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Market Integration and Intra-Industry Trade: A Survey of the Recent Literature and Some Further Suggestions

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MARKET INTEGRATION AND INTRA-INDUSTRY TRADE:
A SURVEY OF THE RECENT LITERATURE
AND SOME FURTHER SUGGESTIONS

by

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N. 4

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1. Introduction

The purpose of these pages is to review the recent literature on Intra-industry trade and to add some further insights into the likely causes of a phenomenon that has attracted the attention of many economists during the past twenty years; indeed intra-industry trade has been viewed as the most striking fact of intra-EEC trade that has accompanied the establishment of the EEC, even though intra-industry trade was apparently present before that event to a different extent and can also be observed in trade statistics of nations belonging to non-integrated areas. Despite what we have just said, some economists have denied the existence of intra-industry trade, attributing it to a too superficial evaluation of data suffering of inconsistencies and too high levels of aggregation. They also attached new labels to intra-industry trade, calling it trade-overlap or two-way trade, with a smaller degree of involvement in theoretical disputes for the student.

The question of the actual existence of intra-industry trade had been debated for some years coming to a virtual end. We anticipate part of it, even though some interest in subsequent pages is going to be lost. By now intra-industry trade is almost unanimously recognized as one of the main features of intra-industry trade among similar (and also less similar) countries and another outstanding fact of trade in integrated areas as EEC, CACM, LAC, CAFTA, LAFTA, etc.¹⁾

But let us go step by step.

1) CACM = Central America Common Market,
LAFTA = Latin America Free Trade Area.

2. Ricardo, Heckscher-Ohlin-Samuelson and their relevance to Intra-Industry Trade.

For several decades International Trade theory has been learnt and taught in terms of two models. One is Ricardo's model (Ricardo 1821) and relative comparative advantage theory. The other one is that of the "trio" Heckscher-Ohlin-Samuelson²⁾ and the neoclassical theory of factor proportions and factor price equalization.

In Ricardo the emphasis is put on economic advantages arising from the production function of one country in one industry relatively to other industries in the same country before opening of trade. The international exchange of commodities is going to lead to specialization of that country in the industry which is most efficient.

Production in other industries is going to be taken over by other countries engaging in trade with the former one. If the number of industries is two and the number of countries is two, each country should have only one industry.

In Heckscher-Ohlin-Samuelson model countries will engage in trade by exporting the good, whose production is intensive in the factor that is more plentiful. Trade is going to be associated with inter-industry specialization, under the canonical assumptions³⁾.

Countries will have the same structure of relative prices for all traded goods after opening of trade has become effective.

In Ricardo's model the comparative advantage might be due to whatsoever reason, whereas in Heckscher-Ohlin-Samuelson it is derived only from a specific factor's economic abundance.

2) See Heckscher (1919), Ohlin (1933), Samuelson (1948).

3) These are: no transportation costs, no barriers to trade of whatsoever nature, no rigidities in production (clay-clay production functions), perfectly competitive markets for goods and factors, no factor mobility across countries, constant returns to scale, no factor intensity reversal.

Not much attention has been devoted so far to the analysis of the structure of relative prices of traded goods in different countries, probably because everybody takes for granted their equalization. The question will be studied in a next paper by the present author, but we can say in advance that the existence of product differentiation associated with intra-industry trade, as we shall see below, might prevent countries from making such an equalization, which is the vehicle of factor price equalization; as a consequence this will become more volatile.

We wonder whether the specialization of the Heckscher-Ohlin-Samuelson model has taken place in the EEC or in other areas.

Unfortunately as far as specialization is concerned, the evidence is not one of inter-industry specialization among countries, like those in the EEC (or simply in the OECD) having similar relative factor endowments and similar levels of per capita income. This could be due to the existence of many kind of trade barriers in Europe and elsewhere. But after the lifting of trade barriers following the foundation of the EEC, and with decades of GATT's negotiations, the reasons for the absence of inter-industry specialization have to be related to other phenomena, other than barriers of national or administrative nature. In addition the growth of intra-industry trade has broadened the comprehension gap in traditional theory. However any superficial observer of international trade statistics might notice some contradictions in the above statements. Up to what extent Heckscher-Ohlin-Samuelson could be invoked to explain the patterns of trade between countries which are quite similar in their relative factor endowments and do not seem to meet the conditions specified in the canonical assumptions? At first sight Heckscher-Ohlin-Samuelson appears not to be of much use to explain trade between those countries. Shall we drop the model or just supple-

ment it with some more specific theory? A reply will come later. At the moment it is much more important to see what intra-industry trade is and whether it can be explained somehow, or whether it is just the inability to explain statistical data which have not been evaluated properly. The issue of proper aggregation of data will entertain us sometime, even though any scanty analysis of them can prove that no inter-industry specialization seems to have arisen out of the lifting of trade barriers within the EEC and the establishment of a Customs Union.

That means that countries export and import goods which have roughly the same input requirements in production, and slightly different inputs in consumption.

In other words, and it might be a preliminary definition of intra-industry trade, there is a simultaneous inflow and outflow of goods which are being produced by the same technique and contain similar "characteristics" though in different proportions when on sale in the shops.

Besides the phenomenon of intra-industry trade, the pattern of trade that accompanied EEC integration, has been marked also by a huge increase in overall trade among member countries, despite the affinities of these nations as far as factor endowments and levels of per capita income are concerned.

Because of these two similarities there does not seem to have been any room for increasing trade (i.e. for increasing the degree of integration) in a Heckscher-Ohlin-Samuelson framework, even though Ricardo's model can be invoked whenever in presence of similar factor endowments a country has some more efficient production techniques. Despite this last statement it is awkward to establish some kind of structural advantage in manufacture production among members of the EEC. However, even if that seems to be the case, there are some analyses, explaining intra-industry trade in terms of variations of factor intensities among the production functions classified under the same data category (Hufbauer (1970), Finger and De Rosa (1978))⁴⁾.

4) Unfortunately the test they conducted is inconclusive, but more on them will come below.

Yet what matters at the moment is that market integration seems not to have brought about any displacement, any switching of activities. Germany, Italy, France, Britain export and import simultaneously cars, T.V.-sets, trucks, boats, computers, chemicals, steel etc., without giving up any major industry on the trace of some presumed inter-industry specialization.

It must eventually be added that Heckscher-Ohlin-Samuelson has even more serious implications than those enlightened by intra-industry trade data and literature.

Complete inter-industry specialization would mean that a country does not produce at all the goods whose production involves intensively the factor which is scarcer.

To contradict inter-industry specialization it would be enough to have an industry producing just for the home market on which also imports are present. In this case intra-industry trade, measured as the proportion of industry specific imports matched by exports in the same industry, would not emerge, even though the statistics would not imply the existence of inter-industry specialization in a Heckscher-Ohlin-Samuelson sense.

3. The empirical findings on intra-industry trade, or does intra-industry trade exist at all?

Most of tests on intra-industry trade have been undertaken by utilizing data at a fairly high level of aggregation, using SITC 3-digit categories. Industries are defined by 3-digit classified data categories, which are built up according 1) to the criterion of similarity of input requirements for the production of the commodities which fall in the same data category; 2) to the criterion of similarity of end use characteristics.

Unfortunately examples of supertankers and canoes or pencil-sharpeners and computers put in the same 3-digit industry might soon make the reader skeptical about any assessment of intra-industry trade at such a high level of aggregation. This problem

will entertain us later on. At the moment we examine the empirical findings supplied by recent literature on intra-industry trade. We do not limit our exam to European data, but we are mainly concerned with intra-EEC intra-industry trade.

Grubel and Lloyd (1975) provide us the opportunity to report some interesting results. In table 1. we present their indexes of percentages of intra-industry trade in the overall trade for EEC member countries and those for trade of U.S., Canada, Japan, Australia, for the year 1967. For the year 1972 we borrow the indexes calculated by Aquino (1978)⁵⁾.

-
- 5) Intra-industry trade is measured by an index devised by Grubel and Lloyd (1971; 1974) on the trace of what was done before by Verdoorn (1960) and Balassa (1966).

