

Chapter 6

Data base summary: input-output multipliers

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For many purposes it is useful to know the answer to the following question: “if the final demand for a given commodity rises by \$1 million, what will be the impact on the profile of factor demands?” The purpose of the tables in this chapter is to help answer this question on a region-by-region basis, without formal simulation of the Global Trade Analysis Project (GTAP) model. Here we report only data for the world aggregate. Country by country multipliers can be found in the CD-ROM data base package that accompany this document.

6.1 Direct requirements coefficients

The columns in table 6.1 correspond to domestic intermediates, imported intermediates, labor, capital, and indirect taxes. These coefficients sum to 100, since sectoral revenue must equal cost (inclusive of taxes) in the balanced GTAP data base. Rows in the table correspond to “sectors”, or columns in the input-output (I/O) table. This includes the activities in final demand, including private and government consumption, investment and exports.

Land is only a direct requirement in the agricultural sectors. (Recall the discussion in chapters 2 and 3.) Splits for the other primary factors in agriculture are almost identical. This is by construction, since we only have primary factor splits for the aggregate agricultural sector (see chapter 17.4).

The next point to note about the World direct requirements coefficients is that the final demand activities — consumption, investment and exports — do not employ primary factors of

production. This follows from I/O accounting. Furthermore, the domestic, import and tax intensities of these final demands also differ widely. Investment is the most import-intensive of the final demands, while government consumption is mostly domestic. Private consumption is the most heavily taxed (4% direct consumption taxation), whereas government consumption is typically not taxed at all or lightly taxed.

Turning to the productive sectors of the economy, we see that manufacturing sectors show high shares of intermediate inputs, while extractive sectors, services and agriculture show relatively low shares. Agriculture, forestry and services are also quite intensive in unskilled labor. In terms of direct requirements coefficients, the sectors which show the highest coefficients for capital are forestry, oil and gas, services and dwellings. The latter absorbs capital in excess of 65% of costs. Finally, we note from the last column that beverages, tobacco products, and petroleum products are the sectors with the highest output taxes, on a global basis.

6.2 *Total requirement coefficients*

Table 6.2 reports the total requirements coefficients, whereby all derived demands are attributed to “primary” factors of production.¹ Thus a \$100 million increase in the sales of wheat to final demand in the World is shown to increase the demand for imports by \$12.4 million, unskilled labor by \$47 million, skilled labor by \$7.2 million, capital by \$30.4 million, land by \$17.2 million, natural resources by \$0.5 million and indirect taxes by \$14.8 million.

Because labor intensive activities also demand some capital intensive intermediates, and vice versa, the factor intensities in table 6.2 tend to be somewhat less diverse than those in table 6.1. This is particularly noticeable in the case of land. Here, the direct requirements are zero outside agriculture, but because other sectors, such as meat and milk products, use a great deal of agricultural inputs, they exhibit significant total requirements for land. The same is true in the case of taxes. The direct requirements tax rate for a number of the agricultural sectors was negative in table 6.1, indicating the presence of a subsidy. The total requirements tax rate was also negative for these agricultural sectors indicating that the derived demand for taxed intermediates did not generate sufficient revenue to offset these subsidies.

It is also interesting to compare the primary factor intensity of total requirements for final demand. Exports are more intensive in capital, skilled labor and natural resource than investment. The later comparison shows the importance of the direct and total requirements coefficients and can give the reader some important insights into the structure of the GTAP data base, and hence the likely outcomes when the data base is used in model simulation.

¹ For the purposes of this calculation, “primary” factors include not only the conventional primary factors, labor, capital, and land, but also indirect taxes and imports, which are external to the one region I/O model.

Table 6.1 Direct requirements coefficients, World (per cent)

