50 Years of Structural Change: An Analysis of Input-Output Tables since 1953

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1. Introduction

Input-output tables are available for over 50 years for the New Zealand economy: from 1953 until 2006. The first formal input-output table for New Zealand was prepared by Statistics New Zealand for the fiscal year 1952/53. The latest input-output table was prepared privately by Adolf Stroombergen for 2005/2006, Stroombergen (2008).

The 53 year interval encompasses a great deal of change in the world and New Zealand economies beginning in the high growth post-war reconstruction era with its high commodity prices and rapidly transforming international institutions and trade ties, and ending in the equally stable, rapidly globalizing 2000's with increasing economy interdependencies at least till 2007. The whole period is encompassed in an international environment of rapid technological change and market fragmentation[2] on both the supply and demand sides. This has resulted in a new globalization era, Safadi and Lattimore (2008). The period (1953-2006) was also notable for a series of major economic shocks and policy changes at home and abroad.

This project explores the changing structure of the economy using 11 tables over this period and a range of structural change indices including forward and backward linkages, cumulative factor indices and economic development indicators. Of special interest in the analysis are the impacts that major changes in domestic and foreign economic policies had on economic structure.

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[2] Market fragmentation is the tendency for the demand and supply of different varieties and models of products to increase with consumer incomes and technological advances.

2. Background

There is a broad and deep literature on New Zealand's modern economic history. The latest survey, which focuses on the effects of recessions in New Zealand, since the great depression, is Reddell and Sleeman (2008). This study has a valuable set of data from the 1920's. A fairly comprehensive list of earlier studies, including work by Gary Hawke, Brian Easton and many others is given in Dalziel and Lattimore (2004).

Iris Claus and Kathy Li have analyzed a number of changes in the input-output structure of the New Zealand economy surrounding the major economic reforms beginning in 1984, Claus (2002 and 2009) and Claus and Li (2003). Their work is based upon standardized 25 sector input-output tables from 1972 to 1995. The analysis includes changes in: forward and backward sectoral linkages, industry interconnectedness indices, value added multipliers, and an employment compensation multiplier. These studies are amongst the very few that have examined the structural effects of the reforms in a consistent general equilibrium fashion.

The availability of a 2006 input-output table is important in assessing structural change in New Zealand. The economic reforms remained on-going in some sectors past the period investigated by Claus and Li. The 25 percent most favored nation (MFN) tariff on cars was removed unilaterally in 1997 and scheduled tariff reductions continued throughout the 1990's. Unemployment rose after 1984 but did not peak (at 11 percent) till 1991. With relative price shifts and resource dislocations of these magnitudes it is likely that the reform influences carried on beyond the last table (1995) analyzed by Claus (2009).

3. Theoretical Frameworks

Four theoretical frameworks form the basis of this analysis. The first is the standard sectoral development model is which focuses on the effects of rising living standards on consumer demand via Engel's Law. This approach views New Zealand as a closed economy. The second is the Australian (Salter and Swan) traded-non-traded goods model which is useful for understanding resource mobilization pressures arising from

the gradual move from the strong import-substitution regime that began in 1938, to a reasonably free trade environment in New Zealand after 1997.

The third and fourth frameworks are the Leontief (1936) and Ghosh (1958) models which are used to examine the structure of the New Zealand economy. The Leontief model is given by

$$x = [I - A]^{-1} f \quad (1)$$

where x is a (N x 1) vector of industries' gross output (intermediate output and final demand), with N denoting the number of industries, f is a (N x 1) vector of industries' final demand, I is a (N x N) identity matrix and $A = [a_{ij}]$ is a (N x N) matrix of technical coefficients. Technical (or input) coefficients record the inputs directly required from one industry to produce one dollar's worth of output of another industry. They are calculated as $a_{ij} = r_{ij} / x_j$, where $R = [r_{ij}]$ is the (N x N) intermediate input flow matrix. The matrix $[I - A]^{-1}$ is the Leontief inverse or total requirement matrix. It shows how much output is required directly and indirectly from each industry for every dollar's worth of output produced for final use. Its elements are denoted by b_{ij}.

The inter industry model suggested by Ghosh is given by

$$x' = p[I - \tilde{A}]^{-1} \quad (2)$$

where p is a (1 x N) vector of industries' primary inputs, $\tilde{A} = [\tilde{a}_{ij}]$ is a (N x N) matrix of direct sales coefficients with $\tilde{a}_{ij} = r_{ij} / x_i$. $[I - \tilde{A}]^{-1}$ is the Ghosh inverse and its elements are denoted by $\tilde{b}_{ij}$. It measures the output of industries that is necessary to absorb primary inputs. The remainder of this paper uses the input output tables and the Leontief and Ghosh models to assess changes in New Zealand's production structure. Four types of measures are reported: (i) backward and forward linkages, (ii) indices of industry interconnectedness, (iii) the compensation of employees, and (iv) value-added multipliers. The formulae used to compute these indices are given in Annex A and the results are reported in Annex B.

The full range of structural indicators employed by Claus (2009) is applied here to the eleven input-output tables. Nine indicators are calculated and the full results are

provided in Annex B. The indicator values are ranked from 1 downwards on the estimated coefficient. So, for example, all indicators are ranked, high to low, from 1 to 12 for the first two input-output tables and from 1 to 21 thereafter. The three highest ranked industries on each indicator are marked in green and the three lowest ranked industries in yellow. This is designed to make it easier to track major shifts over time.

Input output tables are recorded in current dollars. The rows of the inter industry transactions table describe the distribution of industries' output throughout the economy. Across the rows, the table records intermediate inputs in the economy (i.e. how much each industry sells to other industries) and final demand. The columns describe the composition of inputs required by an industry to produce its output, i.e the inputs each industry purchases from other industries and primary inputs to production, such as labour, capital and imports. The compensation of employees, operating surplus, non-commodity indirect taxes, non-commodity subsidies and the consumption of fixed capital add up to total industry value added.

4. Data

The 11 input-output tables are for the years ending March : 1953, 1955, 1960, 1966, 1972, 1977, 1982, 1987, 1991, 1996 and 2006. The industry classifications used to produce the tables differ though there is reasonable consistency from 1972. The highest common denominator that could be simply applied was to aggregate the tables at a 21 sector level. The exceptions to this rule are the 1953 and 1955 tables which are comprised of only 12 sectors. The 21 sector tables from 1960 to 2006 involve aggregating central and local government, the health and education sectors and personal and other services into a single sector called Other Services. The 11 input-output tables are presented in Annex C and Annex D details the aggregation.

5. A History of Structural Change

1950s

The world economy is often referred to as having entered a 'golden age' in 1945. For New Zealand this had a specific meaning. The immediate post-war period was

unusual in that commodity prices rose rather than fell which was of advantage to a commodity exporter like New Zealand. The sectors with the strongest comparative advantages, farming and food processing, comprised 24 and 3 percent of GDP respectively, Table 1. The economic stimulus provided by a terms of trade boost in the late 1940s and early 1950s was sufficient to keep per capita incomes in New Zealand higher than Australia and many other high income countries but not sufficient to prevent the continuing slide compared to US incomes (discussed further below). The economy was further advantaged by the sharp rise in wool prices during the 'police action' in Korea, 1950-53, Figure 1.

There was a strong multilateral spirit of post-war reconstruction that supported the development and commercialization of new technology and associated offshoring from 1945. It was to accelerate over the next 60 years and produce a new globalization era. It was to prove a major boom for international development and poverty reduction. Between 1945 and 2006, thirteen countries over the period grew at more than 6 percent real for continuous periods of 25 years, Growth Commission (2008). All continents were represented though most of the star performers were in the Asian region.

New Zealand initially chose not to participate in this general economic opening (liberalization) in part because agriculture and food were not part of the multilateral liberalization agenda at the time. Regulatory and trade policy in New Zealand extended its pre-war isolationist stance on trade and extensive price controls from the war period. Import protection remained very high in New Zealand both in terms of customs revenues (Figure 2) and in terms of the relative rate of agricultural assistance (RRA). The RRA measures the import protection effect of both tariffs and import licensing, Figure 3. The RRA is the ratio of government assistance in the agricultural and food sectors (as proxies for exportables) to government assistance in the importable sector.

From around 1950 customs revenues started to fall but, except for a short period in the mid 1950's, New Zealand rates of import protection did not fall because the import licensing system was the main trade constraint, Rayner and Lattimore (1991). The RRA ratio was highly negative in the 1955-59 period mainly as a result of high

effective tariff rates on imports resulting from import licensing. Government assistance to exportables was relatively low at this time.

The forward and backward linkages measure the economic dependence of industries in terms of the value of their transactions. In 1953, the top backward linkage (the relative increase in output following an increase in final demand) is for the food processing sector, Table B.1. This is not surprising given its intimate linkage with the large highly competitive agricultural sector. Other manufacturing is in second place. The lowest backward linkages are for fishing and forestry. The top forward linkage measures the relative output associated with primary inputs. Forestry and other manufacturing have the highest ranking in 1953 and in 1955, Table B.2.

The industry interconnectedness indices (concentration and entropy) measure, respectively, the degree of outsourcing and diversification associated with an industry. Food processing was buying more inputs from other industries (backward concentration) in 1953 and 1955 than other industries. Public utilities were in second place. The most dispersed inter-industry sales (forward concentration) came from other manufacturing and construction in 1953 and 1955.

