

"EUROPEAN INTEGRATION AND TRADE FLOWS"

by

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ABSTRACT

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We study a model of intra-European trade flows and trade between Europe and the rest of the world for 29 manufacturing sectors for the period 1975-1985. From the theory of customs unions, we derive some indicators of European and world integration. Evaluating these indicators, we investigate the claim that European integration has slowed down in recent years; we find that integration has not receded, but rather has proceeded alongside integration with the rest of the world. It is only in the food industry that European integration has happened at the expense of world integration. In an econometric model that includes variables for non-tariff barriers in the European manufacturing sector, we investigate the factors underlying EC trade (within the EC and with the rest of the world), as well as how these factors have changed over time. We find no evidence to support the (common) claim that there are significant unexhausted scale economies in European industry. We also observe that non-tariff barriers hamper trade between Europe and the rest of the world significantly more than intra-European trade. As a result, a policy like the internal market program, which focuses on the removal of NTBs to European trade might not be a first priority. Larger benefits could be obtained by opening up trade between Europe and the rest of the world.

I. Introduction

In 1985, the European Commission, upon request from the European Heads of States, has put forward a list of some 300 directives which could lead to more integration in Europe. This list was published as the now famous White Paper on the Internal market. Soon after, a major change in the process through which decisions are taken at the European level was accepted by the member countries, in the form of the single European act. In practice, it meant that decisions could be taken at a qualified, rather than absolute, majority. More than half of the directives originally proposed by the Commission have now been accepted and will progressively be implemented. On the whole, important changes are thus taking place, at least in terms of decision making procedures and in terms of new legislation. The need for such evolution is grounded in the belief that European integration had slowed down in the 70s. In particular, it was felt very strongly in the early 80s that Europe's competitiveness was deteriorating by comparison with Japan and the US, and that the lack of integration in Europe could account at least partly for such deterioration. In particular, it is often claimed that economies of scale are left unexhausted in Europe, because of a lack of integration. Some commentators, like Sapir (1988), have an even more pessimistic view of the 70s, suggesting that during that period, member states have increasingly resorted to protectionist barriers hampering intra-EC trade. In general, given that tariffs applicable to intra-EC trade have been removed since the early 70's, non-tariff barriers are generally considered to be responsible for the lack of integration. The internal market program aims at precisely those barriers.

The purpose of this paper is twofold ; first, we shall try to assess whether the claim that European integration has slowed down, or receded, can indeed be supported empirically. An important contribution in this area has been put forward by Jacquemin and Sapir (1988) and we shall complement their analysis, while reaching slightly different conclusions. Second, we will try to identify the factors, at the industry level, which can explain the trade flows within the EC as well as between the EC and the rest of the world.

Overall, we don't find any strong evidence that European integration has slowed down in the late 70s and early 80s. Rather, we find that European integration has proceeded alongside with integration with the ROW. It is only in the agricultural sector that some trade diversion is observed. In addition, the non-tariff barriers, which according to the Commission have slowed down European integration, seem to have hampered more the trade with the rest of the world than the trade between European partners. As a result, it seems that the priority should be to dismantle non-tariff barriers with the ROW, rather than to dismantle them for the EC trade only. We also observe that the existence of scale economies tends to boost intra-EC trade; this, once again, does not seem to be consistent with the idea that Europe has been hampered by unexhausted scale economies. We also find that trade with EFTA in most cases tends to be a substitute for trade between European countries, rather than a substitute for trade with the non EFTA countries in the ROW.

The paper is organized as follows. First, in section 2, we shall briefly review the theory of integration. This will lead us to identify useful indicators of the extent of integration, that we will subsequently try to

measure, in section 3. In section 4, we present our analysis of the factors which can explain at the industry level the trade flows inside the EC and between the EC and the rest of the world. Some conclusions follow in section 5.

II. Overview of the theory of integration

A custom union is said to be formed when a group of member countries reduce (or remove) tariffs (or non tariff barriers) applicable to trade between members and adopt common tariffs (or more generally a common commercial policy) for trade with the rest of the world. The theory of customs unions as originally formulated by Viner (1950) suggest that the structure of trade between member countries and between member countries and the rest of the world can be affected in the following way¹: trade will be created if domestic production falls. This will typically arise when production in some members countries was "inefficient", by comparison with production in some other country, but was still undertaken because of some tariff protection. At the opposite, trade erosion occurs if domestic production rises. In turn, trade creation (erosion) can occur with members of the custom union or with some other trading partner (the rest of the world). Given that tariffs are reduced (or removed) within the union, trade creation with members is more likely. In addition, trade creation is presumably

1. We abstract from the consideration that integration could lead to higher consumption (in particular countries and/or overall. We are interested in the sources of supply, assuming that demand (consumption) is fixed (or alternatively, as undertaken below, we normalise the supply values).

beneficial because in this instance production shifts to a low cost location. Next, there is some trade diversion when imports from one area are displaced by imports from another area. In principle, trade diversion can occur at the expense of trade between members as well as to the expense of trade between a member and the rest of the world. Diversion is also independent of whether trade is being created or eroded. Still, given that members of the union apply higher tariffs with the rest of the world than between themselves, diversion of trade from the rest of the world is more likely. Also, trade diversion is presumably not desirable (for world welfare) because in this case production shifts to a relatively high cost location.² In very loose terms, union formation will thus be desirable when creation outweighs diversion.³

2. Of course, trade diversion could also be beneficial if integration has an effect on supply. In particular, if the barriers being dismantled internally, are cost increasing (rather than revenue generating) barriers, integration would then lead to diversion in favour of possibly lower cost (rather than higher cost) producers.

3. In theory, some general conclusion can however be derived about the desirability of customs unions, using the fact that the union, in setting the common tariff, can change its terms of trade. Indeed, as shown by Kemp and Wan (1975 ?), it is always possible to set the external tariff at an level such that trade between the union and the rest of the world will involve in the aggregate exactly the same collection and quantities of goods as before the formation of the union. As a result, the rest of the world is unaffected whereas the union members will benefit from the liberalization of mutual trade. That is also to say that the common external tariff can always be used to avoid trade diversion, so that integration leads only to trade creation. If a lump sum transfer can also be organised between union members, it follows that the creation of a union between any set of countries can always be designed such that no country in the world loses and such that members gain.

In principle, more European integration should thus be associated with trade creation among member states, i.e. instances where domestic production is displaced by imports from members. Normalizing⁴ the sources of supply by apparent consumption, trade creation can be identified by (i) an increase in the share of EC imports in apparent consumption and (ii) a simultaneous decrease in the share of domestic production in apparent consumption.

Similarly, more integration with the rest of the world would be measured by (i) an increase in the share of EC-imports in apparent consumption and (ii) a fall in the share of production in apparent consumption. In some cases where both shares of EC and non-EC imports increase, it might be interesting to perform a finer analysis : in particular, it might be interesting to find out about the relative magnitudes of such increases. This will enable us to assess whether the resulting trade creation is more oriented towards the members or towards the rest of the world. Hence, it is useful for this purpose to analyze the share of member imports in total imports (or equivalently the ratio of members to non-members imports).

Still, the evolution of the shares of domestic production and imports over time can only be related unambiguously to integration, if one assumes that these shares would not have changed in the absence of integration. This need not be the case. In general, it is thus necessary to normalize the estimates, i.e. to create an "anti-monde" by constructing hypothetical shares, which represent the alternative of no integration. The effect of integration can than be isolated by taking the difference between actual and

4. Indeed, one is interested in the changes in the structure of the various sources of supply rather than the amounts actually supplied.

hypothetical shares. For the first wave of European integration, starting with the treaty of Rome, the start of integration is a clear cut event; as a result, it has relatively easy in empirical studies to create reasonable "anti-mondes", on the basis of various extrapolations of the pre-integration trade patterns. However, if we want to assess the extent of integration in the 70s, it is much more difficult to simulate a reasonable anti-monde. Indeed, there is no clear-cut event to start with. One could still presumably compare the actual evolution of the shares of production and imports in apparent consumption, with their extrapolated values obtained from their evolution in the 60s. This exercise is however likely to significantly overestimate the extent to which integration has slowed down; the reason is that the effects of the initial integration would presumably be exhausted at some point.

