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EXPORTS, EXPORT CULTURE AND THE AUSTRALIAN ECONOMY

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Abstract

This paper examines Australia's export performance and the reasons for that performance. Historical and comparative data is used to examine whether Australia is sufficiently export-oriented. Trends in Australia's exports-to-GDP ratio are compared with long term historical data and with comparative international data. Data examining the proportion of Australian firms which are exporting are also examined, providing some indication of whether Australia is developing an 'export culture'. The composition of Australian exports is also examined, both on a sectoral and commodity basis. The results show that Australia is not yet exporting sufficiently for a country of its size and stage of development. It is argued that the reason for this is Australia's traditional reliance on commodities and low to medium technology manufacturing for export revenue. It is suggested that industry-specific government strategies may be one way to facilitate the development of value-added export industries.

EXPORTS, EXPORT CULTURE AND THE AUSTRALIAN ECONOMY

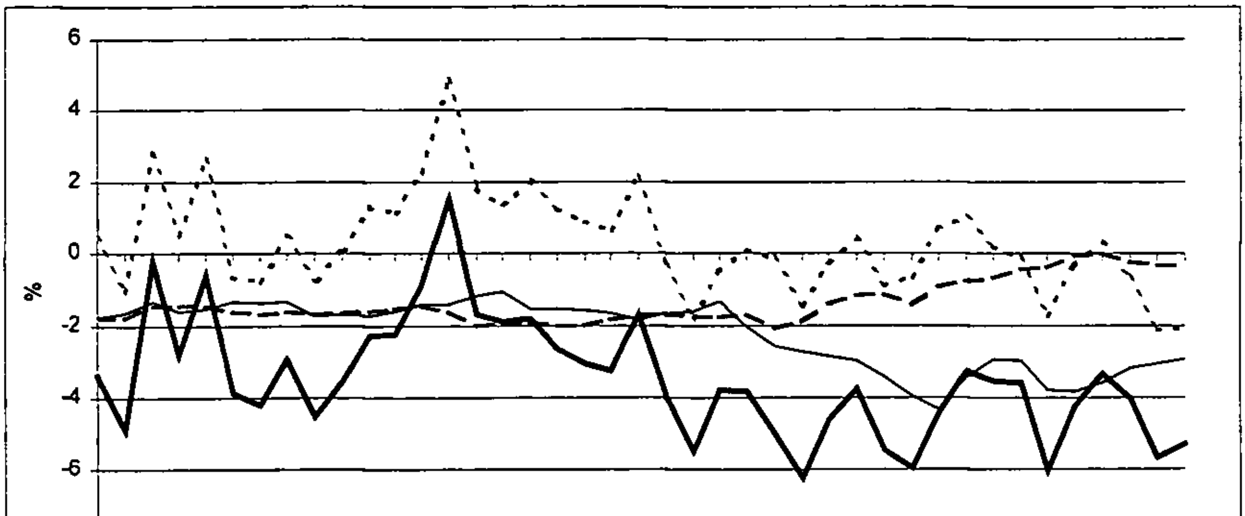
INTRODUCTION

One of the issues in the recent debate over Australia's economic development is the need to improve Australia's export performance and develop an 'export culture' in Australia. Increasing exports assists Australia in overcoming its ongoing current account deficits, helps boost economic growth, improves the competitiveness of Australian firms and industry and more broadly helps Australia become an important part of the growth in the global economy (Harcourt 2000, pp. 1-5). This paper examines the role of exports in the Australian economy on both a historical and comparative basis. It then examines the role of *exporters*, the firms that do the exporting, a topic which has received little attention to date. It is argued that while Australia has made progress in improving its export performance over the last 20 years or so, compared with past history and other small industrialised nations, Australia is not performing particularly well. The main reason suggested here is that Australia has traditionally depended on commodities for its export income and despite making some changes to its export composition, still faces problems in the future.

AUSTRALIA'S EXPORT EFFORT

In terms of its trade performance, historically Australia has had an ongoing current account deficit. This has generally worsened since the 1960s, peaking at 6% of GDP on several occasions during the 1980s and 1990s (Figure 1). Generally, Australia has a deficit in goods, meaning that merchandise imports are greater than merchandise exports. The only times when Australia's merchandise imports have been less than merchandise exports have been when Australia has been going through an economic downturn or recession. Australia's deficit in services trade has gradually reduced during the 1980s and 1990s, such that Australia achieved a balance on services in 1996-97, primarily due to growth in the number of international tourists visiting Australia. Since the early 1980s, the income component of the current account has worsened to be at least 3% of GDP during the 1990s, peaking at 4.3% in 1990-91. This is primarily due to increased interest payments on Australia's foreign debt, brought on by an increase in the amount of debt and a fall in the value of Australia's currency which makes it harder for Australia to pay off that debt. Foreign debt has increased as Australia has had to borrow overseas to fund its previous current account deficits.