The entropy measures are conceptually similar to the concentration indices. They are more descriptive of the economy as a whole, however, because they are measured from the final demand weighted matrix of total requirement coefficients. In 1953, the top two column entropy industries are the same as the forward concentration ranking but the row entropy rankings differ from the backward concentration indices. On the row entropy measure it is the two manufacturing industries that have the highest degree of outsourcing.

The compensation of employees per unit of output was highest in the manufacturing sector in 1953 with the export oriented food processing sector ahead of the importable oriented other manufacturing. By 1955 services had replaced food processing on this score. The employee compensation ranking of other manufacturing points to the targeting of import protection to labour intensive industries at this time. However, this focus did not continue, as will be seen.

The final demand weighted value added multipliers were highest for the manufacturing sector as a whole with food processing slightly ahead. However, farming replaces other manufacturing on the export weighted multiplier. This is probably because, in 1953, farmers were direct exporters of high priced wool as well as suppliers of raw materials to the food processing sector. Food processing retained its first ranking on this measure through 2006 but farming dropped out after 1977.

1960s

The 1960s were a period of high but volatile terms of trade for New Zealand. Dairy export prices had dropped sharply in 1957 leading to a tight fiscal position ('the Black Budget') and the blanket reintroduction of import licensing. Conditions were more prosperous thereafter. High export prices at times offset the decline in the RRA (more negative) in this decade.

The diversification of New Zealand exports in terms of products and markets increased significantly in this decade. Imports were also liberalized to a small degree. The guaranteed British market for agricultural exports ('Commandeer') had ended in 1955 and the US market for beef was opened for the first time. Then in 1965 New Zealand entered into the New Zealand Australia Free Trade Agreement (NAFTA) – a typical highly proscriptive regional trade agreement (RTA). Nevertheless, all these changes were a stimulus for trade diversification efforts by firms. The result was that agricultural exports became more diversified and non-food exports continued to rise as a share of merchandise trade.

In this high income growth environment, the service sector (except government and related services) grew rapidly (Table 1). In 1972, the tertiary sector (excluding other services) represented 48 percent of GDP. It had been 44 percent in 1960. The other services sector which includes government grew by 2 percent of GDP from 13 percent in 1960 to 15 percent in 1972. The other growth industry was food processing which doubled in relative size in the 1960s and has hovered around 5-6 percent of GDP ever since.

These changes are reflected in the structural indicators. In 1960, trade was amongst the highest ranked sector on nearly all measures. Prior to that trade was only highly ranked on the final demand weighted value added (VA) multiplier. Construction, transport and storage also took more prominent places in the rankings.

With the disaggregation of other manufacturing in the 1960 table, one can now begin to see where higher rankings were occurring in the secondary sector. Fabricated metals (including car assembly) ranked highly on dispersion of sales while chemicals ranked highly on the absorption of primary inputs. However, with the exception of these two non-food manufacturing sectors, the top ranked industries exhibit a hollowing out pattern in 1960 that carries through to 1966 – high rankings in the primary sector and food processing on the one hand with the remaining high rankings in the tertiary sector.

Other (non-food) manufacturing had 2nd place on the compensation of employees index in 1953 but from 1960 no manufacturing industry held a top position (except top ranked Food processing). The textile industry is often thought of as the most labour intensive industry and this argument cited as justification for some of the highest import protection. The textile industry was the last to lose its import licensing protection and it continues to be protected by the highest remaining tariffs in New Zealand. Yet the compensation ranking of textiles was 5th in 1960 behind food processing, construction, trade (tourism and hospitality) and other services. This is some corroboration for the hypothesis that, in fact, import substitution was not targeted at labour intensive industries, Gibson and Lattimore (1991).

1970s

When wool prices collapsed in 1967, the (labour) Arbitration Court produced a 'nil wage order' and significant labour activism followed. A number of other factors created economic problems. Moves to generally liberalise the import regime further (on the back of the 1965 New Zealand Australia Free Trade Agreement, NAFTA) were thwarted in the late 1960s. Instead, some high import protection was reduced in an ad hoc fashion. It was also offset by tariff compensation measures to reduce the implicit export tax. They included production subsidies for traditional exportables and

export incentives for non-traditional export products. The reductions in import protection and the tariff compensation measures were not generally applied – they were highly selective. These trade policy adjustments are reflected in the rise in the RRA throughout the decade of the 70s.

The regulatory environment was also partially liberalized in this decade. This shows up as high rankings for the finance sector on the forward linkage, forward concentration and column entropy in 1972.

From the late 1960s, higher inflation was imported from the US (under the fixed exchange rate) as quantitative easing was used to finance the Vietnam war. Agricultural commodity prices spiked on the world market after wheat prices quadrupled in 1972 following droughts, animal feed shortages and Soviet-US agricultural policy changes. The Bretton Woods arrangements collapsed and the NZ dollar peaked at US$1.44 in the early 1970s. In this difficult and unstable environment, New Zealand experienced one of the largest falls in its terms of trade when oil prices rose from US$2 to US$10 per barrel in 1974. The volatility in the terms of trade was reduced after 1975 but it settled at a low level until the mid 1980s. New Zealand's real per capita GDP fell below parity with Australia in the 1970's as economic growth subsided and was negative in two years of the decade.

The non-food secondary industries became slightly smaller in the 1970s but they rebounded to 19 percent of GDP in 1982, Table 1. The relative share of the agricultural sector continued to decline sharply in the 1970s and in 1972 was only half its size of 1953 – from 24 percent down to 12 percent.

The food processing sector maintained its high ranking on the backward linkage and outsourcing, the compensation of employees and the value added multipliers in 1972 and 1977. Agriculture retained two top positions. All the other top positions went to the tertiary sector in 1972. The chemical industry returned to a high ranking on dispersion of sales in 1977 and 1982 probably as a result of the continuation of 'think big' projects.

1980s

The decade began in difficult economic circumstances for New Zealand. The second oil shock had occurred in 1979 and the terms of trade drifted down early in the decade to historically low levels. The economy was also highly indebted after some years of consumption stabilisation efforts. Import protection was reduced with the advent of the new Closer Economic Relations (CER) RTA with Australia and the tendering system for import licenses (as a prelude to replacing these licenses with their tariff equivalents). At the same time subsidies to the sheep industry were raised sharply in attempts to drive up foreign exchange earnings. The result was a rise in the RRA to single digit negative levels, Figure 3.

The trade policy mix was not sustainable under WTO law and the threat of US countervailing duty action was one element forcing the termination of the tariff compensation approach. However, the bigger driver for change was the foreign exchange crisis of 1984, which resulted from poor macroeconomic and regulatory policy settings in the face of high government foreign debt. Economic reforms were introduced in 1984 and a general programme of economic liberalization was continued through into the 1990s.

The agricultural sector fell to 6 percent of GDP by 1991 as the remaining primary sector (forestry, mining and fishing) grew to 4 percent of GDP with the result that the primary sector remained much the same size over the 1980s. The non-food secondary industries shrank from 19 percent to 12 percent of GDP by 1991. The tertiary expanded under deregulation by 8 percentage points of GDP from 1982 to 1991 with most of the growth occurring in private services.

The other manufacturing sector developed a high ranking on outsourcing in this decade and the chemical industry retained its higher rankings on the diversification of sales. In both cases this reflects the heterogeneity of the products produced by these industry. For example the chemicals industry produces petrol, fertilizer, paints and cosmetics. The primary sector lost all its high rankings between 1977 and 1991.

1990s

After oil prices fell back to US$10 per barrel in 1986, the terms of trade rose but then gradually drifted downwards again during the 1990s. However, the terms of trade track was higher than during the previous decade and it continued the low volatility paths that arose after 1975. The economy slowly adjusted to the general reform packages that continued into the 1990s with major labour market deregulation and welfare reform. Import protection continued to decline with scheduled tariff reductions and the last import licenses were removed in 1993. As noted earlier, the big tariff change was the removal of the remaining 25 percent MFN tariff on cars in 1997. The car assembly plants immediately closed but the car parts industry bounced back as a competitive industry in its own right following the initial setback of the assembly closures.

The forestry sector expanded in relative terms after 1990 as trees matured following large earlier plantings of pinus radiata. This is reflected in the high backward concentration index of the wood processing industry in 1996. Apart from food processing and wood however, there are no high structural index rankings in the primary and secondary sectors.

The tertiary sector continued to expand, particularly for other services. This is reflected in the structural indicators. Trade and construction had shown up on the high rankings since the 1960s. Finance and other services appeared in the 1970s and the position of these two was very high by 1996.

2000s

In the early 2000s the terms of trade moved strongly upwards till 2007. This was the result of strong global growth especially among developing economies with China and India leading the way. These countries also produced relatively cheap manufactured goods, helping to lower the cost of imports. Trade continued to growth worldwide. The growth was also stimulated by cheap credit globally which contributed to the 2007 credit crisis.

The growing wood harvest shows as high backward concentration (outsourcing) in both the forestry and wood sectors in 2006 but apart from that the 1996 structural influence patterns remain very similar to those in 1996. Other services and trade consolidated their high rankings in 8 of the 9 indicators with finance and construction also established in their positions.