The index used to estimate intra-industry trade in country J's foreign trade in commodity i is as follows

$$(1) B_{ij} = \frac{(X_{ij} + M_{ij}) - |X_{ij} - M_{ij}|}{(X_{ij} + M_{ij})} \cdot 100$$

where X_{ij} are exports of country j of commodity i
 M_{ij} are imports of country j of commodity i

If we want to have an aggregated index over all industries for the country J we shall have

$$(1) B_J = \frac{\sum_i B_{ij} (X_{ij} + M_{ij})}{\sum_i (X_{ij} + M_{ij})} \cdot 100$$

The value of the index is zero where intra-industry trade is absent and one hundred when trade is made up of intra-industry only. The unadjusted Balassa's index is the complement to 100 of the above one. We so not introduce any adjustment for trade imbalances, because it does not seem plausible to adjust the country's trade imbalance although it had to be corrected uniformly over all industries as Aquino (1978) suggested.

Table 1.

Average intra-industry trade (overall trade)

	Canada	USA	Japan	Benelux	NL	Germany	France	Italy	UK	Ireland	Australia	DK
1967	48	49	21	63	56	46	65	42	69	n.a.	17	n.a.
1972	66	57	30	70	78	62	86	66	76	55	40	70

Source: Grubel and Lloyd (1975), Aquino (1978) from OECD, Statistics of foreign trade and from U.N. Commodity trade statistics and U.N. Yearbook of international trade statistics (1974).

Data shown in table 1. are calculated from 3-digit SITC industries. It appears that both a high level of intra-industry trade is present and that a positive considerable growth rate over time for all countries exists.

In table 2. we present some indexes taken from Sazanami and Hamaguchi (1978) referring to intra-industry trade among EEC member countries, for manufactured goods, for years 1962 and 1972.

Even a scanty look at these data shows the high level of intra-industry trade within the EEC⁶⁾. For more curious readers in Grubel and Lloyd (1975) it is possible to see trends of intra-industry trade by industries and by countries. All data seem to support fairly firmly the hypothesis of the existence of intra-industry trade; in other words there is a considerable two-way trade in similar products. Yet, how much of it might be just a result of heterogeneity of goods or industries stuffed together in the same 3-digit trade category? A first partial answer was given by Grubel and Lloyd (1975) and more came afterwards.

6) Data used were 3-digit SITC trade values as in Grubel and Lloyd (1975).

Table 2.

Intra-industry trade in EEC (before extension to UK, DK, Ireland).

	Holland	France	Benelux	Germany	Italy
1962	56	67	60	59	48
1972	65	71	66	71	58

Source: Sazanami and Hamaguchi (1978) from 3-digit SITC data.

Grubel and Lloyd (1975) tested indeed the heterogeneity issue on Australian trade data. Australia is a peculiar market with natural and administrative barriers to trade, hence their text has to be evaluated in this context. They calculated intra-industry trade indices on Australian industries defined at a 7-digit disaggregation level on SITC trade data. This is undoubtedly a high level of disaggregation. At this level where virtually any problem of heterogeneity of categories disappears, they still found a considerable level of intra-industry trade, even though a lower one if compared with that at 3-digit level of data disaggregation⁷⁾; this result let them affirm that intra-industry trade is not just a fruit of the heterogeneity of SITC 3-digit categories, but a real fact which cannot be assumed away by disaggregation. We shall have again occasion to come back to the aggregation issue.

4. Historical development of intra-industry trade and of economic literature on intra-industry trade.

Earliest mention of intra-industry trade dates probably to the 30s⁸⁾. During those years there was at least some recognition of the existence of two-way trade in some countries. The

6) In 1968-69 Australian intra-industry trade was 20.2 at 3-digit level of disaggregation and 6.2 at 7-digit level of disaggregation.

7) See Hilgerdt (1935), Haberler (1936), Frankel (1943).

partial apperception of the existence of intra-industry trade, and the scarce relevance it had in the literature was due to the diffused supposition that intra-industry trade, wherever it came out, would be just a policy induced phenomenon, related to trade distortions produced by barriers to trade of whatsoever nature.

Indeed, before world war one and later on during the 20's and 30's, the European and more generally most of the western economies grew under the protection of a tariff umbrella. We are not going to examine the foundations of these policies, yet we just wish to remind the reader of some characteristics of the European recent development. Unlike the United States of America, Europe did not develop as an integrated area, but as a sum of competitive and tendentially autarkic countries, which tried to have no other European country as a complementary partner (Tumlir 1978). Policy oriented consumption towards domestic production, and fostering inefficient national industries were quite common.

The existence of intra-industry trade after world war two and before the establishment of the EEC can be explained also on these grounds and on the basis of other kind of policies.

At the beginning of the sixties we see that intra-industry trade is gaining attention among the economists⁸⁾. Intra-industry trade is no longer a marginal phenomenon, but a real striking part of trade, that has to be explained in economic terms, even though economic policy issues seem to be relevant whenever trade among sovereign nations involves strategic issues and sometimes even short period demand management's targets of economic policy.

At that time intra-industry trade starts getting room and pride in the economic literature though new contributes of Balassa (1966), Grubel and Lloyd (1971), Gray (1973) and others we shall examine later on. Many empirical researches are

8) See Verdoorn (1960), Michaely (1962), Balassa (1963, 1966), Grubel (1967).

undertaken, and economic theory is invoked to explain intra-industry trade, both on the production side and on the consumption side. International welfare economics and custom unions theory have to be remodelled taking into due account the new theories of intra-industry trade. At the same time the analysis of intra-industry trade becomes wider and deeper; yet there still are detractors to it who do not believe in its existence either⁹⁾.

By the second half of the seventies the field is scattered by empirical studies and by some tentative theory, however not yet a systematic view of intra-industry trade, that will come partially by the end of the 70's and the first 80's, with the contribution of Krugman (1979), Lancaster (1980), Norman and Dixit (1980), Krugman (1980), Brander (1981).

Intra-industry trade is treated in elegant models both on the production side and on the demand side, and on a market structure basis.

Intra-industry trade gets its chapter in textbooks as a new expanding discipline in international trade, to supplement or to take partially over traditional theories of Ricardo and Heckscher, Ohlin, Samuelson, and to demand for a thorough revision of the theory of Custom Unions and of Welfare in International Trade. By now the new look of international trade among industrialized countries, marked by an increasing proportion of intra-industry trade specialization has entered trade theory and is going to have a major role in the pure theory of trade in the coming years.

5. The theory of intra-industry trade.

There have been many attempts in the literature to interpret intra-industry trade. Statistical and econometric tests

9) See Finger (1975), Pomfret (1978).

have been introduced to assess the role of the supposed determinants, in order to elucidate theoretical aspects.

As we have just said, intra-industry trade would mainly be an empirical result during the fifties and sixties. Yet the causes of intra-industry trade could be defined fairly accurately even though not in a systematic manner.

We try to separate the determinants of intra-industry trade, although the reader might not be too happy with that since it appears that intra-industry trade is due to a set of intertwined phenomena which are not easily separable.

Demand and supply side effects are difficult to disentangle. Almost everybody agrees that a major role has to be assigned to the economies of scale in production, transportation services, distribution, advertising of commodities.

But, as we shall see later, economies of scale would not be a cause of intra-industry trade if not coupled with product differentiation. Product differentiation on its turn implies non-perfectly competitive market structures.

We shall later mention models, in which economies of scale do not need to be wedded to product differentiation to imply intra-industry trade. Thus we can see that intra-industry trade can be simultaneously a result of supply side and demand side factors which interact each other.

5.1. Supply side determinants.

After having adopted such caveat, we can analyse supply side determinants of intra-industry trade and more exactly economies of scale.

Economies of scale matter for intra-industry trade if they appear at plant level; a plant that produces a quantity of a good exceeding domestic demand has to export part of its production. If that good exhausts the whole industry range of products (no differentiation) there would be a case for inter-industry specialization compatible with Ricardo's theory. If that plant produces a differentiated good which does not

exhaust the industry range and for which economies of scale will appear at levels of production exceeding domestic demand, there is a "chance" for intra-industry trade, but not strictly a case for that, because there might be a comparative advantage in the same country for the entire range of differentiated products produced by that industry¹⁰⁾.

At firm level economies of scale in production do not result necessarily in intra-industry trade, since it is possible to have plants in many countries, as it happens in Multi-national Companies¹¹⁾.

In this case other kind of economies of scale matter, that is those linked to marketing, R & D, advertising expenditure, which might be sometimes country specific, (see Caves (1981)).

