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Trade Liberalization and Intra-Industry Specialization:

The Australian Experience

by

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ABSTRACT

Much of the growth in trade among the industrialised countries, and more recently among countries in the Asia-Pacific region, has taken the form of intra-industry trade (IIT). Australia has historically had one of the lowest shares of IIT among OECD countries. This paper examines how Australia's IIT has changed in the 1980s in response to the process of trade liberalisation and completion of the CER pact with New Zealand. Towards this end, IIT indexes are estimated for Australia's multilateral and trans-Tasman trade for 1981 and 1991 for 132 industries using data at the 3 and 4-digit level of the SITC. The results point to a sharp increase in the share of IIT for both multilateral and trans-Tasman trade. We also find that the industries that had undergone the largest reductions in protection levels had also increased their shares of IIT quite considerably. These findings suggest that the short to medium run adjustment costs associated with trade liberalisation are likely to be lower than expected as a result of increased intra-industry specialisation. If IIT continues to grow in response to the on-going process of internationalisation of the Australian economy, then Australia's prospects for expanding its share in world trade, and particularly in the Asia-Pacific region, are likely to be significantly boosted.

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1. Introduction

Australia has historically been considered an atypical developed country because of the dominance of commodity exports in its trade structure. Another peculiarity has been the very low share of intra-industry trade (IIT) in manufactured goods in comparison with other member countries of the OECD. Among OECD countries, Australia had the lowest IIT index of 25 percent in 1978, compared with 80 for France, 81 for the UK, 79 for Belgium, and 74 for both Austria and the Netherlands (Greenaway and Milner, 1986, Table 7.6). A more recent attempt at measuring the extent of IIT found that the mean level of IIT for 1985 was 22 percent of total trade, with the majority of industries (together accounting for about 85 percent of gross manufacturing output) recording IIT estimates below this level (Ratnayake and Athukorala, 1992).

Much has changed with respect to the Australian economy since 1985, however. A significant structural change over the past five years has been the gradual dismantling of the tariff and non-tariff barriers that have long protected the manufacturing sector. Furthermore, the Closer Economic Relations (CER) pact with New Zealand provides for the elimination of practically all tariffs on goods traded between the two countries by 1990. The experience overseas suggests that trade liberalisation and regional trading agreements can serve as powerful agents in promoting IIT (see Greenaway and Milner, 1986).[*]

One of the consequences of a protected regime is the creation of a range of non-traded products, or varieties of product, which become tradeable when protection is reduced or removed (see, for instance, Falvey, 1981). Reducing protection leads to a re-allocation of resources from import-competing to export sectors. The question is whether this adjustment will occur between or within industries, i.e. will it lead to increased concentration or diversification of export patterns?. The theoretical models of IIT would suggest diversification of export patterns through horizontal specialisation, because of the emphasis placed on the roles of product differentiation and product- or variety-specific scale economies.[1] The Australian experience since 1985 would tend to support this view of horizontal specialisation for two reasons: (i) the export structure has become much more diversified with the increasing importance

[*] Using data for 1985 and employing a simultaneous equations framework, Ratnayake and Jayasuria (1992) found that the high level of protection of the manufacturing sector had significantly discouraged IIT in the Australian context.

[1] For a survey of this literature, see Helpman and Krugman (1985).

of manufactured exports,[2] and (ii) much of the growth in manufactured exports has come from small and medium sized enterprises (McKinsey, 1993), implying an exploitation of variety-specific scale economies.

For these reasons, we suspect that the share of IIT in total trade may have increased markedly over the past decade. The aim of this paper is to put our suspicions to the empirical test. Towards this end, we estimate IIT indexes for Australia's multilateral and trans-Tasman trade for 1981 and 1991, and examine how IIT may have changed over time. If our suspicions are proven correct, then this has important implications for both trade expansion and trade adjustment policies for Australia. IIT has been growing rapidly in relation to total trade among the industrialised countries and those in the Asia-Pacific region, as predicted by models of IIT that assume a preference for variety in consumption as real incomes rise. If the share of IIT in Australia's manufacturing trade is trending upwards as a result of increasing horizontal specialisation, then this suggests that Australia's future prospects for trade expansion are very positive indeed. As highlighted by the OECD (1987), the historically low level of IIT in Australia's trade has been a major factor in Australia's lacklustre performance in world trade.