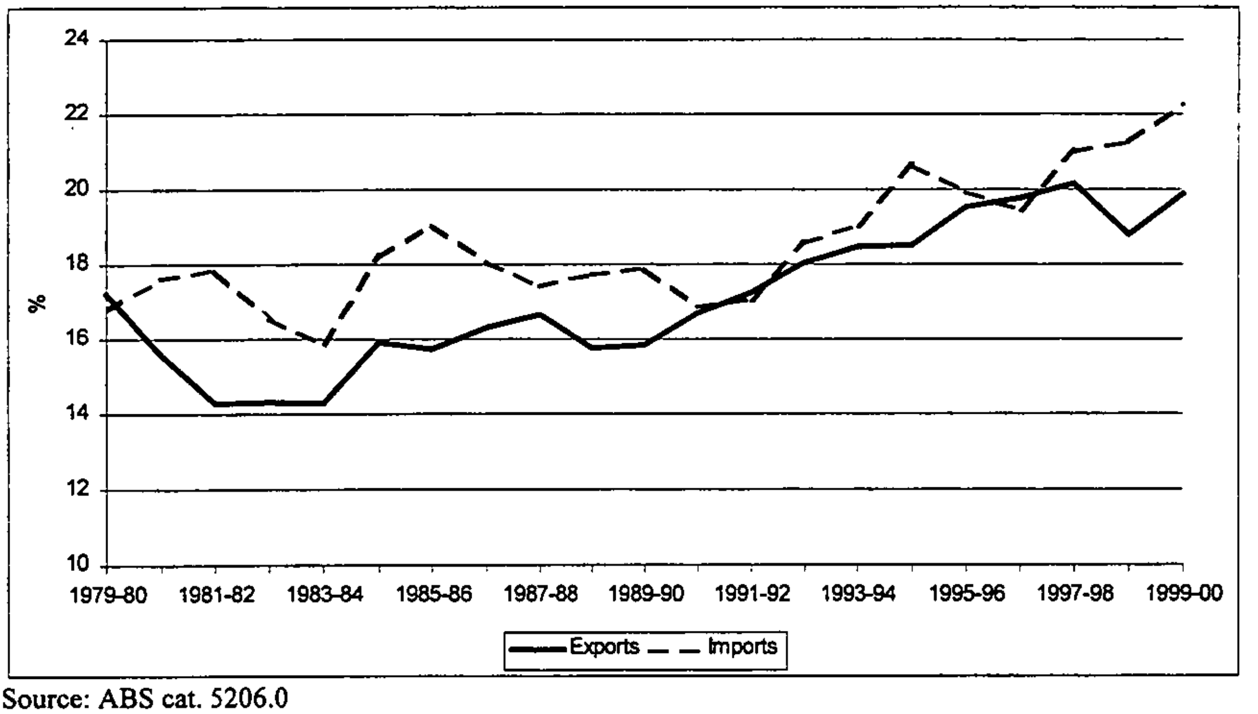
Figure 1: Australia's Current Account Deficit as a Share of GDP



Source: ABS cat. 5206.0, 5302.0

One of the changes that has occurred in the Australian economy over the last 20 years or so has been an increase in Australia's export effort and the development of an 'export culture' in Australia. Broadly, this culture is an attitude that recognises the importance of exporting for wealth generation and an acceptance that Australian firms and industries need to be competitive with the rest of the world. It includes an acceptance that Australia needs to integrate itself more with the global economy. Over the last two decades, Australia has become more integrated with the global economy, with trade accounting for an increasing share of the economy. Both imports and exports have increased as shares of GDP through the 1980s and 1990s (Figure 2). Since 1979-80, exports have become more important to the Australian economy, with the export ratio (exports as a share of GDP) increasing from 17.2% of GDP up to 19.9% by 1999-00. For the sake of comparison, imports have been included in Figure 2. Import penetration (imports as a share of GDP) increased from 16.8% at the end of the 1970s up to 22.3% by 1999-00. Australia's import penetration has been higher than its export ratio for most of this period, save for periods during the late 1980s and mid 1990s when economic downturns caused imports to fall. These trends over the last 20 years are often cited by Australian governments, business and some media commentators as evidence that Australia is internationalising and becoming more competitive in the global economy.

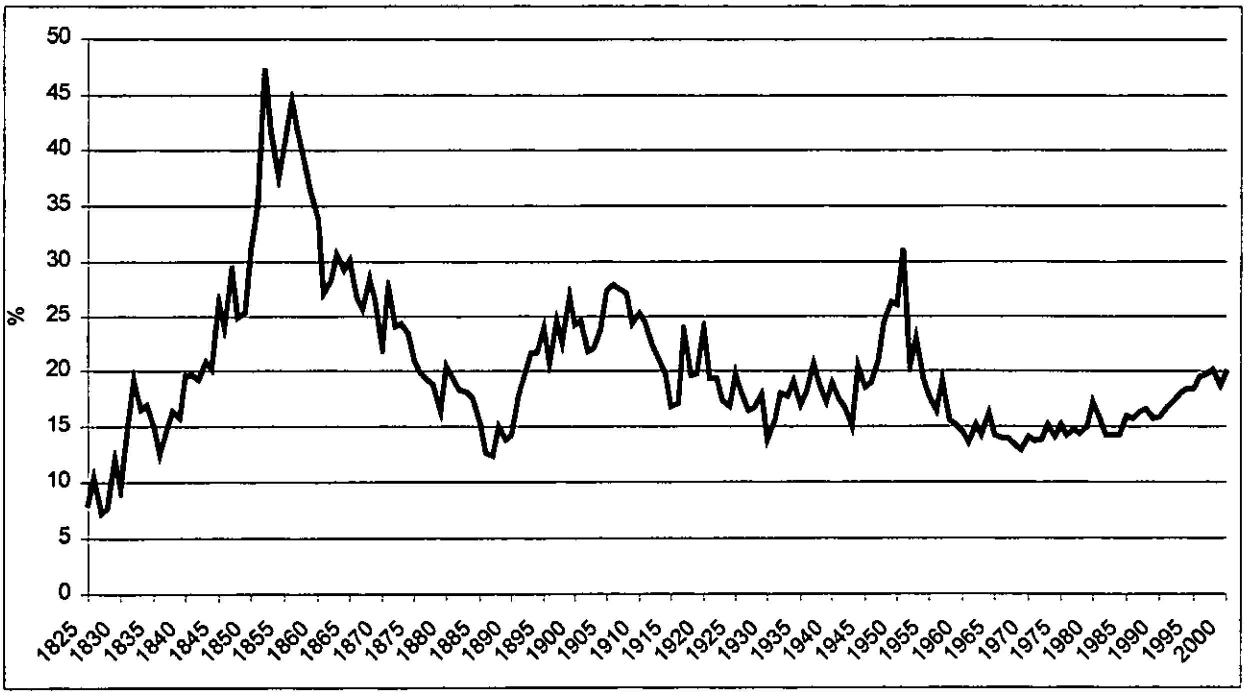
Figure 2: Australia's Exports and Imports as a Share of GDP (%)



