

## **The importance of raw materials processing in Australia**

2.1 There appears to have been a general perception throughout Australia's history that its very existence was heavily dependent on its raw materials base. During much of its early years Australia was perceived as riding on the sheep's back. More recently it has been seen by some as being a quarry to the world.<sup>1</sup>

2.2 These perceptions were largely driven by Australia's long history as a successful and significant producer and exporter of raw materials. As indicated by the Department of Agriculture, Fisheries and Forestry – Australia:

Traditionally Australia's agricultural, fisheries and forestry industries have been exporters of commodity products and have been very successful in this. Limited value-adding was undertaken in Australia beyond meeting the demands of the domestic market. Some products destined for export were value-added, but this was usually confined to small scale, early stage processing. The vast bulk of Australia's agricultural, fisheries and forestry exports were in raw form, with a proportion used as inputs for further processing overseas.<sup>2</sup>

2.3 While there is little doubt that Australia's success in producing raw materials has contributed to its overall growth and prosperity, the Australia economy today appears to be much more broad-based.

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1 See the Chamber of Minerals and Energy Western Australia, submission no. 11, p. 2.

2 AFFA, submission no. 34, p. 8.

2.4 The Committee received significant evidence that the economy has moved well beyond a reliance on its strong raw materials base and that it is now undertaking significant raw materials value-adding activity.

2.5 The Chamber of Minerals and Energy of Western Australia, for example, stated:

In Western Australia, further processing currently occurs across a wide range of minerals including iron ore, bauxite, nickel, mineral sands and gold. There are also a number of proposals in the pipeline in areas such as petrochemicals and iron and steel.

...An extremely conservative estimate would be that at least 50% of those in WA manufacturing jobs are in fact engaged in further processing. Therefore there is more employment in further mineral processing than in actual mining in Western Australia.<sup>3</sup>

2.6 The CSIRO also provided a list of examples of current minerals and energy value-adding activity taking place in Australia, ranging from the production of coke and the distillation of oil through to the development of various techniques to add value to iron ore.<sup>4</sup>

2.7 In addition, witnesses such as the Australian Aluminium Council and Iluka Resources outlined the success of their industries' value-adding activities. The Aluminium Council, for example, stated:

Australia is a major player in the upstream sectors of bauxite, alumina and aluminium and a significant producer of semifabricated and fabricated products.

Some simple facts will illustrate Australia's place in the global structures of these industries.

Australia is:

- The largest producer and second largest exporter of bauxite.
- The largest producer and exporter of alumina...
- The fifth largest producer of aluminium.<sup>5</sup>

2.8 Iluka Resources claimed:

Iluka Resources is one of the world's major titanium minerals production and processing companies...the company has developed a significant value-adding business which makes an important contribution to the company's earnings. In addition,

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3 CMEWA, submission no. 11, p 2.

4 CSIRO, submission no. 22, p. 5.

5 Australian Aluminium Council, submission no 31.

downstream processing operations generate major community economic and employment benefits.<sup>6</sup>

- 2.9 There was therefore broad anecdotal evidence that Australia has significant processing activity well established in a number of industries.
- 2.10 A full evaluation of the state of value-adding in Australia, however, required a much more detailed and thorough examination of this question along the lines outlined below. The Committee has examined the existing statistical data on industry activity to establish just how widespread value-adding activity is, how Australian businesses have been performing in this area and how the Australian experience compares with the rest of the world.

## The extent of raw materials processing in Australia

- 2.11 To estimate the current magnitude of value-adding activity in Australia, the Committee drew on Australian Bureau of Statistics' National Accounts data. This information provides a useful indication of the relative size of the various broad sectors of the Australian economy and an indication of their respective growth rates.
- 2.12 As shown in Table 1, for example, the raw materials sectors of *agriculture, forestry and fishing*, and *mining* accounted for some \$18.8 billion and \$25.2 billion of value-added in Australia in 1998-99. This represented 3.8 per cent and 5.1 per cent respectively of total industry output in that year.
- 2.13 While the overall level of raw material value-adding in Australia is less clear from the data, there is strong evidence of this activity taking place. Metal products, for example, accounted for \$13.4 billion in value-added in 1998-99 or 2.7 per cent of total industry value-added. In addition, food, beverage and tobacco was responsible for some 2.7 per cent of industry value-added in that year.
- 2.14 An overall assessment of the level of raw materials value-adding in Australia depends to a large extent on the interpretation of what industries fall into this category. The term "raw materials value-adding" can refer to just those industries involved in the basic processing of raw materials or can be interpreted as extending to all industries that use or produce products derived from raw materials.

