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INTRAINDUSTRY TRADE IN TWO AREAS : SOME ASPECTS OF TRADE WITHIN AND OUTSIDE A CUSTOM UNION

by

Gianpaolo Rossini

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BADIA FIESOLANA, SAN DOMENICO DI FIESOLE.

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European University Institute
Badia Fiesolana
50016 San Domenico (Fi)
Italy.

1. Introduction

Intraindustry Trade (IIT) is one of the outstanding facts which can be observed in trade figures of manifacture industries of the last twenty years in industrialized countries. IIT is simply the simultaneous importation and exportation of similar or even homogeneous goods. To be more outspoken IIT appears, for instance, each time Italy imports a Volkswagen Golf from Germany while exporting to Germany a Fiat Ritmo. This typical matching of exports of one industry with imports of the same industry, during the same accounting period,is called IIT.

The extent to which export patterns are similar to or differ from import patterns, i.e. the degree of IIT specialization, can be evaluated by resorting to an index to which we shall refer in section 3.

If we want to explain IIT in a suitable way we have to refer to other phenomena which are shown in recent trade figures of manufactures in western industrialised countries. These phenomena are called "new stylized facts of trade". They can be grouped in three major propositions; they are closely intertwined, and, last but not least, they have been an enormous challenge to the traditional theories of trade of both neoclassic and classic sources.

The first fact: a major chunk of international trade in value terms intervenes among industrialized countries whose relative factor endowments are most of the time roughly similar. If this is the case trade of the kind figured out by Heckscher-Ohlin-Samuelson (HOS) theorems should be minimal or even absent (1). In fact, in traditional theories, what makes nations exchange their goods are differences of any kind in their economic structure. Since the evidence of differences

is often scanty, other grounds of trade have to be found out.

The second fact says that much trade of manufactured goods among industrialised countries is intraindustrial in character. As specified above, countries tend to import and to export all manufactured goods simultaneously.

The third fact is linked to the Custom Union (CU) issue. According to the traditional theory of trade, the establishment of a CU should foster HOS specialization.

In Europe, before the establishment of the CU in certain countries some industries could survive just because of a protectionist shelter. After the establishment of the CU these industries should be competed down and taken over by other countries. Surplisingly in the years following the Treaty of Rome, in the EEC just the opposite happened, i.e. there was an increase of IIT specialization, which can be seen clearly from table 1 (Section 3) from 1962 to 1972.

The main object of this paper is both the analysis of IIT in a CU (EEC) and the differences in trade patterns as between members of the CU and industrial non-member countries. In section 2 we shall survey briefly the main determinants of IIT in the empirical and theoretical literature; in section 3 we shall briefly comment on the empirical findings on IIT presented in table 1 and 2; in section 4 a partial equilibrium and a general equilibrium analysis are presented; in section 5 a cross-section test on EEC data of 1979 is performed. Disaggregated data for 3-digit-SITC industries are left to appendix 1 in table 3, since of interest mainly to industrial economists.

2. A survey of theoretical and empirical determinants of IIT

The literature on IIT has been developed following two distinct paths. The first one is empirical, and had its climax in the '60s and the '70s. The second one is theoretical and started in the late '70s.

In empirical studies the emphasis is put on several variables which are also shared by theoretical studies. Let us sum them up in a simple taxonomy.

1) Variables of market structure: i) monopolistic competition, oligopolistic competition and all kinds of imperfect market features which seem to lead to IIT; ii) variables concerning the specification of individual demand for differentiated goods produced by the same sector. Both market structure imperfections and differentiation on the demand side seem to have a positive influence on the level of IIT. These variables are usually proxied by indices of concentration, degree of differentiation in an industry, advertising expenditure etc.
2) Technological variables:i.e. economies of scale, internal to the firm-plant. The usual framework of external economies of traditional models is being supplemented by more realistic plant economies of scales, which means that cost-elasticity is less than 1.
3) Institutional and policy variables: the existence of CUs, the level and diffusion of tariffs and their substitutes (export subsidies, import quotas, administrative barriers of various kinds etc.).
4) Macroeconomic variables: similarities of relative endowments of factors, similarities of income per capita and/or consumption patterns of individuals.

If we were to reconstruct a typical empirical study of IIT of the last ten years we would have to see a positive influence of economies of scale at firm level, a positive influence of macroeconomic variables such as similarities of consumption patterns and standard of living summarized by income per capita indices. The residual two groups of variables have an influence which is not unanimously determined in signs and specifications(2). The theoretical literature has tried to group together the most interesting elements of the empirical literature giving them room in formal models of IIT.

The theory of IIT is mainly based on the existence of economies of scale at the plant-firm level. Economies of scale are coupled to two diverse specifications of individual demand for differentiated goods (according to whether one uses a Stiglitz-Dixit (1977) model of monopolistic competition with economies of scale or instead a Lancaster (1980), Helpman (1981) model of demand for characteristics in a monopolistic market). In most of these models trade is no longer the outcome of differences in some structural variable across nations, but simply due to the benefit countries get from trade when goods are differentiated and their production can be concentrated in fewer plants because of economies of scale.

This may not be the case if there are different production techniques of differentiated goods. As Norman-Dixit (1980) pointed out the result may depend on the size of plants existing in autarky. Goods produced with low fixed costs in autarky are likely substituted by products with high fixed costs as the market expands. Some goods will disappear and some new ones will be introduced. The effects of trade on variety might be ambiguous. However for our purposes we

use less general models where the usual uniformity and homogeneity assumptions of firms and plants allow us to draw some clear conclusions.

Let us sum up the main thread of these models. On the supply side: many firms with one plant produce differentiated goods in monopolistically competitive markets à la Chamberlin-Stiglitz-Dixit. Each firm uses the same technique and there are economies of scale due to a fixed cost. Technological symmetry leads to equal costs for all firms. On the demand side, differentiation enters individual welfare through the effect of variety on utility. This is a substantial improvement with respect to the old specifications of individual welfare, which allows us to comprehend one of the main aspects of today's goods markets.

Equilibrium is reached because economies of scale are halted by the specification of individual demand. In equilibrium the degree of differentiation supplied by firms is coupled to the extent of variety consumers are willing to buy. The diffusion of differentiation has a cost which is measured by the magnitude of "idle" economies of scale. Let us see the question intuitively: if average costs decrease less than the price when producing a further unit of a good, (to be read on the demand curve faced by the firm) it will not be profitable to the firm to increase the quantity supplied.
If before it was breaking even, an increase of quantities supplied will cause losses; otherwise there would be a decline of profits. This means that beyond a certain point economies of scale are just potential; the position of that point is determined by two parameters: elasticity of substitution of goods in demand and elasticity of economies

of scale.

This result is possible since it is assumed that the elasticity of demand does change as the number of firms increases due to free entry in the market. (Dixit-Stiglitz, 1977).

If the number of goods produced is being kept constant, opening of trade between countries which are similar in all aspects has a positive effect since it reduces the level of "idle" economies of scale. According to the values of the two fundamental parameters (3) the effect of trade opening can be i) further exploitation of "idle" economies of scale keeping variety constant ii) increase in the number of goods supplied without further explotation of economies of scale iii) a mix of i) and ii) to a lesser extent.

This is the basis of trade between countries which are equal in all respects, as we shall see in both the partial equilibrium model and the general equilibrium model of section 4.

3. Few comments on the empirical findings

For the empirical analysis we have chosen to use the Grubel-Lloyd index (4) even if there are other measures of IIT available, as the Aquino-Grubel-Lloyd index and Glejser (Glejser et al. 1979) index. We have not used the former because based on an equilibrium condition which is not necessarily met, since it refers to a balanced trade. The latter is quite useful to study trade patterns but it is not very far from the Grubel-Lloyd index to which we stick for the moment, even if for future work we shall resort preferably to Glejser index.

In tables 1 and 2, presented below in this section, we have used the Grubel-Lloyd index to evaluate IIT from the data in nine EEC countries. To do that we distinguished between two areas where trade should take place: area 1 corresponding to the EEC and area 2 corresponding to OECD countries which do not belong to the EEC (5). Data were collected only for macro-SITC industries 5, 6, 7, 8.

