

KING COLLEGE
SCHOOL OF BUSINESS

KING COLLEGE REGIONAL ECONOMIC STUDIES (KRES)

KRES PAPER NO. 4, May 2012

Economic Impact Multipliers for the Coalfield Region of Southwestern Virginia

The Coalfield Region

The area of Virginia referred to as the Coalfield Region of Southwestern Virginia includes the counties of Lee, Wise, Scott, Buchanan, Russell, Tazewell and Dickenson, and the City of Norton. A summary of the economic and demographic characteristics of the region is presented as an Appendix to this report. The summary is based on and quotes freely from *Regional Workforce Analysis: Virginia's e-Region*, May 2011. This report was prepared for The Virginia Coalfield Economic Development Authority (VCEDA) by Charles Kennington, an economist with the Virginia Economic Development Partnership.

VCEDA was created by Virginia's General Assembly in 1988 to augment and diversify the economic base of the Coalfield Region by marketing the area as a location for new and expanded business. VCEDA operates several unique incentive and financing programs to encourage new job creation and economic diversification. The organization is also a good source of information on current economic developments in the region. Readers can learn more about VCEDA by visiting their website via the following link <http://www.vaceda.org>.

Another valuable source of labor market and industry information and community profiles is the Virginia Workforce Connection website. This website allows users to access information for counties and aggregate data for Workforce Investment Areas. The Coalfield Region is Workforce Investment Area, "Southwestern Virginia LWIA I." The website may be accessed at <http://www.vawc.virginia.gov/analyzer/default.asp?>

Economic Impact Multipliers

The Bureau of Economic Analysis (BEA) in the US Department of Commerce makes regional economic impact multipliers available through its Regional Input-Output Modeling System (RIMS II). These multipliers allow users to estimate the extent to which a one-time or a sustained change in economic activity will be supplied by industries within a region and, consequently, how this change in economy activity will affect total employment, earnings and output of goods and services in the region.

The RIMS II multipliers are based on fixed interindustry relationships in the 2002 national input-output (I-O) accounts developed by BEA. To develop multipliers for the Coalfield Region, the national I-O relationships are adjusted to reflect the industrial structure and trading patterns in the region's economy as of 2008. These adjustments are based on knowledge and assumptions about the extent to which increases in demand for intermediate goods and services will be supplied by businesses located within the region.

The employment (jobs) and earnings multipliers reported in Table 1 and visually in Figures 1 and 2 are total (Type II) multipliers. These multipliers include *direct, indirect and induced* economic impacts. To illustrate, suppose 100 workers are hired to complete a new construction project (*direct effect*).

Employment tends to increase by more than the 100 jobs directly tied to the project. As the materials and equipment needed to undertake the project are purchased, additional jobs are created in the industries that supply the materials and equipment (*indirect effect*). Finally, people who are put to work, directly and indirectly, on the new project buy more consumer goods and services. This new spending creates jobs in the industries that supply consumer goods and services (*induced effect*). For example, a new construction project in the Coalfield Region employing 100 people would lead to the creation of 148 new jobs (100 direct and 48 resulting from the indirect and induced effects combined).

We report multipliers for 25 selected industries in the Coalfield Region. These industries account for the vast majority of employment and earnings for residents of the region and represent a broad cross section of the region's economic activity. The BEA supplied multipliers for 160 industries existing in the region in 2008, the latest year for which regional multipliers are available. The complete package of multipliers is available upon request.

Multipliers are commonly used to estimate the total economic impact of changes in production and employment levels of existing industries in a region, the departure of an industry from the region and the location of new industry within the region. We illustrate the use of the multipliers below by examining the regional economic impact of changes in the coal mining sector.

Trends in the Coalfield Region

Information on employment and average weekly wages by industry is presented in Table 2 for 1990 and 2011. As is generally the case nationwide, declines in employment in traditional goods-producing industries, chiefly mining and manufacturing in the Coalfield Region, have been offset by increases in employment in the services sectors. However, the significant losses in mining and manufacturing jobs, sectors with relatively high employment multipliers, have contributed to the weak growth in total employment in the region over the past two decades. Employment multipliers are lower in the services sectors, in some cases, significantly lower than the multipliers associated with mining and manufacturing. Accordingly, total employment in the region rose just over 6 percent from 1990 to 2011, well below the statewide increase of nearly 27 percent.

