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Horizontal and Vertical Intra-Industry Trade in Trans-Tasman Bilateral Trade

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Abstract

This paper disentangles trans-Tasman intra-industry trade (IIT) into horizontal IIT (HIIT) and vertical IIT (VIIT), and uses country-specific features to investigate their determinants in an econometric framework. Results suggest that trans-Tasman IIT is dominated by VIIT and concentrates mainly (about 50%) on two highly protected industries, namely machinery and equipment, and textile, clothing and footwear. This suggests that the closer economic relations (CER) may be contributing to trade diversion rather than trade creation. It appears that despite similarity in resource endowments between Australia and New Zealand the determinants of HIIT and VIIT are sensitive to the country specific characteristics. Hence, assuming similarity across countries in cross-country studies is unjustifiable.

- **JEL Classification:** F13, F14
- **Key words:** Intra-industry trade, horizontal IIT, vertical IIT and closer economic integration

I. Introduction

Over the years trans-Tasman trade ie, bilateral trade between Australia-New Zealand, has grown faster than their multilateral trade with the rest of the world. This has occurred due mainly to the rapid growth in manufactured exports, which account for over 90% share in trans-Tasman trade by the late 1990s. Given that Australia and New Zealand have similar resource endowments and over the years

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tariff reductions under the closer economic relations (CER) have concentrated on highly protected industries, growth in manufactured exports in trans-Tasman bilateral trade appears to have been due to specialisation within industries rather than between industries. When the former is the case one would expect a higher level of intra-industry trade (IIT) as recorded in the previous studies of IIT in trans-Tasman trade (Menon, 1994 and Bureau of Industry Economics,1995).[1] However, these studies have not segregated such trade into horizontally and vertically differentiated products when in fact their determinants do differ.

Recently (Menon et al. 1999) have shown how the failure to segregate IIT into horizontally and vertically differentiated products, and assuming uniformity between countries, can undermine the validity of empirical results. This is particularly the case in cross-country studies where market, industry and country specific characteristics of one country are applied to other countries as a proxy. In this study we address these issues in the context of trans-Tasman bilateral trade which is dominated by IIT (IIT accounts for about 90% share). The higher share of IIT in bilateral trade appears to be due to the deeper economic integration brought about by the CER.[2]

Failure to segregate IIT into horizontally and vertically differentiated products in the earlier studies is not accidental because the existing methodology of estimating IIT index does not disentangle such trade into horizontally and vertically differentiated products. Greenaway *et al*. (1995) have developed a methodology, which allows us to segregate such trade into horizontally and vertically differentiated products. Horizontal IIT (HIIT) refers to trade in similar products but different characteristics or attributes, while vertical IIT (VIIT) involves trade in similar products of different qualities. Krugman (1988) and Lancaster (1979) have demonstrated that HIIT is influenced by scale economies and preference diversity, while Falvey (1981) has shown that factor endowments determine VIIT, with the relatively capital-abundant country exporting higher quality goods and the relatively labour-abundant country exporting lower quality goods. This means that the share of VIIT will be greater, the greater the

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[1]Bilateral trade between Australia and New Zealand is often referred as trans-Tasman trade because both countries are connected through Tasman sea.

[2]The CER Trade Agreement aims to develop closer economic links between Australia and New Zealand through a mutually beneficial expansion of free trade under conditions of fair competition and through the gradual and progressive removal of trade barriers between the two countries. All tariff and non-tariff trade barriers on trade originating between these two countries are prohibited under the CER Agreement.

differences in capital/labour endowments or per capita income.

The purpose of this paper is two fold. First, to disentangle trans-Tasman IIT into HIIT and VIIT which has not been done before. One would expect the predominance of HIIT in trans-Tasman trade due to the similarity in resource endowments. Second, to investigate their determinants using the country-specific independent variables from Australia and New Zealand rather assuming uniformity in market, industry and country specific characteristics in both countries. Segregating IIT into HIIT and VIIT and modelling them separately allows us to gain a better insight into the determinants of HIIT and VIIT in bilateral trade between Australia and New Zealand.

The remainder of the paper is organised as follows. Section II describes the methodology used in segregating IIT into HIIT and VIIT, and discusses trends. A model of HIIT and VIIT is specified in section III, which is subsequently tested in section IV. The paper concludes in section V with concluding remarks.

