

Conclusion

This study examined the current and expected future impact of the coal mining industry in 118 Appalachian coal-producing counties. The results show that coal mining influences not only a sizeable portion of the economic activity in selected counties, but that it also plays an important role in many other counties in Appalachia. The study found that the coal mining industry currently is a large share of the economy in selected counties throughout the region, and in many counties in Central Appalachia. The results show also show that under assumed baseline conditions of modest economic growth with no new restrictive environmental initiatives, the impact of coal mining in the regional economy will decline in the next decade.

The magnitude of this decline will vary among counties, but will adversely affect their tax revenues, population growth, employment, and earnings. The forecast decline in the economic impact of the coal mining industry varies little between the baseline forecasts and four alternative macroeconomic scenarios. However, the decline in the economic impact varies a great deal under alternative scenarios involving the Kyoto Protocol environmental initiative to reduce greenhouse gas emissions. In particular, the size of the decline depends on how much greenhouse gas emissions must be reduced given the protocol. The decline in the coal industry's impact will be only somewhat greater than in the baseline scenario if emissions levels in 2010 are allowed to rise significantly above 1990 levels. However, the decline in the impact of the coal mining industry would be between two and three times greater if emissions must fall to or below 1990 levels.

Current Conditions of the Coal Mining Industry

The study began by examining the current conditions of the coal mining industry in Appalachia and its current impact on affected counties and regions within Appalachia. Three regional groupings are distinguished:

- Northern Appalachia, which includes coal producing counties in Pennsylvania, Ohio, Maryland, and northern West Virginia.
- Central Appalachia, which includes counties in the border region of Kentucky, Virginia, and West Virginia.
- Southern Appalachia, which includes counties in Tennessee and Alabama.

The year 1997 was used as the "current" year due to lags in the data, and coal production data came from the Department of Energy's Energy Information Administration while employment and earnings data came from the Department of Commerce.

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An examination of the data revealed a large mining industry that accounted for a modest share of overall Appalachian employment, but a large share in selected counties and county groupings. Data revealed over 470 million tons of coal production in Appalachia in 1997 within 118 coal-producing counties. The total output of the industry in these counties was roughly \$12.3 billion during that year. The industry employed just over 60,000 workers and worker earnings topped \$4 billion in the 118 coal-producing counties in Appalachia. Reflecting the high wages in the industry, this accounted for roughly 2% of all employment in these 118 counties, and 3.3% of earnings.

The coal mining industry accounted for a much larger share of employment and earnings in selected counties throughout Appalachia, but many of these counties were concentrated in Central Appalachia, particularly in the border area of Kentucky, Virginia, and West Virginia. In the Central Appalachia region, the coal mining industry accounted for roughly 10.4% of employment and 14.7% of earnings.

The total impact of the coal industry on the economy exceeded industry employment and earnings due to the additional indirect and induced impacts on other sectors of the economy. The total impact was approximately 50% higher than the direct industry impact for output, value-added, and earnings, and 100% greater for employment. The total earnings impact was \$6.2 billion and the total employment impact was 135,000 jobs in the 118 Appalachian coal-producing counties. These total impacts accounted for 4.4% of 1997 employment and 5.1% of 1997 worker earnings in these 118 counties overall. The shares were much larger in selected counties throughout Appalachia, particularly in Central Appalachia. The total economic impact of the coal mining industry accounted for 29.9% of employment and 27.6% of earnings in the Central Appalachia region.

The tax impact of the coal mining industry was also concentrated in Central Appalachia. The overall tax impact was estimated to be \$559.5 billion per year in the 118 coal-producing counties from severance, income, or sales taxes. These figures did not include the tax impact of more locally oriented taxes such as property taxes, utility taxes, or other miscellaneous taxes. Much of the tax impact occurred in Central Appalachia, primarily due to the much higher severance tax on coal in the region. One-third of this overall tax impact occurred in Kentucky, 7% in Virginia, and 45% in West Virginia.

The potential impact of the coal industry on factors such as population growth and participation in transfer programs also would be expected to be greater in Central Appalachia. Research by Black *et. al.* (1996; 1999) has found that local population growth and dependence on transfer payments are affected by significant changes in earnings opportunities in the coal mining industry. And, Central Appalachia is the region most dependent on the coal mining industry. Further, Central Appalachia, along

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with Northern Appalachia, already had a falling population during the 1990s. Per capita payments for “income maintenance” transfer programs such as Temporary Assistance to Needy Families (TANF) and food stamps also were much higher in Central Appalachia than in other parts of Appalachia, particularly Southern Appalachia, where transfer payments are low.

