

RESOURCE FLOWS TO THE TRADED GOODS SECTOR

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ABSTRACT

This paper examines the allocation of private investment and employment between the traded and non-traded goods sectors in Australia. Industries are defined as export oriented, import competing or non-traded according to a classification system not used in previous studies of tradeable capacity. Applying this new system to disaggregated investment and employment data we find that there has been an increase in the share of total investment allocated to export oriented industries, but that their share of total employment has not changed. The share of both investment and employment in import competing industries has, on the other hand, fallen. These changes in the sectoral allocation of resources are consistent with the specialisation in production that accompanies international integration.

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1. INTRODUCTION

A theme of current macroeconomic policy debate in Australia is the increasing integration of the Australian economy with the rest of the world. Over the past decade, the adoption of a floating exchange rate regime has combined with the dismantling of protection to bring about profound changes in the nation's economic structure and trade orientation.¹ As both theory and economic history would predict, such international integration has encouraged greater specialisation in production.² There has been a re-direction of output decisions away from import replacement and towards exporting. Indeed, there has been the emergence of an outward-looking economy.

The exportable subsector of the Australian economy has clearly grown. As a share of real gross domestic product (GDP), export volumes have increased significantly since the early 1980s, as has the share of national income contributed by export oriented industries. On the other hand, whilst it is more difficult to identify, the size of the import competing subsector appears to have diminished.³ The share of national income attributable to industries described as import competing is estimated to have decreased significantly during the 1980s (Dwyer 1992).⁴ Consistent with this observation of diminished production of import competing goods is the trend rise in the import penetration of domestic sales.

It might be expected that the structural change evident in the allocation of output has been associated with a change in the allocation of resources both to and within the traded goods sector. In recent years, there have been a variety of studies about the

¹ For a discussion of some of these issues see Bullock, Grenville and Heenan (1993).

² See Balassa (1966, 1977) and Grubel (1967) for an historical account of the specialisation in production that has been both predicted and shown to follow tariff reductions.

³ The import competing subsector is more difficult to identify because its classification entails a judgment about the extent to which domestic production is substitutable with imports.

⁴ Dwyer (1992) examines the period from 1974/75 to 1986/87.

allocation of resources to Australia's traded goods sector - that is, tradeable capacity. They focus on the direction of private investment.⁵ The results have been mixed and, in some cases, counter-intuitive. For instance, few studies have identified an increase in investment in export capacity, and yet an increase in the export orientation of the Australian economy has clearly occurred. Conversely, few studies have identified a fall in investment in import replacement, and yet replacement of imports by domestically produced goods has declined.

Estimates of tradeable capacity are sensitive to the method of identifying tradeable output. In this paper, industries are classified as exportable, importable or non-traded following Dwyer (1992). Resources in each industry are then allocated to the traded and non-traded goods sectors accordingly. Both investment and employment data are used. Results are generated that differ significantly from those reported in other studies, especially with respect to the share of resources allocated to export oriented and import competing industries.

The paper is organised as follows. Section 2 presents some existing approaches to the measurement of tradeable capacity. In Section 3, an alternative classification of the traded and non-traded goods sectors is described. Section 4 presents estimates of the sectoral allocation of investment, while Section 5 presents corresponding estimates of the sectoral allocation of labour. Section 6 summarises and concludes.

2. EXISTING MEASURES OF TRADEABLE CAPACITY

There are two steps involved in defining tradeable capacity: identifying the traded goods sector, and then allocating resources to it. Most challenging is the first step. In principle, the distinction between traded and non-traded goods is simple. However, in practice, this distinction is not clear cut. Goldstein and Officer (1979) describe a spectrum of traded goods. At one end of the spectrum, a narrow class of goods can be defined as traded. These are goods that enter international trade (that is, actual exports and imports) and satisfy the law of one price. At the other end of the spectrum is a much broader class of goods. These are goods that, at an

⁵ See Treasury Dept (1987, 1988), BIE (1989, 1990), Wood, Lewis and Petridis (1990) and Kent and Scott (1991).

appropriate relative price, could earn or save foreign exchange (that is, potential exports or import replacements).

Whilst interpretations of what constitutes a traded good are varied, in this paper, in accordance with the Australian literature, the domestic traded goods sector is defined as that which produces exports and import competing goods.⁶ There are, however, a number of practical issues involved in making such a definition operational. Few industries produce solely for export or to compete with imports: part of production tends to be consumed locally. Consequently, a judgment must be made about the threshold at which the degree of export orientation or import substitutability warrants inclusion of an industry in the traded goods sector. Given the complexity of this task, it has been common to form proxies of the traded goods sector. The traded goods sector has been variously represented by:

- the real value of exports plus imports, with the latter as a proxy for import competing goods (Pitchford 1986);
- the output from a limited number of broad industry divisions that are nominated as traded *a priori* (Shann 1982; Treasury Dept 1987); and
- the output from industries that meet particular criteria about the extent to which their production is exported or import competing (BIE 1989, 1990; Wood *et al.* 1990; Kent and Scott 1991; Dwyer 1992).

Having identified the traded goods sector, the second step in defining tradeable capacity is to allocate resources to it. Kent and Scott (1991) provide a review of estimates of tradeable capacity in the Australian literature focusing on the direction of private investment. From this review, two main approaches to the allocation of resources emerge: the "rule of thumb" approach and the propensities approach. These two approaches are discussed below, where it is shown that estimates of tradeable capacity are sensitive to decision rules about both the classification of traded industries and the method of allocating resources to them.

⁶ See Salter (1959) for an early debate.

2.1 The Rule of Thumb Approach

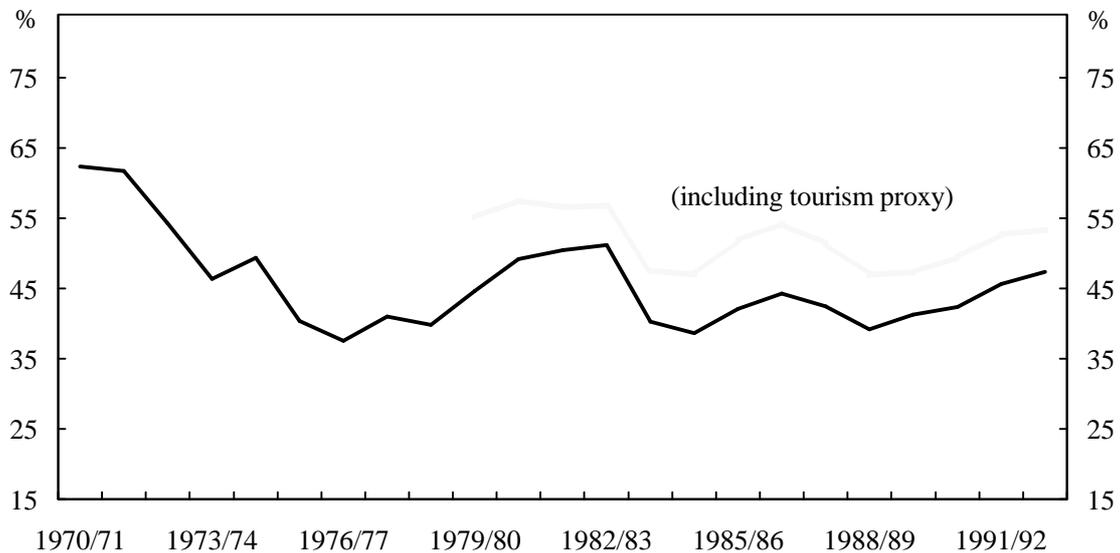
The first, and arguably most common approach, will be described here as the "rule of thumb" approach where industries are described as traded or non-traded *a priori* and *all* resources in that industry are defined as tradeable capacity (Shann 1982; Treasury Dept 1987, 1988). The work by Treasury will be taken as representative of this approach. Treasury Dept (1987) defines traded industries as the divisions of agriculture, mining and manufacturing, based on a prior that agriculture and mining are primarily exported oriented, whilst manufacturing is primarily import competing. All other industries are defined as non-traded.

