VERTICAL SPECIALIZATION IN EUROPE: EVIDENCE FROM THE IMPORT CONTENT OF EXPORTS

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1. Introduction

One of the consequences of the integration of global market is the international fragmentation of production, i.e. the localization abroad of phases of production which previously took place inside the firm.[1]

The literature on international trade considers the different cost of production factors among countries as one of the main reasons for this phenomenon. Vertical fragmentation of production, that takes place through two main ways – foreign direct investments or acquisition of the intermediate products abroad – is an organisational solution aimed at reducing costs and increasing productivity on international markets (Antràs and Helpman, 2003; Helpman, 2006). An important role in this process has been played by the progress in the field of information and communication technologies, that made it possible to reduce coordination costs emerging when production is divided into separate stages (Jones and Kierzkowski, 2001).

Over recent decades the world trade has grown faster than world GDP and manufacturing value added; intra-industry trade in final and intermediate goods accounts for a large part of trade growth, signalling the rising importance of the international fragmentation of production. Many empirical works, although non homogeneous in terms of definitions, measures adopted and kind of data utilized, find evidence of a growing importance of vertical integration in the main industrialized countries. Feenstra and Hanson (1996), by using input-output tables, estimate that in the United States the share of imported inputs on the total purchase of intermediate products grew from 5.5 per cent in 1972 to 11.6 in 1990. Hummels *et al.* (1998, 2001) find evidence of an increasing share of imported goods and services content in exports for some OECD countries during the 1980's. European Central Bank (2005a) estimates an increase of the import content of exports from 1995 to 2000 in the main economies of the euro area. For Italy, Breda *et al.* (2006) find an increase of the import content of exports between 1995 and 2000, while

[1] Many different terms have been used in the literature for this phenomenon: international fragmentation of production (Jones and Kierzkowski, 2001), vertical specialization (Hummels et al., 2001; Goh and Olivier, 2004), delocalization (Leamer, 1998), vertical production networks (Hanson *et. al.*, 2005), production sharing (Feenstra, 1998). We will use them interchangeably.

ISAE (2005), using the previous release of Italy's input-output tables, finds evidence of a reduction of the import content between 1990 and 2000. Other empirical works have focused instead on the effects of internationalization of production on the labour market (Feenstra and Hanson, 1996 and 1999; Amiti and Wei, 2004; Hijzen *et al.*, 2004) or on output and value added volatility (Bergin *et al.*, 2006).

This paper aims at comparing the value of imported goods and services embodied in Italian exports by sector, as obtained in Breda *et al.* (2006), with the same indicators for a set of European countries. These measures can be interpreted as synthetic indicators of the degree of internationalization of production, including imports of intermediate inputs from both foreign affiliates and foreign suppliers (i.e. the "direct import content"), as well as imports that are already incorporated in capital and intermediate inputs acquired from domestic suppliers (i.e. the "indirect import content"). The import content of exports is estimated from the information on production processes provided by the intersectoral tables (input-output tables) at current prices published, for Italy, by the National Statistical Institute (Istat) for years 1995 and 2000 (see Istat, 2006) and collected and published, for the other EU countries, by Eurostat.

The paper is organized as follows. In the next section the measure of the import content of exports is defined and the methodology for its estimate is introduced. Results for some European countries are presented and compared, with a focus on those for Germany and Italy, in section 3. An analysis by sector is presented in section 4. Finally, section 5 resumes the main results.

2. The import content of export: concepts and measures

There are two main ways chosen by firms to internationalize their production process: foreign direct investments and outsourcing, i.e. purchase of intermediate inputs from foreign firms[2]. The measure of *vertical specialization* we use, as in Hummels *et al.* (2001), keeps into account all imports of goods and services that are embodied in a

[2] Piscitello and Tajoli (2005) show that for Italy there exists a positive relationship between different kinds of internationalization in a certain sector on a certain market; they are not substitutes and they tend to mutually strengthen.

country's exports, irrespective of the relationship the domestic firm has established with the foreign supplier.

As an indicator of vertical specialization we choose the import content (*IC*) of exports, calculated on the basis of the input-output tables[3]. Using these tables helps avoiding an arbitrary classification between intermediate inputs and other categories of goods: in fact, the tables consent to disentangle the output of each sector into two parts, the first as an input to the other sectors, the second as a final good. Obviously, they do not account for the international outsourcing to foreign subsidiaries of the whole production and distribution processes (*export platform*), as this case neither implies flows of goods and services across home country borders nor a change in the import content of exports.