In table 1 IIT is the overall average value on area 1 and 2. Figures show a definite increase of IIT between 1962 and 1972 for all EEC countries and also for those countries which joined the EEC later. The upward trend still remains between 1972 and 1979 except for Italy and Belgium-Luxemburg. U.K., Ireland, Denmark show a definite growth of IIT in the second period. All this accords with Balassa's (1975) remarks on the effects of a CU creation on the specialization patterns of member states. From tables 1 and 2 we can see that roughly half of manufacture trade in the EEC (calculated on a 3-digit level of disaggregation) is made up of IIT (U.K. reaches some 85%).

In table 2 there seems to be a tendency for IIT to be lower in area 2 than in area 1. As already seen by Hamaguchi-Sazanami (1978) IIT seems to be CU biased. The only exception is Denmark. The disaggregated data of table 2 will be used in section 5 to see whether trade specialization in the EEC is a determinant of specialization in area 2.

From tables 1 and 2 facts 2 and 3, outlined in the introduction, are apparent: 1.) a great proportion of trade of trade between similar countries is IIT; 2.) lifting internal barrier in a CU is going to increase IIT instead of interindustry trade or, in other words, HOS trade.

Disaggregated data are in appendix 1, table 3.

TABLE 1 OVERALL INTRAINDUSTRY TRADE IN MANUFACTURES (SITC INDUSTRIES 5.6.7.8.)

	ITALY	FRANCE	GERMANY	BELUX	NEDERLAND	U.K.	DENMARK	IRELAND
1962	.4721	.6172	.5908	.5571	.5619	.5671	.4309	.2707
1972	.5599	.6773	.6055	.6388	.6396	.6782	.5843	.4756
1979	.5557	.7723	.6812	.5849	.6722	.8424	.5875	.5437

SOURCE:my computations on OECE,OECD,EUROSTAT data,with the gentle support of the Computer Centre of I.U.E.

TABLE 2 OVERALL INTRAINDUSTRY TRADE IN MANUFACTURES (SITC INDUSTRIES 5.6.7.8.) IN AREA 1 AND 2

	ITALY		FRANCE		GERMANY		BELUX		NEDERLAND		U.K.		DENMARK		IRELAND	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
1962	.4884	.4529	.6702	.5367	.5921	.5881	.6070	.4515	.5665	.5519	.6336	.5262	.2853	.5546	.1397	.3048
1972	.5884	.5111	.7195	.5956	.7130	.6056	.6607	.5831	.6550	.5988	.7311	.6480	.4555	.6560	.2699	.5304
1979	.5567	.5304	.7746	.6249	.7450	.5846	.5851	.5838	.6965	.5170	.8635	.6249	.5639	.6162	.5658	.4469

SOURCE:same as table 1 except 1962,1972 Italy,France,Germany,Belux,Nederland from Hamaguchi-Sazanami(1978)

4. Theoretical aspects of trade between similar countries

In section 4.1 a graphical exposition of a monopolistically competitive market will be presented,in which variety is kept constant as trade is introduced. It is a partial equilibrium framework, from which only few insights can be drawn.

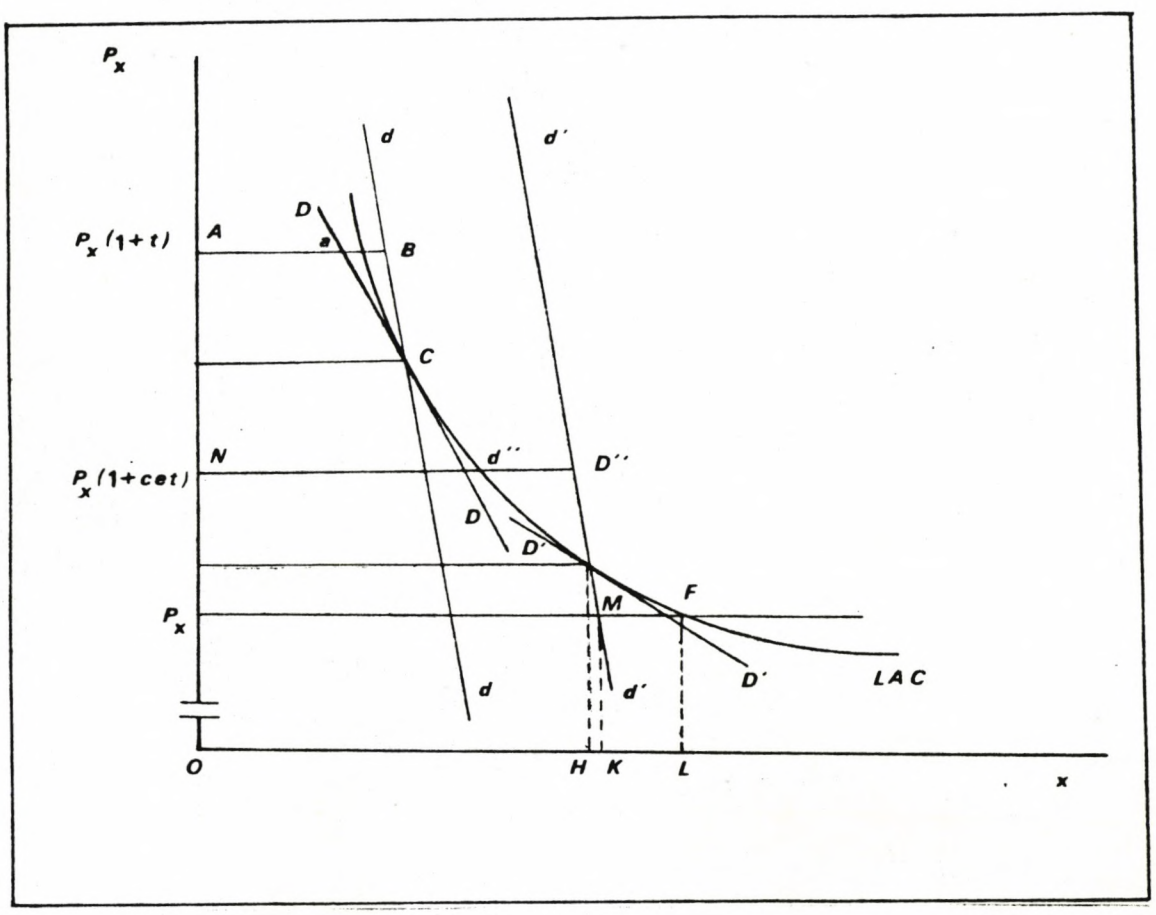
In section 4.2 a general equilibrium model based on Krugman (1980) is presented to see the effect of tariff asymmetries on the level of IIT.

4.1 A partial equilibrium view

We shall proceed by concentrating on monopolistic competition coupled to economies of scale at plant level, keeping variety constant. The graph (6) below (Figure 1) depicts the equilibrium of a firm in perfect monopolistic competition before and after the establishment of a CU. LAC is the long run (lr) average cost curve. DD is the true, in Chamberlin terminology, demand schedule, while dd is the "perceived" one.

In perfect monopolistic competition firms earn "temporary" profits in the short run (sr), yet in the lr profits will be competed down to zero by new entrants, as no barrier to entry is assumed. Product supplied x in differentiated and each firm-plant has the same cost function. As said in section 2, differentiation has no feedback on the technique adopted, as this is invariant with the product specification chosen by the firm. This restrictive assumption will be used also in the general equilibrium model (7).

FIGURE 1 (ww)



(ww) This graph is a modified version of a graph appearing in Pelkmans (1983) ch. 8 by Pelkmans-Rossini.

Before the CU, x is sold behind a tariff wall t.AB is assumed to be the tariff-inclusive world supply curve and equilibrium would be at B. In case of domestic production it could be anywhere between B and C in the sr. Yet lr equilibrium is at C. When sr equilibrium is at B, quantity supplied AB could be split between Aa (by the domestic firm) and aB (world supply). B would then be a lr equilibrium as well, with no profits. Domestic production would be accompained by imports. If we make the assumption that sr equilibrium is at B, as AB are only imports, lr equilibrium will shift to C.At C profits are zero due to new entrants. In the lr there will be no trade and the number of product specifications of x will not change:it will be equal to the number of plants.The creation of a CU would augment demand for x and D'D' will be the relevant schedule. In the lr the domestic firm will be at E, although intra-union exports are protected up to $P_x(1+CET)$ (where CET means common external tariff):there is a cost reduction effect due to: 1) zero profit condition, which determines the number of plants and product specifications (as will be seen next in the general equilibrium model) 2) the deployment of economies of scale in the CU.

