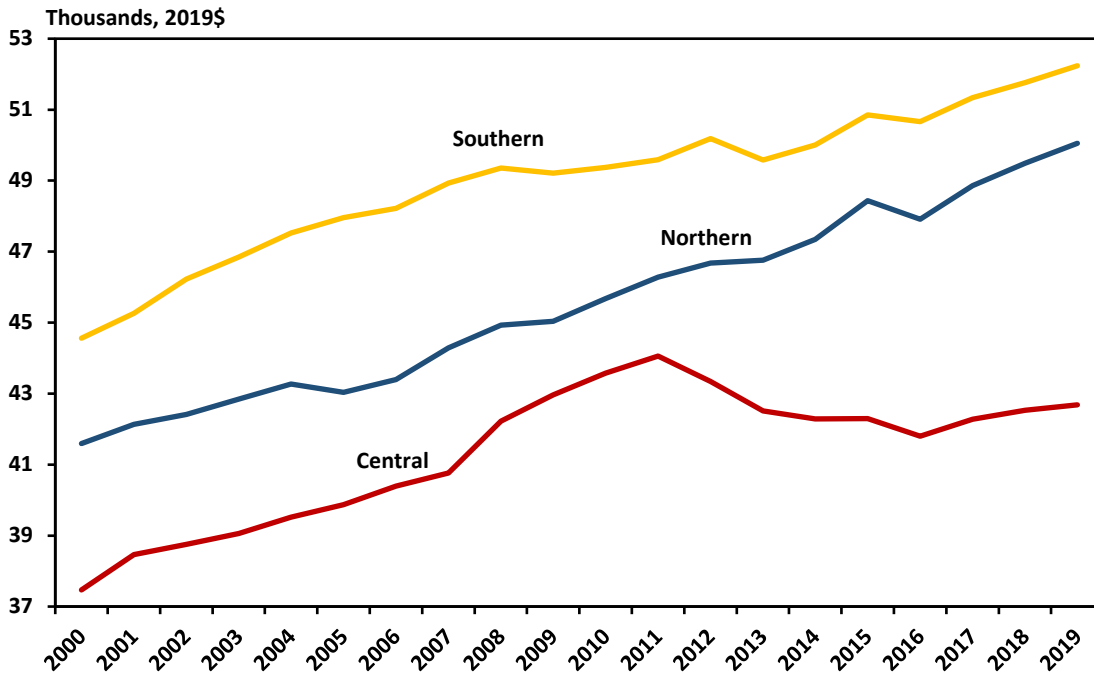
WAGE AND SALARY INCOME: In this section we turn to income earned in the coal producing regions of Appalachia. As reported in figure 26, wages and salaries per job are higher in mining counties compared to non-mining counties in Appalachia, likely the result of the high wages associated with coal mining jobs. However, wages and salaries in mining counties in Appalachia fall well below wages and salaries in the non-Appalachian counties of the 13 states that contain a portion of the Appalachian Region. In figure 27 we report wages and salaries per job across the Appalachian coal-producing sub regions. Here we see that wages and salaries are substantially lower in central Appalachia.