As in Hummels *et al.* (2001), in order to calculate the value of imports directly contained in the exports we resort to the following formula, here reported using matrix notation:

$$direct\ IC\ of\ exports = \ IC_dir = u\,{}_M A \cdot EXP$$

where u is a unit vector of dimension n, ${}_M A$ is an n-dimensional square matrix containing the production coefficients for imported inputs, EXP is the n-vector of exports, where n indicates the number of sectors. Each element a_{iJ}^{M} of the matrix ${}_M A$ measures the value of imported intermediate goods and services classified in the branch i and used to produce one unit of output in sector j (see Guarini and Tassinari, 1993).

Using the input-output tables enables us to calculate also the value of inputs which are *indirectly* used in the production of an exported good. In fact, an imported input can be used in a sector, whose output is in turn employed in another sector, then possibly in a third sector and so on, up to being finally included in a good sold abroad. In this case the measure of the import content of exports includes both directly and indirectly imported inputs, the latter defined as those contained in the domestic inputs. The measure for the whole import content is the following:

[3] For each product in the economy the tables indicate the intermediate inputs involved in its production (classified according to their origin, either foreign or domestic), the imports of the product itself as well as the uses of the product to satisfy the different components of the final demand (private and public consumption, investment, exports).

$$IC\ of\ exports = \quad IC = u_M A(I - {}_D A)^{-1} EXP$$

where ${}_D A$ is the matrix of the input coefficients for domestic intermediate goods and $(I - {}_D A)^{-1}$ is the term capturing imported inputs embodied in the domestic output in the first, second, third, etc. stages of production before being used to produce the good that will be eventually exported.

3.Vertical specialization in Europe

Data sources

The analysis on vertical specialisation is conducted by using the symmetrical input-output tables, which are compiled approximately every five years by the National Statistic agencies and collected by Eurostat. For Italy the tables used are those recently released by Istat and compiled according to a new methodology which guarantees more consistency between intersectoral transactions and national accounts statistics.

The symmetrical tables distinguish between intermediate purchases from domestic suppliers (the so called ‘domestic matrix’) and imported intermediate purchases (the ‘import matrix’). The latest available for a representative set of countries are at current prices and referred to years 1995 and 2000. Tables at current prices do not allow telling apart the effects due to a variation in the technical coefficients for domestic and imported inputs from the effects due to a change in the relative prices. We have chosen, however, not to deflate the aggregates derived from the tables since detailed and reliable data on export and import prices are not available for all countries. For more recent years, Germany and the Netherlands have released the complete set of symmetric input-output tables - which is necessary to distinguish between domestically produced and imported inputs - for 2001 and 2002, while the other countries have released the set of asymmetrical tables only: Italy for the 2001-03 period, Belgium for 2001-02 and France for 2001.

We provide a measure of the import content of exports for 7 European countries: six Monetary Union countries (Belgium, France, Germany, Italy, the Netherlands and Spain) and the United Kingdom. This set of countries currently accounts for about 82 per cent of the European Union (25 countries) GDP and 76 per cent of EU trade in goods and services

(86 and 82 per cent, respectively, of EU-15 GDP and trade). The input-output tables provide a sectoral breakdown into 59 sectors (according to the CPA classification), of which 22 are manufactured goods[4]. The development of the phenomenon of vertical specialisation in the course of the second half of the 1990's will be measured only for a subset of countries (Belgium, France, Germany, Italy and the Netherlands) due to the unavailability of input-output tables for Spain and the UK in 2000.

The international comparison

Table 1 reports three different indicators for the import content of exports. The first measures the overall (direct and indirect) import content of exports of goods and services produced in the country, the second regards manufactured goods alone. The third is a broader measure of internationalization, including the 'transit trade', i.e. goods that are imported in the declaring country and thereafter directly re-exported without any transformation.

The overall IC of exports emerges as quite heterogeneous across countries. In 1995 it ranged between 21 and 42 per cent, with lower end values characterizing larger countries (France, Germany) and upper end smaller countries (the Netherlands and Belgium). Five years later the ranking remains broadly the same, though nothing can be said about Spain and the UK. The IC grew between 1995 and 2000 in all countries considered but France; Germany experienced the strongest growth of the import content in relative terms, probably also because in 1995 the country stood at a very low level. In 2000 in Italy and Germany the IC of exports was equal to about 27-28 per cent, while in Belgium and the Netherlands the phenomenon was much more pronounced (47 and 37 per cent, respectively). Aggregating across the five countries of the Monetary Union for which data for both 1995 and 2000 are available (Belgium, France, Germany, Italy and the Netherlands) by using the export-weighted average of each country's indicator, we

[4] The international comparison is obviously more reliable if input-output tables with the same sectoral disaggregation are available. However, since for France no homogeneous tables are published for the two considered years, we used input-output tables from different sources. The 1995 table provides data broken down into 40 industries from the ISIC Rev 3 classification whereas the 2000 table is broken down into 59 products from the CPA classification. Although the mismatch between the two classifications does not allow making sectoral comparisons between the two periods, we still consider meaningful to compare the aggregate results for France in the two years.

observe an increase of the import content of domestically produced exports in the countries of the group from 25 to 29 per cent, which mostly reflects the upward trend in vertical specialization recorded in Germany.[5] By using the 1995 country export weights for 2000, the IC in this final year would be 29.1.