At industry level economies of scale are definitely conducive only to inter-industry specialization.

Ohlin (1933) had already recognized the role of economies of scale in international trade; later on Balassa (1967) and Kravis (1971) gave further insights on the topic, though without a close link to intra-industry trade.

There have been many tests of the economies of scale relevance to intra-industry trade.

Pagoulatos and Sorensen (1975) provide estimates of the quantitative importance of intra-industry trade in U.S. manufactures. Using the intra-industry trade indexes, they calculate, they test the determinants of intra-industry trade by econometric estimation of a structural equation. They test

10) Many Japanese and U.S. industries are like that: they show differentiation, economies of scale, and inter-industry specialization (Japanese cameras, motorbikes) which is what Finger (1975) argues when saying that differentiation can produce intra-industry trade as well as inter-industry specialization.

11) We shall see later that most of the students of intra-industry trade assume economies of scale at firm level (see Krugman (1979, 1980)).

the hypothesis that product differentiation is pro-intra-industry trade, by including among the determinants the Hufbauer's measure of product differentiation (Hufbauer 1970)¹²⁾. Differentiation does not appear from their testings to be at all significant.

However, differentiation should appear as an important determinant of intra-industry trade¹³⁾. But Pagoulatos and Sorensen did not wed it to economies of scale. This seems to be a lacuna, since differentiation per se cannot be a cause of intra-industry trade, unless decreasing returns to scale are included. Why is it like that? Because if there are no economies of scale to differentiation, every firm can satisfy consumer's desire for variety without having to export. This would lead to isolating the market from imports as well.

Economies of scale and product differentiation are closely conducive to imperfect market structures; monopolistic competition is usually associated with product differentiation, yet not with economies of scale, which are a feature of less competitive market structures. Monopolistic competition maintains the same features of perfect competition as far as cost functions are concerned, leading to atomization or too high a number of firms. Differences respect to perfect competition

12) This measure was developed by Hufbauer (1970) and it is the coefficient of variation of unit export values. This measure is highly unreliable as a proxy for differentiation. It is subject to aggregation biases (see Gray and Martin (1980)) and it fails to capture a lot of differentiation which does not produce different prices of differentiated goods. Differentiation which produces different prices is most of the times linked to different inputs requirements in production. Caves (1981) used also other proxies for differentiation (like advertising and marketing expenditures) which might be an alternative to Hufbauer's index, but he keeps this measure to supplement the others.

13) Many econometric tests of intra-industry trade are ill-specified, they use too often proxy variables which prove to be totally unreliable, also producing downward bias, showing quite poor fits; sometimes there is crowding of the right hand side with too many variables, in some cases up to 14 (as in Caves (1981)). Yet we discuss the tests and the reader who wants to check the 'goodness' of the econometrics should go through the papers.

concern the aspects of production relative to differentiation in order to make it effective and not just virtual (brand image), and the kind of demand functions hypothesized. When intra-industry trade is to be explained by differentiation coupled to market structure imperfections, the question is one of extending the analysis from the domestic market context.

Caves (1981) has devoted his attention to the structure of international product markets, connected to differentiation and economies of scale. He tried to extend Pagoulatos and Sorensen's paper and to give more emphasis to product differentiation on the production side, that they failed to make an effective explanatory variable. Caves tested a fully fledged model of product differentiation and market structure determinants, asserting that differentiation might be based on rather diverse behaviours. The role of economies of scale is stressed: "If there are scale economies in production (and in transportation and selling, G.P.R.) only a limited number of the potential combinations will actually be produced ... and if buyer's preferences are diverse and not entirely wedded to locally produced combinations of attributes, we have a sufficient basis both for product differentiation and intra-industry trade intrinsic heterogeneity is pro-trade because it rests on scale economies in production. Differentiation heavily reliant on advertising, conversely seems biased against trade." However, it seems that there might be economies of scale in advertising, transportation and commercial networks which are pro-trade and there might be differentiation which is not linked to economies of scale and which does not give rise necessarily to any trade. In Caves's paper almost all the structural variables which should explain intra-industry trade have a dual role. That is so for differentiation and for economies of scale which, according to Caves, might be (surprisingly!) mainly against intra-industry trade. The fact is that when he talks about scale economies, he drops differentiation, not considering that in any industry, if scale economies

are absent, a firm will be able to meet the entire range of preferences¹⁴⁾; hence economies of scale can never be thought of as against intra-industry trade. The econometrics he presents is fairly poor. What can be appreciated in his paper is the light shed on different aspects of differentiation: the complexity aspect, represented by technological peculiarities of a firm in a country, and the informational one represented by advertising, marketing, commercial expenditure; the first favourable to trade, the second hostile. He finds empirical confirmation of this last statement.

The issue of differentiation has found also other students. Gray and Martin (1980) pointed to the ambiguity of the Hufbauer's measure of product differentiation suggesting rather scantily to use hedonic demand functions to evaluate properly the prices of the various characteristics contained in a good. Unfortunately they still miss to associate product differentiation to economies of scale. Product differentiation and economies of scale have relevance also to other aspects of international trade, on which we shall also come back later, concerning the effects of trade in differentiated goods upon the stability of balance of trade equilibrium (see par. 7).

Loertscher and Wolter (1980) working on OECD countries data, added some evidence to the question of differentiation, distinguishing between the determinants of intra-industry trade across industries and across countries. Differentiation is an explanatory variable of intra-industry trade across industries and not between countries, because it seems that intra-industry trade should be high in an industry in which the potential for product

14) Moreover the variable used by Caves to represent scale economies is not much reliable, because it is influenced by different levels of vertical integration, when size is proxied by shipments, and when cost disadvantage is proxied by value added measures; moreover when value added per establishment of different size is used different factor intensities across firm would make this measure even more unreliable.

differentiation is high, while it would not play a role at a country level. Unfortunately the role of product differentiation is ambiguous in their tests. At industry level they also use an indicator of economies of scale getting a negative coefficient, that they impute to the bad measure used¹⁵⁾.

Finger and De Rosa (1978), did not find any relationship between intra-industry trade in the U.S. and scale economies and differentiation variables. Thus so far the attempts to assess econometrically the importance of product differentiation and scale economies as determinants of intra-industry trade failed, in spite of a strong theoretical case for their importance. Yet we do not make justice to the empirical literature if we do not say that we need better data and more accurate tests of intra-industry trade theory.

Economies of scale have also been the object of a theoretical study by Krugman (1979, 1980). He has published two papers in which intra-industry trade is explained by scale economies at firm level and he gets intra-industry trade as a result in a simple general equilibrium model. His assertion that economies of scale coupled with differentiation are pro trade, and specially pro intra-industry trade, draws heavily on Dixit and Stiglitz (1977) model of monopolistic competition. Dixit and Stiglitz noticed that "with scale economies, resources can be saved by producing fewer goods and larger quantities of each: however this leaves less variety, which entails some welfare loss". Opening of trade will therefore give back to the consumer what he lost from the existence of economies of scale in terms of variety. Economies of scale in Krugman's papers are internal to the firm¹⁶⁾ and are associated to a monopolistic market. On this point Krugman's paper might find some unhappy reader. Indeed Chamberlin's model was

15) Which is as usual value added per establishment of different sizes.

16) As we said above, we think that intra-industry trade is better explained by economies of scale.

compatible only with economies of scale up to a certain extent. In Krugman's model trade may simply be a way of extending the domestic market in order to allow exploitation of economies of scale compatibly with higher variety of goods. The effects of that in Krugman's papers is to make trade similar to labour force growth. Krugman's model is definitely an important contribution to elevate the quality of the theoretical debate on intra-industry trade. It seems that demand side has to be solved in a different manner, since differentiation is not much compatible with equal preferences across individuals. We shall see how Lancaster (1980) solves the question in a more precise way, on the demand side of differentiation. One more aspect of supply side that has to be analyzed seems to be transportation costs, as a variable influencing intra-industry trade. We shall also come back to it later when dealing with tariffs. In Pagoulatos and Sorensen's study on the U.S. (1975), the variable proxying transportation costs is quite significant and relevant. They think that industries which can ship further distances at lower prices will be more likely potential subjects for intra-industry trade. In other words, products which transport costs are not a substantial proportion of total costs, will show intra-industry trade specialization¹⁷⁾. Loetscher and Wolter (1980) used the same measure for OECD intra-industry trade at industry and country level¹⁸⁾. They found confirmation of the distance hypothesis, as Caves (1981) who found a coefficient of the right sign but not sufficiently significant at 5% level of confidence. Finger and De Rosa (1978) rejected transport cost hypothesis as determinant of intra-industry trade.

