

Marginal Intra-Industry Trade : Measurement and Relevance for the Pattern of Industrial Adjustment

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I. Introduction

Since its emergence in the late 1960s, the concept of intra-industry trade (IIT) has made an enormous impact on the empirical and theoretical analysis of international trade and on ensuing policy recommendations.¹ Balassa [1966] was first in asserting that the observed increase in IIT might imply that "the difficulties of adjustment to freer trade have been generally overestimated". It has been commonly perceived ever since that the observed rise in IIT across the industrialised world greatly facilitated trade liberalisation by reducing pressures for each country to concentrate production on a narrow range of industries according to its comparative advantage. Economic development was thus seen to bring about ever smaller adjustment costs from trade liberalisation. This perception has lent powerful support to projects such as the European Community's Common Market or the NAFTA agreement in North America.

By suggesting a measure of marginal intra-industry trade (MIIT), a recent paper by Hamilton and Kniest [1991] has revealed a new and potentially challenging dimension to the empirical analysis of IIT. Before, empirical investigation of IIT had been confined to "static"² indicators such as the Grubel-Lloyd (GL) index, which measure IIT for one particular time period. It had been implicitly assumed that high "static" levels of IIT were positively related to low adjustment costs, a strictly dynamic phenomenon. However, observation of a high proportion of IIT in one particular time period does not justify *a priori* any prediction of the likely pattern of *change* in trade flows, and even an observed increase in "static" IIT levels between two periods could "hide" a very uneven change in trade flows, concomitant with *inter-* rather than *intra-*industry specialisation.

In order to infer conclusions on adjustment from the measurement of IIT, it is thus conceptually necessary to analyse the pattern of *change* in trade flows rather than comparing the composition of trade at different points in time. Three methods have been used to date for the "dynamic" analysis of IIT. Section II will outline these measures and their shortcomings, and Section III will propose a simple alternative index of MIIT, modelled after the common GL index.

Another drawback of existing IIT measures is that they are of very limited use for one-country analyses. Not only do they fail to take an accurate account of the dynamic nature of adjustment, they also provide no indication

¹ For an early overview, see Grubel and Lloyd [1975].

² Even though the GL index relates to *flows* of goods and is thus not a static measure in the strict sense, it will be referred to in this paper as being of a "static" nature, in contrast to measures of MIIT, which are "dynamic", since they relate to the *change* in these flows between defined time periods.

of the sectoral and geographical distribution of the costs and benefits from specialisation. Therefore, Section IV will propose a measure which relates MIIT to sectoral performance.

The relevance for adjustment of observed MIIT can only be confirmed by relating such measures of trade composition to structural economic variables. Hence, ideally each industry's MIIT is scaled relative to variables such as production or sales to verify the economic significance of the observed trading patterns. This issue will be dealt with in Section V. Section VI will contain some concluding comments.

II. MIIT Measurement to Date

A. COMPARING GRUBEL-LLOYD INDICES

Three methods for measuring MIIT have been used or suggested to date. The first, and by far the most commonly applied, technique is the comparison of GL indices for different time periods. This method was shown to be flawed by Hamilton and Kniest [1991], who pointed out that "an increase in inter-industry trade flows will show up as an increase in the GL index of IIT when the increase in inter-industry trade acts to reduce the trade imbalance in the sector being measured". Thus, the juxtaposition of corresponding GL indices for different periods conveys some information on the structure of trade in each of these time periods, but it does not allow conclusions on the structure of the *change* in trade flows.³ Another shortcoming of the intertemporal comparison of GL indices appears in empirical studies on the trading patterns of *one* country. A generalised rise or fall of average GL indices in one or several countries may be a result of some use *multilaterally*, because it suggests trends towards more intra- or more inter-industry trade and specialisation and it may thus indicate the importance of *aggregate* adjustment costs.⁴ However, it is of limited use in *unilateral* studies, which tend to be less concerned with overall specialisation patterns than with how the respective country and its various economic sectors are affected by trade-induced adjustment. The problem is that a rise in the GL index could suggest both the erosion of a net-exporting position or the balancing of a

