Using national accounts input-output tables

For National Accounts input-output tables: Year ended March 2013
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These notes introduce each of the input-output tables and provide worked examples of how they can be used to understand the structure of the economy and the impact of changes on it.

Table 1: Supply of products in basic prices

Table 1 shows the supply of goods and services by industry, in basic prices, on a money-flow basis. It also reconciles total supply by product in basic prices to purchasers’ prices by adding taxes on products (such as GST, excise, and imports duties) and margins on products. The total supply of margins (C208) is zero, as the wholesale and retail margin products recorded in basic prices (C8 and C7) are removed and allocated to goods and services in purchasers' prices.

Each column shows the production of goods and services by a particular industry. Each row shows the production of a good or service by industries that produce it. Imports are also shown by products as a source of supply (column DI). Total supply of each industry is analysed according to whether the output was:

- market – output sold at economically significantly prices or otherwise disposed of on the market
- own final use – output retained for own use by the owners of the enterprises in which they are produced (eg own account capital formation, the imputed rent of owner occupied dwellings, owner-builders' construction work, and the output of private households with employed persons)
- other non-market – output consisting of goods and services produced by government or non-profit institutions serving households for free, or at prices that are not economically significant. Such output may be produced because:
  - it may be technically impossible to charge individuals for collective services (eg defence)
  - goods and services are not charged for as a matter of social or economic policy (eg health services).

Examples from table 1

1. The food and beverage services industry produced $2,603 million of meal services (BL139) and $1,328 million of beverage services (BL141).
2. In basic prices, New Zealand industries produced $1,606 million of fertilisers and pesticides (DH79) while $857 million of this product was imported (DI79).

Table 2: Use of products in basic prices

Table 2 shows the use of goods and services by industry and final demand category, in basic prices, on a money-flow basis. Total intermediate consumption (goods and services used up in the production process) of each industry, in basic prices, is reconciled to purchasers’ prices in rows 208 to 211. Each industry’s value added (row 212), by component (rows 214 to 218), is then added to intermediate consumption to give the total value of output by industry (row 219). This total output matches the total supply by industry in table 1.
Columns DF to DN show the final use of goods and services by final demand category:

- exports
- final consumption expenditure by households
- final consumption expenditure by private non-profit institutions serving households
- final consumption expenditure by central and local government
- gross fixed capital formation
- changes in inventories.

Examples from table 2
1. The textile and leather manufacturing industry consumed $90 million of yarn and thread products (S60) and $29 million of woven fabrics (S61).
2. The wood product manufacturing industry paid $809 million in salaries, wages, and allowances to its employees, either in cash or in kind (U214).
3. New Zealand exported $575 million of pulp, paper, and paperboard to the rest of the world (DF71).
4. Households spent $126,160 million in purchasers' prices (DG211). This comprised $111,011 million expenditure in basic prices (DG208) and $15,149 million in taxes on products (DG210).

Table 3: Imports into industries and categories of final demand
Table 3 shows how the supply of imported goods and services (column DI in the table 1) are used in intermediate consumption and final use.

Examples from table 3
1. The dairy cattle farming industry imported $139 million of pharmaceutical products (D81).
2. $9,264 million of New Zealand's gross fixed capital formation was imported (DL208); $1,888 million of this was motor vehicles, trailers, and semi-trailers; bodies (coachwork) (DL101).

Table 4: Inter-industry transactions
The interdependence of industries is shown by how much each industry buys from and sells to every other industry.

There are three parts to this table:

- Rows 7 to 113 show the source of goods and services used by industries (columns B to DC) in intermediate consumption. Note that imports are shown in row 113 as a direct source of supply of products.
- Rows 118 to 124 show value added and its components for each industry, while row 125 shows each industry's total output.
- Columns DF to DN show final demand aggregates, according to which industries supply that final demand.
Examples from table 4

1. The pulp, paper, and converted paper product manufacturing industry bought $146 million of products from wood product manufacturing (U25) and $310 million of imported goods and services (U113).
2. Central government administration services purchased $149 million of goods and services from the legal and accounting services industry (CN89).
3. Households purchased $261 million of goods and services from the heritage and artistic activities industry (DF107).
4. The seafood processing industry exported $1,022 million of its output (DE19).

Table 5: Industry by industry total requirements (direct & indirect) per unit of final demand

Table 5 shows how much extra output is required from every industry if a particular industry is to produce more of its own output. These are the direct requirements per unit of final demand. However, each of these contributing industries would need inputs into their own production process, which are produced by other industries. These are called indirect requirements.

Table 5 takes into account both direct and indirect requirements and is sometimes referred to as the Leontief inverse matrix. The cells in the table are read by columns and expressed as coefficients. Each cell describes the change in requirements from the source industry (rows) to meet a one-unit change in production for final demand by the producing industry (columns).

The values at the diagonal intersection of the rows and columns are all greater than one, since in order for an industry to increase its output by one more unit, directly for final use, it must actually increase its output by more than one, the remainder being required by other industries for them to produce their contribution.

As an external source of goods and services, imports are removed from analysis of domestic industries’ interdependence. The import requirements of these industries and final demand is analysed in tables 7, 8, and 9.