Treasury measures resource flows to the traded goods sector using data on new private fixed investment from the Capital Expenditure Survey (CAPEX). However, given that investment in agriculture is unavailable from this source, their analysis is confined to the sectoral allocation of *non-farm* investment. Using recent CAPEX data, their estimate of tradeable capacity of the non-farm sector is updated and reproduced below. An estimate which includes a proxy for investment in tourism is also shown, following Treasury Dept (1988).⁷

In Figure 1 it is shown that, by this measure, the share of total investment allocated to the traded goods sector was as high as 63 per cent in the early 1970s. This share fell sharply through most of the 1970s, but rose during the resources boom era of 1979-82 and again during the episode of currency depreciation in the mid-1980s. However, by the end of the 1980s, the share of investment in the traded goods sector was significantly lower than at the beginning of the decade. In recent years, the share of total investment in the traded goods sector appears to have increased.

⁷ While "exports" of tourism earn foreign exchange, the treatment of tourism as a traded industry is contentious. The tourism industry cannot easily be delimited in terms of production, as are all other industries in the national accounts. Consequently, a proxy industry is often chosen. That used here is "other non-manufacturing service industries" which comprises "entertainment, recreational and personal services" and "restaurants, hotels and clubs".

Figure 1: Real Tradeable Investment as a Share of Total Non-Farm Investment - Rule of Thumb Approach
(average 1989/90 prices)



The rule of thumb approach is, however, impressionistic. Without actual knowledge about the extent to which the output of an industry is tradeable, industries cannot be classified accurately. Any error in judgment is compounded by the use of aggregate data. Even if results are accurate, the share of investment in the traded goods sector as a whole may belie significant developments in the exportable and importable subsectors.

2.2 The Propensity Approach

The second main approach to measuring tradeable capacity will be described here as the "propensity" approach. Industries are defined as traded according to their propensity to produce traded goods. For exportable industries, this propensity is measured by the ratio of exports to total sales or output, while for importable industries it is often measured by some sort of import penetration ratio (Wood *et al.* 1990; BIE 1989, 1990; Kent and Scott 1991). This approach lends itself to the use of disaggregated data and the identification of a more detailed profile of the traded goods sector and its subsectors. Nonetheless, it has only been applied to identify the tradeable capacity of the *manufacturing* division (for which disaggregated data are more readily available) and not the economy as a whole.

Users of the propensity approach have also measured resource flows to the traded goods sector with data on new private investment. However, they tend to allocate investment in one of two ways. A benchmark is nominated above which an industry is defined as traded and then all investment in that industry is defined as tradeable capacity (BIE 1989, 1990). Alternatively, the use of arbitrary benchmarks is avoided. Instead, a fraction of investment is apportioned to tradeable capacity with that fraction equal to the industry's propensity to export or compete with imports (Wood *et al.* 1990; Kent and Scott 1991). The latter method of allocating investment has been more prominent in the literature and will be described here as typical of the propensity approach. The results of Kent and Scott (1991) will be focused upon in this paper.

Applying the propensity approach to highly disaggregated unpublished data, Kent and Scott (1991) estimate the direction of manufacturing investment between 1984/85 and 1988/89.⁸ Their results are reproduced in Figure 2.

Their estimates, over the period from 1984/85 to 1988/89, indicate that 32 to 38 per cent of investment in the manufacturing division is in tradeable capacity. This share fell slightly in 1986/87, despite currency depreciation, and subsequently increased during the episode of growth in the late 1980s. This increase was shown to be the product of growth in the share of investment allocated to the production of import replacements. The share of investment in export creation, on the other hand, changed little over the period.

Others employing the propensity approach have found similar results.⁹ Thus, using this approach, one might conclude that the nation's capacity to produce import replacements had increased, while that to produce manufactured exports had declined. However, the reported increase in import replacement capacity is inconsistent with the continued growth in import penetration. Similarly, the reported

⁸ They define their propensity to export (compete with imports) as the ratio of exports (imports) to total supply. The data used by Kent and Scott were unpublished ABS, Capital Expenditure Survey data and unpublished data on exports, sales and imports of manufactured goods at the four digit ASIC level.

⁹ BIE (1989) report that over the same period, investment in import competing industries increased while that in manufactured export industries declined. Wood *et al.* (1990), who examined export industries only, reported that there was no clear increase in exportable capacity over the 1980s.

lack of growth in exportable capacity is inconsistent with the growth of Australia's exports (in particular manufactured exports) since the mid 1980s.

Figure 2: Real Tradeable Investment as a Share of Total Manufacturing Investment - Propensity Approach
(average 1984/85 prices)



It might be expected that the increase in the capacity to produce import replacements reported by Kent and Scott (1991) is exaggerated by properties of the data available at the time of their estimation; in particular, the issue of computer prices.¹⁰ However, a more substantive question is the extent to which the reported changes in tradeable capacity are an artefact of an inappropriate methodology.

Certainly, few industries produce solely for foreign markets so that the export orientation of an industry is usefully measured by the ratio of exports to output or final sales. Similarly, few import replacement industries produce solely to compete with imports and are best described according to their propensity to do so. The point is whether or not an *import penetration* ratio accurately captures this information. Two points warrant attention.

¹⁰ The methodology employed by the Australian Bureau Statistics to measure computer prices, in effect, equates the dramatic rise in power of computers to a fall in their price. This translates into a large increase in the volume of computers that are, say, imported or form part of investment.

First, high import penetration ratios may exist not because a domestic industry produces import competing goods, but for the very *opposite* reason that such goods are not readily available to domestic consumers.¹¹ In such cases, use of standard import penetration ratios will overstate the capacity to produce import replacements and, thereby, will distort information about trends in the subsectoral allocation of investment.

Second, if investment is then allocated to the import competing subsector in proportion to the import penetration ratio, another distortion can arise. For instance, there may be no change in the absolute level of investment but, because of the trend rise in import penetration observed in Australia over the last decade, import creating capacity will be recorded as having increased.¹²

In the following section, an alternative approach to the estimation of tradeable capacity is presented. It draws on elements of existing measures. However, it employs a more sophisticated method of identifying traded goods, in particular import competing goods, than do other studies.

3. AN ALTERNATIVE APPROACH

3.1 The Method

In this paper, a variant of the above "propensity" approach is used to identify the traded and non-traded goods sectors. It follows Dwyer (1992) and takes advantage of information contained in input-output tables. The propensity to export is measured simply by the ratio of exports to total production of each industry contained in the input-output tables; this approach being little different from other

¹¹ For example, as import penetration climbs towards 100 per cent, under the criterion described above, an industry would be classified as one which produces import competing goods. And yet, continued penetration of domestic sales may exist because production of the domestic substitute is falling.

¹² In principle, since there has also been a trend rise in export propensities, the same argument applies to the apportionment of investment to the exportable subsector. However, in the manufacturing division, the propensity to import is significantly higher than it is to export (see Kent and Scott (1991, pp. 31-32)). Thus the impact of the anomaly is exaggerated in the import competing subsector.

measures of export orientation. However, measurement of the propensity to compete with imports does differ significantly from that in other studies.

A useful feature of input-output tables is that imports are described as either "competing" or "non-competing". Competing imports are those for which there is similar domestic production while non-competing imports are not or cannot be produced locally.¹³ A competing import is, therefore, analogous to an import replacement. To take full advantage of this analogy though, competing imports must then be "matched" to the corresponding domestic industry. This task is facilitated by the way in which imports are allocated to industries in the input-output tables.