³ This, however, is not to say that time-series analysis of corresponding GL indices is misleading or flawed *per se*. If the aim of the analysis is "comparative static", meaning that what is sought is a comparison of the structure of trade at different points (years) in time, then the comparison of GL indices is adequate. It is only when the aim of the analysis is "dynamic" in nature, meaning that the structure of the *change* in trading patterns is to be scrutinised, that the comparison of GL indices is inadequate. Since the costs of adjustment depend on the latter rather than on the former, an alternative measurement method is warranted.

⁴ This is valid if, as has yet to be established, "static" IIT is positively related to MIIT.

sectoral deficit, which obviously have diametrically opposed implications for the respective country or sector.⁵

B. THE HAMILTON-KNIEST INDEX

A second measure of MIIT is the one proposed by Hamilton and Kniest [1991] according to which

$$MIIT_{HK} = \begin{cases} \frac{X_t - X_{t-n}}{M_t - M_{t-n}} & \text{for } M_t - M_{t-n} > X_t - X_{t-n} > 0 \\ \frac{M_t - M_{t-n}}{X_t - X_{t-n}} & \text{for } X_t - X_{t-n} > M_t - M_{t-n} > 0 \\ \text{undefined} & \text{for } X_t < X_{t-n} \text{ or } M_t < M_{t-n}, \end{cases} \quad (1)$$

where X_t (M_t) and X_{t-n} (M_{t-n}) are exports (imports) of a particular industry in years t and $t-n$, n standing for the number of years separating the two years of measurement. This measure eliminates the first shortcoming of simple GL-index comparison by examining the structure of the *change* in trading patterns. However, Greenaway *et al.* [1993] have highlighted that the fact of the HK index being undefined when either X or M has decreased, can lead to a non-random omission of a significant number of statistical observations and therefore to potentially misleading results.⁶

Furthermore, Hamilton and Kniest [1991] have interpreted any situation where their index is undefined as representing "an increase in exports and a decrease in imports (or vice versa), which indicates inter-industry trade". Yet, the HK index is also undefined where both imports and exports have decreased, a situation in which the matched decreases should be recorded as MIIT. In contrast to the interpretation of its inventors, the HK index does therefore not convey any information as to the structure of MIIT for the sectors where the index is undefined.

⁵ The limitations of the GL index appear in a recent assessment of Ireland's economic performance as a member of the EC (NESC [1989]). After thorough examination of aggregate and sectoral trends in IIT, measured with the GL index, the study concludes that "inter-industry trade and inter-industry specialisation are not a problem in and of themselves" and that "it all depends on whether the country is specialising *in* or being specialised *out* of a particular industry". The report then goes on to examine this question sector by sector. It will be the aim of the measure proposed in Section IV of this paper to facilitate this work-intensive two-stage procedure by providing an index that simultaneously conveys information on IIT and on sectoral performance.

⁶ Greenaway *et al.* [1993] also point to the fact that the use of nominal rather than inflation-adjusted trade data biases the MIIT measure upward. While this is a valid point, it is applicable to any measure of MIIT and not just to the HK index. For the remainder of this paper we will thus assume all import and export data to be adjusted for inflation.

C. THE GREENAWAY-HINE-MILNER-ELLIOTT MEASURE

Greenaway *et al.* [1993] have suggested a third measure of MIIT:

$$MIIT_{GHME} = [(X + M) - |X - M|]_t - [(X + M) - |X - M|]_{t-1}, \quad (2)$$

or:

$$MIIT_{GHME} = \Delta[(X + M) - |X - M|]. \quad (3)$$

This measure, unlike the HK index, is always defined. However, the GHME measure resembles the juxtaposition of GL indices in that it corresponds to the difference in IIT levels of two periods, and therefore shares the latter method's inaccuracy for the assessment of the structure of *change* in trading patterns. Hamilton and Kniest's criticism of the GL-comparison method thus also applies to the GHME measure: If, say, over the period of investigation a particular sector has experienced a shift from a trade surplus to balanced trade while exports remained unchanged, the GHME measure will show a positive value of twice the increase in imports, even though this is an obvious case of *inter*-industry adjustment, as the increase in imports is not matched by any corresponding increase in exports. The GHME measure also provides no indication as to the relative trading performance of certain countries or sectors.