II. Methodological Issues, and the Nature and Extent of Trans-Tasman IIT

The Grubel and Lloyd (GL) index is the most popular of indices of IIT, which is calculated as follows:

$$B_j = \left[1 - \frac{|X_j - M_j|}{(X_j + M_j)}\right](100) \qquad (1)$$

Where,

X_j = exports of industry j, M_j = imports of industry j and j = 1…n.

The computed value of B_j lies between 0 to 100. The closer the value of the index to 100 the greater is the degree of intra-industry trade. It should be, however, noted that the GL index is influenced by the size of the trade imbalance. The greater the trade imbalances (deficit or surplus), the smaller the value of the measured index. To overcome this bias Aquino (1978) has suggested to adjust X_j and M_j values in Equation (1) by a factor representing the aggregate imbalance, before deriving the aggregate index. However, there are no theoretical reasons to adjust trade data. Kol and Mennes (1985) have convincingly demonstrated that as far as measuring trade overlap is concerned the GL index is to be preferred. In a comparison of the GL index with the Aquino index, they have come to the conclusion that the latter index measures the ‘similarity’ of product shares in total trade, not trade overlap. For these reasons we prefer the GL index. However, like other indices of IIT, the GL index does not segregate total IIT into HIIT and VIIT. Following Greenaway *et al.* (1995), we segregate trans-Tasman IIT as either HIIT or VIIT using relative unit values (ie, ratio of the unit value of exports (measured f.o.b.) to the unit value of imports (measured c.i.f.)).[3] The underlying assumption is that relative prices tend to reflect quality differences. When relative unit values are within ±15%, IIT is defined as HIIT; otherwise it is considered to be VIIT.[4] Once IIT has been segregated into the two types, trade flows are aggregated over the 5-digit SITC categories comprising a particular industry at the 4-digit industry level (Australia New Zealand Standard Industrial Classification (ANZSIC)) to compute VIIT and HIIT at the industry level.[5]

Table 1 decomposes trans-Tasman IIT into HIIT and VIIT by major industry group for 1998/99- the latest year for which data is available.

As shown in table 1, IIT is low in printing and publishing, wood and paper

Table 1. HIIT and VIIT in trans-Tasman trade by Major ANSIC Industry Group 1998/99*

	1998/99		
ANSIC Industry	IIT	HIIT	VIIT
Food, beverages and tobacco	1.16	0.06	1.10
Textile, clothing and footwear	4.95	0.02	4.93
Wood and paper products	0.44	0.04	0.40
Printing and publishing	0.16	0.01	0.15
Petroleum, coal and chemical	3.38	0.10	3.28
Non-metallic mineral Products	0.90	0.13	0.77
Metal products	2.64	0.09	2.55
Machinery and equipment	8.98	1.46	7.52
Other manufacturing	5.33	0.21	5.12
Manufacturing total	27.95(100.00)	2.13(7.6)	25.82(92.4)

Note the percentage shares of each type of IIT are given in parentheses.
*Share of IIT in total trade of each industry
Source: Author’s estimate based on data from the Statistics New Zealand.

[3]Unit value can be measured in a number of ways, namely per kilogram, per item or per tonne. In this study we use unit value per item.

[4]Greenaway et. al (1994 and 1995) also use ±25% critical value to see if the results are sensitive to this change. However, in both cases they obtain comparable results.

[5]A concordance between SITC 5-digit product and ANZSIC 4-digit industry was employed for estimating horizontal and vertical IIT at the industry level.

products, and non-metallic mineral products, while it is high in machinery and equipment, textile, clothing and footwear, and petroleum, coal and chemical. Two industry sub-groups, namely machinery and equipment, and textile, clothing and footwear, together account for nearly 50% share in trans-Tasman IIT. However, neither Australia nor New Zealand has a comparative advantage in these industries. This indicates that a significant 'trade diversion' may be occurring as a result of the CER. As their trade barriers to third countries fall under the multi-lateral trade liberalisation, it appears that the current level of trans-Tasman IIT would decline significantly.

Despite similarity in resource endowments about 92% of trans-Tasman IIT is dominated by VIIT. Machinery and equipment, and textile, clothing and footwear sub-sectors together contribute about 50% to VIIT. The dominance of VIIT in trans-Tasman bilateral trade appears to be linked with industry protection. In both Australia and New Zealand machinery and equipment, and textile, clothing and footwear sub-sectors receive much higher protection than the manufacturing average. Among the high-income OECD countries, Australia and New Zealand have much higher level of protection. Note that when vertically differentiated products dominate IIT then adjustment costs may be high for two reasons. First, the factor content of exports and imports differs, as in the case of inter-industry trade. Second, the lower quality varieties produced in relatively less advanced countries could be displaced by the higher quality varieties produced in relatively advanced countries, leading to a rise in unemployment in the former group of countries.