In what follows, we shall first look at the evolution of the shares, without explicit reference to their extrapolated trends from the 60s. However, rather than developing an anti-monde on the basis of some extrapolation, we shall subsequently estimate an econometric model of the shares of EC and non-EC imports in apparent consumption and of the share of EC imports in total imports, which include as explanatory variables the classical determinants of trade, factors pertaining to intra-industry trade as well as policy variables like tariffs and proxies for non-tariff barriers. Given that these barriers are claimed, by the European Commission, to be responsible for the lack of integration, the econometric analysis should enable us to find, inductively, whether integration has indeed been hampered

by significant non tariff barriers and hence whether integration has indeed been "too slow".⁵

III. European and World integration from 75 to 85

In order to assess the extent to which European integration has slowed down between 1975 and 1985, we have analysed the evolution for these ten years of the share of EC and non-EC imports in apparent consumption and the share of EC imports in total imports. We have computed these variables for the manufacturing sector of the four "big" European countries, at the three digit level of the SIC industrial classification. The list of the corresponding 29 sectors is provided in the appendix. The data on trade flows was purchased from the OECD. Data on domestic production was obtained from the SOEEC at the NACE three digit level and was converted into SIC three digit codes. Details on data sources and the various conversions that were performed can be found in the appendix. We have computed the share of EC and non-EC imports in apparent consumption and the share of EC imports in total imports, from 1975 to 1985, for England, France, Italy and West

5. Another caveat should be mentioned, the theory of customs unions has been formulated for homogenous commodities, at a time when inter-industry trade was thought to be prevalent. Yet, product differentiation and intra-industry trade are pervasive in actual commerce. The basic ideas of trade creation, erosion and diversion can presumably be carried over to the analysis of intra-industry trade and integration. However, an additional effect has to be taken into account for the normative analysis ; an important benefit from intra-industry trade results from an increase in the number of product variant available in any given country. Looking at trade flows will not allow us to take this positive welfare effect into account.

Germany, respectively. We find that in all sectors and all countries without exception, the share of EC imports in apparent consumption has either stayed by and large constant or has shown a positive trend. As an illustration, graph 1-4 depict the share of EC imports in apparent consumption (SEC) for the whole manufacturing sector (all 29 sectors being aggregated). Furthermore, we also observe that for 23 out of the 29 sectors, the share of EC imports in total imports has actually declined, in at least three out of the four countries. The trade pattern in those industries is thus characterized by internal and external trade creation. In other words, European and world integration have taken place simultaneously in those industries and world integration has been relatively more important.

In 6 of the 29 sectors, we observe that the share of EC imports in total imports (SI) has not decreased over time, in at least three out of the four countries. The six industries in which this pattern of trade is observed include the food (and food processing), leather, wood (and wood processing), paper, non ferrous metals and steel industries. Hence, in those sectors, two possibilities can arise ; first, it might be that internal trade has been created at the expense of external trade, so that trade diversion has taken place. Alternatively, it might be that external trade creation has happened to a lower extent than internal trade creation. We can discriminate between two possibilities by looking at the evolution of the share of non-EC imports in apparent consumption (ROW). For the leather industry, this share has increased over time in all four countries. That is to say that trade diversion has not occurred for this industry but simply that world integration has proceeded less rapidly than European integration.

Let us now turn to the other industries, where the share of non-EC imports sometimes falls; notice first that a fall in this share only indicates that EC suppliers have been preferred to their non-EC competitors. In turn, this indicates either a relative protection of the EC with respect to the rest of the world, or a shift of comparative advantages in favor of EC countries. For the non ferrous metals and steel industry, we observe that in France and West Germany, the share of non-EC imports has increased. In the UK, the share fluctuates without any marked trend. On the whole, this indicates an absence of diversion for these countries. This is however not the case of Italy where the share is decreasing (especially in the non ferrous metals industry); it might thus be that the various CECA-sponsored restructuring plans of the steel industry (in particular) have had trade diverting effects, at least in Italy. In the wood (and wood processing) industry, the share of non-EC imports is increasing, except for Italy, where it is falling after an initial surge. Given that wood is a Ricardo-type industry, where natural resources drive the comparative advantage, it is unlikely that Europe has gained a comparative advantage over time in this industry. The decrease in the share of non-EC imports thus indicates the occurrence of some trade diversion for the Italy. In the paper industry, the share of non-EC imports increase or stays constant in France, Italy and West Germany, whereas it tends to fall in the UK, after an initial surge. Given that once again, paper is a resource based industry, one is tempted to conclude that some trade diversion has recently occurred in the UK. It is only in the food industry that we observe a more systematic negative trend in the share of non-EC imports: it is particularly pronounced in France and the UK and least prevalent in West Germany. There is thus evidence that the EC common agricultural policy has had persistent negative effects on trade; the effect is not very large but has become stronger over time.

The situation of England is worth a comment ; in all cases, the share of EC imports in total imports has increased more in England than in the other countries, or has actually increased when it was declining in the other countries. At the same time, this share of EC imports tend to be lower in England than in the other countries. This is probably due to the fact that our sample includes most of the period of integration for the UK; hence, in terms of the intensity of intra-EC trade, England can be said to be catching up over the whole period. More specifically, we observe that in five industries, the share of EC imports is rising for the UK, whereas it is falling in the other countries. These industries include the clothing, chemical, plastics, glass and (non electrical) machinery sectors. Interestingly, looking at the share of non-EC imports in apparent consumption for these five industries, we observe that there is no evidence of trade diversion; the shares do tend to increase over time and overall, it seems that European integration has proceeded faster than world integration in those industries. The fact that this pattern is observed for the UK only presumably stems from the late entry of the UK in the EEC; the effects of integration are stronger for the UK because the marginal gains (over time) are likely to be decreasing. This evidence also indicates that the rest of the world has not been affected in a major negative way by the accession of the UK to the European Community.

On the whole, it seems that the evolution of trade in Europe and with non-EC countries is characterized in a majority of industries by trade creation, both external and internal. That is to say that European and World integration have proceeded in the late seventies and early eighties. European integration has not been stopped in the late seventies. In most sectors, it has progressed alongside with world integration which is equally

desirable. In a large number of industries, World integration has also occurred faster; this might be the result of either a shift of comparative advantage in favor of the rest of the world, or a more significant trade liberalization with non-EC countries than within the EC. If we assume that no major change in comparative advantage has occurred, the evidence thus suggests that liberalization has been relatively slower in the EC. This observation is clearly consistent with the claim that EC integration has been disappointing. Still, it is not a priori evidence that EEC integration has actually slowed down. Indeed, it might be a measure of how much integration has already been achieved within the EC, by comparison with the rest of the world, so that there is relatively little left to liberalize. In a word, it might thus be a measure of the success of the EC.

As mentioned above, it is hard to reach a conclusion using a a deductive approach. Alternatively, one can approach the problem inductively : the EC commission and several authors (see e.g. Jacquemin and Sapir (1987, 1988), Sapir (1988), Winters (1988)) have suggested that the persistence of non tariff barriers to intra-EC trade is responsible for the "slowing down" of integration. In the following section, we shall estimate an econometric model of the shares of EC and non-EC imports in apparent consumption and of EC imports in total imports. This analysis will enable us to find whether non tariff barriers have indeed significantly affected the extent of integration.