17) As Loetscher and Wolter, they use Weiss's measure (see Weiss (1972)), which is the mean distance of delivery of the product in the U.S., taking this measure as a proxy for the inverse incidence of transport costs.

18) At country level they supplemented it with other variables indicating other structural affinities fostering intra-industry trade, such as similarities of per capita incomes.

5.2. Demand side and market structure determinants.

We have been talking previously about differentiation on the supply side. Almost all what we said in the previous paragraph might be thought of as compatible with the Heckscher-Ohlin-Samuelson model. To this purpose we have to remind that industrialized countries, and mainly EEC member countries possess similar relative factor endowments and similar industrial demand functions. This fact makes the Heckscher-Ohlin-Samuelson model useful only to deal with supply side caused differentiation, as far as differentiation in production implies the use of even slightly different inputs. But it is difficult to say whether this kind of supply determined differentiation goes along the way traced by some kind of comparative advantage. Certainly differentiation and horizontal specialization is compatible with extensions of the Heckscher-Ohlin-Samuelson model to product specific inputs ((Linder 1961). When the endowment of product specific inputs does not matter, Ricardo's approach might adapt better if the advantage comes from sources not easily quantifiable in terms of endowments, but only in terms of some relative technological superiority. However, neither Ricardo nor Heckscher-Ohlin-Samuelson can be used to explain intra-industry trade in goods which are almost homogeneous and the differentiation of which comes mainly from the demand side. According to some students of intra-industry trade only this one is true intra-industry trade which cannot be assumed away by finer disaggregation of trade categories. In this case also scale economies have a different role: they will matter to the extent that demand patterns allow them to be effective. Paradoxically intra-industry trade might be explained by a sort of search for higher variety of goods by consumers. If preferences were so diverse that each consumer wanted his good differentiated from any other, probably economies of scale in trade between two countries with the same population and identical taxes would mean that each firm would produce two units instead of one and the number of firms and goods would equal half the total population of the two countries.

But if in no firm there are increasing returns to scale, doubling quantities will not produce lower costs and hence there is no gain from trade for anybody. No doubt that product differentiation originated on the demand side can explain by itself intra-industry trade, as it is shown in the paper by Caves (1981). The analysis of differentiation of Caves needs some more notes. The elements of "complexity" linked to the production side and to what might be called product-specific inputs in Gray (1980) language or country-specific inputs in Linder (1961) language, are indeed pro-trade shedding some doubts on the lack of relevance attributed to economies of scale. These elements more related to demand side, impinging upon marketing and advertising expenses used to forge or more often to stabilize consumers tastes (see Ashley, Granger, Schmalensee (1980)), should be not conducive to intra-industry trade. Nonetheless the reasons adduced by Caves and the results of testings are not much convincing. The process of unifying tastes across countries and the economies of scale in commercialization of products lead, on the demand side, to a situation more akin to what assumed by Heckscher-Ohlin-Samuelson, wherein patterns of demand have to be equal¹⁹⁾. In this process advertising and marketing expenditures play an important part, which cannot be thought of as anti intra-industry trade or even only anti international trade. To say the least, the effect might be neutral, but certainly not negative as Caves (1981) argues.

In order to examine the fruitful contributions of Lancaster with his theory of differentiation (see Lancaster (1966, 1971)), we have to go back to Chamberlin (1948) who gave us the first theory of monopolistic competition and product differentiation, which were mainly based on production side considerations.

19) Same tastes and homothetic indifference surfaces among countries.

The kind of demand function assumed by Chamberlin could not be plugged into any neoclassical framework existing at that time, since it implied different preferences among individuals. In absence of different preferences differentiation would have never found any theoretical buyer on the demand side.

Lancaster has developed during the sixties and the seventies an original model to interpret differentiation (Lancaster 1966, 1971, 1980). This model is based on the concept that consumers demands and producers supplies are made up of "characteristics", which are contained in different proportions in goods produced by the same industry. A firm produces a bundle of characteristics while consumers demand different bundles of characteristics. The emphasis is put on the demand side, as the title of the first paper of Lancaster says. In 1980 Lancaster has applied successfully his model to explain intra-industry trade. He calls intra-industry trade "an undeniable fact of trade between modern industrial economies, which is simply not a prediction of traditional trade theory, nor is large trade between economies with similar (relative, G.P.R.) factor endowments, technologies, and underlying tastes". He affirms that in modern economies the most common market structure, monopolistic competition, is the "most competitive structure when the number and design of goods are themselves equilibrium variables and not specified as initial data." His approach is clearly a demand determined one, even if a great scope is given to the industrial structure corresponding to differentiation. Here diversity of preferences across individuals plays a crucial role.

In this model economies of scale do not have to be coupled with the monopolistic market, while the case of natural monopoly is associated to scale economies²⁰⁾.

20) "If there is no diversity in preferences and economies of scale vanish at a relatively small output, we would have the perfect competition case: no gains from trade at either the level of the firm or of the economy exist between identical economies, hence no trade ... monopoly if economies persist for outputs beyond those required to supply the market for a single country." Hence no intra-industry trade, but just an explanation in terms of Ricardo.

In Lancaster's model intra-industry trade is made up of goods which are not totally identical in the eyes of consumers; there is a marked phenomenon of horizontal specialization due to scale economies not giving rise to monopoly at an industry level, but to monopolistic competition, because it is a matter of economies of scale relative to differentiation, but not of scale economies we find in textbooks case of natural monopoly.

In sum in Lancaster's model intra-industry trade comes from the kind of demand functions for characteristics introduced during the 60's.

There is a high probability, due to the almost infinite combinations of characteristics contained in one commodity, that intra-industry trade takes place even though scale economies are not present or are exhausted at low levels of output. This happens because of the unsatiable need for variety of consumers with different preferences. It has to be said that Lancaster's approach is not compatible with Heckscher-Ohlin-Samuelson. On a related question an argument by Davies (1979) has to be examined. He says that Heckscher-Ohlin-Samuelson is reconcilable with intra-industry trade; what we should do is just to read it more carefully. Heckscher-Ohlin-Samuelson says that trade brings prices and costs structures into equality across countries. After opening of trade "Industries in different countries will be locked into an international price structure and all commodity groups in common production will be subject for intra-industry trade." This statement does not seem to be correct.

If, as Davies argues, "any commodity group produced in common after the introduction of free trade must be produced at identical relative costs" either it means that there are relevant differences in input requirements within a commodity group, whereby identical relative costs imply that a country can dominate a segment of the common production industry according to her advantage, but that intra-industry trade might disappear as disaggregation becomes finer, or that identical relative costs mean that there is differentiation without

different cost functions as in Krugman (1979, 1980). In Davies' theory intra-industry trade can be either an outcome of a particular industry definition implying heterogeneity of inputs requirements within it or linked to differentiation²¹⁾.

The former part of the statement is compatible with Heckscher-Ohlin-Samuelson, but it impinges upon a wrong concept of industry; the latter can only be a supplement to Heckscher-Ohlin-Samuelson, but not be integrated in Heckscher-Ohlin-Samuelson.

21) Davies' paper is a reply to Finger's paper (Finger 1975) where Finger argued that intra-industry trade is incompatible with the factor proportions explanations of the structure of trade.

Finger defined some inequalities:

$$\boxed{1} \quad v_{1a} > v_{1b} \dots > v_{2a} > v_{2b} > \dots > v_{na} > v_{nb} > \dots > v_{nx}$$

where v_{ij} = capital/labour ratios

i = industries

j = differentiated product within an industry.