Allocation of competing imports can be "direct" or "indirect". While direct allocation involves allocating imports to the industries that use them, for our purposes, indirect allocation is more relevant. Indirect allocation involves allocating competing imports to the industries that *produce similar goods*, thus providing useful information about the scope for import replacement.¹⁴ In this paper, as in Dwyer (1992), the measure of the propensity for import replacement is the ratio of *competing* imports (indirectly allocated) to the total supply of the *corresponding* domestic industry.

Having identified the relevant propensities for export and import replacement industries, a criterion for inclusion of an industry in the traded goods sector is nominated. Here, industries are defined as export oriented if at least 10 per cent of their total supply is exported. Similarly, industries are defined as import competing if at least 10 per cent of their total supply is of competing imports.¹⁵

¹³ For further discussion of the distinction between competing and non-competing (or complementary) imports see explanatory notes of ABS, *Australian National Accounts: Input-Output Tables*, Catalogue No. 5209.0.

¹⁴ Again, for further discussion see explanatory notes of ABS, *Australian National Accounts: Input-Output Tables*, Catalogue No. 5209.0.

¹⁵ Or, in the nomenclature of the input-output tables, 10 per cent of total usage. (In principle, total usage equals total supply.) Note also that, with the growth of intra-industry trade in recent years, some industries may be defined as both export oriented and import competing. In this case, output is allocated to the exportable subsector according to the ratio X_o/X_o+M_o , and

This 10 per cent bench-mark rule is, of course, arbitrary. It was, however, chosen on the basis of sensitivity tests. At benchmark values of two percentage points either side of 10 per cent, the profile of the traded and non-traded goods sectors remains stable.¹⁶ However, as one moves below an 8 per cent benchmark, a large number of industries qualify as both export oriented and import competing.¹⁷ Conversely, as one moves above a 12 per cent benchmark, only a narrow class of goods - primarily traditional exports - qualify as traded, largely precluding the existence of an import competing subsector. Furthermore, the 10 per cent benchmark yields a profile of the sectors that accords generally with priors: export oriented industries are related mainly to agriculture, mining, selected parts of manufacturing and transport services; and import competing industries are in the manufacturing division. The remaining industries are non-traded and comprise the various utilities and services.

Having defined industries as traded or non-traded, the next task is to allocate resources to them. In this paper, the simple approach of defining all resources in the traded goods sector as tradeable capacity is adopted. The rationale is that resources are not perfectly divisible. This is especially so for investment. For example, where substantial fixed capital expenditure is incurred by firms to engage in production, "little bits" of that investment cannot be clearly assigned to the production of, say, exports compared with goods for domestic consumption. Similar arguments apply for the division of labour. Even if resources were perfectly divisible, at an appropriate relative price, it will be optimal for a firm to export all its output. Potentially, therefore, the entire amount of investment or employment could be defined as tradeable capacity.

3.2 The Data

In order to obtain a detailed profile of the traded and non-traded goods sectors, each of the 109 industries included in the input-output tables of the Australian national accounts were classified as exportable, import competing or non-traded. Official

to the import competing subsector according to the ratio M_o/X_o+M_o , where X_o and M_o are the the propensities to export or compete with imports.

¹⁶ The stability of the profile of the sectors at the 10 per cent benchmark has been confirmed by the Australian Bureau of Statistics (Geneveive Knight, personal communication, July 1993).

¹⁷ In fact, some industries typically thought of as non-traded (such as wholesale and retail trade) also qualified as traded.

input-output data were used for selected years up to and including 1989/90. To enable the most recent profile of the traded goods sector, unpublished data for 1990/91 have also been used.¹⁸ Between these years, several industries move between the traded and non-traded goods sector. In these cases, entry/exit is assumed to be graduated.¹⁹ Details and sources of all data are given in Appendix 1, whilst a description of the industries that comprise the traded and non-traded goods sectors is provided in Appendix 2.

An attempt was made to find investment data for each of the 109 industry categories in the input-output tables. Such data are not available. Instead, unpublished CAPEX investment data for 59 "estimation" industries within the divisions of mining and manufacturing were made available by the Australian Bureau of Statistics (ABS).²⁰ These data were supplemented by (aggregate) national accounts data for agriculture, fishing and hunting and a number of service sectors.

The two sources for investment data are necessary to identify investment in the tradeable capacity of the economy *as a whole*, as opposed to the tradeable capacity of the non-farm sector or the manufacturing division, as has occurred previously. Reliance on these two data sources does, however, pose two main problems. First, disaggregated CAPEX data are not available for all industry categories. Second, for a comparable sector, CAPEX survey data report a lower level of investment than the corresponding estimate from the national accounts.²¹

¹⁸ They are provisional and confidential estimates generously made available to the Reserve Bank by the Commonwealth Treasury. For further details see Appendix 1.

¹⁹ For example, when an industry is classified as non-traded in 1986/87 but traded in 1990/91, output/investment is allocated with a weight of zero in the first period and one in the last, with weights interpolated in between.

²⁰ National accounts investment data and those from the CAPEX survey differ both in their source of information and their treatment of speculative construction. (For a detailed description refer to ABS, *National Accounts Concepts Sources and Methods*, Catalogue No. 5216.0.) Disaggregated CAPEX investment data are only available from the mid 1980s. Additionally, prior to the mid 1980s, capital expenditure on leased equipment was recorded by owner, rather than by the end user.

²¹ Typically, the coverage of private fixed capital expenditure in the CAPEX survey is about 80 per cent of that in the national accounts.

The following steps are undertaken to reconcile the investment data from the two sources:

- first, a *pro rata* increase in the value of CAPEX investment is made so that the absolute value of private investment from this source is equal to that from the national accounts.
- second, where investment data are not sufficiently disaggregated, investment is apportioned to an industry by assuming that its share of group investment is the same as its share of group output.

An attempt was also made to identify employment data to correspond to each of the 109 industry categories in the input-output tables. Unpublished employment data were made available by the ABS for 88 industries in its Labour Force Survey. As above, on those occasions where employment data are not sufficiently disaggregated, employment is apportioned to an industry by assuming that its share of group employment is the same as its share of group output.

4. ALLOCATION OF INVESTMENT

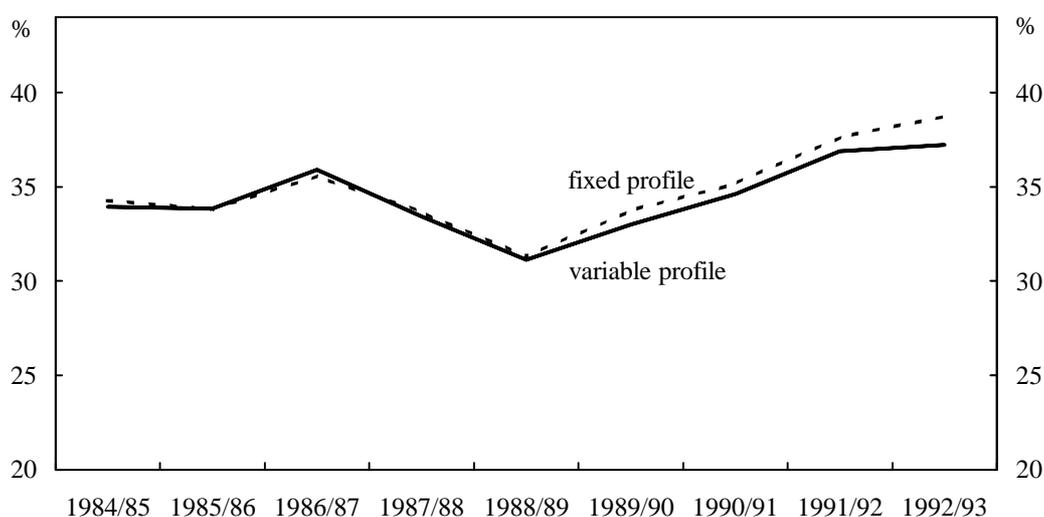
4.1 Sectoral Shares of Total Investment

Initially, we consider the allocation of investment to the traded goods sector as a whole. The disaggregated data used in the estimation are only available for the period since the mid-1980s. This precludes a longer assessment of tradeable capacity. It does, however, permit an examination of the sectoral allocation of investment during a period in which there has been an accelerated increase in the international integration of the Australian economy - a factor central to the development of the traded goods sector.