IV. The Determinants of European Trade

The econometric model that we shall estimate in this section will attempt to identify the factors which can explain the trade between EC countries and

the rest of the world. More precisely, we shall focus on the imports of the four big european countries, originating respectively from the EC and the rest of the world. Ideally, one would have liked to estimate a structural model for imports into these countries, which can identify the demand for imports coming from the EC and the rest of the world, as well as the supply of exports in the EC and the rest of the world. However, in order to perform such an estimation, it is necessary to obtain price data, which undoubtedly constitute an important determinant of the demand for imports and the supply of exports. Unfortunately, the price data are not available at the appropriate level of disaggregation. As a result, rather than estimating a structural model of demand of supply functions for imports, we estimate the reduced form of this system.

In what follows, we shall thus try to model the respective shares of EC and non-EC imports in apparent consumption using a number of determinants which relate to supply as well as demand schedules. The explanatory variables included in this reduced form equation will include the determinants of classical trade, variables pertaining to intra-industry trade, trade barriers as well as policy variables. Trade barriers and policy variables will be of particular interest. Indeed, by estimating separate equations for the shares of EC and non-EC imports in apparent consumption (clearly, the share of domestic production in apparent consumption cannot be estimated jointly, since the three shares would necessarily sum to one), one should be able to assess whether these variable lead to internal and/or external trade creation, or trade diversion. For example (see also section 2), if we find that a variable has led to a lower share of domestic production and a higher share of EC and non-EC imports in apparent consumption, then we can conclude that this variable has contributed to internal and external trade creation,

or equivalently to European and world integration. Jointly with the two equations discussed above, we specify a third equation explaining the share of EC imports in total imports. The reason is twofold; first, it will enable us at the same time to compare our result for this equation with those of Jacquemin and Sapir (1988). Indeed, these authors estimate a model with a single equation, where the dependent variable is the share of EC imports in total imports. Second, as indicated above, there is a large number of instances where the shares of EC as well as non-EC imports in apparent consumption have increased over time. In this context, it is useful to find out the factors which have led to relatively more (less) European integration than World integration. The various combinations of signs that we can find are summarized in table 1, together with their interpretation.

Table 1. Interpretation of estimated signs

	<u>EC imports</u> App. cons.	<u>EC imports</u> Total imp.		<u>Non-EC imports</u> App. cons.
1. World integration More EC integration	+	+		+
2. Internal creation External diversion	+	+		-
3. World integration More ROW integration	+	-	==>	+
4. National protection More against ROW	-	+	==>	-
5. National protection More against EC	-	-		-
6. External creation Internal diversion	-	-		+

The analysis is carried out with a panel data set covering 29 manufacturing industries from 1975-1985, for the four "big" European countries, i.e.

France (F), West Germany (G), Italy (I), and the United Kingdom (UK). In order to allow for country specific effects we specify a separate equation for each country leading to the following three systems of equations,

$$(1) \quad SEC_{ti}^k = \alpha_k + \beta_k X_{ti}^k + \varepsilon_{ti}^k, \quad k=F,G,I,UK$$

$$(2) \quad SI_{ti}^k = \delta_k + \lambda_k X_{ti}^k + v_{ti}^k, \quad k=F,G,I,UK$$

$$(3) \quad SROW_{ti}^k = \theta_k + \gamma_k X_{ti}^k + \eta_{ti}^k, \quad k=F,G,I,UK$$

where SEC_{ti}^k is the share of EC imports in apparent consumption in country k at time t in sector i . Notice that (1) is a system of four equations, one for each country, where the parameter vector β_k varies across countries.

Similarly, SI_{ti}^k and $SROW_{ti}^k$ are the share of EC imports in total imports and the share of non-EC imports in apparent consumption respectively. The vector X is a set of 12 explanatory variables representing inter-industry and intra-industry determinants of trade as well as trade barriers. These variables include proxies for the intensity of human and physical capital in production, the R&D intensity, an indicator of the importance of trade with the EFTA countries, a measure of the degree of scale economies, a proxy for non-tariff barriers, the Community common external tariff, a measure of product differentiation, the rate of growth of demand, a measure of transportation costs and dummies for the wood and agricultural sectors. The data and the proxies used for these variables are described further in the appendix. Notice that human and physical capital intensities as well as the

R&D intensity attempt to capture the factors underlying inter-industry trade. Scale economies and product differentiation try to capture the factors underlying intra-industry trade. Tariff and non-tariff barriers, as well as transportation cost measure the extent of protection (natural or policy-induced). The EFTA variable is introduced to control for the amount of trade carried out with EFTA countries, which are not subject to the common external tariff. There are 29 sectors for the time period 1975-1985 (see the appendix for a list of sectors).

We assume that the additive error terms ϵ^k , v^k , and η^k are temporally uncorrelated (within as well as across equations), contemporaneously correlated, and multinormally distributed with,

$$E[\epsilon_{it}^k] = 0, \quad E[v_{it}^k] = 0, \quad E[\eta_{it}^k] = 0, \quad k=F,G,I,UK$$

$$E[\epsilon_{it}^k, \epsilon_{it}^l] = \sigma_{kl}, \quad E[v_{it}^k, v_{it}^l] = \sigma_{kl}, \quad E[v_{it}^k, v_{it}^l] = \sigma_{kl}, \quad k,l = F,G,I,UK$$

$$E[\epsilon_{it}^k, \epsilon_{it'}^l] = 0, \quad E[v_{it}^k, v_{it'}^l] = 0, \quad E[v_{it}^k, v_{it'}^l] = 0, \quad k,l = F,G,I,UK, t \neq t'$$

With the above stochastic assumptions we estimate each of the systems (1), (2), and (3) separately by seemingly unrelated regression (SUR)⁶. We analyze three variants of the above model. First, the constrained model, where no country specific effects are allowed, except for a fixed effect for the UK. Second, the unconstrained model, which accounts for for

6. We do not perform a SUR estimation for all 12 equations since the vector X is the same for each of the systems (1)-(3). Thus a separate SUR estimation on each system is identical to a SUR for all 12 equations.

heterogeneities across countries. Comparing these two sets of estimates, the relevance of country specific analysis of trade determinants will be clearly highlighted. Finally, the time effects model, we specify a model where the parameter estimates are allowed to change over time, in order to test whether any of these determinants have been significantly altered between 1975-1985.

IV.1 The Constrained Model

To impose country homogeneity in trade determinants, we constrain the parameters in (1)-(3) to be identical across countries, that is, $\beta_k = \beta_l$, $\lambda_k = \lambda_l$, and $\gamma_k = \gamma_l$ for all k, l . However, we allow for a distinct intercept for the UK to control for the different absolute trade level between the UK and the other three countries due to the later entry of the UK, i.e. we set $\alpha_k = \alpha_l$, $\delta_k = \delta_l$, and $\theta_k = \theta_l$ where $k, l \neq \text{UK}$.

Table 2 reports the constrained SUR estimates using a double-logarithmic functional specification⁷. First, the negative coefficients on the human and physical capital variables indicate that imports from the EC tend to be

7. To investigate the robustness of our results we used two other functional specifications on the systems ((1) - (3)), namely a semi-logarithmic and linear functional form. These estimations show that the results reported in the text are only marginally affected by these alternative specifications. In fact none of the major conclusions are altered, thereby displaying considerable robustness across functional forms. These results are not reported in the paper, but are available from the authors upon request.

lower in industries intensive in physical and human capital. Imports from the rest of the world are also reduced, but to a lower extent than EC imports. This suggests that the four big EC countries have a comparative advantage in industries intensive in physical and human capital. This comparative advantage is less pronounced with respect to the rest of the world than with respect to the EC. This accords with intuition, given that Japan and the US presumably have an endowment in physical and human capital which is comparable to the endowment of the four big European countries. A particularly significant comparative disadvantage with respect to the rest of the world is observed in industries intensive in Research and Development. This is consistent with the European Commission's alarmist statements regarding the deterioration of Europe's comparative advantage in R&D intensive industries (see Buigues and Goybet (1985)). It is interesting however that the deterioration of Europe's comparative advantages is limited to R&D intensive industries and does not concern the industries intensive in physical and human capital.