D. THE PROBLEM OF SCALING

The GHME measure fundamentally differs from the GL and HK indices, since it reports IIT in absolute values rather than as a ratio. This feature is desirable mainly because it facilitates the scaling of MIIT relative to gross trade levels, production or sales in a particular industry, which in turn is crucial for the assessment of specialisation and adjustment pressures.

The GHME measure in itself is unscaled, and thus resembles the traditional indices. It is inferior to the latter in that it says nothing about the proportion of (marginal) intra- relative to inter-industry trade and it lacks the presentational appeal of a simple index contained between, say, 0 and 1. Hence, its *raison d'être* rests upon the fact that "it can be related to corresponding levels of gross trade or real output in the context of any analysis of adjustment problems" (Greenaway *et al.* [1993]).

III. A "Grubel-Lloyd Style" Measure of MIIT

A. THE "A" INDEX

MIIT might be calculated as follows:⁷

$$MIIT = A = 1 - \frac{|(X_t - X_{t-1}) - (M_t - M_{t-1})|}{|X_t - X_{t-1}| + |M_t - M_{t-1}|} \quad (4)$$

which can also be written as:

$$A = 1 - \frac{|\Delta X - \Delta M|}{|\Delta X| + |\Delta M|}. \quad (5)$$

This index, like the GL measure, varies between 0 and 1, where 0 indicates marginal trade in the particular industry to be completely of the *inter*-industry type, and 1 represents marginal trade to be entirely of the *intra*-industry type. The index A shares all the statistical properties of the GL index, of which a comprehensive description can be found in Greenaway and Milner [1986].

It is important to note that A can be summed, like the GL index, across industries of the same level of statistical disaggregation by applying the following formula for a weighted average:

$$A_{tot} = \sum_{i=1}^n w_i A_i, \text{ where } w_i = \frac{|\Delta X|_i + |\Delta M|_i}{\sum_{i=1}^n (|\Delta X|_i + |\Delta M|_i)} \quad (6)$$

where A_{tot} is the weighted average of MIIT over all industries of the economy or over all the sub-industries of an industry, denoted by $i...n$.

B. ECONOMIC INTERPRETATION

The main appeal of the A index lies in the fact that it reveals the structure of the *change* in import and export flows, like the HK index. Yet, unlike the latter measure, A is defined in all cases and shares all the familiar statistical properties of the GL index.

By evaluating the change in trade flows, in other words by indicating the structure of *new* or *lost* trade, the A index assesses what is at the heart of economic adjustment problems. Adjustment, being a dynamic phenomenon, is not directly related to the ("static") amount or proportion

⁷ Hamilton and Kniest [1991] mentioned consideration of a very similar measure, a "modified Grubel-Lloyd index", where $MIIT = 1 - \{|\Delta X - \Delta M| / (\Delta X + \Delta M)\}$. They subsequently refuted this index because it "calculates the degree of IIT in total new trade rather than comparing new bilateral trade flows". But the degree of IIT in new trade is precisely what we strive to measure, and any "modified GL index" can be applied to a country's trade with either one or several partners, just as the GL index itself. Furthermore, their omission to use absolute values for ΔX and ΔM in the denominator makes the measure meaningless where either of the two values is negative.

of matched two-way trade in a particular time period. And it is not even the absolute change in the "static" levels of IIT between different periods that is in direct relation to the costs of adjustment to increased trade. What adjustment, in so far as affected by international trading patterns, directly depends on is the structure of *change* in trade flows. Thus defined, MIIT is concomitant with low adjustment costs because it indicates that trade-induced factor reallocation occurs within rather than between sectors.