Another concern as jobs shift out of mining and, to a lesser extent, manufacturing, is that wages are generally lower in the services sectors. This point is clearly evident from the wage data presented in Table 2. In addition, the earnings multipliers for mining and mining-related sectors are among the highest in the region. Shifts in employment from mining and mining-related sectors to sectors with lower wages and smaller earnings multipliers have weakened overall earnings and income growth in the region.

Note: Industries shown in Table 2 are 2-digit NAICS (North American Industry Classification System) groupings. Industries shown in Table 1 and Figures 1 and 2 are, for the most part, 6-digit groupings. For example, the 2-digit NAICS Code for Mining, Quarrying & Oil & Gas Extraction is 21; the 6-digit code for Coal Mining, a subset of Mining ..., is 212100. More information about NAICS Codes and industry definitions may be found at <http://www.census.gov/epcd/naics02/naicod02.htm>.

Multiplier Analysis

The employment and earnings multipliers in Table 1 and Figures 1 and 2 point to the importance of the energy sector, especially coal mining, to the economy of the Coalfield Region. Each coal mining job raises total annual earnings in the region around \$135,000 ... direct earnings plus indirect and induced earnings. This relatively large (earnings per job) multiplier stems from the combined effects of the substantial employment multiplier associated with coal mining and the high average wage earned by coal miners. The average weekly wage of \$1,585 for coal mining was more than double the average

wage for all jobs in the region in 3rd quarter 2011. (See Table 3 for employment and wages for the mining subsectors.)

The analysis presented below shows that coal mining directly accounted for 7.1 percent of total employment and 15.7 percent of total earnings in the region in. However, after the multiplier effects are taken into account, 16.1 percent of total employment and 25.7 percent of total earnings can be traced to the coal mining sector.

The indirect plus induced effect shown below is calculated as follows: Employment: Indirect + induced effect = 4,598 times (employment multiplier minus 1.0) = 4,598 times 1.2715 = 5,846.

Earnings: Indirect + induced effect = \$94.7 mil. times (direct earnings multiplier minus 1.0) = \$94.7 mil. times 0.6413 = \$60.7 million.

Economic Impact of Coal Mining, 3rd Qtr. 2011			
	Direct Measure	Indirect plus Induced	Total
Employment:			
Coal Mining	4,598 ¹	5,846	10,444
All Industries	65,057 ¹	n.a.	65,057
Pct. Coal Mining	7.1		16.1
Earnings Per Quarter:			
Coal Mining	\$94.7 mil. ¹	\$60.7 mil.	\$155.4 mil.
All Industries	\$605.1 mil. ¹	n.a.	\$605.1 mil.
Pct. Coal Mining	15.7		25.7
	¹ Source: QCEW		

The long-term decline in coal mining employment in the region appears to have been arrested, at least for now. After hovering around 4,000 jobs for several years (down from 11,555 in 1990), employment rose 16 percent from 3rd quarter 2009 to 3rd quarter 2011. This was a gain of 642 jobs. Based on the multipliers, we estimate that this increase in coal mining jobs resulted in a total gain of 1,458 jobs in the region. And, the increase in coal mining employment created an additional \$86.8 million in annual earnings for households in the region.

Note: The earnings multiplier for Oil and Gas Extraction exceeds that for coal mining, but the oil and gas sector is much smaller than the coal industry in terms of total employment and wages and, thus, has a smaller overall impact. However, changes in Oil and Gas Extraction employment have an important marginal impact on the region's economy.

Conclusion:

We have focused on the economic impacts of changes in coal mining employment for two reasons. First, more than a quarter of the earnings received by households in the Coalfield Region and roughly 16 percent of employment can be traced to the coal mining sector. Changes in coal mining production and employment have significant impacts on the region's economy. Second, coal mining faces an uncertain

future; this uncertainty mainly is due to the challenging and, from the industry's standpoint, harsh regulatory environment. We are not bold enough to forecast future employment in the coal mining industry. We can, however, predict with a good measure of confidence that any significant reduction in coal mining production and employment will create major issues for the region's business, political and community leaders.