The most striking fact about Table 2 is that non tariff barriers do not seem to affect intra-EC trade but significantly reduce the extent of trade with the rest of the world (case 2 in table 1). This suggests that the remaining NTB in Europe are very successful in keeping out imports from outside the EC, while not having much of an effect on trade within the EC. The removal of NTB to trade in Europe by 1993 should consequently not have such a large effect on European trade but should lead to further integration of Europe with the rest of the world. This would depend, of course, very strongly on the precise fashion in which NTB are dismantled. If one removes trade barriers within Europe, but upholds similar trade barriers vis-a-vis the rest of the world, then it is clear that world integration is sacrificed.

The main benefit from removing NTBs will also stem from liberalization with the rest of the world. The temptation of a "fortress" Europe should thus be resisted and liberalization with the rest of the world should be high on the agenda.

Industries where product differentiation is important tend to have a lower level of imports from the rest of the world, while keeping the share of imports from the EC unaffected. This indicates that tastes might actually matter : where product differentiation is important, consumers in the four big European countries import preferably from the EC, rather than from the rest of the world, presumably because product designs in the EC are closer to their tastes. This suggests that the intra-industry trade usually associated with product differentiation is more likely to occur within homogenous areas rather than across heterogeneous trade blocks. In this sense, product differentiation constitutes an entry barrier for non-EC producers.

Next, we observe that both EC and non-EC imports tend to be higher in industries where economies of scale are prevalent. Larger scale economies are thus associated with more trade. This accords with intuition given that large scale economies will better be used if production can be shipped beyond national markets. This finding does not provide support to claims by the European Commission that Europe is characterized by large unexhausted scale economies due to the lack of market integration. Our results cannot however disprove those claims. Yet, if the problem of unexhausted scale economies was really severe, one would not observe a positive link between scale economies and market penetration.

In accordance with intuition, transportation cost tend to reduce imports from both EC and non-EC sources. In relative terms, low transportation costs also imply more trade creation with the ROW than the EC (case 3), leading to relative decline of EC trade vis-à-vis the rest of the world. Trade with EFTA countries is indicative of lower intra-EC trade suggesting that EFTA trade is a substitute for EC trade. However, trade with the ROW is not neither a substitute nor a complement for EC trade. A similar scenario holds, i.e. less EC and more ROW trade, for the agricultural sector. This verifies empirically that the agricultural sector is significantly less integrated than other manufacturing sectors in the EC. Since trade with the ROW is not affected significantly, it seems that the Common Agricultural Policy is indeed harming EC integration, but not creating a fortress.

Rather surprisingly, the common external tariff is tend to stimulate imports from the rest of the world and to reduce imports of EC origin. The reason underlying this paradoxical observation is probably that EC tariffs tend to be high for labour intensive commodities, which are heavily imported in the EC from the rest of the world. This is also to say that EC tariffs are set to counterbalance Europe's comparative disadvantages and protect domestic industries.⁸

8. The simultaneous occurrence of high tariffs and a high level of imports is also consistent with the idea that the tariffs set by the EC resemble optimal tariffs; indeed, a large level of imports will presumably give the EC some monopsony power on world markets, which would justify a high level of "optimal" tariffs.

IV.2 The Unconstrained Model

Next we estimate the unconstrained **systems** (1) - (3) by seemingly unrelated regression, thereby allowing for country specific trade determinants. Tables 3-6 report the resulting estimates for the four countries. It is clear that there is some consistency across countries, but also some differences. Interestingly, one observation reported above regarding non-tariff barriers is confirmed for all four countries, namely that NTBs hurt trade with the ROW. At the country level, we also observe that EC trade is promoted, not only in relative terms, but also in absolute terms for Italy and the UK. As mentioned above, this seems to indicate that non-tariff barriers are an effective trade barrier against the ROW, thereby diverting trade and possibly even increasing EC trade at the expense of the ROW. One can therefore conclude that the intra-EC non-tariff barriers are more successful in reducing trade with non-EC trading partners than with EC trading partners. This emphasizes the importance of removing NTB with respect to the ROW and indicates that a policy aiming at the removal of the NTB to intra-EC trade might be slightly misplaced. With regard to product differentiation we obtain results which are similar to those reported above, with the additional observation that for Italy and West Germany, product differentiation constitutes an entry barrier not only for the ROW producers but also for EC producers.

The evidence with respect to R&D intensity is slightly different from what we observed in the constrained model; indeed, our previous conclusion is confirmed that imports from the rest of world tend to be larger in R&D intensive industries. However, we find at the country level that EC imports are also increased (which was not the case before) but to a lesser extent

(except for Italy). This might stem from the fact that large R&D outlays can only be amortized on a scale exceeding the national markets. As before, we observe that scale economies are associated with more trade and integration. The only significant exception is the UK, where scale economies have no impact on trade flows, suggesting that unexhausted scale economies might possibly be more important in the UK than in the other countries.

Trade with EFTA has very heterogeneous implications for trade flows across countries. In France EFTA trade has no significant impact on EC trade, suggesting that trade between France and EFTA is neither a substitute nor a complement for trade between France and the EC. However, trade flows with the ROW are adversely affected, indicating that trade with EFTA countries is a substitute for trade with the ROW. The UK's trade with EFTA is also complementary to its EC trade, while her trade with the ROW is not influenced. By contrast, West Germany's trade with EFTA has a significant negative effect on Germany's EC trade. This suggests that in the case of West Germany EC trade and EFTA trade are substitutes in most industries. Italy's trade flows are similar to Germany's, displaying substitutability between EFTA and EC trade. Trade characteristics with the ROW are different however, leading to substitutability between Italy's trade with the ROW and EFTA, and having no significant impact for the German industry. Interestingly, Germany and Italy are the two countries in our sample which have direct borders with some EFTA countries. This might explain why EFTA trade is more of a substitute to EC trade in those countries.

Remarkable consistency across countries exists regarding the common external tariff policy. A high common external tariff goes alongside significantly

less EC trade and increased trade with the ROW, presumably trying to counterbalance Europe's comparative disadvantage.

Finally, for the agricultural sector we obtain the same conclusion for France and West Germany as we did for the constrained model, namely that the Common Agricultural Policy is indeed harming EC integration, but not creating a fortress. However, the picture is different for the UK and Italy. There is no significant difference in trade flows for the agricultural sector in the UK. Italy, on the other hand, seems to be trading more actively with EC partners in the agricultural sector.

IV.3 Time Effects

In order to investigate the dynamic dependency of our estimates we break the parameters in (1)-(3) into two parts; a constant term and a time dependent term. Thus the systems of equations (1) - (3) now become,

$$SEC_{ti}^k = \alpha_k + (\beta_k^0 + \beta_k^1 t) X_{ti}^k + \epsilon_{ti}^k, \quad k=F,G,I,UK$$

$$SI_{ti}^k = \delta_k + (\lambda_k^0 + \lambda_k^1 t) X_{ti}^k + v_{ti}^k, \quad k=F,G,I,UK$$

$$SROW_{ti}^k = \phi_k + (\sigma_k^0 + \sigma_k^1 t) X_{ti}^k + \eta_{ti}^k, \quad k=F,G,I,UK$$

For example, if β_k^0 is positive (negative) and β_k^1 is negative (positive) then the impact of that variable in country k is originally positive (negative) and is diminishing (increasing) over time. We proceed by analyzing time dependencies of only those variables that had a definite positive impact on

world integration, that is to say R&D, Scale, and transportation costs. In addition, we include non-tariff barriers. We estimate the above model by seemingly unrelated regression constraining the parameters to be identical across all countries as above.

