



# THE INTEGRATION OF CHINA AND EAST EUROPEAN COUNTRIES IN GLOBAL NETWORKS

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# **The Integration of China and East European Countries in Global Networks**

## **Are European Multinationals Different?**

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## **Abstract**

The emergence of global production networks (GPNs) has a major impact on trade between low- and high-wage countries. This paper explains that multinationals from Japan, the United States and Europe have nevertheless not developed their global networks to the same extent and with the same purposes. It first focuses on trade between China and the Triad regions. It then examines intra-firm trade by companies located in France, comparing trade patterns with China on the one hand and with Central and Eastern European countries (CEECs) on the other hand.

The examination of French intra-firm trade (IFT) confirms that European groups focus on the Chinese local market, while American and even more Japanese companies tend to be more involved in vertical trade with China. These differences may be related to the international specialization of European countries. In the case of France, for example, aerospace products represent a major export to China, and they do not generate much intra-firm trade or vertical specialization. On the contrary, there is intense IFT, including for transformation, in consumer electronics, for which European countries typically have no comparative advantage. IFT in electronics is largely organized by foreign subsidiaries.

The role of wage levels in the location of production and trade flows is often underscored in the economic literature. This consideration is indeed important when comparing the role of China and CEECs in world trade and their respective positions in GPNs. The paper nevertheless draws attention to the importance of the specialization of flagships' home country. The comparison between the car industry and electronics is a case in point. One major characteristic of European multinationals is thus related to the comparative advantage of major European countries in the car industry. French IFT patterns also confirm the regional focus of GPNs. The geographical patterns of IFT with CEECs are strongly influenced by the proximity with EU countries, in particular France and Germany. Conversely, American and Japanese firms weigh relatively more in IFT between France and China. One specific characteristic of European multinationals is thus related to the integration of the EU and the enlargement process.

## Introduction

The emergence of high growth zones in Asia and to a lesser extent in Central and Eastern Europe tends to increase world growth in the mid-term. This trend has nevertheless raised worries both in high-income countries and in some emerging countries because of short-term adjustment issues. This is due to the fact that high growth in emerging zones is partly based on the transfer of production from industrial countries to these emerging zones. Industrial production has thus been growing much faster in China than in high-income countries. As a consequence of this impressive growth of industrial production, China is regularly portrayed as the new “factory of the world”.

China is nevertheless not seen as equally threatening around the world. At the end of the 1990s, as Chinese imports surged and shifted to higher value added products, Japan perceived China as a potential threat. Japanese firms had started to invest in China to manufacture state-of-the-art consumer products such as digital cameras. Hence, the return of the fear of *hollowing out*. The perception of China nevertheless began to change around 2002, when Japan began to consider the vast opportunity represented by the development of China. According to some, such a change of attitude has been triggered by the fact that Japanese manufacturers seem to “have avoided head-to-head competition with producers in China and shifted domestic production to higher value added devices and materials” (Munakata 2003).<sup>1</sup> The attitude of the United States vis-à-vis China’s economic performance has, on the contrary, become increasingly critical as the bilateral deficit has deepened. EU countries have weaker economic links with China, but they fear the combined emergence of new competitors from Asia and Eastern Europe. More generally, China is not the sole source of the rapidly increasing global manufacturing capacity. To the extent that decreasing capacity in high-income countries for the same products does not offset increasing capacity in emerging zones, global over-capacity builds up.

In order to benefit from dynamic growth in emerging zones, high-income countries need to evolve towards more favorable specialization. Some countries may have a relatively more favorable specialization from the outset. Besides, some countries may prove more mobile. This paper examines the role of multinational companies in this dynamic.

Part one explains the emergence of global production networks and their impact on trade between low- and high-wage countries. Part two examines the differences between multinationals from Japan, the United States and Europe, focusing on trade with China. It then examines intra-firm trade by companies located in France, comparing trade patterns with China on the one hand and with Central and Eastern European countries (CEECs) on the other hand. The conclusion relates intra-firm trade, global production networks and the dynamics of international specialization.

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<sup>1</sup> Others however consider that Japanese firms have not yet organized to take full advantage of China’s growth (Masuyama 2004).

# 1. Global production networks and vertical specialization

Since the 1980s, foreign direct investment has been particularly dynamic and has been one of the drivers of globalization. The expansion of multinational companies has increased global integration and has had an important impact on the qualitative composition of international trade. One characteristic of our integrated world is nevertheless that the cost of international transactions tends to fall and that all companies have an easier access to both foreign clients and foreign suppliers. This section discusses the development of global production networks (GPNs) as one major feature of this context. It then examines the consequences on the trade flows and their qualitative composition. It shows in particular that GPNs constitute a major channel for developing countries to increase their participation in world trade in manufactures, including in non-traditional sectors.

## 1.1. The emergence of Global Production Networks

The reorganization of production processes on a global basis has been one major feature of globalization. Since the 1980s, leading firms design global production networks, where manufacturing processes are divided in discrete production stages and assigned to different countries. While sectoral and product specialization has long been a basis for the development of trade, global production-sharing operates an increasingly fine international division of labor both between and within industries.

GPNs organize the sourcing of specialized items and sub-systems from multiple locations across the globe. The emergence of such complex global networks, which require technical and commercial interactions between industrial suppliers and clients, results from a whole set of changes in the global competitive environment. Global competition and technological evolutions have been major incentives to fragment production processes. However, such a fragmentation and the related exchanges could not have been implemented if trade and foreign direct investment had not been eased by liberalization. As argued by Feenstra (1998), in the global economy, the disintegration of production has built upon the integration of trade. The emergence of GPNs thus depends on technological, economic, and institutional factors. It is important to consider all three sets of factors in order to understand the dynamics and evolving morphology of GPNs, which typically span different countries with contrasting comparative advantages.

Technological evolutions have created new opportunities and have had an impact on both the ability to fragment the production process in separable segments and the ability to source various components from distant suppliers. Since the 1980s, increasing codification of knowledge, standardization of interfaces, and flexible manufacturing technologies have led firms to progressively disintegrate vertically integrated plants into networks of suppliers.<sup>2</sup>

Figure 1 shows the impact of increasing modularity along the value chain on the degree of firm vertical integration. Progress in transport and communication technologies has further

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<sup>2</sup> This trend is related to the development of "markets for technology", where previously internal knowledge is exchanged between companies (Arora *et al.* 2001).

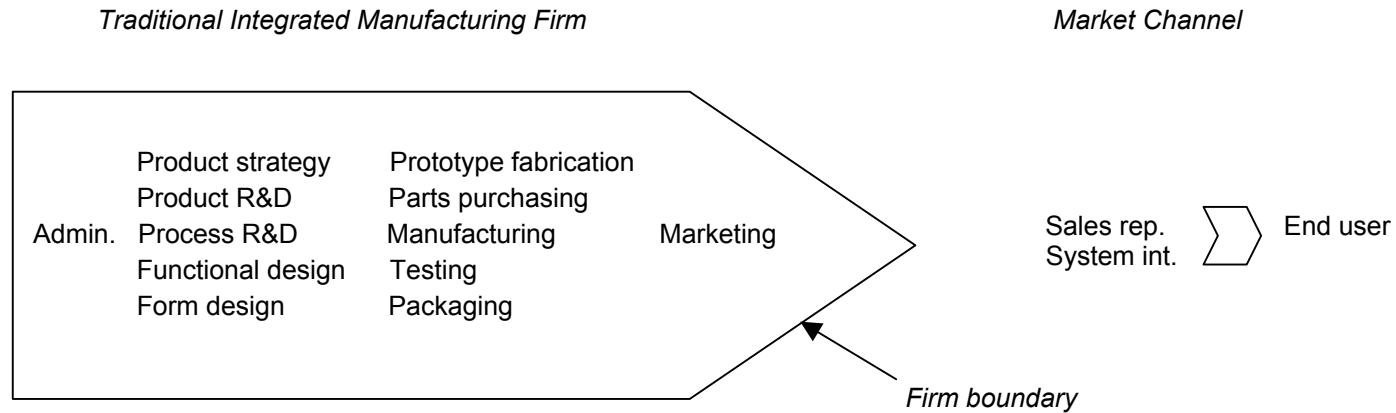
allowed this general evolution to develop on a global scale. Disintegration among different production units along the value chain may occur within multinational companies, among subsidiaries, or more radically, between independent companies. Besides, independent companies may be related to leading firms<sup>3</sup> through various contractual arrangements or alliances. Multinationals thus develop both an *internal network* of subsidiaries and an *external network* of contractors and allied companies. Both the internal and external networks are international in scope.