A huge growth of vertical specialization in Germany is confirmed by other indicators. For example, the share of "own" (i.e. domestically produced) value added in German manufacturing sector sharply declined in the second half of the 1990's, at a rate higher than the one experienced by the other EU countries.[6] Sinn (2004, 2006) argues that Germany's high wages and rigid labour market stimulated a wave of international relocation of production (especially in the automotive sector and towards the neighbouring Eastern European countries that later joined EU in 2005)[7], leaving in Germany almost only the final stages of production, which are usually more capital and skill intensive. This is the so called "bazaar effect": to extremely simplify, German firms export basic components and raw materials to their foreign affiliates in lower-wage countries, assemble (almost) entirely their products abroad and re-import them for implementing the final stages of production, "putting the brand" and selling the final goods in domestic and foreign markets. This phenomenon generates a surge in international trade flows and, thanks to the cost competitiveness gains, may trigger a positive performance of exports market shares and current account balance; however, because of the lower domestically generated value added, this does not necessarily stimulate GDP growth.[8]

In the same period (1995-2000), on the contrary, the internationalization of the production of Italian firms was probably only at its beginning: the lira's 1992 devaluation and 1995 depreciation had temporarily boosted the price competitiveness of Italian goods, making the re-organization of production processes plausibly less urgent. Between the end of the last decade and the beginning of the current one, many factors made the re-

[5] Countries are aggregated without netting the intra-trade.

[6] See Sinn (2006, fig. 3).

[7] See "The impact of FDI in import structure" in Bundesbank (2006, pp. 54-55).

[8] See also Danninger and Joutz (2007). For critical or different views about the "bazaar economy" argument, see Bechert and Cellarius (2004), Zimmermann (2005) and Belke *et al.* (2007).

organization of production for Italian manufacturing firms much more compelling.[9] Among them, the waning effects of devaluations on price competitiveness and the adoption of euro that, once for all, eliminated the exchange rate fluctuations for almost half of Italian external trade, the aggressive entry into world markets of low labour cost developing countries, such as China and India. All this increased the competitive pressure on Italian ”traditional” products (textiles and clothing, leather and footwear, furniture etc.) above all. Further competitiveness losses were caused by the appreciation of the euro during 2001-04 and decreasing labour productivity. Then it became clear that the model of the industrial districts, successfully implemented especially during the 1990’s and quite diffuse in that kind of productions, had to be rethought in face of the increasing globalisation.[10] The lag Italy showed in the process of internationalization could be arguably put in connection also with structural factors, such as the predominance of small and medium enterprises and the lower diffusion of ICT with respect to the main European countries (OECD, 2004).

This stylized picture for the period 1995-2000 - i.e. Italy started from a relatively low level of internationalization of production and the phenomenon grew less than in the other EU countries, while Germany started from a relatively low level too but experienced an above average pace of growth - is confirmed, at least for the part of international outsourcing implemented via direct investment activity, by the ratio between outward FDI stock and GDP: in Italy this indicator rose only from 9.0 per cent in 1995 to 16.4 per cent in 2000, widening its negative gap with all other countries analysed, while in Germany it started from the third lowest level (10.8 per cent) and almost tripled (up to 29.0 per cent). Spain’s FDI stock to GDP ratio, probably due also to catching-up effects, experienced the most exceptional growth (from 5.9 to 29.6 per cent). In the other EU countries analysed the same indicator started from higher levels and more than doubled: in France it grew from 13.5 to 34.0 per cent, in the United Kingdom from 26.5 to 62.4 per cent, in Belgium

[9] Piscitello and Tajoli (2005) find some evidence of a process of internationalization of production for Italian firms in more recent years.

[10] Some districts, e.g. North East textile and shoe manufacturers, have switched from a “traditional district model” (headquarters and manufacturing facilities in the same geographic area) to a “new value chain model” (headquarters in Italy, manufacturing facilities in countries with lower labour costs; see OECD, 2004). For some case studies, see Amighini and Rabelotti (2003) and Bentivogli and Scintillani (2004).