While the benefits of trade expansion as a result of trade liberalisation are evident in the long-run, there can be quite significant costs associated with resource re-allocation in the short to medium-run. The extent of the costs associated with such adjustment will depend crucially on the extent to which the expansion takes the form of inter- versus intra-industry trade. If much of the expansion is intra-industry, then the costs are likely to be much lower. Both labour and capital are likely to adapt more easily to a new environment where the change is a result of increased intra-industry rather than inter-industry specialisation. To the extent that there is a degree of industry-specificity in the employment of factors, their re-allocation between activities (or product lines) *within* industries is likely to incur lower costs than their re-allocation *between* industries. Adjustment costs may also be lower because it is possible for all factors to gain from trade in an intra-industry setting (Krugman, 1981).[3]

Furthermore, support for bilateral trading agreements, particularly from the junior partner, is usually conditioned on the presumption that intra-industry adjustments will dominate inter-industry adjustments (Globerman and Dean, 1990). In the case of the CER, Bollard (1986) notes that New Zealand's support was conditioned in part on the premise that smaller firms would have a greater opportunity to produce specialised

[2] Exports of elaborately transformed manufactures have more than doubled over the past five years, while overall manufactured exports have grown at an annual rate of more than 15 percent a year in real terms. If we include some of the simply transformed metal products such as aluminium ingots and steel in our definition of manufactures, then we find that its share in total exports rises to close to 30 percent, outstripping the contribution of rural exports (see, for instance, Industry Commission, 1992).

[3] This contrasts with the results of conventional trade models which explain inter-industry trade, where, as implied by the Stolper-Samuelson theorem, the relative price changes that accompany trade expansion must make some factor worse off (see Jones and Schienkman, 1977).

products. If intra-industry adjustments dominate, then it is less likely that governments will seek to modify and constrain the impacts of trade agreements, particularly through interventions designed to maintain economic activity in less competitive industries. Thus the extent of intra-industry specialisation will be important in determining the longer term viability and integrity of bilateral and regional trading agreements.

This would also apply to the process of trade liberalisation in general. Increasing intra-industry rather than inter-industry trade following trade liberalisation suggests that protectionist pressures are unlikely to grow in proportion to the degree of import competition (Caves, 1981). Politicians are more likely to press ahead with the process of trade liberalisation if the high political cost associated with resources shifting between industries is limited.

The paper is organised in 5 sections. Section 2 considers recent changes to protection levels in the Australian manufacturing sector, and provides an overview of the CER. The methodological issues associated with measuring IIT and salient features of the data base are discussed in Section 3. The discussion of the results in the context of related economic issues is taken up in Section 4. The last section of the paper summarises the major findings.

2. Changes to Protection and the CER Trading Agreement

Australia and New Zealand have historically been the most highly protected industrial countries, with the major part of the protection provided to the manufacturing sector. For instance, New Zealand had the highest average level of tariffs on industrial products among developed countries in 1970, while Australia came a close second. Australia had the highest percentage of actual imports dutiable at rates of over 25 percent in 1970 (General Agreement on Trade and Tariffs (GATT), 1974). There has been a substantial decline in the overall levels of assistance to the manufacturing sectors of both countries over the last two decades, with much of the reduction taking place over the past five years. The average nominal rate of protection for the Australian manufacturing sector decreased from 24 percent in 1968-69, to 13 percent in 1984-85 and 9.6 percent in 1989-90.[4] Similarly, the average rate of effective protection has decreased from 36 percent to 22 percent and 16 percent during the same period (Industry Commission, *Annual Report*, various issues).

Table 1 presents data on the average nominal rates of assistance (NRA) and effective rates of assistance (ERA) to Australian total manufacturing and manufacturing products disaggregated at the 2 and 3-digit Australian Import Commodity Classification (AICC) level for the period 1981-82 to 1989-90, as well as the rates

[4] This figure is projected to fall to 7.8 percent by the mid 1990s, and to 5.0 percent by the year 2000 (Industry Commission, 1990).

projected for the mid 1990s.[5] There are a number of features that emerge from Table 1 that deserves attention. First, it is clear that the levels of assistance to most of the quota protected products rose quite sharply in the first half of the 1980s, but have dropped back markedly by the end of the 1980s. This is particularly true for woven fabrics (AICC 652), floor coverings (AICC 659) and passenger motor cars (AICC 781). Second, there are significant disparities in the levels of assistance provided across products, even when ignoring the quota protected products. Third, the pattern of declining rates of protection towards the end of the 1980s is clearly evident for the majority of products.