Source: ABS cat. 5206.0

While the improvement in export ratio over the last 20 years has been impressive, it is still at a relatively low level when compared with Australia's performance over the longer term. Since 1825, Australia and the Australian colonies prior to Federation have at various times been intensive exporters. While an export ratio of around 20% appears notable when compared with the last 20 years seen in Figure 2, over the last 175 years of Australia's economic history it is not particularly impressive. A 20% export ratio returns to levels experienced in the late 1950s, however Australia's export ratio has been much higher in the past (Figure 3). The variations in the ratio reflect both Australia's level of exports, as well as its growth in GDP. In the early 1950s the ratio reached 31.2% as a result of a domestic economic downturn, thereby reducing GDP, as well as a boom in exports brought on by the Korean War (Pinkstone 1992, p. 168). Australia's export ratio peaked around 28% in the early 1900s with a combination of a mini-gold boom through discovery of gold in Western Australia and growing demand in Europe for Australian rural products like meat and wool (Pinkstone 1992, pp. 54-64). Australia's export ratio reached its highest levels during the 1850s, peaking at 47.3% in 1852, due to a boom in exports of wool to Britain and the discovery of gold in Victoria and New South Wales which led to major increases in gold exports (Pinkstone 1992, pp. 34-40).

Figure 3: Australia's Exports as a Share of GDP (%), 1825 – 2000[1]



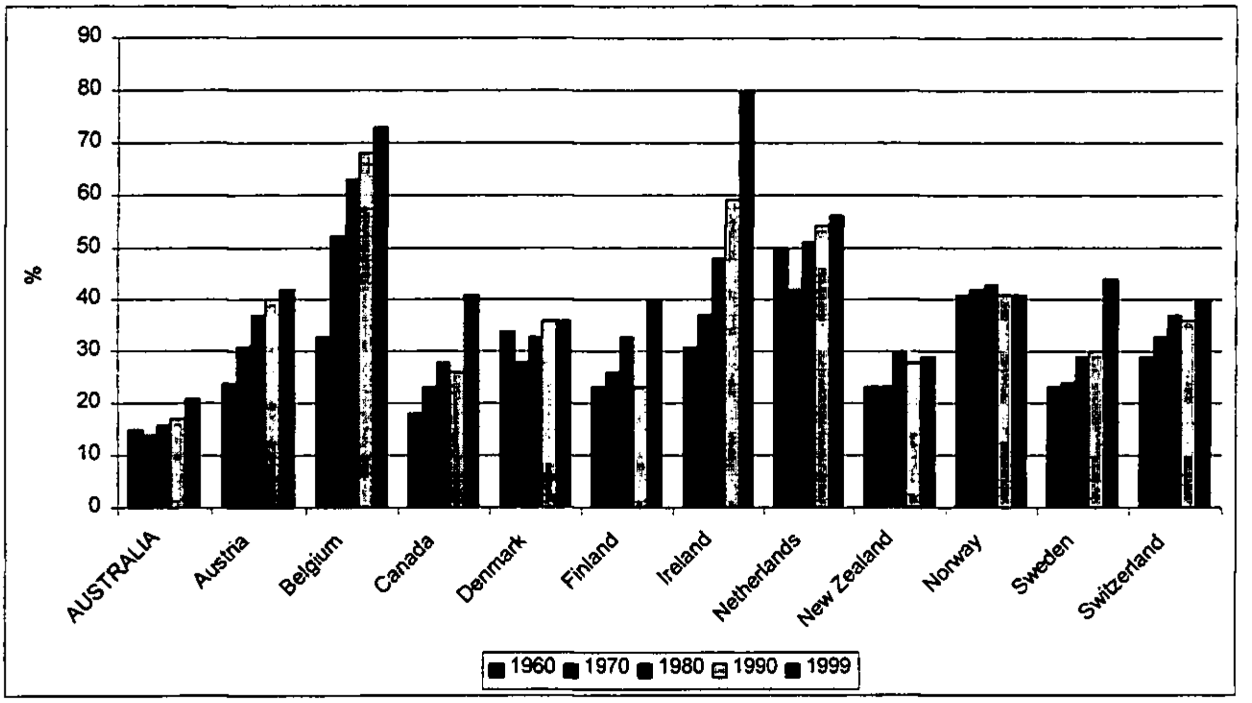
Source: Pinkstone (1992, p. 393); ABS cat. 5206.0

The trend in Figure 3 suggests that Australia has been a more active exporter in the past. Certainly in their earlier history Australia and the Australian colonies exported a greater share of their production overseas than occurs today. In one sense this suggests that Australia was more integrated into the world economy during the 19th century and at the turn of the 20th century than it is today. However, three reasons could be put forward to explain this. First, the previous higher export orientation was a characteristic shared with other countries in the world. During the 19th century and into the early 20th century, the world economy was more integrated and trade more important to countries than later in the 20th century. The trends in Australia's export ratio may mirror those in other countries. It is conceivable that Australia's export ratio was high during the 19th century because trade was more important to the world economy at the time, and then fell with the Great Depression and the increase in trade barriers in the first half of the 20th century. Second, since the mid-19th century when Australia exported almost half of its production, the Australian *domestic* economy has grown in size. Just because the export-to-GDP ratio has fallen, does not necessarily imply that exports have fallen. Rather, as the whole Australian economy has developed since the 1850s, the domestic sectors of the economy have perhaps grown faster than the export sector. However, be that as it may, it suggests that Australia's development since the mid-19th century has been focussed more on supplying the domestic market and less on competing internationally.

