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

Gianpaolo ROSSINI

1. INTRODUCTION

Intraindustry Trade (IIT) is one of the outstanding facts which can be observed in trade figures of manufacture 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 industrialized 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 industrialized 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.

[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.

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. Surprisingly 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 in 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 Tables 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 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

[2] See Rossini (1982, 1983).

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 use the Grubel-Lloyd index[4] even though other measures of IIT are 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.

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.

[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

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

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.

TABLE 2. OVERALL INTRAINDUSTRY TRADE IN MANUFACTURES (SITC INDUSTRIES 5, 6, 7, 8) IN AREAS 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	.3046
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).

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 index on areas 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 area2 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 in 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 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.

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 (Fig. 1) depicts the equilibrium of a firm in perfect monopolistic competition before and after the establishment of a CU. LAC is the long run average cost curve. *DD* is the

[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 starts with gradual lifting of trade barriers. 1979—last year of transition period.

[6] See also Pelkmans (1984), Chapter 4.

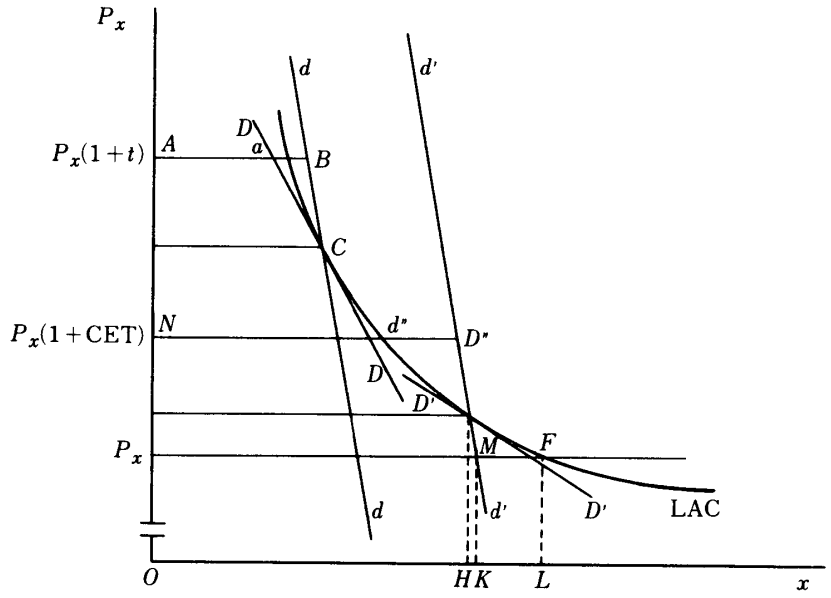

Fig. 1. This graph is a modified version of a graph appearing in Pelkmans (1984) Chapter 4 by Pelkmans-Rossini.

"true," in Chamberlin terminology, demand schedule, while *dd* is the "perceived" one.

In perfect monopolistic competition firms earn "temporary" profits in the short run, yet in the long run profits will be competed down to zero by new entrants, as no barrier to entry is assumed. Product supplied x is 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]

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 equilibrium could be anywhere between B and C in the short run. Yet long run equilibrium is at C. When short run 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 long run equilibrium as well, with no profits. Domestic production would be accompained by imports. If we make the assumption that short run equilibrium is at B, as AB are only imports, long run equilibrium will shift to C. At C profits are zero due to new entrants. In the long run 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 long run the domestic firm will be at E, although intra-union exports are protected up to $P_x(1+\text{CET})$ (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

[7] See Dixit-Stiglitz (1977).

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 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 rest of the world, if the rest of the world has low tariffs.[9] Let us see how it happens. The first step is a short run equilibrium: the firm attempts to discriminate prices, selling OH in the CU and HC to the rest of the world. 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 rest of the world 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 rest of the world. The reason can be sketched as follows. We said that the total number of plants decreases if the rest of the world 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. Rest of the world 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 short run 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 short run in a monopolistically competitive market; this might not be considered correct. However the purpose of that was at least partially to bridge the gap between the monopoly and the oligopoly approach (see Brander (1981)).

[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 the rest of the world are not a necessary condition, since economies of scale can counteract the effects of even higher tariffs in the rest of the world.

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

$$U=\sum_i c_i^{\theta} \qquad 0<\theta<1 \tag{1}$$

where c_i is consumption of the ith good; the number of goods actually produced is n while the number of goods which can be potentially produced is n_p and $n<n_p$.