	Domestic products	Imports	Unskilled labor	Skilled labor	Capital	Land	Natural resources	Indirect tax
Paddy rice	26.1	3	36.5	0.4	14.9	24	0	-4.8
Wheat	42.5	6.9	33.6	1.2	16.1	15.3	0	-15.6
Cereal grains n.e.c.	40.9	5.8	29.8	1.2	16.3	16.6	0	-10.6
Vegetables, fruit, nuts	27.4	3.7	33.8	0.9	15.5	17.6	0	1.1
Oil seeds	35.4	5.3	30.1	0.9	17	20.7	0	-9.4
Sugar cane, sugar beet	29.1	3.4	31.4	0.8	18.2	18.1	0	-1
Plant-based fibers	34.3	4.1	28.3	0.5	12.2	19.2	0	1.4
Crops n.e.c.	26.7	5.1	33	1.2	16.5	17.4	0	0.1
Cattle, sheep, etc.	60.9	3.9	19.5	0.7	10.6	9.7	0	-5.3
Animal prods n.e.c.	57.6	4.6	20.8	0.6	8.9	10.1	0	-2.7
Raw milk	54.4	4.4	23.8	1	11.3	10.2	0	-5.1
Wool, silk-worm cocoons	43.2	10.5	23	0.6	11.3	9.1	0	2.2
Forestry	36.6	2.7	21	0.7	30.5	0	6.9	1.7
Fishing	34.9	4.1	15.2	0.4	20.6	0	22.8	2.1
Coal	47.6	5.3	13.9	2.9	10.7	0	22.4	-2.7
Oil	26.5	4.6	4.9	1.7	35.5	0	24.7	2.2
Gas	31.6	5.8	5.2	2.4	27.8	0	22.9	4.3
Minerals n.e.c.	44.1	8.7	13.4	4	20.3	0	6.5	2.9
Cattle, sheep, etc. meat prods	74.5	5.6	7.7	2.3	8.8	0	0	1
Meat prods n.e.c.	75.2	5.5	8.8	2.6	7.1	0	0	0.7
Vegetable oils & fats	63.2	14.1	8.1	2.7	9.4	0	0	2.6
Dairy prods	71.6	5.8	8.6	2.5	11.1	0	0	0.5
Processed rice	83.8	3.1	3.3	0.7	7.6	0	0	1.5
Sugar	68.3	7.7	8.3	2.6	10.1	0	0	3
Food prods n.e.c.	56.6	9.1	11.6	4.1	15.4	0	0	3.1
Beverages, tobacco prods	42.6	5.4	8.8	3.3	16.6	0	0	23.3
Textiles	55.5	11.5	14.6	3.6	11.5	0	0	3.3
Wearing apparel	52.3	11.7	17.1	3.7	12.3	0	0	2.9
Leather prods	48.8	14.6	16.5	3.4	12.9	0	0	3.9
Wood prods	52.1	9.2	19.1	5.8	11.9	0	0	2
Paper prods, publishing	49.7	10.1	16.3	8.4	13.7	0	0	1.8
Petroleum, coal prods	49.5	22.3	4.1	1.9	11.5	0	0	10.8
Chem., rubber, plast. prod	49.3	13.2	11.5	6.6	15.3	0	0	4
Mineral prods n.e.c.	51.6	6.4	16.3	5.9	16.8	0	0	3
Ferrous metals	56.1	12.8	11.8	4.1	12.4	0	0	2.7
Metals n.e.c.	53.3	19.3	11	3.8	10.2	0	0	2.4
Metal prods	50.6	8.5	20.4	8.1	10.7	0	0	1.7
Motor vehicles, parts	55.5	15.1	12.3	6.2	7.9	0	0	3.1
Transport equip. n.e.c.	43.8	9.9	21.4	11.2	12.1	0	0	1.6
Electronic equipment	46.7	12.7	13.5	8.7	16.2	0	0	2.2
Machinery, equip. n.e.c.	44.8	12.4	16.7	11	12.5	0	0	2.7
Manufactures n.e.c.	48.3	11	18.2	6.5	13.2	0	0	2.9
Electricity	37.9	3.6	9.4	6	37.8	0	0	5.2
Gas manuf, distribution	41.5	11.1	9.7	5.9	28.2	0	0	3.6
Water	47.4	3.1	15	9	23.2	0	0	2.3
Construction	51.7	4.9	19.7	7.9	13.4	0	0	2.3
Trade, transport	36.1	4	26.4	10.5	20.1	0	0	2.9
Financial, bus., etc. serv	39.4	2.8	13.9	14.4	26.7	0	0	2.7
Public admin., educ., etc.	27	3.6	29.9	31.3	6.8	0	0	1.5
Dwellings	18.3	0.9	12.6	0	65.1	0	0	3.1
Private consumption	88	8	0	0	0	0	0	4
Government consumption	95.4	3.7	0	0	0	0	0	0.9
Investment	84.8	12.8	0	0	0	0	0	2.4
Exports	99.6	0	0	0	0	0	0	0.4

Table 6.2 Total requirements coefficients, World (per cent)