Australia's low export orientation cannot be explained by the relative small size of the Australian economy. Compared to other smaller, industrialised countries, Australia has had a relatively low export propensity. While Australia's export ratio has improved since 1960, it is still a long way behind other smaller, industrialised countries (Figure 4). In 1960, the arithmetic average export ratio for all these countries was 29%, compared with Australia's 15% (World Bank, various years). Although Australia's export ratio had increased to 21% by 1999, this was still a long way behind the average export ratio for smaller, industrialised countries which was 45% (World Bank, various years). Compared to other smaller, industrialised countries, Australia's performance has been relatively poor. Even New Zealand, the country with probably the most similarity to Australia in terms of geographic location and industry structure, has consistently had an export ratio higher than Australia's, falling back to 29% in 1999 from a high of 32% in 1995 (Figure 4).

[1] Data up to 1900 are calendar year, after which financial year data is used. Data 1825-1849 are for the colony of New South Wales, 1850-1860 are for the colonies of New South Wales and Victoria and 1861 onwards is for the whole of Australia.

Figure 4: Exports of Goods and Services as Share of GDP, Selected Countries (%)



Source: World Bank *World Development Report*, various years

It might be argued that Australia's low export orientation is due to a lack of intra-regional trade. For example, some of the difference in export ratios in Figure 4 can be explained by the growth in European cross-border trade with the development of the European Union and its predecessors. This has helped to reduce trade barriers between European countries, such as Belgium and the Netherlands, which in turn has stimulated trade between those countries. Moreover, European countries that are not members of the EU, such as Norway and Switzerland, would have benefited more generally due to their close proximity to large markets in Europe. One might argue that Australia's lower export ratio is understandable and nothing to be concerned about, given that it does not have such proximity to the large wealthy consumers of Europe. However, this ignores the fact that in today's globalised economy where falling trade barriers and technology are reducing the impediments to trade, such advantages should be becoming less important. A quick look at Figure 4 shows that New Zealand, a country often considered economically similar to Australia, has achieved an export ratio substantially higher than Australia on a number of occasions, eight percentage points higher in 1999, and even doubling Australia's rate in 1980. One could argue that Australia's proximity to large growing markets in Asia should be as advantageous to Australia as proximity to large European markets is to many small European nations. It could also be argued that trade barriers have hindered Australia's export effort, especially agricultural trade barriers and subsidies in Europe and the United States of America. However, again New Zealand, a country largely dependent on agricultural products for export income, has shown that such barriers have not prevented it from having a higher export ratio than Australia over the last 40 years.

EXPORT CULTURE

Perhaps more important than the level of exports in describing export culture is looking at the exporters themselves. While export ratios and the like do give some indication of Australia export orientation, looking at the number and types of *firms* that export might give a more representative picture of how pervasive exporting activity is across Australian industry. Unfortunately there is not much historical data available which looks at the numbers of exporters in Australia. Instead, most attention has been directed at the level of exports themselves. There is some data available on the Australian firms that export. The *Emerging Exporters* study in 1993 found that 90% of Australian manufacturing firms do not export, arguing that this was too low and needed to increase (McKinsey & Company/AMC 1993, p. 38). This suggests that only 10%

of manufacturing firms exported at that time. Similarly the LEK study in 1994 found that only 1.2% of Australian service firms exported (LEK Partnership 1994, p. 15). In 1997-98, a major study by the ABS and Austrade *A Portrait of Australian Exporters* (ABS/Austrade 2000), found that only 4% of Australian firms export and that 6.4% of their revenue is exported (Table 1). Similarly it found that by 1997-98, 12.5% of manufacturing firms were exporting which, when compared to the 10% indicated by the *Emerging Exporters* study, suggests that perhaps the export orientation of the Australian manufacturing sector has increased slightly. The difference between industries in terms of firms' exporting activity is also apparent. While 27.8% of firms in the food, beverage and tobacco industry export, only 2.1% do in the wood and paper product industry (Table 1). Similarly, while 14.9% of firms in wholesale trade export, only 3.6% of firms are exporters in property and business services.