Where a country's exports and imports in a particular sector grow or shrink at a similar pace (high A), trade-induced geographical specialisation is likely to occur at the intra-industry level, while the overall performance of the sector is determined by factors exogenous to trade, such as demand changes. On the other hand, where a country's exports and imports in a particular sector show diverging trends (low A), both the trade-induced forces for geographical *inter*-industry specialisation and the exogenous factors determining the fate of the sector across countries are likely to be at work. This distinction which is crucial for the importance of adjustment costs is captured by the A index.

IV. MIIT and Sectoral Performance

A. THE "B" INDEX

The A index (like the GL index) can provide results which are relevant for multilateral studies by relating to overall adjustment pressures. Yet, it is of very limited usefulness for one-country studies, since it does not contain any information as to the *distribution* of trade-induced gains and losses among countries or sectors.

Hence, an index such as B might be considered:

$$B = \frac{\Delta X - \Delta M}{|\Delta X| + |\Delta M|}, \quad (7)$$

where

$$|B| = 1 - A. \quad (8)$$

This index can take values ranging between -1 and 1. It is two-dimensional, containing information about both the proportion of MIIT and country-specific sectoral performance. Firstly, the closer B is to zero, the higher is MIIT. B is equal to zero where marginal trade in the particular industry is entirely of the *intra*-industry type, whereas at both -1 and 1 it represents marginal trade to be entirely of the *inter*-industry type. Secondly, sectoral performance is defined as the change in exports and imports in relation to each other, with exports representing good domestic performance and imports reflecting weak domestic performance in a particular sector. Thus defined, B is directly related to sectoral performance. When $B = 1$, ΔX was ≥ 0 while ΔM was ≤ 0 over the considered period. The opposite holds for $B = -1$.

Unlike the A index, B cannot be meaningfully aggregated across industries.⁸ Since high marginal inter-industry trade is expressed by values close to either -1 or 1, the weighted average of two sub-industries might yield a value close to zero (high MIIT) even though there was high marginal *inter*-industry trade in both of them. Therefore, B cannot be used for summary statistics resulting from calculations on a disaggregated level. Its applicability is thus confined to the industry-by-industry assessment of MIIT and performance.

B. ECONOMIC INTERPRETATION

The interpretation of trade flows which underlies the above measure is somewhat mercantilistic in nature. Obviously, the relation between a sector's export performance and its import penetration does not convey the

⁸ The exception to this is where the B s of all sub-industries have the same sign.

full information on competitiveness and adjustment costs. Nevertheless, this analysis provides some indication of which were the sectors a country specialised "into", what sectors it was specialised "out of" and in what sectors the international pattern of specialisation remained unaffected by increased (or reduced) trade flows.

V. Scaling of MIIT Indices

A. SCALING THE A INDEX

As Greenaway *et al.* [1993] have noted, "when we think about adjustment we are thinking about the implications of changes in the pattern of specialisation, *not* changes in the shares of exports and imports in increased trade". It is only by relating measures of the composition of trade to variables such as initial gross trade or production that they can be interpreted as valid indicators of structural change.

The indices A and B are unscaled. Firstly, like the GL index, they are not related to the volume of total trade or production. Secondly, they do not even relate to the volume of trade within each industry, since they are proportions of the *change* in trade flows. We can thus conceive a number of situations where A and B produce results which are of very little economic significance, since the change in trade flows was very small relative to the sector's initial trade volume or since the particular sector is of minor importance in terms of gross trade or production.

