Long-term Trends in IIT

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Abstract

This chapter examines European trade patterns over the 1980-1996 period, using data on values and unit values of bilateral trade flows at a very detailed level. Reviewing the related concerns for the economic policy permits identifying a key issue: quality matters. A new method of measurement highlights that the development of intra-industry trade is associated with a specialisation of countries along quality lines. This result sheds light on the potential adjustment costs of intra-industry trade in vertically differentiated products that are often neglected in the literature and by economic policy designers.

Introduction

There is a huge literature on intra-industry trade (IIT), defined as simultaneous exports and imports within industries. Such interest is twofold: *(i)* integration is generally associated with the development of this type of trade, contrasting with the traditional view of specialisation along comparative advantages, and *(ii)* this is precisely the type of trade that fits well the new standard view of monopolistic competition.

However, the development of IIT, *per se*, neither validates the new view nor invalidates traditional approaches. This puzzling issue has been investigated using increasingly detailed data, increasing country and period coverage, even more sophisticated indicators.

This chapter matches this strand of literature. It tries to examine trade patterns in a long-run perspective at the finest level of nomenclature disaggregation, for a large sample of countries and using original methodologies allowing disentangling trade flows by products' quality.

The European integration has proceeded in a manner that is both original and quite unexpected: hence it provides a good laboratory for new ideas concerning trade patterns. The Common Market has not led to specialisation, the first years of the functioning of the Single market have neither "validated" the optimistic scenario of the Commission, where integration should translate into IIT in horizontal differentiation, nor the scenario of inter-industrial specialisation due to agglomeration. Lastly, structural asymmetries embedding the launching of the euro should endogenously shrink as a result of the single currency itself.

Section 1 highlights the major theoretical foundations and implications of the inter- versus intra-industry nature of trade for the economic policy, using this European framework as a benchmark case.

Section 2 briefly discusses different methods to measure intra-industry trade. It argues in favour of an approach which, by using information on unit values at a very detailed level of trade nomenclatures (some 10,000 product items), allows to disentangle bilateral trade in three trade types: one-way trade, two-way trade in horizontally differentiated goods, and two-way trade in vertically differentiated goods.

Using that approach, Section 3 gives empirical evidence of the nature of European trade, both within EU and with non-EU members. One of the main findings is that the observed increase in intra-industry trade between 1980 and 1996 in Europe is almost entirely due to two-way trade in *vertical* differentiation. This phenomenon of simultaneous exports and imports of products with the same, principle technical

characteristics, but under different prices (unit values), suggests that countries be increasingly specialised along ranges of qualities within products. Thus, gains in trade are not only due to a larger choice of varieties, but also due to a larger choice among different qualities. But adjustment costs might be higher as well.

This leads to a related, but more general question on which quality segments the different countries are positioned. Is there evidence of a "qualitatively" division of labour in Europe, in the sense that more advanced countries are specialised in up-market products, and less advanced countries in down-market goods? This question is important, as European integration might drive to a potential income divergence among countries. To examine in which market segments different countries are specialised, Section 4 defines three price/quality ranges: down-, medium, and up-market products, depending on the difference between unit values of bilateral trade flows and the intra-EU average for each product.

The last section concludes.

1. Trade patterns and economic policy concerns

Trade patterns are a puzzling issue: the European integration process has missed to inducing specialisation among member countries; the related explanation in terms of increasing returns to scale and product differentiation fits well the data (the gravity model) but misses a true hypothesis testing; the corresponding story associating IIT with painless adjustments and specialisation with adjustment costs misses is dubious. As a result, trade patterns are an important concern for the economic policy and have fuelled debates in Europe.

The European experience and the new paradigm of economic integration

The first wave of European integration, following the creation of the *Common Market* in the late 1950s, shed serious doubts on the validity of traditional theories of international trade associating integration and specialisation along comparative advantages through *inter*-industry trade (Table 1). Increased specialisation implies the abandon of contested, comparatively disadvantaged industries and the displacement of factors towards a limited number of export-oriented industries. Thus, fears were expressed at the time that the Common Market might drive to an "excessive" specialisation among Member states, where the most advanced countries specialise in high value added industries and the others countries in the remaining sectors abandoned by the former group. However, even if European integration was accompanied as expected by a strong increase in intra-European trade, it did not translate into an increased specialisation of its Member states. In contrast, empirical studies since the 1960s have shown that an important part of intra-European trade was of an *intra*-industry nature, i.e. simultaneous exports and imports within industries, a phenomenon which has continued to increase since then.

"New trade theory" models developed by the end of the 1970s and early 1980s challenged traditional theories and emphasised the gains of trade associated with intra-industry trade based on imperfect competition, consumer preferences and other elements of industrial organisation. They provided a simple explanation to the observed intra-industry trade patterns in Europe: *Intra*-industry trade in horizontally differentiated products - based upon the similarity of nations - may lead to increased efficiency through increasing returns and welfare gains through a larger choice of varieties for consumers. Between similar countries, consumers' demand for varieties of (horizontally) differentiated goods produced under increasing returns is satisfied by the specialisation of producers. However, since firms in each country follow this pattern, there is no increased specialisation of countries. If the diversity in production declines (firm exits), the variety offered to consumers on a larger market increases, thus bringing new gains in trade and reinforcing the competition.

Helpman and Krugman (1985) popularised an illuminating version of this synthesis that quickly became the central quotation associating similarity between countries with IIT and comparative advantage with inter-industry trade. This rather simple explanation of a puzzling issue missed an empirical assessment. Quoting that similar and deeply integrated countries such as EC countries were trading largely on an IIT

basis should not be considered as a scientific validation. The missing piece of the puzzle was a strong theoretical foundation for the gravity model, which rapidly appeared as the companion of the gravity model.

Helpman (1987) provided a very rough and stimulating version of it. Hummels and Levinsohn (1995) however demonstrated that similar results were obtained not only for (similar) OECD countries, but also for non-OECD countries supposed to be more concerned by the traditional view. They argued that this was disqualifying the gravity model as an empirical proof of the new view of international trade. In the same way, Markusen and Wigle (1990) argue that other determinants than increasing returns to scale and imperfect competition may explain the predominance of trade between developed countries. Using a numerical general equilibrium model they identify potential complementary explanations: developed countries' barriers to trade discriminating against the developing countries, differences in economic sizes (differences in relative factor endowments being given). According to the latter explanation, this is specialisation, and not necessarily imperfect competition and product differentiation that links economic size and trade volumes.

Such results should not be considered as confusing however, since there are foundations for gravity principles in all cases: Bergstrand (1990) clarifies this point[1]. The share of IIT in bilateral trade is a decreasing function of differences in capital-labour endowment ratios. Divergences in tastes, as defined by differences in per capita incomes, also reduce IIT. The share of IIT is a positive or negative function of the average capital-labour ratio of the countries, depending of the sectors under consideration. Hence it does make sense, from a theoretical point of view to integrate determinants of IIT echoing the traditional comparative advantage framework (inequality in capital-labour endowment ratio) and determinants echoing the new views in terms of demand (inequality in per capita incomes). Both enter in the gravity equation with the right sign in Bergstrand, even not significant if associated in the same equation. In total there are simultaneously justifications for the economic distance to reduce IIT since inter-industry trade is boosted or since tastes are too different. In addition, explanations associated with the "size-number of varieties" story fit well the data: average GDP of countries boosts IIT whereas differences in their size reduce it.

[1] Evenett and Keller (1997) follow the same avenue of research: the volume of international trade is explained by of product specialisation, which is the result of the combination of increasing returns and comparative advantage. Economies of scale being a major outcome within intra-OECD trade, Helpman (1987) found that the gravity equation was fitting well OECD trade data; product specialisation being driven by comparative advantage, Hummels and Levinsohn replicated the results for non-OECD countries.

Table 1: Trade patterns and economic policy concerns

	Theory	Political economy
1950s	Traditional trade theory: Integration = specialisation = *inter*-industry trade	Fears that the Common Market drives to the domination of European industry by Germany, with others such as France or Italy remaining specialised in agriculture…
1960s		Rise in intra-EC trade, but no increased specialisation: existence of *intra*-industry trade
1970s / 1980s	"New international economics" based on imperfect competition (internal scale economies and gains in variety)	
mid-1980s	Synthesis by Helpman et Krugman: - between different countries: inter-industry trade - between similar countries: intra–industry trade in similar, i.e. horizontally differentiated goods	European Commission White Paper for a Single European Market, with an optimistic scenario: Integration = intra-industry trade = gains in variety and limited adjustment costs
Still 1980s	Products can differ by quality (due to e.g. capital intensity, R&D, qualification of labour force) - differences between countries favour not only inter-industry trade, but also IIT in vertically differentiated goods - specialisation along quality spectrum matters	Instead of favouring a catch-up of less developed member states, European integration might drive to a potential income divergence among countries…
1990s	Inter-industry trade is not only based on macroeconomic differences between countries. The "new economic geography" suggests that asymmetry between countries might be increased through: - external scale economies - agglomeration effects	One market and one money might be incompatible: successful liberalisation according to Single market criteria might impede a successful monetary union…

During the early eighties, the European Commission made the *diagnosis of "Non Europe"*. High discrepancies in prices among member states for identical products were recorded despite decades of European integration. These differences were explained neither by transportation costs nor by differences in domestic taxes. Hence, something else was as stake, such as a lack of integration of the European market, impeded in non-tariff barriers, exclusive public procurement procedures, and public monopolies. As a result economies of scale were not fully achieved and the European competitiveness was lagging behind third countries competitors(European Commission, 1988).

In response, the 1985 White Paper on the *completion of the internal market* was suggesting the cancellation of border formalities, remaining non-tariff barriers, the opening of public markets and more generally the implementation of the principles of free movement of goods and factors within the integrated area. The European Commission, comforted by past experience and the new view of imperfect competition in international trade, hoped that the rather optimistic scenario of a relatively painless integration in Europe would work again in the case of the single market —even if some studies (such as the European Commission, 1990) expected that not all sectors and member states would be affected in the same way.

For a certain number of so-called "sensitive" sectors with important NTBs in the "pre-completion" situation, conversion costs, implying factor mobility, possibly sunk costs and cohesion costs could not be excluded. In addition, the sectoral adjustment occurring in the less developed member states was all but clear. One possible scenario was an increased specialisation along comparative advantages giving rise in *inter*-industry trade, whereas a convergence in production and demand structures might increase *intra*-industry trade. Trade would thereby contribute to reducing the asymmetries in production and trade structures among the member states.

Beyond the "love for variety story"

However, as underscored by the European experience, two-way trade in horizontally differentiated varieties is only one part of the story. The new view of international trade popularised in the mid eighties missed an important issue: even using a very narrow definition of products, and mobilising very disaggregated nomenclatures, trade overlap may correspond to flows having unit values differing by large. This evidence has generally been understood as the outcome of a vertical differentiation of products, notwithstanding the strong assumptions implied by such interpretation[2].

In turn, determinants and consequences of intra-industry trade in horizontally differentiated products are different from those in vertical differentiation. In the former case, products sold at the same price are perfect substitutes, while in the second a common ranking of consumer preferences can be associated with differences in quality, based on factor endowments (Falvey, 1981; Falvey and Kierzkowski, 1987), on fixed costs in R&D (Gabszewicz, Shaked and Sutton, 1981) or on the qualification of the labour force (Gabszewicz and Turrini, 1997).