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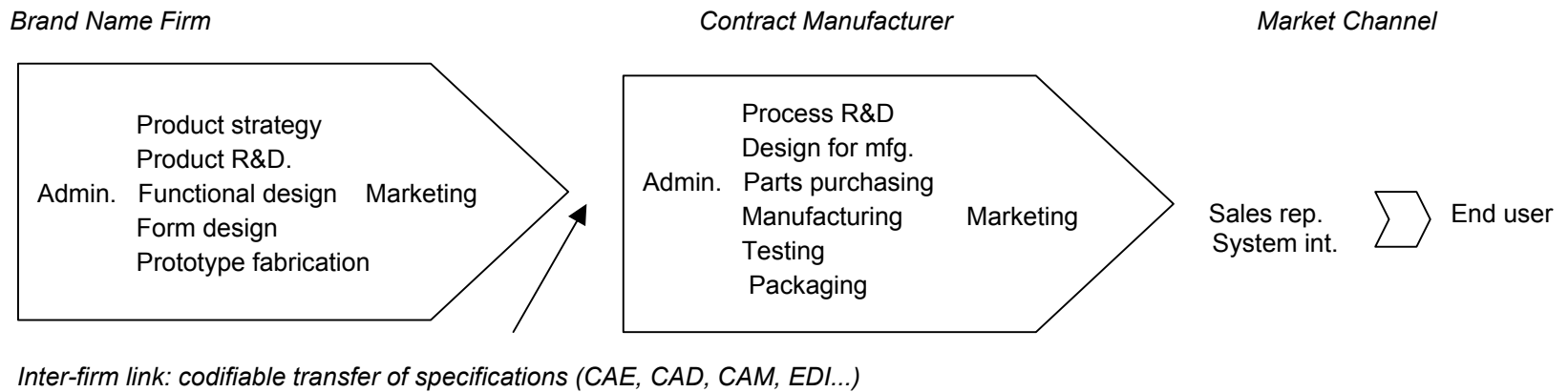
<sup>3</sup> Which are sometimes described as “flagship companies”.

**Figure 1. Value chain modularity and vertical specialization among firms**

**1. Vertical Integration**



**2. Value Chain Modularity and Production Network**



Source: Adapted from Sturgeon (2002).



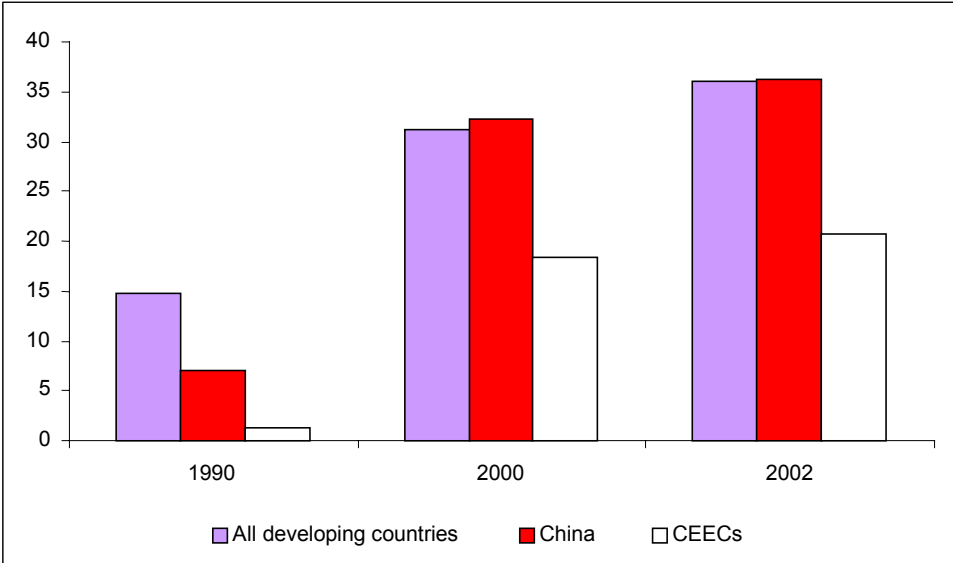
These technological evolutions, including the development of new information networks, have been fundamental because the fragmentation of the value chain between different partners implies exchanges of huge amounts of information. GPNs thus depend on ever more efficient logistics, but also on intense exchange of information around the globe.

Technological change has also had an influence through the evolution of the mix of products within manufacturing. The expansion of production in electronics in particular has stimulated the constitution of networks as these products typically involve separable steps. Besides, tough innovation-based competition generates a continuous flow of new products, and leading firms tend to focus on their core competences, including in particular, research, design, and marketing. Manufacturing operations themselves may also lose their status of core competences as automation and modularity enable contract manufacturers to be efficient and reap economies of scale (Sturgeon 2002).

Liberalization of trade and foreign direct investment has constituted the second fundamental set of factors underlying the diffusion of the global production networks organization. Trade liberalization is important of course since GPNs are based on the international circulation of parts, components, and final products. But GPNs also depend on the liberalization of factor movements, and more particularly of foreign direct investment. GPNs are to a large extent organized as intra-firm networks involving production sites in the home country and subsidiaries across the world. Some members of the network are independent producers, but the global architecture generally relies on a web of subsidiaries. Trade and FDI liberalization by developing and transition economies since the 1980s have thus created much more favorable conditions for the development of GPNs.

From the 1980s on, developing countries have been reversing their hostile policies towards FDI. Countries from Eastern and Central Europe have also opened to FDI during the 1990s. Since the 1980s, a large number of countries have actually sought to attract FDI through various promotion schemes. As a result, the role of FDI has dramatically increased in a number of developing countries (figure 2).

**Figure 2. FDI intensity\* in developing countries, China, and CEECs**



\* FDI inward stock as a share of GDP.  
 Source: Calculation from UNCTAD data.

Some countries have more specifically promoted local assembly through special custom provisions. China for example has granted duty exemptions to selected categories of imports as part of the promotion of export-oriented sectors (Lemoine and Unal-Kesenci 2002a). Other emerging countries from Asia or Eastern Europe have also tried to design supplier-oriented development strategies (Hobday 2000; Sturgeon and Lester 2003).

Finally, the emergence of GPNs depends on the availability and quality of adequate production capabilities around the globe. Here again, evolutions since the 1980s have been favorable as a number of emerging countries have greatly improved their manufacturing capabilities. Some have even started to nurture design and product development capabilities in high-tech sectors.<sup>4</sup> Multinational companies have contributed to the process through investment in equipment and training of the local work force, both in their subsidiaries and in various local suppliers. Increasing local capabilities and investment by multinationals to develop GPNs have thus interacted.

From the mid-1980s on, low and mid-income countries have steadily increased their trade openness, as measured by the share of trade in their GDP. As a group, they have become more open than high-income countries since the 1990s (Sachwald 2003). Developing countries have also increased their share of global trade, from about one-fourth in 1980 to one-third. Their specialization has simultaneously moved beyond resource-intensive exports into manufactures. The share of manufactures in their exports has dramatically increased, from about 20% at the beginning of the 1980s, to 80%.

Table 1 shows that the evolution of the composition of exports from developing countries is not due to China alone. Table 1 also shows that exports of traditional labor-intensive manufactures have not been the most dynamic segment of exports from developing countries. Exports of medium-technology products and electronic products, which include numerous new products, have been the most dynamic.

**Table 1. The structure of exports by developing countries, share by industry, %**

Product category	China		India		Low income less China and India	
	1981	2001	1981	2001	1981	2001
Primary products	36	5	29	14	74	27
Resource-based manufacturing	18	7	25	30	17	14
Low-tech—textiles	25	25	31	29	4	19
Low-tech—other	9	20	6	8	1	5
Medium-technology	9	17	7	10	1	10
Of which automobiles and parts	0	1	1	1	0	1
High-tech—electronic	1	22	1	3	2	22
High-tech—other	1	2	1	3	0	1

*Note:* Country groups defined by income status in 1981.

*Source:* Martin and Manole (2003).

During the 1990s, a number of CEECs have also increased their participation in world trade and have also done so by specializing more in manufacturing, including electronics (Radosevic 2002). Kaminski and Smarzynska (2001) explore the case of Poland in particular, where the share of skilled labor- and capital-intensive exports has increased while that of natural resource-based and unskilled labor-intensive has decreased. Both CEECs and a number of developing countries have increased their specialization in the

<sup>4</sup> Ernst (2003) discusses the migration of some operations in chip design to Asia, for example.

automobile industry, one major sector of medium-technology manufactures. Exports of automobiles and parts from low- and middle-income countries have grown particularly rapidly, at more than 20% per year between 1981 and 2001 (World Bank 2003).