Estimates of tradeable capacity are shown in Figure 3. In this and subsequent figures, the bold line represents tradeable capacity based on profiles of the traded goods sector obtained from input-output data for 1986/87 and 1990/91. We call this series a "variable profile" estimate. A distinguishing feature of this estimate is its similarity to the "rule of thumb" estimate presented in Figure 1. Whilst the

investment share is less than that found using the rule of thumb approach, movements in the series accord closely.²² The results suggest that following the historic currency depreciation of the mid 1980s there was an increase in the share of investment in the traded goods sector. This share subsequently fell as a consequence of the oft-cited speculative boom in non-tradeables in the late 1980s.²³ Recently, however, the share of total investment in the traded goods sector has increased significantly, rising from 31 per cent in 1988/89 to 37 per cent in 1992/93.

Figure 3: Share of Total Investment in the Traded Goods Sector
(average 1989/90 prices)



One question that arises is the extent to which the recent increase in the share of investment in the traded goods sector represents the entry of new industries to the sector or existing industries in the sector investing more. In Figure 3, and in subsequent figures, the broken line represents the share of investment in tradeables based only on the profile of the traded goods sector obtained from the 1986/87 input-output tables: it is a "fixed profile" estimate. The gap between it and the bold

²² The investment share is less because classifying all output in the mining and manufacturing divisions as traded overstates the size of the sector relative to estimates presented in Dwyer (1992).

²³ This was fuelled by the growth of investment by real estate operators and developers. However, as noted by Kent and Scott (1991), a significant part of this growth may have represented a trend away from ownership of buildings and structures by end users, to renting such premises. Part of the growth in investment by real estate operators and developers was replacing investment formerly undertaken by other industries.

line reflects a change in the industries that comprise the traded goods sector. For observations since 1986/87, if the bold line lies above the broken line, the gap indicates the effect of investment decisions of *net entrants* to the traded goods sector.²⁴ Conversely, if the bold line lies below the broken line, the gap reflects the investment decisions of those industries making a *net exit* from the traded goods sector. As shown in Figure 3, there has been a small net exit of industries from the traded goods sector. In consequence, the bulk of the recent increase in tradeable capacity stems from existing industries in the traded goods sector increasing their share of total investment spending.

Another question is the extent to which trends in investment in the traded goods sector as a whole mask changes in the capacity to export or compete with imports. In particular, how different is the pattern of entry to (or exit from) those subsectors of the economy that produce exports or import competing goods? As shown in Figure 4, the share of total investment allocated to export oriented industries has increased, with a significant contribution made by net entrants to the subsector. This result accords with the increased export orientation of the economy. On the other hand, the share of total investment allocated to import competing industries has gradually fallen, reflecting a substantial net exit of investors from the subsector. Thus priors about a sectoral switch in investment that correspond to a switch in the focus of production are largely satisfied. This result is *opposite* to that derived from the standard propensity approach where it was shown that there had been growth in Australia's capacity to replace imports.

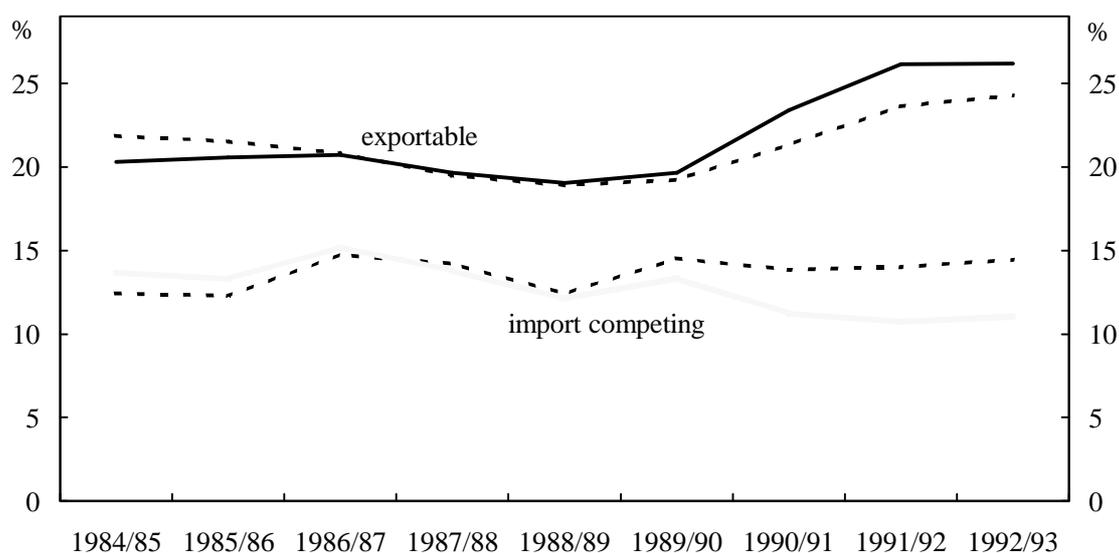
Clearly, the recent increase in tradeable capacity has been driven by an increase in the share of total investment in export oriented industries, with net entry of industries to the exportable subsector playing an important role in the growth of exportable capacity. In fact, the role of net entrants to the exportable subsector may be understated in the present framework. In this framework, only an *industry* that becomes export oriented can be treated as an entrant to the exportable sector.²⁵ Consequently, the investment decisions of individual *firms* - the "emerging exporters" that have entered export markets since the mid 1980s - will not be

²⁴ It is indicative only: some information is lost in the process of interpolation (see footnote 19).

²⁵ Or, an industry that engages in intra-industry trade and increases exports as a share of its total production of traded goods.

captured in the gap unless the increase in their exports has caused an entire industry to be classified as exportable.

Figure 4: Share of Total Investment in Exportable and Import Competing Industries
(average 1989/90 prices)



The propensity approach adopted by BIE (1989) and Kent and Scott (1991) was, however, used to examine the tradeable capacity of the manufacturing division only. Thus a further comparison of the two approaches can be made by applying the methodology outlined in Section 3.1 to manufacturing data.²⁶ As shown in Figure 5, when using the preferred methodology, the switch in investment towards industries that are export oriented, and away from those that compete with imports, is now *magnified*.²⁷ So too is the role played by the net entry of export oriented industries and the net exit of import competing industries.²⁸ Certainly, the increased share of manufacturing investment in export oriented industries is consistent with the

²⁶ Where manufacturing is defined as in the national accounts.