If we want to preserve the analytical and presentational advantages of an index contained between two easily interpretable margins and relating IIT to inter-industry trade, scaling for gross trade or for any other variables can be introduced when indices are aggregated across industries. We can thus simply scale the standard weighted average A_{tot} , as defined in equation (6), for any other variable instead of the gross change in trade flows:

$$A_{sc} = \sum_{i=1}^n v_i A_i, \left(\text{where } v_i = \frac{V_i}{\sum_{i=1}^n V_i} \right) \quad (9)$$

For V , variables such as gross trade, production, sales or employment in either the initial or the final time period can be introduced.

This procedure is not applicable to the B index, since this measure cannot be aggregated across industries, for the reasons outlined in the previous section.

B. THE "C" MEASURE

Alternatively, a method analogous to the one proposed by Greenaway *et al.* [1993] could be applied. Thus, the absolute values of MIIT, representing matching *changes* in trade flows, yield the following measure:⁹

$$C = (|\Delta X| + |\Delta M|) - |\Delta X - \Delta M|, \quad (10)$$

which can be scaled even at the disaggregated industry level, like the GHME measure:

$$C_v = \frac{C}{V}, \quad (11)$$

where V is any relevant scaling variable.

C. CHOICE OF MEASURE

The choice between the different measures depends on the purpose at hand. Where only the trade-flow dimension is considered, and where comparisons for different industries and countries are to be facilitated, an index such as A , which relates (marginal) intra- to inter-industry trade, seems the most meaningful tool. A_{sc} maintains this information and incorporates scaling for additional variables, but this is confined to the weighing procedure when aggregating over sub-industries. A_{sc} thus represents scaled averages, but it cannot relate IIT to any structural variable at the base industry level. This is achieved by a measure such as C_v , which, however, does not relate intra- to inter-industry trade.

Whereas it is conceivable to conduct a meaningful analysis on the sole basis of a measure such as A , any calculation of C should be accompanied by measures such as A . Absolute values of MIIT alone are meaningless, since they give no indication of the proportion between intra- and inter-industry trade, which, after all, is central to the definition of the very concept of IIT. Therefore, it seems most appropriate for studies investigating MIIT and adjustment to use a two stage approach, where MIIT is expressed firstly in relation to marginal *inter*-industry trade and secondly in relation to structural variables.¹⁰

⁹ Unlike the GHME measure, C is always positive.

¹⁰ The relationship between MIIT and marginal inter-industry trade could be expressed both in absolute numbers (C and $|\Delta X - \Delta M|$) or with an index such as A , the latter having obvious presentational advantages.

VI. Summary and Conclusions

This paper has attempted to show that the concept and measurement of MIIT as introduced by Hamilton and Kniest [1991] are fundamentally different from the previous "static" view of IIT. It was argued that where trade is significant in determining economic adjustment and specialisation, it is the structure of the *change* in flows of goods (MIIT) which affects adjustment rather than the trading pattern in any given time period (IIT). Conceptually, adjustment is thus only related to IIT in so far as IIT is related to MIIT. This link remains to be explored empirically.

Concerning empirical measurement of MIIT it was argued that neither the comparison of GL indices nor the GHME measure capture MIIT in the desired sense. The HK index, while based on the relevant conception of MIIT, is fraught with unsatisfactory statistical properties. Thus, two related indices were suggested, one being the transposition of the GL index to MIIT, and the second being of two-dimensional nature so that it can indicate both MIIT and sectoral performance. It was argued that the usefulness of IIT and MIIT measurement in one-country studies is greatly enhanced when it can be directly linked to sectoral performance.

Finally, it was attempted to scale MIIT relative to structural variables so as to assess the significance of the trade dimension for economic adjustment. We concluded that no single indicator can convey all the necessary information, and that a multi-stage evaluation therefore seemed the only practicable solution.