The CER agreement was signed between Australian and New Zealand in 1983 and further expanded in 1988. It is important in the context of bilateral trade for two main reasons: (i) it eliminates practically all impediments to trade between two of the previously most highly protected industrial countries, and (ii) it is considered to be one of the most comprehensive trading agreements in the world. The renegotiations in 1988 contained provisions to (i) eliminate all export subsidies and incentives on goods traded bilaterally, with exceptions for certain sensitive industries (although some sensitive items which had previously been excluded such as steel and motor vehicles were now incorporated), (ii) waive anti-dumping actions against each other, (iii) harmonise customs procedures, business laws, quarantine arrangements and technical barriers to trade, and (iv) extend the agenda to services and to investment (see Bollard, 1986; Globerman and Dean, 1990).

[5] These measures are computed by the Industry Commission, and incorporate a scarcity premium that accounts for the assistance afforded by quota protection based on tender premiums of quota entitlements.

Table 1: Nominal Rate of Assistance (NRA) and Effective Rate of Assistance (ERA) for Australian Manufacturing, 1981-82 to 1989-90, and projection for the mid 1990s

AICC	Product Description	81-82		85-86		89-90		mid 90s	
		NRA	ERA	NRA	ERA	NRA	ERA	NRA	ERA
51	Organic chemicals	9	24	4	6	0.7	5.8	0.7	5.1
52	Inorganic chemicals	9	17	13	30	8.0	19	5.8	14
53	Dyeing,tanning materials	9	33	17	21	15	17	14	15
54	Medicinal,pharm. prods.	2	-1	2	1	1.7	1.6	1.7	1.8
55	Essential oils,perfumes etc.	16	12	9	10	9.9	14	9.3	14
58	Artificial resins,plastics etc.	19	37	22	52	12	30	12	31
59	Chemical materials, products	10	12	12	13	13	22	11	19
61	Leather,leather manu.	16	37	8	27	8.8	28	7.9	25
62	Rubber manufactures	22	33	22	36	18	30	13	20
63	Cork,wood manufactures	9	12	9	12	8.1	11	6.5	8.7
64	Paper,articles of pulp paper	13	21	16	31	11	22	10	19
65	Textile fabrics, yarn etc.	30	78	22	79	11	97	8.6	71
652	Woven fabrics	35	68	42	158	44	103	35	82
655	Knitted fabrics	25	57	25	51	23	53	23	53
659	Floor coverings	20	22	36	217	33	151	31	144
66	Non-metallic mineral manu.	4	4	4	4	2.5	3.2	2.0	2.4
67	Iron and steel	9	15	9	14	7.4	11	6.7	10
69	Manufactures of metal	18	23	17	26	15	22	12	17
71	Power generating machinery	16	17	11	11	9.5	8.7	7.7	7.0
74	General industrial machinery	17	21	14	18	11	12	8.6	9.1
75	Office mach.,ADP equipment	21	27	25	41	16	26	12	19
76	Telecommunications equip.	19	39	25	45	12	20	10	18
77	Electrical machinery,parts	17	24	21	33	16	24	12	17
78	Road vehicles	53	108	39	120	27	65	23	57
781	Passenger motor cars	59	143	49	250+	30	119	25	109
782	Trucks and buses	21	31	24	34	19	29	13	18
784	Motor vehicle parts	50	91	21	30	24	43	20	38
81	Sanitary,heating etc. equip.	11	13	19	28	14	18	11	13
82	Furniture and parts thereof	16	19	22	29	18	23	12	13
84	Apparel,clothing accessories	90	216	55	133	72	177	44	109
842	Outer garments of textile	92	212	47	100	83	210	49	120
844	Under garments of textile	86	221	67	186	90	250	49	129
845	Outer garments, knitted	72	162	80	250+	73	250	49	168
85	Footwear	88	229	50	123	72	238	38	112
87	Professional,scientific equip.	5	1	6	10	5.7	7.2	5.2	6.6
88	Photographic, optical equip.	9	8	4	5	4.2	2.9	3.6	2.5
89	Miscellaneous manufactures	21	27	19	25	15	22	13	18
	Total Manufactures	16	25	12	20	9.6	16	7.8	11

Source: Industry Commission, *Annual Report*, various issues.

3. Method and Data

There are a number of measures that have been proposed for measuring IIT. The most widely used is the Grubel-Lloyd (GL) index (see Grubel and Lloyd, 1975). The GL index is computed as:

$$GL_i = \{ ((X_i + M_i) - |X_i - M_i|) / (X_i + M_i) \} . 100 \quad (1)$$

where X_i and M_i refer to exports and imports of commodity *i*, respectively.