Emerging countries have thus fully participated in the general evolution of trade in favor of R&D-intensive products. High-technology intensive manufactures were the fastest growing product category in world trade between 1980 and 2000 (Mayer et al. 2003). High-income countries are specialized in these products, but emerging countries have tended to increase their contribution to global exports of these products too, partly through their participation in GPNs.

The development of GPNs is a quite general phenomenon, involving thousands of companies around the globe. GPNs are nevertheless much more pervasive and sophisticated in some industries. Due to their technical and economic characteristics, industries that manufacture equipment have developed GPNs the most. They first tend to involve production stages, such as design, component manufacturing and final assembly – which are physically separable. Second, these separable production stages exhibit different factor intensities, with assembly being typically less skill-intensive. This constitutes an incentive for companies to locate labor-intensive stages in labor-abundant countries.

Simple electronic products have been produced in low-wage countries quite early and the production of some more sophisticated products such as hard disk drives has progressively organized through GPNs since the early 1980s (McKendrick 1999). A wide array of electronic products are now the result of global production processes, including television and radio receivers, various office equipment or cameras. Electrical machinery and power and machine tools are also largely involved in global value chains (Kaminski and Ng 2001). Finally, the role of GPNs has markedly increased in the automotive industry since the 1990s, involving countries from all continents (Sturgeon and Lester 2003).

GPNs have also been developed differently by different multinational companies. One reason being that different leader countries are specialized in different industrial sectors. European countries tend to be more specialized in automobiles and machinery than in electronics. Japan and the United States both have strong positions in electronics, but focus on different products. The degree of development of GPNs also depends on manufacturing practices and traditions. American companies have been less focused on manufacturing than Japanese and Europeans, which may have influenced their earlier propensity to outsource in the office equipment and electronic industries (McKendrick 1999; Sturgeon 2002). A third reason for the varying scope and shape of GPNs is that they tend to have a regional focus. The relationship between the national origin of the leading company and the regional focus of its GPN will be explored below by comparing American and Japanese multinationals with European ones.

### ***1.2. The impact of GPNs on trade flows and specialization***

The development of GPNs involving companies from both high-income and lower income countries has had a substantial impact on the location of manufacturing production and the specialization of countries. One difficulty in assessing this impact is that trade flows and specialization develop within industries.

A significant portion of trade within production networks is intra-firm, i.e., taking place among subsidiaries of a multinational company. Part of these exchanges nevertheless takes place between independent partners through outsourcing. Due to the variety of forms

of GPNs, they generate various types of trade flows. As a result, different indicators have measured the phenomenon of international segmentation of production. Two main approaches have been developed to evaluate the impact of GPN on trade patterns. The first approach studies intra-firm trade. The second approach evaluates the share of production-related flows of components in total trade. This second approach has often involved an evaluation of the vertical component of intra-industry trade (box 1).

### **Box 1. Intra-industry and intra-firm trade**

#### *Intra-firm trade (IFT)*

IFT takes place among subsidiaries of multinational companies. It may be horizontal, when subsidiaries exchange differentiated finished goods, or it may be vertical when the multinational has organized a global network with parts and components circulating between subsidiaries. Intra-firm trade is thus an important component of intra-industry trade. Horizontal intra-firm trade is also intra-industry trade. Vertical intra-firm trade may be more diverse though, especially if intra-industry trade is observed at a highly disaggregated level.

Intra-firm trade is not systematically recorded and some countries have conducted surveys to observe its evolution. This paper uses data from the U.S., Japan, and mostly France. The last section of the paper is based on the latest French survey of intra-firm trade, which is presented in Appendix 1.

#### *Intra-industry trade (IIT)*

IIT has both a horizontal and a vertical component. The analysis of GPNs and associated trade flows focuses on vertical IIT (VIIT). Vertical flows are distinguished from horizontal flows within IIT on the basis of price differences between imports and exports. Differentiated products exchanged through horizontal IIT are supposed to have similar prices. On the contrary products with different levels of quality or components are supposed to have substantially different prices. Hu and Ma (1999), for example, define VIIT as the simultaneous export and import of 3-digit SITC products where the unit value of exports relative of the unit value of imports was outside the range of +/- 25%.

#### *Vertical specialization*

Vertical specialization can be evaluated based on the extent of VIIT. Another approach to estimate vertical specialization has been to calculate the rate of imported intermediate inputs used in the production of goods exported (Hummels *et al.* 2001, Martin and Manole 2003, Strauss-Kahn 2003). Some of these studies however estimate vertical specialization by multiplying the value of industry A's inputs into industry B by the import ratio of the former. Such an indicator may overstate vertical specialization if the share of final products in industry A is high. It may also understate vertical specialization if components are exported to be assembled abroad.

Estimates using different methods nevertheless converge to suggest that vertical trading chains have taken an increasing role in international trade. Different methods also indicate similar sectoral and country differences.

According to the available estimates, the share of intra-firm trade has been increasing during the 1990s. Table 2 shows that intra-firm trade has increased in all the three countries for which we have surveys for the beginning and the end of the 1990s. The increase in intra-firm trade has been particularly rapid for Japanese multinationals, on both the export and import sides. American and French multinationals have increased their intra-firm trade in smaller proportions. Between 1993 and 1999, the share of intra-firm imports has more

than doubled in the case of foreign multinationals located in France.

**Table 2. Increasing intra-firm trade, in % of total trade**

	Exports		Imports	
	1990 <sup>1</sup>	1999 <sup>2</sup>	1990 <sup>1</sup>	1999 <sup>2</sup>
<b>United States</b>	32.8	36.2	43.7	39.4
<i>of which</i>				
- domestically-based parent company	23.1	<b>27.7</b>	16.1	17.2
- foreign-based parent company	9.7	8.6	27.6	22.2
<b>Japan</b>	16.6	30.8	14.7	23.6
<i>of which</i>				
- domestically-based parent company	14.5	<b>28.6</b>	4.2	<b>14.8</b>
- foreign-based parent company	2.1	2.2	10.5	8.8
<b>France</b>	34.0	40.1	19.0	36.8
<i>of which</i>				
- domestically-based parent company	21.0	23.0	7.0	7.5
- foreign-based parent company	13.0	<b>17.1</b>	11.0	<b>28.3</b>

1. 1993 for French data.

2. For United States data for 1998.

Note: Comparisons are indicative, as methodology is different in the different national surveys.

Sources: OECD (2002) and survey from the SESSI for France (see Appendix 1).

A large share of intra-firm trade between high-income countries is composed of finished goods destined to be distributed without additional processing. Intra-firm trade between high-income countries is thus a way for multinational companies to produce and sell differentiated products. On the contrary, intra-firm trade with middle- and low-income countries tends to reflect the development of GPNs.

At the aggregate level, this expansion of GPNs leads to an increasing share of intermediate inputs and components in trade by developed countries since the 1980s (Feenstra 1998, Barba Navaretti *et al.* 2002). As a consequence of this trend, the share of vertical IIT between industrial countries and less developed countries increases (box 1). In the mid-1990s, vertical IIT already accounted for 80 to 90% of total IIT between the CEECs and the EU for example (Aturupane *et al.* 1999). Moreover, during the second half of the 1990s, trade in parts and components by CEECs has been very dynamic (Kaminsky and Ng 2001). By the mid-1990s, IIT between China and different high-income countries, as well as the share of vertical IIT in total IIT were already quite high (Hu and Ma 1999). As a result, China has a relatively high and growing index of vertical specialization (Martin and Manole 2003).

More generally, IIT has been increasing both in a number of high-income countries and in poorer countries. Table 3 indicates that among OECD countries, IIT has been increasing for mid-income countries that became more open to trade during the 1990s and for high-income countries that are the closest to the former. Since the creation of NAFTA, Mexican production facilities have thus become more tightly integrated into the production networks of American firms. IIT has also substantially increased for the countries which have become more integrated with EU members, including Portugal and future members from Central and Eastern Europe. The rapidly increasing rate of IIT in Korea and Japan may be due to both more open trade and tighter integration with lower-income countries in Asia. Overall, vertical IIT has played a larger role in raising the intensity of IIT than horizontal IIT by which countries exchange similar but differentiated products.