Table 1: Export Orientation of Australian Firms, by Industry, 1997-98

Industry	Share of firms exporting (%)	Share of turnover exported (%)
Mining	**16.1	*50.3
Manufacturing		
Food, beverage & tobacco	27.8	*18.8
Textile, clothing, footwear & leather	7.5	*25.8
Wood & paper product	2.1	*6.4
Printing, publishing & recorded media	*11.5	**4.4
Petroleum, coal, chemical & associated product	36.9	*10.4
Non-metallic mineral product	*5.2	2.7
Metal product	11.0	*14.6
Machinery and equipment	14.8	*13.6
Other	*6.8	*3.6
Total manufacturing	*12.5*	*12.9*
Construction	**0.5	*0.2
Wholesale trade	14.9	*7.8
Retail trade	**0.8	*0.1
Accommodation, cafes & restaurants	n.p.	n.p.
Transport & storage	n.p.	n.p.
Finance and insurance	**2.9	**0.6
Property and business services		
Property services	**0.6	**0.7
Business services	4.2	1.3
Total property & business services	3.6	1.2
Cultural & recreational services	*1.7	*1.0
Personal & other services	**0.7	0.6
Total all industries	**4.0**	**6.4**

Source: ABS/Austrade (2000, p. 13)
* Sampling error 25% - 50%
** Sampling error >50%.
n.p. – not published

The *Portrait* study suggests that there has been an increase in the number of Australian firms exporting. Overall, the number of non-agricultural firms exporting in Australia has grown by an average 8% per annum between 1994-95 and 1997-98 (Table 2). The property and business services has seen the fastest growth in the number of exporters (12.7% per annum) of any individual sector of the economy over the period. In terms of firm age, firms that are between 10 and 20 years old recorded the fastest growth in the number of exporters (15.5% per annum). In terms of firm size, the number of micro business exporters, those employing one to four employees, grew by an average 11.0% per annum over the period, the fastest of any class of business size. However, the strong growth in micro businesses' export participation is off a low base. In 1997-98, only 2.2% of micro businesses exported, compared with 5.5% of other small businesses, 13.0% of medium sized firms and 32.7% of large firms (DEWRSB 2000, p. 15). Of those 2.2% of micro firms that do export, they export at least half of their turnover, compared to 20% for all other exporting firms (DEWRSB 2000, p. 11). In addition, there are non-exporting firms which have plans to export. In 1997-98, 7% of non-exporters, roughly 22,000 firms, reported that they had increased their export marketing (ABS/Austrade 2000, p. 35), probably in anticipation of entering export markets. On an industry basis, 2.1% of non-exporters in the manufacturing and property and business service sectors were developing plans to enter export markets (ABS/Austrade 2000, p. 34).

Table 2: Average Annual Growth in Number of Exporting Firms, by Industry, by Size and by Age, 1994-95 – 1997-98

		(%)
Industry	Mining	4.0[2]
	Manufacturing	2.7
	Wholesale trade	8.3
	Property and business services	12.7
	Other	13.9
	Total all industries	8.0
Firm size (no. employees)	Micro (1 to 4)	11.0
	Other small (5 to 19)	8.7
	Total small business	*9.7*
	Medium (20 to 199)	4.4
	Large (200+)	-3.3
	Total	8.0
Firm age (no. of years)	<5	5.6
	5 to <10	8.2
	10 to <20	15.5
	20+	0.4
	Total	8.0

Source: ABS/Austrade (2000, pp. 11, 14, 17)

Australia is developing more of an export culture. Australia's export ratio is increasing, as is the numbers of firms that are exporting, with differences in export effort across industries. Small firms, particularly, are starting to accept exporting as an important part of their business strategy. However, while Australia's export culture has developed in the last few years, it is clear that Australia still has some way to go. Judged against its own history, Australia is not as export-oriented as it has been in the past. Neither does Australia's export orientation compare favourably when judged against the performance of other smaller industrialised countries. The lack of export culture in Australian business has been debated for some time. For example, the Hughes Committee (1989) highlighted the importance of developing an export culture in Australia. More recently the Mortimer Inquiry (1997, p. 146) argued that Australia needed to develop its export culture further if it was to maintain and improve its wealth.

THE COMPOSITION OF AUSTRALIAN EXPORTS

One of the reasons for Australia's poor export performance has been the composition of its exports. While Australia's domestic industrial structure has been that of a high-income industrialised country, the composition of Australia's exports has been more akin to that of a low-income developing country with a dependence on commodity exports. This has moved one commentator to suggest that for much of its history

[2] High degree of standard error in this estimate.

"Australia has been the world's most successful Third World country" (Storey 1990). In 1980 Australia's structure of merchandise exports was almost identical to low-income developing countries around the world, perhaps the only difference being a greater reliance on mineral exports and a lower reliance on fuel and manufactured goods (Table 3). While the structure of Australia's merchandise exports has changed somewhat, it is still similar to that seen in low- and middle- income countries, with an emphasis on food, fuels and minerals and still a somewhat lower reliance on manufactured exports than low- and middle-income countries and certainly much less than high-income countries.