The King College Regional Economic Studies Team (KCRES) was formed in 2010 to provide analysis of issues and opportunities confronting the region served by the College. KCRES Paper No. 4 was prepared by Dr. Sam Evans (rsevans@king.edu) and Dr. Jerry Wood (jgwood@king.edu).

KCRES Paper No. 5 will be released in fall 2012.

TABLES and FIGURES

Table 1. Multipliers, Selected Industries, Coalfield Region			Earnings
		Direct	Per job
	Jobs	Earnings	Multiplier
INDUSTRY	Multiplier ¹	Multiplier ²	\$'s ³
Food services and drinking places	1.1655	1.3828	18264
Business support services (includes call centers)	1.2	1.3477	26490
Retail trade	1.2171	1.3249	28660
Nursing and residential care facilities	1.2232	1.264	29315
Other educational services	1.285	1.3598	40022
Colleges, universities, and prof. schools	1.2971	1.3077	45288
Hospitals	1.4133	1.3164	54215
Professional, technical and scientific services	1.5754	1.2836	54265
Ambulatory health care services	1.4349	1.2828	55032
Mattress manufacturing	1.5074	1.5071	58264
Truck transportation	1.5412	1.4984	59840
Wholesale trade	1.5893	1.3434	62173
Public admin. (includes correctional facilities)	1.7923	1.6183	62272
Construction	1.4821	1.4362	69156
Telecommunications	2.1679	1.6406	75074
Plate work and fabricated structural product mfg.	1.7234	1.502	75136
Management of companies and enterprises	1.7546	1.2832	75468
Offices of physicians	1.5006	1.2756	76878
Soft drink and ice manufacturing	1.985	1.9468	77646
Wood Product Manufacturing	2.5196	2.3729	78847
Utilities	2.0356	1.4958	78946
Mining and oil and gas field machinery mfg.	1.7537	1.5702	86368
Support activities for coal mining	1.9096	1.7079	98314
Coal mining	2.2715	1.6413	135276
Oil and gas extraction	2.0112	2.0583	160761

¹ Total increase (or decrease) in the number of jobs in all industries for each job gain (or loss) in the selected industry. Source: BEA.

² Total dollar change in earnings of households employed in all industries for each additional dollar of earnings paid directly to households employed by the selected industry. Source: BEA.

³ Total increase (or decrease) in annual earnings of households employed in all industries for each job gain (or loss) in the selected industry, 2011 \$'s. Source: Calculated by the authors as the direct earnings multiplier times the annual average earnings per job in the selected industry.

Table 2. Employment and Wages, Coalfield Region	1990	1990	2011	2011
Industry	Average Employment ¹	Average Weekly Wage ¹	Average Employment ²	Average Weekly Wage ²
Total, All Industries	61,226	\$668	65,057	\$715
Agriculture, Forestry, Fishing & Hunting	273	\$379	170	\$494
Mining, Quarrying & Oil & Gas Extraction	12,152	\$1,113	6,588	\$1,445
Utilities	400	\$905	445	\$1,015
Construction	2,831	\$606	5,263	\$926
Manufacturing	7,175	\$535	3,630	\$835
Wholesale Trade	1,805	\$702	1,599	\$890
Retail Trade	8,668	\$392	9,440	\$416
Transportation & Warehousing	1,780	\$644	1,810	\$761
Information	883	\$618	955	\$727
Finance and Insurance	1,552	\$614	1,445	\$629
Real Estate & Rental & Leasing	453	\$477	387	\$510
Professional, Scientific, & Technical Services	1,020	\$757	1,981	\$813
Management of Companies & Enterprises	***	***	750	\$1,131
Admin. & Support & Waste Management	790	\$685	2,364	\$472
Educational Services	6,940	\$644	6,810	\$566
Health Care and Social Assistance	5,882	\$642	9,746	\$658
Arts, Entertainment, and Recreation	236	\$318	409	\$887
Accommodation and Food Services	2,746	\$225	4,095	\$259
Other Services (except Public Admin.)	2,147	\$453	2,014	\$580
Public Administration	3,206	\$716	5,157	\$704

