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INTERNATIONAL TRADE AND INTEGRATION OF THE EUROPEAN COMMUNITY: AN ECONOMETRIC ANALYSIS

by

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Summary

The paper contributes to the policy debate on European integration by analyzing intra-Community trade and studying the structural determinants of European competitiveness. Four types of explanatory factors of intra-EC trade are distinguished: (1) factors related to inter-industry trade; (2) factors pertaining to intra-industry trade; (3) factors which reflect natural and policy-induced barriers to trade; and (4) factors reflecting supply constraints. Distinction is drawn between two contrasting factors that favor intra-area trade: those that foster economic welfare and those that hinder a more efficient world division of labor.
1. Introduction

The creation of a large common market has always been, ever since the Treaty of Rome was signed thirty years ago, the keystone of the European edifice. The rationale for transforming national markets into a single market is that it tends to improve European specialization and efficiency as well as intensify competition, and, thereby, increase trade, and foster economic welfare.

During its first fifteen years, the European Community (EC) witnessed a rapid expansion of intra-area trade as a result of dismantling all tariffs and quantitative restrictions among the member countries. The expansion of trade was accompanied by rapid economic growth in the Community.¹

Since 1973 Europe has undergone a prolonged period of slow growth and high unemployment. At the same time there has been a slowdown in intra-area trade. This trend has recently been documented by Jacquemin and Sapir (1988) who use the ratio of intra-Community imports to total (i.e. intra- and extra-Community) imports as an index of intra-Community trade. They show that two sub-periods can be distinguished in the evolution of intra-EC trade in manufactured goods for the Community of Ten. The first one, starting in 1958, is characterized by a steady increase in the share of intra-Community imports reaching a peak of 61 percent in 1972. The second period, starting in 1973, indicates a more irregular tendency; stagnation around 60-61 percent between 1973 and 1979, followed by a decline in 1980 with a further stagnation thereafter at around 58 percent. The slowdown in intra-Community trade becomes far more striking when the new
member-countries (especially the United Kingdom) are excluded.

There are two broad categories of factors which may account for the deceleration of intra-Community trade. One includes macroeconomic, short-term factors such as exchange rate variability or misalignment. The second category reflects a structural, long-term weakness possibly associated with the failure to complete the process of European integration. In view of the success of the European Monetary System (EMS) at stabilizing exchange rates and the positive impact on intra-EMS trade [De Grauwe (1987)], the burden of explaining the relative slowdown in intra-EC trade falls heavily on structural factors.

The Community's loss of momentum has prompted efforts by the European Commission to adopt structural measures for completing the internal market. The aim is to eliminate, by the end of 1992, all physical, fiscal, technical barriers among the twelve member countries in order to give new impetus to trade and revitalize economic growth.

The purpose of this paper is to contribute to the policy debate on European integration by analyzing intra-Community trade and studying the structural determinants of European competitiveness. Distinction will be drawn between two contrasting factors that favor intra-area trade: those that foster economic welfare and those that hinder a more efficient world division of labor. The study relies on a new databank allowing, for the first time, to conduct research on European industry at a rather disaggregated level that distinguishes over one hundred sectors.
2. **Theoretical Background for Explaining Intra-EC Trade**

In the existing theoretical literature there is no general argument resulting in the prediction of a distinct impact by trade factors according to whether they are related to trade of an intra- or extra-Community origin. The purpose of this section is to provide a simplified framework allowing such a distinction. The explanation rests on modern trade theory which predicts intra-industry trade in differentiated manufactured products between similar countries and inter-industry trade between countries with different factor endowments or technologies.

Divide the world into two regions, the European Community and the rest of the world. The EC can be viewed as a set of countries with relatively similar factor endowments and technologies. In turn, the rest of the world can be subdivided into two regions called North and South which comprise of the non-EC industrialized countries and the developing nations, respectively. The European Community and North share similar factor endowments and technologies which generally differ from those of South.

The prediction about the direction of trade depends upon whether a given manufactured good is either homogeneous, produced under constant returns to scale or differentiated, produced under increasing returns to scale. Trade between the European Community and South will be primarily inter-industry trade of goods belonging to the former category; a given Community member will tend to import homogenous goods from South rather than from EC partners if they use intensively factors of production which are abundant in South. On the other hand, trade between the
European Community and North will be primarily intra-industry trade in differentiated/increasing-returns products; a given Community member will tend to import differentiated goods from North rather than from EC partners if it enjoys some competitive advantage.