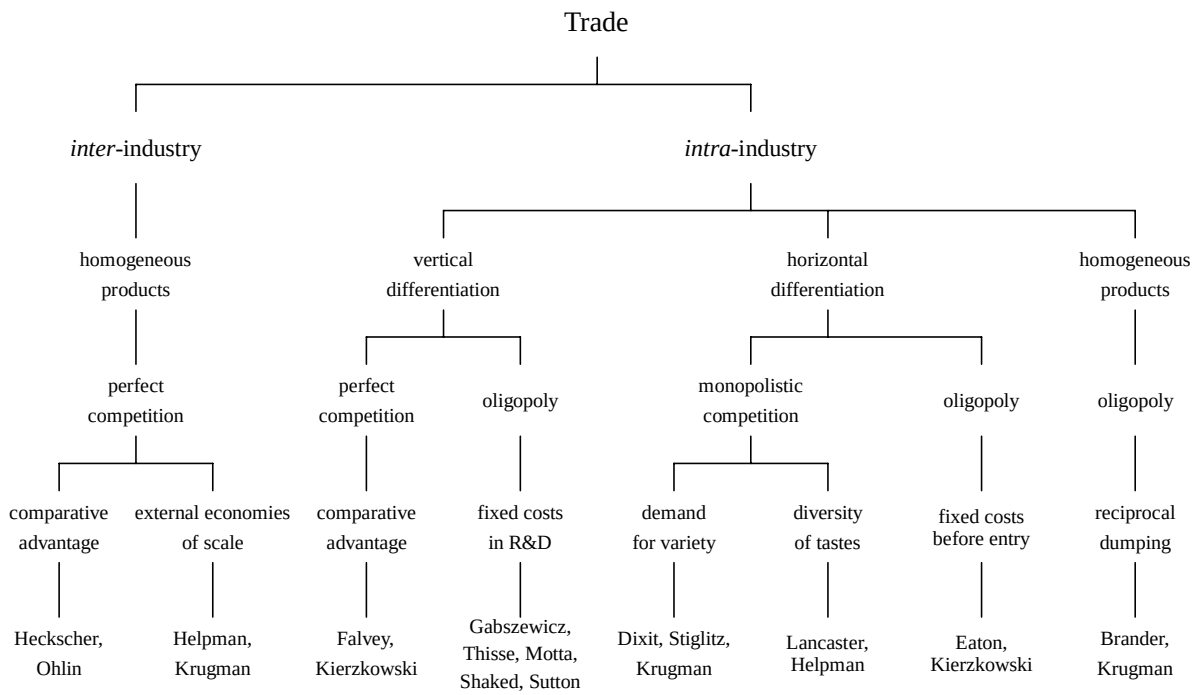
Incidentally, *inter*-industry trade is no longer exclusively based upon comparative advantages: external economies and agglomeration effects, spillover effects, or more generally the country size (and differences in size) do matter.

In total, a wide spectrum of determinants of trade patterns is to be considered, going far beyond the popular perception of the new international trade theory (Figure 1). Inter-industry trade is no longer associated with perfect competition and constant returns to scale, while intra-industry trade can be determined by market structures only, independently from any diversification of products. The latter explanation, to be referred to as the reciprocal dumping model of IIT (Brander and Krugman, 1983), is increasingly receiving empirical support (Feenstra, Markusen and Rose, 1998; Fung and Lau, 1998).

Accordingly, the increase in intra-industry trade observed in Europe is the result of numerous determinants. They can be identified using a gravity-type model having four dimensions (country, partner, industry, time) and combining explanatory variables on country characteristics (comparative advantage, size etc.), market structure (returns to scale, product differentiation), and European integration (border formalities, non tariff barriers, agglomeration economies). One of the main conclusions reached by Fontagné, Freudenberg and Péridy (1997) is that the share of IIT in vertically differentiated products increases with the difference in income per capita between countries, a result generally associated to inter-industry trade and comparative advantage. This suggests that the perception of IIT as a smooth path of adjustment might be inapropriate.

[2] The idea of defining a product as a "bundle of attributes" has found its empirical counterpart in so-called "hedonic prices". These implicit prices of attributes are derived through econometric estimates which relate observed prices of goods to specific amounts of characteristics associated with them: a product with a higher amount of a specific (quality) attribute usually sells at a higher price. However, several factors can undermine the positive link between quality and price: *(i)* While high-priced good need to have a minimum (objective or subjective) quality to be sold on the market (non-price competitiveness), low-priced goods are not necessarily of low quality, owing to lower production costs (price-competitiveness) or firms' strategies (mark-up). *(ii)* Prices of goods are also influenced by factors such as market structure, firm strategies, income distribution, consumer tastes and behaviour, and consumers' perception of quality. *(iii)* In addition, prices of imported goods are influenced by factors such as exchange rate movements and trade restrictions. *(iv)* Another difficulty arises, as unit values are imperfect proxies for prices. But unit values are increasingly used in the literature, partly because there is no alternative to systematic empirical analysis.

Figure 1: Market structure, differentiation of products and the determinants of trade



Gains versus adjustments costs

A key issue associated with the mid-eighties synthesis between the traditional view (incomplete specialisation of nations) and the new perspective (complete specialisation of firms) is the potential (social) cost of displacing resources between alternative uses: gains are not *net* gains, since adjustment costs have to be considered:

- Displacement of factors being specific to some extent: due to incomplete portability across sectors or within sectors across the quality range of products, invested capital and qualifications becomes obsolete. In turn, there is a need for investment in capital, R&D and formation;
- Absolute/relative impoverishment of certain categories of agents, along the traditional Stolper-Samuelson mechanism.

Such costs appear if some factors are specific in the short run: the qualification of workers can be specific to the industry they are employed in. In this case, moving from one industry to another as a result of inter-industry adjustment is costly: you have to be trained once again since your human capital is depreciated[3]. In case of IIT, in contrast, human capital is portable across firms even if some firms exit from the market: adjustment costs in that case are supposed to be much smaller than for *inter*-industry trade that has distribution effects for factor rewards. They are limited to specific assets of firms dropped out the market, in case of exits. Krugman (1980) provides a stylised framework associating the costs of inter-industry trade and the gains of IIT: similar enough countries or differentiated enough products authorise the traditional Stolper-Samuelson effect to be compensated for by gains in variety for the scarce factor.

However, such association of inter-industry trade with painful adjustments and intra-industry trade with less costly adjustments might be challenged by new developments in international trade theory related *(i)* to (vertical) product differentiation and to agglomeration economies; and *(ii)* to measurement issues.

As far as the first issue is concerned, inter-industry trade (implying a displacement of resources between industries), intra-industry trade of vertically differentiated products (associated with a specialisation along quality ranges), and intra-industry trade of similar products (associated with a specialisation in varieties)

[3] Labour economists have extensively addressed this issue (Neal, 1995 is a good example).

have different implications. As far as the specificity of qualifications is concerned, specialising on top quality varieties will be associated to adjustment costs if the qualification of labour intensively employed to produce in low quality varieties is specific. Here, qualifications might not be portable not only between sectors, but also within sectors, across the quality range of products.

Turning to measurement issues, there has been growing concern about the consequences of increasing IIT over time: according to the static view referred to here, such move towards IIT would mean painless adjustments, at least as far as the distinction between horizontal and vertical differentiation is neglected.

Hamilton and Kniest (1991) however noticed that this was not necessarily the case. What matters is the intra-industry nature of marginal trade (Greenaway *et al.* 1994). Accordingly, an inter-industry adjustment can lead to an increasing Grubel and Lloyd index. In total, increasing values of the G&L index would hardly been interpreted systematically as carrying painless adjustments. For example, starting with a trade surplus in an industry, an increase in imports leaving exports unchanged will reduce the trade surplus: thus an increase in the GL level -tabulated on total trade flows- may be associated with an inter-industry *marginal* trade.

This difficulty with the traditional GL and consequently the need for a "marginal" indicator are simply due to a definition of IIT based on the trade overlap[4]. Azhar, Elliott and Milner (1998) and Lovely and Nelson (1999) tackle this issue in partial and general equilibrium respectively. Intra-industry trade may induce inter-industry adjustment and carry changes in factor prices, and measures of marginal intra-industry trade are poor predictors of such adjustment. The intuition is very simple: when opening the economy, the number of varieties falls in each country. Marginal trade is of an intra-industry nature, but since the number of varieties shrinks in each country at the same pace, resources leave the manufacturing sector and the adjustment is of an inter-industry nature.

In total, a large diversity of trade patterns is expected as determinants, nature, and effects of trade are highly dependent of market structures. Driven by a horizontal differentiation of products, IIT leads to gains in variety and potential economies of scale, without implying high reallocation costs for member countries. At the opposite of this smooth path towards integration, inter-industry trade, and the associated specialisation of countries, has a cost in terms of resources displacement along comparative advantages, to the benefit of large countries in case of agglomeration economies. Between these two polar cases, IIT associated with a vertical differentiation of products leads to specialisation along the quality spectrum, as a result of R&D expenses, endowments in human capital, or simply advertising. In this case, IIT might be associated with a costly displacement of resources, as inter-industry trade under specialisation. Thus, contrasting with IIT in horizontal differentiation (exchange of varieties), the adjustment costs associated with IIT in vertical differentiation (exchange of qualities) might be sizeable, as it may not be equivalent to specialise in high or low quality products in the same industry.

Determinants and consequences of IIT clearly depend on the nature of product differentiation. In fact, inter-industry trade (implying a displacement of resources between industries), intra-industry trade of vertically differentiated products (associated with a specialisation along quality ranges), and intra-industry trade of similar products (associated with a specialisation in varieties) have different implications (Table 2). A large diversity of trade patterns can be expected as determinants, the nature, and the effects of trade are highly dependent on market structures. This must discourage the researcher from seeking a simple representation of what the trade effects of integration are.

[4] Brülhart (1994) and Greenaway, Hine, Milner and Elliott (1994) explore the same issue.

Table 2: Determinants of trade types and potential effects on integration

	Traditional theories	New International Trade Theory		
Trade patterns	*Inter*-industry trade		*Intra*-industry trade in *vertical* differentiation	*horizontal* differentiation
Specialisation	along comparative advantages	through agglomeration economies	along the quality spectrum	in varieties
Adjustment costs	Important (changes in factor prices among industries within countries)	Potentially important (potential income divergence among countries)		Weak

Source: Adapted from Fontagné and Freudenberg (1997).

2. The definition of trade types

This chapter does not rely on the traditional Grubel and Lloyd indicator. It uses a complementary method that allows the whole of given flow to be classified in one and the same trade type. This strategy contrasts with the assimilation of IIT to balanced trade.

Aims

Studies on intra-industry trade sometimes strongly overestimate the extent of intra-industry trade, as an insufficient country and/or product disaggregation lead to the well-known sectoral[5] or geographic[6] aggregation biases.

While these biases may arise with any indicator of IIT, the widely used Grubel and Lloyd indicator (based on the degree of overlap in trade) may set an additional, analytical problem, as explanations of international trade have been inspired by the decomposition of total trade in trade overlap (representing intra-industry trade) and the imbalance (inter-industry trade).

In this case, the flows related to inter-industry trade remain largely explained by traditional theory, whereas intra-industry trade is explained by the "New international trade theory". This helps to reconcile what are a priori two incompatible paradigms (along Helpman and Krugman, 1985), but raises the problem of marginal trade referred to above, when used in dynamics. Hence, a long-run study of trade patterns should consider this measurement issue carefully.

Accordingly, our analysis of intra-EC trade is based on a methodology initiated by Abd-El-Rahman (1986) and refined by Fontagné and Freudenberg (1997), that has the following characteristics:

[5] The *sectoral bias* stems from an insufficient disaggregation in the trade classifications: the lesser the detail of the classification used, i.e. the more products are lumped together into a single industry, the more trade becomes of an intra-industry nature. A specific problem arises when an exchange of intermediate goods (e.g. motors) for final goods (e.g. cars) belonging to the same industry is considered as "intra-industry" trade. Simultaneous exports and imports within an industry, but at different production stages, should not be considered as intra-industry trade, but as an international splitting-up of the production processes (see Fontagné, Freudenberg and Ünal-Kesenci, 1995).

[6] Likewise, *geographic bias* arises from an insufficient disaggregation of partner countries, and in the extreme case, only country's trade relations with "the rest of the world" are examined. However, the sign of the trade balance for a particular product may change from one partner to another, corresponding to the accumulation of various inter-industry flows for the same item of the product classification. Such a "multilateral" intra-industry trade is a pure artefact and is perfectly compatible with traditional theories (see e.g. Deardorff, 1979 and Lassudrie-Duchêne and Muchielli, 1979) for the concept of the "chain of comparative advantages").

- It considers, depending on the degree in overlap, both exports and imports as being as being part of either two-way trade or one-way trade. This authorises breaking the link between the two notions of IIT and trade balance that is at stake;
- It minimises the bias of geographic aggregation by only considering bilateral flows;
- It minimises the bias arising from sectoral aggregation by using far more disaggregated classifications and finally;
- It distinguishes between vertical and horizontal differentiation by incorporating price (unit value) differences.

Method

The analysis of trade patterns is conducted on a strict bilateral basis and at the most detailed level for which statistics are available: data published by Eurostat in the classification of the 8-digit

Combined Nomenclature (CN) (and, until 1987, the 6-digit Nimexe) concern some 10,000 product items. Since products may differ by their quality, even at the most detailed level of disaggregation, it is assumed that differences in prices (unit values) reflect quality differences.

Products whose unit values are close are considered as similar, i.e. horizontally differentiated. The criterion is necessarily arbitrary: if the export and import unit values differ by more than 15% products are considered vertically differentiated.

Finally, trade at the elementary level will be either inter-industry or intra-industry: when the value of the minority flow (for example imports) represents at least 10% of the majority flow (exports in that case), then both these flows are considered as being part of "two-way trade". Otherwise, both flows would be considered as being part of "one-way trade".