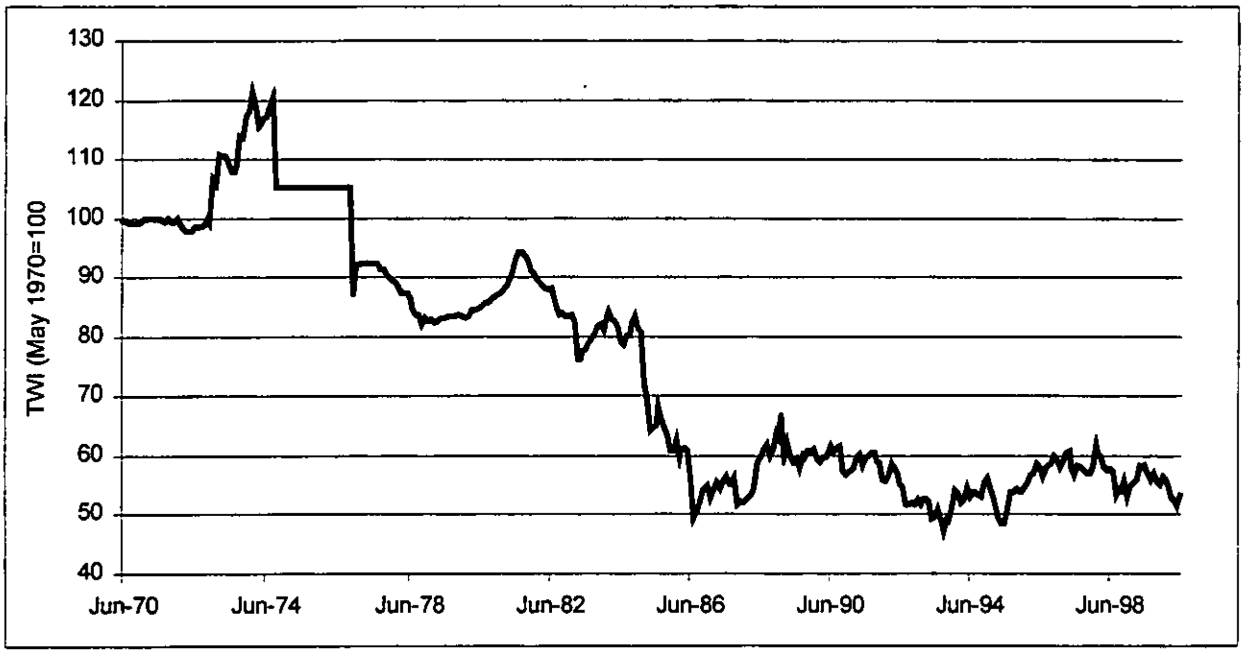
Table 3: Structure of Merchandise Exports, Australia, Low, Middle and High Income Countries, 1980 and 1997, (%)

Countries	Food		Agricultural raw materials		Fuels		Ores and minerals		Manufactures	
	1980	1997	1980	1997	1980	1997	1980	1997	1980	1997
Australia	34	24	11	8	11	20	17	16	22	29
Low Income	30	-	10	-	19	-	7	-	33	-
Low-middle income	24	14	8	3	35	16	8	5	22	58
High income	11	7	4	2	7	4	4	3	73	81

Source: World Bank (1999, pp. 205-206)

Australia's export profile is an important issue because commodities such as agricultural products, fuels and minerals are becoming less valuable and less important to world trade. Agricultural products accounted for half of world merchandise trade in 1950, but only 11% by 1997 (DFAT 1999, p. 24). Similarly, mining products accounted for a quarter of world merchandise trade in 1980, but this had also fallen to 11% by 1997 (DFAT 1999, p. 24). Manufactured goods' share of world merchandise trade has increased from 40% in 1980 to 75% today (DFAT 1999, p. 24). The decline in the relative importance of commodities in world trade has led to falls in world commodity prices. The World Bank's commodity price indices show that global agricultural and mineral commodity prices have both fallen by around 45% between 1980 and 1998, while petroleum prices fell by 75% over the same period (World Bank 1999, p. 334). The fall in the world price of commodities, which Australia has traditionally relied on for export income, is reflected in the decline of Australia's currency. The reduction in the trade weighted index (TWI), an index showing the value of the Australian dollar relative to a basket of currencies of our major trading partners, shows that the value of Australia's currency has been in long term decline since the 1970s (Figure 5). This decline has been due to the decline of world prices for those commodities and Australia's over-reliance on those commodities for export income. Global prices for manufactured products tend to be more stable than prices for commodities and have shown good growth compared to commodities, due to the growing importance of manufactured goods in world trade. "Moreover, this trend is likely to continue. This suggests that the opportunities for further growth are better for manufactured products than for unprocessed mineral or agricultural products" (BIE 1995, p. 88). Services are also an important part of world trade, representing over 20% of total OECD exports, and have been growing at similar rates as goods exports (OECD 1998, p. 52).

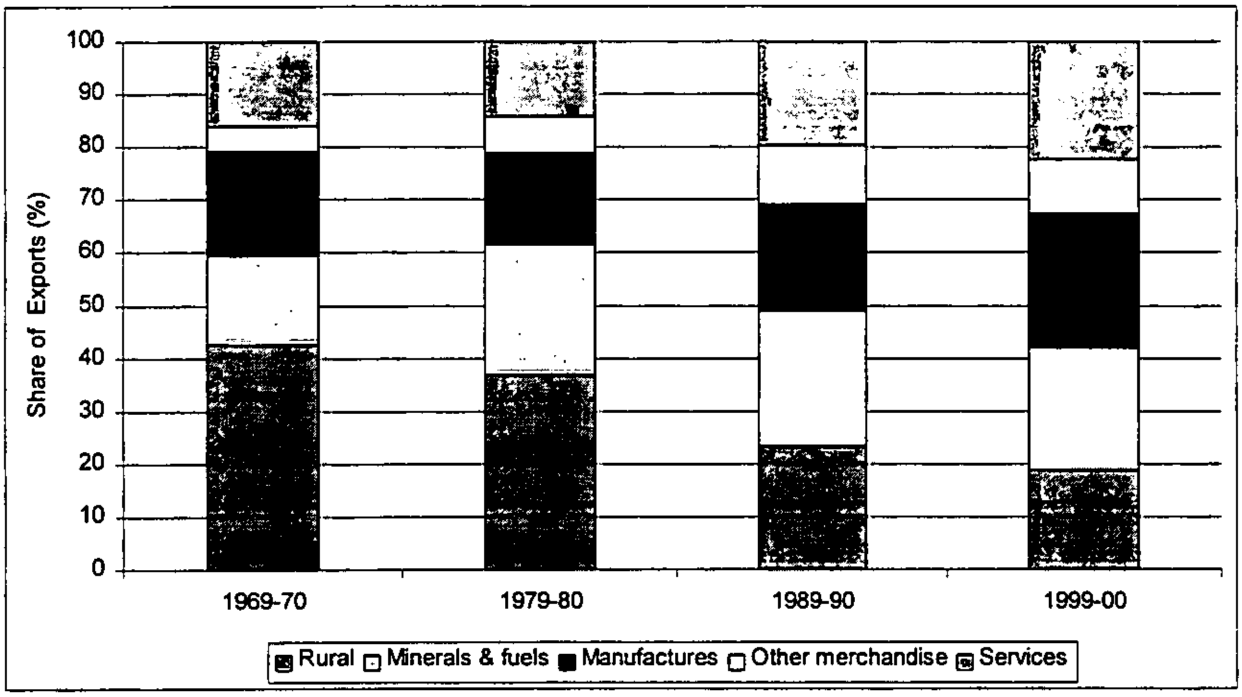
Figure 5: Trade Weighted Index (May 1970 = 100)