	Imports	Unskilled labor	Skilled labor	Capital	Land	Natural resources	Indirect tax
Paddy rice	6.3	44.9	3.7	23.2	25.7	0.2	-4
Wheat	12.4	47	7.2	30.4	17.2	0.5	-14.8
Cereal grains n.e.c.	10.9	42.3	7.3	30.2	18.1	0.4	-9.1
Vegetables, fruit, nuts	7.2	42.2	4.7	24.5	18.7	0.3	2.4
Oil seeds	9.6	41	6	28.9	22.5	0.3	-8.3
Sugar cane, sugar beet	7.1	40.8	4.4	27.5	19.9	0.3	-0.1
Plant-based fibers	8	38.8	5.5	23.7	20.9	0.3	2.8
Crops n.e.c.	8.5	41.2	4.8	25.4	18.6	0.3	1.3
Cattle, sheep, etc.	10.7	41.6	7.6	29.9	15.7	0.4	-5.9
Animal prods n.e.c.	11.9	40.3	7.2	27.4	14.2	0.6	-1.5
Raw milk	10.8	42.9	7.2	28.6	14.7	0.4	-4.7
Wool, silk-worm cocoons	16.1	37.4	6.1	24.7	11.5	0.4	4
Forestry	6.1	32.4	4.9	44.6	0.2	8.5	3.2
Fishing	8.8	25.3	5.2	32.2	0.5	24	4
Coal	11.1	27.2	9.8	27	0.1	25.4	-0.6
Oil	7.3	11.2	5.5	45.6	0	26.9	3.5
Gas	8.9	12.5	7.2	39.7	0	25.5	6
Minerals n.e.c.	14.3	25.3	10.7	36.4	0.1	7.8	5.5
Cattle, sheep, etc. meat prods	13.9	36.4	9.6	32	8.6	0.4	-0.9
Meat prods n.e.c.	14.5	37.1	9.9	29.5	7.8	0.5	0.7
Vegetable oils & fats	21.9	30.3	9.3	29.1	6.6	0.5	2.4
Dairy prods	14.1	35.3	10.2	33.6	6.4	0.4	0
Processed rice	9.4	38.3	5.6	29.1	17.4	0.6	-0.4
Sugar	14.2	33.4	8.6	30.7	8.4	0.6	4.1
Food prods n.e.c.	15.8	30.1	11.2	34	2.8	1.3	4.8
Beverages, tobacco prods	10.2	22.2	9.2	30.5	1.7	0.3	25.8
Textiles	20.2	31.4	11	29.5	1.2	0.4	6.4
Wearing apparel	20.2	33.5	10.6	28.9	0.6	0.3	5.9
Leather prods	22.4	31.8	9.8	28.5	0.9	0.3	6.3
Wood prods	15.5	35.6	12.9	30.1	0.2	1.1	4.5
Paper prods, publishing	16.7	31.3	16.6	30.6	0.1	0.5	4.2
Petroleum, coal prods	28	13	6.9	31	0	7.4	13.7
Chem., rubber, plastic prods	20.5	24.7	14.1	32.5	0.3	1	7
Mineral prods n.e.c.	12.7	31	13.8	35.4	0.1	1.2	5.9
Ferrous metals	21.3	27.5	12.2	31.9	0.1	1.1	5.8
Metals n.e.c.	28.4	25.4	11.2	28.6	0.1	1.1	5.3
Metal prods	16.6	35.4	15.9	27.2	0.1	0.4	4.4
Motor vehicles, parts	24.5	28.6	15.2	25.2	0.1	0.3	6.1
Transport equipment n.e.c.	16.7	34.8	18.8	25.7	0	0.2	3.7
Electronic equipment	19.8	27	16.5	31.8	0.1	0.3	4.6
Machinery, equipment n.e.c.	19.1	29.8	18.5	27.3	0.1	0.3	5
Manufactures n.e.c.	18	32.5	14.1	29.2	0.3	0.5	5.5
Electricity	8	18.9	11.2	52.1	0	2.5	7.2
Gas manufacture, distribution	15.8	17.9	11	45	0	4.4	5.8
Water	8.8	28	17	40.7	0.1	0.5	5
Construction	11.6	35.6	16.3	30.9	0.1	0.5	5.1
Trade, transport	7.6	37.1	16.7	33.2	0.2	0.3	4.9
Financial, business, etc. serv	6.4	24.8	22.2	41.6	0.1	0.2	4.7
Public admin., education, etc.	6.3	38.2	37.1	15.4	0.1	0.2	2.7
Dwellings	2.5	18.2	3.6	71.6	0	0.1	4
Private consumption	16.5	27	14.9	31.5	1.2	0.5	8.4
Government consumption	11.5	34.2	29.2	20.4	0.2	0.3	4.3
Investment	24.6	28.4	14.1	25.8	0.1	0.4	6.6
Exports	16.5	29.4	15.2	30.6	1	1.8	5.5