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Economic Impact Multipliers for the Mountain Empire Region

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 2006 national input-output (I-O) accounts developed by BEA. To develop multipliers for the Mountain Empire Region, the national I-O relationships are adjusted to reflect the industrial structure and trading patterns in the Mountain Empire economy as of 2006. 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 Mountain Empire Region.

To illustrate, suppose a new construction project requires \$1 million of ready-mix concrete. The RIMS II multipliers associated with construction would be greater if industry data indicate that all the concrete would be supplied by local firms than if all, or a portion, of the concrete would be supplied by firms outside the region, i.e., if the region were importing concrete. The same could be said for all inputs, including labor, required for the construction project.

Mountain Empire Region

The Mountain Empire Region consists of counties and cities in Northeast Tennessee and Southwest Virginia and the neighboring counties in Kentucky, North Carolina and West Virginia. Roughly speaking, the region is the area within a 75-mile radius of Bristol.

RIMS II multipliers are available for 60 industries (industry aggregations) in the Mountain Empire, based on the region's economic structure and trading patterns identified for 2006. This paper presents direct employment multipliers and related measures for 15 selected industries in the region (Table 1).

Table 1. Employment Multipliers and Related Measures, Selected Industries, Mountain Empire Region.

Row Industry	Employment multiplier ¹	Total change in earnings ²	Earnings per job ³
	<i>jobs</i>	<i>dollars</i>	<i>dollars</i>
Coal mining	2.4794	137,061	55,280
Auto parts mfg.	2.8462	141,948	49,873
Chemical mfg.	2.3664	141,386	59,747
Primary metal mfg.	2.5906	132,720	51,231
Wood product mfg.	2.4873	84,993	34,171
Construction	1.7241	63,466	36,811
Truck transportation	1.8593	72,198	38,831
Information & data processing services	2.6078	116,607	44,715
Ambulatory health care services	1.7494	80,966	46,282
Educational services	1.3626	38,721	28,417
Retail trade	1.3610	36,936	27,139
Accommodation	1.4045	38,082	27,114
Food services & drinking places	1.2614	23,803	18,870
Warehousing & storage	1.4086	49,121	34,872
Printing & related support activities	1.8791	80,162	42,660

1. Each column entry represents the total increase (decrease) in the number of jobs in all industries for each job gain (loss) in the row industry. The number of jobs in all other industries supported by one job in the row industry is found by subtracting 1.0 from the employment multiplier for the row industry. Source: BEA.

2. Each column entry represents the total dollar increase (decrease) in earnings of households employed by all industries for each job gain (loss) in the row industry, 2010 dollars. Source: Calculated by author.

3. Each column entry represents the total change in earnings divided by the employment multiplier for the row industry, 2010 dollars. This is a measure of average earnings for jobs gained or lost in all industries, not average earnings for the row industry. Source: Calculated by author.

Example Applications of Multipliers for the Mountain Empire Region

I. An increase in demand for coal generates 100 new coal mining jobs:

Total jobs created in all industries: The total number of new jobs created in the Mountain Empire Region is estimated as follows: 100 times the employment multiplier of 2.4794 yields 248 new jobs in all industries. Therefore, each job in the coal mining sector supports 1.48 jobs in all other sectors of the regional economy (found by subtracting 1.0 from the employment multiplier for the coal industry).

Increase in total earnings: The increase in total earnings in the region is estimated as follows: 100 times the earnings multiplier of \$137,061 equals \$13,706,100. This is the total increase in earnings of households employed by all industries, which results from the creation of 100 jobs in the coal mining sector.

Earnings per job gained: Average earnings for the 248 new jobs are \$55,280. This average includes the relatively high earnings for the 100 new mining jobs and earnings for all other affected industries. Some new jobs, such as those created in the retail trade sector, would have relatively low earnings.

II. An auto parts manufacturing facility closes with a loss of 140 jobs:

Total jobs lost in all industries: The total number of jobs lost is estimated as follows: 140 times the employment multiplier of 2.8462 equals 398 jobs lost across the region. For every auto parts manufacturing job lost, 1.85 jobs are lost in other sectors of the regional economy.

Decrease in total earnings: The decrease in total earnings in the region is estimated as follows: 140 times the earnings multiplier of \$141,948 equals \$19,872,720. This is the total decrease in earnings of households employed by all industries, which results from the loss of 140 jobs in the auto parts manufacturing industry.

Earnings per job lost: Average earnings for the 398 jobs lost are \$49,873. This is an average of the 140 jobs lost in auto parts manufacturing and the 258 jobs lost in other sectors of the regional economy.

Note: This example is based on the closing of the Bosch Corporation brake manufacturing facility in Johnson City in 2010. Local media reported that 140 jobs would be lost.

III. A new construction project employs 300 construction workers:

Total jobs created in all industries: The number of total jobs created is estimated as follows: 300 times the employment multiplier of 1.7241 equals 517 jobs created in all industries in the Mountain Empire Region. One construction job supports 0.72 jobs in other sectors of the regional economy.

Increase in total earnings: The increase in total earnings in the region is estimated as follows: 300 times the earnings multiplier of \$63,466 equals \$19,039,800. This is the total increase in earnings of households employed by all industries, which results from the creation of 300 jobs in the construction industry.

Earnings per job gained: Average earnings for the 517 new jobs are \$36,811. This is an average of the 300 construction jobs and the 217 jobs created in other sectors of the regional economy.

Limitations of Multiplier Analysis

Estimated economic impacts based on multiplier analysis are sensitive to assumptions about the extent to which increases in demand for goods and services are supplied by local businesses. In addition, the RIMS II multipliers assume that patterns of purchases among industries are fixed (in our case, 2006 purchasing patterns). If the regional industry structure has notably changed since these relationships were quantified, the impact analysis may be misleading.

RIMS II is a “static equilibrium” model, so estimated impacts have no stated time dimension. Because the multipliers are based on annual data, it is customary to assume that the impacts occur in one year. The multipliers also assume that excess capacity exists in the region and that the local labor force is capable of meeting increases in demand.

The model does not take into account changes in input prices, including wages, which may result from expansion or contraction of economic activity in the region. For example, a factory closure may result in lower wages and subsequent gains in employment in other industries. This occurrence would partly offset the negative impacts of the factory closure. Consequently, some analysts suggest that RIMS II multipliers provide estimates that are best seen as upper bounds on total impacts.

The King College Regional Economic Studies Team was formed in 2010 to provide analysis of issues and opportunities confronting the region served by the College. Dr. William Teng (wyteng@king.edu) is the Team Leader. KCRES Paper No. 1 was prepared by Dr. Sam Evans (rsevans@king.edu).

KCRES Paper No. 2 is scheduled for release in May 2011.