This method allows elementary trade flows to be broken down into different categories according to the similarity in unit values and to the overlap in trade:

- One-way trade (no or insignificant overlap between exports and imports);
- Two-way trade in similar, horizontally differentiated, products (significant overlap and small unit value differences);
- Two-way trade in vertically differentiated products (overlap and high unit value differences).

This approach permits the totality of trade to be broken down according to these criteria, both imports and exports being part of one and the same of these types. Notice that each trade type can be presented both in value or, alternatively, in share of total trade.

This method is therefore complementary with the one developed by Greenaway, Hine and Milner (1994 and 1995), but addresses directly the shares of trade types whereas Greenaway *et al*. consider a mix of trade shares and trade types notwithstanding their use of the Grubel and Lloyd reference.

Table 3: How to define the three trade types?

Degree of Overlap between Export and Import Values *Is the value of the minority flow at least 10% of the majority flow?*	**Similarity of Export and Import Unit Values** *Do export and import unit values differ less than 15%?*	
	Yes	No
Yes	Two-way trade in horizontally differentiated products	Two-way trade in vertically differentiated products
No	One-way trade	

3. Empirical evidence on the nature of EU trade

Using such methodology authorises drawing an original picture of the long-term trends in IIT within the EU, and vis-à-vis third countries. IIT is particularly important for Europe, especially in intra-EU trade, it expands continuously, but quite exclusively due to a development of "two-way trade in qualities".

Intra-industry trade is important, especially within the EU

Table 4 shows the relative importance of the three trade types for trade of the 15 EU Members in 1996.[7] Half of trade between the EU-members with the world (i.e. both intra- and extra-EU partners) is one-way, i.e. it takes the form of either exports or imports with no significant flows in the other direction. The difference between 100% and the share of one-way trade yields the share of two-way trade. What is the relative importance of two-way trade in horizontal as compared to vertical differentiation? The second trade type in importance, with about one third of total trade is two-way trade in vertically differentiated goods which can be interpreted as an exchange of different qualities. Finally, two-way trade in horizontal differentiation has a relatively small share (15%). In total, two-way trade in vertically differentiated goods is about twice as important as two-way trade in horizontal differentiation.

A more detailed examination yields three major results.

The share of two-way trade in total trade is much more important in intra-EU trade than in trade with non-members, and this is true for each individual member country. Thus, while two-way trade represents about 60% of intra-EU trade, it accounts for only 25% of trade with extra-EU partners.

There are striking differences among member states concerning the relative importance of the three trade types. For example in *intra*-EU trade (see also Figure 1), two-way trade is most pronounced for France, Germany, Belgium-Luxembourg, the United Kingdom and the Netherlands, followed closely by Spain, Austria and Italy. In contrast, trade is mostly one-way for small periphery countries, especially for Portugal, Finland and Greece, which suggests an insertion within intra-EU trade based on complementarity.

For each country, two-way trade in vertically differentiated products is much more important than in horizontally differentiated goods. Of course, a threshold other than 15% for unit value differences would have given a different relative importance of vertical versus horizontal differentiation. Nevertheless, this indicates a specialisation that operates at a very detailed level, by quality ranges inside products. While this phenomenon which may be called a “qualitative division of labour” has only received a limited attention in the literature, it underlines the interest of an analysis (which will be done below) on which price or quality range the different countries are specialised.

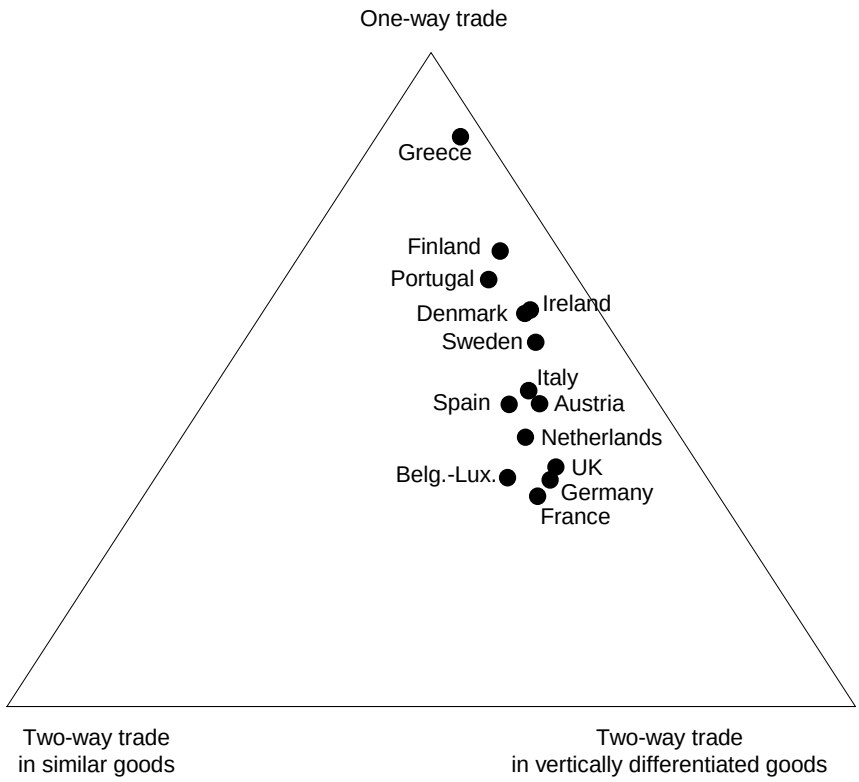
[7] Concerning extra-EU partners, EU trade statistics are available for some 250 partners, some of which were aggregated, leading in total to some 50 non-EU partners. The calculations being done bilaterally for these partners, the share of two-way trade with the aggregates and thus with the “world” is thus overestimated.

Table 4 : Share of trade types in EU-15 trade, 1996

	Intra-EU			Extra-EU			World		
	Horizontal two-way trade	Vertical two-way trade	One-way trade	Horizontal two-way trade	Vertical two-way trade	One-way trade	Horizontal two-way trade	Vertical two-way trade	One-way trade
Belgium-Lux.	23.6	41.7	34.7	15.4	12.1	72.5	21.5	34.0	44.5
France	21.5	46.6	31.9	8.1	23.0	68.9	16.8	38.4	44.8
Germany	18.7	46.9	34.4	6.1	27.3	66.6	13.5	38.8	47.7
U. Kingdom	17.1	46.6	36.3	5.4	27.1	67.5	12.2	38.4	49.4
Netherlands	18.4	40.7	40.9	2.8	14.2	83.1	13.9	33.0	53.1
Austria	14.3	39.8	45.9	5.1	21.4	73.6	11.5	34.4	54.1
Spain	17.8	36.3	45.9	2.1	7.4	90.5	12.9	27.2	60.0
Italy	14.5	37.5	48.0	3.2	16.2	80.7	9.8	28.6	61.6
Sweden	10.0	34.7	55.3	4.3	19.9	75.8	7.9	29.2	63.0
Ireland	8.2	31.6	60.2	5.8	22.9	71.3	7.4	28.8	63.7
Denmark	9.1	31.2	59.7	6.1	13.3	80.6	8.2	25.6	66.2
Portugal	10.8	24.4	64.8	0.9	3.1	96.0	8.6	19.7	71.6
Finland	7.2	23.6	69.2	2.4	11.9	85.8	5.2	18.8	76.0
Greece	3.2	10.2	86.6	1.0	3.5	95.5	2.4	7.6	90.0
EU-15	17.5	41.6	40.9	5.7	20.9	73.4	13.2	34.1	52.7

Countries are ranked by the relative importance of one-way trade with the world.
Source : Eurostat - Comext, authors' calculations.

Figure 1 : Trade types in *intra*-EU15 trade, 1996



The closer a country is to a summit, the more the corresponding trade type is important.
Source : Eurostat - Comext, authors' calculations.

Intra-industry trade has strongly increased with the EU, especially in vertical differentiation…

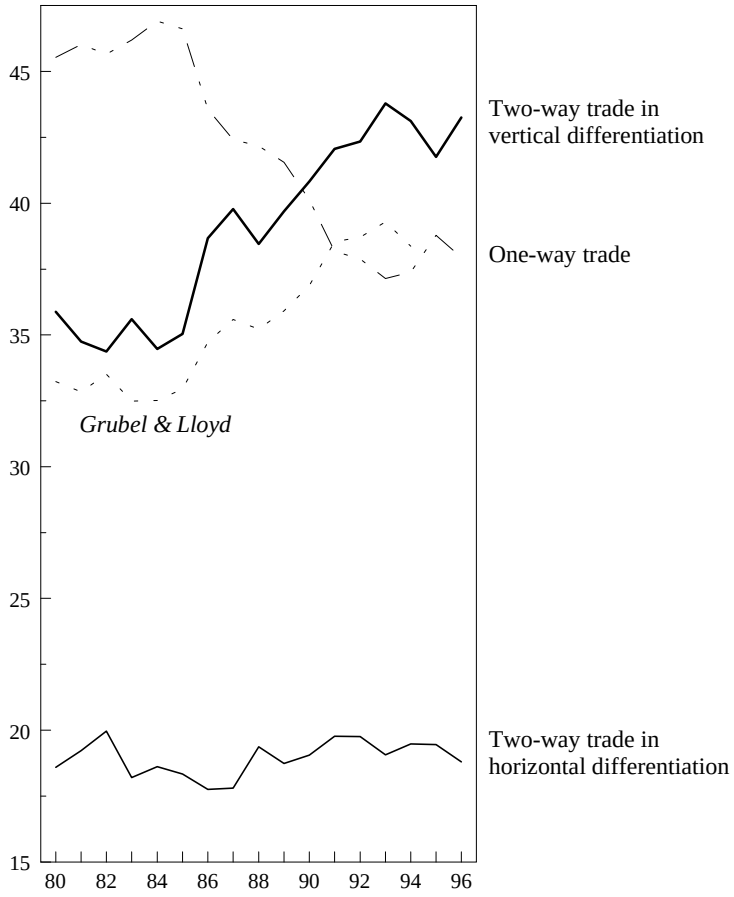
An analysis of the dynamics of trade patterns allows overcoming the initial bias introduced by the arbitrary threshold of 15% for unit value differences. How has the relative importance of the trade types evolved over time? Since there are no data for a sufficiently long time period for all EU-15 members, we examine more closely trade patterns among EU-12 countries, going back until 1980.

Figure 2 indicates the evolution of the share of the three trade types in intra-EU-12 trade from 1980 to 1996, and, for comparison's sake, the Grubel and Lloyd indicator. The considered time period was characterised by an increase in intra-industry trade: the Grubel and Lloyd indicator was around 33% in the beginning of the 1980s, and gained rather regularly about five points.[8]

One-way trade, with a share of some 45% the most important trade type in the beginning of the 1980s, experienced a decline from the mid-1980s onwards. In that sense, the evolution of one-way trade is symmetric to the Grubel and Lloyd indicator. However, and in contrast to what is often implicitly assumed, including ex ante studies on the impact of the Single Market, the rise in intra-industry trade in intra-EU-12 trade does not concern horizontally differentiated products, but products that are vertically differentiated. In fact, two-way trade in similar products remains rather stable and represents less than 20% of all intra-EU trade, whereas two-way trade in vertically differentiated products increased from less than 35% in 1980 to 1985 to more than 40% in 1996. However, this phenomenon, the pre-eminent feature of intra-European trade, has received little attention in the theoretical literature when compared to intra-industry trade in horizontal differentiation.

[8] While the rise of IIT in intra-EU trade comes as no surprise, as it is well documented in the literature, the *level* of the Grubel and Lloyd indicator may seem low when compared to other studies, but this is of course due to the strong disaggregation of trade flows.