Figure 26: Wage and Salary per Job, Various Appalachian County Groups



Source: U.S. Bureau of Economic Analysis

Figure 27: Wage and Salary per Job, Appalachia Coal Producing Regions

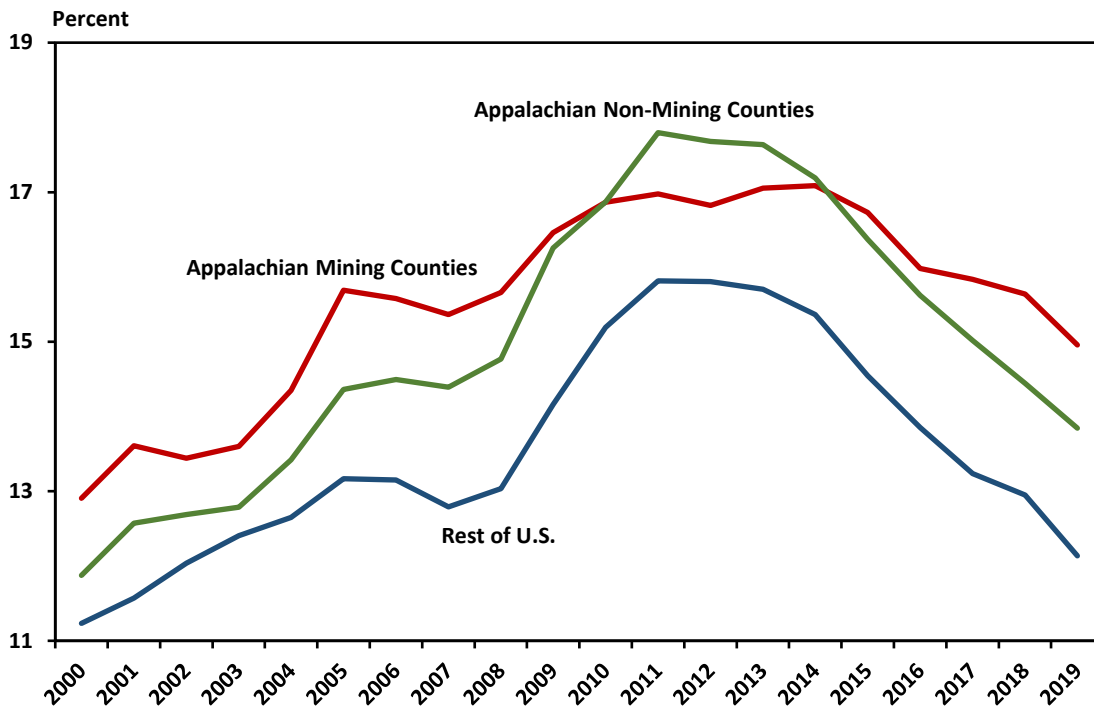


Source: U.S. Bureau of Economic Analysis

Note: Appalachian coal-producing regions include only Appalachian coal-mining counties.

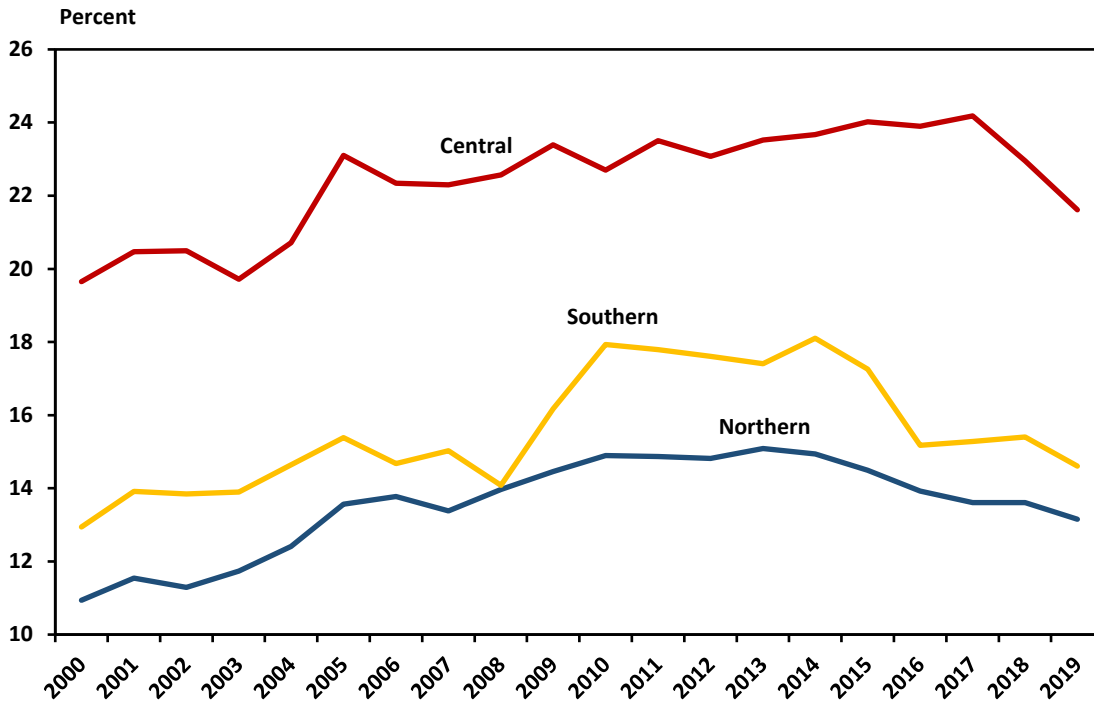
POVERTY IN APPLACHIAN COAL PRODUCING REGIONS: In this section we turn to poverty in the coal producing regions of Appalachia. As reported in figure 28, the poverty rate is consistently higher in Appalachia compared to the rest of the U.S. The rate for both mining and non-mining counties increased substantially since 2000 through around 2013, but has improved in recent years. Currently mining counties in Appalachia have a poverty rate of just under one percentage point higher compared with Appalachian non-mining counties. In figure 29 we report the poverty rate for the coal mining counties for the three major Appalachian sub regions. Consistent with many of the figures above, poverty is substantially higher in Central Appalachia and there poverty has grown noticeably over the past two decades. In 2018, the poverty rate for Central Appalachia saw a decrease of 1.5 percentage points.