If partner countries imported x from the rest of the world (ROW) before the CU there will be trade diversion. If instead they produced x before the CU, trade creation will imply that producers in those countries will be swept away, and prices will be lower.

The shift from DD to D'D' has to be examined carefully. At C there is no trade. At E trade creation is there since production of good x is concentrated in one country only at a lower cost. When this process is symmetric, in partner

countries trade creation is being accompained by an IIT effect, if variety is kept constant. This is what Balassa (1975) and data in table 1 (section 3) show (8). If variety is not kept constant the outcome will be less easy to predict. We shall see in the general equilibrium framework which are the parameters which determine either an increase or a decrease in variety. A variety reduction could appear when the CU exports to the ROW, if ROW has low tariffs (9). Let us see how it happens. The first step is a sr equilibrium: the firm attempts to discriminate prices, selling OH in the CU and HC to the ROW. Free entry on the domestic market will let the firm sell OK at price P_x on the CU market and a quantity lower than before to the ROW i.e. KL (< HL). This will lead to a narrower choice for the consumer, since the number of plants will have to decrease to make room for a higher degree of exploitation of economies of scale. The effect of all this will be a lower level of IIT than before the introduction of exports to the ROW. The reason can be sketched as follows. We said that the total number of plants decreases if ROW enters the picture (asymmetrically) that way. If industries are made up of only two firms in monopolistic competition, one firm will be swept away as a consequence of the CU formation, as economies of scale become effective and give rise to trade creation and IIT. ROW trade will make some more plants disappear: this means that in some industries countries will experience net trade (either net imports or net exports). Hence IIT will decline on the aggregate even if in some industries it can stay constant.

More information might be obtained if we went through sr equilibria as well. Yet what could be inferred from AaBC and Nd"D"E would be too vague.

As seen above we introduced price discrimination in the sr in a monopolistically competitive market; this might not be considered correct. However the purpose of that was just to at least partially bridge the gap between the monopoly and the oligopoly approach (see Brander (1981)).

4.2 A general equilibrium approach

Using Krugman's model (Krugman (1980)) it is possible to see that under certain conditions the imposition of tariffs on trade is going to decrease the level of IIT. The assumptions of the model are quite restrictive, even though it would be possible to generalize the model on the basis of further research presented elsewhere (10).

On the demand side: there is a utility function which is symmetric in goods (the arguments) and equal for all individuals

$$U = \Sigma_i c_i^{\theta} \qquad 0 < \theta < 1 \qquad (I)$$

where c_i is consumption of the ith good ;the number of goods actually produced in n while the number of goods which can be potentially produced is $\bar{n}_p$ and $n < \bar{n}_p$.

On the supply side: there is only one factor of production which is labour. The cost function is

$$l_i = \alpha + \beta x_i \qquad (II)$$

$$x_i = l_i / \beta - \alpha / \beta \qquad (III)$$

where l_i is the quantity of labour needed in the production of x_i

x_i is the output of the firm producing good i.

Apparently production in (II) displays increasing returns to scale sincre there is a fixed cost (α), decreasing average costs and constant marginal costs. We are still in a closed economy, hence we do not have leakages. Output of each firm must be equal to total consumption of the good produced by that firm (a single plant firm producing only one good which is firm specific, as seen in section 4.1).

$$x_i = Lc_i \qquad i = 1.....\underline{n} \qquad \text{(IV)}$$

Then if we assume full employment

$$L = \Sigma_i \, l_i = \Sigma_i \, (\alpha + \beta \, x_i) \qquad \text{(V)}$$

These assumptions permit us to describe the equilibrium in a closed economy. First we write the equilibrium price (11)

$$p_i = \Theta \, \lambda^{-1} \, (x_i / L)^{\Theta - 1} \qquad \text{(VI)}$$

If the number of goods is relevantly high, we can consider the slight change of a price by a firm as not influencing the marginal utility of income: i.e. the shadow price stays constant. Therefore the elasticity for each individual demand will be

$$\frac{1}{1 - \Theta} \qquad \text{(VII)}$$

The price set to maximize profits is

$$p_i = \theta^{-1} \beta \, w \qquad \text{(VIII)}$$

where w is the wage rate.

The (VIII) is obtained from the usual maximum condition of a monopolistic firm, p(1-1/e)=MC.

Then we set

$$p_i = p_i \quad \text{for all } i \qquad \text{(IX)}$$

owing to the symmetry across individuals and across firms ((uniformity of cost functions, symmetry in demand, symmetry of reactions).

Lr equilibrium conditions imply zero profits due to free entry. From this condition (12) we get the level of output per firm and the number of goods; from constancy of $x_i = x$ for all i

$$x_i = \frac{\alpha}{\left(\frac{p}{w - \beta}\right)} = \frac{\alpha \, \theta}{\beta \, (1 - \theta)} \qquad \text{(X)}$$

then using full employment condition, we get

$$\underline{n} = \frac{L}{\alpha + \beta x} = \frac{L \, (1 - \theta)}{\alpha} \qquad \text{(XI)}$$

If we start focusing on open economies, trade will come out as a result of economies of scale. In particular in a world made up of two equal countries, with only one factor of

production, trade will be a result of the way technology and tastes are set. Under the specification of utility and technology adopted, consumers will benefit from a greater variety of goods: there will be $\underline{n} + \underline{n}''$ goods (where $\underline{n}''$ is the number of goods produced abroad). This a welfare gain due to trade.
Individuals will consume a fraction

$$\frac{n''}{n + n''} \qquad \text{(XII)}$$

of their income on foreign goods and a fraction

$$\frac{n}{n + n''} \qquad \text{(XIII)}$$

on domestic goods. We can then determine imports and exports: home country imports in wage units are

$$\frac{L\ n''}{n + n''} \qquad \text{(XIV)}$$

through substitution we can get

$$\frac{L\ L''}{L + L''} \qquad \text{(XV)}$$

this is equal to foreign country imports; hence there will be a foreign trade balance, which strongly depends on the assumptions of equal wages and the equilibrium setting imposed.

If we assume that technological and demand symmetries hold, IIT can range between 0 and 1 according to the "random" distribution of firms and goods across industries. This is the case in which location theory of regional policy would not have anything to say, since it is not determined which country

produces which goods.

We now take up the issue of tariffs between two countries. We still think in terms of two countries which are similar in all aspects. We assume that tariffs are uniformly distributed across all industries, yet that there is asymmetry. This means that at home there are tariffs on imports, while abroad not. We introduce a tariff in the same way as a transport cost (13) is usually modeled:

$$\hat{p}'' = p'' / h \qquad 0 < h < 1 \qquad \text{(XVI)}$$

where (XVI) defines the price of home imports, while home exports will be paid abroad

$$\hat{p} = P$$

due to non symmetry in tariffs. We expect home consumers to buy

$$(p / \hat{p}'')^{1/(1-\theta)} \qquad \text{(XVII)}$$

units of imported good for every unit of corresponding domestically produced good. If we try to write home imports and exports again we get

$$M = (n''/(n+n'')) \; L \; n \; x_i \; (p/\hat{p}'')^{1/(1-\theta)} \qquad \text{(XVIII)}$$

$$X = (n/(n+n'')) \; L''n'' \; x''_i \qquad \text{(XIX)}$$

where X are exports and M are imports

Since $L = L''$, $n = n''$ and $x_i = x''_i$ we can write the Grubel-Lloyd IIT formula

$$IIT = 1 - \frac{\left|1 - (p/p'')^{1/(1-\theta)}\right|}{(1 + (p/\hat{p}'')^{1/(1-\theta)})} \qquad (XX)$$

Therefore IIT cannot range between 0 and 1 any longer but will range between 0 and a value which is less than 1. This is quite consistent with the results of table 2 which we have seen in section 3. Because of the assumptions imposed in Krugman's model our expectations as to what should happen in the real world have to be carefully tested as stated. Take the case of a CU. If a uniform tariff is imposed on imports from ROW we should expect IIT to be lower in trade figures of ROW (Area 2 of section 3) if tariffs of imports from ROW differ from tariffs of ROW (14). If this is the case we should also expect IIT to be distributed roughly the same way within and outside the CU, if the degree of asymmetry of tariffs across industries is similar.

To sum up, theory says that countries which are similar in all aspects will exhibit different levels of IIT according to whether or not they possess a similar tariff structure. IIT will be higher between Italy and France than between Italy and Finland, since Italy and France are members of the same CU. This implies that they share a common external tariff (CET), they are part in international agreements as equal members (such as the Multifiber agreement, several preferential trade agreements, production quotas as in steel industry etc.) and share many non tariff barriers like those represented by product quality requirements, uniformity standards and so on. As seen above data of table 2 confirm these statements.