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

$$l_i=\alpha+\beta x_i \tag{2}$$

$$x_i=l_i/\beta-\alpha/\beta \tag{3}$$

where l_i is the quantity of labour needed for the production of x_i while x_i is the output of the firm producing good i. Apparently production in (2) displays increasing returns to scale since 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).

$$x_i=Lc_i \qquad i=1\cdots n \tag{4}$$

Then if we assume full employment

$$L=\sum_i l_i=\sum_i(\alpha+\beta x_i) \tag{5}$$

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

$$p_i=\theta\lambda^{-1}(x_i/L)^{\theta-1} \tag{6}$$

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

[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 ith good

λ = shadow price or marginal utility of income.

$$\frac{1}{1-\theta} \tag{7}$$

The price set to maximize profits is

$$p_i=\theta^{-1}\beta w \tag{8}$$

where w is the wage rate.

Equation (8) is obtained from the usual maximum condition of a monopolistic firm, $p(1-1/e)=\text{MC}$. Then we set

$$p_i=p \qquad \text{for all} \quad i \tag{9}$$

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

Long run 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

$$x_i=\frac{\alpha}{\left(\frac{p}{w-\beta}\right)}=\frac{\alpha\theta}{\beta(1-\theta)} \tag{10}$$

then using full employment condition, we get

$$n=\frac{L}{\alpha+\beta x}=\frac{L(1-\theta)}{\alpha} \tag{11}$$

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 $n+n''$ goods (where n'' is the number of goods produced abroad). This is a welfare gain due to trade. Individuals will consume a fraction

$$\frac{n''}{n+n''} \tag{12}$$

of their income on foreign goods and a fraction

$$\frac{n}{n+n''} \tag{13}$$

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

[12] Profits are

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

$$\frac{Ln''}{n+n''} \tag{14}$$

If we define L'' the foreign labour force, through substitution we can get

$$\frac{LL''}{L+L''} \tag{15}$$

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 technology 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:

$$\hat{p}''=p''/h \qquad 0<h<1 \tag{16}$$

where Eq. (16) 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

$$(p/\hat{p}'')^{1/(1-\theta)} \tag{17}$$

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

$$M=(n''/(n+n''))Lnx_i(p/\hat{p}'')^{1/(1-\theta)} \tag{18}$$

$$X=(n/(n+n''))L''n''x_i'' \tag{19}$$

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

$$\text{IIT}=1-\frac{|1-(p/p'')^{1/(1-\theta)}|}{(1+(p/\hat{p}'')^{1/(1-\theta)})} \tag{20}$$

Therefore IIT cannot range between 0 and 1 any longer but will range between 0

[13] See Brander (1981).

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 and stated. Take the case of a CU, when a uniform tariff is imposed on imports from the rest of the world we should expect IIT to be lower in figures of trade with the rest of the world (area 2 of Section 3) if tariffs on imports from the rest of the world differ from tariffs of the rest of the world.[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 causal 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 instancce 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,

[14] See Pelkmans (1984).

provided that the causal 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 is 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 Fiats to France with imports of Renaults to Italy we expect to find also a similar, yet lower, matching of exports of Fiats to Sweden with imports of Volvos 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 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:

$$IIT_{i2} = \delta + \zeta IIT_{i1} + \mu_i \tag{21}$$

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).

[15] See Linder (1961).

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,

$$\log\{\mathrm{IIT}_{i2}/(1-\mathrm{IIT}_{i2})\}=\pi+\gamma\mathrm{IIT}_{i1}+\omega_i \tag{22}$$

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 Eq. (22) and Eq. (21) 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

$$\frac{\left(\mathrm{RRSS}-\sum_i \mathrm{URSS}_i\right)\Big/(k-1)}{\sum_i \mathrm{URSS}\Big/\left(\sum_i n_i-2k-2\right)} \tag{23}$$

where $i=1\cdots 4$ 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 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*

[16] See Pindyck-Rubinfeld (1976), p. 248.

[17] For this test see Maddala (1977), p. 198. To do this test it is assumed that Eq. (23) has an F distribution, with degrees of freedom $k+1$ (where k is the size of the entire sample) and $\sum_i n_i-2k-2$ where n_i are the sizes of the subsamples.

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.

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 within an interval narrower than 0–1. The *econometric test* has tried to see whether there exists a relationship 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)[19] 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-indices 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.