6. Trends in the distribution of output and the composition of inputs

Over the period 1953 to 2006, New Zealand GDP per capita more than doubled in real terms from $17,112 to $35,261 (both expressed in 2009 dollars). Engel's Law predicts that in a closed economy setting, an increase in income will cause a relative increase in the demand for discretionary (luxury) goods and services and a relative decline in the demand for basic goods. This demand shift shows clearly in the changing structure of the New Zealand economy. The primary sector (which produces many basic goods) has shrunk from 26 percent of GDP in 1953 to 7 percent of GDP[3] in 2006, Table 1. The tertiary sector (which produces services with higher income elasticities of demand) has expanded from 52 percent of GDP to 77 percent over the same period. In an open economy some of this structural effect would instead be manifested in the composition of imports. Given that New Zealand is an open economy and has a high propensity to import, especially with regard to discretionary consumer goods and services, it is notable that the Engel effect is nonetheless observable in the domestic industrial structure.

The composition of total use over the period 1953-2006 is given in Figure 5. It is the sum of intermediate inputs and final demand. The largest category of final demand is consumption. Its contribution to total use varied between 24.2 and 36.7 percent. The low consumption share in 1977 coincides with the high intermediate use of goods and services which jumped from 40.4 to 49.6 percent from 1972. One possible explanation is that the 1972 table coincides with a period of very high economic growth and high import prices, and the 1977 table with a major recession. The same phenomenon

[3] This is lower than official estimates would be because the farm dairy price has been split between the farm (agricultural) sector and the food sector based on the value added in each, rather than on the actual payouts of the co-operative dairy companies (which include a food sector shareholder return). The so-called commodity dairy price of Fonterra is assigned to the farm sector and the value-added component to the food processing sector.

occurs between 1982 (high growth) and 1987 (low growth). The decline in the share of domestic intermediate use since 1987 may be due to the increasing import content of inputs as import restrictions were reduced.

The second largest component of final demand is exports. Its share rose from 11.2 percent in 1966 to 15.2 percent in 1995 but has fallen ever since as the GDP growth rate recovered, while the value added content of exports (discussed further below) has remained virtually unchanged. The high export share in 1977 might be attributed to the forced export growth arising from increased subsidies to the exportable sector combined with low consumer demand during this low growth period.

Figure 6 shows the trends in the composition of primary inputs. The high import component in the 1950s is probably due to the brief removal of import licensing in the mid 1950's. Thereafter the import component increased with gradual import liberalization up to 1982. It fell during the reform adjustment period of 1987 and 1991 and stabilized at over 15 percent in 1996. The import component fell in 2006, probably because of low import prices.

The largest share of primary inputs has usually been the compensation of employees but the operating surplus is sometimes in that position. The share of employee compensation, for the economy as a whole, grew rapidly from 1953 to reach a peak in 1972 of 46.9 percent. It remained stable at that level throughout the difficult period of the oil shocks in part because labour reactions to the 1967 'nil wage order' locked in higher wages during the stabilization programmes of the 1970s. Compensation dropped sharply after 1987 until 1996. It has increased again in 2006. High unemployment, low employment rates, and labour market reforms that ended compulsory unionism, centralised wage setting and facilitated employer-employee individual contracts all likely contributed to the sharp fall in the share of compensation of employees. Moreover, the share fell as the number of self-employed rose following the downsizing of publicly owned companies and public sector organisations in the mid 1980s, Claus (2009).

The operating surplus was higher than the compensation of employees in the 1950s but the ratio of the two fell in favour of employees from 1955 until 1987 – from a

ratio value of 1.05 to 0.74. From the reform period (1987) the ratio rose to peak at 1.13 in 1996 only to fall back to 0.93 in 2006.

7. Trends in Overall Value Added and Import Content

The value added and import content of consumption, gross fixed capital formation (GFCF) and exports is illustrated in Figures 7-9. They are measured by the cumulated primary input coefficients, which show the ultimate contribution of primary inputs to producing final demand. The import content of consumption is lower in 2006 than it was in 1953. The economy appears to be more diverse than it was 50 years ago. However, part of the explanation may lie in the brief trade liberalisation period initiated in the mid-1950's. This resulted in a temporary increase in imports (especially cars). The liberalisation period came to an abrupt halt in 1957 when dairy prices fell and blanket import licensing was re-imposed. If 1960 is used as the base then there has been a small increase in the import content of consumption to 2006.

By contrast there has been a sustained rise in the import content of gross fixed capital formation (GFCF) after 1972. The trigger may have been "Think Big" investments during the 1970's and the gradual liberalisation of barriers to imported inputs which may also explain the earlier rise in 1960. The higher current import content in GFCF has been sustained post reform by market demand for investment goods. As with consumption goods, there is an offsetting relationship between value-added and import content. Interestingly, the import content of GFCF has fallen off since 1995.

Higher levels of import content in exports also began in 1977 and have carried on at this level ever since. This might be explained by the gradual reductions in import protection that occurred in the 1970's, particularly those providing businesses with duty free access for imports of inputs. Again there is a fall off in the latest table.

Finally, it is instructive to examine all 9 indicators together. If the reader takes a colour version of Annex B and flicks through the tables in chronological order, a pattern emerges. In 1960 the green highly rated indices are spread more or less evenly between the highly tradable sectors (primary and secondary) and the tertiary sector. Over time the green industries move South until in 2006, most highly ranked

industries are in the tertiary sector. However, there does appear to be a break. After 1977 or 1982, the Southward drift appears to increase. This is almost certainly a result of the economic reforms. In 2006, Trade, Finance and Other Services capture most of the green slots. Food processing dominates green slots in the top half of the industry list with Forestry and Wood playing minor roles.

8. Conclusions

The New Zealand economy has become much more diverse over the last 50 years. The service or tertiary sector has grown much larger at the expense of the primary and manufacturing sectors since 1953. However, the agricultural sector is still twice as large as it is in other high income countries. This is to be expected given the high degree of comparative advantage agriculture has in New Zealand. The food processing sector has grown as the agriculture sector has shrunk. Food processing is now 50 percent larger than the agriculture sector. Other primary industries have increased their share of GDP from 2 to 4 percent as exotic forests have reached maturity and the sector moves towards a balanced age resource base. The non-food manufacturing sector has a much smaller share of GDP than was true prior to the economic reforms but its export propensity has not diminished.

The industry linkages and interconnectedness of the economy has generally shifted as the service sector has increased its GDP share. Food processing still stands out on many structural indicators but most of the highest ranked structural indicators have moved to services. The biggest gains in structural rankings are for Other Services which comprises government services, education, health and personal and social service sectors.

Many of these changes occur gradually from the 1960s with further developments in the 1970s. However, change was accelerated by the economic reforms from the mid-1980's. Industry profitability has returned to historic levels last seen before the late 1960's and the difficult policy decade of the 1970's. The import content of gross fixed capital formation and exports has remained high over the last 35 years with only some acceleration post-reform.

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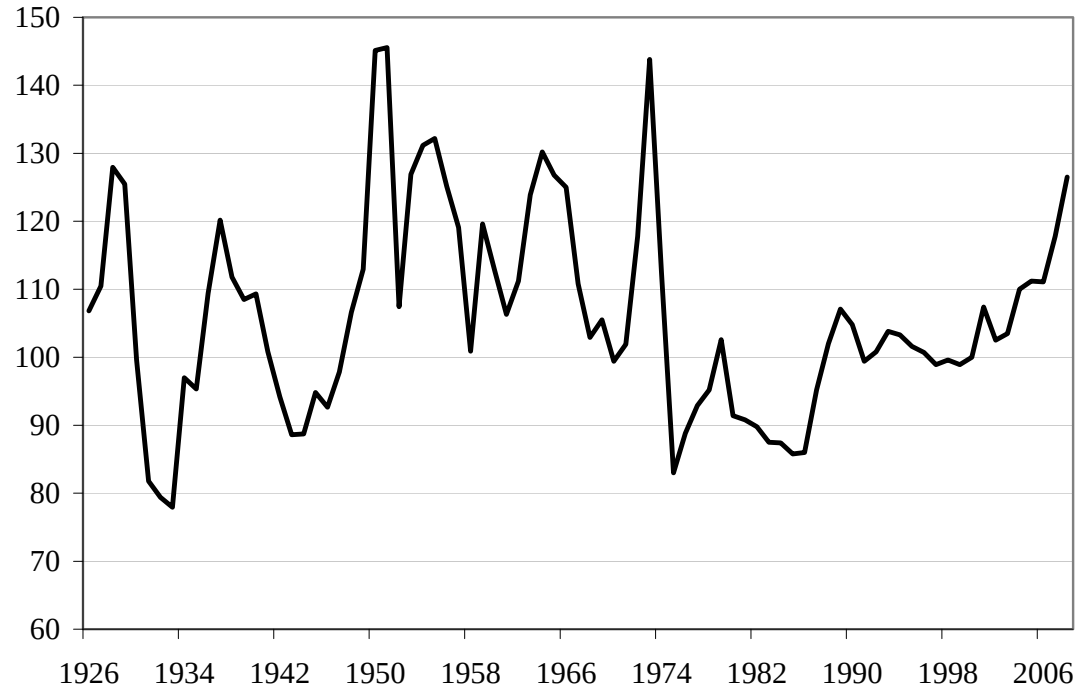
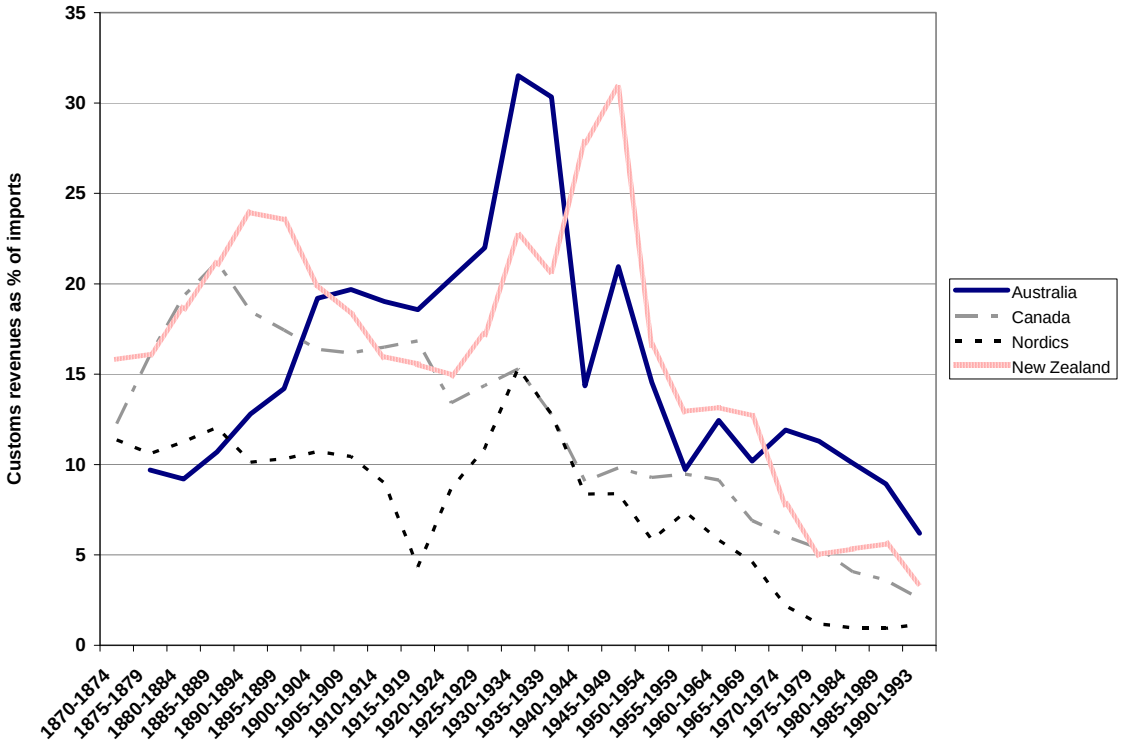
Figure 1: New Zealand terms of trade
(2000 = 100)