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6 Iluka Resources Ltd, submission no. 33.

Table 1 Industry gross value-added, 1998-99

	Value-added 1998-99	Average real <sup>a</sup> annual growth 1988-89 to 1998-99	Share of value- added 1998-99
	(\$million)	(per cent)	(per cent)
<b>Agriculture, forestry and fishing</b>	18 817	3.45	3.81
<b>Mining</b>	25 245	4.80	5.11
<b>Manufacturing</b>	72 926	0.94	14.77
<i>Food, beverage and tobacco</i>	13 196	1.79	2.67
Textile, clothing, footwear and leather	3 576	-2.67	0.72
<i>Wood and paper products</i>	5 081	-0.45	1.03
Printing, publishing and recorded media	6 659	0.87	1.35
<i>Petroleum, coal, chemical, etc</i>	9 501	1.47	1.92
<i>Non-metallic mineral products</i>	4 048	0.63	0.82
<i>Metal products</i>	13 422	1.22	2.72
Machinery and equipment	14 948	1.42	3.03
Other manufacturing	2 493	-0.79	0.50
<b>Services</b>	376 801	3.61	76.31
<b>Total All industries<sup>b</sup></b>	493 789	3.21	100.00

Note: **a** Values are in real terms based on the ABS chain volume measure with reference year 1997-98. **b** The total gross value added for all industries does not equate with GDP. GDP includes additional items such as ownership of dwellings and taxes (less subsidies on products).

Source ABS 5206. Updated from a table provided by ISR, submission no. 28, p. 4.

- 2.15 In considering this issue, the Department of Industry, Science and Resources suggested that a number of proxies could be used for this purpose. It indicated that a useful proxy can be derived, for example, by adding together the production in the sub-divisions of the manufacturing sector that appear to have a large component of raw materials processing.
- 2.16 For the purposes of this inquiry, it suggested that the sum of production in the sub-divisions of food, beverage and tobacco; wood and paper products; petroleum, coal and chemicals; non-metallic mineral products; and metal products would provide a useful indicator.
- 2.17 The Department noted in this regard:
- While this proxy does not provide a precise guide to the level of raw materials processing activity in Australia (for example, it does not include wool scouring and includes production of fabricated

metal products such as firearms), it does serve to provide a useful illustration of the order of magnitude of this activity in Australia.<sup>7</sup>

- 2.18 Based on this proxy and the information in Table 1, raw materials processing in Australia accounted for some \$45.2 billion of industry value-added in 1998-99. This equates to around 9.2 per cent of total industry output in that year or slightly more than the combined value-added of the agriculture, forestry and fishing and mining sectors.
- 2.19 The other issue that is given prominence by the data in Table 1 is the relative importance of the services sector. This sector accounts for some 76 per cent of industry value-added and dominates Australia's industry output.
- 2.20 Given its relative size, the services sector is also responsible for much of the growth that the Australian economy has achieved in recent times. With average real growth of 3.6 per cent a year over the ten years to 1998-99, the sector has been a major contributor, particularly in absolute terms, to Australia's healthy overall growth rate. It is clear, however, that part of this growth has been driven by trends such as the increasing propensity for businesses to contract-out their property and business services.
- 2.21 Australia's raw materials producing sectors, however, have also performed relatively well. As indicated in Table 1, the agriculture, forestry and fishing, and mining sectors achieved average real growth of 3.5 per cent and 4.8 per cent growth respectively in the decade to 1998-99.
- 2.22 While this appears to indicate that Australia has had increasing opportunities to develop its raw materials processing industries, the country does not seem to have fully realised this potential. The average growth in the raw materials processing industries (as defined above) of 1.2 per cent a year<sup>8</sup> suggests that the growth in processing has not kept up with the increasing raw materials output.
- 2.23 Some raw materials processing industries, however, have performed better than others. The food, beverage and tobacco and petroleum, coal and chemicals industries, for example, had higher growth rates than the other raw materials processing areas with average annual growth of 1.8 per cent and 1.5 per cent during the ten year period examined.
- 2.24 On the other hand, raw materials processing industries such as wood and paper products and non-metallic mineral products have achieved relatively disappointing growth. The output of the wood and paper

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7 ISR, submission no. 28, p. 5.