(including Luxembourg) from 27.8 to 72.5 per cent and in the Netherlands from 41.1 to 82.4 per cent.[11]

The import content of exports including transit trade

By considering a broader measure of internationalisation, the one including 'transit trade', the IC of exports for the five countries reaches 42.3 per cent in 2000, while it was 33.9 in 1995. The figure for year 2000 compares with that estimated by the European Central Bank (2005a) for a slightly different subset of countries (44.2 per cent).[12]

The measure of import content including transit trade shows an even higher variability across countries than the one excluding it. Transit trade is negligible for Italy and Spain, while it is very relevant for the Netherlands and Belgium, due also to their geographical position and size. The developments for the manufacturing sector alone are quite similar to those referred to total exports.

The import content of exports excluding energy

Finally, since we use input-output tables at current prices and in the period 1995-2000 the oil price rose by more than 110 per cent, our results are, at least partly, likely to be affected by the nominal growth of energy imports that "mechanically" inflated the IC. According to Eurostat trade statistics, between 1995 and 2000 the share of energy products on total imports grew by more than two percentage points in all EU countries of the group: from 7.3 to 9.7 per cent in Italy, from 6.2 to 8.8 per cent in Germany, from 5.9 to 8.9 per cent in Belgium, from 8.3 to 10.6 per cent in the Netherlands and from 6.3 to 8.9 per cent in France. So, in order to get rid of the oil price effect, we calculate the IC of exports excluding energy minerals from imports and also excluding completely the energy input both in its domestic and imported components.

If we exclude energy products or sectors, the IC growth in all the four comparable countries (Italy, Germany, Belgium and the Netherlands) is still confirmed but, to a varying extent, less pronounced. For Belgium and, in particular, Germany the level and

[11] See UNCTAD (2005); for Italy, own calculations on Banca d'Italia – UIC and Istat data.

[12] Countries considered are Austria, Finland, Germany, Italy, the Netherlands. Also in the ECB's exercise countries are aggregated without netting the intra-trade.

variation of the IC are only slightly reduced by the exclusion of energy. For Italy and, above all, the Netherlands both the absolute levels and the 1995-2000 growth become significantly lower. Net of imported energy inputs, the IC of Italy's total exports grew from 23.6 to 25.4 per cent (i.e. by 7.9 per cent; see tab. 2, first column), in the Netherlands from 30.4 to 31.2 (i.e. by 2.7 per cent), while including energy minerals, the IC of total exports of the two countries grew, respectively, by 11.6 and 10.5 per cent (see tab. 1, second column).

4. Analysis by sector

A growing propensity in the use of imported goods and services to produce goods addressed to satisfy the external demand between 1995 and 2000 characterizes all manufacturing branches (fig. 1).

In 2000 the extent of internationalization was everywhere particularly high in the transport equipment sector, ranging between 29 and 66 per cent, well above the average for manufacturing (tab. 3). Due to its highly standardized production process, this is a typical sector in which international vertical specialization is exploited.

Also in the chemical sector the degree of international fragmentation of production seems is particularly high in all countries with the exception of France. The IC of exports for low-tech sectors such as "textile products and clothing" and "leather and leather products" is, everywhere but in Germany, in line with the average for manufacturing; for Italy, strongly specialized in these sectors, this seems to corroborate the findings that the process of producing abroad was not so pronounced, at least up to 2000.

In the main service sectors, such as transport and communication and wholesale and retail trade, the IC turns to be quite lower than in manufacturing for all countries.

Considering a sub sample of four countries - Belgium, Italy, Germany and the Netherlands, for which comparable input output tables are available for both years - the variation of the import requirement has been decomposed into two parts according to the standard shift and share analysis. The first part accounts for the change in the intensity of the IC within each sector; the second for the change in the sectoral composition of exports (tab. 4). The increase in the intensity of the import content explains the 94 per cent of the

whole variation for this aggregation of countries; the branches providing the higher contribution to IC growth of exports are “chemical products and man-made fibres”, “transport equipment” and “electrical equipment and precision instruments”. The change in the sectoral composition plays a marginal role (tab. 5).

5. Conclusions

Between 1995 and 2000 the import content of exports grew in all the European countries we can confidently include in the comparison (Italy, Germany, the Netherlands and Belgium); the production of transport equipment emerges as the most internationalized sector. However, the two bigger countries in this group show very different patterns: Italy started in 1995 from the second lowest level of IC and experienced the weakest growth (11.6 per cent, considering total exports); Germany started from the lowest level of IC but experienced by far the most sizable rise (29.6 per cent). Plausibly, at the beginning of the period, Italian firms felt a lower pressure to transform their organization by locating segments of their production process abroad, thanks to the delayed effects on price competitiveness of the 1992 and 1995 lira crises; only in the following years Italian products, especially the “traditional” ones, started suffering from the rising competition from developing countries and the weak growth of world demand. Then it became clear that the model of industrial districts, particularly common in that kind of productions, had to be rethought in the light of the globalisation process. Also other structural issues, such as small firm size and low diffusion of ICT, could contribute to explain why Italy was lagging behind in the process of internationalization. In the second half of the 1990’s, instead, German firms were already experiencing an increasing competition on both domestic and foreign markets (also from Italian products), so they started a rapid process of international outsourcing of manufacturing activities, leaving in the home country basically only the final (and more capital and skill intensive) stages of production and the R&D and marketing activities. Drawing from this evidence, some economists and observers started defining Germany a “bazaar economy”.