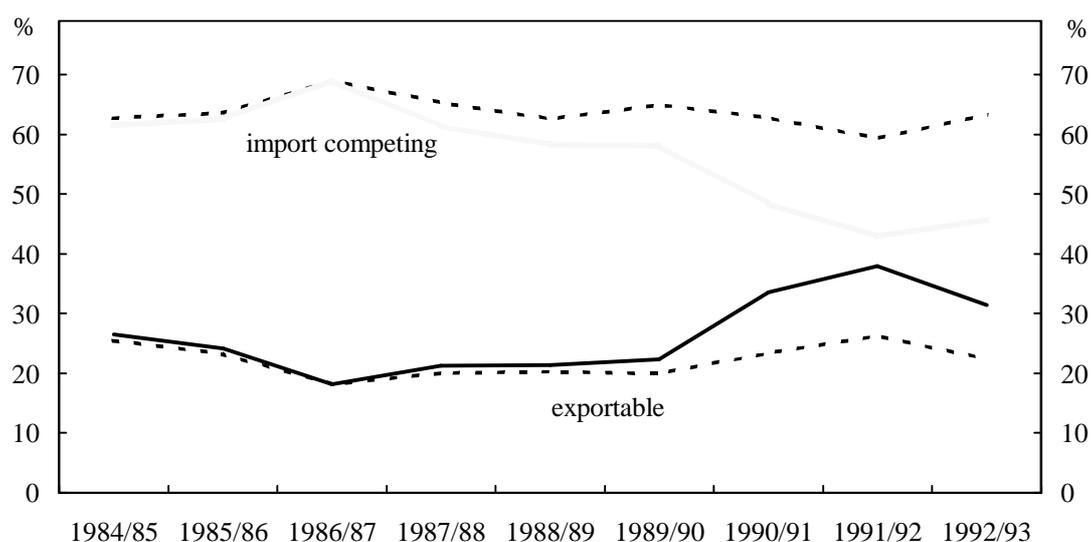
²⁷ With the exception of 1992/93 where results are driven by a fall in investment by the non-ferrous metals industry to levels that were similar to those in 1990/91.

²⁸ This reflects, in part, the movement of basic iron and steel from the import competing subsector to the exportable subsector. However, even when basic iron and steel are removed from the data set, the switch towards export orientation of manufacturing investment remains prominent, as does the role played by entry of new industries.

accelerated growth of Australia's manufactured exports, also evident since 1986/87.²⁹

Similarly, the fall in the share of investment in import competing industries is consistent with the claim that the domestic supply of import competing goods has become constrained.³⁰

Figure 5: Investment in Manufacturing
(average 1989/90 prices)



4.2 Sectoral Levels of Investment

The above discussion of tradeable investment has been couched in terms of the *share* of total investment allocated to the traded goods sector. However, the level of investment is prone to substantial swings. In particular, during the recent recession, there has been a protracted fall in the level of real private investment in the economy. Of interest is the extent to which the increased share of investment allocated to the traded goods sector, and its exportable subsector, represents an *absolute* increase in investment.

²⁹ See McKinsey & Co. (1993), Bullock *et al.* (1993) and Menzies and Heenan (1993).

³⁰ Dwyer and Kent (1993) show that the dismantling of protection has corresponded with a reduction in the domestic supply of import competing goods. It is argued that this supply side constraint has been a key explanator of recent trends in import penetration.

The following figures give some indication of the disaggregated level of real investment.³¹ Figure 6 shows the level of real investment in the traded and non-traded goods sectors. An interesting feature of the figure is that investment in the non-traded goods sector has been more volatile than that in the traded goods sector, at least since the mid 1980s. While the level of investment in the traded goods sector increased steadily up until 1989/90, investment in the non-traded goods sector surged towards the end of the decade. Correspondingly, as the economy went into recession, the absolute level of investment in the traded goods sector fell only marginally while that in the non-traded goods sector fell sharply.

Figures 7 and 8 show the level of real investment in the subsectors. The level of investment in export oriented industries began to increase in 1986/87 and, during the recent recession, has virtually "held ground". The level of investment in import competing industries, on the other hand, has fallen significantly. In fact, the resilience of investment in export oriented industries suggests that capital shortages are less likely to be an issue for the expansion of Australia's export oriented industries than may be the case for other sectors of the economy.³²

³¹ In those years where interpolation was used to determine exportable and importable shares of sectoral GDP, the level of investment will not be exactly equal to that reported in the Australian national accounts.

³² Fahrer and Simon (1994) have argued that insufficient capital is installed in some industries to accommodate sustained growth in output and employment. They note that exceptions include the mining and manufacturing divisions; industries that comprise the bulk of the traded goods sector. The relative strength of investment in export oriented industries is consistent with their findings.

Figure 6: Levels of Real Investment in the Traded Goods Sector
(average 1989/90 prices)

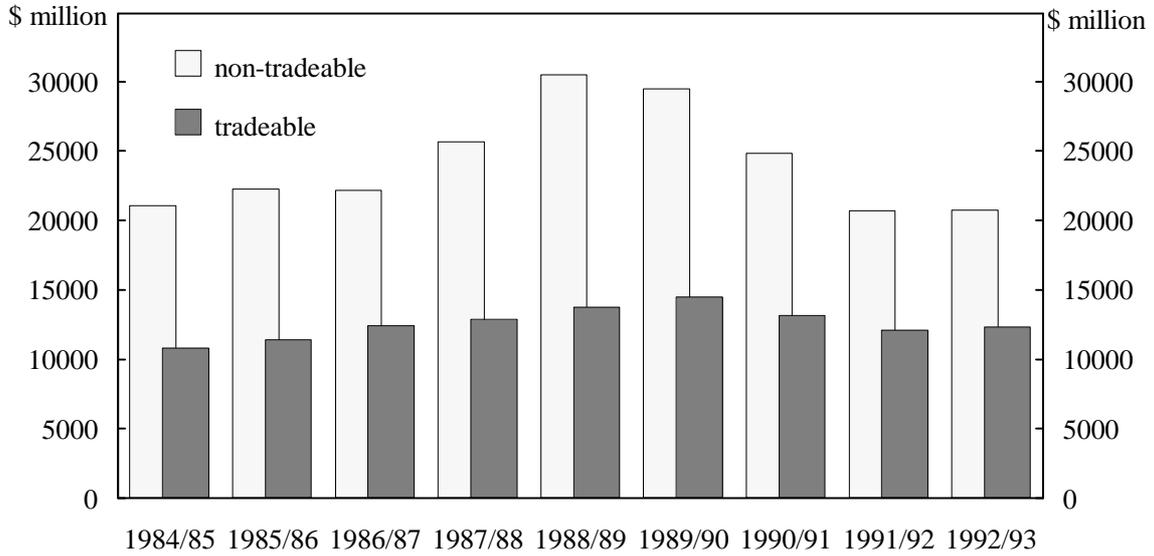


Figure 7: Levels of Real Investment in Exportable and Import Competing Industries
(average 1989/90 prices)