8 This is a weighted average of the growth in these industries.

products industry declined by an average of 0.4 per cent a year over the decade to 1998-99 and non-metallic mineral products increased by an average of only 0.6 per cent a year over the same period.

## Employment

- 2.25 The primary reason there has been so much focus in recent years on raw materials processing in Australia relates to the economic benefits it generates, with one of the most frequently cited benefits being the level of employment creation (both directly and indirectly) throughout the economy.
- 2.26 To put this issue in perspective and to assess the current impact of raw materials processing in Australia, the Committee examined the direct employment benefits that are currently flowing from the local processing industries. This analysis is based on the ABS industry employment data in Table 2.
- 2.27 This indicates that the primary industry sectors and the raw materials processing industries are both responsible for a significant proportion of Australia's current industry employment. The *agriculture, forestry and fishing* and *mining* sectors, for example, accounted for employment of some 421,800 and 79,600 persons in 1998-99 or for 4.9 per cent and 0.9 per cent respectively of the total Australian industry workforce.
- 2.28 On the other hand, the raw materials processing industries, based on the definition used above, contributed some 566,100 jobs in 1998-99 or 6.6 per cent of the workforce in that year. This again is more than the combined contribution of the raw materials producing industries.
- 2.29 It is notable, however, that the level of employment provided by all these sectors has been declining over the last decade. Employment in the agriculture, forestry and fishing sector declined by 0.3 per cent a year and employment in the mining sector declined by 2.0 per cent a year over the decade to 1998-99.
- 2.30 Over the same period, employment in the raw materials processing industries declined by an average 0.8 per cent a year, with the most significant decline occurring in the wood and paper products industry for which employment fell by an average 2.1 per cent a year over the decade examined.

Table 2 Industry employment 1998-99

	Average employment 1998-99	Average annual growth 1988-89 to 1998-99	Share of total employment 1998-99
	('000)	(per cent)	(per cent)
<b>Agriculture, forestry and fishing</b>	421.8	-0.3	4.9
<b>Mining</b>	79.6	-2.0	0.9
<b>Manufacturing</b>	1 082.5	-1.0	12.5
<i>Food, beverage and tobacco</i>	176.5	0.0	2.0
Textile, clothing, footwear and leather	92.6	-2.6	1.1
<i>Wood and paper products</i>	65.1	-2.1	0.8
Printing, publishing and recorded media	110.8	0.3	1.3
<i>Petroleum, coal, chemical, etc</i>	103.7	-0.1	1.2
<i>Non-metallic mineral products</i>	48.4	-1.0	0.6
<i>Metal products</i>	172.6	-1.3	2.0
Machinery and equipment	221.3	-2.2	2.6
Other manufacturing	91.7	1.0	1.1
<b>Services</b>	7 054.4	2.0	81.7
<b>Total All industries</b>	8 638.3	1.4	100.0

Source ABS 6203. Updated from a table provided by ISR, submission no. 28, p. 6.

2.31 Indeed, the only sector that has contributed to employment growth in Australia over the last decade has been the services sector. While some industries within the other sectors (such as printing, publishing and recorded media; and other manufacturing) have provided some contribution to Australia's employment growth, the overall growth in employment in Australia is clearly being primarily driven by services.

## Industry performance

2.32 While the industry value-added and employment figures discussed above help show recent trends in industry growth, they provide only limited help in deciding whether Australia has been achieving its full potential in adding value to its raw materials. Although there is no definitive mechanism for measuring the country's performance in this area, a number of relatively simple ratios have been used in recent years.

2.33 For example, the relatively healthy output growth rates in Australia's primary and raw materials processing industries and the more modest employment outcomes discussed above indicate that output per person employed has been increasing. This in turn is likely to have contributed to the competitiveness of these industries on world markets and to their successful continuing operation in Australia.