Figure 28: Poverty Rate, Various Appalachian County Groups



Source: Small Area Income and Poverty Estimates, U.S. Census Bureau

Figure 29: Poverty Rate, Appalachian Coal Producing Regions



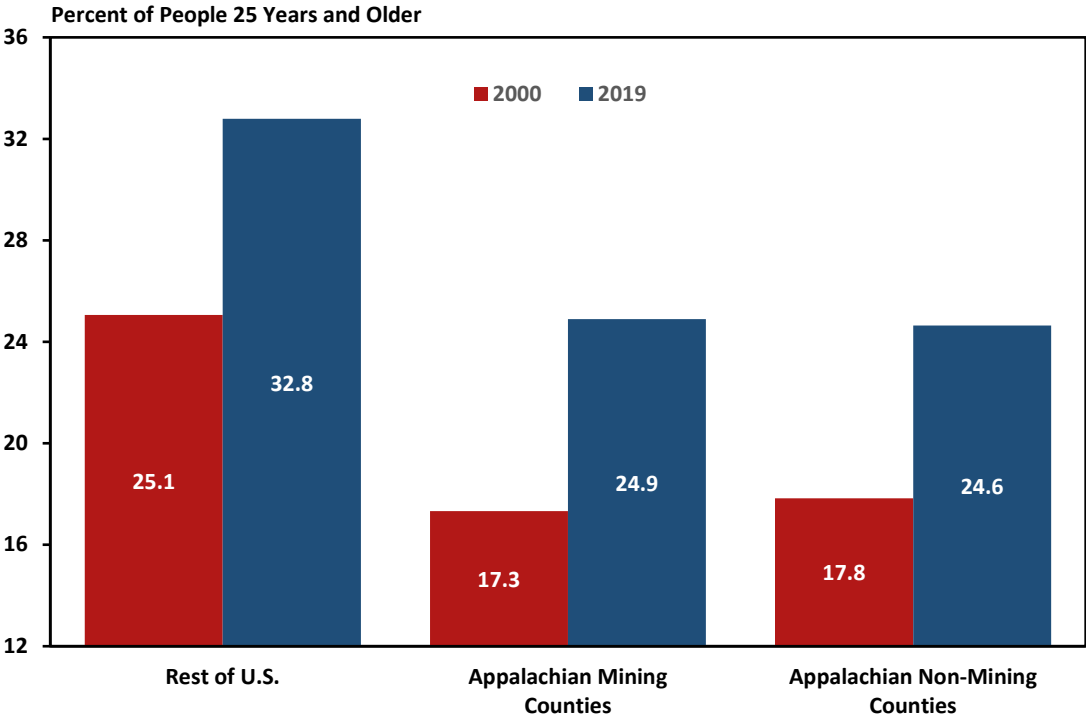
Source: Small Area Income and Poverty Estimates, U.S. Census Bureau

Note: Appalachian coal-producing regions include only Appalachian coal-mining counties.