Finally, we calculated the import content of exports excluding the energetic inputs, in order to get rid of the effects of the oil shock in year 2000. Even without energy inputs a rise in the import content of exports is still found, albeit less pronounced, for all four

comparable countries. The figures regarding Germany are barely affected by energy exclusion, confirming the relevance of the international outsourcing for that country, while the IC levels and growth become smaller for Italy and, above all, the Netherlands.

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Tab. 1

Import content of exports of the main EU countries

(percentage values)

Country	year	Manufacturing	Total	Total including transit trade
Italy	1995	27.5	24.4	24.7
	2000	30.6	27.2	27.8
Germany	1995	23.9	21.5	29.4
	2000	31.0	27.9	37.9
Netherlands	1995	42.6	33.8	50.0
	2000	48.1	37.3	56.6
Belgium	1995	49.9	41.5	55.2
	2000	54.3	46.6	60.4
France	1995 (1)	22.5	20.5	26.8
	2000	24.5	20.5	41.3
United Kingdom	1995	28.4	23.0	26.1
	2000	-	-	-
Spain	1995	33.5	27.5	27.5
	2000	-	-	-

Source: own calculations on Eurostat and, for Italy, Istat data.

(1) The 1995 results for France are obtained by utilising the OECD input-output tables with a different sectoral classification.

Tab. 2

Import content of exports of the main EU countries excluding energy

(percentage values)

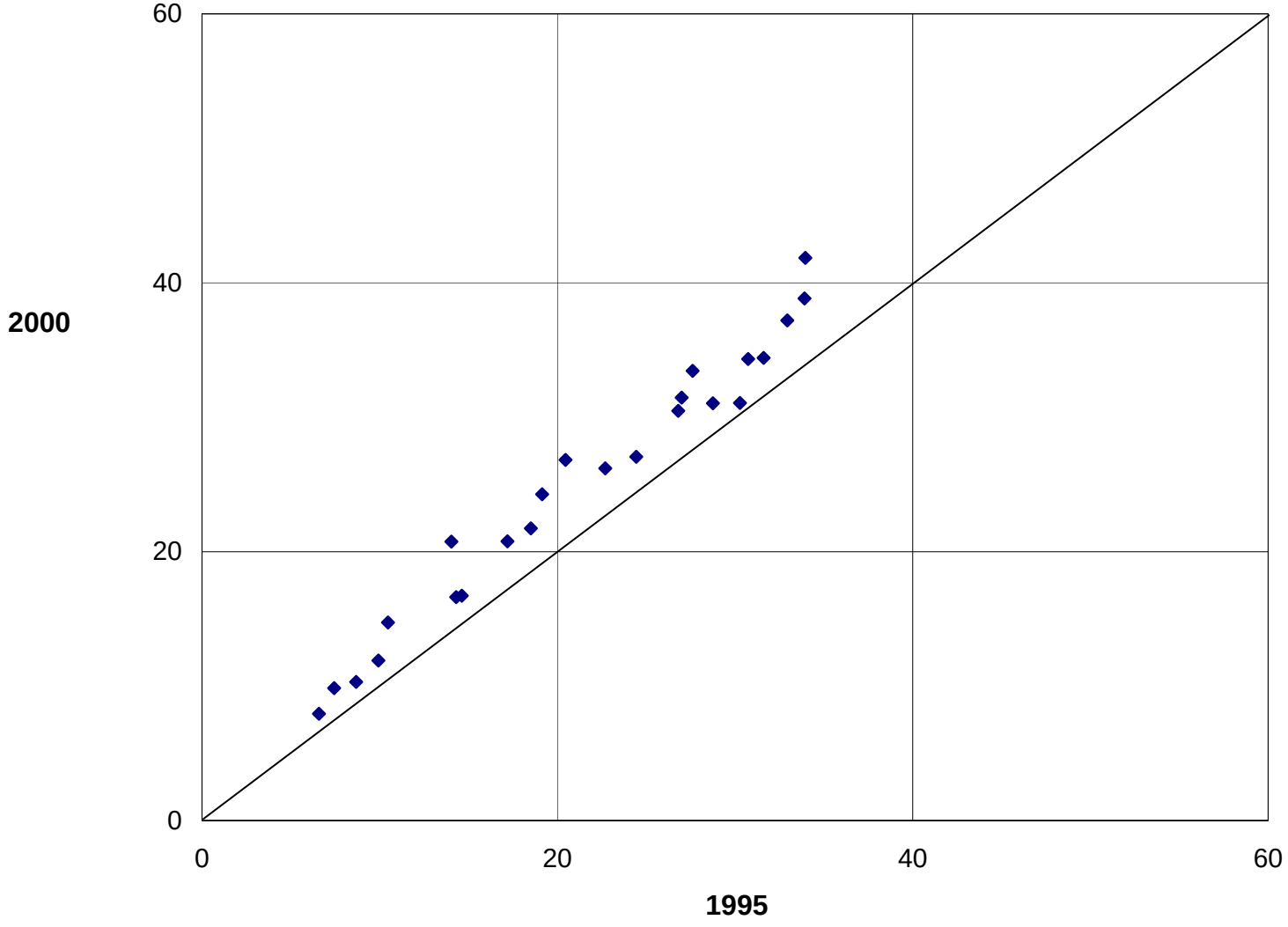
Country	year	Net of imported energy minerals	Net of energy sector
Italy	1995	23.6	22.4
	2000	25.4	24.2
Germany	1995	20.3	19.5
	2000	26.2	24.9
Netherlands	1995	30.4	30.1
	2000	31.2	31.1
Belgium	1995	39.8	37.2
	2000	44.1	40.7
France	1995 (1)	20.2	19.4
	2000	18.3	17.8
United Kingdom	1995	22.5	22.6
	2000	-	-
Spain	1995	25.9	24.7
	2000	-	-