With two countries, one capital abundant and the other labour abundant, the latter's relative costs will be:

$$\boxed{2} \quad c_{1d} > c_{1b} > \dots > c_{2a} > c_{2b} > \dots > c_{4a} > c_{4b} > \dots > c_{nx}$$

There will be a dividing line and all goods on the right will be exported by the labour abundant country, while those to the left will be imported. Intra-industry trade will appear only on the frontier industry. The criticism we make to Finger is that it is quite unacceptable to classify industries according to the capital/labour ratio, even if it is in good Heckscher-Ohlin-Samuelson style to do that. There might be variations of capital-labour ratios within industries giving rise to what we have called supply determined intra-industry trade; a kind of intra-industry trade mainly due to aggregation failure (leather boots and plastic boots have probably different capital/labour ratios besides peculiar inputs). Hence we might have a structure of the following type:

$$\boxed{1'} \quad v_{1a} > v_{2a} > v_{1b} > v_{nb} > v_{na} > v_{2b} > v_{nx}$$

with a corresponding $\boxed{2'}$.

However, what we call genuine intra-industry trade is just the intra-industry trade related to differentiation on the demand side which does not require much differences in inputs requirements. Only this kind of intra-industry trade is not compatible with traditional theories of international trade.

As said above, Heckscher-Ohlin-Samuelson is not very useful to explain trade and intra-industry trade in areas, such as the EEC, where countries have quite akin relative endowments. Demand analysis seem to be more fruitful, be the demand structure a product of marketing policies or be it determined by similarities of per capita incomes. These demand features can be thought of as partly fostering the use of what are called product specific inputs, which are quite a part of the product differentiation process.

Gray (1980) augmented Heckscher-Ohlin-Samuelson model following Linder's model. Linder (1961) examined trade between similar countries, wherein the domestic market with its tastes and its size (see also Drèze (1960)) determines the pattern of differentiation, i.e. the pattern of intra-industry trade specialization. Linder says that there is a relationship between per-capita income of a country and quality levels of exported goods. Thus specialization is determined by pattern of demand, obviously showing not much homoteticity. Gray emphasized the role of product specific inputs, not available to all firms and to all countries, but which might become mobile through direct investment or licences, giving rise either to product cycle goods or to transnational firms. Product specific inputs give rise to what he calls "Linder's" goods. Those goods are not the outcomes of path-breaking innovative activities, rather they are derivative results, coming from development activity and from peculiarities in production and commerciality, either of a firm or of a country. Intra-industry trade arises because this kind of country or firm specific specialization meets the variety needs of demand of other countries.

Also Drèze (1961) emphasized the role of domestic market size, hence of another aspect of demand determinants of intra-industry trade. He found a relation between standardization of production lines and the size of domestic markets. His point is correct, and we would add that small countries are more subject to intra-industry trade than big countries are. For small countries economies of scale and differentiation are crucial if the demand patterns have to be the same as of other bigger countries (as in Heckscher-Ohlin-Samuelson)

therefore for small countries intra-industry trade should be more important. Unfortunately the evidence (see Table 1 and 2) does not support this thesis (see also par. 6).

Closely related to Linder-Gray approach might be thought the set of models related to technological progress (Posner 1961, Hufbauer 1966, Vernon 1966). The existence of technological progress in production and innovation activity, of dynamic scale economies or diseconomies, make some industries likely field of intra-industry trade. If for instance the "product cycle"⁽²²⁾ is a constant feature of an economy, product cycle might be certainly responsible for intra-industry trade, being an important aspect of differentiation. "Product cycle", "technological gap" models are also relevant to intra-firm trade, which we shall discuss in the next paragraph. Finger and De Rosa (1978) found no evidence of the variable describing the rate of product turnover on intra-industry trade in the U.S. in 1963 and 1975. They affirm "that product development has a role in the determination of the pattern of U.S. exports ... but it is not a part of the explanation for trade overlap".

5.3. Market structure and intra-firm trade.

Differentiation, on supply and demand side, and scale economies need a better reconsideration of market structure issue, as a supplementary explanatory variable of intra-industry trade. We have already touched the topic when dealing with differentiation in production and economies of scale. But even when the accent was on demand it was clear the importance of a monopolistic competitive market. In fact intra-industry trade could not be explained in a perfectly competitive market, as Heckscher-Ohlin-Samuelson is not suitable for imperfect goods' and factor's markets. First we sketch some points on multi-

22) A product is developed and first produced by the innovative country which exports it as well, then production through licencing or copywriting is displaced elsewhere following dynamic comparative advantages.

nationals and then we analyse the more peculiar issue of market structure imperfections. When Multinational companies are taken into account it seems that the extent of trade promoted by them is quite high.

Helleiner (1978) and Helleiner and Lavergne (1979) report that in 1977, 48.4% of the value of total U.S. imports came from firms which were related by ownership to the importing firms. This datum might be a significant step to understand what the other face of world markets is. They also found a bias in the tariffs of the industries in which those firms operate, which are generally lower than in other industries (such as textiles, clothing, footwear). Some intrafirm trade is certainly intra-industry trade, but so far nobody has tried to appraise the relationship between intra-industry trade and intra-firm trade. Yet, intra-firm trade seems to be more relevant for its influence on the structure of international markets, than to intra-industry trade. Intra-firm trade is linked to vertical integration (which is pro-intra-industry trade, even though to an intra-industry trade of a kind which can be assumed away by finer disaggregation) and to horizontal specialization (which is highly pro-intra-industry trade when coupled with scale economies)²³⁾.

There are also other upshots of market structure, not dependent upon the existence of multinationals, which are worth scrutinizing.

Agmon's (1978) aim was to inspect the effects of a discriminating monopolist, selling on a competitive world market by the equalization of price to marginal costs and on domestic market where barriers to trade allow him to sell at a higher price the quantity determined by equalization of marginal revenue and marginal costs.

23) Intra-industry trade emerges if for example: Ford produces Fiestas in Spain and Germany for all markets and simultaneously Ford of Spain and Germany imports some intermediate inputs and other cars from other Ford factories established in countries where Ford Fiestas are exported.

Not many insights are provided by this model. Certainly there is an attempt to explain "dumping" practices. But, dumping practices do not need many theoretical explanations, they can just be interpreted by some policy leading to the protection of domestic market.

An interesting paper by Brander (1981) accounts for intra-industry trade simply by using a Cournot setting, without any mention of scale economies and differentiation.

Cross-hauling appears in identical products just because of firm strategies. The argument is slightly similar to that above of Agmon (1978). In a Cournot setting each firm assumes that the output of the other firm remains the same. "Low cost firms do not throw out high cost (slightly higher G.P.R.) firms".

Despite transport costs trade exists on the basis of a dumping policy, here called price discrimination. Trade has the only advantage of increasing competition, reducing monopoly distortions. Cournot's behaviour assumptions make the model not easily acceptable, although a Cournot setting of behaviour on the world market might be rational: myopic conduct is indeed likely to be the case on a big, highly competitive market where information is scarce and less reliable than on wellknown domestic market. Major drawbacks of this model are two: first, there does not seem to be any clear reason for a firm to engage in trade and to export since, if there are neither economies of scale nor differentiation, domestic markets would be sufficient. Second, in common with Agmon, competition in world markets is more likely to take place through differentiation and innovation activity and not by competition in a homogeneous oligopoly type framework.

Willmore (1978) discusses different kinds of specialization which are produced by intra-industry trade, arguing that under oligopoly intra-industry trade is not necessarily associated with specialization, which amounts to what Brander and Agmon in different terms discovered. He distinguishes three

types of goods:

1. Goods which are close substitutes in production but not in consumption; for those goods intra-industry trade leads to industry rationalization via scale economies and reduction of variety produced by firms (as Balassa (1974) pointed out).
2. Goods which are close substitutes in consumption but not in production (leather boots vis à vis rubber boots etc.) which are compatible with Heckscher-Ohlin-Samuelson.

Some specialization of this kind may be due to different relative factor (and input) prices due to not-achieved equalization.

3. Goods which are only slightly differentiated by design; brand label, advertising.

Intra-industry trade in type 2 goods is due to heterogeneity of trade categories. With type 1 goods we are in the field of scale economies with likely rationalization at firm and industry level and positive welfare effects. Type 3 goods give rise to genuine intra-industry trade. In these goods "cross-hauling" or intra-industry trade increases distribution costs, which seem to be borne by producers in presence of geographical price discrimination, through the absorption of freight costs. Wilmore analyzed intra-industry trade in two industries in Central American Common Market: one of perfectly homogeneous goods (portland cement) and the other of slightly differentiated goods (tyres), finding substantial levels of intra-industry trade for both products. Willmore attributed cross-hauling to the oligopolistic nature of markets, and the frequent tacit collusion on the determination of a common price structure without determination of shares, which brings about cross-hauling. Brander (1981) produced a theoretical model of that behaviour, Wilmore (1978) Agmon (1978) made an empirical analysis, but the conclusions are practically the same. Price discrimination through

differential absorption of freight costs is a sort of disguised dumping due to the oligopolistic nature of the market.