References

- Balassa, Bela** "Tariff Reductions and Trade in Manufactures Among the Industrial Countries", *American Economic Review*, Vol. 56, 1966.
- Greenaway, David, Robert C. Hine, Chris Milner, Robert Elliott**, "Adjustment and the Measurement of Marginal Intra-Industry Trade", *SPES Working Paper N/8*, 1993.
- , **Chris Milner**, *The Economics of Intra-Industry Trade*. Oxford 1986.
- Grubel, Herbert G., Peter J. Lloyd**, *Intra-Industry Trade: The Theory and Measurement of International Trade in Differentiated Products*. London 1975.
- Hamilton, Clive, Paul Kniest**, "Trade Liberalisation, Structural Adjustment and Intra-Industry Trade: A Note". *Weltwirtschaftliches Archiv*, Vol. 127, 1991, pp. 356-367.
- National Economic and Social Council (NESCC)**, *Ireland in the European Community*. Dublin 1989.

Appendix: A Numerical Example

TABLE 1: Trade in the Irish Chemicals Sector 1985 and 1990 ^a

SITC Groups	1985		1990		ΔM	ΔX
	Imports	Exports	Imports	Exports		
511	8,572	780	9,255	557	683	-224
512	16,974	547	14,831	8,802	-2,143	8,255
513	38,025	70,943	49,457	71,410	11,431	468
514	21,749	100,196	65,151	127,747	43,403	27,551
515	93,069	551,134	86,319	622,665	-6,750	71,531
516	22,326	19,788	28,803	22,127	6,477	2,339
522	37,234	24,657	44,437	15,011	7,204	-9,646
523	23,838	5,372	21,666	4,813	-2,171	-559
524	1,272	147	6,344	7,752	5,071	7,605
531	7,301	1,031	9,758	662	2,456	-369
532	978	217	3,457	1,431	2,479	1,214
533	30,327	15,457	44,176	12,850	13,848	-2,607
541	167,491	185,901	224,963	508,085	57,473	322,184
551	43,322	86,898	49,676	154,216	6,354	67,318
553	39,635	59,010	58,304	101,422	18,669	42,411
554	46,690	18,928	58,839	18,986	12,148	58
562	183,134	15,953	140,787	29,304	-42,347	13,351
572	3,545	1,995	2,931	57	-615	-1,938
582	46,659	18,309	21,636	10,399	-25,023	-7,909
583	167,203	61,504	269,525	94,077	102,323	32,573
591	28,818	3,038	9,055	758	-19,763	-2,279
592	23,009	95,186	27,441	3,534	4,431	-91,652
598	52,430	32,347	125,144	234,471	72,715	202,124
Section						
5	1,103,600	1,369,337	1,371,955	2,051,134	268,355	681,798

^a all figures in IR£ 1000s at 1985 prices; calculated from OECD data (exchange rate of 1.066 US\$ per IR£ for 1985, and 1.658 for 1990); 1990 data adjusted for inflation using CPI; 1990 industry groups (SITC Rev. 3) rearranged so as to match 1985 groups (SITC Rev. 2).