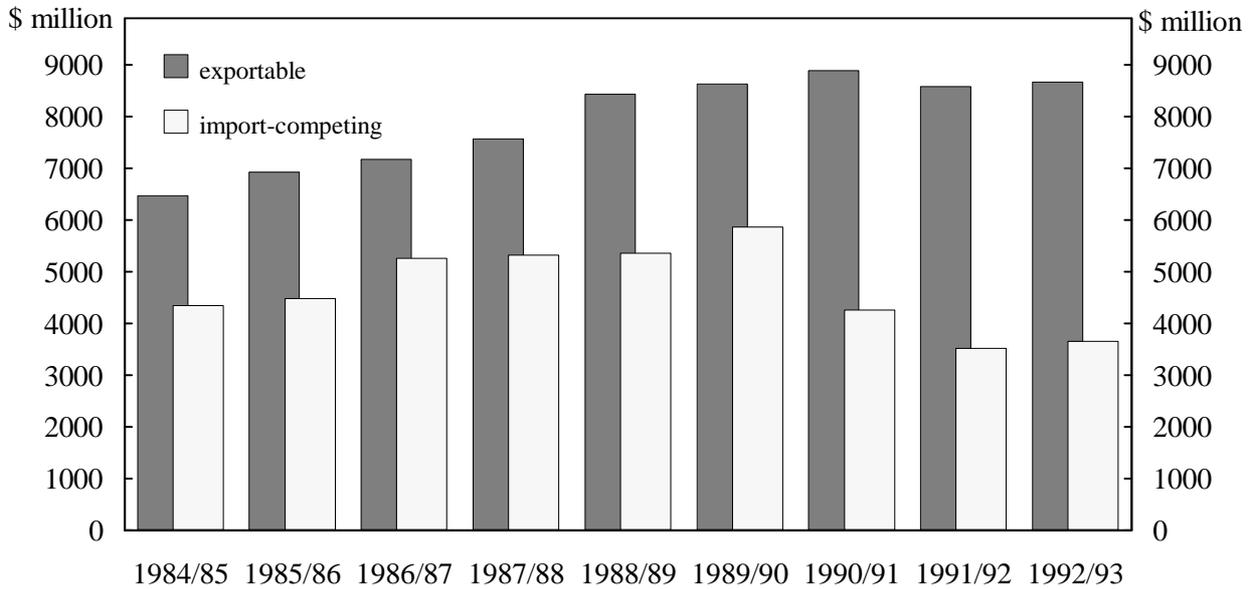
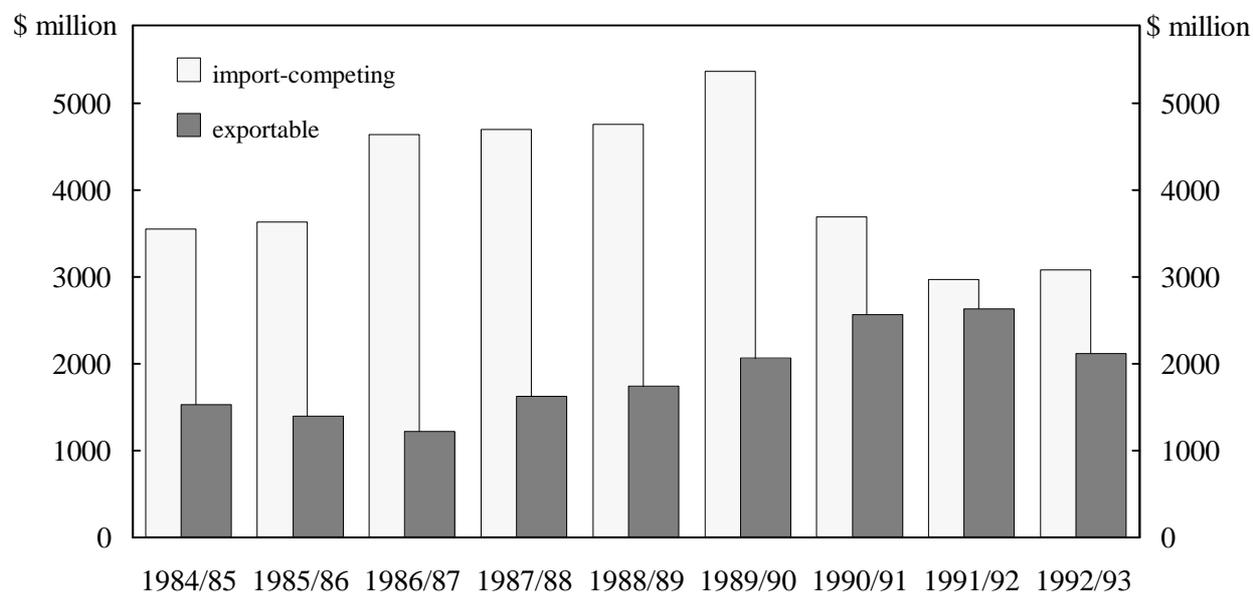


Figure 8: Levels of Real Investment in Exportable and Import Competing Manufacturing Industries
(average 1989/90 prices)



5. ALLOCATION OF EMPLOYMENT

To obtain a more comprehensive picture of the allocation of resources to the traded goods sector, the sectoral allocation of investment is augmented by that for total employment.³³ Of interest is the extent to which the switch towards the traded goods sector, in particular export oriented industries, evident in the allocation of investment is also evident for employment. Using the same method outlined in Section 3, and disaggregated labour force data, employment is allocated to each industry according to whether it is traded or non-traded. Data are for the period 1978/89 to 1992/93.

³³ While investment is a flow, employment is a stock. Nonetheless, flows of human resources can be inferred from changes in the stock.

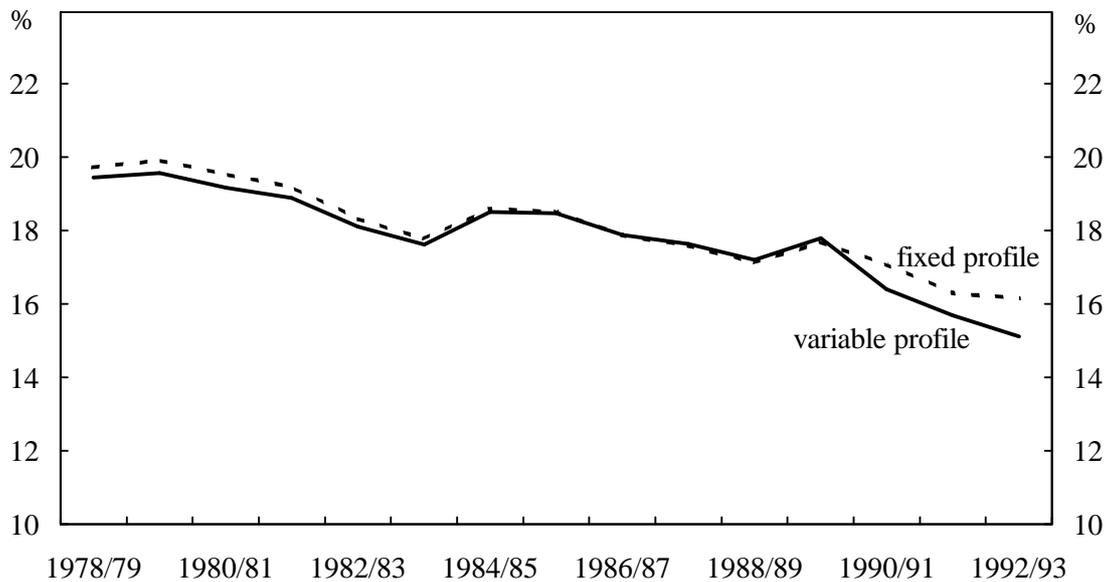
Figure 9: Share of Total Employment in the Traded Goods Sector

Figure 9 shows the proportion of total employment in the traded goods sector.³⁴ This share is relatively small and reflects, on average, a greater capital intensity of industries in the traded goods sector compared with those of the non-traded goods sector. Furthermore, it has fallen steadily throughout the period, in contrast to the corresponding share of investment. The fall has occurred because virtually all the growth in the level of employment over the past decade has arisen in the non-traded goods sector. Moreover, it reflects the net exit of major employers from the traded goods sector in recent years.