Source: Reserve Bank of New Zealand

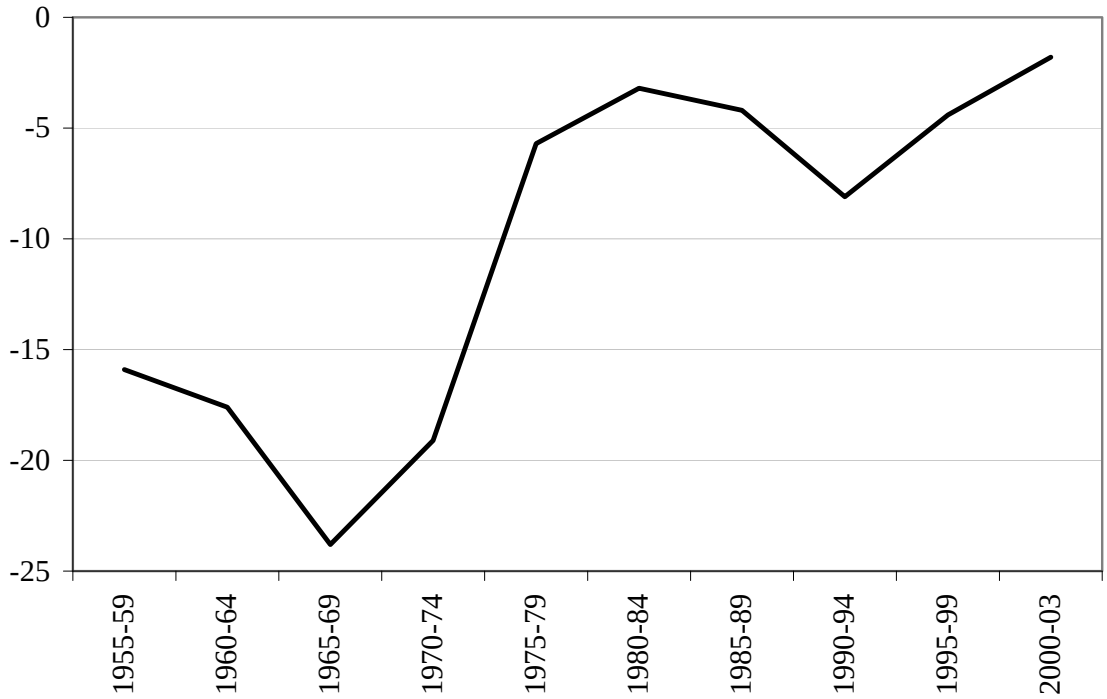
Figure 2: Openness indicators, New Zealand plus other high-income countries, 1865 to 1993

Customs revenue as a share of merchandise imports (in percent, five-year averages)



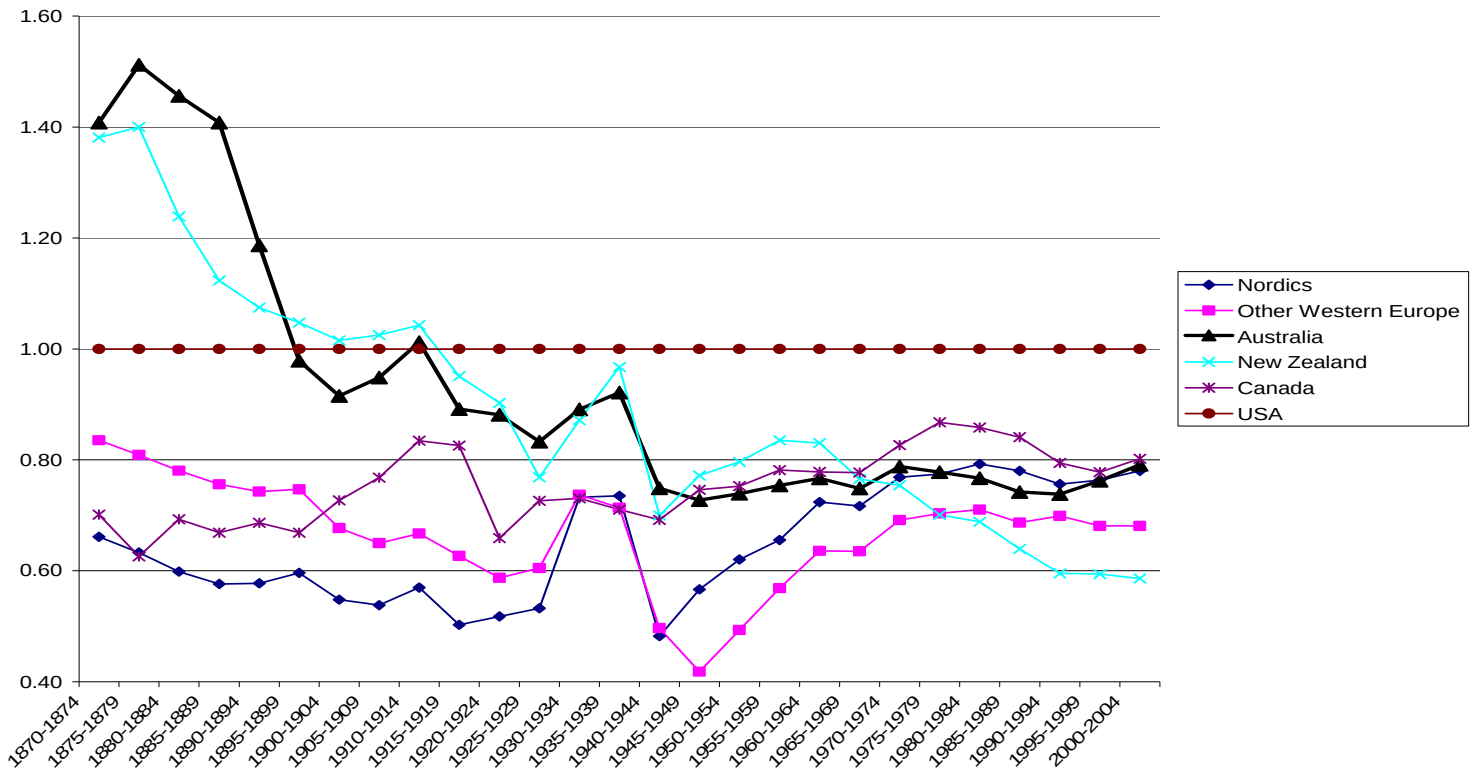
Source: Anderson et al (2008)

Figure 3: Relative rate of agricultural assistance in New Zealand
(in percent)