Table 7 reports the results. The first observation is that the sign and significance of the constant term parameters are unchanged from the previous model. Therefore, most of the insights discussed above hold for the time period close to 1975, i.e. when the constant parameter dominates the time dependent parameter. The two variables that seem to have a significant time effects are R&D and transportation costs. As before, R&D intensity has no significant impact on EC trading. This holds for the entire time period from 1975-1985 with no evidence of change. However, the effect on trade with the ROW is significant and increasing over time. This indicates that Europe has a relative comparative disadvantage in high-tech industries and is continuing to lose ground. Similarly, transportation costs seem to play a more important role over time. Already a strong indicator of world integration, low transportation costs have an increasingly positive impact on EC trade, while the effect on trade with the ROW has stabilized. Economies of scale and NTB have no significant time dependency over our sample period. Non-tariff barriers continue to harm trade with the ROW throughout our sample and there is no evidence that this has changed.

V. Conclusion

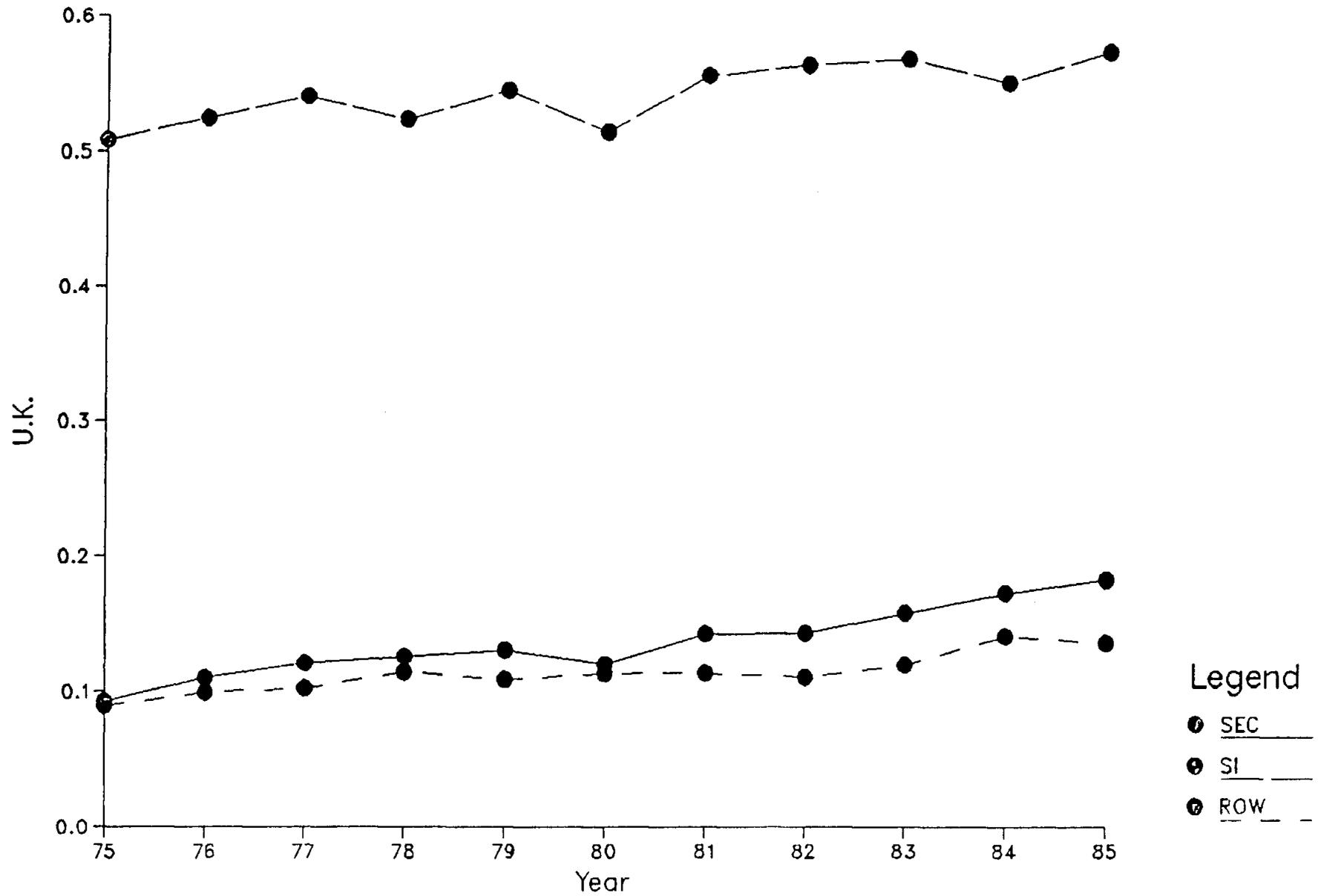
In this paper, we have characterized the imports of the four big European countries, in light of the theory of integration. First, contrary to what the European Commission seems to claim, we do not find any strong evidence that European integration has slowed down over time. Rather, we observe that European integration has proceeded over time and that Europe was also becoming more integrated with the rest of the world. It is only in the agricultural sector that we can find some consistent evidence of trade diversion. Admittedly, integration with the ROW has occurred to a larger extent than integration in the EC, for the period 75-85. Yet, this can be taken as a measure of the success of European integration prior to 75, as well as a measure of its failure to integrate further. In this respect, we assess whether the existence of non-tariff barriers can be held responsible for the relative slowing down of EC integration. We find that non-tariff barriers do actually hamper trade with the ROW more than trade within the EC. Hence, NTB can hardly be seen as a cause for the relative slowdown of integration in the EC; furthermore, one is led to conclude that the current emphasis on removing NTB in Europe might be misplaced. NTB with the rest of the world should be the priority.

In terms of the determinants of trade within the EC and between the EC and the rest of the world, we also find that European countries have a comparative advantage in industries intensive in human and physical capital, and a comparative disadvantage in R&D intensive industries. Yet, intra-EC trade in R&D intensive industries is also particularly intense, suggesting that R&D outlays are appropriately amortized on a European, rather than national, scale. Along the same line, we observe that a high degree of scale economies leads a higher level of trade. As a result, it is difficult to claim that Europe has been significantly hampered by

unexhausted scale economies, because of high barriers in those industries where scale economies are important. The only exception might be the UK and West Germany, even though the lower level of trade observed in the UK when scale economies are high, could possibly only reflect the late entry of the UK in the EC. Another country specific effect that we uncover, has to do with the importance of the trading relationship between the various EC countries and EFTA. It seems that for some countries, most notably Italy and West Germany, trade with EFTA is a substitute for trade with the EC countries, whereas for the UK it is a complement. We observe that trade with EFTA is never a complement for trade with the ROW, but is a substitute for countries like France and Italy. This suggests that the continued effort by EFTA to reduce trade barriers between EFTA and EC countries is important if one wants to avoid that trade between the two trading blocs is replaced by intra EC trade or trade with the ROW.