It is easily seen from equation (1) that the index measures IIT (numerator) as a share of total trade (denominator) in commodity *i*, and will lie in the interval 0 to 100. If $X_i = M_i$, then all of country *j*'s trade in commodity *i* is intra-industry, and GL_i records a value of 100. If either X_i or M_i is zero, then GL_i is also zero indicating that all trade is inter-industry.

We can show that IIT depends only on exports for net-import industries, and only on imports for net-export industries. That is,

$$IIT_i = 2 . (minimum\ (X_i, M_i)). \quad (2)$$

For net-import industries for instance, $M_i > X_i$ implies

$$|X_i - M_i| = M_i - X_i, \quad (3a)$$

so that

$$IIT_i = 2X_i. \quad (3b)$$

Denoting lowercase letters as percentage growth rates (eg. $x_i = (\Delta X_i/X_i).100$), we have:

$$iit_i = x_i. \quad (4)$$

That is, the growth in IIT over a period of time for a net-import industry is determined by the growth in exports (and *mutatis mutandis* for net-export industries). Since the overwhelming majority of Australian manufacturing industries are net importers, equation (4) suggests that any growth in IIT between 1981 and 1991 would be mainly due to export growth. To relate this to the GL index, we use equations (1) and (2) to show that, for net-import industries:

$$GL_i = \{ 2X_i / (X_i + M_i) \} . 100. \quad (5)$$

Dividing through by X_i, we have:

$$GL_i = \{ 2 / (1 + (M_i/X_i)) \} . 100. \quad (6)$$

That is, the GL index is inversely related to the import-export ratio for net-import industries. In this instance, the index will increase over time if [6]:

$$x_i \quad > \quad m_i. \qquad (7)$$

An index of IIT of total trade at a given level of commodity aggregation, *GL*, is obtained as a weighted average of the GL_i's (from equation 1) as follows:

$$GL = \left\{ [\sum_{i=1}^{n} (X_i + M_i) - \sum_{i=1}^{n} |X_i - M_i|] / \sum_{i=1}^{n} (X_i + M_i) \right\} \times 100 \qquad (8)$$

A problem with the GL index is that the measured degree of IIT will be affected by the size of the trade imbalance. That is, the greater the trade imbalance (deficit or surplus), the greater will be the share of net trade and the smaller the share of IIT. To overcome this bias, Aquino (1978) suggests adjusting the X_i and M_i values in (1) by a factor representing the aggregate imbalance, before deriving the aggregate index.[7] The Aquino index has been subject to some criticism, however. Greenaway and Milner (1981) question the validity of this adjustment when there is no *a priori* knowledge of the particular set of transactions which will be balanced in equilibrium, or the nature and effects of the balance of payments adjustment forces initiated by the imbalance. Vona (1991) argues that the need-for-correction argument is theoretically unsound, and shows that the Aquino adjustment can produce unreliable estimates of IIT because it measures similarity of product shares in total trade, not trade overlap. For these reasons, we use the GL index as our measure of IIT.

Perhaps the most controversial issue in the measurement of IIT relates to the definition of "industry" employed in compiling the data base. Indeed, sceptics such as Finger (1975), Lipsey (1976) and Rayment (1976) have argued that almost all measured IIT is purely a statistical artefact brought about by "categorical aggregation". Categorical aggregation has two conceptually distinct components, which we will call "product misclassification" and "aggregation

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[6] Here we assume that the "status" of the industry remains the same at both ends of the period. If the industry switches from a net-import at the beginning of the period to a net-export at the end of the period, then the GL index will increase if:

$$x_i \quad > \quad \{(M_i^2 \,.\, (1 + m_i)) / X_i^2\} - 1$$

or

$$m_i \quad < \quad \{(X_i^2 \,.\, (1 + x_i)) / M_i^2\} - 1$$

The conditions for an increase in the GL index when a product switches from a net-export to a net-import are obtained by turning around the strict-inequality signs in each of the equations above. Proofs are available from the author on request.