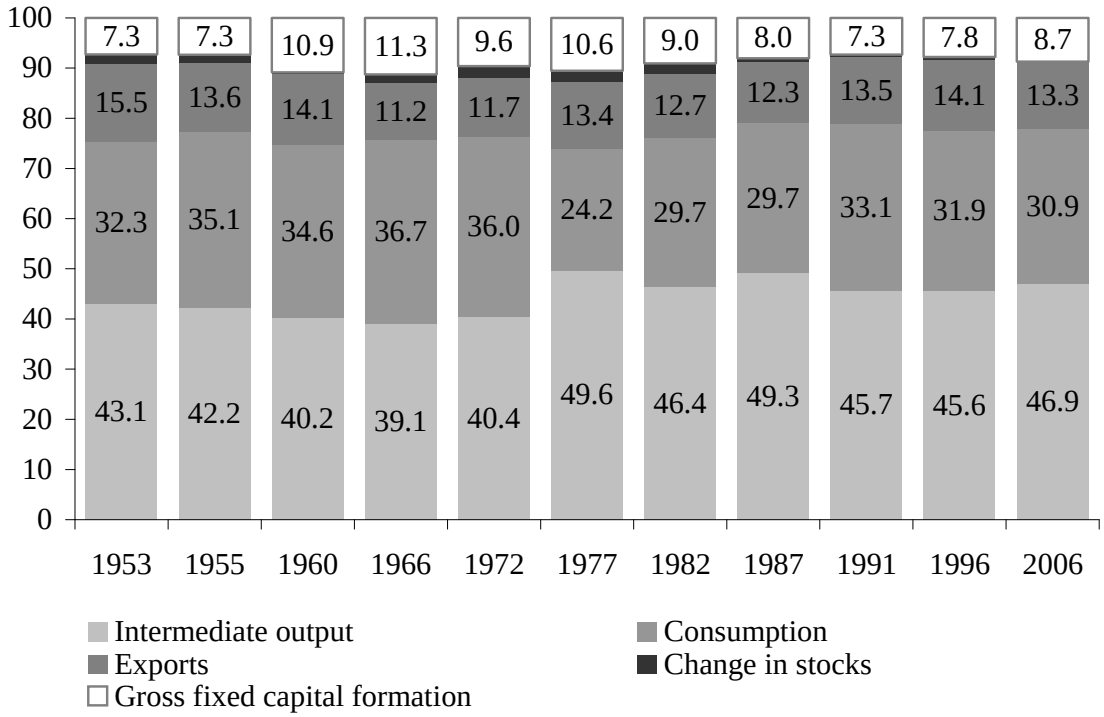
Source: Anderson et al (2008)

Figure 4: Real GDP per capita in New Zealand and other high-income countries relative to the United States, 1870 to 2004
(United States = 100)



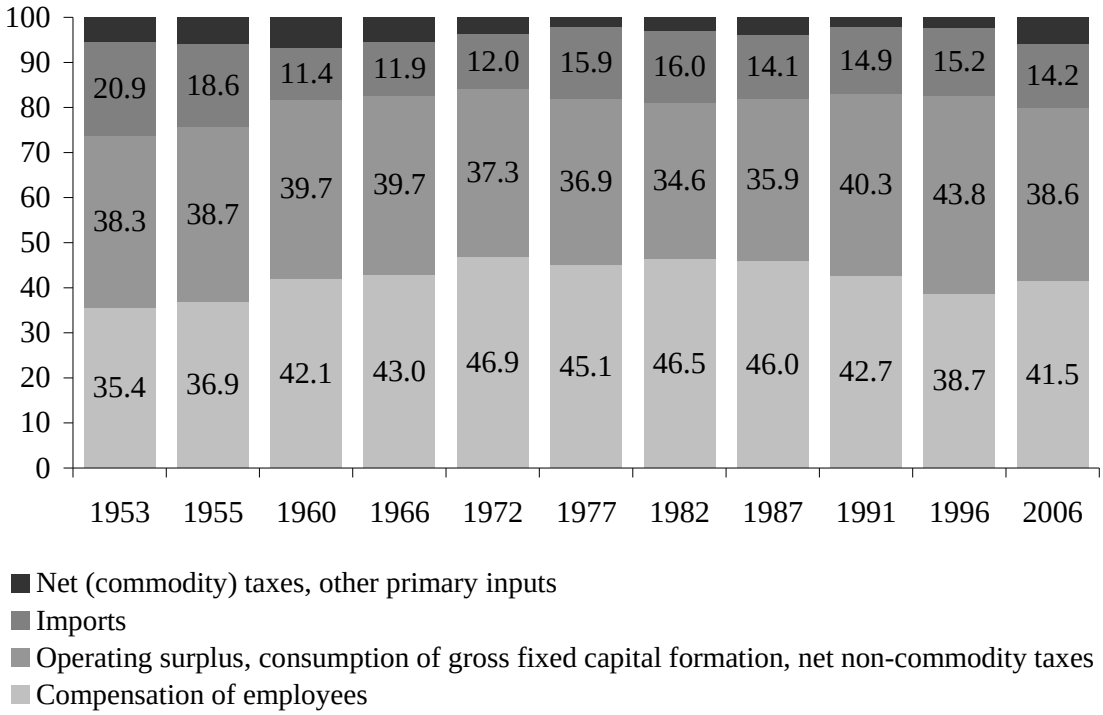
Source: Based on 1990 International Geary-Khamis dollars from Maddison (2003), shown relative to the United States which is set as the numeraire at 100. 'Nordics' includes Denmark, Finland, Norway and Sweden; 'Other Western Europe' includes all with data from 1870, namely Belgium, France, Germany, Italy, Netherlands, Portugal, Spain, Switzerland, and the United Kingdom.

Figure 5: Composition of total use
(in percent)



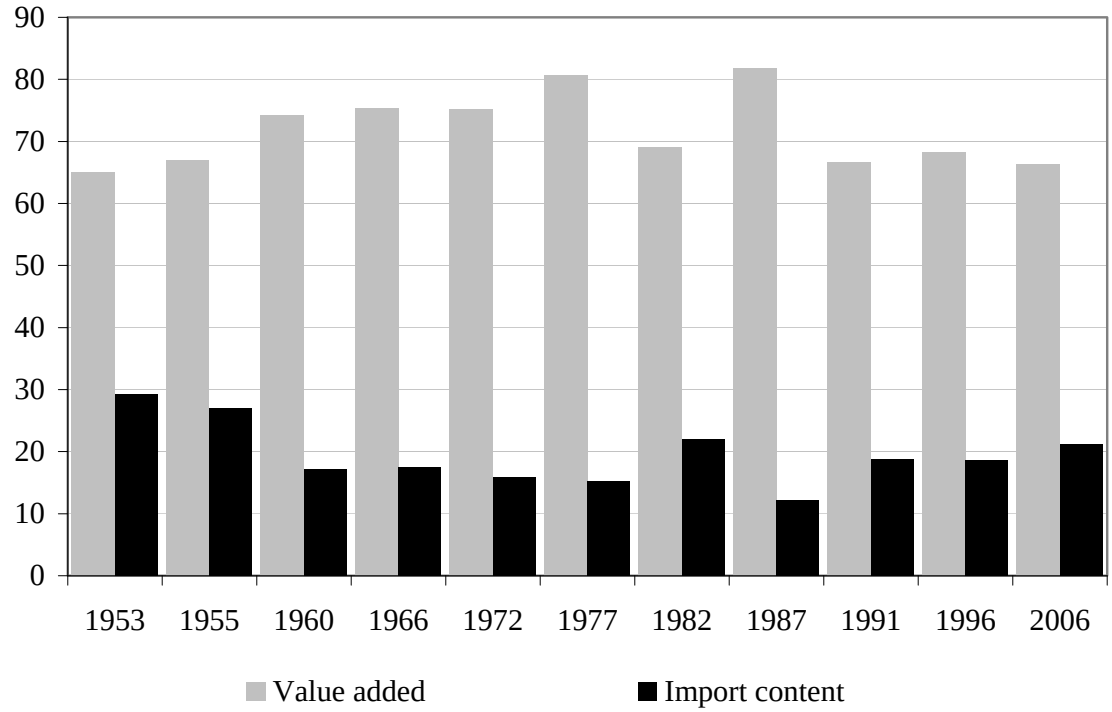
Source: Input-output tables, Annex C.

Figure 6: Composition of primary inputs
(in percent)



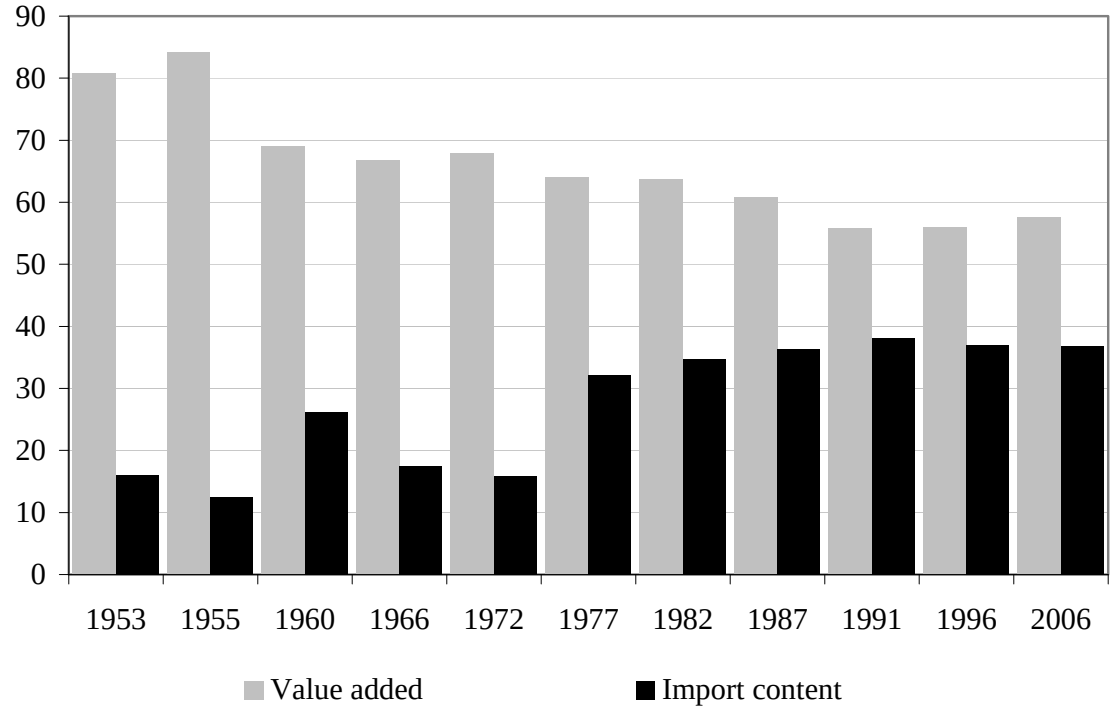
Source: Input-output tables, Annex C.