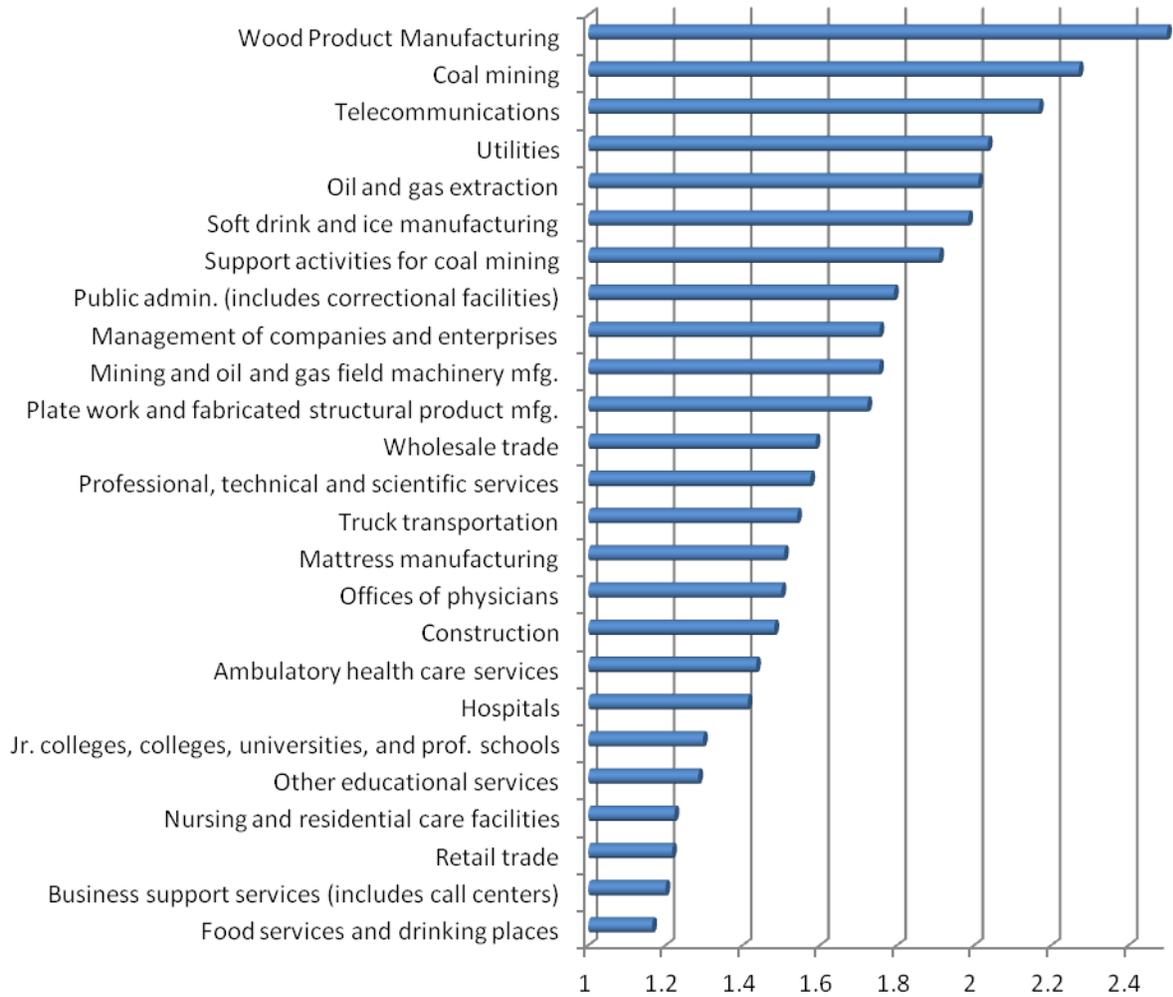
¹ Source: *Quarterly Census of Employment and Wages (QCEW)*, US Bureau of Labor Statistics. The average weekly wage for 1990 is expressed in 2011 dollars.