TABLE 2: MITT in the Irish Chemicals Sector 1985-1990 ^a

SITC Groups	GL index		HK index	GHME measure		A	B	C ^b	C _V ^c
	1985	1990		unscaled ^b	scaled ^c				
511	0.17	0.11	undef	-448	-0.05	0.00	-1.00	0	0.00
512	0.06	0.74	undef	16,510	0.94	0.00	1.00	0	0.00
513	0.70	0.82	0.04	22,863	0.21	0.08	-0.92	935	0.01
514	0.36	0.68	0.63	86,806	0.71	0.78	-0.22	55,103	0.45
515	0.29	0.24	undef	-13,500	-0.02	0.00	1.00	0	0.00
516	0.94	0.87	0.36	4,678	0.11	0.53	-0.47	4,678	0.11
522	0.80	0.51	undef	-19,292	-0.31	0.00	-1.00	0	0.00
523	0.37	0.36	undef	-1,118	-0.04	0.41	0.59	1,118	0.04
524	0.21	0.90	0.67	12,392	8.73	0.80	0.20	10,143	7.15
531	0.25	0.13	undef	-738	-0.09	0.00	-1.00	0	0.00
532	0.36	0.59	0.49	2,429	2.03	0.66	-0.34	2,429	2.03
533	0.68	0.45	undef	-5,214	-0.11	0.00	-1.00	0	0.00
541	0.95	0.61	0.18	114,946	0.33	0.30	0.70	114,946	0.33
551	0.67	0.49	0.09	12,709	0.10	0.17	0.83	12,709	0.10
553	0.80	0.73	0.44	37,338	0.38	0.61	0.39	37,338	0.38
554	0.58	0.49	0.00	116	0.00	0.01	-0.99	116	0.00
562	0.16	0.34	undef	26,702	0.13	0.00	1.00	0	0.00
572	0.72	0.04	undef	-3,876	-0.70	0.48	-0.52	1,229	0.22
582	0.56	0.65	undef	-15,819	-0.24	0.48	0.52	15,819	0.24
583	0.54	0.52	0.32	65,146	0.28	0.48	-0.52	65,146	0.28
591	0.19	0.15	undef	-4,559	-0.14	0.21	0.79	4,559	0.14
592	0.39	0.23	undef	-38,951	-0.33	0.00	-1.00	0	0.00
598	0.76	0.70	0.36	185,595	2.19	0.53	0.47	145,430	1.72
Section									
5	0.52	0.52	na	484,714	0.20	0.34	na	471,696	0.19
(0.21) ^d									

^a For data sources see footnote to table 1.^b in IR£ 1000s.^c scaled for gross initial (1985) trade.^d Section total, weighted by Group shares of gross initial (1985) trade (=A_{sc}).

COMMENTS

- [1.] The example illustrates the inappropriateness of the HK index, which is undefined for 12 of the 23 "industries".
- [2.] A rise in the GL index does not necessarily imply MIIT to be positive. This can be seen in Group 512, where the GL index increased from 0.06 to 0.74, while MIIT, measured with the *A* index, was zero. Thus, ("dynamic") *inter*-industry adjustment led to higher ("static") *intra*-industry trade. The reverse can be observed in Group 553.
- [3.] The results for Group 512 also highlight the fact that the GHME measure is conceptually closer to the comparison of GL indices than to the measurement of MIIT as the structure of the *change* in trade flows. The strong increase of "static" IIT indicated by the GL indices is mirrored by a high GHME value, even though in the period of investigation imports and exports have shown diametrically opposed trends.
- [4.] Where the changes in trade flows do not exceed initial gross trading volumes, any *scaled* MIIT index (matched trade change relative to gross trade) is lower than the corresponding *unscaled* measure (matched trade change relative to total change). Thus both A_{sc} (0.21) and C_V (0.19) are below *A* (0.34) for the total sector. The reverse can be observed in Group 524.
- [5.] A rise (fall) in the GL index for a particular industry, even if combined with high (low) MIIT, does not necessarily imply a positive (negative) sectoral performance. This is shown by Group 514, where the GL index increased over the period of investigation and the *A* index indicates relatively high MIIT, yet the *B* index is negative, indicating a deterioration of the sector's trading performance. The opposite pattern can be observed in Group 551.
- [6.] Following the finding of [5.], it will be interesting to empirically assess the relation between MIIT and sectoral performance. In our example, the average value of *B* in the 12 sectors with negative performance is -0.75, while the average *B* for the 11 sectors with positive performance is at 0.68. This might suggest that wherever there was MIIT, this tended to be beneficial to the trade performance of the Irish chemicals sector. Of course, this result is not statistically significant and warrants much wider empirical investigation.
- [7.] The overall *A* index for SITC Section 5 of 0.34 signifies that, measured at the three-digit level, 34 per cent of the absolute trade flow changes were matched on the export and the import side. Whether this is to be interpreted as a high or low level of MIIT remains to be established by comparison with other sectors, other time periods and other countries.