**Table 3. Intra-industry trade as a percentage of total manufacturing trade**

	1988-91	1992-95	1996-2000	Change over the period
<b>High and increasing intra-industry trade</b>				
Czech Republic	n.a.	66.3	77.4	11.1
Slovak Republic	n.a.	69.8	76.0	6.2
Mexico	62.5	74.4	73.4	10.9
Hungary	54.9	64.3	72.1	17.2
Germany	67.1	72.0	72.0	5.0
United States	63.5	65.3	68.5	5.0
Poland	56.4	61.7	62.6	6.2
Portugal	52.4	56.3	61.3	8.9
<b>High and stable intra-industry trade</b>				
France	75.9	77.6	77.5	1.6
Canada	73.5	74.7	76.2	2.7
United Kingdom	70.1	73.1	73.7	3.6
Switzerland	69.8	71.8	72.0	2.2
Belgium/Luxembourg	77.6	77.7	71.4	- 6.2
Spain	68.2	72.1	71.2	3.0
Netherlands	69.2	70.4	68.9	- 0.3
Sweden	64.2	64.6	66.6	2.4
Denmark	61.6	63.4	64.8	3.2
Italy	61.6	64.0	64.7	3.1
Finland	53.8	53.2	53.9	0.1
<b>Low and increasing intra-industry trade</b>				
Korea	41.4	50.6	57.5	16.1
Japan	37.6	40.8	47.6	10.0

*Note:* Countries are classified as having a high level of intra-industry trade if intra-industry trade is above 50 per cent on average over all periods shown and “increasing” if intra-industry trade increases by more than 5 percentage points between the first and last periods.

*Source:* OECD (2002).

Trade within GPNs develops as multinationals expand their global operations. As a result, vertical trade tends to be positively correlated with FDI, which has important consequences for the geographical orientation of trade flows and for their sectoral specialization. FDI is a channel for capital, but also technology transfer and various production and management know-how transfers.<sup>5</sup> As a result, there are interactions between the home country and host country specialization.

Foreign firms have been playing a crucial role in the surge of exports from China. Chinese policy has strongly favored the use of imported inputs in labor-intensive production of manufactures, and exports based on the processing of imported intermediates account for half of total exports (World Bank 2003, Lemoine and Unal-Kesenci 2002). As a result, the intensity of vertical IIT is positively correlated with FDI (Hu and Ma 1999). The rate of growth of high-tech exports by China has been particularly remarkable (table 1 above) and it is clearly related to FDI by leading companies and vertical trade with high-income countries. The diversification of exports by China towards more technologically advanced

<sup>5</sup> This is a major theme of the literature on multinationals and development; for a recent survey, see Sachwald and Perrin (2002).

products such as electronics was achieved through specializing in processing and assembly in relation with foreign firms. For high-tech sectors, comparative advantage only appears for final goods, while China exhibits a strong disadvantage for parts and components (Lemoine and Unal-Kesenci 2002).

Similarly, the diversification of trade by CEECs has been led by FDI and the integration of local subsidiaries and local firms into GPNs. Industrial specialization of these countries is still characterized by comparative advantage in labor-intensive industries and, for some of them, in resource-intensive sectors. There are however increasing differences between Central European countries and Balkan and Baltic States. In most Central European countries, there has been a trend towards an evolution of specialization since the mid-1990s (Freudenberg and Lemoine 1999, Kaminski and Smarzynska 2001, Boilllot *et al.* 2003). This evolution is partly driven by exports in new sectors, where FDI is high. As in the case of China, comparative advantage in the manufacturing of parts increases through the integration into GPNs (Freudenberg and Lemoine 1999, Kaminski and Ng 2001).

Some CEECs have become involved in the global production networks of electronic goods, office machinery, and telecommunication equipment. The automotive industry however plays a relatively more important role in some CEECs. Since the mid-1990s, the automotive industry has been driving production sharing for a number of countries (Kaminsky and Ng 2001). In this industry, production networks mainly involve EU carmakers and CEECs' trade in parts and components is especially concentrated toward the EU.

This brief comparison between China and CEECs underscores similarities in the dynamic evolution of trade and specialization, and also differences in the focus of the new specialization in manufactures. These differences are connected with the regional orientation of trade for each zone. Structure of trade between both emerging zones and high-income countries seems to be related to the specialization of the latter. The next section explores this hypothesis by looking at the relationships between multinationals' strategies, the specialization of the countries of origin, and trade flows with emerging countries.

## **2. Are production networks of European multinationals different?**

This section examines first the regional focus of production networks and whether American, Japanese, and European multinationals build different types of GPNs. This issue is examined in more detail in the case of France, by comparing intra-firm trade with China and the CEECs.

### ***2.1. The regional configuration of production networks***

The analysis of trade flows indicates that multinationals build global networks through which they organize both production and distribution activities. Distribution activities are conducted through subsidiaries located in high-income countries and typically generate horizontal intra-industry and intra-firm trade among similar countries. Production activities tend to be globally organized and involve FDI in emerging countries, so as to take advantage of their lower labor cost. And as we have seen GPNs generate intense vertical intra-industry trade flows between countries with different income levels. We now focus on the scope of these production networks and more particularly on the issue of regionalization.

A detailed examination of the location of their new affiliates suggests that U.S. multinationals have been shifting activities towards low-income countries since the 1990s. Growth of U.S. majority-owned foreign affiliate activity has been the most dynamic for industrial machinery in non-OECD Asia, with an annual growth rate of 23% between 1982 and 1998 (Hanson *et al.* 2001). Computers and office equipment account for about two-thirds of industrial machinery sales, but that fraction rises to more than 90% in non-OECD Asia. Besides, the export-to-sales ratios of U.S. foreign affiliates are highest in industries commonly associated with outsourcing: computer and office equipment, electronic equipment, as well as transportation equipment. Based on these observations, Hanson *et al.* (2001) study the determinants of the share of imports by affiliates for further processing in affiliates' total sales, which may be considered as a measure of vertical specialization by American multinationals. They find that vertical specialization is negatively correlated with GDP and per capita GDP. American multinationals thus tend to outsource more to low-labor-productivity countries. Vertical specialization is also negatively related to the distance from the United States, which is consistent with outsourcing requiring substantial back-and-forth movements of components and managers between parents and foreign affiliates.

Since American multinationals tend to prefer countries that are closer to the United States to organize vertical specialization, their production networks should have a regional focus. Data in table 4 confirm this hypothesis, especially for the industries in which GPNs are most developed. In particular, U.S. affiliates in Mexico appear the most involved in vertical specialization with their parent. Canadian affiliates are more involved in GPNs than other OECD countries, while low-income Asian countries are less involved than Mexico or other Latin American countries.



**Table 4. Affiliate imports of goods for further processing as a share of total sales of American affiliates in 1994, %**

	World	Canada	Mexico	Other Latin America	Non OECD Asia
Total manufacturing	12.2	33.5	42.3	21.1	14.3
Industrial machinery and equipment	10.9	36.7	44.3	23.8	8.7
Electronic and other electric equipment	22.2	21.2	131.6	96.1	25.9
Transportation equipment	23.2	49.6	56.1	36.7	7.0

Source: Hanson *et al.* (2001).

Table 5 confirms the regional configuration of GPNs. It both looks at reverse flows from affiliates abroad to parents and compares American and Japanese multinationals. It shows that multinationals tend to focus on the local markets, but that this tendency is stronger in high-income countries. Europe is in a specific situation since regional integration and the limited size of each national market compound as incentives for multinationals to organize horizontal intra-firm trade. The table further shows that exports to the home country are more intense from low-income countries that are closer, such as Mexico in the case of the United States and China in the case of Japan.

**Table 5. Destination of sales by subsidiaries of Japanese and US Firms, by location, 1999, %**

Destination of sales	Location of Operation						
	Japan	U.S.	Europe	East Asia (exc. Japan)	China	Latin America	All countries
<b>U.S. Subsidiaries</b>							
Local Market	90.1	-	56.7	39.6	50.4	65.1	57.7
Exports to other countries	7.1	-	37.5	32.8	29.6	13.1	27.2
Export to the U.S.	2.8	-	5.8	27.6	20.0	21.8	15.1
<b>Japanese Subsidiaries</b>							
Local Market	-	90.4	60.1	48.2	47.0	77.3	70.0
Exports to other countries	-	7.3	36.3	28.5	21.8	17.7	20.4
Exports to Japan	-	2.3	3.6	26.0	31.2	5.0	9.6

Source: Fukao *et al.* (2003), based on data from the Department of Commerce (U.S.) and METI (Japan).