Education and Health in Appalachia

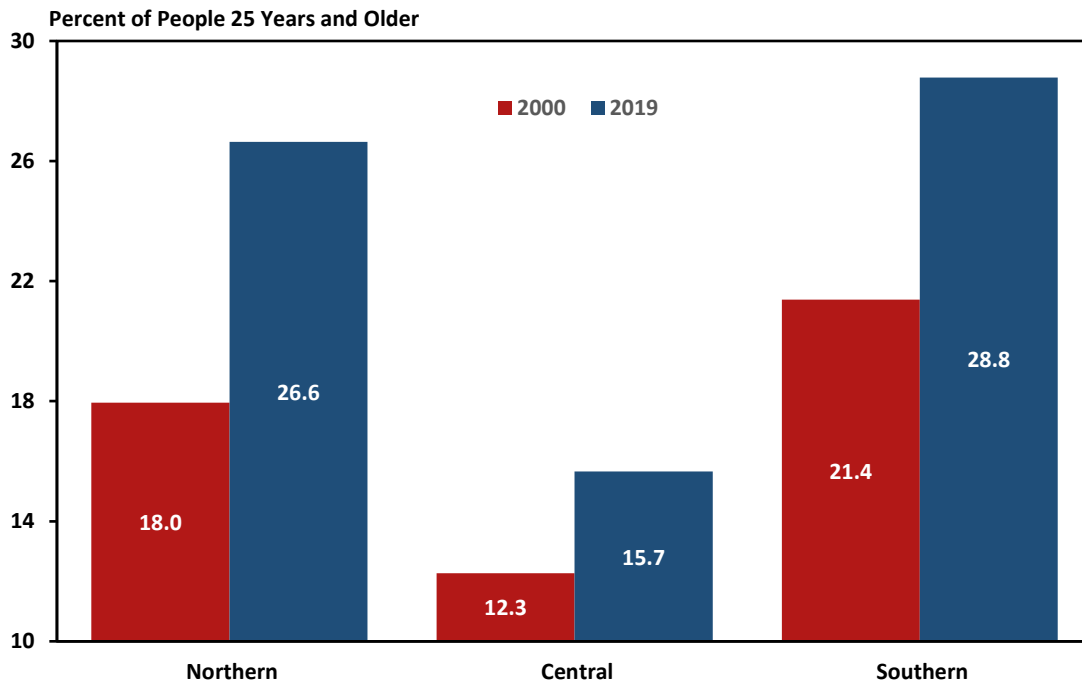
EDUCATION: We close with a brief examination of human capital outcomes in the coal-producing regions of Appalachia. With figures 30 and 31, we begin with the attainment of a bachelor’s degree or higher. In figure 30 the data indicate that overall educational attainment is low in Appalachia compared to the rest of the U.S. However, Appalachia has made a significant improvement in the figure over the time period illustrated. Perhaps surprisingly, attainment of a bachelor’s degree does not vary substantial between coal mining and non-mining counties in Appalachia. In figure 31 we observe much lower rates of educational attainment in Central Appalachia, and a smaller improvement in educational attainment over time.

Figure 30: Attainment of a Bachelor’s Degree or Higher, Various Appalachian County Groups



Sources: 2000 Census and 2019 American Community Survey 5-Year Estimates, U.S. Census Bureau

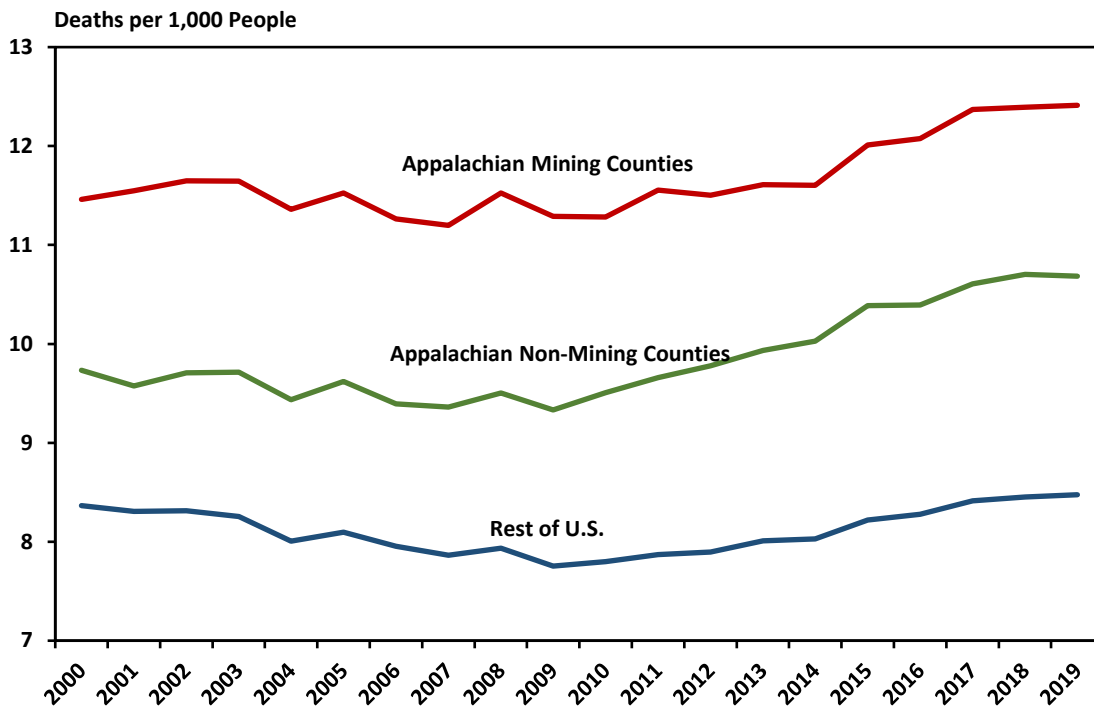
Figure 31: Attainment of a Bachelor's Degree or Higher, Appalachian Coal Producing Regions



Sources: 2000 Census and 2019 American Community Survey 5-Year Estimates, U.S. Census Bureau
Note: Appalachian coal-producing regions include only Appalachian coal-mining counties.