Economic and Kyoto Scenarios

The study also examined potential scenarios for the development of the coal mining industry in Appalachia over the next decade. Results changed very little under the four alternative macroeconomic scenarios that were considered. The decline in the industry and its impact was only slightly lower in the favorable high economic growth and high oil price scenarios, and slightly higher in the less favorable low growth or low oil price scenarios. Results, however, did differ a great deal under alternative emissions reduction scenarios related to compliance with the Kyoto environmental protocol. Compliance with the protocol could require significant emissions reductions, although smaller reductions may be possible if emissions trading and other innovative approaches are included when the protocol is implemented. But, even in this case, the level of emissions reduction that would be required is uncertain. The 6 alternative scenarios examined assumed different levels of reduction in greenhouse gas emissions in order to comply with the Kyoto protocol. Under scenarios where there was less restriction on omissions, the forecast decline in the coal mine industry and its impact was only somewhat higher than in the baseline scenario. However, the size of the impact rises rapidly as greater emission reductions are made necessary, particularly in the Central Appalachia.

The total impact rises sharply under more restrictive Kyoto emission reduction scenarios, in which 2010 emissions levels are required to return to or below emissions in 1990. Under the most restrictive scenarios, the direct impact would rise to between 1.1% and 2.2% of all employment and earnings in the 118 county Appalachian coal-producing region. The total impact including the “multiplier effect” would be a decline of between 3% to 4% of all employment and earnings in the region. As always, the relative impact would be greatest in the Central Appalachia region. In particular, the direct reduction in coal mining employment and earnings would account for between 5.5% and 8.8% of Central Appalachia employment and earnings under these most restrictive emissions scenarios. The reduction in the total impact of the coal mining industry would be equivalent to between 14% to 18% of total employment and earnings in Central Appalachia. Finally, there were many individual counties where the decline in total earnings could exceed even these levels.

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Tax Revenue, Demographic, and Transfer Payments Impacts Under Varying Scenarios

In addition to its impact on employment and earnings, the forecast decline in the coal mining industry has the potential to impact tax revenue, population growth, and participation in transfer payment programs. Under the baseline scenario, tax revenues due to the coal mining industry are forecast to decline by \$113 million per year from 1997 to 2010. This is roughly a 20% decline in revenue. The forecast tax impact under each of the alternative macroeconomic scenarios is similar to this baseline forecast. However, the forecast decline in tax revenues is much greater in the Kyoto environmental scenarios that limit emissions most strictly. The three scenarios where emissions are limited to at or below 1990 levels call for a forecast decline in tax revenues of over \$330 million. This represents a 60% or greater reduction in the tax revenues generated due to the coal mining industry.

At the same time, forecast changes in the coal mining industry are expected to have a significant impact on the level of transfer payments and the rate of population growth in Central Appalachia, but more modest impacts in Northern and Southern Appalachia. Forecast losses in the coal mining industry are expected to cause population to decline by less than 0.5% in both Northern and Southern Appalachia under the baseline scenario, and by 1.33% in Central Appalachia. Overall, this represents a loss of 32,000 in population in the 118 major coal-producing counties of Appalachia. Under the more restrictive emissions reduction scenarios for the Kyoto protocol, where emissions must fall to or below 1990 levels, population loss is expected to be roughly 2 ½ times greater than in the baseline scenario. Population is expected to decline by roughly 80,000 under these scenarios, with just over half of this population loss occurring in Central Appalachia, and most of the rest occurring in Northern Appalachia.

The impact on transfer payments under all scenarios is most dramatic in the case of Central Appalachia. In Central Appalachia, the total increase in per capita payments under the six transfer programs is expected to reach \$110 in the baseline scenario, with program payments rising by between 5% and 15% in the TANF, SSI, food stamp, and unemployment insurance programs. A similar level of payments increase is expected under each alternative macroeconomic scenario. Under the most restrictive Kyoto greenhouse gas emission scenarios, total per capita transfer payments are forecast to rise by around \$280 per year in Central Appalachia. Forecast payment increases are less than half as large in Northern and Southern Appalachia.

It should be remembered that under all of these forecast scenarios, the reductions in employment, earnings, tax revenues, and population that are discussed, along with the increases in transfer payments, are forecast changes due to the coal mine industry alone, with other factors held equal. In particular, no special workforce or community economic adjustment programs are examined to determine how they might alter the

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estimated employment, income or transfer payment impacts. Many other factors could occur, such as growth in other industries in these regions or increases in the earnings potential of regional workers, which could have a substantial impact on the fortunes of these regions a decade from now. Indeed, these other factors may have a much larger economic impact on these counties than potential changes in the coal mining industry alone.