Within this framework, four types of explanatory factors of intra-EC trade can be distinguished: (1) factors related to inter-industry trade; (2) factors pertaining to intra-industry trade; (3) factors which reflect natural and policy-induced barriers to trade; and (4) factors reflecting supply constraints.

As regards the determinants of inter-industry trade, the neo-factor proportion extensions of the Heckscher-Ohlin theory are well known. In particular, the production factor constituted by capital has been broken down into two components: human capital and physical capital. Moreover, in the Ricardian perspective, an effort has been made to introduce several aspects of technological advantage in explaining the pattern of trade. To the extent that Europe possesses relatively advanced technologies and large stocks of capital, it can be expected to enjoy a comparative advantage in high-tech and capital-intensive industries.

Concerning the determinants of intra-industry trade, theoretical elements are based on the roles of product differentiation and economies of scale. There is a tendency for increasing-returns industries, other things equal, to locate in the largest markets and export to other markets. To the extent that the degree of European integration is similar to that of other industrialized countries, European industry will not be handicapped in realizing economies of scale. But if European markets are fragmented so that firms are constrained to operate
at suboptimal plant size a disadvantage will appear.

The existence of product differentiation (which is especially found in consumer products) implies monopolistic competition which, from the consumer's viewpoint, may correspond to a demand for variety in products. As far as a country's range of potential imports of manufactured goods is determined by its internal demand [Linder (1961)], countries with similar demand structure will trade more with each other. Intra-EC trade would then be promoted if, indeed, European countries exhibit a greater similarity of demand among themselves than vis-à-vis the other industrialized countries. However, it must be noted that this potential effect will be realized only if European producers are able to respond to a common pattern of European preferences over the spectrum of differentiated products.

Because of the strict assumptions behind the two main strands of trade theory, no unambiguously correct and conclusive test of these theories has been formulated and applied so far. "Instead there have been piecemeal improvements in the empirical applications of trade theories." [Deardorff (1984), p. 469] These applications, however, have fostered a consensus on the economic factors contributing most to the understanding of international trade. The purpose here is to identify those factors that are able to explain the relative intensity of intra-EC imports of an intra- as well as inter-industry nature.

The third type of factor which is expected to sustain EC imports of Community origin are the barriers to international trade. An obvious natural barrier is transport costs which are expected to positively influence trade between neighbours. Most barriers, however, are
artificial, in the form of regulations and institutions. Some of these can protect the entire European market, as in the case of the common external tariff. Others, such as national public procurement policies, can favor individual countries or specific industries within a given country, therefore affecting intra-Community imports as well as imports of extra-Community origin. It is worth pointing out here that a large number of these barriers could be eliminated by harmonizing and integrating markets. However, other types of strategic actions which also result in changes detrimental to international trading conditions are deemed by governments to be their sovereign right. This type of barrier probably necessitates recourse to various forms of cooperation among states to preclude the damaging effects of a non-cooperative solution.

The final type of factor concerns the ability of suppliers to respond to the dynamics of international demand. In line with previous studies (for instance, Buigues and Goybet (1985)), one may wonder whether European corporations have been able to exploit rapidly growing product markets.

In the light of the previous distinctions, it is useful to point out the possible welfare implications of an empirical analysis of the determinants of EC imports of Community origin. In the 1960s several studies were made of the relative importance of trade-creation and trade-diversion effects resulting from the formation of the European Common Market. The main result was the strong predominance of trade creation.4

This issue has been raised again in the current context. But the
question today is: what are the factors, at the inter- and intra-industry level, which positively influence EC imports of Community origin, and which can be viewed as expressing European competitiveness leading to sustained trade creation, and what are the factors which correspond to trade diversion? Once this question can be answered, it will be possible to indicate the characteristics of European industry which could and should be reinforced and those which have to disappear over time.