2.34 These trends are illustrated in Table 3.

Table 3 Industry gross value-added per person employed<sup>a</sup> 1988-89 and 1998-99

	1988-89	1998-99
	(\$'000)	(\$'000)
<b>Agriculture, forestry and fishing</b>	30.8	44.6
<b>Mining</b>	161.4	317.0
<b>Manufacturing</b>	55.3	67.4
<i>Food, beverage and tobacco</i>	62.7	74.8
Textile, clothing, footwear and leather	38.8	38.6
<i>Wood and paper products</i>	65.9	78.0
Printing, publishing and recorded media	56.6	60.1
<i>Petroleum, coal, chemical, etc</i>	78.1	91.7
<i>Non-metallic mineral products</i>	71.1	83.7
<i>Metal products</i>	60.2	77.8
Machinery and equipment	47.0	67.6
Other manufacturing	32.5	27.2
<b>Services</b>	45.6	53.4
<b>Total All industries</b>	47.8	57.2

Note: a Calculated by dividing real industry gross value-added (chain volume measure reference year 1997-98) by employment in the industry.

Source ABS 5206 and 6203.

2.35 It appears from this table that most Australian industries have been achieving increasing real output per person employed, with the agriculture, mining, manufacturing and services sectors all improving their performance in the decade to 1998-99.



- 2.36 The mining sector in particular achieved outstanding growth in this area with its average value-added per employee increasing in real terms from \$161,400 per employee in 1988-89 to \$317,000 per employee in 1998-99. That sector also achieved by far the largest output per employee of the sectors examined.<sup>9</sup>
- 2.37 While this measure does not necessarily provide a useful guide to the relative efficiency of an industry (different industries typically have varying capital and labour intensities), the agriculture, forestry and fishing sector was at the other end of the spectrum and achieved a relatively modest level of output per employee. The sector's output, however, also increased over the period in real terms, rising from an average \$30,800 in 1988-89 to \$44,600 in 1998-99.
- 2.38 The raw materials processing industries, on the other hand, all produced above average output per employee and all achieved relatively healthy growth in the decade to 1998-99. While some of the other manufacturing industries experienced declining output per employee during the period, the raw materials processing industries (as defined above) all achieved relatively strong growth, with average value-added per employee rising from \$65,700 per employee in 1988-89 to \$79,900 in 1998-99.
- 2.39 The relatively healthy productivity growth in Australian industry in recent years has also been confirmed in a number of recent studies into this issue. The Productivity Commission, for example, found that multifactor productivity (a combined labour and capital productivity measure) in Australia's market sector grew at an average 2.4 per cent a year from 1993-94 to 1997-98, compared with an average 1.2 per cent a year from 1964-65 to 1993-94.<sup>10</sup>
- 2.40 An alternative industry performance measure that helps indicate the relative importance of the opportunities that may be available to Australian raw materials processors is the relative value-added to sales ratios of the various industry sectors.
- 2.41 This ratio is of interest because it is sometimes contended that, since manufacturing (or raw materials processing) is a relatively high value-added activity, it is more important than relatively low-value added activities because it has a better capacity to sustain a higher living standard.<sup>11</sup> The corollary of this argument is that it is a worthwhile activity to encourage.

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9 See CIE, exhibit no. 7, p. 6 for further discussion of this issue.

10 Productivity Commission, *Microeconomic Reforms and Australian Productivity: Exploring the Links*, November 1999, p. xvii.

11 See Productivity Commission, *The Changing of Australian Manufacturing*, December 1996, p. 67.

Table 4 Industry gross product to total income 1996-97

Industry	(per cent)
Agriculture	33.2
Services to agriculture; hunting and trapping	30.7
Forestry and logging	40.1
Commercial fishing	44.5
<b>Agriculture, forestry and fishing</b>	<b>33.8</b>
Coal mining	44.8
Oil and gas extraction	73.1
Metal ore mining	42.9
Other mining	39.7
Services to mining	28.4
<b>Mining</b>	<b>49.4</b>
Food, beverage and tobacco	24.9
Textile, clothing, footwear and leather	31.3
Wood and paper products	35.1
Printing, publishing and recorded media	42.5
Petroleum, coal, chemical and associated products	23.6
Non-Metallic mineral product manufacturing	34.6
Metal product manufacturing	31.0
Machinery and equipment	28.9
Other manufacturing	33.4
<b>Manufacturing</b>	<b>29.3</b>
<b>Services<sup>a</sup></b>	<b>26.4</b>
<b>Total All industries</b>	<b>28.2</b>

Note: **a** Excludes the Finance and Insurance division, as industry gross product is not seen as being relevant to these industries.