[7] The adjustment factors for X_i and M_i are α and β, respectively, where

$$\alpha = \left\{ \sum_{i=1}^{n} (X_i + M_i) / [2 \sum_{i=1}^{n} X_i] \right\}$$

and

$$\beta = \left\{ \sum_{i=1}^{n} (X_i + M_i) / [2 \sum_{i=1}^{n} M_i] \right\}$$

bias". Finger (1975), Lipsey (1976) and Rayment (1976) emphasise the product misclassification aspect, arguing that the problem lies with trade data classification systems which group data within heterogeneous categories. To rectify this problem, they suggest regrouping the basic data such that the resulting categories conform more closely to the theoretical construct of an industry.

The definition of an "industry" with respect to product homogeneity is still under dispute, however.[8] For instance, Finger (1975) defines an industry as one where the products produced are similar with respect to their factor intensities. Falvey (1981), on the other hand, concentrates on the specificity of factors and defines an industry by the range of products that a certain type of capital equipment can produce. While these definitions concentrate on the production side, Lancaster's (1980) definition focuses on consumption: "a product class in which all products, actual and potential, possess the same characteristics, different products within the group being defined as products having these characteristics in different proportions" (p. 153).

It is clear from the discussion above that there is no unique criteria for regrouping the data. Furthermore, as Greenaway and Milner (1983) point out, none of these definitions deal adequately with the problem of how to allocate trade in parts and components in any reclassified scheme. All in all, it is unclear if the arduous task of regrouping would yield any improvement upon established trade classification systems.

The aggregation bias aspect of categorical aggregation deals with the *level* of disaggregation at which the analysis is conducted within a *given* classification system. Aggregation bias occurs if sub-group or component industries at a lower level of disaggregation have offsetting trade imbalances, i.e. if sub-group trade imbalances have opposite signs (see Greenaway and Milner, 1983). To illustrate, consider, for instance, an industry defined at the 3-digit level of the Standard International Trade Classification (SITC) which is composed of two industries (*a* and *b*) at the 4-digit level. That is:

$$X_i = X_a + X_b \tag{9}$$

$$M_i = M_a + M_b \tag{10}$$

If $M_i > X_i$, and $M_a > X_a$, $M_b > X_b$, then

$$GL_i = (2X_i / (X_i + M_i)).100 \tag{11}$$

$$= \{ (2(X_a + X_b)) / (X_i + M_i) \}.100 \tag{12}$$

[8] For a comprehensive discussion on this issue, see Lloyd (1989:19-22)

$$= \{ ((X_a + M_a)/(X_i + M_i)).(2X_a/(X_a + M_a)) + ((X_b + M_b)/(X_i + M_i)) . (2X_b/(X_b + M_b)) \}.100 \quad (13)$$

Equations (13) through (15) above show that, if component imbalances are not oppositely signed, aggregating from the 4-digit level to the 3-digit level does not affect the value of the GL index. This is because, as shown in equation (15), the GL index computed with data at the 3-digit level is a trade weighted average of the indexes computed at the 4-digit level.

If $M_i > X_i$, but $M_a > X_a$, $M_b < X_b$, then the GL index computed with data aggregated at the 3-digit level will *overstate* the share of IIT in total trade. We can quantify the extent of the aggregation bias at the 3-digit level. In this instance, the GL index obtained by working with data defined at the 4-digit level is:

$$GL_i = \{ (2(X_a + M_b)) / (X_i + M_i) \} . 100 \quad (14)$$

$$= \{ [(2(X_a - M_b)) / (X_i + M_i)] - [(2(X_b - M_b))/(X_i + M_i)] \}.100 \quad (15)$$

GL index computed at the 3-digit level — *Aggregation bias from offsetting imbalances at the 4-digit level*

It is clear that the level of disaggregation of the data should be chosen so as to minimise aggregation bias. In our analysis of the Australian data, we find that the 3-digit level of the SITC is sufficiently disaggregated to overcome the problem of aggregation bias in the overwhelming majority of industries. Only 8 out of the 132 industries at the 3-digit level contain 4-digit industries with opposite-signed imbalances. For these industries, the GL index is computed at the 4-digit level, and weighted using trade shares to obtain the index at the 3-digit level.[9] For the other industries, the analysis is conducted at the 3-digit level. Our sample consists of 132 industries for total (multilateral) trade and 122 industries for trade with New Zealand or trans-Tasman trade. The analysis is carried out for manufactured goods defined as SITC 5-8 less SITC divisions 67 (iron and steel) and 68 (non-ferrous metals). The data relate to the calender years 1981 and 1991, and come from the United Nations' *Commodity Trade Statistics* (Series D).