According to table 5, both Japanese and American subsidiaries in East Asia nevertheless tended to export a substantial part of their total sales to other than the home country. This fits well with the emerging regional division of labor in East Asia and with the increasing role of China. It also suggests that East Asia is attractive even for American companies as a manufacturing platform.

Table 6 focuses on the case of China and allows us to have a more precise assessment of the role of China in the production networks of multinationals from different home countries. Subsidiaries with Asian parents exhibit the tightest production links with their parent and intense vertical intra-firm trade. Trade for processing represents more than 40% of both their imports and exports. American affiliates export a similar share of their production after processing in China, but they import much less for processing into China. American parents have not organized to export intensely components to their Chinese subsidiaries, which suggests that they rely relatively more on local or regional sourcing.

These patterns could be related to the more general approach of American firms to outsourcing, which has been discussed above. The major contract manufacturers in electronics, such as Flextronics or Solectron, are American. As they focus on manufacturing operations and efficiency, they are more mobile and keen to take advantage of low-cost capabilities in emerging regions, especially Latin America and Asia. As a result, they may be quicker to localize production facilities in new areas, which could lower intra-firm trade between the home country and low-cost regions.

European multinationals exhibit yet another behavior, with a much lower rate of vertical intra-firm trade. Their subsidiaries have only one-third of their exports classified as “processed exports”. Moreover, a very small portion of imports by French and German subsidiaries is aimed at further processing. This dovetails with conclusions from studies on trade, which have emphasized that European firms tend to focus on sales to the Chinese domestic market, including in particular for machinery. An analysis of Chinese trade by stage of production shows that China’s largest trade deficit for capital goods is with Europe. In high-tech products, 43% of Chinese imports of capital goods come from Europe, 28% from Asia, and 26% from America.<sup>6</sup> For the same products, capital goods represented 65% of imports from Europe in 1999, while parts and components represented only 30%.

**Table 6. Share of foreign subsidiaries in Chinese trade, in % of total trade by partner, 1999**

	World	Japan	Korea	Taiwan	U.S.	E.U. 15	Germany <sup>2</sup>	France <sup>2</sup>	UK <sup>2</sup>
Total exports	100	100	100	100	100	100	100	100	100
Exports by foreign firms	45	55	44	50	54	42	38	42	42
of which after processing <sup>1</sup>	38	43	36	42	48	36	33	37	38
Total imports	100	100	100	100	100	100	100	100	100
Imports by foreign firms	52	63	58	65	43	49	60	39	59
of which for processing <sup>1</sup>	32	43	44	50	<b>21</b>	<b>12</b>	<b>11</b>	<b>6</b>	19

1. China’s custom data distinguishes “ordinary” trade and “trade processing”.

2. For France, Germany and the UK, data is for 1997. Data for other countries were little different in 1997, which means that in 1999, the contrast was certainly still very strong with European countries.

*Source:* Lemoine and Unal-Kesenci (2002b); personal communication of data by the authors for France, Germany and the UK.

The specific profile of European multinationals could be due to distance from China. Total EU FDI in China has been equivalent to that of the United States and Japan, but European multinationals are relatively more involved in CEECs, where they are, in the main, first investors. The specific profile of European multinationals could also be due to their industries of specialization. The next section explores these hypotheses. It specifically studies whether the more intensive involvement of French multinationals in CEECs generates a different trade pattern with Eastern Europe by exploring the characteristics of intra-firm trade. It examines in particular the intensity and distribution of vertical specialization with China and CEECs.

<sup>6</sup> Calculated from data for 1999 in Lemoine and Unal Kesenci (2002a) on trade in high tech products broken down by stages of production.

## 2.2. China and CEECs in French intra-firm trade

French trade with China and CEECs has been increasing since the 1990s, but remains relatively low. Trade with China is a much lower share of international exchanges for France than for Japan and the United States, and is also lower than for Germany, the largest EU economy. Since the end of the 1990s, the share of German exports going to China has increased, while the share of French exports to China is less dynamic. As a result, the share of China in total exports, which was similar and around 1% for both countries in the early 1990s, is now around 2% for Germany. The share of German exports to CEECs has consistently been higher for Germany and at the beginning of the 2000s, it is around 8%, as opposed to 3% for France.

The geographical structure of French trade partly reflects the development of French multinationals. French firms have rapidly internationalized from the end of the 1980s on and have to a large extent caught up with firms from other high-income countries. During the 1990s, French firms have in particular actively invested in the United States. French multinationals nevertheless remain quite centered on the EU. This major characteristic has to be emphasized when discussing the development of GPNs by French firms.

Intra-EU trade represents two-thirds of total French trade. The weight of the EU is even higher in French IFT, reaching 70%. As a consequence of the completion of the Single Market in the early 1990s, French and European multinationals have rationalized their production sites at the regional level, which has generated intense intra-firm intra-regional trade. The share of IFT with the EU is higher than the share of intra-firm trade in total French trade (table 7). The share of IFT is generally high with all the Triad zones, but American subsidiaries exhibit a relatively low rate of intra-firm imports, while on the contrary Japanese subsidiaries exhibit a relatively low intra-firm export rate (table 7).

**Table 7. Intra-firm trade as a share of total French trade, 1999, %**

	<b>Imports</b>	<b>Exports</b>
EU	38.8	45.1
U.S.	34.3	51.6
Japan	51.8	44.3
China	15.3	22.3
CEECs	37.0	38.5
<i>Total trade</i>	<i>36.8</i>	<i>40.1</i>

IFT flows among Triad countries are mainly distribution-oriented, as three-fourths of the products that are shifting within multinationals are sold without any further transformation (appendix 1 on the survey). European groups exhibit a distinctive behavior, with most of their intra-firm imports coming from their home country. Ninety percent of imports by German subsidiaries in France are intra-firm and more than three-fourths of these imports come from Germany. The profile is similar for Italian and British subsidiaries, but quite different for extra-European multinationals. American subsidiaries in France, for example, exhibit a quite even distribution of intra-firm imports, in particular with 14% coming from the U.S, 19% from Germany, 19% from the UK, and 12% from Ireland. Japanese subsidiaries source most of their intra-firm imports (53%) from Japan, but also 11% from the UK and about 20% from outside the Triad.

French IFT is thus mainly horizontal IIT among Triad countries and even more intensely within the EU. European firms have specialized their production sites in Europe so as to

reap more economies of scale. This is the case in particular in automobiles and pharmaceuticals, the two sectors in which IFT is the most intense. The situation is nevertheless quite different for IFT with countries from outside of the Triad.

IFT with emerging countries, where French industrial multinationals do not yet have large operations, is relatively less important than with the Triad (table 7). A comparison with the previous survey conducted in 1993 nevertheless shows that IFT with emerging countries increased. It is the highest for Latin America, for which 39% of exports are intra-firm. It has remarkably increased with emerging Asia:<sup>7</sup> From 4.4% of imports in 1993 to 21.8% in 1999, and from 7.8% of exports to 32.1%. This rate is approaching that of IFT with CEECs (table 7). IFT with China has also increased, but remains much lower than with CEECs. These observations confirm the relationship between FDI and IFT.

IFT with both CEECs and China has also very different characteristics from IFT with high-income countries. A comparison between the two zones further shows that the regional focus of GPNs also has an impact on the products being exchanged through IFT.

Studies have generally been interested in the share of IFT in total trade in order to evaluate the role of multinationals in total trade, as in table 7. In order to study in detail IFT and the organization of GPNs, it seems at least as interesting to examine *IFT intensity*, which I define as the share of IFT in total exports or imports of a specific industrial group.<sup>8</sup> Table 8 shows IFT intensity and clearly indicates the differences between groups from different home countries. French groups tend to have a lower IFT intensity than foreign multinationals, except for trade with CEECs. In that case, firms from other EU countries trade relatively more with CEECs from their own territory. The IFT intensity of French firms is on the contrary very low with China, reflecting their limited presence in the country.

A comparison of IFT with China between tables 7 and 8 further indicates that multinationals represent a small share of total French imports from China. Intra-firm imports from China represent 15% of total trade and intra-firm import intensity for industrial groups 44%. This suggests that independent firms make a substantial share of imports from China; these may be smaller firms or various distribution channels, importing directly from Chinese suppliers. Such a discrepancy between IFT as a share of total trade and IFT intensity does not exist on the export side, with groups being the major actors.