Figure 7: Value added and import content of consumption
(in percent)



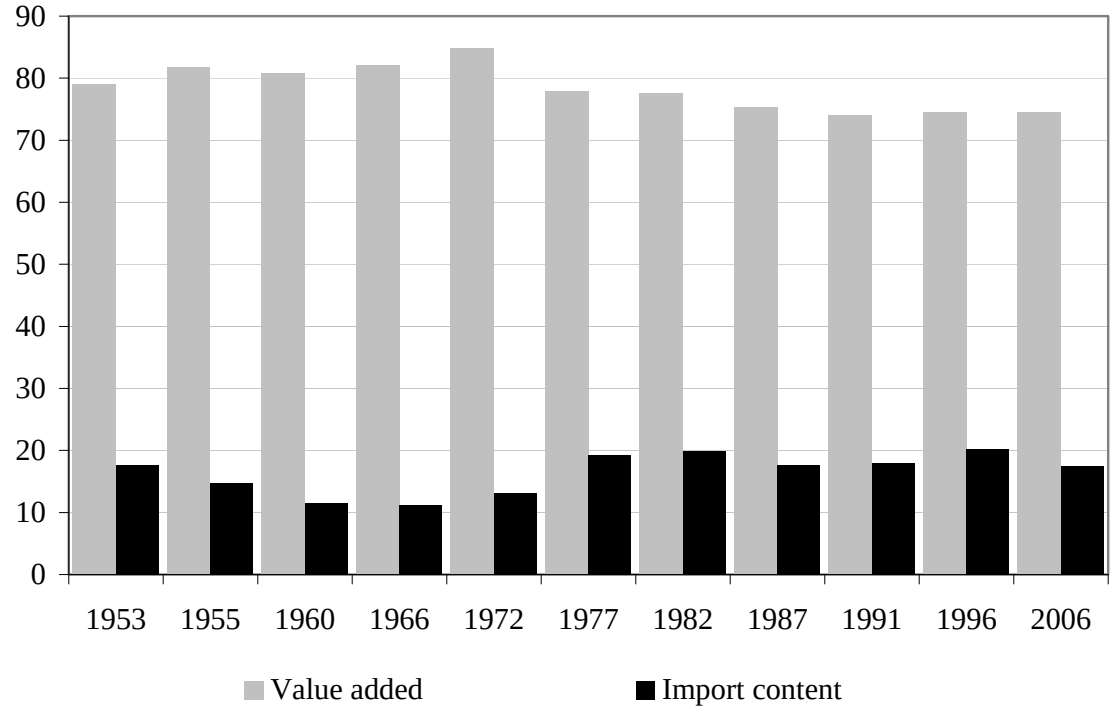
Source: Input-output tables, Annex C and authors' calculations.

Figure 8: Values added and import content of gross fixed capital formation
(in percent)



Source: Input-output tables, Annex C and authors' calculations.

Figure 9: Value added and import content of exports
(in percent)



Source: Input-output tables, Annex C and authors' calculations.

Table 1: Sector shares
(as a percent of GDP)

Sector	**1953**	**1960**	**1972**	**1982**	**1991**	**2006**
Primary	26	21	14	11	10	7
Agriculture	24	19	12	9	6	4
Non-Agriculture	2	2	2	2	4	3
Secondary	22	22	23	24	17	16
Food	3	6	6	5	5	5
Non-Food	19	16	17	19	12	11
Tertiary	52	57	63	65	73	77
Other Services	13	13	15	18	19	30

Source: Input-output tables, Annex C.

Annex A: Structural Indices

Backward and forward linkages

Backward and forward linkages measure economic interdependence of industries. The backward linkage is an estimate of the direct and indirect increase in output following an increase in final demand. The elements of the total requirement matrix are weighted by final demand to account for the size of industries in the economy. The weighted elements are denoted by b_{ij}^{w} and calculated as $b_{ij}^{w} = b_{ij} w_j$, where $w_j = f_j / \sum_{j=1}^{N} f_j$.

The backward linkage is given by

$$U_{.j}^{w} = \frac{b_{.j}^{w}}{(1/N)\sum_{j=1}^{N} b_{.j}^{w}} \tag{3}$$

where $b_{.j}^{w} = (1/N)\sum_{i=1}^{N} b_{ij}^{w}$.

The forward linkage is calculated using the Ghosh inverse weighted by primary inputs with the weights given by $p_i / \sum_{i=1}^{N} p_i$. It measures an industries' relative importance in terms of their primary inputs requirements. It is given by

$$U_{i.}^{w} = \frac{\tilde{b}_{i.}^{w}}{(1/N)\sum_{i=1}^{N} \tilde{b}_{i.}^{w}} \tag{4}$$

Industry interconnectedness

Indices of industry interconnectedness measure the degree of outsourcing and diversification. Two measures of industry interconnectedness are calculated: (i) measures of concentration, and (ii) entropy as a measure of variation. The backward and forward concentration measures of inter industry distributions of inputs are calculated from the unweighted total requirement matrix and thus focus on the intermediate sector. The entropy based measures of dispersion are more descriptive of the characteristics of the economy as they are based on the final demand weighted Leontief inverse.

The backward concentration index is defined as

$$G_{.j} = \left[N\left(1 - \sum_{i=1}^{N} (c_{.j,ij})^2 \right) \right]^{1/2} \tag{5}$$

and the forward concentration index as

$$G_{i.} = \left[N\left(1 - \sum_{j=1}^{N} (c_{i.,ij})^2 \right) \right]^{1/2} \tag{6}$$

where $c_{.j,ij} = b_{ij} / \sum_{i=1}^{N} b_{ij} = b_{ij} / b_{.j}$ and $c_{i.,ij} = b_{ij} / \sum_{j=1}^{N} b_{ij} = b_{ij} / b_{i.}$. The larger is the measure of concentration, the more inter industry transactions or the higher the degree of outsourcing and diversification.

An alternative measure of industry interconnectedness is entropy. The higher (lower) is the entropy, the more (less) integrated and thus specialised industries are. The row entropy is calculated as

$$H_{i.} = \sum_{i=1}^{N} d_{i.,ij} \log\left(\frac{1}{d_{i.,ij}} \right) \tag{7}$$

and the column entropy as

$$H_{.j} = \sum_{j=1}^{N} d_{.j,ij} \log\left(\frac{1}{d_{.j,ij}} \right) \tag{8}$$

where $d_{i.,ij} = b^{w}_{ij} / \sum_{j=1}^{N} b^{w}_{ij} = b^{w}_{ij} / b^{w}_{i.}$ and $d_{.j,ij} = b^{w}_{ij} / \sum_{i=1}^{N} b^{w}_{ij} = b^{w}_{ij} / b^{w}_{.j}$. Note that $d_{..,ij} \log(1/d_{..,ij})$ is replaced by $\lim_{d_{..,ij} \to 0} d_{..,ij} \log(1/d_{..,ij}) = 0$ for $d_{..,ij} = 0$ (Theil 1971). The row and column entropy are conceptually similar to the backward and forward concentration index, but are more descriptive of the characteristics of the economy as a whole as they are calculated from the final demand weighted matrix of total requirement coefficients.

Value added multipliers

Value added multipliers assess the impact on GDP of changing inter industry linkages and industry specialization. The value added multiplier weighted by final demand is measured as

$$D_{.j} = v_i b^{w}_{.j} \tag{9}$$

where v_i is the share of value added in industry i's output. It measures the direct and indirect contribution of a fractional increase in final demand to value added in an industry relative to other industries.

Compensation of employees multiplier

The largest component of value added is compensation of employees. To assess the changing importance of industries in terms of employment the compensation of employees multiplier can be used. It measures the direct and indirect contribution of a fractional increase in final demand to compensation of employees in industry j relative to other industries. The compensation of employees multiplier is calculated as

$$W_{.j} = z_i b^w_{.j} \tag{10}$$

where z_i is the share of compensation of employees in industry i's output.

Cumulated primary input coefficients for exports, gross fixed capital formation and consumption

Cumulated primary input coefficients for final demand categories show the ultimate contribution of primary inputs to producing final demand. Ultimately all output produced is for final demand. It is eventually consumed, exported, or added to gross fixed capital formation or inventories. Taking into account this ultimate disposition of commodities produced, cumulated primary input coefficients show the contribution of primary inputs to consumption, exports, gross fixed capital formation, and change in stocks. They take into account the direct and indirect costs; that is, they include the direct payments by an industry for salaries and wages and imports, for example, as well as the costs incurred by other industries that produce commodities used by the industry.