Figure 2: Trade types in *intra*-EU*12* trade, 1980-1996



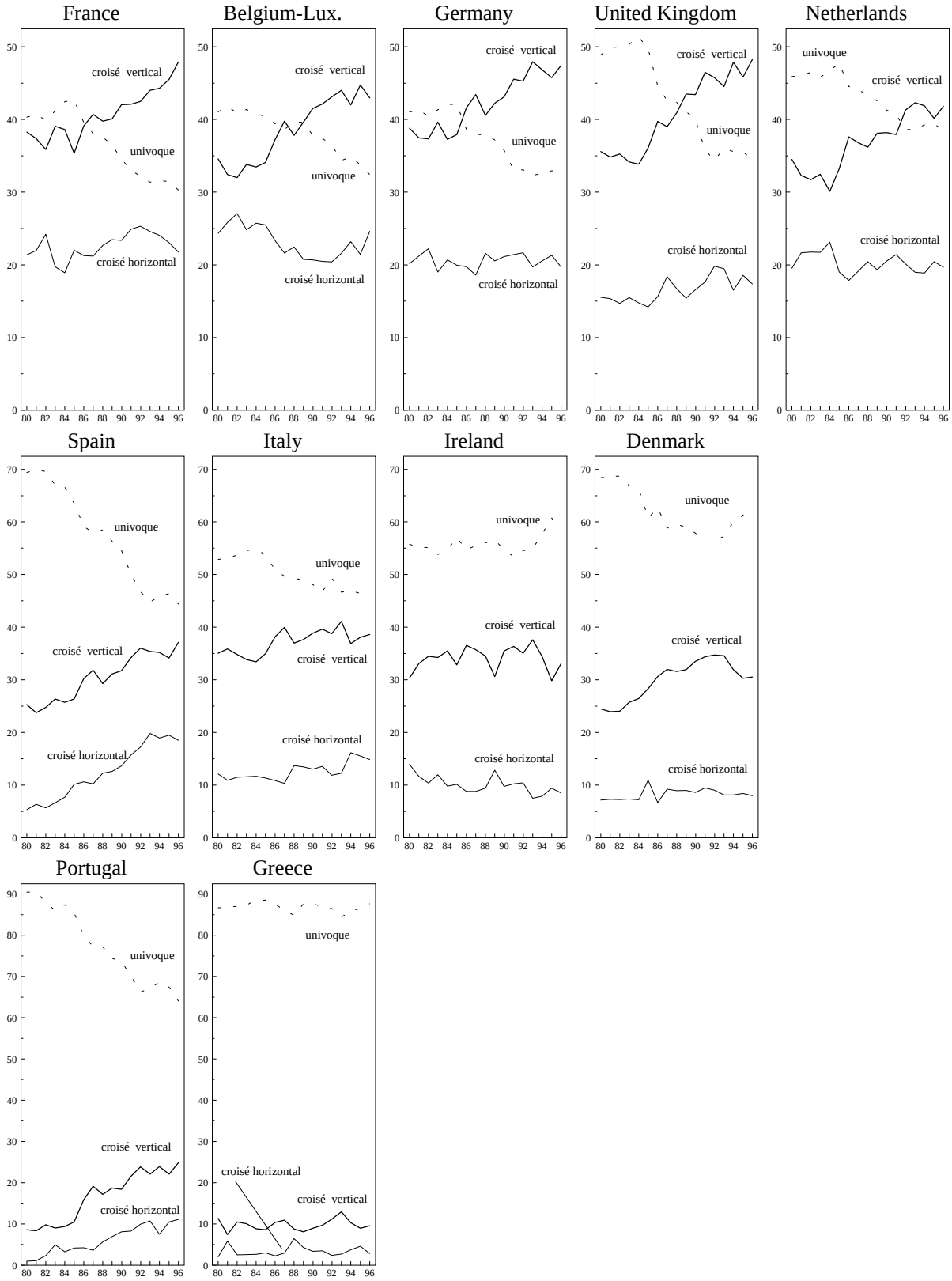
Source : Eurostat - Comext, authors' calculations.

… and this for virtually each Member country

The evolution of trade patterns by country is important in view of the potential income divergence across countries due to an increasing specialisation. Between 1980 and 1996, the share of one-way trade in total intra-EU trade has fallen for virtually all countries (Figure 3). Thus, contrasting with often-expressed fears, this evidence does not support a possible scenario of concentration of industries in a limited number of countries. At least at this level of aggregation, it appears that theoretically possible agglomeration effects, detrimental to European cohesion, are not empirically observed.

While the relative importance of trade types differed substantially in the early 1980 between European "core" and "periphery" countries, the observed dynamics of trade patterns is quasi-general: European integration has been accompanied by an increase in intra-industry trade, with the exception of Ireland (slight decline) and Greece (stability). For most countries, the corresponding rise in IIT it almost exclusively due to the vertical product differentiation. Whereas one-way trade was the most important trade type for all countries in the early 1980s, two-way trade in vertical differentiation has become the major trade type the United Kingdom (since 1989), France (since 1986), Germany (since 1986), Belgium-Luxembourg (since 1989) and the Netherlands (since 1992).

Figure 3: Evolution of trade types in intra-EU-12 trade by country, 1980-1996



Countries are ranked in decreasing order by the relative importance of one-way trade. Note the difference in scale between the three groups of countries (50%, 70%, and 90%).

Source: Eurostat - Comext, authors' calculations.

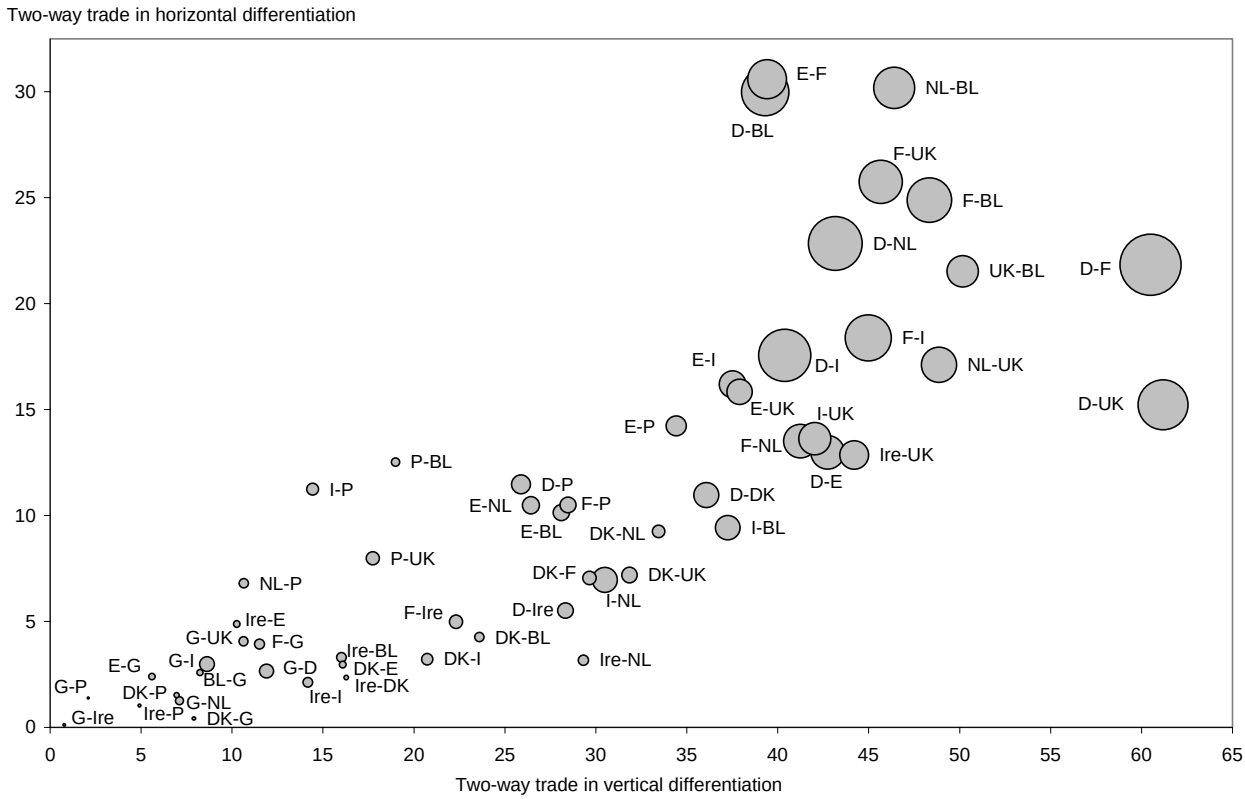
The rise in IIT is most pronounced for Spain and Portugal who seem to have successfully integrated in intra-EU trade, away from a residual specialisation on activities abandoned by more advanced countries, thereby strongly contrasting with Greece's situation. It should be noted here that rise in IIT for Spain and Portugal began well before their entry into the EC in 1986. For Portugal and even more so for Spain, foreign direct investment may have accelerated the convergence towards the trade structure observed in more advanced countries. At the same time, structural funds engaged by the Community may have smoothed the transition period for these countries.

IIT is particularly important in bilateral trade between European core countries

Trade patterns have a clear bilateral dimension according to the new trade theory: similarities in GDP, in GDP per capita and the average size of the market fuel the share of IIT in total trade. Accordingly, in 1996, the share of two-way trade in total bilateral trade (see Figure 4 for a breakdown) is most important between Germany and France (82%), Germany and the United Kingdom (77%), the Netherlands and Belgium (76%), France and Belgium (72%), the United Kingdom and Belgium (72%), United Kingdom and France (72%), and France and Spain (70%).

In contrast, some bilateral trade relations (by the way of little importance when measured in the value of the transaction) are almost exclusively one-way and based on complementarity: this is the case e.g. in trade between Greece and Ireland or Greece and Portugal. In short, "South"-"South" trade is characterised by one-way trade, and "North"-"North" trade by two-way trade. And when less developed countries engage in two-way trade, it is primarily in vertical differentiation with the "North".

Figure 4: Trade types in bilateral intra-EU12 trade, 1996



The area of the bubbles represents the relative importance of total bilateral trade in total intra-EU trade, ranging from some 10% (France-Germany) to about 0.02% (Greece-Portugal, Greece-Ireland and Portugal-Ireland).
Source : Eurostat - Comext, authors' calculations.

4. Beyond IIT: Quality matters in EU trade

The results obtained by disentangling trade types show the (rising) importance of two-way trade in vertically differentiated products, i.e. simultaneous exports and imports of products with the same technical characteristics, but under different prices (unit values), suggesting a "qualitatively division of labour" not only within EU-members, but also in trade with Non-members.

Firms need to differentiate their products horizontally (different varieties) or vertically (different qualities) to shelter them temporarily from increased competition. In contrast to homogeneous goods sold on competitive markets, goods differing by quality can coexist on a same market and be sold at different prices since they can be considered outputs of distinctive production functions. Factors which play a key role in vertical product differentiation and which influence positively the quality of goods comprise: *(i)* more capital (Falvey, 1981; Falvey et Kierzkowski, 1987), *(ii)* more R&D (Gabszewicz, Thisse, Shaked et Sutton, 1981), *(iii)* a highly qualified labour force (Gabszewicz et Turrini, 1997), and *(iv)* a specific organisation of internal procedures of firms.

As already stressed, the question on which market segments (in terms of price/quality) different member states are positioned in is important for political economy issues, as this has important consequences in terms of adjustment costs, income distribution, or catching-up. But in addition to the problem of imperfect portability of qualifications referred to above, specialisation in high quality goods allows to extract important rents: demand for high quality goods is generally characterised by high income elasticity and low price elasticity.

Therefore, the range on which countries specialise is not "neutral" from a policy point of view. More advanced countries are expected to be specialised in high quality, and less advanced countries in low quality. However, while advanced countries need to constantly improve the technological content or the quality of goods, there is also a possibility that less advanced countries engage in a catch-up or leapfrogging process through technology spillovers[9] or in terms of quality upgrading (Herguera & Lutz, 1997).

Three price-quality ranges

Here again, we assume that differences in unit values reflect quality differences. As exports and imports are analysed separately, flows for the same product with a given trade partner can exist in different European price/quality ranges (Freudenberg & Müller, 1992):

(a) up-market products (with unit values exceeding the intra-EU average by at least 15%),

(b) down-market products (more than 15% below the norm), as well as

(c) medium-market products (between +/- 15% around the average).

It is important to mention that despite their common use of unit values, trade types and price/quality ranges are two distinct and strictly independent notions.[10] The analysis by price-quality ranges can therefore not only be applied to two-way trade in vertically differentiated products, but also to the other trade types, and thus to all trade. Being carried out at the most detailed level of the classification, this work allows headings to be aggregated to any desired level, so that a break down all trade into three trade types and three price/quality ranges may be obtained.[11]

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[9] See Soete (1985), Brezis, Krugman and Tsiddon (1993), Coe and Helpman (1995) or Coe, Helpman and Hoffmaister (1996).

[10] For example, two-way trade in *similar* products can be done in *different* European price segments. Likewise, two-way trade in *vertically differentiated* products can be done in the *same* market segment.

[11] This approach clearly differs from Aiginger (1997) and Erkel-Rousse and Le Gallo (1998) who use relative unit values to discriminate between price and quality competition. In our approach, we are not interested if a country has *higher* relative unit values (compared to another country or exports compared to imports), but whether a country exports (imports) *more* of the high (medium, low) quality product.