Source ABS 8140.0. Taken from ISR, submission no. 28, p. 13.

- 2.42 To test the validity of this suggestion the Department of Industry, Science and Resources produced the data in Table 4, which expresses industry gross product<sup>12</sup> as a proportion of the total income for each of the major industry categories.
- 2.43 These figures do not appear to lend much support to the argument outlined above. While the total industry gross product represented some 28.2 per cent of total industry income in 1996-97, the ratio for the manufacturing sector was only slightly higher at 29.3 per cent.
- 2.44 On the basis of this data, however, it appears that there are some grounds for pursuing the argument with respect to the services sector. The services sector had a value-added to income ratio of only 26.4 per cent in 1996-97 and the ratio for manufacturing does compare favourably with that figure.
- 2.45 Care needs to be taken, however, in suggesting that manufacturing therefore should in some way be favoured over the services industries. As noted above, the services sector is providing much of the economic growth and essentially all the employment growth that is occurring in Australia currently. Any measure to favour another sector over services would therefore need to be based on a very solid foundation, as such action could hold back the development of the major growth sector of the economy.
- 2.46 It is also notable in this context that the mining and agriculture sectors appear to have relatively higher gross product to income ratios than manufacturing. The mining sector's value-added represents 49.4 per cent of the sector's income and the ratio for the agriculture sector, at 33.8 per cent, was also well above the national average.
- 2.47 Any encouragement based on the above argument would therefore need to be directed at these sectors rather than materials processing.
- 2.48 It should be noted, however, that this finding also needs to be approached with some caution. As indicated by the Productivity Commission,<sup>13</sup> measures such as that used in Table 4 will generally result in lower values for downstream industries than will be the case for industries involved in processing raw materials. This occurs because primary industries, by their nature, tend to have fewer variable inputs into their production processes. In addition, a number of inputs such as the value of the minerals in the ground are not generally viewed as an input cost for the purposes of calculating value added. They are therefore included in the value added of these industries.

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12 Industry gross product is a value-added type measure. It estimates the unduplicated gross product of a business defined as gross output minus intermediate inputs.

13 See Productivity Commission, *The Changing of Australian Manufacturing*, December 1996, p. 69.

- 2.49 In examining the figures in Table 4, ISR also noted that the ratios for some value-adding industries were significantly higher than for others:

The figures for the manufacturing sector as a whole, therefore, do not suggest that manufacturing is a comparatively “high value-added” sector when compared to the industries providing its raw material inputs. Some parts of the sector, however, have ratios significantly higher than the sector average. These include industries such as wood and paper products (35.1 per cent) and non-metallic mineral product manufacturing (34.6 per cent), which could be described as raw materials processing industries. On the other hand, other of these, including petroleum, coal, chemical and associated products (23.6 per cent) and food, beverage and tobacco (24.9 per cent), have relatively low industry gross product to income percentages.<sup>14</sup>

- 2.50 It appears that, at best, only some raw materials processing industries have relatively high value-added to income ratios.

- 2.51 The CIE attempted an alternative approach to assessing this question using Australian Bureau of Statistics input-output data and came to a similar conclusion.<sup>15</sup> While the level of value-added per dollar of production was relatively higher for the services industry using this approach (possibly because the services industries draw much of their inputs from other services), the ratios for the other sectors showed the same relativities.

- 2.52 The value-added to production ratios for the mining and agriculture sectors were both significantly higher than for manufacturing, with, for example, the ratio for mining being about double that for the manufacturing sector.

- 2.53 ISR also reported on some work undertaken by the Economic Planning Advisory Council,<sup>16</sup> which had taken yet another approach to examining this issue, estimating the additional value-added provided to specific raw materials at each stage of processing. ISR suggested in this context:

While there was considerable variation in the coefficients estimated in this work, a number of them (particularly for zirconia and heavy rare earth metals) were very high, indicating that these

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14 ISR, submission no. 28, pp. 13-14.