² Average for 3rd quarter 2011. Source: *Quarterly Census of Employment and Wages (QCEW)*, US Bureau of Labor Statistics.

Table 3. Employment and Wages in the Mining Sector				
Industry Code (NAICS)	Industry	Average Employment¹	Total Wage¹	Average Weekly Wage¹
21	Mining, Quarrying, and Oil and Gas Extraction	6,588	\$123,770,570	\$1,445
211	Oil and Gas Extraction	282	\$5,506,719	\$1,502
212100	Coal Mining	4,598	\$94,741,238	\$1,585
21231	Stone Mining and Quarrying	204	\$1,871,227	\$706
213	Support Activities for Mining	1,504	\$21,632,108	\$1,107
213111	Drilling Oil and Gas Wells	366	\$4,769,508	\$1,002
213112	Support Activities for Oil and Gas Operations	389	\$5,029,470	\$995
213113	Support Activities for Coal Mining	749	\$11,833,130	\$1,215

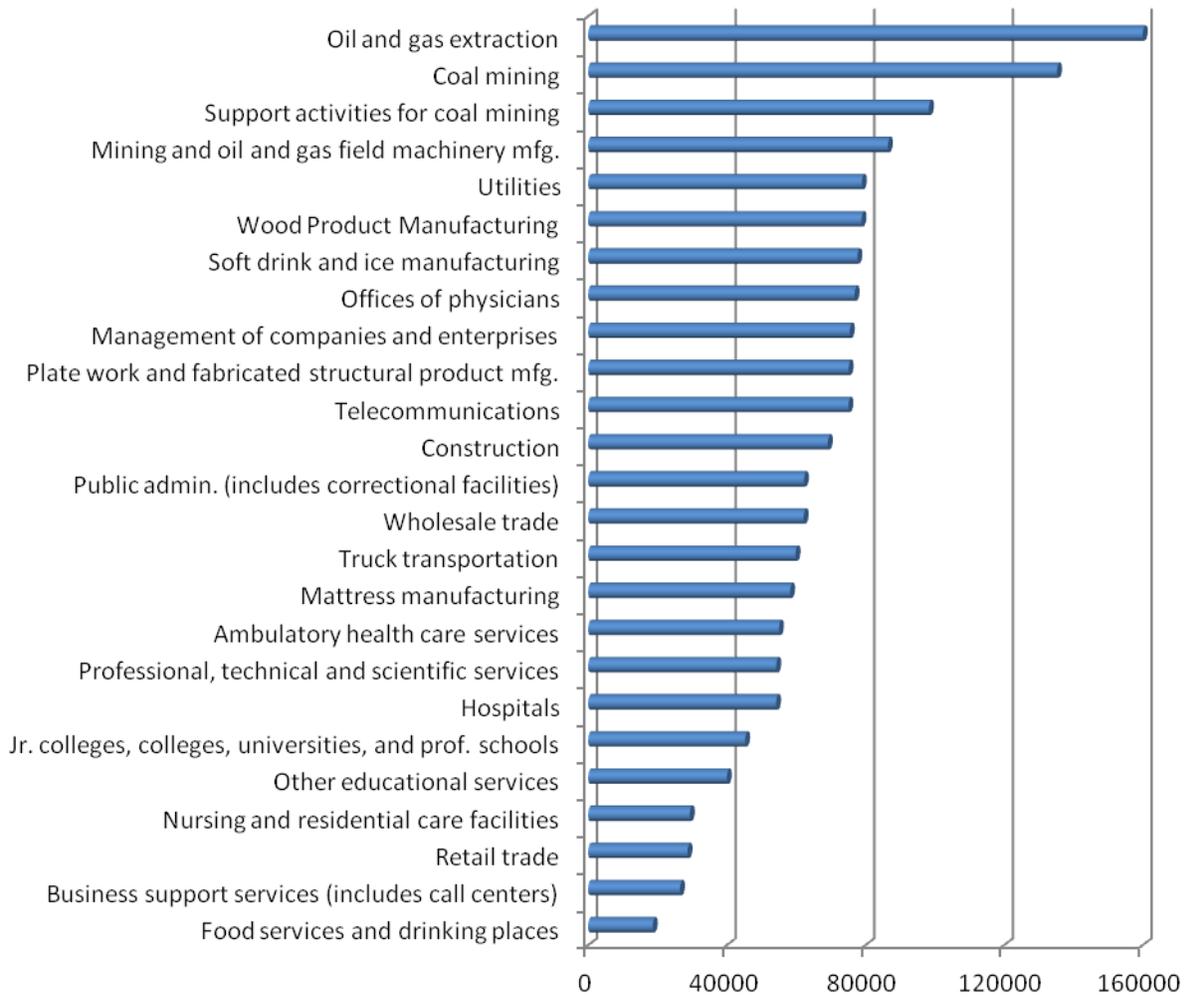
¹ Average for 3rd quarter 2011. Source: *Quarterly Census of Employment and Wages (QCEW)*, US Bureau of Labor Statistics.