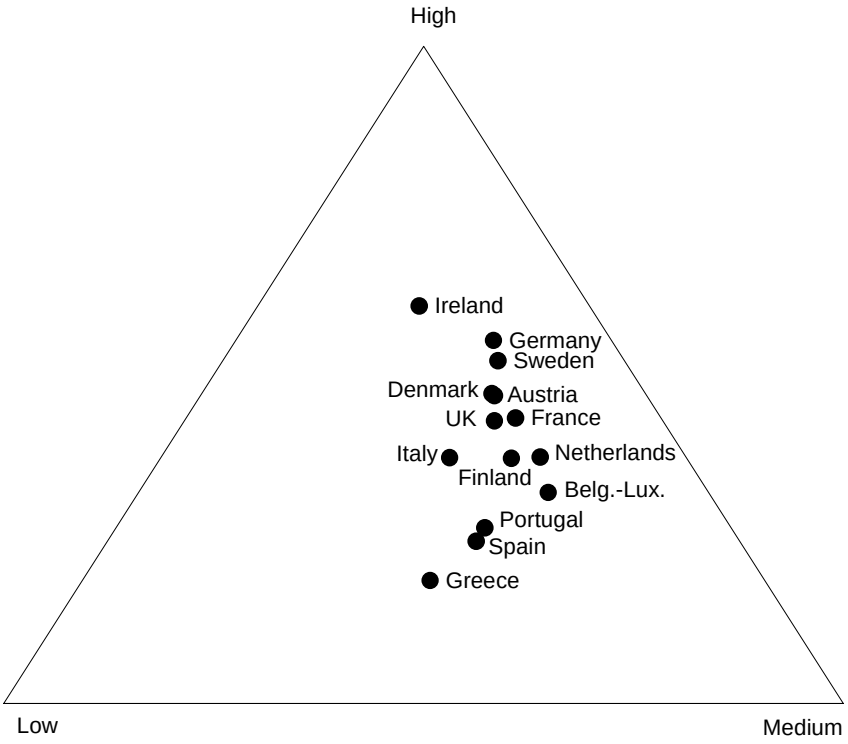
While the structure of imports by price-quality range is quite close among countries (suggesting harmonised consumption patterns in Europe), some striking differences across countries can be detected with respect to the structure of exports (Table 5 and Figure 5). Up-market goods represent more than half of total exports for Ireland, Germany and Sweden. If the results for Germany and Sweden seem compatible with their image of expensive but high-quality goods, the presence of foreign affiliates of multinational firms certainly plays a major role in Ireland's situation (Ruane et Görg, 1997). Possible transfer pricing between headquarters and affiliates in this country with a favourable fiscal system cannot *a priori* be excluded and may thus lead to a possible bias in our indicator. Denmark, Austria, the United Kingdom and France are other countries that export mostly up-market goods. At the other extreme are the Southern countries, which joined the EC in the 1980s: Greece, Spain and Portugal export mostly down- and medium-market goods.

Table 5 : Export and import shares by price-quality range, 1996

	Share in exports			**Share in imports**			**Revealed comparative advantage**					
	%			%			1000/GDP-PPP			1000/trade		
	Low	Med.	High	Low	Med.	High	Low	Med.	High	Low	Med.	High
Ireland	20.3	19.3	60.5	24.7	30.3	45.0	-24.0	-59.0	**83.0**	-21.9	-53.9	75.8
Germany	14.1	30.8	55.2	22.6	41.0	36.4	-22.9	-27.2	**50.2**	-42.6	-50.7	93.3
Denmark	18.3	34.6	47.1	25.0	36.6	38.4	-23.3	-6.9	**30.2**	-33.4	-9.9	43.4
Netherlands	17.3	45.2	37.5	23.7	43.9	32.4	-33.4	6.9	**26.5**	-31.8	6.6	25.3
Sweden	15.1	32.8	52.1	19.0	34.0	47.0	-15.2	-4.5	**19.7**	-19.5	-5.8	25.4
France	17.3	39.3	43.4	22.3	40.6	37.2	-11.1	-2.9	**14.0**	-24.9	-6.4	31.3
U. Kingdom	20.0	37.0	43.0	26.2	35.9	37.8	-12.9	2.2	**10.7**	-30.9	5.3	25.7
Finland	20.9	41.9	37.3	22.3	32.0	45.8	-5.1	**35.2**	-30.1	-7.0	48.7	-41.7
Belgium-Lux.	19.1	48.9	32.1	20.6	47.0	32.3	-10.8	**12.6**	-1.8	-7.8	9.1	-1.3
Austria	18.1	35.0	46.8	19.2	33.0	47.8	-3.6	**6.9**	-3.3	-5.3	10.1	-4.8
Italy	28.2	34.5	37.4	18.5	43.5	38.0	**17.1**	-16.1	-1.0	47.8	-44.9	-2.9
Portugal	29.3	44.0	26.7	22.8	41.8	35.4	**13.5**	4.5	-18.0	31.3	10.4	-41.6
Greece	39.9	41.5	18.7	29.0	38.2	32.8	**13.5**	4.1	-17.6	45.4	13.7	-59.1
Spain	31.4	44.0	24.7	25.4	44.6	30.0	**10.5**	-1.1	-9.4	29.7	-3.1	-26.6

Source: Eurostat - Comext and CEPII-CHELEM, authors' calculations. Countries are ranked by the decreasing importance of their RCA (per thousands of GDP) for each market segment.

Figure 5: Export shares by price-quality range, 1996



The closer a country is to a summit, the more the corresponding price-quality range is important.
Source: Eurostat - Comext, authors' calculations.

Concerning long-term dynamics, Appendix 1 shows the export structure by price-quality range in intra-EU-12 trade between 1980 and 1994. In the beginning of that time period, medium-market goods were the most important price-quality segment in exports for all countries.

Concerning Ireland, Germany, Denmark and the United-Kingdom, the main feature of export patterns is certainly the fact that up-market products are leading in the final period, after having increased their share throughout the period considered here. But this increase over time was due to a sharp decrease of medium market products, not lower ones. In contrast, simultaneously, the share of down-market products has increased in all these countries' exports. Quality ranges are sometimes interpreted in terms of a response to exchange rates pressure on exporters, countries with appreciating currencies being pushed to up-grade in their specialisation in order to balance declining market shares in volume. In contrast, producers from countries with depreciating currencies may be able to compete on the basis of lower prices, feeling less obliged to up-grade and may therefore persist in producing a given (lower) quality. The similar evolution for Germany and United-Kingdom, two countries which had opposite strategies concerning their respective exchange rates, raised this interpretation into doubt: British exporters have not been driven downward the quality spectrum.

Concerning Southern countries, exporters are located mainly on the medium range of the price-quality spectrum. But as in most countries, exports in the medium-market range are decreasing. Down-market and up-market exports have an increasing share, which highlights the process of an in-depth specialisation of producers which is not oriented *a priori* against top quality products, contrary to the intuition, even if down-market products account systematically for a larger share of exports than up-market ones.

The difference between the "North" and the "South" can also be found once structural strengths and weaknesses in both intra- and extra- EU trade are analysed with an indictor of revealed comparative

advantages which takes into account both exports and imports.[12] Ireland, Germany, Denmark, Sweden and France are overall specialised in up-market goods, whereas Spain, Greece, Portugal and Italy are clearly specialised in down-market goods (Table 5). Italy's presence in that latter group may comes as a surprise, and suggests that these overall results need to be also examined at a more detailed level: as will be shown below, Italy is strongly specialised in up-market goods in some of its key industries such as textiles.

An analysis of structural strengths and weaknesses shows that the large European countries clearly differ with respect to their specialisation by price-quality range (Appendix 2).

Germany is clearly specialised in up-market goods. Thus, the highest contribution to the trade balance in its key industries (machinery, vehicles, chemicals and electrical goods) stems from up-market goods. This result is confirmed at a more disaggregated level for its leading product groups: cars, specialised machines, engines and turbines, plastics, vehicle components, precision instruments, machine tools, heavy electrical equipment, construction equipment and toilet products. Whereas a part of the deficit in electronics and agro-food is due to up-market goods, Germany's major weaknesses are mostly in medium-market goods (energy, agro-food) and down-market goods (textiles, mostly due to trade with non-EU-members).

The situation is more contrasted for *France*. The major contributions to its trade balance stem from medium-market goods (vehicles, agro-food and machinery) and from up-market goods (machinery, chemicals, agro-food and textiles). For textiles, globally in deficit, the inversion of the sign of the different price-quality ranges reveals that France proceeds in a clear division of labour: strongly disadvantaged in down-market goods, France keeps a favourable situation in up-market goods. An inverse phenomenon can be observed for vehicles: France has a strong structural surplus in medium-market vehicles, and a deficit in up-market vehicles. That latter can be decomposed into a strong surplus in up-market vehicles with extra-EU partners, and an even stronger deficit with EU-partners. Likewise, the surplus in up-market machinery results from a deficit in intra-EU trade that is more than compensated by a surplus with extra-EU partners.

Like it is the case for France and contrasting with Germany, *Italy's* specialisation by price-quality range clearly depends on the industries and partners. The structural surplus in its leading industry -- machinery -- concerns mostly down- and medium-market goods, especially specialised machinery, miscellaneous hardware and engines and turbines. In contrast, the surplus in textiles stems to a large part from up-market goods, especially from leather and footwear, yarns and fabrics, and knitwear. Italy has a slight deficit in down-market textiles, which can be attributed to extra-EU trade. Italy's deficit in agro-food (mostly due to intra-EU trade) and energy (extra-EU trade) concerns mostly medium-market goods, whereas the deficit in electronics stems from up-market goods.

Like Germany, but to a lesser extent, the *United Kingdom* has a strong structural surplus in up-market goods in its leading industries, chemicals and machinery. The United Kingdom has a particular situation concerning its surplus in (medium-market) energy. The phenomenon of an inversion of the sign of price-

[12] The "contribution to the trade balance" (Lafay, 1987) makes it possible to identify structural strengths and weaknesses in an economy via the composition of international trade flows. It takes into account not only exports, but also imports, and tries to eliminate business cycle variations by comparing an industry's trade balance to the overall trade balance. It can be interpreted as an indicator of "revealed comparative advantage", as it examines whether an industry performs relatively better or worse than the manufacturing total, no matter whether the manufacturing total itself is in deficit or surplus. If there were no comparative advantage or disadvantage for any industry *j*, then a country's total trade balance (surplus or deficit) should be distributed across industries according to their share in total trade. The "contribution to the trade balance" is the difference between the actual and this theoretical balance:

$$\underbrace{(X_j - M_j)}_{\text{observed industry trade balance}} - \underbrace{(X - M)\frac{(X_j + M_j)}{(X + M)}}_{\text{theoretical industry trade balance}}$$

A positive value for an industry indicates a structural surplus, and a negative one a structural deficit. The indicator is additive, and individual industries can be grouped together by summing up their respective values: by construction, the sum over all industries is zero. To allow comparisons across countries, the indicator is generally expressed in thousands of total trade or of GDP.

quality ranges within an industry can be found in electronics and wood and paper, industries in which the United Kingdom keeps a surplus in up-market goods. Weaknesses concern mostly agro-food, (down-market) textiles and (up-market) vehicles.

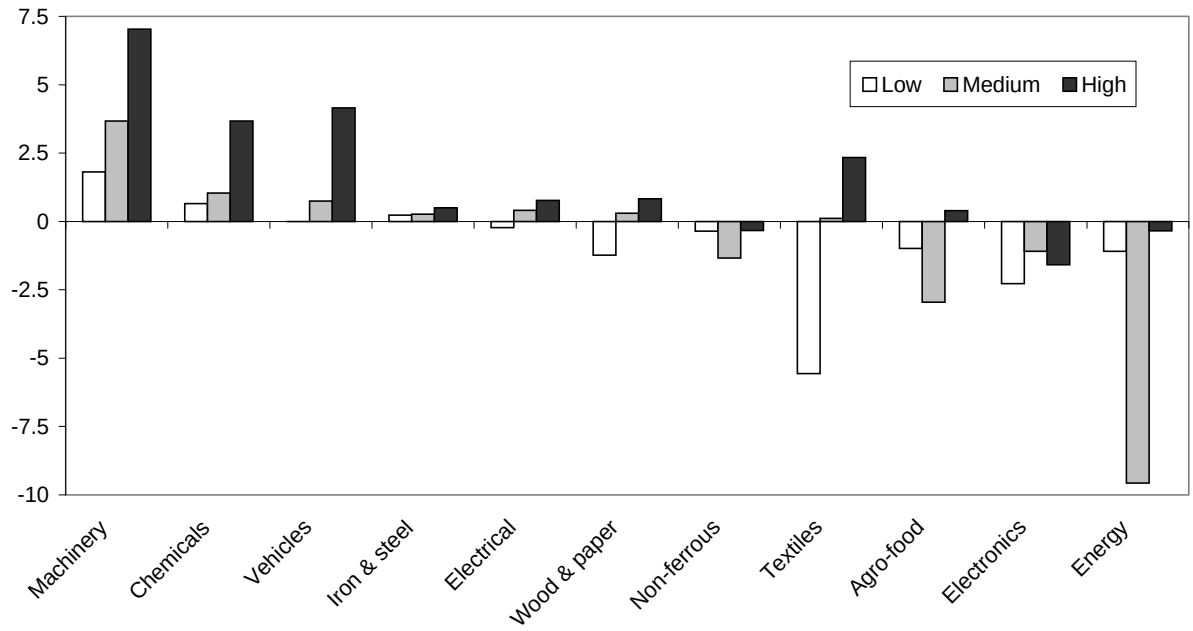
These results suggest a qualitative division of labour among the countries, and often, a structural surplus in one price/quality range coexists with a deficit in another price/quality range within a same industry. Also, for example, the major European exporters of machinery -- Germany and Italy -- seem to have found a division of labour: Italy is specialised in down- and medium-market goods, and Germany in up-market goods within that same industry.