III. Model specification

In this section, based on theoretical and empirical literature, we specify a model to investigate the determinants of IIT in horizontally and vertically differentiated products. Since industry, market and country specific characteristics have an impact on IIT, our model includes all these variables.

As argued in the literature it is not clear whether market structure with a large number of firms or a small number of firms contributes to IIT. For example, Helpman (1981) argues that markets with a large number of firms are more likely to generate HIIT than markets with a small number of firms. However, Eaton and Kiezkowski (1984) have shown the occurrence of HIIT even in market structures with a small numbers of firms. Thus, the effects of market structure (MS) ie, large number vs small number of firms, on HIIT is not clear-cut. Likewise, the link between market structure and VIIT is ambiguous (Greenaway et. al, 1995). Falvey (1981) argues that VIIT may arise in market structures where large numbers of firms produce varieties of different qualities but no economies of scale in production. The pattern of VIIT follows the traditional factor-endowment model, with the relatively capital-abundant country exporting higher quality goods, while the relatively labour-abundant country exporting lower quality goods. On the other hand, Shaked and Sutton (1984) have shown that VIIT may also arise in market structures with small numbers of firms and scale economies. Hence, the link between market structure (MS) and VIIT is not clear-cut.

Krugman (1980) and Lancaster (1980) have shown that in the presence of demand similarity between countries and preference diversity between consumers, product differentiation (PD) generates IIT between countries. Hence, we expect both HIIT and VIIT are positively related to product differentiation. As argued in the literature economies of scale (ES) prevent nations from producing the full range of products within the same industry, leading to the scope for the exchange of similar products between countries. This led us to believe that industries enjoying the benefits of economies of scale are the industries with the higher level of HIIT and VIIT. Krugman and Ostfeld (1994, pp. 131) have argued that IIT tends to be high in sophisticated manufactured goods requiring a high level of R&D. Hence, we expect the higher the level of R&D intensity (RD) the greater the level of HIIT and VIIT.

Foreign investment (FI) contributes to the higher level of IIT by producing different varieties of the same products in different market the production of which is subject to economies of scale. On this ground one would expect a positive link between foreign investment and intra-industry trade. However, it is also possible to argue that if the motive behind foreign investment is to fragment the production process geographically by stage of production (vertical investment) then there would be inter-industry rather than intra-industry trade (Markusen, 1995). Thus, the nature of the links between foreign investment and intra-industry trade crucially depends on the motive behind such investment. As argued by Grubel and Lloyd (1975) the deep economic integration between trading partners results in the higher level of IIT. Since Australia and New Zealand have a long history of the close economic relations (CER) we expect a positive links between CER and IIT. Trade barriers restrict international trade and in their presence tradeable goods become non-tradeable. Hence, we expect a lower level of HIIT and VIIT in the presence of higher trade barriers (PRO).

The above considerations lead to the following specification of the model. The expected signs are given in parentheses. Since our aim is to see whether the determinants of VIIT and HIIT differ, we estimate the same specifications for total, vertical and horizontal IIT.

$$\underset{}{IIT_i} = \delta_o + \underset{(?)}{\delta_1 MS_i} + \underset{(+)}{\delta_2 PD_i} + \underset{(+)}{\delta_3 ES_i} + \underset{(+)}{\delta_4 RD_i} + \underset{(?)}{\partial_5 FI_i} + \underset{(+)}{\delta_6 CER_i} + \underset{(-)}{\delta_7 PRO_i} + U_i \quad (2)$$

Where,

IIT = IIT stands for either Total, Horizontal or Vertical IIT.

MS = Market structure

PD = Product differentiation

ES = Economies of scale

RD = Research and development intensity

FI = Foreign investment

CER= Close economic relation

PRO = Industry protection

i= 1,..…N (sub-sectors or industries)

δ*j* =(j = 0,…..7) are parameters to be estimated.

U is a standard error term.

Appendix 1 describes the measurement of variables and their sources.