3. Empirical Analysis

In this section we present an econometric study intended to account for the levels of the share of intra-EC imports in total imports for the "big Four" member states (i.e. France, the FRG, Italy, and the UK) in 1973 and 1983. As already indicated in the previous section, the explanatory factors can be divided into four groups:

inter-industry trade determinants (human capital, physical capital, technology);

intra-industry trade determinants (economies of scale and degree of product differentiation);

barriers to trade (transport costs, tariffs, Common Agricultural Policy, public procurement); and

ability to supply rapidly growing demands.

On the basis of the previous considerations, the determinants of the intra-Community trade index can be measured as follows.

The human capital variable is expressed by the reciprocal of the
share of non-qualified employment in total employment in industry.

The physical capital variable is measured using per capita value added.

The technological factor is measured by the ratio between R&D staff and total staff.

As regards economies of scale, we have used British data on the output achieved in each industry by the largest plants, which account for 50% of total output.

Product differentiation is captured by a dummy variable which takes the value 1 for consumer goods and the value 0 otherwise.

Transport costs are measured by the reciprocal of the price per kilo of Belgian imports.

To measure the common external tariff we used the observed tariff which corresponds to the amount collected by Belgian customs divided by the value of extra-Community imports.

The role played by the Common Agricultural Policy is expressed by a dummy variable which takes the value 1 for the agro-business sectors and 0 for the other sectors.

One variable has been used with reference to barriers within the EC: public procurement. This is calculated on the basis of two-digit national input-output tables by the ratio between sales to the public
sector and total sales.

The rate of growth of consumption in OECD countries is used to identify areas of fast growing world demand.

Lastly, a dummy variable has been introduced for sector 461 (sawing and processing wood) which is characterized in all countries and for both 1973 and 1983 by an atypically low share of intra-EC imports.

Our regression analysis covers all of the observations available (n=361), which are obtained by pooling the observations for each of the "big Four" countries. This pooling was rendered necessary by the fact that certain structural variables were missing for some industries in some countries. In order to retain the possibility of specific effects produced by the late entry of the UK, as suggested in the introduction, we have introduced a national dummy variable for the United Kingdom. This variable takes the value 1 if the observation belongs to the UK and 0 otherwise.

Two ordinary-least-squares (OLS) regressions, one for 1973 and one for 1983, have been carried out in order to be able to compare the possible changes of effect exercised by the explanatory variables on the share of imports of Community origin in EC imports. A semi-logarithmic specification has been adopted, expressing the view that the explanatory variables exercise a decreasing marginal effect.

Given that the dependent variable is bounded by the values of 0 and 1, and could yield biased coefficient estimates, a logit transformation has also been made, as well as the corresponding adjustment for the
expected heteroscedasticity of the residuals. Having multiplied the dependent and the explanatory variables by the adjustment factor, \( \sqrt{\hat{\mu}/(1-\hat{\mu})} \), we have used weighted least squares to estimate our equation.

The results of the regressions appear in Table 1. A pair of OLS equations is presented for 1973 and 1983 (equations I and II), along with a parallel pair of logit equations (III and IV).

\[ \text{[INSERT TABLE 1]} \]

These regressions show a similar pattern in the years 1973 and 1983. For both years the summary statistics (R^2 and F ratio) are relatively high, and the effects of most variables are consistent with our expectations.⁸ According to the OLS estimations, intensive human capital and skilled labour, substantial physical capital, and high R&D activity are all conducive to a high level of intra-Community imports in relation to imports of extra-Community origin.

In contrast, intra-Community trade is not the preferred option in fast expanding industrial sectors, confirming previous studies by the Commission of the EC. Economies of scale also have a negative impact, suggesting that, given the still fragmented Common Market, firms belonging to other large integrated industrialized countries are more able to exploit the scale advantages.

The EC also has a handicap in the domain of consumer goods, which can be considered to be systematically less standardized than intermediate goods and more dependent on efficacious non-price policies.
The common external tariff plays its anticipated part in assisting intra-Community trade. Its impact in terms of welfare does not, however, have the same positive connotation as that of R&D. It appears that in 1983 this protectionist effect is reinforced in the case of the agro-business sectors, which in all probability reflects the effective role played, in terms of diversion of trade, by the Common Agricultural Policy.

Transport costs constitute another barrier to trade. In industries where these costs are substantial, intra-Community trade is helped by the geographical proximity of the member states.