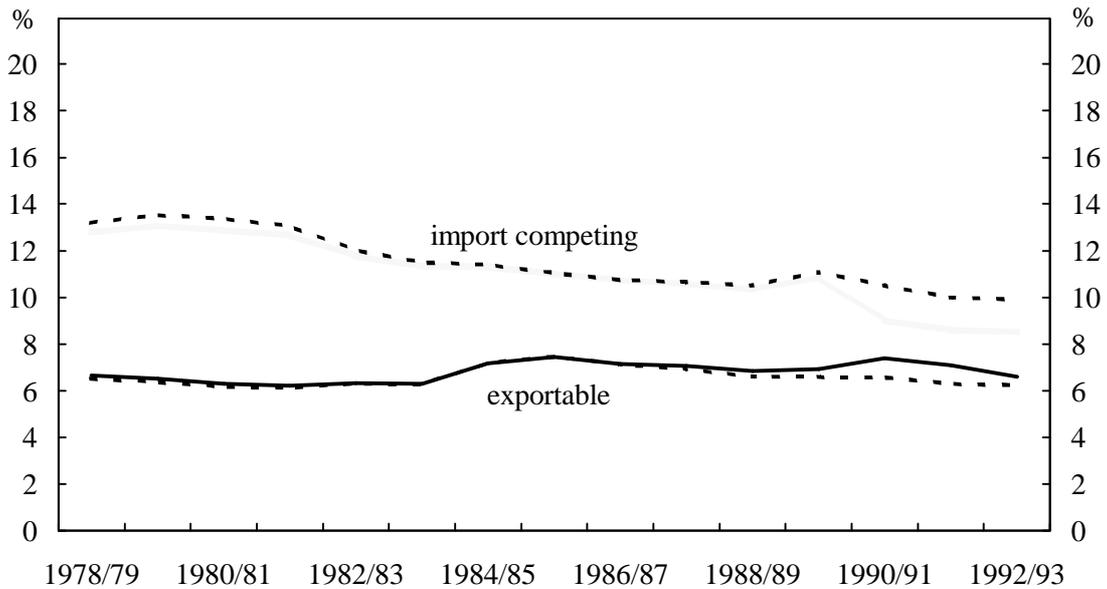
In fact, as shown in Figure 10, the fall in the share of total employment in the traded goods sector has been driven by the declining share of employment in import competing industries; a decline accelerated by the net exit of employers in these industries.³⁵ As a result, the share of total employment in exportable industries has

³⁴ In this section, only shares of total employment are considered and not levels. In general, an increase in a sector's share of total employment implies an increase in the level of employment in that sector because total employment has grown.

³⁵ In Figure 11, the sharp decline in the share of employment in import competing industries is driven by changes in the classification of basic iron and steel and printing and allied industries. Between 1989/90 and 1990/91, a significant share of the domestic production of basic iron and steel moved from competing with imports to being exported. Furthermore, between 1989/90

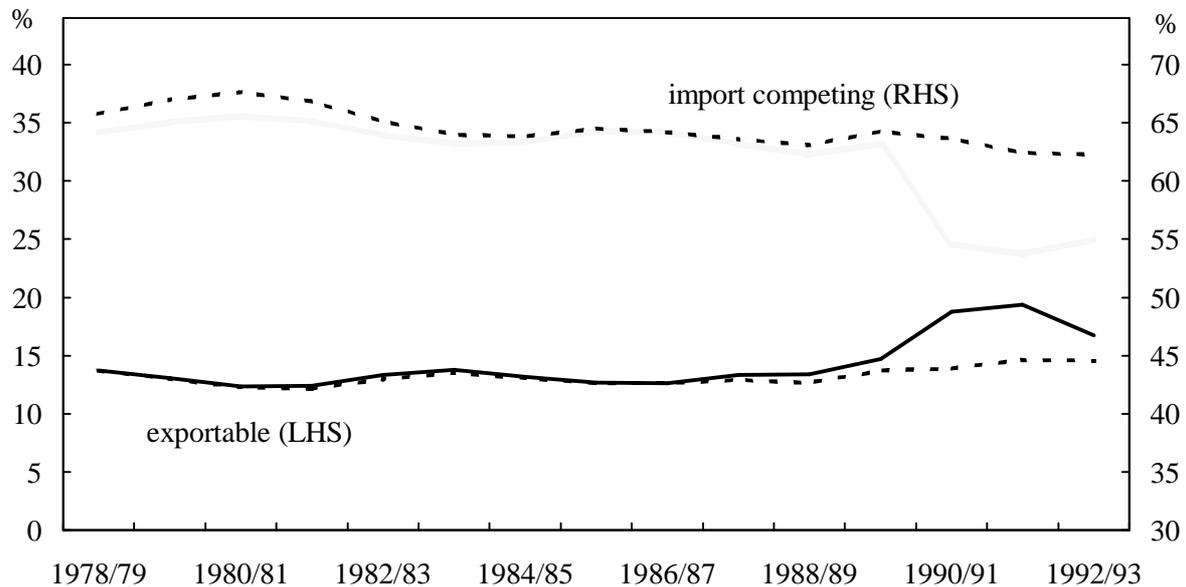
increased slightly. A similar although more pronounced result is found for the manufacturing division (see Figure 11). These results corroborate the evidence of a switch in the allocation of investment away from import competing industries.

Figure 10: Share of Total Employment in Exportable and Import Competing Industries



and 1990/91, the printing and allied trades group moved from the import competing subsector to the non-traded sector.

Figure 11: Share of Total Manufacturing Employment in Exportable and Import Competing Industries



6. CONCLUSION

The paper has examined the sectoral allocation of resources since the early 1980s; a period in which there has been important structural change in the traded goods sector. Using an input-output framework, industries were defined as traded or non-traded according to their propensity to export or compete with imports. By this measure, the share of total investment allocated to the traded goods sector has increased in recent years. Importantly, this has been driven by an increase in the allocation of investment to export oriented industries. In contrast, the share of investment allocated to import competing industries has fallen. A similar switch in the allocation of total employment away from import competing industries has also occurred, although the share of employment in the exportable subsector has not changed greatly. These results contradict earlier findings of an increase in resources allocated to import replacement industries; a result which seemed at odds with observed structural changes in production.

For both investment and employment, the switch is most evident from the mid 1980s, consistent with the accelerated pace of international integration from this time (Bullock *et al.* 1993; Menzies and Heenan 1993). These changes in the

sectoral allocation of resources are the corollary of the specialisation in production that has accompanied international integration. The recent tendency to allocate resources towards export oriented industries and away from those that compete with imports is a tangible measure of the outward orientation of the Australian economy.

Given the course of internationalisation on which the economy has embarked, the sectoral switch in the allocation of resources evident since the early 1980s will become more pronounced. Over time, the development of a greater capacity to export should offset the increase in import penetration and assist the adjustment of Australia's balance of payments to a state of longer-run sustainability (Bullock *et al.* 1993). Furthermore, it is an empirical regularity that outward-looking export oriented countries attain higher rates of growth than do countries with inward-looking policies of import replacement (Balassa 1978; Edwards 1991; Marin 1992). Thus the continued development of Australia's export capacity should improve the nation's long-run growth prospects.

APPENDIX 1: DATA

(a) Input-Output Data

Taken from an absorption matrix in which competing imports are allocated indirectly. Official published data are used for 1980/81, 1982/83, 1986/87 and 1989/90, while unpublished estimates are used for 1990/91. They are provisional and confidential estimates, prepared by the Commonwealth Treasury, in which input-output tables for 1986/87 have been updated by applying the RAS (Richard A. Stone) System to national accounts data for 1990/91. For a discussion of the RAS technique see Gretton and Cotterell (1979). Given that relevant data for the air and water transport industries are not available in the 1989/90 input-output tables, unofficial estimates of the export/import orientation and output of these industries are taken from the 1990/91 tables.

Source: ABS, unpublished; ABS, Catalogue No. 5209.0; and Treasury Dept.

(b) Investment

Disaggregated unpublished data from the 59 estimation industries in the CAPEX survey. The estimation industries correspond to the four digit Australian Standard Industrial Classification (ASIC) codes from 1111 to 3478. Published investment data from the Australian national accounts were used for the following industry divisions and industries: agriculture, forestry, fishing and hunting; electricity, gas and water; water sewerage and drainage; construction; wholesale and retail trade; transport storage and communication; finance, property and business services; community services; and recreation, personal and other services.

Source: ABS, unpublished CAPEX Survey; ABS, Catalogue No. 5221.0.