Source: Reserve Bank of Australia

Some structural change has occurred in Australia's trade profile. Since the end of the 1970s, Australia has seen an increasing proportion of its export income earned from manufactured goods and services (Figure 6). Since 1979-80, manufacturing increased its share of export receipts from 17% to 25% and services' share increased from 14% to 22%. Over the same period, both rural and mineral products have become less important in Australia's export profile. At the end of the 1960s these two sectors accounted for 60% of Australia's exports, while by the end of the 20th century they accounted for a still significant 42% of Australia's exports.

Figure 6: Composition of Australia's Exports, balance of payments basis (%)



Source: ABS cat. 5302.0

Changes can also be seen in the types of commodities in Australia's merchandise exports; that is, exports excluding services. Even 10 years ago Australia's top 20 merchandise exports were all agricultural and mining commodities, with the possible exception of some low grade aluminium processing (Table 4). By 1999 five manufactured products had entered Australia's top 20 merchandise exports: passenger motor vehicles, alcoholic beverages (mostly wine), medicaments or pharmaceuticals, ships and computer parts. This suggests that Australia is achieving some success in developing high value added manufactured exports. Interestingly, of these five manufactured products all except wine were subject to Federal Government industry-specific plans and assistance over the last 10 years (passenger motor vehicles; medicaments including veterinary; ships, boats and floating structures; and computer parts). This lends support to the findings of Sheehan, Pappas and Chang (1994) who suggested that such industry-specific plans helped boost Australia's manufactured exports. Moreover, the wine industry, represented by exports of alcoholic beverages, has its own extensive industry strategy, vision and collective programs which may have helped encourage that industry's exports (Marsh & Shaw 2000). The fact that all manufacturing industries that have entered the top 20 merchandise exports have received industry-specific strategies and programs of some form suggests that these may have been of some positive benefit. It suggests that these measures have been important in developing new value-added export industries in Australia.

Table 4: Top 20 Australian Merchandise Exports 1989 and 1999, by Commodity

1989			1999		
Rank	Commodity	$m	Rank	Commodity	$m
1	Coal	5,149.8	1	Coal	8,393.2
2	Greasy & fleece-washed wool	4,236.1	2	Non-monetary gold	4,808.1
3	Gold, non-monetary	2,614.1	3	Iron ore	3,573.7
4	Wheat in bulk	2,482.8	4	Aluminium	3,323.1
5	Aluminium (unworked)	2,379.2	5	Wheat	3,311.5
6	Iron ore & conc	2,075.7	6	Bovine meat	3,018.8
7	Beef & veal	2,047.5	7	Aluminium ores incl alumina	2,804.8
8	Raw sugar, bulk	1,051.9	8	Wool	2,453.3
9	Confidential items	1,044.0	9	Crude petroleum	2,317.5
10	Petroleum prod, refined	935.4	10	Refined petroleum	1,830.0
11	Other sheep's or lamb's wool	841.0	11	Passenger motor vehicles	1,611.6
12	Petroleum oils, crude	602.3	12	Cotton	1,458.2
13	Mineral sands (excl. monazite)	579.3	13	Natural gas	1,456.5
14	Copper	543.0	14	Other ores	1,414.0
15	Zinc ores & conc	538.2	15	Alcoholic beverages	1,324.0
16	Cotton	525.8	16	Milk & cream	1,198.6
17	Crustaceans	469.1	17	Medicaments incl veterinary	1,125.7
18	Zinc unworked	421.8	18	Ships, boats & floating structures	1,112.9
19	Pulpwood	386.3	19	Meat excl bovine	1,079.6
20	Milk & cream	367.3	20	Computer parts	1,076.8

Source: DFAT (1991, p. 4; 2000 p. 26)