5. An econometric test on IIT data in two areas

If there are no tariffs and if two countries are equal in all respects ^{IIT} can range between 0 and 1, while, when tariffs are not symmetric, IIT will be within a narrower range.

Data of table 2 (and table 3 in appendix 1) seem to confirm this statement . Now we want to test whether there is any significant casual relationship between IIT specialization in the EEC and in OECD (excluding EEC countries): i.e. between area 1 and area 2.

The hypothesis to test is linked to the previous theoretical section. The supposition is that IIT of EEC countries among themselves should be higher than IIT of EEC countries with OECD countries, due to asymmetry of tariffs in the two areas above specified. Yet IIT should have a similar distribution across industries in the two areas. Take for instance two industries: steel and furniture. If in area 1 steel exhibits higher levels of IIT than furniture, we would expect that in area 2 steel will still have higher levels of IIT than furniture. More precisely what we want to test is the following: industrial specialization (IIT 3-digit SITC indices)of manufacture in the EEC (area 1) determines industrial specialization of trade flows of EEC countries with other OECD countries (area 2). In other words we want to see whether the distribution of IIT across industries is similar in area 1 and 2, provided that the casual link is from area 1-IIT to area 2-IIT.

What are the grounds for these two hypotheses?
First: IIT distributions within and outside the EEC should be similar, unless the tariff structure in such as to change the pattern of specialization, besides decreasing IIT with countries outside the EEC.

Second: the causal direction assumed is due to the European structure of trade of manufactures. This structure is the outcome of decisions which put imports and exports in the EEC as determinants of imports and exports in other OECD countries. In other words: if IIT or cross-hauling is strong in the EEC this feature of specialization in Europe will be transferred to non-EEC markets. Consider, for instance, the Italian automotive industry: whenever we see from figures a fair amount of matching of exports of Fiat's to France with imports of Renault's to Italy we expect to find also a similar, yet lower, matching of exports of Fiat' s to Sweden with imports of Volvo's to Italy. This happens because many European countries opened their trade first in the EEC. Their specialization in the EEC, or the range of differentiated products they sell in the EEC: depends depends on some "peculiarities" countries have in their consumption habits and in their culture, as Linder (15) pointed out. These "peculiarities" found their consistency first with other EEC countries and then became one of the most important variables which determine their trade specialization. Incidentally these variables should be used to "close" all models à la Krugman to determine which country produces which goods.
To sum up: the kind of trade specialization forged in the EEC influenced trade with other industrial non-EEC countries. So "the international division of labour" which results from trade figures of area 2, is a sort of "residual" determined by the "division of labour" primarily established in the EEC. If industrial policy in the EEC were more effective the above statement would be even more stringent.

Whether what is said above is true, and how much it is going to be relevant is the object of an econometric test. The nature of data and the very partial ability of the

Grubel-Lloyd index to describe the international specialization should generate some caveats on the answers we would like to get from this test.

We estimated a structural equation on a cross-section of 1979 data for 8 countries (Belgium and Luxemburg are in Belux). The specifications used are two:

the first one

$$IIT_{i2} = \delta + \zeta \; IIT_{i1} + \mu_i \qquad \text{(XXI)}$$

where IIT_{i2} = IIT index in area 2 in sector i

IIT_{i1} = IIT index in area 1 in sector i

The estimation of this equation has been performed on SITC indices of IIT calculated on 3-digit industries from EUROSTAT data (see appendix 1 where those IIT indices are shown).

The second one:

another specification has been used, as the dependent variable varies within an open interval which goes from 0 to 1. It is based on a logistic transformation of the dependent variable,

$$\log \{IIT_{i2} / (1- IIT_{i2})\} = \pi + \gamma \; IIT_{i1} + \omega_i \qquad \text{(XXII)}$$

where the dependent variable is the logarithm of the odds that a particular specialization in area 1 will give rise to an analogous specialization in area 2 (16).

In table 4 we grouped all the results of estimations of the two different specifications. We estimated (XXII) and (XXI) primarily on one sample made up of four major industries (SITC 5,6,7,8) and then on four subsamples, one for each of the four industries. The purpose of that was to test

the stability of coefficients across industries. We then computed a Chow statistic (which can be found at the bottom of table 4 for each country) in the following way

$$\frac{(RRSS - \Sigma_i URSS_i) / (k - 1)}{\Sigma_i URSS / (\Sigma_i n_i - 2k - 2)} \qquad \text{(XXIII)}$$

where $i = 1....4$ number of subsamples

k = size of the entire sample

n_i = size of subsamples

RRSS = restricted residual sum of squares, i.e. calculated on the entire sample

URSS = unrestricted residual sum of squares, i.e. calculated on the four subsamples (17)

The results of this test say that the stability of coefficients is more common than the instability (except for Italy and U.K.) since in most cases the critical value of the F statistic with 2, 142 degrees of freedom is not reached.

Table 4 needs few comments. In many cases the significance of coefficients is not sufficient and the non-logit specification often seems to perform better than the logit one (logit specification in table 4 is the one with the code A12 while the non-logit is the one with the code IIT12). The signs of coefficients are the opposite of what is reasonably expected in a couple of cases only. In most of the countries and industries the coefficient level is very low.

All of this means that the pattern of trade in area 2 of EEC countries cannot be claimed to be dependent upon the pattern of trade in the EEC, as we expected. The issue we wanted to prove is not settled. In other words the patterns of specialization of EEC countries differ within and outside the CU (18) and no causal relationship there exists among these two.

A deeper analysis of industrial data in appendix 1, or the use of a different measure of IIT might provide new evidence. The present state of this research does not permit us to give a different answer.

What Sazanami-Hamaguchi wrote as a comment to their tests on 1972 data: "The industries where levels of IIT were high for area 1 also experienced large IIT in area 2" does not hold on 1979 data.

TABLE 4 REGRESSION COEFFICIENTS OF IIT OF AREA 1 ON IIT OF AREA 2 USING INDUSTRIAL DATA OF IIT (3-Digit sectors of 5.6.7.8 SITC classification)