In Willmore differentiation is a means to undertake intra-industry trade, not a cause. Differentiation becomes more linked to market structure than to supply determinants (economies of scale) and demand determinants (different tastes and demand for variety). His conclusion seems to be supported by his analysis of intra-industry trade in Central American Common Market in homogeneous and differentiated products²⁴⁾. Besides that he sees a positive influence of custom unions on developing countries, which are not restricted to build up their firms at inefficient scale, provided that they give up some industries. Also Caves' (1981) contribution is relevant to the present issue. As Pagoulatos and Sorensen (1975), Caves tested the relationship between intra-industry trade and foreign direct investments. Should they be a substitute for trade in the long run, they would be against intra-industry trade as evidence shows. But this tendency is countervailed by horizontal and vertical integration of multinational companies, that we specified above. Despite this evidence, influence of multinationals on intra-industry trade is not easily assessable.

5.4. On the aggregation issue and on some policy and structure questions.

The aggregation issue has been for many years the 'war-horse' of those who did not give credit to the existence of intra-industry trade. Finger (1975) Lipsey (1976) Pomfret (1979) have maintained that intra-industry trade is mainly a statistical artifact.

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- 24) According to Grubel and Lloyd (1975) pioneering work, intra-industry trade in homogeneous goods could appear only because of
- 1) minimization of transport costs (border trade and similar trade)
 - 2) joint shipments of different goods because of scale economies in transportation
 - 3) seasonal fluctuations in demand and production.

By now nobody doubts that this is not the case. However any test of intra-industry trade has produced evidence that heterogeneity of trade categories justifies part of intra-industry trade²⁵⁾.

Even if intra-industry trade decreases as disaggregation grows, the trend in intra-industry trade also at highly disaggregated levels is growing.

In 1975 Finger defined intra-industry trade literature as valueless. He showed that between 40% to 70% of the variation in factor inputs requirements among products was within 3-digit product groups, at which level 44% of U.S. trade was overlapped. Indeed input variations within 3-digit SITC data did not prove that intra-industry trade was absent. To do that he should have proved that the variation of inputs was between imports and exports within every sub-category. But Finger did not undertake this test. In 1978 Finger and De Rosa recognized that "trade overlap for U.S. and other industrialized countries was a stable industry characteristic".

More criticisms might come to intra-industry trade students from policy arguments. Indeed intra-industry trade might be the effect of manyfold government interventions. Tariffs and other kinds of barriers seem to be quite important as explanatory variables of intra-industry trade. Trade negotiations often take place on the basis of mutual concessions industry by industry. Inter-industry specialization would not be hindered completely by those kinds of tariff reductions agreements. However if we wed them to strategic issues involving the survival of all domestic industries fostered by multiform administrative aids, policy is going to matter, although its role cannot be overemphasized and exactly evaluated.

25) This appeared in Grubel and Lloyed (1975) Pagoulatos and Sorensen (1975) Gray (1978) Loertscher and Wolter (1980) Caves (1981): all of them show that part of intra-industry trade is accountable by heterogeneity of 3-digit SITC data categories.

In the EEC, customs union has gone much further than anywhere else preventing any kind of non tariff barrier (other than capital and labour subsidies) to be long lasting. Ease of communications and low transportation costs on the continent have made the concept of a common market more effective. The growth of intra-industry trade has accompanied this process of harmonization between countries which are quite similar, as far as relative factor endowments and per capita incomes are concerned. We have already said that these "structural" elements make intra-industry trade more likely. Now we examine the state of the evidence. In Pagoulatos and Sorensen (1978) similarities of incomes (per capita) is the variable which accounts more and more significantly for intra-industry trade in the U.S. Loertscher and Wolter (1980) among the variables explaining intra-industry trade at country level included also differences in per capita incomes and gross domestic products (cross-section). Their hypothesis was that the higher the level of per capita incomes of countries is, the higher should be intra-industry trade. It seems that this variable might actually be a proxy for differentiation, which could be used better than other variables. Nonetheless their hypothesis received empirical confirmation.

Another aspect of intra-industry trade, linked more to policy, concerns tariffs. We saw in the supply side determinants of intra-industry trade the influence of natural barriers, i.e. transportation costs, and we spent some words around on tariffs. Traditional theory suggests that lowering of tariffs is going to lead to inter-industry specialization in presence of different relative factor endowments. In absence of that the effect of lowering tariffs and (as in the EEC) forming a custom union are not clearly discernible from a theoretical standpoint²⁶⁾.

26) The adequacy of traditional custom union's theory to explain patterns of trade in EEC is not discussed here. See J. Pelkmans, "Market Integration in the European Community", forthcoming (1982).

We just examine the evidence as far as the influence of tariffs on intra-industry trade is concerned. Pagoulatos and Sorensen (1975) found that lower and similar tariffs are pro intra-industry trade. Loertscher and Wolter (1980) tested the hypothesis just by recurring to a dummy variable relative to the establishment of a custom union, receiving positive evidence that it is pro intra-industry trade. In Caves (1981) evidence is ambiguous for the U.S.; there is a positive coefficient for the level of tariffs and a negative coefficient for the variation of tariffs. Lloyd (1978) simulated the effects of multilateral lowering of tariffs on a competitive model he built up. He finds that freeing of trade fosters the growth of trade, and intra-industry trade as well, but on the contrary of what has been the story of intra-industry trade during the last twenty years (see Grubel and Lloyd (1975)), its share remains constant²⁷. Finger and De Rosa (1978) found no statistical significant correlation for U.S. between changes of tariff rates (nominal and effective) and intra-industry trade. As it appears the effect of tariff changes and levels has not had any clear evidential proof, thereby leaving the question open to new empirical work and to theoretical research.

5.5. Uncertainty and geographical diversification of markets.

We would add some new element to the determinants of trade patterns and also to intra-industry trade. Grubel (1978) has reported that there is a great deal of two-way trade in financial assets in Germany. He attributes the cause of it to the diversifying attitude of financial agents. Rugman (1979) has also found that the earnings in multinationals are more stable (less variance, hence less risk) the more diversified are their operations.

27) Lloyd's model has not been estimated, since he put arbitrary parameters in it.

Given those facts we could introduce uncertainty as a determinant of trade and intra-industry trade in particular between similar and less similar countries. According to our approach, a firm starting to export on foreign-markets might be thought to do so in order to lessen the total risk associated to operating just on the domestic market^{27bis)}.

In other words it follows a policy of market diversification, as if national separate markets were different assets in a portfolio. If we think of aggregated demand in domestic currency terms in different countries not to be perfectly correlated ($\rho_{ij} < 1$) where ρ_{ij} is the coefficient of correlation between aggregate demand in country j and country i ²⁸⁾ it will sound reasonable for a firm to diversify its portfolio of orders over the world market²⁹⁾.

In the EEC this phenomenon might be thought of as even more relevant. In fact the risk associated with selling on foreign markets is quite low in the EEC for member country exporters. This makes selling abroad almost as easy as selling at home; the advantage could be that a recession at home is not simultaneously coupled to a recession abroad. A portfolio approach seems to be suitable for all the cases in which there does not seem to be any case for supply or demand side determinants to play any role, or it might just be used to supplement them. Market structure variables still play a role which can be overemphasized by uncertainty. As we saw trade in identical goods is a real fact (Willmore 1978) with theoretical significance (Brander 1981). After all using a Cournot type of behaviour, as Brander did, is a first attempt to take into account problems of decision under uncertainty or not-perfect information. If we recognize that firms face stochastic demand functions and cyclical pattern of aggre-

27bis) We shall develop this topic more extensively in a subsequent paper.

28) Of course we are dealing with simultaneous correlation excluding any lag.