The EU is clearly specialised in up-market goods

Figure 6 shows the contribution of the different industries to EU-15's trade balance. Industries are ranked in decreasing order of their total contribution to the trade balance. Thus, Europe's major strengths are machinery, chemicals and vehicles, and its major weaknesses concern energy, electronics, agro-food and textiles.

The analysis by price-quality range shows that Europe has a structural surplus in up-market goods. This phenomenon is particularly pronounced for machinery (stemming mainly from specialised machines, engines and turbines, and miscellaneous hardware, see Appendix 3), chemicals (especially toilet products and pharmaceuticals) and vehicles (mainly cars), suggesting the importance of quality for European goods. In textiles, for which Europe is globally disadvantaged (especially in down-market goods), up-market goods remain a structural strength. If the structural weakness in medium-market energy goods is not surprising, the negative situation in all price-quality ranges in electronics is more preoccupying.

Figure 6: Contribution to EU-15's trade balance, by industry and price-quality range, 1996



In thousandths of current GDP-PPP. Industries are ranked in decreasing order of their total contribution to the trade balance.
Source: Eurostat - Comext and CEPII-CHELEM, authors' calculations.

Examining more closely individual product groups by price-quality ranges (Table 6), we find that the contribution to the trade balance is highest for up-market cars, up-market specialised machinery, up-market engines and turbines (followed by medium-market specialised machinery), up-market miscellaneous hardware (followed by down-market specialised machinery), up-market yarns and fabrics, up-market toilet products, soaps and perfumes, up-market beverages, up-market construction equipment, up-market leather

and footwear, up-market clothing, up-market pharmaceuticals... in short, of the first fifteen major strengths of the EU, thirteen concern up-market goods.

A similar examination of EU's major weaknesses shows that the structural deficit concerns mostly medium-market goods (crude oil, other edible agricultural products, and non-ferrous metals) and down-market goods (clothing, knitwear, leather and footwear, and miscellaneous manufactured articles). However, one industry does not fit into this scheme, as the structural deficit concerns all price-quality ranges: this is the case for computer equipment.

In total, the EU is often advantaged for one price-quality segment (often up-market goods) and disadvantaged for other segments within that same product group, suggesting an "inversion of comparative advantages by price-quality ranges". However, this phenomenon of a qualitative division of labour cannot only be attributed to two-way trade in vertically differentiated goods, but concerns mostly one-way trade.[13] Often, the EU exports up-market goods and imports *other* down-or medium-market goods.

[13] In fact, a more detailed examination of the contribution of industries by price-quality ranges separately for the three trade types clearly shows the importance of one-way trade to yield the overall result (Freudenberg, 1998).

Table 6: EU-15's strengths and weaknesses by price-quality range, 1996

Positive overall contribution to the trade balance					Negative overall contribution to the trade balance				
	Low	Med.	High	Total		Low	Med.	High	Total
Specialised machines	1.1	1.2	2.1	4.4	Crude oil	-0.3	-8.3	-0.2	-8.8
Cars (incl. motorcycles)	-0.4	0.2	3.1	3.0	Computer equipment	-1.5	-0.9	-1.2	-3.6
Engines, turbines etc.	0.6	0.5	1.2	2.3	Other edible agric. pr.	-0.7	-2.3	-0.4	-3.4
Miscellaneous hardware	-0.2	0.5	1.2	1.4	Clothing	-2.4	-0.1	0.6	-1.9
Construction equip.	0.2	0.4	0.7	1.3	Knitwear	-1.4	-0.2	0.1	-1.5
Toilet pr., perfumes	0.3	0.3	0.8	1.3	Non-edible agr. pr.	-0.6	-0.3	-0.4	-1.4
Pharmaceuticals	0.5	0.2	0.6	1.3	Non-fer. metals	-0.1	-1.1	0.1	-1.1
Commercial vehicles	0.2	0.3	0.5	1.1	Misc. manuf. articles	-0.8	0.2	-0.5	-1.1
Beverages	0.1	0.2	0.8	1.0	Electronic components	-0.4	-0.2	-0.4	-1.0
Machine tools	0.2	0.2	0.5	0.9	Coal	-0.5	-0.2	-0.2	-0.9
Aeronautics	-0.3	0.5	0.6	0.9	Natural gas	-0.1	-0.7	0.0	-0.9
Plastic articles	-0.1	0.4	0.5	0.9	Consumer electronics	-0.2	-0.2	-0.4	-0.9
Vehicle components	0.1	0.2	0.6	0.9	Non-fer. ores and scrap	-0.2	-0.2	-0.4	-0.9
Iron and steel-making	0.2	0.4	0.3	0.9	Animal foodstuffs	-0.1	-0.6	0.0	-0.7
Yarns and fabrics	-0.4	0.3	0.9	0.9	Meat and fish	-0.1	-0.5	-0.1	-0.7
Paints & intermed. chem.	0.1	0.2	0.3	0.7	Iron ores and scrap	0.0	-0.3	-0.1	-0.4
Telecomm. equip.	0.2	0.2	0.3	0.7	Refined petr. pr.	-0.1	-0.2	0.0	-0.3
Ships	0.2	0.2	0.2	0.6	Watch & clockmaking	-0.1	0.0	-0.2	-0.3
Ceramics	0.1	0.2	0.4	0.6	Optics	-0.2	0.0	-0.1	-0.3
Fats	0.1	0.2	0.2	0.6	Preserved meat and fish	-0.1	-0.1	-0.1	-0.3
Paper and pulp	0.2	0.0	0.4	0.6	Leather & footwear	-1.1	0.1	0.6	-0.3
Basic organic chemicals	0.0	0.0	0.4	0.5	Carpets & textile furnish.	-0.3	0.0	0.0	-0.3
Tubes & first-stage proc.	0.0	0.2	0.3	0.5	Articles in wood	-0.4	0.0	0.1	-0.3
Cereal pr.	0.1	0.3	0.1	0.5	Basic inorg. chemicals	-0.2	-0.1	0.0	-0.2
Large metallic structures	0.0	0.1	0.3	0.4	Unprocessed minerals	-0.1	-0.1	-0.1	-0.2
Agricultural equipment	0.1	0.2	0.1	0.4	Plastics & synth. resins	0.0	0.0	0.0	-0.1
Domestic el. appliances	-0.1	0.1	0.3	0.4	Coke	-0.1	0.0	0.0	-0.1
Precision instruments	0.0	0.1	0.4	0.4					
Printing and publications	0.1	0.0	0.3	0.4					
Cement and derived pr.	0.1	0.0	0.1	0.3					
Glass	0.0	0.0	0.2	0.3					
Electrical apparatus	-0.1	0.2	0.3	0.3					
Heavy el. equipment	-0.1	0.1	0.2	0.3					
Preserved fruit & veget.	0.0	0.1	0.2	0.3					
Sugar pr.	0.1	0.0	0.1	0.2					
Furniture	-0.3	0.1	0.4	0.2					
Fertilisers	0.0	-0.1	0.1	0.1					
Rubber articles	-0.1	0.0	0.1	0.1					
Cereals	0.1	0.1	0.0	0.1					
Manufactured tobaccos	0.1	0.0	0.0	0.1					
Arms and weaponry	0.0	0.0	0.0	0.0					

In thousandths of current GDP-PPP.
Source: Eurostat - Comext and CEPII-CHELEM, authors' calculations.

Analysis of bilateral trade between EU-12 and the United States, China and the CEECs

Finally, the contribution to the trade balance can be calculated for bilateral trade. The basic principle of the calculation of the indicator is the same; the only difference is that we do not examine the partner's contribution to the overall trade balance[14], but to the bilateral trade balance: thus, by construction, the sum over all strengths and weaknesses is zero for each partner. As an illustration, Figure 7 shows the results in

[14] This was done in Freudenberg (1998).

EU-12 trade with three important partners: the United States, China, and Central and Eastern European countries.

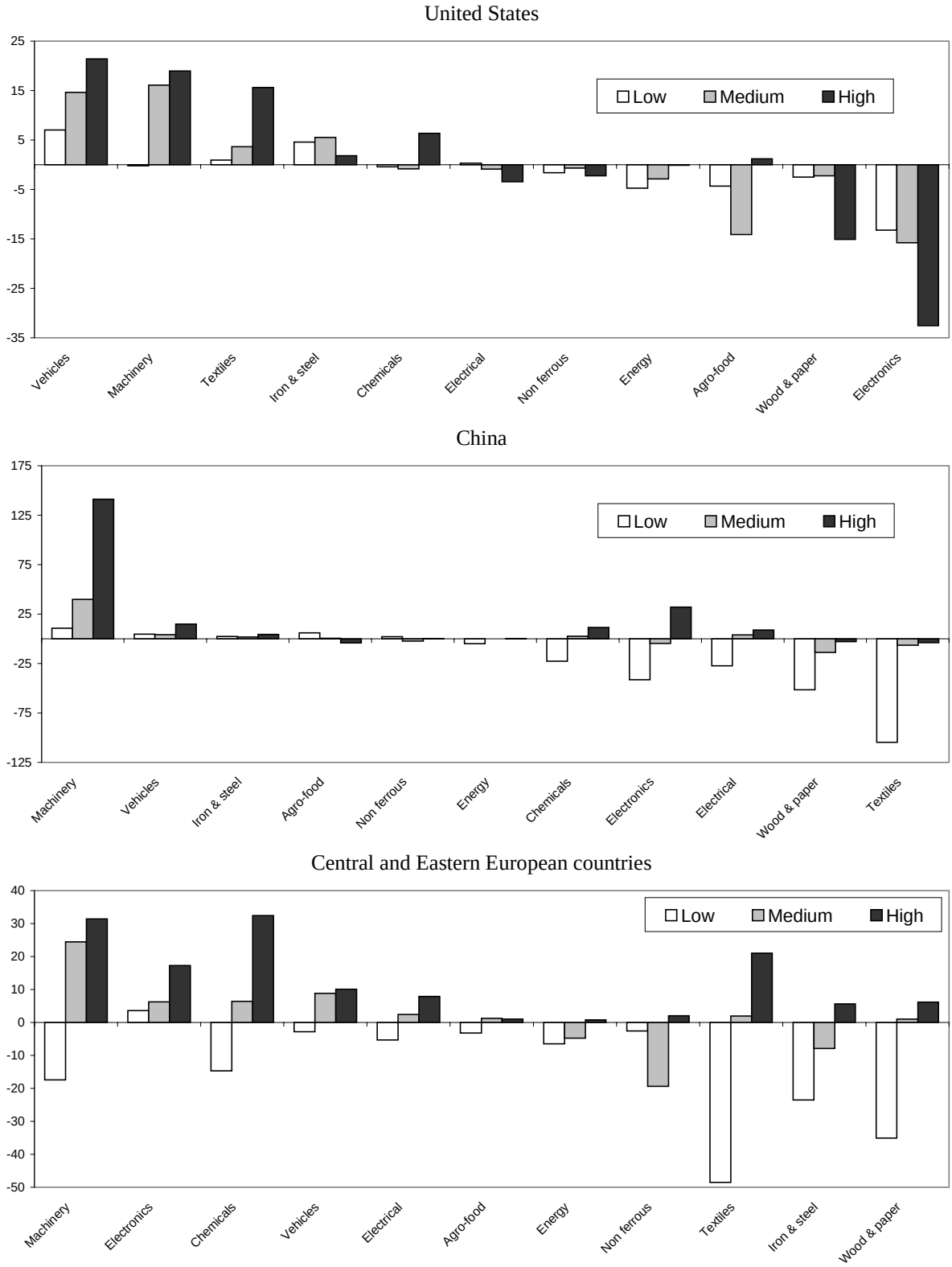
EU's structural surplus in trade with the *United States* concerns mostly up-market goods (vehicles, machinery, textiles, and to a lesser extent chemicals), followed by medium-market goods (vehicles and machinery). Europe's weakness concerns also up-market goods (electronics and wood and paper), followed by medium-market goods (electronics and agro-food). In short, trade between EU and the United States concerns mostly an exchange of up-market and medium-market goods: European vehicles and machinery against American electronics.