**Table 8. Intra-firm trade intensity for industrial groups in France, by trade partner, %**

Trade partner	IFT share of imports to France by:			IFT share of exports from France by:		
	All industrial groups	French groups	Foreign-owned firms	All industrial groups	French groups	Foreign-owned firms
Germany	59.8	13.9	73.9	62.2	54.9	67.8
U.S.	55.4	32.8	67.1	60.7	58.6	64.8
Japan	72.6	6.6	81.0	59.2	58.1	62.2
China	43.8	<b>25.7</b>	<b>51.9</b>	23.0	<b>12.2</b>	<b>54.3</b>
CEECs	61.3	<b>44.8</b>	<b>71.5</b>	55.0	<b>57.2</b>	<b>51.8</b>
<i>All partners</i>	<i>56.8</i>	<i>31.6</i>	<i>70.1</i>	<i>54.0</i>	<i>50.0</i>	<i>59.2</i>

<sup>7</sup> China, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand.

<sup>8</sup> See the definition of groups (which are basically multinationals) in Appendix 1. In 1999, overall, trade by industrial groups represented 75% of French exports and 64% of French imports of industrial products.

## IFT between France and China

IFT, which is quite low for imports from China (tables 7 and 8) is also relatively low for the largest import from China, which is office equipment. Table 9 nevertheless shows that IFT is much more intense for some of the most important products imported from China. This is the case in particular for consumer electronics,<sup>9</sup> toys, and basic chemicals, where IFT intensity reaches 76%, 72%, and 69% respectively. Intra-firm transactions also account for a relatively large share of industrial groups' imports of household appliances (66.7%) and photographic equipment (67.1%). With most of these products, the production process can be divided into separable segments or modules, and China has a comparative advantage in some of these segments. For electronic goods, China has an advantage in the assembly stage, while multinationals control distribution networks in France. As a result, most electronic goods that industrial groups import are for resale. This is also the case for toys and sporting goods, where distribution networks are important. On the contrary, virtually all (99.2%) basic chemicals imported by industrial groups are destined for further transformation. A substantial share of intra-firm imports are also aimed at further transformation in the sectors where advanced countries may still have some technological advantage, like optics and professional electronic equipment. Conversely, IFT intensity is very low for apparel, an industry in which advanced countries no longer have technological advantage.

**Table 9. Characteristics of industrial groups' imports to France from China, by industry, %**

	Share in imports from China by industrial groups	Characteristics of intra-firm imports		
		IFT intensity	Share for resale	Share for transformation
Office equipment, data processing	18.2	37.4	96.0	4.0
<i>Consumer electronics**</i>	11.9	76.1	72.3	27.7
Basic chemicals	9.1	68.9	0.8	99.2
Electrical engines, generators and transformers	4.9	43.6	67.3	32.7
<i>Toys and games</i>	4.8	72.7	98.1	1.9
<i>Professional electronic equipment**</i>	4.7	59.3	65.9	34.1
Apparel	4.5	16.5	89.7	10.3
Plastic products	4.1	26.0	72.2	27.8
Optical and photographic equipment	3.9	67.1	76.7	23.3
Other electrical materials	3.0	9.8	59.9	40.1
Travel goods	2.5	31.7	87.3	12.7
Household appliances	1.4	66.7	99.3	0.7
Sporting goods	0.9	56.6	100	0
<i>Automotive parts**</i>	0.1	59.9	68.2	31.8
<b>All industries</b>	<b>100</b>	<b>43.8</b>	<b>68.8</b>	<b>31.2</b>

Note: \* Intra-firm trade may also be used for investment. This use is generally very low and not reported here. Finally, some firms did not answer this question from the survey (appendix), but they represent a very low share of trade. Shares for resale and transformation are calculated on the total of firms that answered this question.

\*\* Products in italics belong both to the most imported and most exported products from China.

Table 10 shows that for, some products, foreign firms play a major role in intra-firm imports

<sup>9</sup> Products for the reception, recording and reproduction of sounds and images.

from China. For example, American subsidiaries are responsible more than 50% of intra-firm imports of toys and office equipment, and firms from Switzerland account for 68% of intra-firm imports of basic chemicals. The observation of table 10 further suggests that the origin and characteristics of intra-firm trade flows depend on the competitiveness of the parent company. American and Japanese groups thus account for almost 90% of intra-firm imports of office equipment from China, while French and German groups play a marginal role. These imports by American and Japanese groups, which are virtually all for resale, were presumably assembled in China. French and Dutch firms, on the other hand, account for 85% of intra-firm imports of professional electronic equipment, which may reflect the strong position of such firms as Alcatel.

The consumer electronics and professional electronic equipment sectors are particularly interesting because, in both, intra-firm trade intensity is high for exports as well as imports. IFT intensity of consumer electronics is above that of professional electronics in the case of imports (table 9), and below that of professional electronics in the case of exports (table 11).<sup>10</sup> This seems to be consistent with comparative advantage. The data on IFT in these two sectors suggest that production is fragmented between France and China. With consumer electronics, industrial groups of various nationalities, including firms from South Korea and China, import consumer electronics to France. The imports by Chinese industrial groups, however, are all transformed further in France, and Chinese industrial groups do not export consumer electronics to China from France.<sup>11</sup> On the other hand, almost all consumer electronics (97%) exported by industrial groups to China are intended for resale, not further transformation (table 11). Similarly, with professional electronics French industrial groups account for 60% of imports from China and 82% of these products are destined for further transformation, not resale (table 10). Export of professional electronics to China is mainly by Canadian and French firms, and these exports are exclusively resold on the local market (table 12). These observations suggest a pattern of vertical specialization between France and China in both consumer and professional electronics.

Overall, consumer electronics seem to be the major products for which firms have developed fragmentation of production between France and China. Groups from different nationalities participate in this process, including in particular Japanese companies.

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<sup>10</sup> Products for the emission and transmission of sounds and images.

<sup>11</sup> IFT in consumer electronics by Japanese groups exhibits these same characteristics.

**Table 10. Intra-firm imports from China, by industry and nationality of parent company, %**

	Share of intra-firm imports	Characteristics of intra-firm imports		
		IFT intensity	Share for resale	Share for transformation
<b>Office equipment</b>				
United States	52.4	2.3	100	0
Japan	37.0	84.8	95.7	4.3
Germany	3.8	1.7	100	0
France	2.1	31.8	78.6	21.4
<b>Consumer electronics</b>				
Netherlands	27.8	91.5	100	0
Japan	26.9	66.3	31.8	68.2
France	25.5	59.5	74.3	25.7
South Korea	5.3	99.9	100	0
China	5.0	100	0	100
United States	2.0	85.1	100	0
<b>Basic chemicals</b>				
Switzerland	67.6	99	0	100
France	21.4	1.2	99.3	0.7
United States	4.9	27.5	0	100
<b>Electrical engines, generators and transformers</b>				
France	37.8	27.9	2.2	97.8
United States	26.2	51.1	100	0
Netherlands	14.7	95.2	100	0
Japan	11.1	50.3	30.6	69.4
Germany	7.9	0.6	0.7	99.3
<b>Toys and games</b>				
United States	53.3	89.8	100	0
France	15.0	11.6	19.4	80.6
Japan	13.2	80.0	100	0
Germany	11.3	48.7	100	0
<b>Professional electronics</b>				
France	60.2	38.6	17.2	82.8
Netherlands	24.8	100	100	0
Japan	11.5	88.3	91.5	8.5
United States	2.3	27.8	100	0
<b>Apparel</b>				
France	53.1	8.2	61.5	38.5
United States	22.5	9.8	100	0
Germany	10.2	8.6	100	0
Switzerland	9.8	87.3	100	0

Exports to China are heavily concentrated on aerospace products and boilers (table 11), both industries for which France exhibits a strong comparative advantage. In both cases, French firms account for all exports. Aerospace products are directly exported to Chinese clients and IFT is zero. Intra-firm exports represent a small share of total exports for boilers, but mostly for resale. Intra-firm exports are much higher in electronics.