Source: own calculations on Eurostat and, for Italy, Istat data.

(1) The 1995 results for France are obtained by utilising the OECD input-output tables with a different sectorial classification.

Fig. 1

Aggregated import content of exports by sector in Belgium, Germany, Italy and the Netherlands: 1995-2000



Source: own calculations on Eurostat and, for Italy, Istat data.

Tab. 3

Import content of exports by sector in five EMU countries

(as a percentage of exports of each sector)

	Italy		Germany		Netherlands		Belgium		France	
	1995	2000	1995	2000	1995	2000	1995	2000	1995	2000
Products of agriculture, forestry and fishing	7.4	8.3	11.8	15.1	17.7	19.8	25.7	27.2	-	13.2
Energy minerals	10.7	23.2	10.6	16.6	8.4	9.8	-	24.2	-	14.5
Non-energy minerals	13.9	16.4	11.4	16.6	19.5	22.2	25.2	28.8	-	18.1
Manufactures	***27.5***	***30.6***	***23.9***	***31.0***	***42.6***	***48.1***	***49.9***	***54.3***	***22.5***	***24.5***
Food products, beverages and tobacco	*19.1*	*19.8*	*19.2*	*21.0*	*38.0*	*38.9*	*41.7*	*43.5*	-	*15.6*
Textile products and clothing	*24.5*	*28.0*	*30.6*	*36.2*	*50.6*	*48.7*	*47.8*	*51.1*	-	*24.6*
Leather and leather products	*25.7*	*30.2*	*32.4*	*38.3*	*36.7*	*39.0*	*47.0*	*53.3*	-	*21.7*
Wood and wood products	*22.5*	*24.9*	*14.9*	*19.5*	*39.3*	*39.7*	*39.7*	*46.5*	-	*15.6*
Paper and paper products, printing and publishing	*26.7*	*27.9*	*23.8*	*27.0*	*39.5*	*40.1*	*42.4*	*45.7*	-	*21.6*
Refined petroleum products	*49.7*	*69.7*	*72.6*	*81.2*	*74.5*	*80.8*	*63.5*	*83.4*	-	*51.3*
Chemical products and man-made fibres	*38.9*	*42.0*	*23.4*	*34.7*	*42.3*	*51.0*	*49.7*	*52.6*	-	*21.7*
Rubber and plastic products	*32.6*	*34.4*	*24.2*	*29.5*	*45.4*	*44.6*	*45.1*	*47.6*	-	*22.7*
Non-metallic mineral products	*18.0*	*20.1*	*12.0*	*16.6*	*27.2*	*28.4*	*30.4*	*36.5*	-	*13.9*
Basic metals and metal products	*28.5*	*29.9*	*28.0*	*34.1*	*37.6*	*40.1*	*51.4*	*56.1*	-	*29.1*
Mechanical machinery and equipment	*23.6*	*25.0*	*19.0*	*24.1*	*37.9*	*39.9*	*45.1*	*43.0*	-	*18.7*
Electrical equipment and precision instruments	*31.7*	*34.3*	*20.9*	*28.1*	*42.2*	*47.9*	*44.5*	*50.9*	-	*24.6*
Transport equipment	*31.2*	*34.4*	*27.6*	*35.0*	*50.0*	*52.3*	*62.1*	*66.2*	-	*29.2*
Other manufactures	*27.4*	*28.7*	*20.9*	*26.3*	*24.2*	*26.9*	*43.3*	*56.2*	-	*17.0*
Electricity, gas and water	24.4	*32.5*	8.3	13.5	13.6	20.1	20.5	25.2	-	21.0
Construction	12.2	*13.1*	10.8	14.6	25.6	25.6	21.6	28.2	-	
Wholesale and retail trade	10.3	*12.0*	5.7	9.3	16.6	17.4	13.6	28.5	-	5.3
Hotels and restaurant	11.8	*11.2*	12.0	14.3	18.2	19.1	20.5	24.0	-	
Transport and communication	13.4	15.8	18.7	24.5	25.8	29.8	26.4	39.4	-	10.5
Financial intermediation	5.1	5.6	7.9	10.3	6.3	7.4	10.5	15.9	-	5.6
Real estate, renting and business activities, consulting	8.7	9.1	4.7	6.7	14.2	14.2	17.0	21.6	-	6.3
Public administration and services to households	4.7	5.4	4.7	6.5	9.0	9.7	5.4	10.2	-	5.5
Total	**24.4**	**27.2**	**21.5**	**27.9**	**33.8**	**37.3**	**41.5**	**46.6**	**20.5**	**20.5**
Total including transit trade	**24.7**	**27.8**	**29.4**	**37.9**	**50.0**	**56.6**	**55.2**	**60.4**	**26.8**	**41.3**