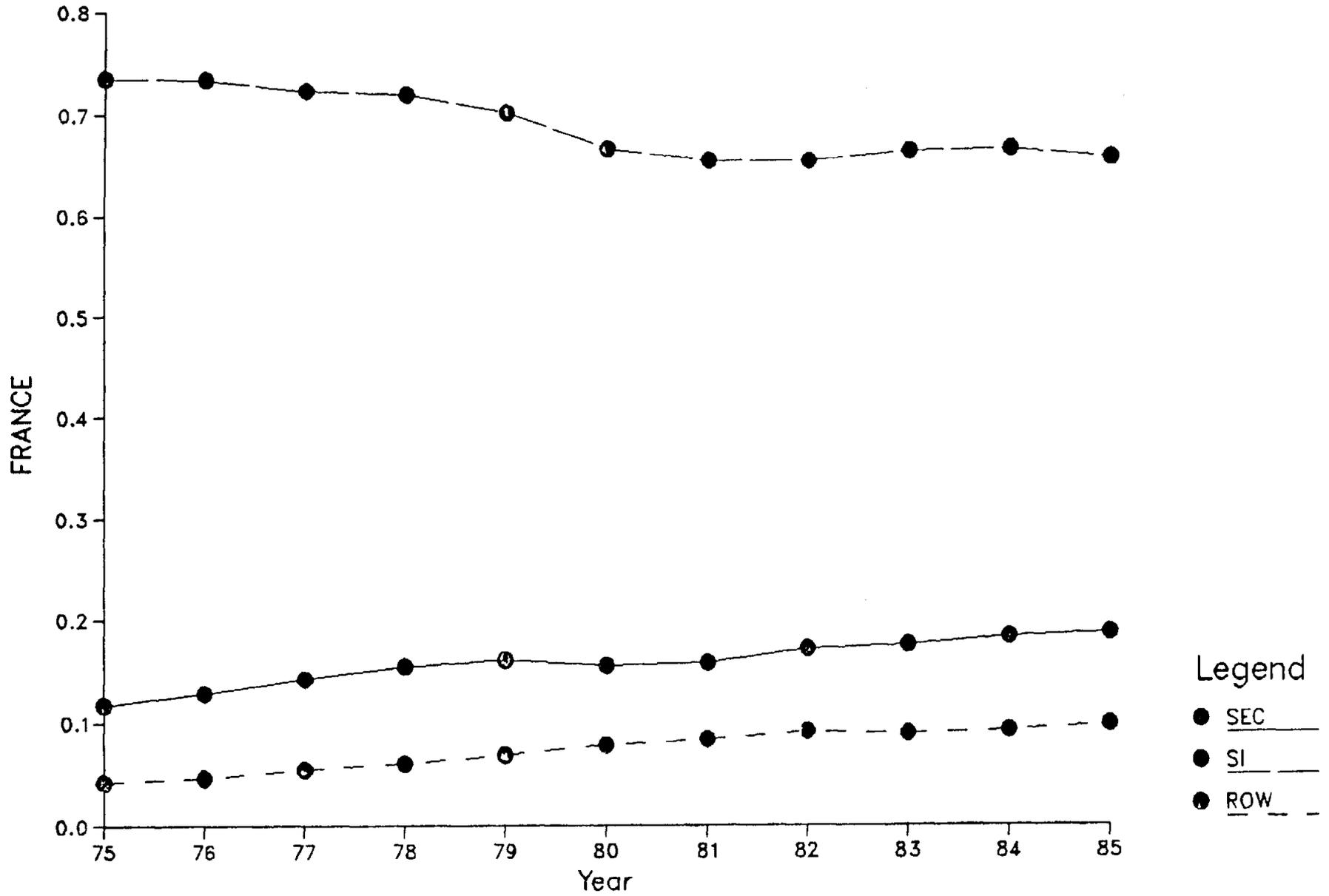
Graph 1

U.K.