(c) Employment

Disaggregated unpublished data from the Australian Bureau Statistics, Labour Force Survey for 88 industries that correspond to the three digit ASIC codes from 013 to 940.

Source: ABS, unpublished.

APPENDIX 2: INDUSTRY CLASSIFICATION

The following table lists the 109 industries considered and how they are categorised as exportable (x), import competing (m) and non-traded (nt) using the method outlined in Section 3.1.

| Input/Output Year | 1978/79 | 1980/81 | 1982/83 | 1986/87 | 1989/90 | 1990/91 |
|-------------------|---------|---------|---------|---------|---------|---------|
| Sheep | x | x | x | x | x | x |
| Cereals | x | x | x | x | x | x |
| Meat cattle | nt | nt | nt | nt | nt | nt |
| Milk cattle, pigs | nt | nt | nt | nt | nt | nt |
| Poultry | nt | nt | nt | nt | nt | nt |
| Agriculture nec | nt | nt | nt | nt | nt | nt |
| Ag services | nt | nt | nt | nt | nt | nt |
| Forestry | nt | nt | nt | nt | nt | nt |
| Fishing | x | x | xm | xm | x | x |
| Ferrous | x | x | x | x | x | x |
| Non-ferrous | x | x | x | x | x | x |
| Coal, oil, gas | x | x | x | x | x | x |
| Minerals nec | x | x | x | x | xm | xm |
| Mining services | nt | nt | nt | nt | nt | nt |
| Meat products | x | x | x | x | x | x |
| Milk products | x | x | x | x | x | x |
| Fruit,vegetables | m | m | m | xm | m | xm |
| Marg, fats nec | m | m | m | m | m | m |
| Flour, cereal | x | x | x | x | x | x |
| Bread, cakes | nt | nt | nt | nt | nt | nt |
| Confectionary | m | m | m | m | m | m |
| Food products nec | x | x | x | xm | xm | x |
| Soft drinks | nt | nt | nt | nt | nt | nt |
| Beer, malt | nt | nt | nt | nt | nt | nt |
| Alcohol nec | m | m | m | m | m | m |
| Tobacco | nt | nt | nt | nt | nt | nt |
| Cotton ginning | x | x | x | x | x | x |
| Man-made fibres | m | m | m | m | m | m |
| Cotton fabrics | m | m | m | m | m | m |
| Woollen fabrics | m | m | m | m | m | m |

cont.

| Input/Output Year | 1978/79 | 1980/81 | 1982/83 | 1986/87 | 1989/90 | 1990/91 |
|----------------------|---------|---------|---------|---------|---------|---------|
| Textile finishing | nt | nt | nt | nt | nt | nt |
| Textile coverings | m | m | m | m | m | m |
| Textiles nec | m | m | m | m | m | m |
| Knitting | m | m | m | m | m | m |
| Clothing | m | m | m | m | m | m |
| Footwear | m | m | m | m | m | m |
| Sawmill products | xm | xm | xm | xm | xm | xm |
| Wood boards | m | m | m | m | m | m |
| Wood products | nt | nt | nt | nt | nt | nt |
| Furniture | nt | nt | nt | m | m | m |
| Pulp, paper | m | m | m | m | m | m |
| Containers | nt | nt | nt | nt | nt | nt |
| Paper products nec | m | m | nt | m | m | m |
| Publishing | m | m | m | m | nt | nt |
| Stationery | nt | nt | nt | nt | nt | nt |
| Chemical fertilizers | nt | nt | m | m | m | m |
| Basic chemicals | m | m | m | m | m | m |
| Paints | nt | nt | nt | nt | nt | nt |
| Pharmaceutical | m | m | m | m | m | m |
| Soap | nt | nt | nt | nt | m | nt |
| Cosmetics | nt | nt | nt | m | m | m |
| Chemicals nec | m | m | m | m | m | m |
| Petroleum products | m | m | m | m | m | m |
| Glass | m | m | m | m | m | m |
| Clay products | m | m | m | m | m | m |
| Cement | nt | nt | nt | nt | nt | nt |
| Concrete | nt | nt | nt | nt | nt | nt |
| Concrete products | nt | nt | nt | nt | nt | nt |
| Non-metallic nec | nt | nt | nt | m | m | m |
| Basic iron, steel | m | m | m | m | mx | x |
| Basic non-ferrous | x | x | x | x | x | x |
| Structural metal | nt | nt | nt | nt | nt | nt |
| Sheet metal | nt | nt | nt | nt | x | x |
| Metal products nec | m | m | m | m | m | m |

cont.

| Input/Output Year | 1978/79 | 1980/81 | 1982/83 | 1986/87 | 1989/90 | 1990/91 |
|---------------------|---------|---------|---------|---------|---------|---------|
| Motor vehicles | m | m | m | m | m | m |
| Ships, boats | m | m | m | m | m | m |
| Railway | nt | nt | nt | nt | nt | nt |
| Aircraft | m | m | m | m | m | m |
| Photographic | m | m | xm | xm | m | m |
| Electronic | m | m | m | m | m | m |
| Refrigerators | m | m | m | m | m | m |
| Electrical nec | m | m | m | m | m | m |
| Ag machinery | m | m | m | m | m | m |
| Construction mach | m | m | m | m | m | m |
| Machinery nec | m | m | m | m | m | m |
| Leather products | m | m | m | xm | xm | x |
| Rubber products | m | m | m | m | m | m |
| Plastic products | m | m | m | m | m | m |
| Advertising | m | m | m | m | m | m |
| Manufacturing nec | m | m | m | m | xm | xm |
| Electricity | nt | nt | nt | nt | nt | nt |
| Gas | nt | nt | nt | nt | nt | nt |
| Water | nt | nt | nt | nt | nt | nt |
| Res building | nt | nt | nt | nt | nt | nt |
| Construction nec | nt | nt | nt | nt | nt | nt |
| Wholesale trade | nt | nt | nt | nt | nt | nt |
| Retail trade | nt | nt | nt | nt | nt | nt |
| Mechanical repairs | nt | nt | nt | nt | nt | nt |
| Repairs nec | nt | nt | nt | nt | nt | nt |
| Road transport | nt | nt | nt | nt | | nt |
| Railway transport | x | x | x | x | x | x |
| Water transport | xm | xm | xm | xm | x(a) | x |
| Air transport | xm | xm | xm | xm | xm(a) | xm |
| Transport services | - | - | - | x | x | x |
| Communication | nt | nt | nt | nt | nt | nt |
| Banking | nt | nt | nt | nt | nt | nt |
| Non-bank finance | nt | nt | nt | nt | nt | nt |
| Investment services | nt | nt | nt | nt | nt | nt |

cont.

| Input/Output Year | 1978/79 | 1980/81 | 1982/83 | 1986/87 | 1989/90 | 1990/91 |
|-------------------|---------|---------|---------|---------|---------|---------|
| Insurance | nt | nt | nt | nt | nt | nt |
| Business services | nt | nt | nt | nt | nt | nt |
| Dwellings | nt | nt | nt | nt | nt | nt |
| Public admin | nt | nt | nt | nt | nt | nt |
| Defence | nt | nt | nt | nt | nt | nt |
| Health | nt | nt | nt | nt | nt | nt |
| Education | nt | nt | nt | nt | nt | nt |
| Welfare | nt | nt | nt | nt | nt | nt |
| Entertainment | nt | nt | nt | nt | nt | nt |
| Restaurants | nt | nt | nt | nt | nt | nt |
| Personal services | nt | nt | nt | nt | nt | nt |

Note (a): For these industries, relevant data are not available in the 1989/90 input-output tables so that unofficial estimates of export/import orientation and output of these industries are taken from the 1990/91 tables.

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