		ITALY	FRANCE	GERMANY	BELUX	NEDERLAND	U.K.	DENMARK	IRELAND
AI2.5	Coeff	.639E-4	.3279E-3	.2917E-3	.4296E-3	.3106E-3	-.644E-4	-.776E-4	.5231E-3
	(t)	.4147	2.3709	2.1860	2.4146	1.3840	.3809	.5992	3.5011
	Inter	6.77	3.1021	2.9467	2.6161	3.4621	5.7556	5.0792	1.7240
	(t)	7.9148	2.8249	3.0111	1.9475	2.0350	5.0857	7.5787	2.1943
	R^2	.0074	.1964	.1720	.2022	.0769	.0063	.0154	.3477
	SEE	1.3796	1.1417	1.2622	1.5761	2.0603	1.5128	1.9434	2.2342
IIT12.5	Coeff	-.1428	.3583	.3926	.3162	.2302	.0752	.0884	.4537
	(t)	.5951	2.3385	2.2490	2.5165	1.6605	.3383	.3678	3.1690
	Inter	6399	5268	4901	5115	5860	7067	3709	2261
	(t)	3.2728	4.7400	4.7390	5.4301	6.0462	4.0424	2.4559	2.7133
	R^2	.0152	.1921	.1803	.2159	.1070	.0050	.0058	.3039
	SEE	1851	1546	1785	1635	1808	1860	3119	2601
AI2.6	Coeff	.2842E-3	.6477E-4	.3955E-4	.2479E-3	.2035E-3	.2613E-3	.2255E-3	.1649E-3
	(t)	4.7937	.4943	.2832	2.1815	1.8869	2.3211	2.5888	1.7001
	Inter	2.9558	4.8792	5.3547	3.1362	3.4855	2.9565	3.9649	2.7945
	(t)	7.0779	4.8288	4.6674	3.9667	4.2444	3.3910	8.1747	4.8328
	R^2	.2789	.0049	.0016	.0869	.0665	.0973	.1182	.0546
	SEE	1.2830	1.6494	1.6992	2.0287	1.5548	1.7590	1.7674	2.2301
IIT12.6	Coeff	.4930	.0416	.0260	.2327	.2446	.2456	.2787	.2529
	(t)	4.0172	.4330	.2580	2.0970	2.0896	2.4875	2.1428	1.700
	Inter	3302	7249	720	5275	6187	6026	3207	4093
	(t)	4.6023	11.098	10.916	7.8226	10.014	9.4845	3.8337	5.7990
	R^2	.2440	.0037	.0013	.0808	.0803	.1101	.0841	.0546
	SEE	2440	1777	1719	2420	1955	2084	2746	3159
AI2.7	Coeff	-.2499E-5	.5725E-4	.1753E-3	.1859E-3	.6724E-4	.1061E-3	.1469E-3	.4500E-3
	(t)	.3161	.5207	1.5376	1.6441	.3614	.7588	2.0226	2.8836
	Inter	5.3430	4.7793	3.7591	3.6515	4.9634	5.1363	4.5316	1.1434
	(t)	8.8607	5.7655	5.0651	4.5103	3.7764	4.5510	9.7522	1.3484
	R^2	.0000	.0063	.0521	.0591	.0030	.0132	.0869	.1621
	SEE	1.1150	1.4739	1.3328	1.4837	2.6349	1.6852	1.4838	2.7054
IIT12.7	Coeff	.8530E-2	.1103	.2443	.2211	.0646	.0977	.4477	.3214
	(t)	.5877E-1	.8840	2.2127	1.9492	.5567	.9560	2.7116	2.7280
	Inter	7275	6611	4943	5682	6382	7158	2848	3608
	(t)	7.3253	8.2407	7.6078	8.3630	8.8897	9.0597	2.5652	6.4149
	R^2	.0001	.0179	.1022	.0812	.0072	.0208	.1460	.1475
	SEE	2150	2025	1688	1917	2151	1818	2878	2440
AI2.8	Coeff	.4375E-3	.1927E-3	.1399E-3	.3679E-3	.5027E-3	-.5753E-4	.1602E-3	.3602E-3
	(t)	5.5707	1.5573	1.2956	3.7531	3.0678	-.5101	1.1412	2.3494
	Inter	2.5343	4.1795	4.8241	2.0899	1.8547	6.3940	4.9099	2.8148
	(t)	6.3621	4.3168	6.1222	3.1976	1.5982	7.0447	5.9185	2.5291
	R^2	.5441	.0853	.0606	.3514	.2658	.0099	.0477	.1751
	SEE	1.2128	1.1609	1.1548	1.1257	1.8765	1.1555	1.9004	2.1515
IIT12.8	Coeff	.7541	.3147	.2605	.5042	.4146	-.0591	.5048	.3743
	(t)	5.5722	2.0558	1.2559	3.8727	3.2526	.2449	2.5456	2.4126
	Inter	682	5429	5144.4	3948	4317	8251	2014	4610
	(t)	.9327	4.8823	3.3487	5.6718	5.2217	4.4951	1.4730	4.5795
	R^2	.5443	.1398	.0572	.3658	.2892	.0023	.2020	.1829
	SEE	2049	1705	2036	1793	1893	2007	2372	2487
AI2. Overall	Coeff	.2201E-3	.1291E-3	.1859E-3	.2980E-3	.2054E-3	.1395E-3	.1457E-3	.3575E-3
	(t)	4.9868	2.0151	3.0471	4.7945	2.4588	1.9994	2.9620	5.4396
	Inter	3.7894	4.4458	4.0120	2.9074	3.5672	4.5732	4.4894	2.0439
	(t)	13.268	8.9867	8.8625	6.6176	5.8094	8.2765	15.649	5.2115
	R^2	.1439	.0267	.0590	.1344	.0392	.0263	.0560	.1666
	SES	1.4652	1.4312	1.4512	1.6672	2.1099	1.6798	1.7566	2.4107
IIT. Overall	Coeff	.3889	.1502	.2284	.2985	.2096	.1606	.3403	.3662
	(t)	5.1446	2.4455	3.4412	5.0874	3.5676	2.6266	4.0117	5.2255
	Inter	3571	6534	5735	5077	5837	6572	2999	3619
	(t)	7.2615	15.495	13.010	13.987	15.463	14.715	5.3615	9.7334
	R^2	.1522	.0388	.0741	.1488	.0792	.0445	.0981	.1558
	SEE	2511	1799	1880	2033	1991	1934	2787	2770
Chow Test for stability of coeff.s performed only on Log.struct.		32.5	unst.	2.2	st.	4.6	st.	3.8	st.	5.8	st.	10.0	unst.	4.5	st.	5.6	st.

6. Conclusions

We have shown empirically (tables 1 and 2) that IIT is CU-biased: i.e. it is higher within an integrated area than outside. This is what can also be deducted theoretically. Using a general equilibrium model of Krugman's type we have seen that,when two countries are similar in all respects, but display non-symmetric tariffs, the level of IIT will range between a range narrower than 0 and 1. The econometric test has tried to see whether there exists a bivariate relationships between IIT in area 1 and IIT in area 2,when the casual link is from area 1 to area 2. The answer of this test has been on the 'short side' of our question. In fact the relationship between IIT in the EEC as a determinant of IIT outside the EEC is either ill-specified or absent. This is just the opposite of Sazanami and Hamaguchi's (1978) conclusions.

There are some other conclusions which can be drawn from this study: some of them are more general, some are less general of the ones outlined above. It seems that IIT is more relevant in the EEC than outside even though for some European countries IIT seems to be less EEC oriented, as table 2 shows. Moreover IIT, as it has been theoretically specified, involves a certain degree of vagueness about which country produces which goods, and about the level of IIT. In fact from theoretical models of the kind used here we can deduce only a range of IIT possible values. These questions can be tackled either by resorting to Linder (1961) (20) or to Helpman (1981). But the casual nature of specialization of similar countries remains an important question which should be properly answered. A further consequence of this is that regional policy will have weaker grounds the higher is the level of IIT, as

a consequence of countries similarities. Unless one thinks that IIT, in areas such as the EEC, is the outcome of past, autarkic policies, there does not seem to be any chance of guessing from trade specialization any information about the most correct industrial policy for a country. In addition to that, the conclusion that IIT is not a definite feature of an industry,makes the above conclusion even stronger.In fact IIT changes its distribution across industries as we go from EEC to non-EEC countries.

Indices of IIT at 3-digit level of disaggregation (SITC).

TABLE 3 INTRAINDUSTRY TRADE IN EUROPE IN AREA 1 AND 2:3-Digit industries of SITC classification

SECTOR 5	ITALY		FRANCE		GERMANY		BELUX		NEDERLAND		U.K.		DENMARK		IRELAND	
SITC Code	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2
511	.3521	.9676	.9654	.9880	.9979	.8032	.7563	.0593	.5535	.7739	.8171	.7884	.0656	.4207	.2539	.0127
512	5417	7906	9536	7226	7794	4436	8247	9209	9260	9223	8484	4764	1905	4112	1554	0519
513	5717	7896	8174	8508	6458	4171	8704	8924	8509	9545	9431	8812	6020	7461	6041	9742
514	5559	9325	8690	6317	8257	5764	9616	8424	7031	9942	4705	9766	2833	9010	9086	7650
515	6649	8530	9900	5607	6541	6317	5590	9054	7113	4384	9223	7804	7996	6802	5413	7422
516	4977	7617	8802	7861	8816	5676	7533	9861	8185	9858	7937	8901	7716	1253	3165	8091
522	6196	9854	9164	7999	6215	6564	7958	6760	9756	8783	9848	9619	0795	2837	3866	3767
523	5680	7869	7858	8498	5068	8373	6634	8920	9675	5461	7756	8099	1212	2370	1473	4623
524	6838	5120	7643	5359	6058	2076	3767	0487	6199	1369	2944	4282	0003	9576	0005	0538
531	3055	5797	8547	4047	2572	3642	7588	3748	6490	5776	9392	6653	9697	0019	0766	2266
532	1795	9806	6082	4838	3542	1850	6336	9029	4879	4342	6206	9574	6323	6359	0003	0050
533	2598	7244	7279	7610	7805	3714	9367	6858	8884	6130	8509	6030	7229	7756	5470	2199
541	7703	9812	8100	7772	9861	7184	9512	8367	8316	9993	6515	6889	9328	7971	7200	2498
551	7222	8202	5808	5264	5137	8028	4195	4251	8054	5029	9687	9952	2920	5978	9292	9659
553	5493	9054	3533	1086	6852	4559	8336	7472	5278	6565	8763	6020	1924	6577	5583	9221
554	1565	5956	6253	8895	6654	3736	8847	9665	9675	8421	7615	4301	5362	5699	7317	2798
562	8031	3763	4178	7337	9162	9935	5141	7180	4082	3339	9238	7242	1972	0228	0805	1113
572	5479	9915	7144	7832	9163	9542	4105	5870	8541	1787	7572	7556	0002	5532	0015	0050
582	6601	7605	6757	9081	7232	5255	8152	6915	4966	8073	7415	7625	2888	6468	5570	8442
583	7212	7277	9540	6720	9567	4233	6411	6406	7273	6158	7050	9529	2852	6487	3429	8061
584	5341	9294	7535	9020	5975	3898	6745	4973	8657	2100	5850	6559	1681	5178	2947	8894
585	7277	7239	9841	8877	8972	5555	6399	9293	3296	3913	8296	8802	4672	8620	9209	7728
591	3539	8746	7536	4745	4948	5682	7030	4740	9370	8027	7447	7360	3800	6556	2556	0045
592	3836	8193	7153	4863	7563	5448	9798	9722	6353	7892	3717	9922	7994	7763	7743	0576
598	4118	8795	9424	8961	6905	5328	9902	9053	8477	8289	9371	8151	7612	8222	7070	7610
5	5767	8056	8191	6606	7927	5332	7514	6778	7125	7819	7526	7667	5127	5577	5317	5660