[18] See Pelkmans (1984).

[19] See Sazanami-Hamaguchi (1978), p. 57.

[20] See Rossini (1983).

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	6.7556	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.	Coeff.	.2201E-3		.1291E-3		.1859E-3		.2980E-3		.2054E-3		.1395E-3		.1457E-3		.3575E-3	
Overall	(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	
	SEE	1.4652		1.4312		1.4512		1.6672		2.1099		1.6798		1.7566		2.4107	
IIT.	Coeff.	.3889		.1502		.2284		.2985		.2096		.1606		.3403		.3662	
Overall	(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. 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.

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7. APPENDIX 1 Indices of IIT at 3-digit level of disaggregation (SITC).

TABLE 3. INTRAINDUSTRY TRADE IN EUROPE IN AREAS 1 AND 2: 3-DIGIT INDUSTRIES OF SITC CLASSIFICATION

Sector 5 SITC Code	Italy		France		Germany		Belux		Nederland		U.K.		Denmark		Ireland	
	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	.0675	.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	.6209	.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	.9208	.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 SITC Code	Italy		France		Germany		Belux		Nederland		U.K.		Denmark		Ireland	
	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	.0689	.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	.7864	.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	7.412	.5519	.8601	.1627	.1001	.9988	.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 SITC Code	Italy		France		Germany		Belux		Nederland		U.K.		Denmark		Ireland	
	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 SITC Code	Italy		France		Germany		Belux		Nederland		U.K.		Denmark		Ireland	
	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	.6868	.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	.9093	.7011	.5001	.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.

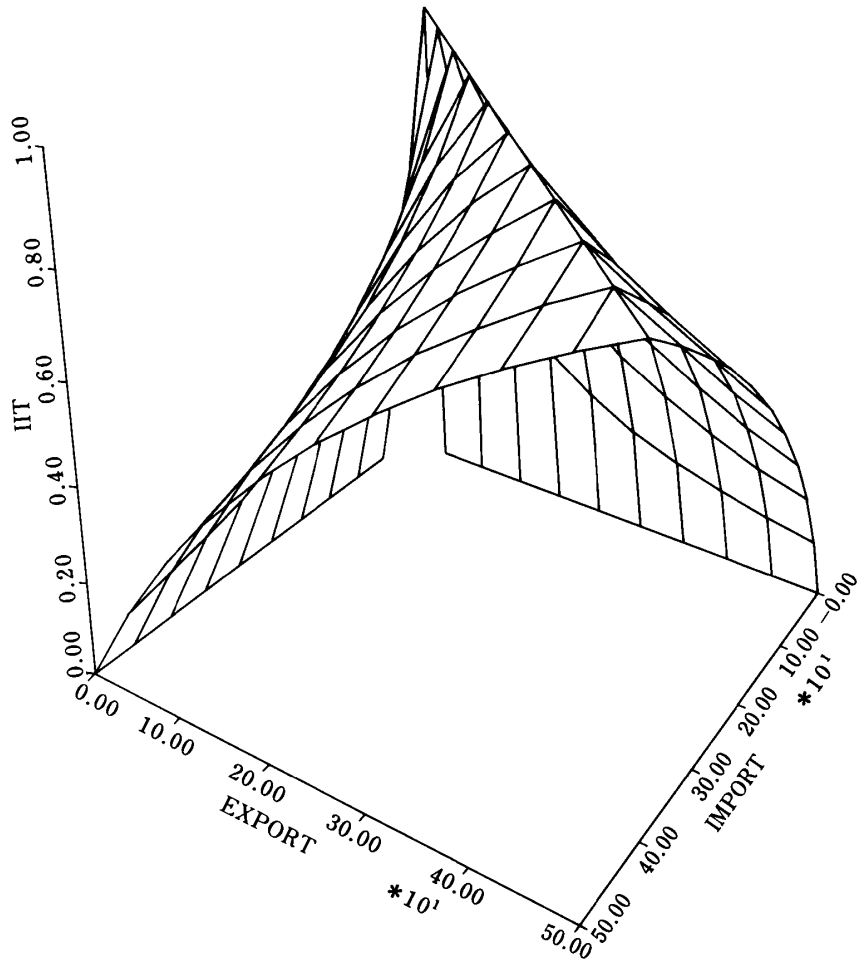

Fig. 2.