**Table 11. Characteristics of industrial groups' exports from France to China, by industry, %**

	Share in exports to China by industrial groups	Characteristics of intra-firm exports		
		IFT intensity	Share for resale in China	Share for transformation in China
Aerospace products	31.3	0	-	-
Boilers	10.5	12.5	72.85	27.15
<i>Professional electronics**</i>	7.6	81.8	98.8	1.2
Equipment for the distribution of electricity	4.9	47.0	71.5	28.5
Other machines with specific use	4.2	14.0	22.1	77.9
Mechanical equipment	3.9	6.8	47.5	52.5
Electronic components	3.8	88.4	57.9	42.1
Basic chemicals	3.3	14.6	86.7	13.3
Oil and natural gas	2.9	0	-	-
General machinery	2.3	26.8	46.3	53.7
<i>Consumer electronics**</i>	2.3	65.3	97.4	2.6
Measurement instruments	2.2	17.7	18.9	81.1
<i>Automotive components</i>	2.0	80	0	100
<b>All industries</b>	<b>100</b>	<b>23</b>	<b>66</b>	<b>34</b>

*Note:* \* Intra-firm trade may also be used for investment. This use is generally very low and not reported here. Finally, some firms did not answer this question from the survey (appendix), but they represent a very low share of trade. Shares for resale and transformation are calculated on the total of firms that answered this question.

\*\* Products in italics belong both to the most imported and most exported products from China.

The share of French groups is low in exports of electronic components, which are dominated by American subsidiaries (table 12).



**Table 12. Main intra-firm exports to China, by industry and nationality of parent group, %**

	Share of intra-firm exports	Characteristics of intra-firm exports		
		IFT intensity	Share for resale in China	Share for transformation in China
<i>Aerospace products</i>				
France	99.8	0	nd	nd
<i>Boilers</i>				
France	95.6	9.2	100	0
<i>Professional electronics</i>				
Canada	65.4	100	100	0
France	29.0	50	100	0
<i>Electric power generators and transmitters</i>				
France	89.1	47.3	73.7	23.3
United States	7.9	36.3	26.6	73.4
<i>Other machines with specific use</i>				
France	45.1	13.9	11.8	88.2
United States	21.5	18.9	17	83
Netherlands	16.6	0	nd	nd
Switzerland	12.2	21.5	60.3	39.7
<i>Electronic components</i>				
United States	51.6	95.6	92.0	8
France	20.5	67.1	42.5	57.5
Netherlands	25.2	100	0	100
<i>Mechanical equipment</i>				
France	59.7	0.17	100	0
Germany	7.6	0.15	nd	nd
United States	7.4	13.2	20.5	79.5
<i>Basic chemicals</i>				
France	71.3	6.2	78.4	21.6
United States	10.0	16.2	99	1
United Kingdom	4.8	100	100	0

***IFT between France and CEECs***

On average, France's IFT is more intense with the CEECs than with China, especially on the export side. IFT intensity is extremely high for the two major products imported from the CEECs, automobiles and consumer electronics (table 13). In both cases, the preponderance of imports is for resale. German firms account for over half (57%) of the intra-firm import of automobiles and Dutch firms for two-thirds of intra-firm imports of consumer electronics (table 14).

**Table 13. Characteristics of industrial groups' imports to France from CEECs, by industry, %**

	Share in imports from CEECs by industrial groups	Characteristics of intra-firm imports		
		IFT intensity	Share for resale	Share for transformation
<i>Automobiles</i>	17.2	99.9	100	0
<i>Consumer electronics</i>	15.5	94.1	87.5	12.4
Apparel	5.4	36.9	98.3	1.7
<i>Automobile components</i>	5.2	45.7	22.5	77.5
Other metal work	4.2	20.9	86.6	13.4
<i>Electronic components</i>	3.7	28.3	13.0	87.0
Non ferrous metals	3.3	41.1	10.3	89.7
Rubber products	3.2	75.5	95.5	4.5
<i>Basic chemicals</i>	2.9	30.1	0.7	99.2
<i>Office equipment, data processing</i>	2.8	35.9	87.3	12.7
<i>Household appliances</i>	2.7	97.7	98.6	1.4
<i>Electric power generation and transmission equipment</i>	2.4	75.3	42.4	57.6
<i>Lamps and lighting materials</i>	2.0	99.9	100	0
<b>All industries</b>	<b>100</b>	<b>61.0</b>	<b>78.3</b>	<b>21.7</b>

Note: \* Intra-firm trade may also be used for investment. This use is generally very low and not reported here. Finally, some firms did not answer this question from the survey (see Appendix 1), but they represent a very low share of trade. Shares for resale and transformation are calculated on the total of firms that answered this question.

\*\* Products in italics belong both to the most imported and most exported products from CEECs.

The automobile industry is clearly fragmented between France and the CEECs, with intense intra-firm trade in both autos and components. Together, autos and auto components account for 22% of imports from the CEECs (table 13) and for the same share of exports to CEECs (table 15). Automobile components display a classic pattern of vertical fragmentation, with 77% of imports to France intended for transformation (table 13) and 88% of exports to CEECs intended for resale (table 15). This complex pattern may be due to the fact that component suppliers have tended to follow carmakers to the CEECs so that components are, to a certain extent, being produced within the CEECs and in connection with other European countries (Brocard and Darmaillacq 2003). In the case of automobiles, on the other hand, intra-firm imports and exports are both mostly for resale (tables 13 and 15), which suggests a pattern of specialization by quality level, with lower end models produced in CEECs and exported to EU countries. French firms are the main actors in intra-firm trade of automobile components with CEECs, followed by American firms (tables 14 and 16). German carmakers account for over half of intra-firm imports of automobiles from CEECs, reflecting particular Volkswagen's extensive operations in these countries (table 14).

**Table 14. Intra-firm imports from CEECs, by industry and nationality of the parent company, %**

	Share of intra-firm imports	Characteristics of intra-firm imports		
		IFT intensity	Share for resale	Share for transformation
<i>Automobiles</i>				
Germany	57.3	100	100	0
France	32.5	99.8	100	0
Italy	7.8	100	100	0
<i>Consumer electronics</i>				
Netherlands	67.0	92.2	100	0
Japan	12.7	97.5	15.0	85.0
France	10.1	97.3	99.3	0.7
South Korea	9.2	100	88.4	11.5
<i>Apparel</i>				
France	55.6	60.8	100	0
Switzerland	24.5	0.2	nd	nd
United States	12.9	22.3	77.7	22.3
Germany	6.7	2.1	100	0
<i>Automobile components</i>				
France	56.4	32.4	39	61
United States	19.9	69.8	6.9	93.1
Germany	17.6	74.7	13.7	88.3
<i>Electronic components</i>				
United States	54.6	6.9	93.7	6.3
France	15.7	85.3	0.1	99.9
Netherlands	15.6	71.3	1.2	98.8
China	10.0	Na	Na	Na
<i>Office equipment and data processing</i>				
United States	86.8	26.4	86.4	13.6
Netherlands	13.3	93.2	100	0

Electronic products also account for a substantial share of trade by groups between France and CEECs. Electronic components, which include some electronic car components, and office equipment together account for 12% of groups' exports to the CEECs (table 15) and 6.5% of imports (table 13). IFT is much lower on the import side than on the export side. American subsidiaries account for over half of intra-firm imports of electronic components and they resell almost 94% of them (table 14). Firms from the Netherlands, including the Franco-Italian STMicroelectronics, which is incorporated in the Netherlands, are responsible for over 80 percent of intra-firm export of electronic components to the CEECs (table 16). And these exports are mainly for transformation. These patterns of intra-firm trade suggest that there is some vertical specialization between France and the CEECs in the production of electronic components. The pattern of IFT in office equipment and consumer electronics also suggests vertical specialization between France and CEECs. In office equipment, American subsidiaries account for almost 90 percent of intra-firm exports (table 16).

**Table 15. Characteristics of industrial groups' exports from France to CEECs, by industry, %**

	Share in exports to CEECs by industry groups	Characteristics of intra-firm exports		
		IFT intensity	Share for resale in CEECs	Share for transformation in CEECs
<i>Automobiles</i>	16.4	84.6	88.5	11.5
<i>Electronic components</i>	8.6	95.4	8.3	91.7
Pharmaceuticals	6.3	55.1	91.1	8.9
<i>Automobile components</i>	6.1	83.0	88.1	11.9
<i>Professional electronics</i>	5.4	13.2	66.5	33.5
Basic chemicals	3.6	23.4	66.5	33.5
Other machinery for specific use	3.4	26.4	39.2	60.8
<i>Office equipment, data processing</i>	3.1	92.2	99.4	0.6
Other chemical products	2.9	13.6	77.2	22.8
General machinery	2.9	48.1	35.4	64.6
<i>Equipment for the distribution of electricity</i>	2.6	73.8	61.0	39.0
Soap, perfume and detergents	2.1	55.1	91.1	8.9
<i>Consumer electronics</i>	1.8	61.4	70.3	29.7
<b>All industries</b>	<b>100</b>	<b>55.0</b>	<b>65.6</b>	<b>34.4</b>

Note: \* Intra-firm trade may also be used for investment. This use is generally very low and not reported here. Finally, some firms did not answer this question from the survey (appendix), but they represent a very low share of trade. Shares for resale and transformation are calculated on the total of firms that answered this question.