29) Differentiation, and mergers might be due to the same reason, but we are not going to examine this topic here.

gated demand on all markets, the decision to export becomes simply a criterion of decision consistent with the usual maximizing behaviour of neoclassical firms, operating in markets where a firm cannot sell as much output as it likes at the going price. Indeed in a perfectly competitive "milieu" there would certainly not be any need to introduce this kind of criterion of decision, because any firm can sell as much as it likes at a fixed price. Only if market imperfections and some kind of interdependence among firms is allowed in uncertainty is going to matter. Uncertainty has to do also with the introduction of dynamic considerations; diversification would not be possible in a static timeless world.

The introduction of uncertainty in pure theory will probably prove to be useful to make intra-industry trade walk on safer theoretical paths. Uncertainty does not give rise necessarily to intra-industry trade, but it gives to intra-industry trade specialization a firm-based ground. Intra-industry trade might be then a product of the peculiar decision-criterion adopted by the firm.

6. Intra-industry trade in other areas.

We presented before some data on intra-industry trade relatively to countries which are not members of the EEC³⁰⁾ to show that intra-industry trade is not a pattern of trade which is peculiar to integrated areas and to custom unions.

Sazanami and Hamaguchi (1978) studied the levels of intra-industry trade for EEC countries within EEC (see table n. 2) and outside EEC (see table n. 3).

30) U.S. and some other OECD countries, such as intra-industry trade of Grubel and Lloyd on Australia at 7-digit SITC level of disaggregation.

Table 3

Intra-industry trade of EEC countries towards industrial countries excluding member countries.

	Netherlands	France	Be-lux	W.Germany	Italy
1962	55	53	45	58	45
1972	59	59	58	60	51

Source: Sazanami and Hamaguchi (1978)

From table 3, above, we see the importance of intra-industry trade for EEC countries trade with other industrialized countries. Intra-industry trade with non member countries is quite near to that for member countries, showed in table 2. Sazanami and Hamaguchi, noticed 1°) that intra EEC intra-industry trade exceeded for all countries intra-industry trade with other industrialized countries; 2°) that only Italy had intra-industry trade less than 50%; 3°) that between 1962 and 1972 intra-industry trade grew for both areas; 4°) that there is a coincidence of industries showing high levels of intra-industry trade in the two areas (except for Italy); 5°) there is only a small difference in intra-industry trade between the two areas³¹⁾.

Also Linder's theory that intra-industry trade should be far higher between countries with similar factor endowments is rejected.

In Balassa (1978) paper on intra-industry trade in developing areas we find further analysis of Central American Common Market and LAFTA trade patterns³²⁾. He shows that CACM has on average a greater degree of intra-industry specialization. (see table 4).

31) This seems to be due according to Hamguchi and Sazanami to the timing of abolition of external and internal tariffs which went "pari passu".

32) We examined Willmore's (1978) paper on CACM and LAFTA before.

Table 4
 LAFTA - CACM
Intra-industry trade for trade in manufactures 1975

		World	Dev.Cont.	LAFTA	LDC-LAFTA
L Argentina	)	23	12	29	11
L Brazil	L	40	20	28	25
L Chile ⁷⁴	A	08	02	15	02
L Colombia	F	27	11	34	21
L Mexico ⁷⁴	T	40	31	26	22
L Venezuela	A	06	02	07	15
C Costa Rica	) C	23	03	41	29
C Honduras	A	11	02	23	06
C Nicaragua	) C	19	02	26	05
	M				

Source: Balassa (1978), our elaborations to make data comparable with those showed above.

He explained that on the basis of a different tariff structure in the two areas. He also observed that "the extent of intra-industry trade specialization is far greater in the EEC than in either CACM or LAFTA.

The differences appear to reflect disparities of industrial development and the more far-reaching economic integration of the EEC". Indeed, as Balassa added, intra-industry trade between European countries was great (higher than LAFTA's and CACM countries) also in 1958, before the formation of the EEC.

Two case studies seem to be fairly interesting: Pomfret (1978) on Israel and McAleese (1978) on Ireland. Pomfret tested on Israel data once more the aggregation hypothesis, finding that, as disaggregation goes from 100 to 2000 industries, intra-industry trade falls from 46% to 8%. This result let him to affirm that the importance of intra-industry trade has been exaggerated.

McAleese (1979) finds further evidence in Ireland of Drèze (1961) thesis that market size is a determinant of the extent to which a country is able to differentiate its products. As market size increased between 1964 and 1977 in Ireland due to higher per capita incomes, intra-industry trade grew and product differentiation became more important, even if it seems that small countries which are more specialized in standardized products are more exposed to competition from third world developing countries.

Some partial conclusions can be drawn:

1. Intra-industry trade is present to a lesser extent also in integrated areas other than EEC.
2. In the EEC trade figures, intra-industry trade is almost as important within as it is outside the community with respect to non member industrialized countries. The role of Custom Unions between developed countries becomes more ambiguous.
3. Between developing countries intra-industry trade is increased by Customs Unions.
4. The importance of market size for the kind of specialization undertaken by a country is confirmed.
7. Welfare and stability of trade balances in intra-industry trade economies.

Over the previous paragraphs we have referred many times to welfare effects of intra-industry trade³³⁾. However, welfare evaluations of intra-industry trade are not easily feasible in terms of income distribution, though they appear more amenable to general efficiency evaluations.

33) Normative aspects concerning Customs Unions will not be treated here. See J. Pelkmans, "Market Integration in the European Community" (1982) forthcoming.

As far as the distribution of income is concerned, intra-industry trade as a consequence of market integration does not involve any redistribution between import competing industries and exporting industries. That would be the case if market integration were to imply inter-industry specialization. Instead there will be a redistribution of income between those firms which did not operate at their optimal scale when tariffs existed and those whose scale was optimal under a tariff regime but not in absence of it.

Welfare augmenting influences matter as far as

- 1) greater competition; 2) more efficient production;
- 3) higher variety of goods are taken into consideration.

Intra-industry trade might lead to an increase of the number of firms due to differentiation: this might make a market more competitive. But even if this is not the case, collusion is going to be more difficult because fixing a common price might become impossible due to exchange rate fluctuations. Collusion will not be able to curb the aggressive behaviour of those firms which take advantage of exchange rate fluctuations because of their geographical location. Prices should be kept at a reasonably lower level by international competition through likely incursions of foreign firms into domestic market .

In fact barriers to entry into a domestic industry are lower for already established foreign firms, which have to build up just a commercial network to penetrate the foreign market. Yet, as we saw above, price competition is by now less likely than product innovation competition. Price competition would not explain after all much intra-industry trade, whereas competition by differentiation and innovation is part of the explanation of intra-industry trade. What more on intra-industry trade effects on welfare? It seems that more efficient production comes from greater competition and from the opportunities provided by larger size markets as to exploit economies of scale in production, commercialization, development of new products. ✓

However the issue of greater competition is not completely true in some cases. When there are economies of scale, the establishment of more efficient firms due to the existence of a greater market, does not lead to an increase in the number of firms, but more likely to a decrease, according to the scale at which economies appear. Moreover the pricing policy of those firms has to be analyzed carefully, since no marginal rule can be used if economies of scale do not come to any end. Thirdly, if differentiation increases proportionally to the increase of market size due to opening of trade (is that the case of the EEC?) no room for economies of scale will be there, no more efficiency either, therefore there will be a welfare gain only in terms of variety, but higher prices will appear due to greater commercial expenses entailed by operating in many countries.

If there is not any proportionate increase in the number of differentiated goods available on the domestic market, there will be either mergers or bankruptcies, but the effect on prices is not easily assessable because it depends on the new market structure and on the extent of economies of scale.

More efficient production is often favoured by the need to adapt exported products to foreign legal requirements, which might be most of the times more severe for developing countries or for less developed industrialized countries³⁴⁾.

Higher variety of goods could result from horizontal specialization only if economies of scale are absent. Horizontal specialization is often wedded to innovation and development of new products which is going to increase the consumers' welfare even though it is sometimes associated with a decrease of consumer's surplus, when a consumer buys more than one differentiated goods belonging to the same industry.

34) Think for instance of pollution control devices required for European cars to be exported either to the U.S. or Japan.

As we said above, when intra-industry trade is associated to a higher number of firms operating on the domestic market, commercial expenses will be higher. Transport costs will not be higher because they are related to the volume of trade and not to the characteristics of it³⁵⁾.

A second question we are going to analyze is related to macroeconomic issues more than to welfare. When intra-industry trade is prevalent there appears to be a certain degree of volatility of the advantages on which trade is based.

