

**New Zealand System of National Accounts**

***Inter-Industry Study 1996***

***Interim Release of Tables***  
**49 Industries**

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Statistics New Zealand  
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# Introduction

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This document is an interim release of the Inter-Industry Study 1996 tables, comprising:

- the full set of tables directly available from the study at a 49 industry level of detail
- a description of each table and examples of how to interpret the table
- a concordance between the industry classification used in the study and the Australian and New Zealand Standard Industrial Classification
- a concordance between the commodity classification used in the study and the Australian and New Zealand Standard Commodity Classification
- an explanation of the differences between the supply and use tables, and the other tables.

A full publication will be produced shortly. It will contain all the above, along with additional text explaining the concepts, key sources and methods used, and the relationship of the tables to the New Zealand System of National Accounts time series. Note that the enclosed tables are final; however, the explanatory text may change during editing for the final publication.

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## Money flow and product flow tables

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The supply and use tables show transactions on the same basis as those recorded in business financial accounts. These accounts are collected via the Annual Enterprise Survey, which in turn is the principal data source for the inter-industry study. The business units surveyed are not homogeneous in what they produce, often producing a range of goods and services in addition to those that are characteristic of the industries they are classified to - that is 'secondary production'. Transactions in supply and use tables are observable 'real world' flows. They make useful statements about the economic flows in the New Zealand economy as shown in business accounts, ie on a 'money flow' basis. They are conceptually consistent with the other New Zealand System of National Accounts tables.

Tables produced on the money flow basis do not necessarily give the most appropriate account of the relationship between inputs and outputs of goods and services and the production processes used, because of the problem of secondary production. Therefore, where practical, the accounts of industries which have significant amounts of secondary production are adjusted, to remove this production and reclassify it to the industry where that production is characteristic. These 'product flow' tables form the basis of the transactions table and the later tables in this report.

There are two main types of adjustment made:

- Contract manufacturing, where, typically, a wholesale industry purchases raw materials, has them processed on a fee or commission basis, and then sells the finished product. The secondary production adjustments move the purchase and use of the raw materials, and sales of the finished product, from wholesale trade to the appropriate manufacturing industry, and eliminates the processing fee. These adjustments involve reclassifying actual transactions so that the tables record the physical flow of goods. Hence these tables are termed "product flow" tables.
- Significant retail trade activities of non-margin industries are reclassified to retail trade.

An example of a contract manufacturing adjustment is that made to the wholesale trade industry which includes the oil companies. This wholesale trade industry purchases crude oil, pays a manufacturing fee to have it refined by the petroleum refinery, then distributes and sells the refined product. Money flow transactions show the wholesale trade industry producing petrol when it is physically and characteristically done by the refinery. In the product flow tables the wholesale industry has had its purchases of crude oil transferred to the inputs of the refinery. The sales of petrol have been transferred from the wholesaler to the refinery too. The manufacturing fee paid by the wholesaler and received by the refinery is removed. The petroleum wholesaler is then shown to purchase refined petrol from the refinery for resale. The margin that becomes part of the adjusted petroleum wholesaler's output is spread over the users of petrol. In summary, we have adjusted two industries' production accounts to show production where it physically occurs.

Other activities where product flow adjustments for contract manufacturing contract were made are aluminium smelting, vehicle assembly and clothing manufacture. The main instance of secondary adjustment for margin activities is in the accommodation, restaurants and bars industry, where the margin activity has been shifted to the retail industries.

*Important note:*

The contract manufacturing adjustments, which put transactions on a product flow basis, have produced differences between the total outputs (inputs) as presented in the supply (use) tables and total outputs (inputs) in the inter-industry transactions table (ie table 4), and the other derived tables. Not only are the consumption expenditures, primary inputs and outputs of some individual industries different, but so is total gross output in the system. This is because contract manufacturing fees for the industries listed below have been removed as described in the petroleum example above. The difference is summarised below:

Total output in basic prices as per supply and use tables

= \$214,747m

less contract manufacturing fees for aluminium refining, petroleum refining, motor vehicle assembly, clothing manufacturing:

= \$585m

= \$214,162m as per total output in the inter-industry transactions table.

Also notice that 'total use in basic prices' and 'taxes on products' for individual industries show slight variation between the use and inter-industry transactions tables, but 'total use in purchasers' prices' is the same. This is the result of the contract manufacturing adjustments on petroleum wholesaling that have increased the wholesale margin on the use of petrol, while maintaining purchasers' prices. Producers' prices for petrol have therefore decreased and this has reallocated the petroleum tax among users depending on the incidence of the margins.

## Using inter-industry tables

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**Table 1: Supply of products in basic prices.**

The table shows the supply of products by industry in basic prices, on a money-flow basis. It also reconciles total supply by product in basic prices with purchasers' prices by adding taxes on products and margins on products. The total supply of margins is zero as the wholesale and retail margin commodities recorded in basic prices (rows 38 & 39, column 67) are removed and allocated to products in purchasers' prices.