Examples from table 5

1. For the forestry and logging industry to produce $1 million extra output for exports, $152,000 extra output is required from the road transport industry (F66). [$1m x 0.152]
2. If the medical and other health care services industry is to increase its output by $1 million for household consumption, it must increase its own production by $1.188 million (CV105). [$1m x 1.188]
3. If an upturn in world demand for milk powder increased dairy product manufacturing exports by $100 million, then $65.0 million more output is required from the dairy cattle farming industry (O9). [$100m x 0.650].

Table 6: Ultimate disposition of the output of industries

Table 6 shows the final demand categories that each industry’s output ultimately goes to. The output may go directly to final demand (e.g., exports), or may go indirectly, after processing by other industries. Nevertheless, total output by New Zealand industries (table 4, DD125) must eventually be consumed by households, government, non-profit institutions serving households, or add to gross fixed capital formation or inventories, or be exported. Flows in columns B to J of the ultimate disposition of the output of industries
will exceed the equivalent columns in the inter-industry transactions table (table 4, columns DE to DM) by purchases by industries for further processing.

The table is useful for determining an industry's overall contribution to the economy's export receipts and other final demands, both directly and indirectly.

Examples from table 6

1. Of the dairy cattle farming industry's output of $10,544 million (K9), 87 percent is ultimately exported (B9). [$9,205m/$10,544m x 100]
2. Of the non-residential building construction industry's output of $5,100 million (K48), 71 percent is ultimately used for gross fixed capital formation (I48). [$3,607m/$5,100m x 100]

Table 7: Cumulated primary input coefficients of industries

The columns of table 7 show, in unit terms, the allocation of the components of value added (primary inputs) and imports to industry. It includes the direct payments by an industry for salaries and wages, imports etc, but also takes into account the value added items and import costs incurred by other industries that produce goods and services used by that industry (ie indirect payments).

These tables can also be read by rows, to show the effect on each industry of an economy-wide change in one of the primary input categories (eg compensation of employees), or a change in imports due to the New Zealand dollar depreciating.

Examples from table 7

1. Wages increase by 3 percent across the whole economy. Since direct and indirect salary and wage costs form 75.9 percent of the total costs of the preschool education industry (CQ7), it follows that the total input costs of this industry will ultimately rise 2.3 percent. [0.03 x 0.759 x 100]
2. If the motion picture and sound recording activities industry is to increase its output by 10 percent, then import costs will increase by 0.05 percent for the whole economy. [0.10 x 0.178 (table 7, BQ6) x $1,694m (table 4, DN74) / $61,252m (table 4, DN113) x 100]

Table 8: Cumulated primary input coefficients of categories of final demand

Table 8 extends table 7. The columns of table 8 show, in unit terms, the allocation of the components of value added (primary inputs) and imports to final demand categories. It is calculated by taking into account all the primary input and import costs incurred, both directly and indirectly, by all industries, and the ultimate disposition of goods and services produced. Table 8 also shows the import content of exports or capital formation.

Example from table 8

If import prices rise 5 percent economy-wide, total export costs for the whole economy will rise 1 percent. [0.05 x 0.192 (B6) x 100]
Table 9: Cumulated import coefficients of industries and categories of final demand

Table 9 expands the imports row in tables 7 and 8, and shows imports itemised according to the goods and services listed in table 3. For example, the total import component of gross fixed capital formation (table 8, I6) is analysed by imported products in this table (Column DK).

Table 9 shows the imported goods and services used, directly and indirectly, in gross fixed capital formation.

Example from table 9

A 10 percent increase in the output of air and space transport will require a 6.4 percent increase in the imports of other petroleum products. [0.10 x 0.130 (table 9, BL75) x $5,015m (table 4, BL125)]/ $1,020m (table 3, DN76) * 100].

Concordance 1: Industry groupings

The industry groupings list shows which national accounts working industries have been combined to produce data shown in tables 1 to 9. National accounts working industries are analysed individually, but may be combined to preserve the confidentiality of data provided by survey respondents. They may also be combined when the data for an industry is lower quality, which means there’s limited value in presenting it separately.

Concordance 2: National accounts working industries to ANZSIC06

The national accounts working industries to ANZSIC06 concordance shows which ANZSIC06 (our detailed industry classification) categories make up each of the national accounts working industries (which use the NZSIOC classification). For example, the aquaculture industry (AA311) includes three different ANZSIC06 classes: two for offshore aquaculture (A020100 and A020200) and one for onshore aquaculture (A020300).

Concordance 3: Product groupings

The product groupings list shows which national accounts goods and services have been combined to produce data shown in tables 1 to 9. As with the industry groupings, national accounts goods and services are analysed individually, but may be combined to maintain confidentiality or where individual data is lower quality.

Concordance 4: National accounts products to CPC

The national accounts products to CPC (Central Product Classification – a detailed product classification) concordance shows which CPC products make up each of the national accounts goods and services (which use the NA06CC classification). For example, the vegetables product (012.00) includes 37 different CPC products, from asparagus (1211) to pulses not elsewhere classified (1709).