\*\* Products in italics belong both to the most imported and most exported products from CEECs.

The pattern of France's intra-firm trade with the CEECs reveals comparative advantages more clearly and suggests that production is less vertically fragmented than was the case between France and China. The IFT intensity of pharmaceuticals and of soaps, perfume, and detergents exported to the CEECs is relatively low, and these products are mainly for resale (table 15). French firms are the main exporters (table 16). Similarly, on the import side, apparel exhibits both low IFT intensity and a high share of resale (table 13). French firms are the main importers (table 14).

**Table 16. Main intra-firm exports to CEECs, by industry and nationality of parent group, %**

	Share of intra-firm exports	Characteristics of intra-firm exports		
		IFT intensity	Share for resale in CEECs	Share for transformation in CEECs
<i>Automobiles</i>				
France	98.7	85.5	88.5	11.5
<i>Electronic components</i>				
Netherlands	81.6	100	1.7	98.3
United States	9.3	83.5	55.9	44.1
France	8.6	70	43.6	56.4
<i>Pharmaceuticals</i>				
France	75.3	63.9	95.6	4.4
United Kingdom	6.1	69.4	100	0
Switzerland	4.1	86	100	0
United States	3.5	82.5	100	0
<i>Automobile components</i>				
France	83.8	92.4	92.7	7.3
United States	10.3	30.7	37.7	62.3
Germany	2.4	19.2	15.5	84.5
<i>Professional electronics</i>				
France	60.4	8.3	50	50
Canada	28.8	1.7	100	0
Netherlands	3.5	100	100	0
Japan	3.3	50	0	100
<i>Basic chemicals</i>				
France	46.7	12	4.7	95.3
United States	18.2	36.6	99.8	0.2
Germany	6.9	75	91.6	8.4
Netherlands	9.6	28.7	60.1	39.9
United Kingdom	5.6	29.9	100	0
<i>Soap, perfume and detergents</i>				
France	62.4	62.5	98.9	1.1
United States	10.7	65.4	38.8	61.2
Switzerland	6.1	0	-	-
United Kingdom	6.1	100	100	0
<i>Office equipment and data processing</i>				
United States	89.4	96.4	99.7	0.3
France	9.0	75.3	98.0	2.0
<i>Consumer electronics</i>				
France	56.9	67.9	79.9	20.1
Canada	16.5	4.9	100	0
Japan	9.4	50.5	1.5	98.5
Netherlands	8.3	99.5	33.2	66.7

These patterns suggest that French firms and foreign firms located in France have started to integrate CEECs into their European networks. They further indicate that CEECs play a more important role in the industrial networks of French firms than does China, but there is relatively greater vertical specialization with China. The same is true for foreign firms, even if there are also specific national profiles. Japanese firms thus tend to be more involved in vertical specialization, both with firms in China and with firms in the CEECs.

These comparisons between IFT with China and CEECs confirm the role of proximity.

Trade patterns are also influenced by the differences in wage levels and specialization of home countries. For example, the comparative advantage of France and Germany in the car industry strongly influences the organization of German and French firms' production networks with the CEECs. American and Japanese firms play a relatively more important role in GPNs in electronics and related industries.

## Summary and conclusions

### *Summary of main results*

The examination of French IFT confirms a number of conclusions drawn from the comparison of multinationals' behavior in Asia and in China in particular. One such conclusion is the focus of European groups on the Chinese local market. American and even more Japanese companies tend to be more involved in vertical trade with China. These differences may be related to the international specialization of European countries. In the case of France, for example, aerospace products represent a major export to China, and they do not generate much intra-firm trade or vertical specialization. On the contrary, there is intense IFT, including for transformation, in consumer electronics, for which European countries typically have no comparative advantage. IFT in electronics is largely organized by foreign subsidiaries.

The role of wage levels in the location of production and trade flows is often underscored in the literature. This consideration is indeed important when comparing the role of China and CEECs in world trade and their respective positions in GPNs. The examination of French IFT nevertheless draws attention to the importance of the specialization of flagships' home country. The comparison between the car industry and electronics is a case in point. One major characteristic of European multinationals is thus related to the comparative advantage of major European countries in the car industry.

French IFT patterns also confirm the regional focus of GPNs. The geographical patterns of IFT with CEECs are strongly influenced by the proximity with EU countries, in particular France and Germany. Conversely, American and Japanese firms weigh relatively more in IFT with China.<sup>12</sup> One characteristic of European multinationals is thus related to the integration of the EU and the enlargement process.

Finally, the examination of French IFT reminds us that multinationals are only one type of actor in world trade and in the development of global sourcing. The share of IFT in exchanges with CEECs, and even more with China is lower than its share in total French trade. Most imports from China and exports to China in particular are not traded within multinationals. This is again related to specialization patterns. High-income countries have lost their comparative advantage in textiles and other labor-intensive goods, where traditional patterns of country specialization develop, with companies from low-wage countries and SMEs being important actors. Some products, such as apparel, represent a relatively large share of imports by industrial groups in France, but exhibit a low IFT intensity. In labor-intensive sectors, IFT may nevertheless be quite intense if marketing plays an important role. This seems to be the case for toys and games imported from China for example.

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<sup>12</sup> Differences between imports and exports were discussed in the paper.

### ***Vertical specialization and the hollowing out syndrome***

The technological and institutional dynamics that stimulate the development of GPNs should allow yet further vertical specialization in a number of sectors. Leading companies are only one type of actor in this global process. They can nevertheless use GPNs to increase their competitiveness by focusing their resources and efforts on core competences. American companies in electronics and data processing have thus strategically outsourced a large part of their manufacturing operations in order to focus on R&D, design, and marketing and to speed up innovation. By doing so, they have also created a new business segment for contract manufacturers, some of which have become (American) multinationals on their own. European carmakers have also operated some vertical disintegration and expanded their GPNs to strengthen their competitiveness. Leading companies are demanding ever greater competence and more flexibility from electronic contract manufacturers or automobile suppliers, which in turn implies that these companies also have to keep upgrading their capabilities.

Leading companies and some of their contractors thus tend to integrate new suppliers into their global strategy. Early movers may reinforce their competitive advantage by exploiting new opportunities to simultaneously lower manufacturing costs and speed up new product development. In such a perspective, the relocation of some manufacturing activities abroad should not be seen by high income countries as a symptom of hollowing out and industrial decline, but rather as an opportunity to speed up the evolution of international specialization.

The sheer pace of some evolutions may be impressive. Despite anecdotes, it nevertheless seems that international specialization and in particular the specialization of China in labor-intensive products, does not change rapidly (Roland-Holst 2003, Ahearne *et al.* 2003). The objective for high-income countries to reinforce their comparative advantage in knowledge-intensive products and services thus seems reasonable, provided adequate policies are further developed to improve the adaptation of low-skilled workers and lower the cost of displacement for them. Besides, firms from high-income countries also benefit from the expansion of business opportunities in China. These should further develop as China becomes more open to trade and does not focus so much on building a global manufacturing platform.

The rapid evolution of some emerging countries as well as the constant restructuring of GPNs call for further research and the examination of more recent data. It seems particularly interesting to observe the interactions between leading firms' strategies and the evolution of national specialization. On this issue, comparisons among both home countries and host countries should bring interesting insights.



## **Appendix 1. The French Survey on Intra-Group Trade**

The "Survey on international intra-group exchanges" has been conducted by the SESSI from the French Ministry of the Economy, Finance and Industry. It deals with intra-firm trade by industrial groups located in France.

The first French survey of this kind on intra-firm trade was conducted for 1993 operations. This second survey was launched in 2000, and questionnaires asked about 1999 operations.

The scope of the survey was industrial or wholesale companies located in France that are majority-owned by industrial groups. International industrial groups (IIGs) are defined as groups possessing at least one manufacturing subsidiary and at least one subsidiary abroad. All subsidiaries taken into consideration are majority-owned.

The survey was limited to firms with substantial international exchanges, i.e., with exports plus imports totaling more than €1 million. The survey focused on manufactures, excluding makers of military equipment.

Survey respondents comprised 4,305 companies belonging to 2,114 IIGs. These companies represent 52% of the population, but 78% of international exchanges by IIGs.

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