[9] In all 6 cases, opposite-signed imbalances did not exist at the 5-digit level of disaggregation (data from ABS (Catalogue numbers 5426.0 and 5424.0)). Of course this does not preclude the possibility that opposite-signed imbalances may re-emerge at a lower level of disaggregation for these or any of the other industries. In fact, if one were to persist, it is almost certain that they would re-emerge at some point. It is also true that if one were to keep disaggregating *ad infinitum*, any measured IIT would also eventually disappear. The problem, however, is that extending the disaggregation beyond the 5-digit level may exceed the bounds placed on any reasonable notion of an industry. This point is particularly important given our interest in adjustment costs associated with trade expansion. The disaggregation should be broad enough to accomodate some degree of factor mobility *between* activities *within* each industry, while at the same time minimising aggregation bias.

4. Results

The aggregate (trade-weighted) GL index for Australia's total trade increased from 20.89 percent in 1981 to 32.53 percent in 1991, while the GL index for trans-Tasman trade rose from 34.15 percent in 1981 to 49.22 percent in 1991.[10] The mean value of the GL index for total trade in 1981 is 26.31 percent with a standard deviation of 23.81, and 30.86 percent with a standard deviation of 23.12 in 1991. For trans-Tasman trade, the mean is 42.08 percent with a standard deviation of 30.56 in 1981, and 50.02 percent with a standard deviation of 30.05 in 1991.

Figures 1 and 2 present the results for total and trans-Tasman trade in the form of scatter diagrams, with the horizontal axes representing 1981 values of the GL index and the vertical axes the 1991 values. If a point lies *on* the 45-degree line in Figures 1 or 2, this indicates no-change in the value of the GL index between 1981 and 1991. Points that lie above (below) the 45-degree line in each figure represent increases (decreases) in the GL index between 1981 and 1991. The vertical distance between the 45-degree line and any point that lies above (below) it represents the absolute increase (decrease) in the GL index over the period. Table 2 summarises this information in a frequency distribution.

There is a clear pattern of increasing IIT between 1981 and 1991 for both total and trans-Tasman trade. With respect to total trade, much of the increase occurs from the lower end of the distribution. Table 2 shows that while 74 industries have GL indexes that lie in the zero to 20 percent range in 1981, this drops to 46 industries in 1991. From Figure 1, we see that quite a number of these industries moved up into the 20 to 40 percent range (bottom left-hand corner). There is very little change in the number of industries in the upper end of the distribution (80 to 100 range), with the small number of industries moving up into this range almost equally matched by the number moving down. From Table 1, we find some increase in 1991 in the mid-ranges, with the number of industries recording GL indexes in the 40 to 70 percent range increasing from 19 in 1981 to 30 in 1991.

Turning to trans-Tasman trade, the change in the distribution is reflected by a sharp rise in the number of industries recording GL indexes of between 90 and 100 percent. From Table 2, we find that this percentile records the highest frequency with 17 industries. Figure 2 presents a more dispersed pattern than Figure 1, indicating larger changes in GL indexes between 1981 and 1991. There are quite a few industries where the GL index increases from the zero to 40 percent range in 1981 to the 70 to 100 percent range in 1991 (i.e. points in the upper left-hand corner of Figure 2). While almost a quarter of all industries record a GL index in the zero to 10 percent range in 1981, this falls to just above 10 percent of industries by 1991. These figures suggest that the growth in trans-Tasman IIT has contributed strongly to the overall growth in IIT between 1981 and 1991. This is in line with theory that suggests that IIT will grow more rapidly when reductions in protective barriers occur simultaneously in both countries (as with the CER) (Lloyd, 1978:33-4).[11]

[10] The detailed results for the 132 industries for total trade and 122 industries for trans-Tasman trade are available from the author on request.

[11] Despite the sharp rise in shares of IIT over the period for both total and trans-Tasman trade, it should be noted that Australia's share of IIT index in 1991 continues to remain far below the OECD average of above 70 percent. If the trend observed during the 1980s continues in the 1990s, fuelled

