Handout on using final demand and industrial multipliers
CRP 523 Spring 2008

I handed out multiplier tables for the state of Iowa. They contain output, labor income, and jobs multipliers. The output multiplier is to be read as a value per unit of change in direct output in the firm that you are measuring. So, per $1 increase in output in oilseed farming, your economy would expect $.2828 in indirect output (suppliers to the oilseed farmers), and you would expect $.2669 in induced activity (the household spending round). The Type I and Type Total multipliers express these values. The Type I multiplier tells you how much a dollar's change in the direct sector (oilseed farming) affects the regional economy through supplying sectors. The Type Total multiplier tells you how much a dollar's change in the direct sector affects the whole economy.

The labor income and the jobs multipliers are a little different. The first four columns of the table express expected values per dollar unit of output (it can be a $1 or $1,000,000). So if the oilseeds sector increases output by, say, $1,000,000, then we would expect, in order, $271,800 in direct labor income, $67,700 in indirect labor income, and $80,900 in induced labor income. For the jobs we'd expect 5.74 jobs in the direct sector per $1,000,000 of direct oilseeds output, 1.978 jobs in the indirect or supplying sectors, and 2.77 jobs in the induced sector.

The Type I and the Type II multipliers can be used when you already know the direct output, labor income, and jobs in the sector that you are studying. Often when we do economic impact assessments, the company will give us an estimate of the jobs that will be created (or lost) and their total payroll. In those cases, we can simply use the labor income or the job Types I and Types Total multipliers to estimate economic impacts.

Often, however, all that you are given for a sector is the number of jobs that the company is adding or, if closing, taking away from the regional economy. We can back-out the expected output values, deduce the labor income values, and then compile our economic impact estimate using multipliers.

As an example, say that a furniture manufacturer (sector 364) is going to close and 250 plant workers are going to lose their jobs. If we go to sector 364 we can see that there are an expected 7.7552 jobs per $1,000,000 of industrial output. So,

250 jobs / 7.7552 = $32.24 million in direct output.

Next we need to know the direct labor income. The coefficient is .2972, so,

$32.24 million X .2972 = $9.581 million in labor income.

We now know direct jobs, output, and labor income and can compile an impact summary:

Multiplier Example

Category	Direct	X	Type Total Multiplier	=	Total Impact
Output	$32.24		1.562		$50.35
Labor	$9.58		1.5722		$15.06
Jobs	250		1.6444		411

We can also use the Type I multiplier and the difference between Type I and Type Total to determine the expected indirect and the induced values if that is required. It rarely is.

Sometimes we don't have good information about an industry's operations in a region, but we may have a good sense of the kinds of inputs and labor the firm requires. In those cases we can conduct a "Bill of Goods" type of analysis. That analysis basically looks at all of the major inputs into production that would be expected of a firm. An assumption has to be made as to how much of those inputs would be purchased from the local economy. Once assumed, you can then calculate an expected economic impact.

For example, we might, based on basic research, determine that a new furniture manufacturer in our region had the following regional input needs:

Inputs (Sector)	Percent
Sawmill (112)	20%
Wholesale (390)	10%
Plastic parts (177)	5%
Trucking (394)	8%
Labor	30%
Imports	27%

We can treat this as the inputs bill of goods and calculate the expected regional economic impacts if those inputs were purchased in our study economy and all of those purchases represented increased regional sales by those suppliers. For simplicity's sake, we can assume that this factory will have $1,000,000 in output or sales (this fabrication is completely different than the example above). As such, the plant will require $200,000 in milled wood. We can go to the milled wood sector (112) and find the total output, labor income, and jobs multipliers for that sector. In order, then, $200,000 of new sawmill purchases in the region from our furniture plant would yield the following outcomes:

$200,000 direct saw mill output			
TIMES			
Total output multiplier	**1.7568**	**=**	**$351,360**
Labor income total multiplier	**.3026**	**=**	**$60,520**
Jobs total multiplier	**9.8 X .2**	**=**	**1.96 jobs**

Note that the jobs multiplier of 9.8 is per $1,000,000 of output. So, I've multiplied 9.8 times the fraction of a million that my plant has ($200,000 or $.2 million). The labor income multiplier is just .3026 times $200,000 as it is a coefficient of the output.

We repeat these steps for each input item until we've finished all of the major inputs. You can ignore minor input categories, for the most part, so long as the major inputs have accounted for, say 90 percent or so of inputs.

Next we need a value for worker spending. We find worker spending by going back to the multiplier table for the furniture sector and find that $297,845 in labor income would be expected going to 7.75 jobs. The last table of the multiplier table had a median household income multiplier per $1,000,000 of income table. Accordingly we can use the totals column times the expected boost to area incomes. That amount from my table is 30 percent or $300,000. If the values in the totals column are multiplied times .3 we get the estimates for the labor income component.

There are of course no multipliers for the imports as the imports are external to our economy.

Furniture Economic Impact Per $1,000,000 in Output

		Total Impacts		
Inputs (Sector)	Percent	Output	Labor Income	Jobs
Sawmill (112)	20%	351,360	60,520	1.96
Wholesale (390)	10%	155,000	55,730	1.25
Plastic parts (177)	5%	73,495	18,180	0.45
Trucking (394)	8%	132,368	44,400	1.14
Labor	30%	297,912	88,731	3.03
Imports	27%	*	*	*
Sum of all Inputs		**1,010,135**	**267,561**	**7.83**
Direct Values	**100%**	**1,000,000**	**300,000**	**7.75**
Totals		**2,010,135**	**567,561**	**15.58**
Multiplier		**2.01**	**1.89**	**2.01**