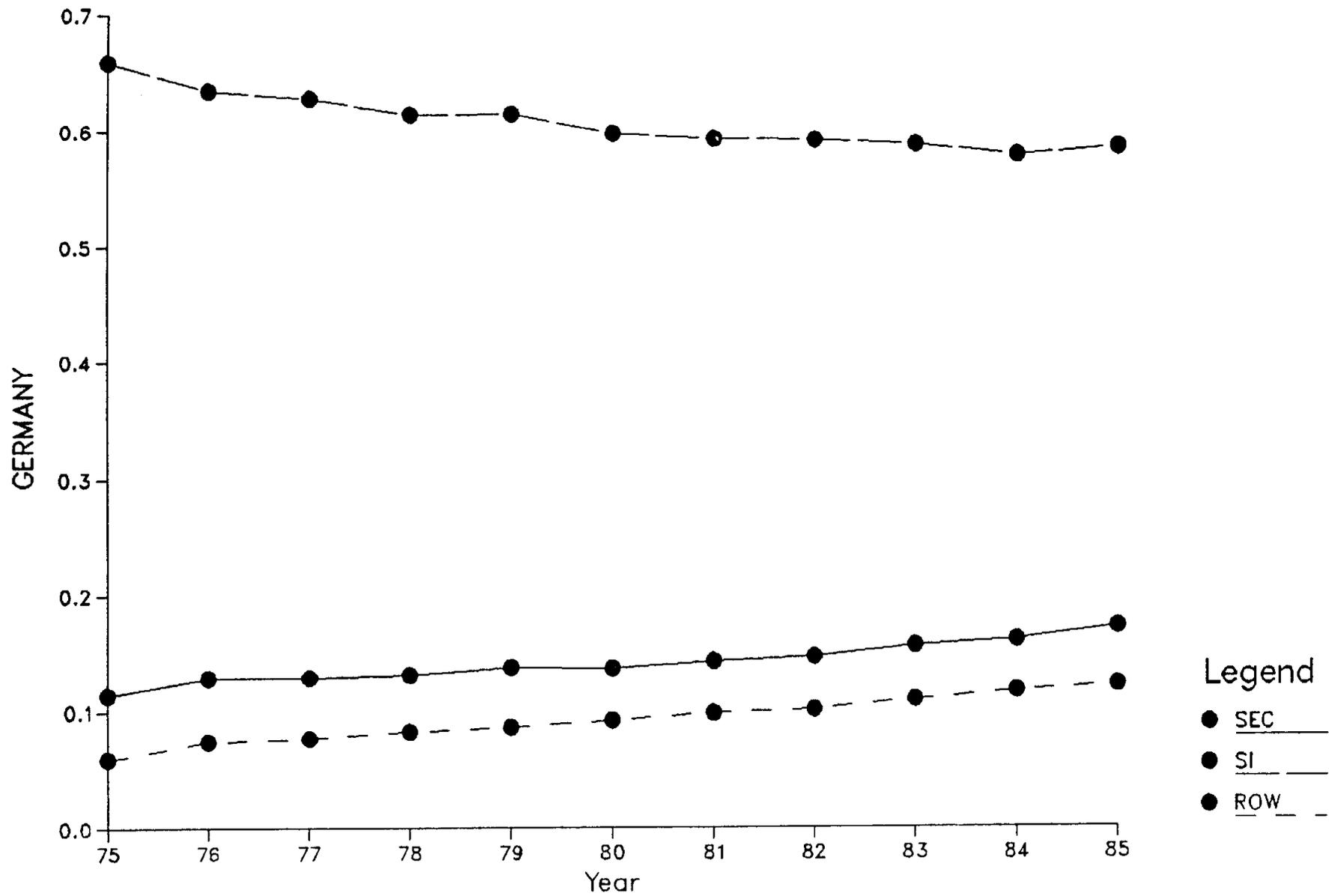
Graph 2

FRANCE



Graph 3

GERMANY



Graph 4

ITALY

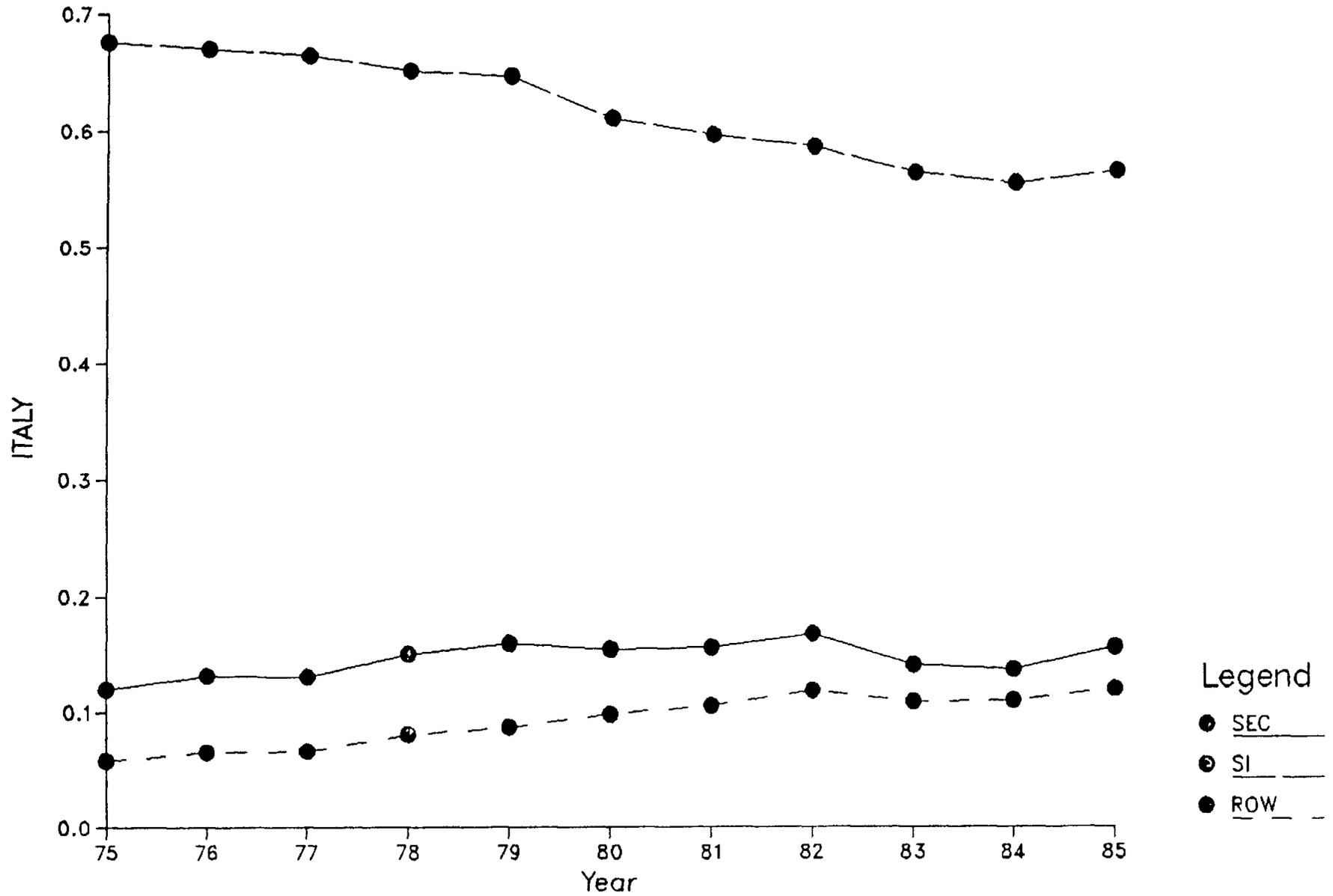


Table 2
Constrained Seemingly Unrelated Regression Results
(t-statistics in parenthesis)

	SEC	SI	SROW
Intercept	-1.771 (-1.47)	-2.663 (-4.610)	3.235 (1.17)
Intercept U.K.	-1.904 (-1.57)	-2.872 (-4.97)	3.640 (1.93)
Human Capital	-.546 (-3.61)	-.013 (-.19)	-.615 (-3.39)
Investment	-.288 (-6.14)	-.084 (-4.19)	-.091 (2.04)
R&D	.014 (.95)	-.067 (12.13)	.193 (14.02)
EFTA	-.134 (-4.12)	-.055 (-4.09)	-.012 (-.37)
Scale	.159 (4.18)	-.016 (-.87)	.183 (3.07)
NTB	.072 (1.32)	.078 (2.98)	-.425 (-5.07)
Tariff	-.273 (-2.78)	-.287 (-6.15)	.710 (4.75)
Product Diff.	-.090 (-1.30)	.168 (5.17)	-.494 (-4.60)
Growth	-.571 (-.62)	.286 (.64)	-.620 (-.42)
1/TC	.059 (3.06)	-.073 (-7.94)	.246 (8.29)
Agriculture	-.620 (-5.06)	-.239 (-4.05)	-.166 (-.87)
Wood	-.577 (-5.16)	-.499 (-9.42)	.434 (2.56)

Table 3
Seemingly Unrelated Regression Results-France
(t-statistics in parenthesis)

	SEC	SI	SROW
Intercept	.735 (.60)	-1.228 (-2/26)	2.214 (1.53)
Human Capital	-1.060 (-5.95)	-.163 (-2.53)	-.185 (-.68)
Investment	-.025 (-.43)	.056 (2.79)	-.089 (-1.04)
R&D	.133 (7.59)	-.031 (-4.95)	.195 (7.63)
EFTA	.021 (.54)	.016 (1.33)	-.260 (-4.77)
Scale	.122 (3.20)	-.019 (-1.12)	.105 (1.60)
NTB	-.012 (-.21)	.043 (1.76)	-.401 (-4.20)
Tariff	-.107 (-1.02)	-.249 (-5.60)	.849 (4.89)
Product Diff.	.052 (.72)	.206 (6.55)	-.854 (-6.95)
Growth	-1.11 (-1.22)	-.095 (-.23)	-.800 (-.51)
1/TC	-.015 (0.76)	-.064 (-7.61)	.293 (8.93)
Agriculture	-.665 (-5.35)	-.223 (-4.03)	.188 (.88)
Wood	-.246 (-2.04)	-.432 (-8.30)	.829 (4.09)
R ²	.45	.43	.43

Table 4

Seemingly Unrelated Regression Results—West Germany
(t-statistics in parenthesis)

	SEC	SI	SROW
Intercept	-.100 (-.08)	-3.056 (-5.12)	4.666 (2.85)
Human Capital	-1.928 (-9.16)	-.075 (-.80)	-1.470 (-5.71)
Investment	-.210 (-3.73)	-.072 (-2.81)	-.030 (-.44)
R&D	.384 (6.84)	-.105 (-4.23)	.499 (7.50)
EFTA	-.264 (-3.53)	-.145 (-4.60)	-.127 (-1.46)
Scale	.174 (4.68)	-.040 (-2.16)	.202 (3.93)
NTB	.055 (1.01)	.165 (6.09)	-.467 (-6.27)
Tariff	-.360 (-3.57)	-.399 (-8.05)	.586 (4.29)
Product Diff.	-.161 (-2.46)	.117 (3.55)	-.526 (-5.77)
Growth	-.935 (-1.07)	.023 (.05)	-.907 (-.74)
1/TC	.010 (0.53)	-.076 (-8.14)	.210 (8.15)
Agriculture	-.699 (-5.27)	-.222 (-3.44)	-.200 (-1.12)
Wood	-.380 (-3.66)	-.404 (-7.69)	.405 (2.81)
R ²	.61	.44	.52

Table 5

Seemingly Unrelated Regression Results-Italy
(t-statistics in parenthesis)

	SEC	SI	SROW
Intercept	1.917 (1.17)	-.488 (-.53)	2.364 (.97)
Human Capital	-.414 (-1.54)	.401 (3.28)	-1.534 (-4.53)
Investment	-.160 (-1.69)	.116 (2.78)	-.161 (1.48)
R&D	.559 (6.85)	.093 (2.50)	.286 (2.90)
EFTA	-.261 (-3.52)	.016 (.48)	-.401 (-4.54)
Scale	.130 (2.70)	-.012 (-.44)	.124 (1.68)
NTB	.189 (2.70)	.038 (.95)	-.184 (-1.76)
Tariff	-.299 (-2.39)	-.221 (-3.17)	.425 (2.29)
Product Diff.	-.350 (-3.95)	.392 (7.78)	-1.319 (-9.85)
Growth	-1.66 (-1.41)	-.146 (-.21)	-.912 (-.51)
1/TC	.104 (3.66)	-.052 (-3.39)	.294 (7.25)
Agriculture	.403 (2.40)	.039 (.42)	.397 (1.60)
Wood	-.735 (-4.73)	-.830 (-9.75)	.460 (2.02)
R ²	.60	.57	.51

Table 6
Seemingly Unrelated Regression Results-United Kingdom
(t-statistics in parenthesis)