15 CIE, exhibit no. 7, p. 5.

16 See EPAC, *Raw Materials Processing: Its Contribution to Structural Adjustment*, April 1988, Appendix 1.

processing industries, if they can be successfully undertaken in Australia, could provide significant benefits.<sup>17</sup>

- 2.54 Although the range of statistics and measures discussed above provide some guidance on evaluating the performance of Australia's industry in undertaking raw materials processing and on the opportunities that may be available to local producers, the Committee believes these questions warrant further examination. It would therefore be interested in hearing from witnesses on any other useful work that may have been undertaken in this area and other indicators for measuring value-adding.

## Trade performance

- 2.55 One area where the processing of raw materials has provided a clear and robust benefit for Australia is through a growth in exports. A healthy growth in exports of processed raw materials in recent years has significantly contributed to Australia's industry growth. It has also worked to improve the country's balance of payments outcome and the value of the Australian currency.

- 2.56 As indicated by the Department of Foreign Affairs and Trade:

Over the past 15 years, Australia's export growth has been considerably stronger than economic growth. Exports of goods and services accounted for 14 per cent of GDP in 1983, but represented about 20 per cent of GDP in 1998 (in current price terms). One of the most notable features of Australia's trade profile is its specialisation in resource-based goods, which account for the bulk of Australia's export items. Another notable feature is the strong trading links with developing countries, particularly those in the Asia-Pacific region. Australia's fast growing export sector reflects in part Australia's proximity to expanding markets in the Asia-Pacific region and the relationship between the resource-intensive nature of Australia's exports and the Asia-Pacific region's imports.<sup>18</sup>

- 2.57 A number of these features are demonstrated in Table 5. It is, for example, clear from this table that Australia's exports of processed raw materials have been increasing at a rate well in excess of industry output.

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17 ISR, submission no. 28, p. 14.

18 DFAT, submission no. 32, p. 4.

- 2.58 In particular, the growth in exports of petroleum, coal and chemicals and non-metallic mineral products, with average annual real growth rates of 9.4 per cent and 9.0 per cent a year respectively in the decade to 1998-99, have been very strong. Exports of metal products, with average growth of 8.4 per cent a year have also been relatively healthy.
- 2.59 Although the growth in exports of wood and paper products (with average real growth of 5.6 per cent a year) and food, beverage and tobacco (4.1 per cent) have been more modest, these growth rates are also well in excess of the growth in outputs from these industries.
- 2.60 These growth rates have also outstripped the growth in exports of the raw material products from which they are derived. As indicated in Table 5, exports of agricultural, forestry and fishing products only increased by an average 1.1 per cent a year in real terms over the decade while mining exports increased by an average 6.3 per cent over the same period.
- 2.61 The other feature demonstrated by the data in this table is the strong increase in the number of imports coming into Australia over the past decade. Mining imports, for example, have been increasing by an average 9.3 per cent a year in real terms over the decade and manufacturing products by 7.6 per cent.
- 2.62 While, on the surface, this would appear to give some support to the prospect of using further raw materials processing to displace some of these imports, the composition of Australia's imports raises some questions in this area.<sup>19</sup>
- 2.63 As indicated in Table 5, over half of Australia's merchandise imports are comprised of machinery and equipment that would not be displaced by further raw materials processing. Indeed, further processing may even work to increase the demand for these products.
- 2.64 Some other merchandise imports, however, could offer better prospects. For example, Australia appears to have a sizeable dependence on imports of petroleum, coal and chemicals and on imports of metal products, some of which could potentially be replaced through further processing.
- 2.65 The other issue that needs to be taken into account in considering this potential is the strong growth that is already taking place in processed exports. As indicated by DFAT:

There has also been a trend towards higher levels of processing in Australia's export composition...the contribution of unprocessed exports to Australia's overall merchandise export composition has

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19 As indeed does the fact that much of Australia's imports are services and are not included in these figures.

fallen steadily over the past decade. This decline in relative importance has been achieved despite the strong export performance in many areas of unprocessed primary products, such as unprocessed fuels, minerals and foods.<sup>20</sup>