Each column shows the production of products by a particular industry. Each row shows the production of a product by industries which produce it. The industry columns are sub-divided between market industries and non-market industries. Imports are also shown, by product, as a source of supply. Total supply of each industry is analysed according to whether the output was:

- Market ie output sold at economically significant prices or otherwise disposed of on the market.
- Own final use ie output retained for own use by the owners of the enterprises in which they are produced. Own account capital formation, the imputed rent of owner occupied dwellings, owner-builders' construction work, and the output of private households with employed persons are examples.
- Other non-market ie, 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 for two reasons:
  - (a) It may be technically impossible to charge individuals for collective services eg defence.
  - (b) Goods and services are not charged for as a matter of social or economic policy eg health services.

These outputs are classified as 'services for own use' in the accounts of these producers.

Note that direct purchases abroad by residents (row 64, column 51) includes all expenditure by New Zealanders overseas for personal or business purposes. The supply of direct purchases abroad by residents is a component of imports and is shown as a single 'product'. The use table shows the industries and final use that have made the direct purchases abroad.

Inter-industry tables use a 'cost insurance and freight' (cif) valuation of imports as this is the valuation at which purchasers record their purchases of imports, consistent with the basic value of domestically produced goods. A global adjustment (rows 75, 76) adjusts imports from this cif basis to a total value consistent with the SNA 93 and the New Zealand System of National Accounts treatment of a 'free on board' (fob) valuation of imports. The deduction of \$224m (row 75, column 51) represents the resident freight and insurance implicit in the cif valuation of imports, but is a resident-to-resident transaction that is not included in imports in SNA93. Note that exports are also reduced by \$224m in the use table (row 75, column 52). Under SNA68 resident freight and insurance on imports was included as an exported service and balanced with the resident freight and insurance debits implicit in the cif valuation of imported goods.

Examples from table 1.

1. The transport equipment manufacturing industry produces \$1,463m of motor vehicles and other transport equipment (row 28, column 23M) and \$435m of repairs to machinery and equipment (row 40, column 23M).

2. In basic prices, New Zealand industries produce \$3,212m of electronic equipment and appliances (row 30, Total industry column), while \$3,854m of this commodity is imported (row 30, column 51).

3. The total supply of electronic equipment and appliances is \$7,066m in basic prices (row 30, column 65), but taxes on products of \$280m (column 66) and trade margins of \$1,243m (column 67), make total supply in purchasers' prices of \$8,588m (column 68).

## Table 2: Use of products in basic prices.

The table shows the use of products by industry and final demand category, in basic prices, on a money-flow basis. Each column shows products and value added (primary inputs) used by each industry. Each row shows the inputs of a commodity or item of value added to industries which use it. The industry columns showing intermediate consumption are sub-divided between market industries and non-market industries as per table 1. Other columns show use by product of final demands:

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

Total intermediate consumption of each industry in basic prices is reconciled to purchasers' prices in rows 65 to 67. Each industry's value added, by component, is then added to intermediate consumption to give the total value of gross output by industry. This total output matches the total supply by industry as in table 1.

### Examples from table 2.

1. The printing, publishing and recorded media industry consumed \$643m of paper products (row 20, column 17M).
2. The accommodation, restaurants and bars industry paid \$920m in salaries, wages and allowances to its employees, either in cash or in kind (row 69, column 32M).
3. New Zealand exported \$3,131m of meat products to the rest of the world (row 13, column 52).
4. Households spent \$54,420m in purchasers' prices (row 67, column 53). This comprised expenditure in basic prices of \$48,537m (row 65) and \$5,883m in taxes on products (row 66).

**Table 3: Imports into industries and categories of final demand in basic prices.**

This table details the imported products used by industries and final demand. It shows where the supply of imported goods and services (column 51 in the supply table) are used in intermediate consumption, final demand and gross capital formation.

Note that only products with non-zeros are shown in this table. The market / non-market split of industries is removed.

Examples from table 3.

1. The dairy cattle farming industry imported \$87m worth of rubber, plastic and other chemical products (row 24, column 3).
2. Households spent \$1,315m on the direct purchase of goods and services abroad (row 64, column 53).
3. \$4,503m of New Zealand's gross fixed capital formation is imported (column 57). The biggest single item is electronic equipment and appliances at \$1,466m (row 30, column 57).

#### **Table 4: Inter-industry transactions in basic prices.**

The interdependence of industries is shown in terms of how much each industry buys from and sells to every other industry. The market / non-market split of industries is removed.

This table traces the flows to where the production physically occurs. Contracted aluminium production, petroleum refining, vehicle assembly, and clothing manufacture have their activities moved from the wholesale industries (as they were in the supply and use tables) to the manufacturing industries. The accommodation, restaurants and bars industry has had its output of margin and corresponding inputs moved to the retail trade industry.