EU's trade with *China*, which is almost exclusively of a one-way nature, shows a substantially different pattern once price-quality ranges are taken into account. The EU is advantaged in up-market machinery and disadvantaged in down-market goods (textiles, wood and paper, electronics, chemicals and electrical goods). In the latter three industries, we can again observe a "qualitative division of labour", where the EU keeps a (small) advantage in up-market goods.

Yet another trade pattern can be observed in trade with *Central and Eastern European countries* (for which the calculations were done country by country and just the overall result is presented). Two-way trade is already quite important, especially for central European countries such as the Czech Republic. In many cases, a structural surplus in one quality segment coexists with a deficit in another quality segment, within a same industry. While the EU is advantaged in up-market goods not only in their structural surplus industries (machinery, electronics, chemicals and vehicles), they are also advantaged in up-market goods in structural deficit industries such as textiles, iron and steel and wood and paper. Likewise, the EU is disadvantaged in down-market goods even in its leading industries.[15]

[15] For a more detailed discussion, including the potential impact of EU-enlargement, see Freudenberg and Lemoine (1999).

Figure 7: EU-12's strengths and weaknesses by price-quality range in bilateral trade, 1995



In thousandths of total bilateral trade. Industries are ranked in decreasing order of their total contribution to the bilateral trade balance.
Source: Eurostat - Comext and CEPII-CHELEM, authors' calculations.

Conclusion

The analysis presented here shows that European integration has proceeded in a manner that is both original and quite unexpected. The first years of the functioning of the Single market have neither "validated" the optimistic scenario of the Commission, where integration should translate into IIT in horizontal differentiation (gains in variety, limited adjustment costs), nor the more pessimistic scenario of inter-industrial specialisation due to agglomeration economies. In the latter case, integration would have translated into stronger asymmetries among member states.

Accordingly, the *ex post* appraisal of the completion of the internal market underscores the following (CEPII, 1997, Fontagné, Freudenberg and Péridy, 1998).

- As expected in *ex ante* studies, one-way trade has strongly declined in Europe. Hence, this evidence does not support a possible scenario of concentration of industries in a limited number of countries. Contrasting with the conclusions of ex ante studies, the share of intra-industry trade of varieties has remained remarkably stable over time, whereas the share of intra-industry trade of qualities has increased rapidly, and is now the most important trade type in intra-European trade. The corresponding rise in IIT is most pronounced for Spain and Portugal who seem to have successfully integrated in intra-EU trade, away from a residual specialisation on activities abandoned by more advanced countries;
- However, contrasting with *ex ante* studies, the progression of IIT is not based on horizontal, but on vertical product differentiation.

In total, gains in trade are not only due to a larger choice of varieties, but also due to a larger choice among different qualities. A new form of specialisation, more difficult to assess empirically but with important consequences, is taking place. There is increased specialisation, but within industries: the quality of goods and the positioning on the quality ladder are now playing a crucial role. R&D efforts, technological progress or the qualification of the labour force are determinants of this qualitative division of labour.

However, it is not neutral for countries to be specialised on up-market or on down-market goods. Quality matters, and there seems to be a "qualitatively division of labour" in Europe. This suggests a *qualitatively division of labour within the EU*. Adjustments are taking place within industries along the quality spectrum, rather than between industries.

There is evidence that countries are globally specialised differently along the quality spectrum, roughly corresponding to a dividing line between the "North" (up-market goods) and the "South" of Europe (medium- and down-market goods). At the industry level, a structural surplus in one quality segment often coexists with a deficit in another quality segment within a same industry.

In total, the deep integration of European economies has not implied, so far, increased inter-industry specialisation. However, the possibility that reduced transaction costs lead to agglomeration economies should not be excluded. Accordingly, inter-industry trade would increase, in the same manner as in the United States, where states and regions exhibit a high degree of industrial specialisation (Krugman, 1993).

This is important with respect to the *monetary union* in Europe: if the single market pushes towards intra-industry trade, "one market" is complementary to "one money", as structural asymmetries between member states are reduced. In contrast, if it pushes towards an inter-industry specialisation, asymmetries between countries may increase, and sectoral shocks may have different macro-economic consequences for individual member states: in that case, the coexistence of the single market and a single currency might lead to tensions in Europe.

As far as a macro-economic perspective is used, structural asymmetries among EU countries are large enough to authorise identifying core and peripheral countries (Bayoumi et Eichengreen, 1993). The corresponding debate of a "Two-Speed Europe" has reached a turnpike with the sequence of arguments related to the endogeneity of asymmetries. Boone (1997) identifies that structural asymmetries are not so structural: they rapidly decrease over time. Frankel and Rose (1998) argue that fostering integration in

Europe will lead to more symmetrical shocks, along the increasing diversification of economies and the rise in IIT.

This replicates the informal argument lagging behind Euro-optimism of the Commission, as illustrated by the so-called "Mechanism 13" of the Emerson Report (1990): the general idea was that the combination of Single Market effects and Monetary Union effects would lead to a reduction of asymmetries between individual member countries. Comparative advantages losing their significance as a determinant of trade patterns, sector-specific shocks would thus affect a large number of member countries in the same way. It deserves further comment stressing that Kenen (1969) highlighted in a seminal contribution that diversified economies, having a large share of *intra*-industry trade (IIT) in their total trade, will experience more symmetric shocks.

To what extent is such prediction robust to the disentangling of IIT by type of product differentiation is the issue tackled by Fontagné and Freudenberg (1999). They show, in contradiction to what is generally assumed on the basis of the reduction in transaction costs only, that the European Monetary Union is likely to foster intra-industry trade in Europe, leading to more symmetric shocks between member states. The monetary union will endogenously create the conditions of its success since inter-industry trade and the corresponding specialisation will shrink to the benefits of both types of IIT.

Another question concerns EU-enlargement. IIT is increasingly becoming important in trade with Central (less so with Eastern) European countries, but which remain globally disadvantaged in up-market goods in their trade with EU countries, and advantaged in down-and medium-market goods. However, some Central European countries have revealed comparative advantages in up-market goods in some of their leading industries. At this stage, the evidence does not support the scenario of the integration to EU of a first wave of countries based on a "residual" specialisation on down-market products.

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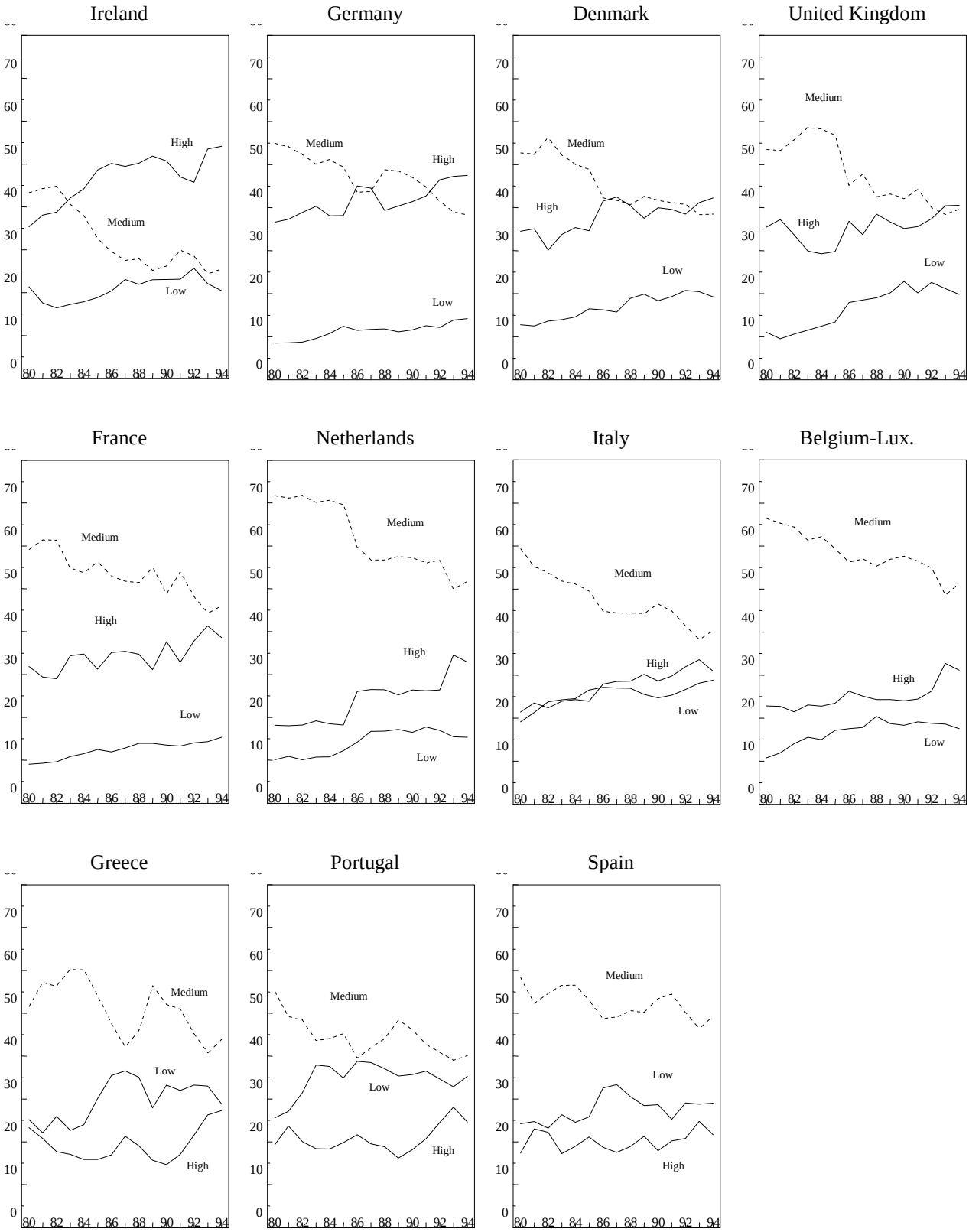
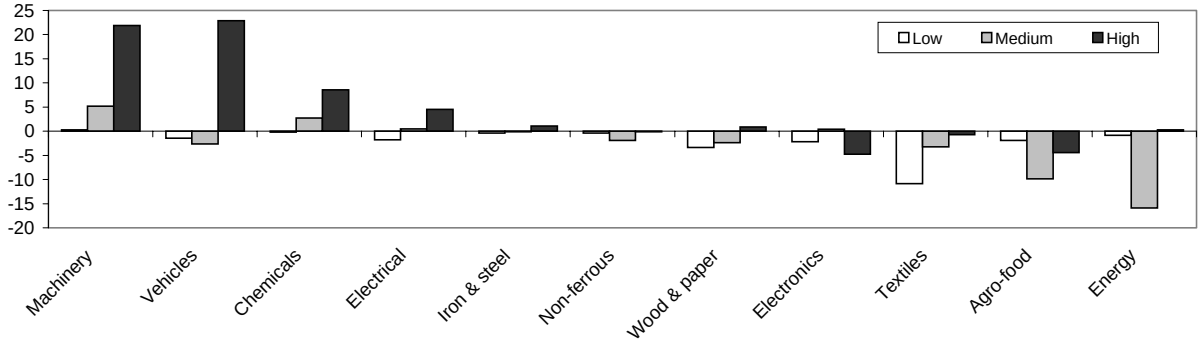
Appendix 1: Export structure by price-quality ranges in intra-EU-12 trade, 1980-1994



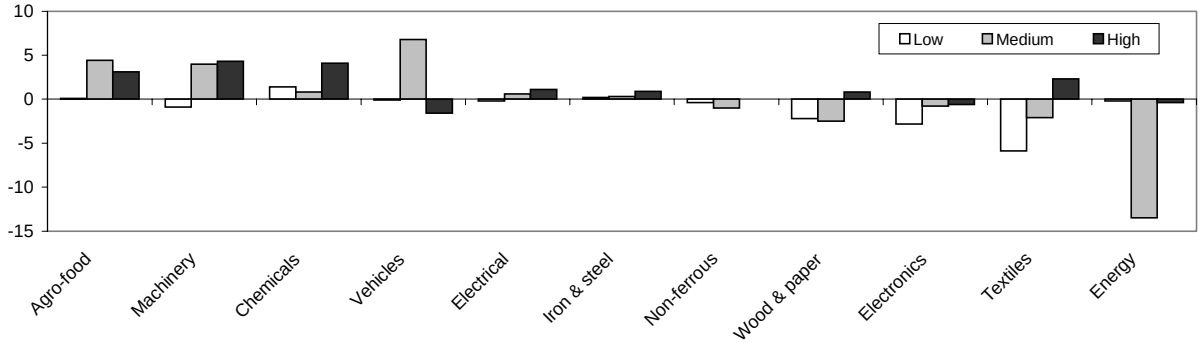
Source: Fontagné, Freudenberg and Péridy (1997), based on Eurostat - Comext data.