**Table 5** Merchandise trade by industry (current prices<sup>a</sup>)

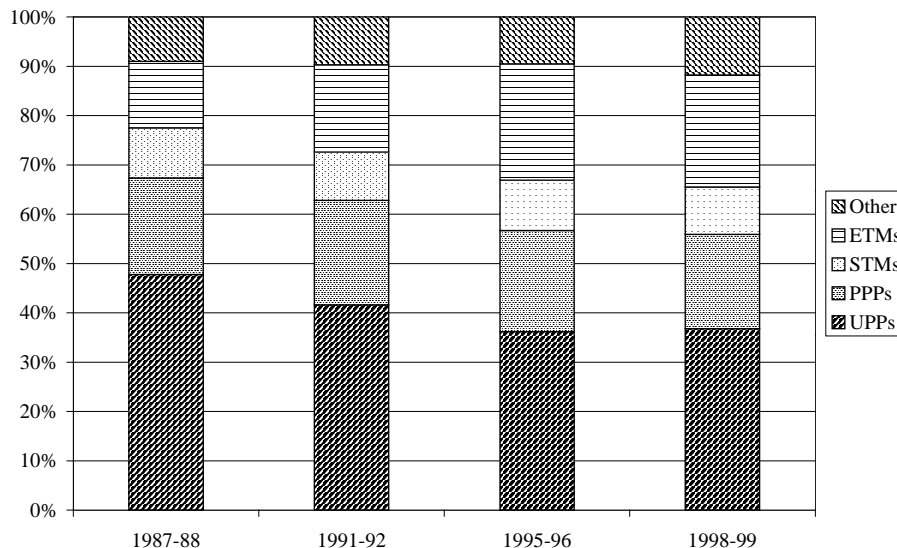
	Imports		Exports	
	1998-99 \$ million	Average growth 1988-89 to 1998-99 <sup>b</sup> (per cent)	1998-99 \$ million	Average growth 1988-89 to 1998-99 <sup>b</sup> (per cent)
<b>Total agriculture</b>	<b>815</b>	<b>0.7</b>	<b>10 056</b>	<b>1.1<sup>c</sup></b>
Agriculture	717	..	9 367	..
Forestry & fishing	98	..	689	..
<b>Total mining</b>	<b>3 963</b>	<b>9.3</b>	<b>20 228</b>	<b>6.3</b>
Coal mining	19	..	9 284	..
Oil & gas extraction	3 672	..	3 323	..
Metal ore mining	100	..	7 424	..
Other mining	173	..	197	..
<b>Total manufacturing</b>	<b>92 450</b>	<b>7.6</b>	<b>51 894</b>	<b>8.4<sup>c</sup></b>
Food, beverage & tobacco	4 231	5.6	11 679	4.1 <sup>c</sup>
TCF & leather	6 354	4.2	2 531	5.3
Wood & paper products	3 018	1.1	1 186	5.6
Printing & recorded media etc	2 137	7.4	488	11.6
Petroleum, coal, chemical etc	14 974	6.9	5 577	9.4
Non-metallic mineral product	1 297	2.4	302	9.0
Metal product	7 653	7.8	17 215	8.4
Machinery & equipment	49 984	9.1	12 170	14.8
Other manufacturing	2 803	5.7	745	3.3
<b>Other industries<sup>d</sup></b>	<b>396</b>	<b>..</b>	<b>3 822</b>	<b>..</b>
<b>Total</b>	<b>97 623</b>	<b>..</b>	<b>86 000</b>	<b>..</b>

Note: **a** Levels in current prices and growth in constant prices. **b** In constant prices. The growth rates have only been calculated where trade deflators are available. **c** Average growth for the ten years to 1998 (as deflators are not available for the first quarters of 1999). **d** "Other" is comprised of miscellaneous and confidential items. Fluctuations in the make-up of these items can have a significant impact on the size of a range of industries in this table and on their growth rates.

Source DFAT International Trade Database and ABS implicit price deflators. Updated from ISR submission no. 28, p. 7.

2.66 DFAT used Figure 1, which demonstrates the change in processed and unprocessed export shares between 1987-88 and 1998-99, to illustrate this trend.

Figure 1 Processed and unprocessed export shares 1987-88 to 1998-99



Note: This figure covers Unprocessed Primary Products (UPPs); Processed Primary Products (PPPs); Simply Transformed Manufactures (STMs); and Elaborately Transformed Manufactures (ETMs).