Figure 1
Scatter Diagram of GL Indexes (1981, 1991) for Total Trade

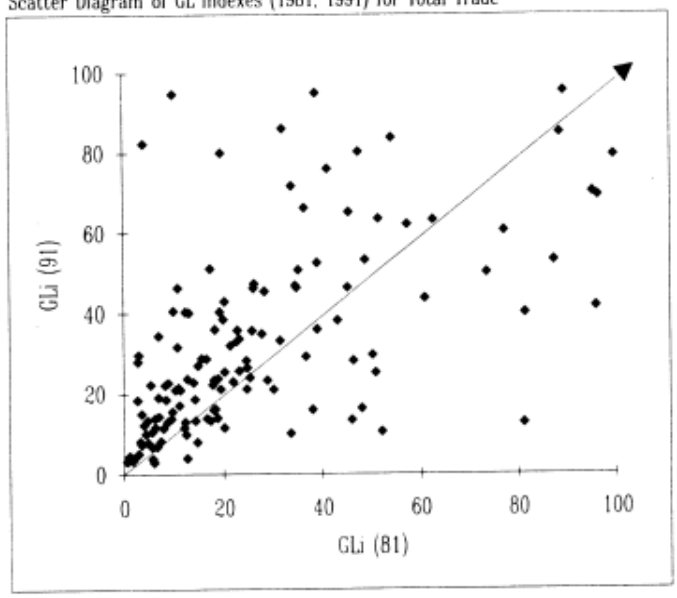

Figure 2
Scatter Diagram of GL Indexes (1981, 1991) for Trans-Tasman Trade

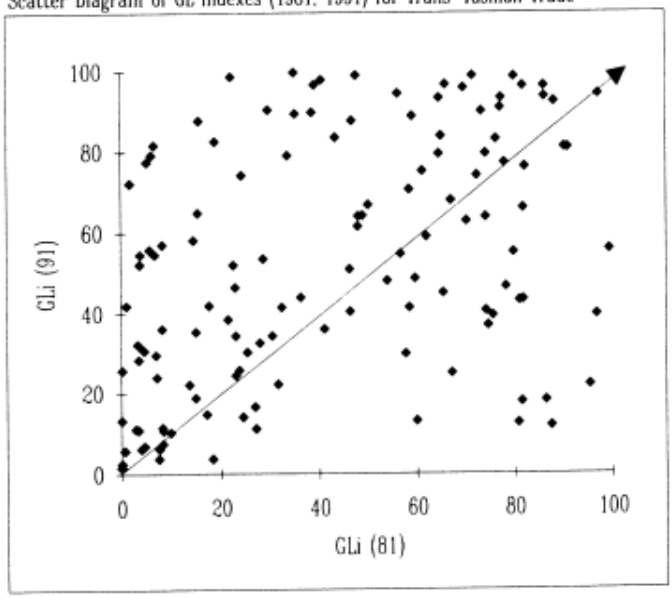

Table 2
Frequency Distribution of GL Indexes for Total and Trans-Tasman Trade, 1981 and 1991

Percentile	Total (1981)	Total (1991)	Trans-Tasman (1981)	Trans-Tasman (1991)
$0 < GL_i < 10$	28.03(1) (37)(2)	15.91 (21)	24.59 (30)	11.48 (14)
$10 < GL_i < 20$	28.03 (37)	18.94 (25)	9.02 (11)	7.38 (9)
$20 < GL_i < 30$	14.40 (19)	16.67 (22)	11.48 (14)	9.84 (12)
$30 < GL_i < 40$	10.61 (14)	18.18 (24)	8.20 (10)	13.11 (16)
$40 < GL_i < 50$	6.81 (9)	9.85 (13)	8.20 (10)	9.84 (12)
$50 < GL_i < 60$	4.54 (6)	6.81 (9)	7.38 (9)	11.47 (14)
$60 < GL_i < 70$	3.03 (4)	6.06 (8)	7.38 (9)	8.20 (10)
$70 < GL_i < 80$	2.27 (3)	3.03 (4)	10.66 (13)	6.56 (8)
$80 < GL_i < 90$	3.79 (5)	3.03 (4)	9.02 (11)	8.20 (10)
$90 < GL_i < 100$	3.03 (4)	2.27 (3)	4.10 (5)	13.93 (17)
Total	100.00 (132)	100.00 (132)	100.00 (122)	100.00 (122)

Notes:
(1) Percentage shares
(2) Number of industries

Table 3 reports the GL indexes for total and trans-Tasman trade for the industries that have undergone the most significant reductions in protection levels over the sample period. These are mainly industries in the passenger motor vehicle (PMV), clothing, textile and footwear (TCF) sectors. Both total and trans-Tasman trade record quite significant increases in shares of IIT for almost all of these industries between 1981 and 1991.[12] The increases in trans-Tasman trade for industries within the clothing sector over this period are particularly large, with quite a number of industries moving from very low shares of IIT (below 10 percent) in 1981 to relatively high shares in 1991 (above 80 percent).