When the advantage is represented by the possess of Linder's type product specific inputs, or even by product cycle variables, it becomes easy for a country to loose (or improve) quickly its trade position and incur in frequent trade disequilibrium: hence instability of flows. This is due to two reasons.

1. Related to supply side conditions, is the existence of across countries dynamic economies of scale, or in other words to the variations of production frontiers over time.
2. Related to demand side, and certainly more relevant, is the existence of high elasticity of substitution between domestically produced goods and imported goods belonging to the same industrial category, which are the protagonists of intra-industry trade³⁶⁾.

35) If trade volume (Imports + Exports) is one third of GNP, the cost of transportation of goods will be the same if all the trade is made up of intra-industry trade or of inter-industry trade. Therefore increase in intra-industry trade does not mean that consumers bear higher transport costs and that there is wasting of resources. Of course we assume that switching from intra-industry trade to inter-industry trade does not imply a switching of partner countries.

36) Tsurumi and Tsurumi (1980) affirmed that foreign trade flows in differentiated goods are likely to be quite sensitive to variations of costs, prices and marketing efficiency, because consumers will have high elasticity of substitution between imported goods and domestic goods in the same category.

Intra-industry trade in differentiated goods seems not to be conducive to the stability of balance of trade which might instead occur when inter-industry specialization is dominant. When this is the case, a country in the short and medium term is locked in both by her industries producing for domestic and foreign markets, and her imports producible only by foreign industries, because of the specialization of the Heckscher-Ohlin-Samuelson type, that has led each country to give up completely some industries. In this situation of Heckscher-Ohlin-Samuelson specialization, a temporary loss of competitive advantage is not going to induce any immediate big trade disequilibrium³⁷⁾ because it takes time and efforts to switch productions according to the fresh conditions of the advantages. On the contrary, a country showing high levels of intra-industry trade is more exposed to trade imbalances, because even temporary gains (or losses) of comparative advantages displace demand to (or from) domestic producers, since their goods are highly substitutable to foreign commodities. In fact differentiation implies that domestic and imported goods are only slightly different, and do not entail the creation or the establishment "ex-novo" of an entire industry, but only an increase in productive capacity of the existing one.

If countries are highly integrated in an intra-industry trade sense and if tariffs and other kind of barriers are almost absent (as it is in the EEC) the upshot of intra-industry trade in differentiated products points to a sort of "de-facto" monetary union in which room and scope for some kind of autonomous economic policy are practically non-existent. Foreign goods compete in practically all industries, whose markets are not "sheltered" by any kind of inter-industry specialization which would make some industries peculiar to some particular country.

37) The only disequilibrium will be due to inter-industry substitution effects in demand.

It follows that economic integration in the EEC has a character which is fairly different respect to the one hypothesized by its founders. EEC members, and also any nation-country which has high levels of intra-industry trade, are only partially integrated in their economic structures, because no country has given up any industry, and every country has the virtual capacity of being autonomous and independent of other members. Yet paradoxically, this kind of integration makes country-members less independent of each other because their balance of trade is much more sensible to what others do, than it would be if there were inter-industry specialization³⁸⁾.

Gains from integration therefore seems to come from other sources. These could include more efficiency due to economies of scale, longer production runs, more competitive markets; but it is not clear what is the loss of actual intra-industry trade specialization vis à vis inter-industry specialization.

In the new context of intra-industry trade countries will be able to export differentiated goods successfully according to the degree of sophistication and efficiency of their firms.

A positive effect of intra-industry trade specialization is due to the fact that Heckscher-Ohlin-Samuelson inter-industry specialization would not have the incentives for higher efficiency in production, and for greater innovation, that we find in intra-industry trade, where each firm and each country is much more liable to be taken over by partner nations, than in the case of firmly established industries owned by only one country, whose take over would imply instead the fresh building up of a new industry.

38) The results of Hufbauer and Chilas (1974) were interesting. They found more intra-industry trade between EEC members than between States of the U.S. The historical reasons given in the previous paragraphs are able to explain this fact. But they cannot explain persistence and growth of intra-industry trade in the EEC.

Conclusions

Intra-industry trade is an outstanding feature of international trade patterns, whose share and importance is growing.

Intra-industry trade is not due to the heterogeneity of trade categories, even though as the number of industries increases because of finer disaggregation, the level of intra-industry trade decreases.

The causes of intra-industry trade are many and multiform. Some of them relate to economics, few of them to economic policy.

On the side of economics: economies of scale and differentiation play an important role. Failure to test their empirical relevance depends mainly on the difficult task of finding correct variables to measure product differentiation and economies of scale at plant level.

Theoretical models give more emphasis to economies of scale and product differentiation coupled to monopolistic competition.

Structural elements enter the picture on the market side. However market imperfections matter as a cause of intra-industry trade only as far as they are coupled to economies of scale. Monopolistic competition without economies of scale DOES NOT give any account of intra-industry trade.

Hence market structure matters only as far as it has a technological basis. In absence of that two elements can be invoked for the explanation of intra-industry trade in imperfect market structures: one is related to optimal choice under uncertainty (due to stochastic industrial demand, cyclical patterns of foreign demand not synchronized with domestic cycles, interdependence of firms operating in the same industries, fluctuations of exchange rates or as we said in paragraph 7, fluctuations of foreign demand value in domestic money terms) the second one is related to demand arguments. In this sense demand for higher variety than that producible on the domestic market should be the cause of intra-industry trade. But as explained in previous paragraphs,

this cannot be by itself a cause of intra-industry trade unless it is accompanied by some kind of scale economies or by the existence of product-country-specific inputs which cannot be traded because of restrictions on them due to legal (patents, quotas on exports, copyrights etc.) or natural (high transport costs, immobility of some peculiar skilled labour force etc.) impediments.

Some more structural elements pertain to similarities of per capita incomes across countries, and to similarities of relative factor endowments, which are against inter-industry specialization of the Heckscher-Ohlin-Samuelson kind, and hence are a factor explaining intra-industry trade, even if not the volume of trade between similar countries.

Structural elements, uncertainty, economies of scale coupled to differentiation, product-country-specific inputs can be complementary causes of intra-industry trade and not in competition with each other. Some of them are compatible with the traditional Heckscher-Ohlin-Samuelson framework, some are not. To say the least differentiation seems to prevent partly (or even more) the achievement of what has been a milestone of international trade theory, that is factor price equalization across countries via the exchange of goods.

However on the economics side, we have to remind that intra-industry trade is only a casual result of all the phenomena we have just mentioned. Differentiation, economies of scale, monopolistic competition, oligopolistic behaviours are necessary causes of intra-industry trade but not sufficient, for it.

In fact all these things might be present also in case of inter-industry specialization, which is not necessarily coupled to product homogeneity.

On the side of economic policy arguments it has to be concluded that they provide the sufficiency for the phenomena just mentioned to cause intra-industry trade. In Europe, where the industrial development has taken place most of the times under strong autarkic policies, inter-industry specialization would

have meant the dismantling of entire industries as a follow up of the establishment of the Common Market. Therefore intra-industry trade has taken its great share of trade in a Common Market where tariffs and quotas are virtually absent, but where national strategic issues still have a part in many kind of hidden taxes or subsidies³⁹⁾.

The existence of such a huge level of intra-industry trade in Europe and in other integrated areas raises macro-economic issues.

In fact short run fluctuations of exchange rates due to financial causes would not have great effect on balances of trade if there were more inter-industry specialization.

The temporary loss of absolute advantage (a fashionable expression) makes a country liable to import all the goods across the board, because all countries produce almost all manufactured goods⁴⁰⁾ making their reciprocal balances of trade quite unstable.

Inter-industry specialization would lock a country in her industry, and the temporary loss of the advantage would not have as a consequence an immediate switching of orders from its products to other foreign producers, because it would take the time necessary to build up a new industry. When all countries produce all goods they have to manage with a straightjacket of a pseudo-monetary union even if they do not realize it.

But of course differentiation and horizontal specialization is an escape way from that. How strong we do not know.

39) For instance different pollution requirements across EEC nations might be considered as differential taxes or subsidies to production; or even the quantity and quality of research and development undertaken by government agencies. The examples would be several more .

40) We are obviously talking of big and medium industrialized countries.

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