TABLE 3 SECTION 2

SECTOR 6	ITALY		FRANCE		GERMANY		BELUX		NEDERLAND		U.K.		DENMARK		IRELAND	
SITC Code	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2
611	.6603	.8211	.9910	.9114	.4816	.8800	.9161	.5665	.9733	.6185	.8356	.9334	.4865	.5306	.5802	.6054
612	1929	1078	3921	5821	7514	9683	9029	9984	8662	6335	7327	4144	7550	8178	3099	6625
613	7091	5763	8668	9460	6038	5780	6224	8574	6348	7003	6127	5377	6664	3551	9197	2500
621	6095	3039	9178	9975	9302	6481	8855	8805	6231	5953	9501	6485	5629	8199	9490	8210
625	8785	3873	7863	5869	8371	7587	9427	9622	8431	7708	9847	6931	1352	3718	9315	4822
628	9021	6858	8578	8663	9004	7971	6938	6320	9285	6260	7363	9352	8899	9329	6776	1872
633	8027	2321	6671	0538	7540	1712	2629	0045	9399	0919	2437	3626	9554	0997	0004	0006
634	5375	6584	7576	5347	9618	4769	4752	3093	5246	0526	3799	0520	5326	4293	2445	0022
635	2199	5787	7820	8734	8145	8847	4266	2129	9036	3546	7471	2336	1731	8556	6373	1153
641	7934	6304	9674	2206	9040	3452	9533	2131	9383	2147	8125	1535	9051	1252	5430	0850
642	9047	7388	7526	8654	6707	9418	8989	5959	9032	6717	8957	8467	8169	3791	5140	2846
651	9807	8043	8683	8147	9903	9890	9584	5257	9983	9349	9926	8448	2406	2476	9832	8399
652	8797	7736	9782	6678	9949	9185	9809	6428	9919	8940	6636	6193	5307	5781	7970	1075
653	4577	3807	8699	8780	9532	5678	7511	4031	8960	9730	4085	5033	4648	9694	7099	4840
654	2431	0926	7567	4078	3761	5430	9713	2342	7414	3499	9214	1832	3286	5921	6748	3082
655	4134	4831	6048	9677	9292	6149	6708	4419	8159	7899	9537	9184	2702	7696	5925	5452
656	9283	4575	7039	6081	6802	8671	9513	3406	8728	6380	9845	5043	3797	8952	9156	2564
657	8774	7554	7088	9474	9970	6646	8225	7319	9241	8655	8691	8517	5853	7417	7870	7357
658	5060	6494	6793	7174	9857	9979	8552	8899	6357	4764	9673	4748	9815	7235	8557	5025
659	5949	8389	2849	8939	5318	7273	3413	0875	9767	4918	9935	6672	8174	2312	9490	1934
661	0911	0804	9743	6240	6774	7461	5108	9799	1882	2636	7695	2986	6928	9267	5303	0409
662	1844	1791	4112	9847	8770	6905	4754	3067	9629	9093	9923	5910	4055	9870	8304	6205
663	8918	7429	8810	9032	8579	7021	9708	4499	9000	7621	8610	7829	7857	8448	5490	6306
664	8226	8562	8346	8423	9882	6277	5189	2612	6807	9875	8193	8735	7675	8313	5038	9952
665	9239	2925	7242	2847	8504	6072	9811	9495	5923	5009	5431	8878	5379	7750	9011	0968
666	7113	2604	6959	7832	9405	4757	6460	7618	4981	4123	5528	1993	8972	4303	4872	4017
667	0726	0462	4433	4442	5778	9732	3682	6865	8941	5354	2917	0151	2654	0831	0684	4183
671	4981	1189	7149	5876	9563	3075	7960	2866	7149	2026	9387	2460	0976	0311	0002	3913
672	2631	5430	6095	2641	8749	8190	4818	6854	2823	4461	7196	7349	4867	6904	0759	1384
673	9199	9321	8212	6697	8252	9675	5065	3609	4637	8206	9284	8630	4041	5601	1677	0635
674	6393	7832	8143	4905	9408	7504	3227	3110	9422	4663	6642	9015	5642	6852	1099	0767
675	2797	8870	9937	3716	9519	4963	4089	2289	4720	6592	6429	8464	0496	7746	0754	9154
676	0426	7814	4509	0412	2509	1015	9291	0390	3425	0916	8804	0079	0878	1317	1827	0645
677	7870	9595	7966	5599	9035	6841	3047	0483	5694	9337	6284	5529	0828	5232	0389	0288
678	6486	7067	9718	9180	7522	6093	8307	7306	6428	6513	8342	9339	2899	8159	2369	1469
679	8136	6636	8915	6537	7338	2374	4171	9487	6750	9433	6236	1643	4238	2884	0001	5122
681	3358	0704	5191	7097	8275	7788	5448	6528	9635	1011	4912	4796	4311	4417	2982	0147
682	5365	4641	6422	5918	9085	9079	3057	6214	6441	8167	7202	6790	4672	2871	3051	6854
683	0820	0447	8214	2372	9709	4793	3589	0286	7686	0705	3659	7725	0002	0367	7895	7127
684	.5399	.6499	.9318	.8481	.8758	.7853	.8161	.6201	.7422	.2408	.9390	.5231	.5100	.4724	.2075	.0813
685	3976	0905	8891	1880	9762	9002	9449	0181	5229	2044	3034	1796	1524	2497	9689	0015
686	3138	6008	7298	6918	5988	9960	4404	8948	4250	1076	4084	1088	0003	0283	1138	0519
687	3672	0879	3615	3317	8886	7203	5496	8755	8705	7247	2774	7152	7229	3515	0003	3636
689	9571	3537	5988	6673	8012	0694	1549	5577	7205	2976	8798	0165	0002	4561	4817	6816
691	4212	2299	9367	1699	9098	7581	7381	9425	8364	8276	7963	7579	7884	9278	3617	8999
692	8283	7363	9566	6356	7687	5253	9290	8243	5944	8480	7704	5788	7065	9534	2469	0512
693	8160	3904	7993	3326	9254	2148	4017	0932	4910	3356	8681	4642	1810	7056	3735	0849
694	3738	6310	6225	8302	7581	7108	7083	5056	7232	7742	9966	8170	4967	9319	8229	1158
695	7510	7877	7755	6684	5780	8290	8172	6286	6731	5450	9107	9209	5773	7059	8006	5274
696	9335	7710	6548	7412	5519	8601	1627	1001	9088	8206	8131	8293	1241	5619	5019	7426
697	4283	3459	8911	5045	7587	6723	4974	7189	7898	6321	7746	6999	9166	9952	6726	7248
699	6292	7668	7071	7884	7112	6431	6872	7524	6876	7965	9691	9772	5904	8382	9038	5992
6	6188	5505	7887	6055	8431	6936	6088	5829	7714	5162	7542	4107	5293	5370	6249	3275