IV. Empirical results

The empirical findings about the determinants of total IIT, VIIT and HIIT in trans-Tasman bilateral trade are reported in Tables 2 and 3. As discussed earlier, our models are estimated separately using the country-specific independent variables from Australia and New Zealand rather than assuming uniform structure between the countries. Tables 2 and 3 report results obtained using the Australian and New Zealand specific characteristics respectively.

The models of total IIT and VIIT are estimated using the OLS procedures while the Tobit method is applied for estimating the model of HIIT.[6] The use of the Tobit method is motivated by the fact that there are many industries (over 50%) where

[6]At the experimental stage we also estimated the models of total and vertical IIT using the logit method. However, results obtained through the OLS procedures were better in terms of explanatory power than the logit method. Hence, we decided to report the OLS results.

Table 2. Determinants of total IIT, HIIT and VIIT using the Australian Characteristics

Independent variable	Total IIT (OLS Results)	VIIT (OLS Results)	HIIT (Tobit Results)
Intercept	0.2409(3.9260)***	0.2314(3.9680)***	-0.4381(-1.5610)
MS	-0.0001(-0.0335)	-0.0002(-0.6696)	0.0026(1.1484)
PD	0.0048(2.2070)**	0.0047(2.2820)**	0.0095(1.7261)*
PRO	-0.0012(-1.3170)	-0.0087(-0.9355)	-0.01861(-1.723)*
RD	0.0009(0.9523)	0.0004(-0.5760)	0.0011(2.1909)**
FI	-0.0024(-2.0600)**	-0.0024(-2.286)**	-0.0032(-0.5220)
No. of observations	105	105	105
F (5,99)	12.2700***	12.3790***	-
R^2	0.1120	0.1241	0.0200
RESET F(3, 96)	1.5894	1.5258	-
Heteroskedasticity test F (5, 99)	Corrected	Corrected	-
Standard error of estimates	-	-	0.1226
Log likelihood function	-	-	7.6918

The R^2 in the Tobit method is the squared correlation between observed and expected value. The heteroskedasticity test refers to the B-P-G test. Significant levels are:***1%, **5% and *10%.

Table 3. Determinants of total IIT, HIIT and VIIT using the New Zealand Characteristics

Independent variable	Total IIT (OLS Results)	VIIT (OLS Results)	HIIT (Tobit Results)
Intercept	0.1285(2.7210)***	0.1174(2.6120)***	-0.8070(-3.3794)***
MS	-0.0007(-0.9143)	-0.0008(-1.0280)	0.0002(0.5769)
PD	0.0026(2.1660)**	0.0025(2.1970)**	0.0120(2.3830)**
PRO	0.0068(1.4130)	0.0076(1.9710)**	-0.0153(-0.9090)
RD	0.0128(0.1863)	-0.2463(-0.4017)	0.6295(2.3911)**
FI	-0.1272(-1.0450)	-0.1145(-1.1150)	-0.0693(-0.1301)
No. of observations	105	105	105
F (5, 99)	10.9850***	10.7330***	-
R^2	0.0709	0.0717	0.0279
RESET F(3, 96)	1.7815	1.6131	-
Heteroskedasticity test F (5, 99)	Corrected	Corrected	-
Standard error of estimates	-	-	0.1210
Log likelihood function	-	-	9.2180

The R^2 in the Tobit method is the squared correlation between observed and expected value. The heteroskedasticity test refers to the B-P-G test. Significant levels are: ***1%, **5% and *10%.

the value of dependent variable (ie, HIIT) is zero. As discussed in the literature in this circumstance the Tobit method is appropriate (see Gujarati, 1995, pp. 752-573). Our models are significant in terms of the F-test, although explanatory powers are not very high which is expected in a study like this, which relies on cross-sectional data. All models are estimated after performing diagnostic tests (namely heteroskedasticity and RESET tests), except for the model of HIIT, which uses the Tobit method. In the final estimation of the model we deleted the economies of scale and closer economic relations variables as in their presence the model failed to pass the RESET test despite a change in functional forms and the use of logit method.[7]

Results are somehow similar regardless of the country-specific characteristics. For instance, industries with the higher level of product differentiation are the industries with the higher level of IIT (all types) and the higher level of R&D results in the higher level of HIIT regardless of the country-specific features. The only difference in results is about the effects of protection and foreign investment. For example, when the New Zealand specific independent variables are used protection appears to have a positive impact on VIIT while foreign investment has no significant impact on any type of IIT (Table 3). However, when the Australia specific independent variables are used it appears that protection reduces HIIT and foreign investment discourages total and vertical IIT (Table 2).