Appendix 2: Contribution to the trade balance by price-quality range for major countries, 1996

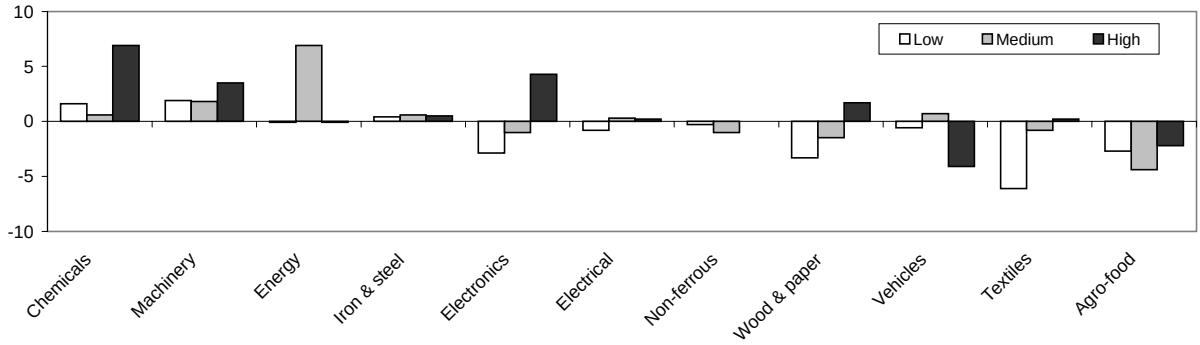
Germany



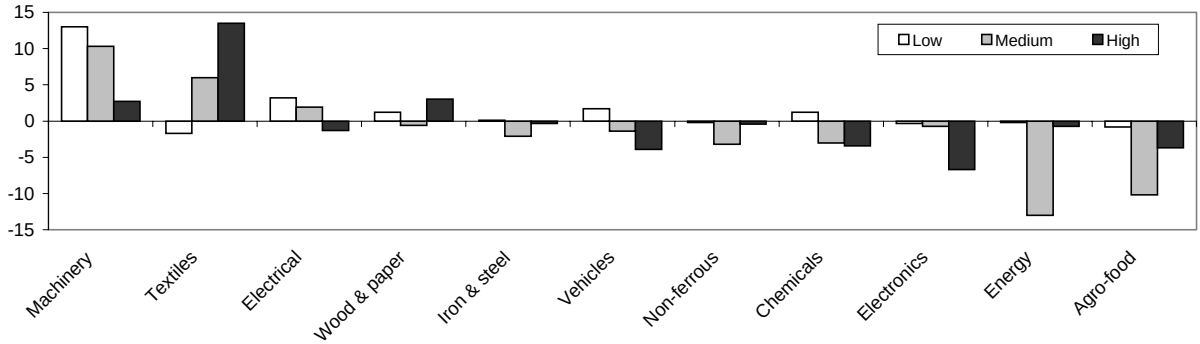
France



United Kingdom



Italy



In thousandths of current GDP-PPP for each country. For each country, industries are ranked in decreasing order of their total contribution to the trade balance.
Source: Eurostat - Comext and CEPII-CHELEM, authors' calculations.

Appendix 3: EU-15's structural strengths and weaknesses by price-quality range, 1996

Structural strengths	Low	Med.	High	Total
Machinery	**1,8**	**3,7**	**7,0**	**12,5**
Specialised machines	1,1	1,2	2,1	4,4
Engines, turbines etc.	0,6	0,5	1,2	2,3
Miscellaneous hardware	-0,2	0,5	1,2	1,4
Construction equip.	0,2	0,4	0,7	1,3
Machine tools	0,2	0,2	0,5	0,9
Aeronautics	-0,3	0,5	0,6	0,9
Ships	0,2	0,2	0,2	0,6
Large metallic structures	0,0	0,1	0,3	0,4
Agricultural equipment	0,1	0,2	0,1	0,4
Arms and weaponry	0,0	0,0	0,0	0,0
Chemicals	**0,7**	**1,0**	**3,7**	**5,4**
Toilet pr., perfumes	0,3	0,3	0,8	1,3
Pharmaceuticals	0,5	0,2	0,6	1,3
Plastic articles	-0,1	0,4	0,5	0,9
Paints & intermed. chem.	0,1	0,2	0,3	0,7
Ceramics	0,1	0,2	0,4	0,6
Basic organic chemicals	0,0	0,0	0,4	0,5
Cement and derived pr.	0,1	0,0	0,1	0,3
Glass	0,0	0,0	0,2	0,3
Fertilisers	0,0	-0,1	0,1	0,1
Rubber articles	-0,1	0,0	0,1	0,1
Plastics & synth. resins	0,0	0,0	0,0	-0,1
Basic inorg. chemicals	-0,2	-0,1	0,0	-0,2
Unprocessed minerals	-0,1	-0,1	-0,1	-0,2
Vehicles	**0,0**	**0,7**	**4,1**	**4,9**
Cars (incl. motorcycles)	-0,4	0,2	3,1	3,0
Commercial vehicles	0,2	0,3	0,5	1,1
Vehicle components	0,1	0,2	0,6	0,9
Iron and steel	**0,2**	**0,3**	**0,5**	**1,0**
Iron and steel-making	0,2	0,4	0,3	0,9
Tubes & first-stage proc.	0,0	0,2	0,3	0,5
Iron ores and scrap	0,0	-0,3	-0,1	-0,4
Electrical	**-0,2**	**0,4**	**0,8**	**1,0**
Domestic el. appliances	-0,1	0,1	0,3	0,4
Electrical apparatus	-0,1	0,2	0,3	0,3
Heavy el. equipment	-0,1	0,1	0,2	0,3

Structural weaknesses	Low	Med.	High	Total
Energy	**-1,1**	**-9,6**	**-0,3**	**-11,0**
Crude oil	-0,3	-8,3	-0,2	-8,8
Coal	-0,5	-0,2	-0,2	-0,9
Natural gas	-0,1	-0,7	0,0	-0,9
Refined petr. pr.	-0,1	-0,2	0,0	-0,3
Coke	-0,1	0,0	0,0	-0,1
Electronics	**-2,3**	**-1,1**	**-1,6**	**-4,9**
Computer equipment	-1,5	-0,9	-1,2	-3,6
Electronic components	-0,4	-0,2	-0,4	-1,0
Consumer electronics	-0,2	-0,2	-0,4	-0,9
Watch & clockmaking	-0,1	0,0	-0,2	-0,3
Optics	-0,2	0,0	-0,1	-0,3
Precision instruments	0,0	0,1	0,4	0,4
Telecomm. equip.	0,2	0,2	0,3	0,7
Food and agriculture	**-1,0**	**-3,0**	**0,4**	**-3,5**
Other edible agric. pr.	-0,7	-2,3	-0,4	-3,4
Non-edible agr. pr.	-0,6	-0,3	-0,4	-1,4
Animal foodstuffs	-0,1	-0,6	0,0	-0,7
Meat and fish	-0,1	-0,5	-0,1	-0,7
Preserved meat and fish	-0,1	-0,1	-0,1	-0,3
Cereals	0,1	0,1	0,0	0,1
Manufactured tobaccos	0,1	0,0	0,0	0,1
Sugar pr.	0,1	0,0	0,1	0,2
Preserved fruit & veget.	0,0	0,1	0,2	0,3
Cereal pr.	0,1	0,3	0,1	0,5
Fats	0,1	0,2	0,2	0,6
Beverages	0,1	0,2	0,8	1,0
Textiles	**-5,6**	**0,1**	**2,3**	**-3,1**
Clothing	-2,4	-0,1	0,6	-1,9
Knitwear	-1,4	-0,2	0,1	-1,5
Leather & footwear	-1,1	0,1	0,6	-0,3
Carpets & textile furnish.	-0,3	0,0	0,0	-0,3
Yarns and fabrics	-0,4	0,3	0,9	0,9
Non ferrous	**-0,4**	**-1,3**	**-0,3**	**-2,0**
Non-fer. metals	-0,1	-1,1	0,1	-1,1
Non-fer. ores and scrap	-0,2	-0,2	-0,4	-0,9
Wood and paper	**-1,2**	**0,3**	**0,8**	**-0,1**
Misc. manuf. articles	-0,8	0,2	-0,5	-1,1
Articles in wood	-0,4	0,0	0,1	-0,3
Furniture	-0,3	0,1	0,4	0,2
Printing and publications	0,1	0,0	0,3	0,4
Paper and pulp	0,2	0,0	0,4	0,6

Source: Eurostat - Comext and CEPII-CHELEM, authors' calculations.

Appendix 4: Trade types in trade with EU-12 countries, 1996

In % of total, bilateral trade with EU-12 countries

Highest share of *two*-way trade				Highest share of *one*-way trade			
	Hor. *two*-way trade	*Vert.* *two*-way trade	*One*-way trade		*Hor.* *two*-way trade	*Vert.* *two*-way trade	*One*-way trade
France	21.8	47.9	30.3	Algeria	0.6	1.1	98.4
Belgium-Lux.	24.6	43.0	32.4	Indochina*	1.2	0.9	97.9
Germany	19.7	47.5	32.9	OPEC America*	1.2	2.3	96.6
United Kingdom	17.4	48.3	34.4	Indonesia	0.9	3.1	96.1
Netherlands	19.7	41.8	38.5	Egypt	1.0	3.1	95.9
Spain	18.5	37.1	44.4	**Estonia**	0.8	3.5	95.7
Switzerland	10.9	44.7	44.5	Non-OPEC Mid-East*	1.4	3.2	95.4
United States	11.0	43.0	46.0	**Latvia**	0.9	4.0	95.1
Italy	14.9	38.6	46.5	Non-OPEC Africa*	1.9	3.9	94.2
Austria	13.3	38.6	48.1	**Lithuania**	1.1	5.9	92.9
Czech Republic	9.6	38.1	52.3	Gulf countries*	1.6	5.5	92.8
Ireland	8.5	33.1	58.4	Philippines	0.9	6.3	92.8
Sweden	7.5	32.0	60.5	Rest Ex-Yugoslavia*	1.3	6.5	92.3
Denmark	8.0	30.5	61.5	Rest Ex-USSR*	3.0	5.0	92.0
Hungary	6.4	30.9	62.7	EFTA nec.*	1.4	6.7	91.9
Portugal	11.1	24.8	64.1	Morocco	3.4	5.4	91.2
Israel	21.2	13.0	65.8	China	0.8	8.2	91.1
Japan	4.7	27.8	67.5	Brazil	1.5	7.8	90.7
Slovenia	4.8	27.3	67.9	India	1.3	8.2	90.5
EU-12 – CEEC-10	5.0	24.8	70.2	South Africa	4.7	6.2	89.1
Singapore	4.0	23.6	72.4	*Greece*	2.8	9.6	87.6
Slovakia	5.7	19.7	74.6	America nec.*	7.6	5.0	87.4
Canada	3.6	21.5	75.0	Medit.Orient. nec.*	4.7	8.4	86.9
Poland	2.7	20.6	76.6	Australia & N.Zealand*	2.2	11.3	86.5
Finland	3.4	18.3	78.3	Thailand	5.8	7.8	86.4
Albania	3.7	16.6	79.7	**Bulgaria**	2.6	11.2	86.3
Tunisia	4.1	15.2	80.6	Mexico	2.4	12.0	85.7
Hong Kong	4.7	13.9	81.5	Malaysia	2.7	12.3	85.1
Croatia	3.7	13.6	82.6	**Romania**	1.7	13.3	85.0
Turkey	6.1	10.2	83.7	OPEC Africa*	14.5	0.6	84.9
Asia nec.*	4.0	12.2	83.8	South Korea	2.1	13.1	84.7
Norway	4.6	11.3	84.1	Taiwan	2.0	13.6	84.5

nec.: Not elsewhere classified.

* : Two-way trade may be overestimated for these groups of countries due to the geographical aggregation bias.

The countries are ranked by increasing (left columns) and decreasing (right columns) importance of one-way trade in 1996.

Source: Eurostat-Comext, authors' calculations.