Fig.1. Jobs Multipliers, Selected Industries, Coalfields



Total increase (decrease) in the no. of jobs in all industries for each job gain (loss) in the selected industry.

Fig. 2. Earnings Multipliers, Selected Industries, Coalfields



Increase (decrease) in earnings of households employed in all industries for each job gain (loss) in the selected industry, 2011 \$'s.

APPENDIX

Summary: Economic and Demographic Characteristics of the Coalfield Region

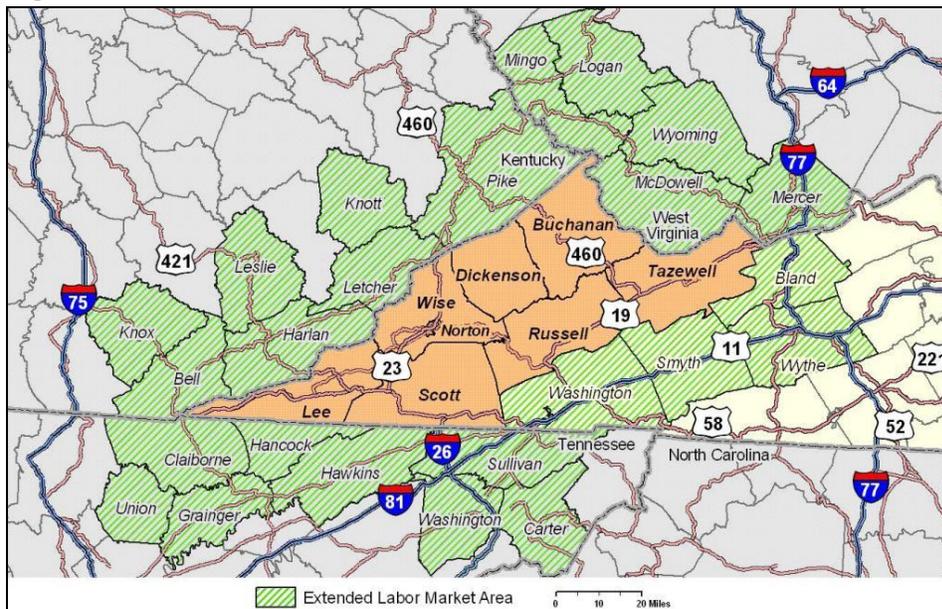
General

The southwest area of Virginia is historically referred to as the Coalfield Region of southwestern Virginia and includes the counties of Lee, Wise, Scott, Buchanan, Russell, Tazewell and Dickenson, and the City of Norton. The physiographic aspect of an area is the description of its geography and other natural phenomena. Much of this area of Virginia has a unique land form that is conducive to the coal mining industry. As changes in population and the job market influence current and future development in the Coalfield Region, local and regional economic conditions play an important role in shaping how the area looks and functions. Although economic growth to a large extent is influenced by external factors that are beyond the control of the area, there are factors an area can influence. Creation of new jobs, attraction of private investment, and incentives for expansion of existing business serve to direct future development. In order to influence the direction of economic development local officials, businesses, and residents must be aware of the influence of the coal mining industry as it pertains to the economic characteristics of the area.