The matrix of cumulated primary input coefficients for categories of final demand is given by

$$Y = M^w Q^w + S^w \tag{11}$$

M^w denotes the matrix of cumulated primary input coefficients of industries. It is weighted by the share of primary inputs in total output, i.e. $M^w = O[I - A]^{-1}$ with $O = [o_{lj}]$, where o_{lj} is the share of primary input l in industry j's output. Q^w is the

matrix of industries output absorbed by final demand. It is weighted by the output absorbed by final demand as a share of output plus primary inputs absorbed by final demand, i.e. $Q^w = [q_{ik}^w]$ with $q_{ik}^w = q_{ik} / (\sum_{i=1}^{N} q_{ik} + \sum_{l=1}^{L} s_{lk})$, where q_{ik} is industry i's output and s_{lk} is the primary input l absorbed by final demand category k. S^w is the matrix of primary inputs absorbed by final demand. It is weighted by the primary inputs absorbed by final demand as a share of output plus primary inputs absorbed by final demand, i.e. $S^w = [s_{lk}^w]$, where $s_{lk}^w = s_{lk} / (\sum_{i=1}^{N} q_{ik} + \sum_{l=1}^{L} s_{lk})$.

Annex B: Structural Indicators
Table B.1: 1953

	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
1953									
Farming	5	3	10	5	5	5	10	5	2
Forestry	12	2	11	11	11	11	12	12	12
Hunting, fishing	11	12	8	12	12	12	8	11	8
Mining	10	8	4	8	10	9	11	10	9
Primary processing	1	11	1	9	2	8	1	1	1
Other manufacturing	2	1	12	1	1	1	2	2	5
Construction	6	7	5	2	6	2	6	6	10
Public utilities	9	10	2	10	9	10	5	9	11
Transport	7	5	9	4	7	4	7	7	3
Wholesale, retail trade	3	4	6	3	3	3	4	3	4
Banking, insurance	8	9	3	7	8	7	9	8	7
Services	4	6	7	6	4	6	3	4	6

Table B.2: 1955

1955	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
Farming	5	3	11	5	6	5	10	5	2
Forestry	12	2	10	11	11	11	12	12	12
Hunting, fishing	11	12	8	12	12	12	9	10	8
Mining	10	6	5	8	10	9	11	11	9
Primary processing	2	11	1	10	2	8	3	3	1
Other manufacturing	1	1	12	1	1	1	1	1	5
Construction	6	7	4	2	5	2	5	6	10
Public utilities	9	10	2	9	9	10	6	9	11
Transport	7	5	9	4	7	4	7	7	4
Wholesale, retail trade	3	4	7	3	4	3	4	2	3
Banking, insurance	8	9	3	7	8	6	8	8	6
Services	4	8	6	6	3	7	2	4	7

Table B.3: 1960

1960	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
Agriculture	5	1	15	4	4	9	10	5	2
Fishing and hunting	19	21	5	21	21	21	8	19	13
Forestry and logging	21	10	21	10	20	16	21	21	15
Mining and quarrying	20	12	3	12	19	13	20	20	19
Food, beverages and tobacco	1	17	1	18	1	15	2	1	1
Textiles, apparel and leather	6	19	10	19	9	19	5	8	8
Wood and wood products	12	11	8	13	10	10	13	13	12
Paper, products and printing	13	6	11	6	12	5	15	12	5
Chemicals, petrol, rubber etc.	14	3	6	8	13	6	18	15	10
Non-metallic mineral products	18	9	4	17	16	17	19	18	21
Basic metals	15	14	12	11	15	11	17	16	16
Fabricated metal products	8	7	17	3	6	4	7	9	14
Other manufacturing	17	20	7	20	18	20	12	17	18
Electricity, gas and water	11	13	20	9	14	8	16	11	17
Construction	2	8	2	5	2	3	1	4	20
Trade, restaurants and hotels	3	2	13	2	3	2	4	2	4
Transport and storage	9	4	16	1	7	1	11	7	3
Communication	16	15	19	16	17	18	9	14	11
Finance, insurance etc.	10	16	9	14	11	12	6	10	7
Owner-occupied dwellings	7	18	18	15	8	14	14	6	9
Other services	4	5	14	7	5	7	3	3	6

Table B.4: 1966

1966	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
Agriculture	5	1	13	4	4	11	12	5	2
Fishing and hunting	20	21	6	21	21	21	8	19	9
Forestry and logging	19	16	8	14	19	17	17	20	11
Mining and quarrying	21	14	3	15	20	15	21	21	21
Food, beverages and tobacco	1	18	1	18	1	14	2	1	1
Textiles, apparel and leather	8	19	9	20	10	20	5	9	10
Wood and wood products	12	15	5	12	9	12	9	13	13
Paper, products and printing	13	6	11	6	11	4	14	12	5
Chemicals, petrol, rubber etc.	11	4	10	5	12	5	19	15	8
Non-metallic mineral products	18	12	4	17	17	18	20	18	19
Basic metals	15	10	15	10	15	10	18	16	15
Fabricated metal products	6	7	16	3	6	3	7	7	14
Other manufacturing	17	20	7	19	16	19	13	17	16
Electricity, gas and water	10	9	21	11	13	8	16	10	17
Construction	2	11	2	9	2	6	1	4	20
Trade, restaurants and hotels	3	2	14	1	3	1	4	2	4
Transport and storage	9	5	12	2	8	2	10	8	3
Communication	16	13	20	16	18	16	11	14	12
Finance, insurance etc.	14	17	17	13	14	13	6	11	6
Owner-occupied dwellings	7	8	19	8	7	9	15	6	18
Other services	4	3	18	7	5	7	3	3	7

Table B.5: 1972

1972	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
Agriculture	6	3	12	6	6	10	13	6	2
Fishing and hunting	20	20	5	20	20	20	12	20	10
Forestry and logging	15	18	18	12	16	16	16	16	7
Mining and quarrying	21	13	4	13	21	13	21	21	16
Food, beverages and tobacco	1	16	1	16	1	12	2	2	1
Textiles, apparel and leather	8	17	16	18	9	18	5	10	8
Wood and wood products	13	15	8	11	10	11	11	12	9
Paper, products and printing	12	6	10	8	13	7	15	11	5
Chemicals, petrol, rubber etc.	11	5	14	5	12	5	18	13	11
Non-metallic mineral products	19	11	6	15	15	14	20	18	14
Basic metals	18	14	17	17	18	17	19	19	12
Fabricated metal products	5	8	15	4	5	4	6	5	6
Other manufacturing	17	19	7	19	17	19	10	17	18
Electricity, gas and water	14	9	21	10	14	8	17	14	19
Construction	4	12	2	7	2	6	1	4	20
Trade, restaurants and hotels	2	1	11	1	3	1	4	1	3
Transport and storage	9	7	13	2	8	2	7	8	4
Communication	16	10	20	14	19	15	9	15	17
Finance, insurance etc.	10	2	19	3	11	3	14	9	15
Owner-occupied dwellings	7	21	3	21	7	21	8	7	21
Other services	3	4	9	9	4	9	3	3	13

Table B.6: 1977

1977	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
Agriculture	9	3	16	6	9	9	17	9	2
Fishing and hunting	21	14	8	20	19	20	18	21	17
Forestry and logging	17	18	15	17	16	17	13	17	11
Mining and quarrying	20	10	10	12	21	14	21	20	15
Food, beverages and tobacco	1	17	2	13	2	11	2	2	1
Textiles, apparel and leather	6	20	6	18	7	18	5	6	5
Wood and wood products	13	16	5	14	11	13	10	13	10
Paper, products and printing	12	8	11	9	12	7	12	11	6
Chemicals, petrol, rubber etc.	10	5	17	3	10	3	14	12	12
Non-metallic mineral products	19	13	7	16	20	15	20	19	16
Basic metals	16	12	18	10	15	12	19	16	8
Fabricated metal products	5	6	13	4	5	5	7	5	7
Other manufacturing	18	19	4	19	18	19	9	18	18
Electricity, gas and water	14	11	20	11	14	10	15	15	19
Construction	3	15	3	7	1	6	1	4	20
Trade, restaurants and hotels	4	1	12	1	3	1	4	3	3
Transport and storage	8	7	9	5	8	4	8	8	4
Communication	15	9	21	15	17	16	11	14	13
Finance, insurance etc.	11	2	19	2	13	2	16	10	14
Owner-occupied dwellings	7	21	1	21	6	21	6	7	21
Other services	2	4	14	8	4	8	3	1	9

Table B.7: 1977

	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
1982									
Agriculture	9	5	13	7	9	7	15	9	5
Fishing and hunting	18	20	11	20	20	20	16	19	13
Forestry and logging	16	18	18	17	16	18	14	16	17
Mining and quarrying	21	9	9	11	21	12	21	21	15
Food, beverages and tobacco	1	15	2	13	1	11	2	3	1
Textiles, apparel and leather	6	19	4	18	6	17	5	6	4
Wood and wood products	13	16	5	12	12	14	9	13	10
Paper, products and printing	12	11	8	9	11	8	11	11	6
Chemicals, petrol, rubber etc.	10	6	14	3	8	3	12	12	11
Non-metallic mineral products	20	12	6	15	19	15	20	20	16
Basic metals	15	13	15	14	14	13	18	17	8
Fabricated metal products	5	4	16	4	5	4	6	5	7
Other manufacturing	19	17	3	19	17	19	10	18	19
Electricity, gas and water	14	7	21	10	15	9	19	14	20
Construction	4	14	1	6	2	6	3	4	18
Trade, restaurants and hotels	3	2	12	1	4	1	4	2	2
Transport and storage	7	10	10	5	7	5	7	8	3
Communication	17	8	20	16	18	16	13	15	14
Finance, insurance etc.	11	1	19	2	13	2	17	10	9
Owner-occupied dwellings	8	21	7	21	10	21	8	7	21
Other services	2	3	17	8	3	10	1	1	12