In an attempt to improve the statistical significance of the models, variables with t-ratios less than unity were deleted one by one but this did not improve the results. Hence, we decided to report the results of the full models. Results vary between the models, suggesting that the determinants of HIIT and VIIT differ and the failure to segregate IIT into these two categories can produce misleading information. First examine the results obtained using the Australia specific independent variables (Table 2).

Market structure appears to have statistically no significant impact on HIIT and VIIT when the models are tested using the Australian characteristics. This appears to be due to the predominance of intra-industry trade in machinery and equipment, and textile, clothing and footwear industries, which are highly regulated. In a study of IIT between UK and Australia, Menon *et al*. (1999) found that the Australian market structure has statistically significant and a negative impact on HIIT but no significant impact on VIIT.

Product differentiation (PD) has statistically significant and a positive impact on all types of IIT (ie, total, horizontal and vertical IIT). This suggests that industries

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[7]When the value of the dependent variable lies within the range of 0 and 100, like in our case, the estimated regression equation may predict values, which lie outside that range. Therefore, to overcome this problem the logit transformation method is often applied. For further discussion on the use of logit transformation method see Gujarati (1995: 556-557). See also Caves (1981), Tharakan (1986) and Sharma (2000) for the use of the logit method in IIT analysis.

with the higher level of product differentiation are the industries with the higher level of IIT in trans-Tasman trade; a finding similar to Ratnayake and Jaysuriya (1991), Ratnayake and Athukorala (1992) and Sharma (2000) for Australias multilateral IIT. However, Menon *et al.* (1999) found that product differentiation has a positive effect only on HIIT but not on VIIT in bilateral trade between Australia and UK.

Protection (PRO) appears to have statistically no significant impact on total IIT and VIIT in trans-Tasman bilateral trade. However, it has statistically significant and a negative impact on HIIT, suggesting that protection does reduce IIT in horizontally differentiated products. In the previous studies of IIT in Australias multilateral trade Ratnayake and Jayasuriya (1991), Ratnayake and Athukorala (1992) and Sharma (2000) found that protection contributes to the lower level of IIT.

The R&D intensity (RD) appears to have statistically no significant impact on total IIT and VIIT. This finding about the statistically insignificant link between R&D intensity and total and vertical IIT is not surprising given that 50% of IIT takes place in highly protected industries. Thus, there is no motivation for undertaking R&D activities. The earlier studies have also found similar results (see, for example, Ratnayake and Jayasuriya (1991), Ratnayake and Athukorala (1992) and Sharma (2000)). The R&D intensity, however, appears to have statistically significant and a positive impact on HIIT, suggesting that industries with the higher level of R&D intensity are the industries with the higher level of HIIT in trans-Tasman bilateral trade.

There is some statistical evidence in support of the view that foreign investment (FI) lowers total IIT as well as VIIT. In the previous studies of IIT in Australias multilateral trade, Ratnayake and Jayasuriya (1991), Ratnayake and Athukorala (1992) and Sharma (2000) also found similar result. This could be due to prevalence of inter-firm trade between the subsidiaries of foreign owned firms. Foreign investment, however, appears to have statistically no significant impact on HIIT. Results of the determinants of total IIT, HIIT and VIIT using the New Zealand specific independent variables are reported in Table 3.

Market structure (MS) appears to have statistically no significant impact on HIIT and VIIT even when the models are tested using the New Zealand specific variables. Product differentiation (PD) has a positive and statistically significant impact on HIIT and VIIT, suggesting that the higher the number of differentiated products within an industry the higher the level of IIT in horizontally and vertically differentiated products. This is similar to the evidence obtained using the Australian characteristics.

There is no statistical evidence in support of the hypothesis that protection (PRO) reduces total IIT as well as HIIT. However, it appears to have a positive impact on VIIT. This suggests that industries with the higher level of protection are the industries with the higher level of VIIT; a finding consistent with the discussion in section II where we observed a higher level of vertical IIT in highly protected industries (see, Table 1). Note that when our models are estimated using the Australia specific independent variables we found the opposite results, although the relationship is not statistically significant.

The research and development intensity (R&D) appears to have statistically no significant impact on total IIT and VIIT, but statistically significant and a positive impact on HIIT. This is similar to the findings obtained using the Australian characteristics. We did not find any link between foreign investment (FI) and HIIT and VIIT when the models are tested using the New Zealand characteristics.