Workforce

The workforce available to industries located in this region is not limited to the immediate area. Workers routinely commute across jurisdictional boundaries, most likely for higher wages, thus, a more complete picture of the regional workforce would include labor from nearby localities. (See Figure 1) The labor force in Virginia's mining region and the surrounding extended labor market area is characterized by unemployment rates that are persistently higher than the statewide average and educational attainment levels that are lower than the statewide average. Measured as a share of total employment, the dominant industries in Virginia's Coalfield region are Mining, Construction, Retail Trade and Government, which is principally comprised of workers in local school systems. The region's largest employers include Wal-Mart (retail), Shaw Services LLC (construction), Food City (retail), the school boards of the region's constituent counties (government), Paramount Coal Company Virginia, and Consolidation Coal Company. The largest manufacturer and fifteenth largest local employer is Joy Technologies with less than 1,000 workers.

Figure 1



Declining Population (2000-2010)

Over the last decade, the population of Virginia's Coalfield Region has declined. The region experienced a fall in population of 1,148 persons or 0.5% from 2000 to 2010, while Virginia's population grew by over 922,000 or 13%. Buchanan County saw the largest decline in population, falling by 2,880 persons (10.7%). Also declining were the counties of Dickenson, Russell, and Scott. Lee County experienced a sizable gain, adding 1,998, or 8.5%. The populations of Tazewell County, Wise County, and the City of Norton increased modestly. Economic growth, to a large extent, is influenced by changes in population. These changes, along with other external factors influence the current and future development in the Coalfield Region. In order to influence the direction of economic development local elected officials and residents must be aware of economic trends and characteristics that contribute directly to the loss in population.

Per Capita Personal Income

Income and poverty levels are an important measurement used to gauge social and economic conditions. While it is recognized that creating and retaining jobs is vital to the growth and development of an area, equally important is the income that is derived from this employment. It is widely recognized that creating jobs is important, the retention of jobs such as those in the mining industry is vital to the overall sustainability of the region. Equally important is the income that is derived from this employment. Income determines how much people spend and fixes the limits on kinds of goods and services they are able to purchase. It is ascertained that coal industry jobs contribute to the creation of other employment opportunities within the region.

An area's capacity to expand and develop, therefore, is affected by the income and spending patterns of its residents and whether or not the incomes are sufficient to support future economic investment and growth. Per capita income is often viewed as a measure of the overall standard of living in a region. Personal income data are collected by the U.S. Department of Commerce's Bureau of Economic Analysis (BEA). Wages and salary disbursements make up the majority of personal income, but other sources such as farm and non-farm proprietors' income, dividends, interest, and transfer payments are also included. Per capita personal incomes in the region and in the surrounding extended labor market area are approximately 37% below the statewide average. Wages in the counties where more coal is produced are higher than those with other sources of income.

Educational Attainment

In Virginia's Coalfield Region there is a relatively low overall educational attainment level. Fewer than 10% have earned a bachelor's degree or higher. Statewide, the rate is three times as high. In this region the percentage of the population lacking a high school diploma is twice the state average at 38% versus 19% statewide. These educational levels most likely contribute to the overall relatively low average income. However, as previously pointed out, wages in the counties producing coal are much higher due to the fact a college education is not a normal requirement to obtain employment in the majority of coal related jobs.

Largest Employers are Government, Health Services, Retail Trade and Mining

Not surprisingly, in a region long associated with coal production, the Natural Resources and Mining sector once accounted for a large share of employment. However, according to data from the Quarterly Census of Employment Wages (QCEW) made available through the Virginia Employment Commission, in the third

quarter of 2010, Natural Resources and Mining accounted for fewer than 10% of total employment opportunities in the Coalfield Region. Government, primarily state and local, is the largest sector, making up 21.6% of total employment. The Trade, Transportation and Utilities sector is second with over 12,500 employees or 19.5% of total employment. Within this sector, utilities account for just four-tenths of one percent. Retail trade, with over 9,100 employees (14%), makes up the lion's share of the sector. Statewide, retail trade accounts for about 11% of employment. Education and Health Services is also an important sector, accounting for 14.4% of employment. Of that, about 8,900 jobs are in health and social assistance.