The fact that all of these industries are unambiguously net-import industries imply that the substantial increases in their GL indexes is a result of strong export growth over this period. A number of industries in the clothing sector that increased their shares of IIT from very low levels would have started exporting a significant share of their output (particularly across the Tasman) for the first time. This suggests that the more competitive firms within these industries have responded positively to reductions in their high levels of protection, by specialising in product lines that have enabled them to penetrate export markets. The clothing sector then provides an example of how the costs of adjusting to lower protection are moderated when specialisation occurs within industries and firms begin to export.

[12] A common concern in interpreting GL indexes of individual industries is that large indexes are not inconsistent with small trade volumes. This should not affect these industries because they are subject to strong import competition.

Table 3
GL indexes for Industries with Largest Reduction in Protection Levels, 1981 and 1991

	Product Description	Total (81)	Total (91)	Trans-Tasman (81)	Trans-Tasman (91)
652	Woven cotton fabrics	4.04	10.16	10.28	8.65
655	Knitted fabrics	5.03	12.32	53.52	56.76
658	Textile articles	6.87	32.42	73.35	87.89
659	Floor coverings	9.89	38.52	14.44	56.14
781	Passenger motor vehicles	23.13	32.63	0.06	0.63
842	Men's clothing, non-knitted	11.20	18.95	5.71	53.80
843	Women's clothing, non-knitted	2.98	27.14	6.57	80.08
844	Undergarments, non-knitted	5.32	20.25	6.63	52.62
845	Knitted clothing, non-elastic	2.81	26.04	22.16	97.66
846	Knitted undergarments	9.61	13.56	3.75	52.62
847	Textile clothing accessories	6.17	9.64	64.60	78.38
848	Non-textile clothing, headgear	22.32	28.49	6.82	27.55
851	Footwear	6.09	11.89	61.17	73.11

The industries that have undergone the largest reductions in protection have also enjoyed quite substantial increases in the "subsidy" offered by governments through various specific programs (eg. PMV Export Facilitation Scheme, TCF Industry Development Strategy; see Hughes, 1989). The amount of subsidy offered to other industries to promote exports through general schemes (eg. Export Market Development Grants) has also increased of late (Industry Commission, *Annual Report*, various issues). The observed increase in shares of IIT for industries in the PMV and TCF sectors, as well as most other industries, could be the result of a combination of lower overall rates of protection and increased assistance in the form of subsidies.

It appears the ethos is now that governments do good by promoting exports through subsidies, rather than obstructing imports through protection. While it is not the aim of this paper to assess the merits or otherwise of subsidies, our results do suggest the following implication for commercial policy. If intervention is contemplated, then the same level of intervention directed at promoting manufactured exports (and thus IIT) would lead to a better outcome than were it directed at restricting imports. This is true not only because increased IIT implies lower adjustment costs, but also because of positive externalities associated with exporting (see, for instance, Hughes, 1989).

5. Concluding Remarks

This paper has examined the changes in Australia's IIT in the 1980s in the context of on-going trade liberalisation and completion of the CER pact with New Zealand. We estimated GL indexes of IIT for Australia's total (multilateral) and trans-Tasman trade for 1981 and 1991 using data at the 3 and 4-digit level of the SITC. The results point to a growing trend in rates of IIT for both total and trans-Tasman trade. We also found that the industries that had

undergone the largest reductions in protection levels had also increased their shares of IIT quite considerably. In the context of increased intra-industry specialisation, the short to medium run frictional costs of resource re-allocation associated with trade liberalisation are likely to be lower than expected. With respect to trans-Tasman trade, the simultaneous removal of trade restrictions as a result of the CER resulted in very sharp increases in shares of IIT. While Australia still has a long way to go before it reaches the IIT levels recorded in other OECD countries, there are clear signs of growth in IIT coming from the (yet to be completed) phase of trade liberalisation and the CER. The increase in horizontal specialisation that underlies the growth in IIT suggests that Australia is well-placed to take advantage of rising real incomes in the Asia-Pacific region, and the demand for higher quality varieties of manufactured products that accompany it. The implications for Australia's future trade prospects will be particularly significant if recent attempts to link the CER with the Asian Free Trade Area (AFTA), or the proposed formalisation of the more ambitious Asia-Pacific Economic Cooperation (APEC) arrangement, come to fruition.

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