Source: own calculations on Eurostat and, for Italy, Istat data.

Tab. 4

Decomposition by sector of the growth of the import content of exports in four EMU countries (1995-2000)

(percentage values)

	Italy			Germany			Netherlands			Belgium		
	Contribution to the growth of IC of total exports	Change in the intensity of IC within each sector	Change in the sectoral composition of exports	Contribution to the growth of IC of total exports	Change in the intensity of IC within each sector	Change in the sectoral composition of exports	Contribution to the growth of IC of total exports	Change in the intensity of IC within each sector	Change in the sectoral composition of exports	Contribution to the growth of IC of total exports	Change in the intensity of IC within each sector	Change in the sectoral composition of exports
Products of agriculture, forestry and fishing	-0.01	0.01	-0.02	0.00	0.03	-0.03	-0.12	0.12	-0.24	-0.03	0.01	-0.04
Energy minerals	0.00	0.00	0.00	0.00	0.01	-0.01	0.06	0.04	0.02	0.00	0.00	0.00
Non-energy minerals	0.00	0.00	0.00	0.00	0.01	-0.01	0.02	0.01	0.01	-0.03	0.02	-0.04
Manufactures	***2.62***	***2.01***	***0.61***	***5.64***	***5.54***	***0.10***	***2.62***	***2.42***	***0.20***	***1.34***	***3.09***	***-1.75***
Food products, beverages and tobacco	*-0.01*	*0.03*	*-0.04*	*-0.03*	*0.07*	*-0.09*	*-1.12*	*0.15*	*-1.27*	*-0.27*	*0.15*	*-0.42*
Textile products and clothing	*0.08*	*0.31*	*-0.24*	*-0.10*	*0.12*	*-0.21*	*-0.21*	*-0.03*	*-0.18*	*-0.26*	*0.14*	*-0.40*
Leather and leather products	*0.11*	*0.19*	*-0.08*	*0.00*	*0.02*	*-0.02*	*-0.01*	*0.00*	*-0.01*	*-0.03*	*0.01*	*-0.05*
Wood and wood products	*0.01*	*0.01*	*0.00*	*0.04*	*0.02*	*0.02*	*-0.03*	*0.00*	*-0.03*	*0.06*	*0.05*	*0.01*
Paper and paper products, printing and	*-0.01*	*0.02*	*-0.03*	*0.09*	*0.11*	*-0.02*	*-0.23*	*0.02*	*-0.25*	*0.24*	*0.07*	*0.17*
Refined petroleum products	*0.68*	*0.18*	*0.50*	*0.28*	*0.06*	*0.22*	*2.09*	*0.30*	*1.79*	*1.63*	*0.66*	*0.97*
Chemical products and man-made fibres	*0.72*	*0.23*	*0.49*	*1.24*	*1.35*	*-0.11*	*0.81*	*1.26*	*-0.45*	*0.48*	*0.42*	*0.05*
Rubber and plastic products	*0.04*	*0.06*	*-0.02*	*0.17*	*0.16*	*0.00*	*-0.10*	*-0.02*	*-0.08*	*-0.07*	*0.07*	*-0.14*
Non-metallic mineral products	*0.01*	*0.07*	*-0.06*	*0.04*	*0.06*	*-0.02*	*-0.05*	*0.01*	*-0.06*	*0.03*	*0.12*	*-0.09*
Basic metals and metal products	*-0.13*	*0.11*	*-0.23*	*0.26*	*0.52*	*-0.26*	*-0.12*	*0.13*	*-0.24*	*-0.41*	*0.48*	*-0.89*
Mechanical machinery and equipment	*0.19*	*0.23*	*-0.04*	*0.34*	*0.72*	*-0.38*	*0.42*	*0.08*	*0.34*	*-0.19*	*-0.09*	*-0.10*
Electrical equipment and precision	*0.35*	*0.22*	*0.14*	*1.14*	*0.82*	*0.32*	*0.80*	*0.39*	*0.41*	*0.96*	*0.32*	*0.64*
Transport equipment	*0.50*	*0.28*	*0.22*	*2.11*	*1.43*	*0.68*	*0.33*	*0.11*	*0.22*	*-1.06*	*0.48*	*-1.54*
Other manufactures	*0.07*	*0.07*	*0.00*	*0.05*	*0.08*	*-0.02*	*0.02*	*0.02*	*0.00*	*0.25*	*0.21*	*0.04*
Electricity, gas and water	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	-0.01	0.06	0.01	0.05
Construction	-0.01	0.00	-0.02	0.00	0.00	0.00	0.02	0.00	0.02	0.03	0.03	0.01
Wholesale and retail trade	0.14	0.12	0.02	0.23	0.21	0.02	0.17	0.08	0.09	1.45	1.31	0.15
Hotels and restaurant	0.00	0.00	0.00	0.02	0.01	0.01	0.00	0.00	0.00	0.02	0.03	-0.01
Transport and communication	0.00	0.13	-0.13	0.36	0.34	0.01	0.47	0.45	0.02	1.50	1.08	0.42
Financial intermediation	0.00	0.00	0.00	0.01	0.01	0.00	0.04	0.01	0.03	0.08	0.08	0.00
Real estate, renting and business activities,	0.07	0.01	0.06	0.10	0.07	0.03	0.26	0.00	0.26	0.64	0.32	0.32
Public administration and services to	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	-0.01	0.01	0.02	-0.01
Total	**2.83**	**2.30**	**0.53**	**6.37**	**6.25**	**0.12**	**3.54**	**3.14**	**0.40**	**5.09**	**5.99**	**-0.90**