TABLE 3 SECTION 3

SECTOR 7	ITALY		FRANCE		GERMANY		BELUX		NEDERLAND		U.K.		DENMARK		IRELAND	
SITC Code	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2
711	.7664	.7460	.6542	.0660	.3962	.0368	.7761	.3428	.5520	.1555	.8439	.1374	.6762	.2035	.1353	.0581
712	9703	8951	9553	1609	6757	1924	6543	8933	3623	4252	6194	2716	4657	4911	9865	0071
713	8808	7537	9703	5232	4854	3977	3667	2258	5189	6262	7985	5813	4666	8379	3752	2742
714	6515	7021	9721	6593	9886	7855	9915	5299	6038	8204	9531	7911	2180	2661	5913	3297
716	8034	8426	9817	6579	6889	7451	6173	2876	6113	6366	8917	8749	7246	8602	6569	3656
718	5717	8242	3357	2744	5209	5833	6797	4487	1222	9088	2699	7672	2364	8126	7885	3297
721	9045	3862	6254	3858	6727	4968	6124	9188	9394	8109	8455	9517	9767	5179	2299	1013
722	8440	0997	6226	5861	5343	0982	7057	3022	1051	3897	7944	0658	0358	2773	0845	0010
723	9762	8430	8953	4969	9105	5197	8754	3387	6545	4176	9830	7831	1904	4849	3415	0957
724	8160	7630	5953	8934	4623	3971	7371	7939	7747	9754	8130	8531	7407	8926	2773	2976
725	9912	8393	6228	9385	4472	3889	5119	2368	7363	4055	6414	9839	3453	9255	6326	4532
726	7258	7860	5801	9904	3109	4095	4352	5379	5902	4955	8168	9686	3170	7368	2016	1606
727	7748	4440	5854	8430	5502	3821	4368	6034	8696	6150	8114	8980	9028	3760	3171	1427
728	7028	3132	5763	5159	5664	4527	5896	9309	8075	9460	7397	8008	7805	7864	3551	2066
736	9425	5795	6555	8686	5168	6311	7821	9948	6782	6553	5689	9328	5031	8788	3557	3747
737	8220	7760	8715	7607	6381	5621	6099	7444	8326	4746	6148	9247	9605	9365	1438	7481
741	5203	3367	7558	4698	8530	6244	6498	9717	7977	8428	8134	9310	8379	5764	6364	8179
742	6946	7233	7958	7674	5536	4732	7598	5568	5944	8530	9881	8192	7642	7715	7212	9652
743	7036	6440	6784	7089	7031	5531	9164	8581	7128	7601	9455	9344	9973	7323	4431	6494
744	9471	6333	9464	5677	6498	6332	5651	4090	7889	6112	9718	9619	9206	8443	4901	7732
745	7531	5878	4770	9185	4444	4715	5804	5702	7127	6426	7872	9304	9352	7536	4123	4700
749	9914	7020	7726	7824	6504	5987	6179	7223	6600	6529	8989	9455	9197	8846	5389	6675
751	9582	8668	1790	4723	8997	9503	3549	1880	8785	7960	8897	8395	5878	9878	7364	4983
752	2002	8051	9278	9804	9355	6455	7549	3770	4919	2273	7297	5059	3033	3501	2934	8167
759	6200	9068	8868	6504	8461	7469	9819	4579	9816	7306	9278	8928	5824	6109	8488	2625
761	3241	4158	3362	3591	2655	9226	5335	4766	6547	0001	8881	3534	6187	5848	1846	0071
762	7024	6161	5951	5457	5274	4881	4475	6249	8410	0001	8528	0727	7670	6394	9190	1171
763	9943	1876	5082	2836	6924	3625	5543	1050	9281	0014	8712	6587	9414	4857	2089	0078
764	7159	8906	8146	9332	7971	8671	9677	7098	8737	9188	9165	8947	9957	9502	8152	3414
771	4134	7220	7458	7235	6471	8421	9680	8446	9571	6087	7367	9180	4263	8661	9654	8559
772	6049	8703	9575	6482	6095	7462	8716	6638	7598	7342	8009	7701	4999	9131	8403	4613
773	6284	7343	8041	4976	6140	8446	9643	5451	7583	0361	8361	9048	2368	4625	7522	2180
774	7174	7688	9108	7247	5587	6877	9411	2620	7064	2941	9952	8581	9927	5010	8303	9224
775	2855	2378	7739	3649	7284	4647	2820	5993	6149	7949	6226	9891	8508	6271	5298	9790
776	7516	4531	7756	9525	9417	7994	6067	1481	6878	2619	9172	5333	3052	1630	5577	9302
778	8081	8928	8767	7753	6954	7049	9101	5109	8583	6155	8742	9682	4396	9575	5059	3561
781	7875	5573	5989	4395	7997	2626	9546	7825	1906	3199	2122	7097	0490	2769	4595	0008
782	6263	8851	8411	7592	4480	2538	8922	7686	8951	8540	9400	6463	0713	1772	1237	0001
783	9703	6075	2371	5543	4426	1647	8535	6176	4485	9444	3168	1680	1470	2551	1157	0437
784	.9747	.2268	.8302	.1328	.5705	.2617	.6195	.5808	.5245	.3897	.9127	.4213	.5615	.7463	.2738	.4138
785	1955	4866	9286	8291	9003	6264	5114	3566	7324	1303	8404	3648	1296	5103	3291	0001
786	8780	3264	7160	3236	5207	5022	8490	9397	5763	7302	5616	5965	7067	6219	6527	5680
791	4320	8937	7305	2234	4388	5576	3404	2473	2721	4374	7120	6822	0995	1665	1809	0567
792	9139	7661	9963	5234	6876	2887	7702	0712	8649	4556	6918	8536	7799	2187	1391	1611
793	7336	8084	8163	3684	4270	9921	5793	3585	8099	5034	9476	9650	3051	9894	5284	0795
7	6604	6047	7619	5745	6687	4918	7836	5664	6334	5839	7116	7162	5760	6595	4534	4070