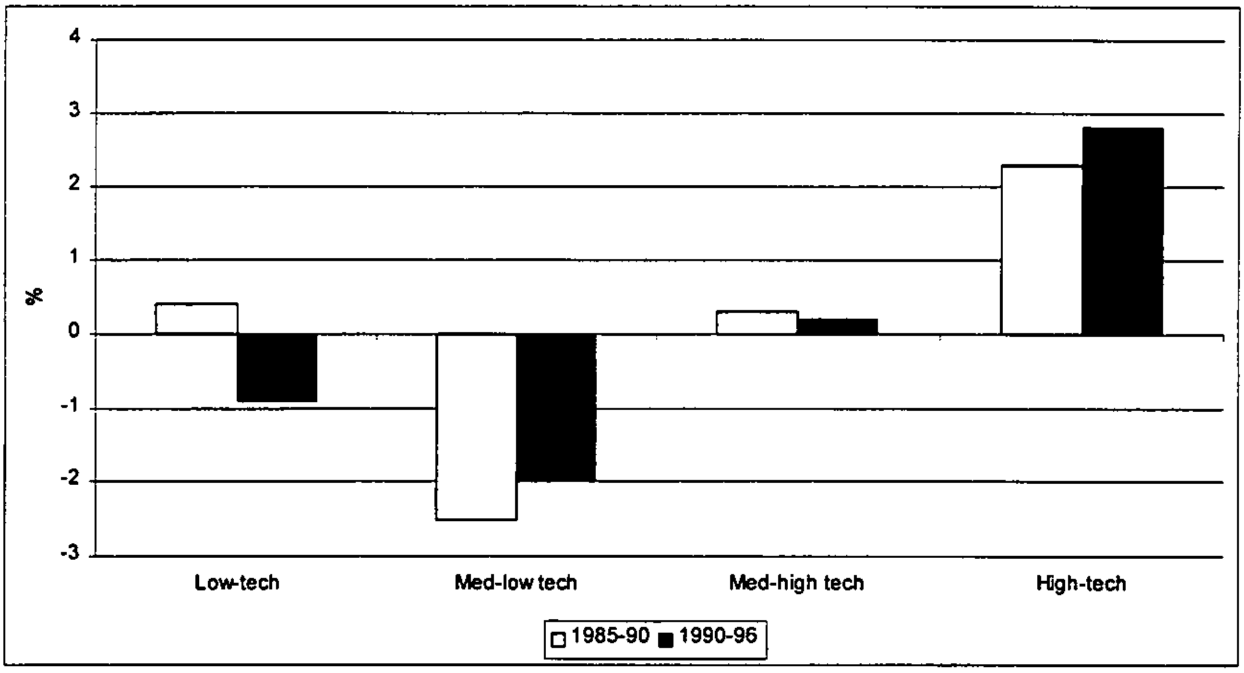
Although this structural change in Australia's exports has been encouraging, it is not entirely reassuring. While manufacturing and services have increased their share of Australia's exports, Australia has generally tended to specialise in lower value added industries or those industries where growth in world demand is not particularly strong. In the manufacturing sector, Australia's exports tend to be in lower technology, lower value added manufacturing industries, a trend reminiscent of Australia's earlier reliance on natural resources. Compared to other high income OECD economies, Australia's manufactured exports are still predominantly in low- and medium-low technology industries (Table 5), despite a small shift into high- and medium-high technology industries. While low- and medium-low technology industries account for almost two-thirds of Australia's manufactured exports, across the OECD high- and medium-high technology industries account for almost two-thirds of manufactured exports. In addition, the only manufactured exports showing any significant growth in trade across the OECD since the mid-1980s have been high-technology manufactured goods (Figure 7). More generally, there is a worldwide shift in manufacturing trade towards high technology industries (Sheehan et al 1995, p. 62). Moreover, the Australian international-scale manufacturing firms that do exist tend to be in non-traded manufacturing industries and are 'multi-domestics', preferring to establish production facilities in overseas markets rather than export from Australia. This also means Australia's manufacturing sector will tend not to be a major exporter (Yetton, Davis & Swan 1992, p. 63).

Table 5: Manufacturing Exports, Australia and OECD, by industry technology[3] (%)

Industries	Australia		OECD	
	1990	1996	1990	1996
High tech	8	11	15	17
Med-high tech	17	23	46	46
Med-low tech	32	28	19	17
Low tech	43	37	20	19

Source: OECD (1999, p. 173)

Figure 7: Average Annual Growth In OECD Manufacturing Trade, by industry technology



Source: OECD (1999, p. 151)

The composition of Australia's service exports is somewhat unique. Australia's service exports are also skewed towards travel services, namely tourism and are unusually low in other service industries such as communications and IT services (Table 6). Just under half of all the growth in Australia's services exports since 1983-84 has been due to growth in personal travel, or tourism, while a third has been due to other business services such as communications, computer and financial services (Calculated from ABS cat. 5302.0, various years). Table 6 also shows that compared to high, middle and low income countries generally, information technology, telecommunication (IT&T) and other services account for a low proportion of Australia's service exports.

[3] The OECD has developed this classification for manufacturing industries based on their level of R&D and technology.

Table 6: Structure of Service Exports, Australia, Low, Middle and High Income Countries, 1980 and 1997, (%)

Country/Group	Transport		Travel		IT&T[4] & other		Insurance & financial	
	1980	1997	1980	1997	1980	1997	1980	1997
Australia	49	27	29	48	20	20	1	6
Low income	35	25	30	28	32	45	3	2
Middle income	30	20	36	41	30	36	5	3
High income	34	24	25	30	39	42	3	6

Source: World Bank (1999, pp. 213-214)

CONCLUSION

In summary, while Australia has made some headway in diversifying its industrial and trade base, it still has some way to go to develop industries and exports in industries where much of the growth in the world economy can be found. Compared to its past history, but perhaps more importantly compared to other smaller industrialised nations, Australia's export ratio is relatively low. Australia has seen some changes in its trade profile, with manufacturing and services becoming more important export income earners. However, the bulk of these manufacturing and services exports are in industries with lower technology and lower growth. Australia needs to do more to develop high value-added manufacturing and services exports to lift its export performance. This in turn suggests further encouraging the development of high value-added manufacturing and service industry clusters in Australia. Moreover, given the prominence of government-assisted manufacturing sectors in Australia's top 20 merchandise exports, government industry development policies may make a positive contribution to achieving this task.

[4] Information technology and telecommunications

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