	SEC	SI	SROW
Intercept	1.074 (.73)	-1.237 (-1.34)	2.526 (1.23)
Human Capital	-2.033 (-5.83)	-.343 (-2.22)	-1.749 (-4.06)
Investment	-.195 (-1.95)	.094 (2.55)	-.229 (-1.93)
R&D	.331 (10.11)	-.003 (-.22)	.349 (8.84)
EFTA	.315 (3.66)	.042 (1.37)	.144 (1.41)
Scale	-.063 (-1.30)	-.049 (-1.62)	-.020 (-.30)
NTB	.163 (2.53)	.233 (5.78)	-.508 (-5.66)
Tariff	-.490 (-3.27)	-.569 (-6.75)	.646 (3.25)
Product Diff.	.054 (.52)	.325 (5.68)	-.721 (-5.21)
Growth	-2.250 (-2.07)	-.943 (-1.34)	-.094 (-.06)
1/TC	.057 (2.24)	-.060 (-3.96)	.228 (6.57)
Agriculture	.006 (.04)	.114 (1.22)	-.075 (.37)
Wood	.088 (.62)	-.557 (-6.45)	1.026 (5.28)
R ²	.55	.42	.50

Table 7
Constrained Seemingly Unrelated Regression Results
(t-statistics in parenthesis)

	SEC	SI	SROW
Intercept	-2.426 (-2.14)	-2.374 (3.96)	2.048 (1.06)
Human Capital	-0.515 (-3.44)	0.033 (0.45)	-0.637 (-3.53)
Investment	-.297 (-6.35)	-.082 (-4.21)	-.089 (-2.00)
R&D	0.052 (1.61)	-0.024 (-2.08)	0.143 (4.86)
R&D*Time	-.005 (-1.21)	-.006 (-3.70)	.007 (1.81)
EFTA	-0.130 (-4.02)	-.058 (-4.44)	-.011 (-0.35)
Scale	0.185 (2.99)	-.051 (-1.76)	0.289 (3.23)
Scale*Time	-.006 (-0.77)	.006 (1.60)	-.017 (-1.65)
NTB	0.109 (0.98)	0.073 (1.35)	-0.412 (-2.37)
NTB*Time	-0.004 (-0.27)	.001 (0.08)	.003 (-0.15)
Tariff	-0.262 (-2.65)	-0.285 (-6.07)	0.728 (4.89)
Product Diff.	-0.108 (-1.55)	0.174 (5.27)	-0.505 (-4.73)
Growth	-.084 (-0.09)	0.077 (0.17)	0.316 (0.21)
1/TC	0.036 (1.68)	-.084 (-7.81)	.241 (7.78)
1/TC*Time	.004 (3.01)	.002 (2.42)	-.000 (-0.27)
Agriculture	-0.602 (-4.90)	-0.235 (-3.95)	-0.173 (-0.91)
Wood	-0.535 (-4.79)	-0.495 (-9.28)	0.422 (2.51)

Appendix A

Data Overview

The period selected for the analysis includes the years 1975 to 1985. The data are available for all EEC countries, with Belgium and Luxemburg regrouped as one country. The currency retained is the ECU (in thousands and constant in the base year 1980). In order to obtain a coherent final data set, the conversion of foreign currencies into ECUs (Research and Development data, trade data) and the use of deflators (trade data, economics variable data) to obtain 1980 ECUs had to be performed. The classification of industries used is the International Standard Industrial Classification System (ISIC) (United Nations statistical Studies Serie M #4/REV.2, 1969).

In our analysis, we used manufacturing (sector 3), which represents 29 industries. The level of aggregation used is the ISIC 3-digit level. Industries from other data sources were therefore matched to the ISIC 3-digit level classification.

List of Industries

ISIC Code	Industry
311	FOODSTUFF
312	FOODSTUFF-OTHER
313	BEVERAGE
314	TOBACCO
321	TEXTILE
322	TEXTILE-CLOTHING
323	LEATHER-FUR
324	LEATHER-FOOTWEAR
331	WOOD
332	WOOD-FURNITURE

341	PAPER
342	PRINTING-PUBLISHING
351	CHEMICAL
352	CHEMICAL-OTHER
353	OIL REFINERIES
354	PRODUCTS DERIVED FROM PETROLEUM
355	RUBBER
356	RUBBER-OTHER
361	CERAMIC GOODS
362	GLASS & GLASSWARE
369	STONE & NON METALLIC MINERAL PRODUCTS
371	STEEL
372	PRODUCTION & TRANSFORMATION OF NON-FERROUS METALS
381	TOOLS & FINISHED METAL GOODS
382	MECHANICAL MACHINERY
383	ELECTRICAL MACHINERY
384	MOTOR VEHICLES, RAILWAY, AEROSPACE
385	CHIRURGICAL, OPTICAL INSTRUMENTS
390	OTHER MANUFACTURING

Sources of data

Number of employees, gross wages, production values (value added taxes excluded), total investments for the years 1975 to 1986 : Statistical Office of the European Communities, magnetic tape, extracted from
Domaine:Inde:Enquete Industrielle Annuelle, Collection:01, Donnees Globales.(Luxemburg:S.O.E.C. 06/07/88). The NACE 3-digit classification used there was converted to the ISIC 3-digit classification. The variables, expressed in millions of ECUs, have been deflated to thousands of constant

1980 ECUs with unpublished deflator factors obtained at the Statistical Office of the European Communities in Luxemburg.

Imports and exports for individual countries for the years 1961 to 1987 were obtained from: The Organisation for Economic Co-operation and Development, National Economics Statistics and National Accounts Division, magnetic tape, extracted from International Trade by Products System. (Paris : O.E.C.D.). Imports are expressed CIF (Cost, insurance and freight) and exports are expressed FOB (Free on board). The currency used there was thousands of dollars which has been converted (conversion rate tables - Eurostat - EEC) to thousands of ECUs and deflated similarly than the data obtained through the S.O.E.C. in Luxemburg.

Research and Development expenditures were obtained at the Organisation for Economic Co-operation and Development from unpublished sources for the years 1975 to 1985. It was made available to us by the Administrator of the Scientific, Technological and Industrial Indicators Division at the O.E.C.D. office in Paris. In order to expand the data base some data points had to be created when years and industries were missing for some countries. When a year was missing in a particular industry for a particular country the previous year was used and when an industry for a particular country was missing the average of existing country data for that industry was substituted. In addition, the ISIC 4-digit classification used there was converted to the ISIC 3-digit classification. Constant 1980 millions of dollars have been converted with unpublished conversion rate tables provided by the same source than above at the O.E.C.D. in Paris into constant 1980 ECUs. There are no data available for Greece.

Tariffs data was produced from the Bulletin International des Douanes - European Economic Community - Year 1987-1988. (International Customs Tariffs Bureau - Brussels). Averages were created within industries for the ISIC 3-digit classification.

Non-tariff barriers industry sectors data were created based on the article -The Sectoral Impact of the Internal Market by Pierre Buigues and Fabienne Ilzkovitz - Commission of The European Communities - 1988. The NACE 3-digit classification used there was converted to the ISIC 3-digit classification.

Price per kilo of belgium imports: Belgium Ministry of Foreign Trade.

Economies of scale data, measured by the relative size of the mid-point plant for the German industry, for the years 1978 to 1984 : Scherer (1975)- pp 66. The SYPRO 4-digit classification used there was first converted into NACE 3-digit and secondly into ISIC 3-digit classification. A regression model was performed to create data for the years 75, 76, 77, 85.

A dummy variable is used for the agricultural and wood sectors, as well as for product differentiation where the dummy is 1 for the consumer industry and 0 otherwise. The EFTA variable is defined as the share of of EFTA imports in ROW imports. The human capital variable is proxied by the deviation of industry wages from the country mean wage. Demand growth is computed as the percentage growth in apparent consumption.

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