There are three parts to this table:

- Rows 1 to 51 show the source of products used by industries (columns 1 to 49) in intermediate consumption. Note that imports are shown in row 51 as a direct source of supply of products.
- Rows 68 to 73 show value added of each industry, while row 74 shows each industry's total gross output. These rows correspond to those in table 2, but there are differences due to the secondary production adjustments.
- Columns 53 to 58 analyse final demand aggregates according to which industries supply that final demand.

Examples from table 4.

1. The construction industry buys \$1,152m worth of products from domestic wood product manufacturers (row 15, column 29) and \$1,051m worth of imported goods and services (row 51, column 29).
2. Central government administration, defence, public order and safety services purchased \$221m of services from the real estate industry (row 40, column 44).
3. Households purchased \$1,068m of goods and services from the cultural and recreational services industry (row 48, column 53).
4. The forestry and logging industry exports \$753m of its output (row 6, column 52).

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

Table 5 shows how much extra output is required to be produced by every industry if a particular industry is to produce more of its own output. However, each of these contributing industries would need inputs into their own production process, in turn produced by other industries. These are called indirect requirements. As an external source of products, imports are removed from an analysis of the interdependence of domestic industries. The import requirements of these industries and final demand is analysed in tables 7, 8 and 9.

Table 5 takes into account both direct and indirect requirements and is sometimes referred to as the inverse matrix. It is read by columns and expressed as coefficients. Each cell in the table 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).

In order for an industry in a column to produce one extra unit of output for final use (eg household consumption, exports) extra output is required from each industry in the rows in the proportions shown. 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 in order for them to produce their contribution.

**Examples from table 5**

1. In order for the forestry and logging industry to produce \$1m extra output, for say exports, \$133,000 extra output will be required from the road transport industry (row 33, column 6). [ $\$1,000,000 \times 0.133$ ]
2. If the health and community services industry is to increase its output by \$1m, for say household consumption, then it must increase its own production by \$1.052m (row 47, column 47). [ $\$1,000,000 \times 1.052$ ]
3. If the horticulture and fruit growing industry were to decrease its output for exports by \$100m (say, in the face of falling world demand for fruit), then \$7.3m less output would be required from the services to agriculture, hunting and trapping industry (row 5, column 1). [ $\$100,000,000 \times 0.073$ ]

### **Table 6: Ultimate disposition of the output of industries.**

This table shows the final demand categories that each industry's output ultimately goes to. The output may go directly to final demand, eg exports, or may go indirectly after processing by other industries. Nevertheless, total output by New Zealand industries (table 4, row 74, Total industry column) 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 52 to 58 of the ultimate disposition of the output of industries table will exceed those equivalent final demand columns in the inter-industry transactions table (table 4, columns 52 to 58) 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 fishing industry's output of \$807m, 59% is ultimately exported (row 7, column 52).

[\$478m/\$807m x 100]

2. Of the construction industry's output of \$12,869m, 79% is ultimately used for gross fixed capital formation (row 29, column 57). [\$10,173m/12,869m x 100]

### Table 7: Cumulated primary input coefficients of industries.

The columns of this table show, in unit terms, the allocation of each industry's total value added and imports to the items of value added (primary inputs) and imports. It includes the direct payments by an industry for salaries and wages, imports etc, but also takes into account the value added components and import costs incurred by other industries which produce commodities 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 components (for example, compensation of employees), or say a change in imports due to a depreciation of the New Zealand dollar.

#### Examples from table 7

1. Say wages increase by 3% across the whole economy. Since direct and indirect costs relating to compensation of employees form 75% of the total costs of the education industry (row 66, column 46), it follows that the total input costs of this industry will ultimately rise by 2.2%. [ $0.03 \times 0.75 \times 100$ ]

2. If the culture and recreation industry is to increase its output by 10%, then import costs will increase by 0.2% for the whole economy:

$$\frac{[0.10 \times 0.185 \text{ (table 7, row 51, column 48)} \times \$3,505\text{m (table 4, row 74, column 48)}] \times 100}{\$26,641\text{m (table 4, row 51, Total economy column)}}$$

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

This table is an extension of table 7. The columns of this table show, in unit terms, the allocation of 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 commodities produced. The table can be used, for example, to show the import content of exports or capital formation.

Example from table 8

1. If imports rise by 5% economy wide, total export costs for the whole economy will rise by 1%.  
[ $0.05 \times 0.204$  (row 51, column 52)  $\times 100$ ]

### Table 9: Cumulated import coefficients of industries and categories of final demand

This table is an expansion of the imports row in tables 7 and 8 and shows imports itemised according to the products listed in table 3. For example, the total import component of gross fixed capital formation (table 8, row 51, column 57) is analysed by imported products in this table (column 57). The table shows the imported products used, directly and indirectly, in gross fixed capital formation.

Example from table 9

An increase of 10% in wholesale trade services will require a 1.6% increase in the imports of computer services.

$$\frac{[0.10 \times 0.002 \text{ (table 9, row 52, column 30)} \times \$14,735\text{m (table 4, row 74, column 30)}]}{\$187\text{m (table 3, row 52, column 51)}}$$