As regards national public procurement, the following explanation seems to account for the negative effect observed. These purchases centre mainly on activities such as telecommunications and transport where national producers are systematically favoured. If it proves essential to have recourse to the external market, extra-Community partners are given preference. It would appear that not only are national public procurement policies unfavourable to intra-Community trade, but also that they systematically encourage imports from the rest of the world.

Finally, as suggested in the introduction, the United Kingdom has a systematically inferior amount of trade with the Community.

In order to compare of our results in 1973 and 1983 we have computed the beta-coefficients corresponding to the OLS estimates. As regards barriers to trade, it is interesting to contrast the stable effect
produced by the common external tariff with the impact of the CAP -- non-significant in 1973 but positive and highly significant in 1983. The successive enlargements of the EC seem to have boosted the dissuasive effect of the Common Agricultural Policy.

[INSERT TABLE 2]

Another characteristic of the 1973 and 1983 results are the increased positive effect of the R&D efforts as well as of the human and physical capital. By contrast a handicap has appeared in the consumer goods sectors.

Finally, the difference between the United Kingdom and the other three "big" countries has been strongly reduced between 1973 and 1983. This confirms, in the context of a multivariate analysis, the convergence phenomenon identified in Jacquemin and Sapir (1988).

These results are, on the whole, confirmed when using the logit transformation. However, the negative effects of scale economies and demand growth are less significant.

4. Conclusions

This study is the first analysis of intra-EC trade made at a relatively disaggregated industrial level. Our work has been hampered by the absence or poor quality of European standardizing for some data, especially concerning production and several structural variables. It is hoped that this research will encourage the indispensable setting up of more complete, homogenous information. In spite from those
limitations, a set of conclusions can be derived from the study. We have seen that the EC countries are becoming increasingly involved in a process of world-wide division of labour at the expense of European integration, which is making time.

Our multiple regression analysis has enabled an initial identification of a set of variables which tend, other things being equal, to be conducive or detrimental to intra-Community imports in comparison with imports from the rest of the world. This analysis has been done for the years 1973 and 1983.

According to their probable effects in terms of Community welfare, two types of variables can be distinguished. Some, such as Research and Development and human capital, are conducive to intra-Community trade and enable better "resistance" to imports of extra-Community origin on the basis of assets reflecting genuine competitive advantages and, therefore, trade creation. Other variables, intended to capture the common external tariff and agro-business policy, while also being conducive to intra-Community trade, probably promote it at the expense of greater integration into world competitiveness and the international division of labour, thus implying trade diversion. Just as the influence of the first type of variables could well be strengthened through various Community policies, such as cooperation on R&D and the accumulation of human capital, so the part played by the second type should be considered makeshift, destined to be gradually phased out. This suggests that it is no doubt necessary to resist the temptation to create a sort of "generalized Community preference" designed to defend intra-EC trade systematically by various measures resulting in the checking of the progress of world free trade. But it is also necessary
to beware of a pure "laissez-faire, laissez-passer" approach, which would ignore the importance, for the common interest, of strategic behaviour patterns in the formation and dynamics of competitive advantages.
Footnotes

¹See, for instance, Balassa (1975), Owen (1983) and Pelkmans (1986).

²For a recent discussion of the role of industrial structure on trade performance, see Lawrence (1987) who, on the basis of a 22-sector analysis, argues that "[i]t is unlikely to explain the differences [among the main OECD countries] in industrial performance" (p. 360). However, in a comment Jacquemin has pointed to the need to examine industrial characteristics and performance in more disaggregate fashion in order to draw proper inference.

³See Krugman (1980).

⁴See, for example, Kreinin (1974) and Balassa (1975).

⁵The absence of three-digit input-output tables made it necessary to assume a uniform behaviour within two-digit industries.

⁶This is explained by the fact that this industry is based on a natural resource which is scarce in the EC.

⁷If the intention had been to carry out regressions by country on a sample covering the same variables and the same sectors, the number of observations per country would have been less than 20.

⁸A double-log specification gives similar results to those obtained with the semi-log form.

⁹To obtain $\hat{m}$, m has been regressed on the same set of independent variables as in the OLS regression.

¹⁰An inspection of the correlation matrix does not reveal a strong collinearity problem. The matrix is available upon request.

¹¹These coefficients are obtained by multiplying the OLS estimates by the ratio of the standard deviations of the dependent and independent variables.
References


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