Source: own caculations on Eurostat and, for Italy, Istat data.

Tab. 5

Decomposition by sector of the growth of the import content of exports in Belgium, Germany, Italy and the Netherlands (1995-2000)

(percentage values)

	Contribution to the growth of IC of total exports	Change in the intensity of IC within each sector	Change in the sectoral composition of exports
Products of agriculture, forestry and fishing	-0.03	0.04	-0.07
Energy minerals	0.01	0.01	0.00
Non-energy minerals	0.00	0.01	-0.01
Manufactures	***3.83***	***3.61***	***0.22***
Food products, beverages and tobacco	*-0.26*	*0.05*	*-0.30*
Textile products and clothing	*-0.12*	*0.14*	*-0.26*
Leather and leather products	*0.00*	*0.06*	*-0.05*
Wood and wood products	*0.03*	*0.01*	*0.01*
Paper and paper products, printing and publishing	*0.04*	*0.06*	*-0.03*
Refined petroleum products	*0.82*	*0.19*	*0.63*
Chemical products and man-made fibres	*0.94*	*0.92*	*0.03*
Rubber and plastic products	*0.06*	*0.08*	*-0.02*
Non-metallic mineral products	*0.01*	*0.06*	*-0.05*
Basic metals and metal products	*0.04*	*0.34*	*-0.30*
Mechanical machinery and equipment	*0.23*	*0.42*	*-0.19*
Electrical equipment and precision instruments	*0.87*	*0.53*	*0.34*
Transport equipment	*1.12*	*0.67*	*0.45*
Other manufactures	*0.06*	*0.09*	*-0.03*
Electricity, gas and water	0.01	0.01	0.00
Construction	0.00	0.01	-0.01
Wholesale and retail trade	0.34	0.30	0.04
Hotels and restaurant	0.01	0.01	0.01
Transport and communication	0.43	0.44	-0.01
Financial intermediation	0.02	0.02	0.00
Real estate, renting and business activities, consulting	0.18	0.08	0.10
Public administration and services to households	0.01	0.01	0.00
Total	**4.82**	**4.53**	**0.28**

Source: own caculations on Eurostat and, for Italy, Istat data.