V. Conclusion

In this paper we have achieved two things. First, disentangled trans- trans-Tasman IIT into HIIT and VIIT, which has not been done before. Second, investigated their determinants separately using the country-specific independent variables from Australia and New Zealand. We believe that differences in country-specific features have an impact on trade pattern, and hence assuming uniformity between countries can undermine the validity of empirical findings as shown in section IV.

Results suggest that trans-Tasman IIT is dominated by VIIT and concentrates mainly on two highly protected industries- namely machinery and equipment, and textile, clothing and footwear. Note that none of the country has a comparative advantage in these products. This suggests that the closer economic relations may be contributing to trade diversion rather than trade creation. As trans-Tasman trade barriers to third countries fall, the current level of bilateral IIT cant be sustained. Econometric evidence confirms that the determinants of HIIT and VIIT differ, and hence there is a strong case for modelling them separately. Also, assuming similarity between Australia and New Zealand, on the ground that both nations have similar resource endowments, is not justified. For example, the coefficients of foreign investment are statistically insignificant when the New Zealand-specific independent variables are applied but significant (particularly total IIT and VIIT) when the Australia-specific independent variables are used. Likewise, protection has a positive impact on VIIT when the New Zealand specific variables are used but a negative impact when the Australia specific variables are applied. The impacts of other variables are the same regardless of the country specific features. For instance, industries with the higher level of product differentiation are the industries with the higher level of total IIT, HIIT and VIIT, and R&D intensity results in the higher level of HIIT. These results, however, must be interpreted with caution due to the fact that the criteria used in disentangling HIIT and VIIT is crude. Until a more sophisticated methodology is developed these results should not be taken as conclusive.

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Appendix 1: Definition of Variables and Their Sources

IIT= % share of IIT in gross trade of industry j. Source: trans-Tasman exports and imports in both values and volumes at the five-digit SITC level are obtained on special request from the Statistics New Zealand (SNZ). Australias multilateral trade data in both values and volumes at the five-digit SITC level are obtained from the Australian Bureau of Statistics (ABS) on special request. A concordance between SITC five-digit and ANZSIC four-digit is applied to estimate IIT at the four-digit ANZSIC level.

HIIT= % share of measured horizontal IIT in gross trade of industry j. Source: as per the IIT variable.

VIIT= % share of measured vertical IIT in gross trade of industry j. Source: as per IIT variable.

MS= Market structure (MS) is defined as the number of firms in each four-digit ANZSIC industry. Data sources: On special request, Australian data was obtained from the ABS and New Zealand data was supplied by the SNZ. Note that it is a common practice to measure market structure using the number of firms within an industry group (see, for example, Greenaway *et al.* (1995) and Greenaway *et al.* (1999)).

PD= Product differentiation (PD) is proxied by the number of five-digit SITC in each four-digit ANZSIC industry. Data source: as per the MS variable.

ES= Economies of scale (ES) is proxied by the average value added per establishment. Data source: as per the MS variable. This is widely used proxy for economies of scale in the literature of IIT (see, for example, Loertscher and Walter (1980) Greenaway *et al.* (1995) and Greenaway *et al.* (1999) and Sharma (2000)).

RD= R&D intensity (RD) was proxied, in the case of Australia, by human resources devoted to R&D in each manufacturing industry. Source: ABS, *Research and Development Business Australia*, Cat. No. 8104.0. However, due to unavailability of the above data for New Zealand we were forced to use a dummy for R& D intensive industries following Mennon *et al.* (1999).

CER= Closer Economic Relation (CER) between Australia and New Zealand was proxied as follows. To capture the intensity of CER in Australia we use trade share of New Zealand in Australia's total trade in each four-digit ANZSIC industry. In the case of New Zealand we use trade share of Australia in New Zealands total trade in each four-digit ANZSIC industry. Data sources: ABS and SNZ on request.

PRO= Industry protection (PRO) was measured in terms of nominal rate of protection in the absence of effective rate of protection data for New Zealand. Source: Australian data from Industry Commission (1995). New Zealand data from BIE (1995) and is for 1993.

FI= The intensity of foreign investment (FI) is proxied by the value added share of a foreign-owned company in each category. Data sources: Australian data from the ABS, *Foreign Ownership and Control in Manufacturing*, Catalogue nos 5315.0 and 5314.0. New Zealand data is obtained from the SNZ on request.