HEALTH: In figures 32 and 33, we briefly examine health outcomes in Appalachia. In figure 32, the data show that mining counties in Appalachian have substantially higher mortality rates than those for non-mining counties and counties outside Appalachia. As these mortality rates reflect deaths from all causes, these rates are likely influenced in part by higher levels of population 65 years or older, but there are almost certainly other factors at play as well.

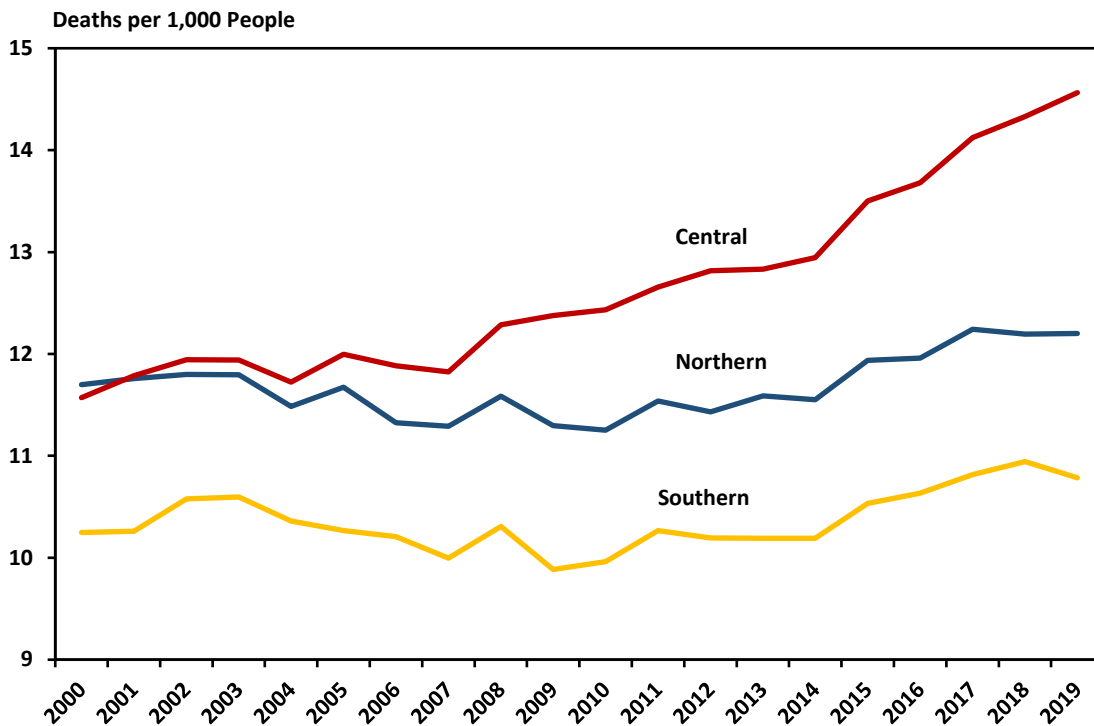
Figure 32: Mortality Rate, Various Appalachian County Groups



Source: U.S. Centers for Disease Control and Prevention
 Note: Rates are not age-adjusted.

In figure 33 we show mortality rates for the different regions in Appalachia. While mortality rates in the northern and southern Appalachian regions are relatively flat, mortality rates in Central Appalachia have risen substantially since 2000, rising from 11.6 deaths per 1,000 population in 2000 to 14.3 deaths per 1,000 population in 2018, a gain of about 24 percent. These mortality rates coincide with increases in obesity and other health concerns and drug abuse in the region.

Figure 33: Mortality Rate, Appalachian Coal Producing Regions



Source: U.S. Centers for Disease Control and Prevention

Note: Rates are not age-adjusted. Appalachian coal-producing regions include only Appalachian coal-mining counties.