TABLE 3 SECTION 4

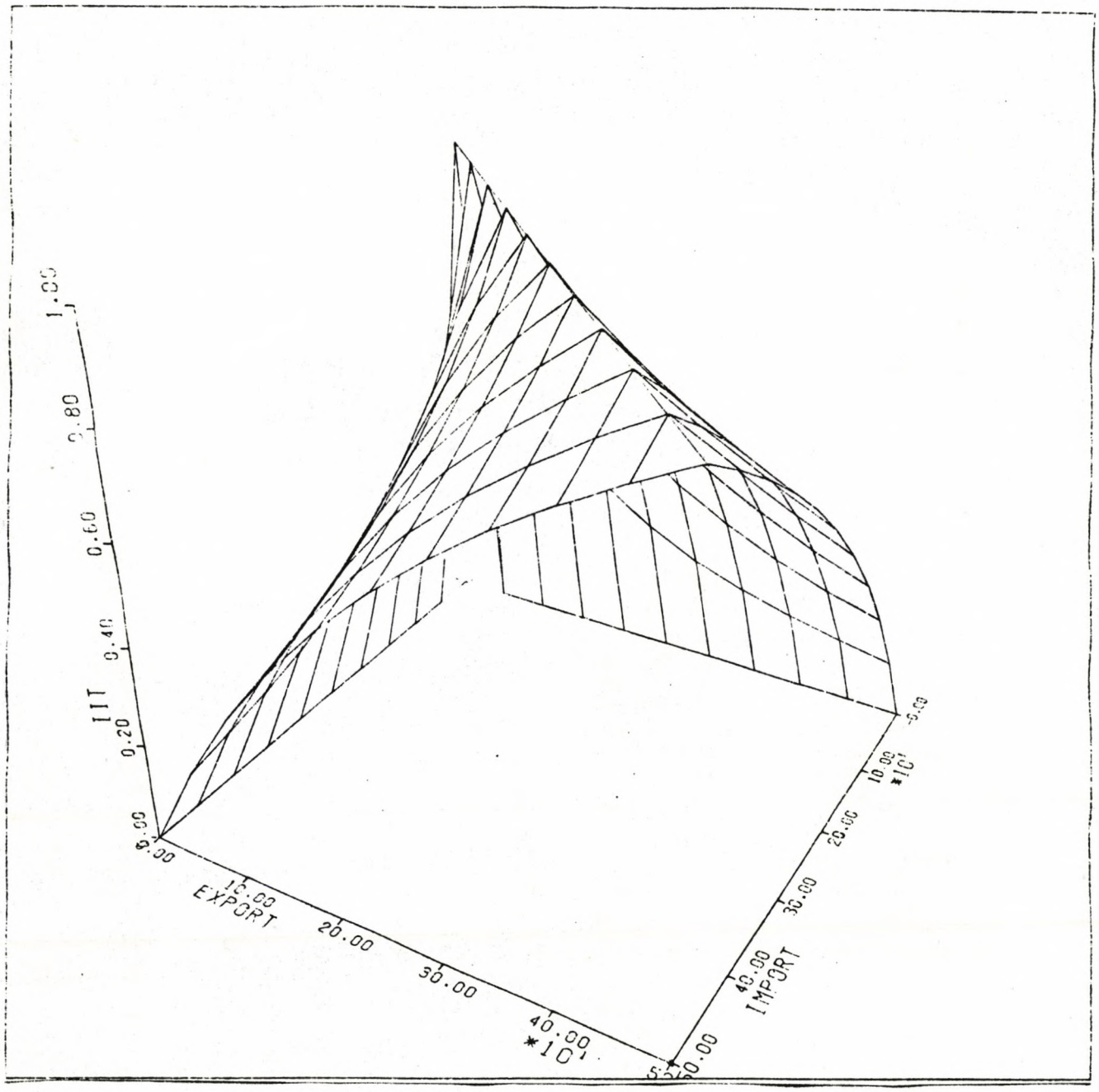
SECTOR 8	ITALY		FRANCE		GERMANY		BELUX		NEDERLAND		U.K.		DENMARK		IRELAND	
SITC Code	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2	Area 1	Area 2
812	.3325	.3469	.6932	.6297	.9954	.8394	.9443	.4387	.7704	.9855	.6925	.9009	.6346	.7500	.6581	.4649
821	1237	1294	4429	8399	8969	7469	9152	8507	4610	5489	8154	8713	5463	6866	5014	1977
831	0710	0420	5703	3797	5182	6345	5640	4027	7002	0583	6842	8202	4931	5799	4387	9281
842	2310	2104	8362	7697	8025	4317	9442	7532	5573	5975	8902	6441	2254	7173	5969	6506
843	1680	1251	7003	2461	9470	8206	6745	7377	4579	3833	8827	5626	4234	5594	8572	4456
844	1459	4051	9353	6893	9891	4280	5337	4762	8183	9002	9225	6048	5589	5571	2504	7930
845	0609	0602	7619	8265	4786	8213	4040	4088	3302	2783	7098	6805	7372	3831	6547	4744
846	2369	7883	9151	8645	8127	7110	4784	1153	5602	9015	9309	5831	5196	8915	9641	2059
847	1396	1980	6859	7129	5762	5556	5754	3219	5408	1341	9179	7045	2994	7064	3737	9412
848	1721	2963	3093	7611	5061	3965	5778	3158	7922	4755	6802	9590	8264	7056	7346	9226
851	0261	0533	7896	9037	2587	5609	1782	0725	4251	0888	5403	6370	3014	9967	4297	2665
871	2109	4042	5410	2457	5022	8097	7239	4597	7537	3726	9884	6443	2874	3311	2796	0143
872	6720	7004	5262	6193	7698	7284	9952	7863	7474	8854	9880	8780	8300	8836	3881	4448
873	2599	8664	9884	3994	2895	5225	4720	0556	5450	7262	6398	7997	2664	2774	1116	1254
874	7632	5337	7807	7040	7370	8829	6322	3234	9645	6069	8088	8303	8515	7674	8762	9961
881	8499	7936	3013	2961	5236	8854	7663	2396	8195	4720	9806	6005	7954	8203	8599	9992
882	5967	5896	9163	7484	9069	8735	5047	3454	9523	6551	9424	9325	1380	2597	2190	0851
883	4294	5856	8224	8283	5533	9661	3939	5564	7491	9711	2882	6788	4585	8261	7295	2280
884	9304	7243	5778	6561	7126	8855	5455	0713	3436	5036	5444	3340	1069	3145	9852	9171
885	8729	5491	9333	8604	6077	9555	3593	1923	4426	6234	6665	5597	2385	4296	7468	4012
892	3597	3491	6372	9088	6947	4976	7738	8043	9593	6573	9745	6667	8707	9910	9783	6159
893	5076	5342	7921	9476	7376	6326	7973	7478	8023	5939	9339	8746	8291	5970	9281	4576
894	4086	5938	6563	9783	9109	9370	6519	4914	6412	5235	7388	8993	9393	5819	9938	7896
895	9918	9857	9707	9044	5330	6148	2223	2721	5409	7146	8293	9715	3348	9978	9458	8989
896	5917	2687	7793	5034	6971	6604	9578	8436	9964	7594	5828	9878	6819	9861	9655	9052
897	1075	0259	9923	6225	8005	3910	4818	8999	2617	0380	3303	8420	4147	5948	7605	7713
898	5592	8938	9489	7438	8888	9087	8442	3343	9924	9212	9879	5908	3503	3587	8563	4829
899	7807	7941	9247	8790	9875	9753	7401	7615	9533	9993	9813	7795	9603	8316	8378	6398
8	2473	2615	7247	7307	7261	7374	7079	4843	6683	3483	8053	7790	6415	6872	7069	6401
Overall	.5557		.7723		.6812		.4762		.6722		.8424		.5875		.5437	
IIT	5567	5304	7746	6249	7450	5846	5851	2385	6965	5170	8635	6249	5639	6162	5658	4469

SOURCE: my computations on EUROSTAT data with the gentle support of the computer centre of IUE in Firenze

8. Appendix 2

We present the 3-dimensional diagram of the Grubel-Lloyd index as a function of imports and exports (*).

FIGURE 2



(*) We are grateful to Dario Sermasi who provided computer facilities for this graph.

Footnotes

(1) See Krugman (1981) where the volume of trade of HOS kind is function of the degree of diversity of relative factor endowments of countries engaging in trade of both IIT type and HOS type.

(2) See Rossini (1982, 1983).

(3) As said above these parameters are the elasticity of costs and the elasticity of substitution in demand. See Stiglitz-Dixit (1977) Krugman (1979, 1980).

(4) Grubel-Lloyd index for IIT, when measured in industry i, in country j, is

$$IIT = \frac{\Sigma_i (X_{ij} + M_{ij}) - \Sigma_i |X_{ij} - M_{ij}|}{\Sigma_i (X_{ij} + M_{ij})}$$

where X are exports and M are imports.

We present in appendix 2 a diagram in 3 dimension of Grubel-Lloyd index, which can be used by the reader to see the non-linearities of the index.

(5) The enlargement of the EEC to U.K., Denmark and Ireland was marked by the following stages which are of interest for our data: 1972-last year before the official start of the CU. 1973-the CU is enlarged and a transition period staffs with gradual lifting of trade barriers.
1979-last year of transition period.

(6) See also Pelkamns (1983) chapter 8.

(7) See Dixit-Stiglitz (1977).

(8) Take the case of a CU made up of two countries A and B. Suppose that they are all alike. Consider an industry made up of two equal monopolistic firms (yet rule out interdependence, since n firms would be more correct).

No trade is there before the CU, since equilibrium is at B (Fig. 1). At point E each country will have one firm for each industry. Trade creation and IIT will arise and will equal one in each industry considered.

(9) Yet lower tariffs of ROW are not a necessary condition, since economies of scale can counteract the effects of even higher tariffs in ROW.

(10) See Helpman (1981), Krugman (1981).

(11) We can get the first order condition from individual maximisation of utility.

$$\theta\, c_i^{\theta-1} = \lambda\, p_i$$

where p_i = price of the i_{th} good

λ = shadow price or marginal utility of income

(12) Profits are

$$\pi_i = p\, x_i - (\alpha + \beta\, x_i)\, w$$

(13) See Brander (1981)

(14) See Pelkmans (1983)

(15) See Linder (1961)

(16) See Pindyck-Rubinfeld (1976) pg. 248

(17) For this test see Maddala (1977) pg. 198. To do this test it is assumed that (XXIII) has an F distribution, with degrees of freedom k+1 (where k is the size of the entire sample) and $\Sigma_i n_i - 2k-2$ where n_i are the sizes of the subsamples.

(18) See Pelkmans (1983)

(19) See Sazanami-Hamaguchi (1978) pg. 57

(20) See Rossini (1983)

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