Table B.8: 1987

1987	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
Agriculture	10	11	11	8	10	11	16	10	5
Fishing and hunting	19	17	9	19	18	19	19	19	14
Forestry and logging	15	19	20	17	19	18	18	12	18
Mining and quarrying	20	9	10	9	21	10	21	20	16
Food, beverages and tobacco	3	16	2	13	2	12	2	3	1
Textiles, apparel and leather	7	20	6	18	7	17	5	9	4
Wood and wood products	13	15	5	14	12	15	10	15	13
Paper, products and printing	12	4	12	11	13	9	13	14	6
Chemicals, petrol, rubber etc.	11	8	15	5	11	5	12	11	11
Non-metallic mineral products	21	12	4	16	20	16	20	21	17
Basic metals	16	14	14	15	14	14	14	17	7
Fabricated metal products	6	7	13	4	5	4	6	7	8
Other manufacturing	18	18	1	20	16	20	9	18	15
Electricity, gas and water	14	10	19	10	15	7	17	13	20
Construction	4	13	3	6	4	6	3	4	19
Trade, restaurants and hotels	2	3	8	2	1	2	4	2	2
Transport and storage	9	5	16	3	9	3	8	8	3
Communication	17	6	21	12	17	13	15	16	12
Finance, insurance etc.	8	1	18	1	8	1	11	6	10
Owner-occupied dwellings	5	21	7	21	6	21	7	5	21
Other services	1	2	17	7	3	8	1	1	9

Table B.9: 1991

1991	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
Agriculture	10	9	9	5	11	9	16	10	4
Fishing and hunting	21	17	7	19	19	19	20	21	17
Forestry and logging	13	19	20	14	17	18	18	11	11
Mining and quarrying	19	12	16	9	18	10	19	18	14
Food, beverages and tobacco	2	15	1	13	1	13	2	3	1
Textiles, apparel and leather	8	20	4	18	8	15	6	9	5
Wood and wood products	17	16	5	15	13	14	10	16	10
Paper, products and printing	12	4	13	10	12	8	12	14	8
Chemicals, petrol, rubber etc.	11	7	14	4	10	4	15	13	9
Non-metallic mineral products	20	13	6	16	20	16	21	20	19
Basic metals	14	18	11	17	14	17	9	17	7
Fabricated metal products	6	10	10	6	5	6	5	7	6
Other manufacturing	18	21	3	20	21	20	7	19	16
Electricity, gas and water	16	8	21	8	15	7	17	15	20
Construction	4	11	2	7	4	5	3	5	18
Trade, restaurants and hotels	3	3	8	2	3	2	4	2	2
Transport and storage	9	6	12	3	7	3	8	8	3
Communication	15	5	17	12	16	12	14	12	13
Finance, insurance etc.	7	1	19	1	9	1	13	6	12
Owner-occupied dwellings	5	14	18	21	6	21	11	4	21
Other services	1	2	15	11	2	11	1	1	15

Table B.10: 1996

	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
1996									
Agriculture	13	7	11	6	12	9	19	14	6
Fishing and hunting	20	10	12	18	20	18	20	20	16
Forestry and logging	15	19	10	12	14	15	15	15	11
Mining and quarrying	19	15	15	13	19	14	18	18	13
Food, beverages and tobacco	3	16	1	14	3	11	1	3	1
Textiles, apparel and leather	11	21	7	20	13	20	6	13	9
Wood and wood products	16	17	2	17	11	17	11	16	10
Paper, products and printing	10	5	14	8	10	7	10	9	7
Chemicals, petrol, rubber etc.	9	9	13	5	8	5	12	10	8
Non-metallic mineral products	21	11	9	19	21	19	21	21	19
Basic metals	18	18	4	16	17	16	13	19	12
Fabricated metal products	17	12	5	15	15	13	14	17	14
Other manufacturing	6	14	6	9	5	10	5	7	5
Electricity, gas and water	12	8	19	7	16	6	16	12	18
Construction	4	13	3	10	4	8	2	5	20
Trade, restaurants and hotels	2	3	8	2	1	2	3	2	2
Transport and storage	8	6	17	4	9	4	7	8	3
Communication	14	4	21	11	18	12	17	11	15
Finance, insurance etc.	7	2	20	3	7	3	9	6	17
Owner-occupied dwellings	5	20	16	21	6	21	8	4	21
Other services	1	1	18	1	2	1	4	1	4

Table B.11: 2006

	Backward linkage	Forward linkage	Backward concentration	Forward concentration	Row entropy	Column entropy	Compensation of employees	Value added multiplier (final demand weighted)	Value added multiplier (export weighted)
2006									
Agriculture	11	11	7	7	11	8	13	12	6
Fishing and hunting	20	12	5	17	20	17	19	20	18
Forestry and logging	17	15	3	14	15	16	11	18	14
Mining and quarrying	18	14	17	9	19	11	20	16	12
Food, beverages and tobacco	3	18	2	10	4	10	1	3	1
Textiles, apparel and leather	15	20	4	20	18	20	6	17	11
Wood and wood products	14	16	1	18	9	18	8	14	7
Paper, products and printing	13	5	12	13	12	12	10	13	8
Chemicals, petrol, rubber etc.	9	10	15	5	10	6	14	11	10
Non-metallic mineral products	21	9	10	19	21	19	21	21	19
Basic metals	16	17	6	16	14	15	16	15	9
Fabricated metal products	19	13	13	11	17	9	18	19	16
Other manufacturing	7	19	8	15	5	14	5	7	5
Electricity, gas and water	10	6	18	6	13	5	17	10	20
Construction	4	8	11	8	3	7	2	4	17
Trade, restaurants and hotels	2	3	9	2	1	2	3	2	2
Transport and storage	8	7	14	4	6	4	7	8	4
Communication	12	4	20	12	16	13	15	9	15
Finance, insurance etc.	6	2	21	3	7	3	9	6	13
Owner-occupied dwellings	5	21	16	21	8	21	12	5	21
Other services	1	1	19	1	2	1	4	1	3

Annex C: Input Output Tables

TO BE SUPPLIED ON REQUEST

Annex D: Aggregation of industries

	1960 and 1966	1972 to 1991	1996
Agriculture	Farming	Agriculture	Horticulture & fruit growing Livestock & cropping farming Dairy cattle farming Other farming
Fishing & hunting	Hunting, fishing	Fishing & hunting	Fishing Services to agriculture, hunting & trapping
Forestry & logging	Forestry	Forestry & logging	Forestry & logging
Mining & quarrying	Mining	Mining & quarrying	Mining & quarrying Oil & gas exploration & extraction
Food, Beverages & Tobacco	Meat products Dairy products Fruit & vegetable preserving Other food products Beverages Tobacco	Food, beverages & tobacco	Meat & meat product manufacturing Dairy product manufacturing Other food manufacturing Beverage, malt & tobacco manufacturing
Textiles, apparel & leather	Wool textiles Other textiles Footwear Clothing Leather products	Textiles, apparel & leather	Textile & apparel manufacturing
Wood & wood products	Wood products Furniture	Wood & wood products	Wood product manufacturing
Paper, products & printing	Paper products Printed products	Paper, products & printing	Paper & paper product manufacturing Printing, publishing & recorded media
Chemicals, petrol, rubber etc.	Rubber products Chemical fertilisers Other chemical products	Chemicals, petrol, rubber etc.	Petroleum & industrial chemical manufacturing Rubber, plastic & other chemical product manufacturing
Non-metallic mineral products	Non-metal minerals	Non-metallic mineral products	Non-metallic mineral product manufacturing
Basic metals	Metal products	Basic metals	Basic metal manufacturing
Fabricated metal products	Machinery	Fabricated metal products	Structural, sheet & fabricated metal product manufacturing
Other manufacturing	Electrical products Vehicle assembly Other transport products Other manufacturing	Other manufacturing	Transport equipment manufacturing Machinery & equipment manufacturing Furniture & other manufacturing
Electricity, gas & water	Electricity, gas Water & sanitation	Electricity, gas & water	Electricity generation & supply Gas supply Water supply
Construction	Residential building Commercial building Other construction	Construction	Construction
Trade, restaurants & hotels	Trade	Trade, restaurants & hotels	Wholesale trade Retail trade Accommodation, restaurants & bars
Transport & storage	Rail transport Shipping Air transport Road transport	Transport & storage	Road transport Water & rail transport Air transport, services to transport & storage
Communication	Communications	Communication	Communication services
Finance, insurance etc.	Banking & insurance	Finance, insurance etc.	Finance Insurance Services to finance & insurance Real estate
Owner-occupied dwellings	Ownership of property	Owner-occupied dwellings	Ownership of owner-occupied dwellings
Other services	Services Services to household & government	Community, social services etc. Central government services Local government services Private non-profit services Household domestic services	Equipment hire & investors in other property Business services Central government administration, defence, public order & safety services Local government administration services & civil defence Education Health & community services Cultural & recreational services Personal & other community services