Source ABS Data on UN Stars Database. From DFAT, submission no. 32, p. 5.

2.67 It is clear from this figure that there is already a strong trend in Australia towards processed merchandise exports. This has resulted in a decline in the importance of unprocessed primary products (which includes items such as ores and concentrates of iron and copper as well as coal and petroleum). In the period 1987-88 to 1998-99, the contribution of unprocessed foods, fuels, minerals and other primary products declined from 48 per cent to 39 per cent of Australia's total merchandise exports.

2.68 DFAT suggests that:

Based on growth rates over the past decade, the relative decline in the contribution of unprocessed primary products can be expected to continue for some time.<sup>21</sup>

2.69 The Department also noted that exports of processed raw materials have grown at widely varying rates, both at the category level and in terms of individual products. The strongest growth at the category level has been exports of elaborately transformed manufactures (including minerals



manufactures and metals, chemical and engineering products) which have enjoyed average growth of 14.1 per cent a year<sup>22</sup> in the decade to 1998-99.

2.70 The growth in simply transformed manufactures and processed primary products, while healthy, have been a relatively more modest 5.7 per cent and 6.2 per cent a year respectively. Unprocessed primary products have shown the lowest growth at an average 4.9 per cent a year.

2.71 DFAT suggests these figures provide strong evidence that the trend in Australia's trade has been skewed towards the export of processed raw materials with higher levels of value-adding.

2.72 The Department also provided some figures to illustrate the different growth rates that have been achieved at the product level. These figures, which highlight some of the better performing processed raw material exports, are outlined in Table 6.

2.73 DFAT suggests:

The key point emerging from this table is that some of the fastest export growth is now occurring in industries with a higher level of value adding. For example, exports of alumina, a by-product of bauxite, are slower than exports of higher value added bauxite by-products such as worked aluminium alloys.<sup>23</sup>

2.74 The Department goes on to note that the aluminium example provides a useful case study demonstrating the opportunities available in value-adding in energy-intensive industries:

For some time aluminium producers have chosen to locate new production facilities in countries with low cost energy and have placed less emphasis on proximity to final markets. In some cases, such as Japan in the early 1980s, production facilities have been closed down and replaced offshore in countries such as Australia and Canada.

Consumption in the major markets of Europe, Japan and the United States - which constitute around 70 per cent of the world's consumption - have continued to expand over recent decades. Imports, rather than domestic production, have supplied the increased consumption of aluminium. The global specialisation of the industry has led to a number of exporters emerging, where the major proportion of production is destined for foreign markets.<sup>24</sup>

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22 These growth rates are in current price terms and cannot be compared to the constant price growth rates used earlier.

23 DFAT, submission no. 32, p. 7.

24 *ibid*, pp. 7-8.

**Table 6 Trends in exports of value-added raw materials products: 1987-88 to 1998-99 (Australian produce)**

	Value in 1998-99	Trend growth <sup>a</sup>
	(\$'000)	(per cent)
<b>Processed primary products</b>		
Automotive spirit	263 695	20.6
Alumina	2 843 130	1.2
<b>Simply transformed manufactures</b>		
Ingots, puddled bars & pilings of iron and steel	28 830	56.4
Nickel and nickel alloys (unworked)	449 828	6.9
Aluminium unworked (including alloys)	2 858 077	2.9
Base metals (unworked)	80 770	19.5
Blooms and billets (excluding high carbon steel)	368 264	18.3
<b>Elaborately transformed manufactures</b>		
Glass	150 267	12.3
Wire rod (not high carbon or alloy steel)	60 814	19.8
Bars and rods of iron or steel	44 027	12.4
Angles, shapes and sections of iron or steel	63 320	25.5
Universals, plates and sheets of iron or steel	500 445	7.1
Iron or steel wire (not wire rod) not insulated	31 083	16.1
Tubes, pipes and fittings of iron or steel	99 862	14.2
Iron and steel casings, forgings & stampings	100 150	15
Copper bars and rods (including wire rod)	124 073	24.2
Copper plates, sheets and strip	100 873	12.5
Aluminium and aluminium alloys, worked	437 241	9.4

Note: **a** Average compound growth of trend line (fitted using regression techniques).

Source TREC data on DFAT database. From DFAT, submission no. 32, p. 7.