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China is shipping more products to the United States than Germany

Recent theoretical and empirical literature on international trade has renewed our understanding of specialisation and competition, especially between developed and emerging economies. Specialisation operates at the level of varieties instead of product or sector-level. Furthermore, competition selects the most productive firms and the best performing of their products. Using this dual approach, we investigated the market for manufactured imports in the United States. The emerging countries are winning large market shares there, particularly for the most technological products. It is especially in this field that some of them are managing to combine an increase in market share with a higher value of the products exported. How can older industrialised countries face up to this competition? The comparison between two export champions, China and Germany, illustrates how market positioning and the selection effect operate in the US market.

Specialisation of the emerging countries: A re-examination

The traditional theory of international trade, based on the *Ricardo-Heckscher-Ohlin* comparative advantage paradigm, looks at the specialisation of countries. Imports in sectors exposed to foreign competition release resources that can be employed in the activities that have a relative advantage. These specialisations are rooted in differences in relative endowments in resources (labour, capital and natural resources) or in the technological level. Thus, advanced economies should specialise in the technological or skilled intensive activities, whereas the new competitors on the international scene should specialise in low-tech or unskilled labour intensive activities.

However, the theory according to which the South would exchange clothing products for machinery and advanced equipment now seems dated. At the level of industries, a number of emerging countries exhibit export structures similar to those of the most advanced countries, characterised by the importance of capital goods and, increasingly, by that of technological products. Should we then reject the idea that specialisation is linked to countries' levels of development? Are all of the North's products threatened by the South's competitive pressure? Recent work prompts us to interpret the data cautiously.

The fact that trade flows with persistently dissimilar prices (within the most fine grain categories of products) can be observed actually leads us to consider that the specialisation occurs inside these categories, on varieties of products[1]. The determinants of these specialisations are partially linked to the traditional ideas (the competitive advantage) but operate between varieties of the same product and not between products. In parallel, following the work by M. Melitz[2], links between trade and the heterogeneous performance of firms have been introduced into the analysis. Only the most productive firms can support the cost of access to export markets. Therefore, trade introduces a selection effect between firms, as well as, for each firm, between its different products[3].

1. See P.K. .Schott (2004), "Across-Product versus Within-Product Specialization in International Trade", *Quarterly Journal of Economics,* 119(2): 647-678 and L. Fontagné, G. Gaulier & S. Zignago (2007), "Specialisation across Varieties within Products and North-South Competition", *CEPII working paper*, 2007-06.
2 M. Melitz (2003), "The Impact of Trade on Aggregate Industry Productivity and Intra-Industry Reallocations", *Econometrica*, 71(6): 1695-1725.
3 A. B. Bernard, S. J. Redding & P. K. Schott (2006), "Multi-Product Firms and Trade Liberalization", *NBER Working Paper*, 12782.

These recent developments have enabled us to refine our understanding of the competitive pressure exercised by the emerging countries. We will illustrate this by looking at the United States market. The United States import all kind of products. The sharp increase in their imports, linked to macro-economic imbalances, has allowed for a fast redistribution of market shares between exporters. The United States is largely open to exports from emerging countries and, due to its geographical proximity, constitutes a natural outlet for those from the American continent, reinforced, in the case of Mexico, by the free trade within the NAFTA.

Emerging countries' growth in high-tech products

We use the new BACI database developed at the CEPII based on the United Nations' COMTRADE data. This database details the bilateral flows between more than 200 countries over a decade (1995-2004). Within each of the industries defined by the international ISIC classification, we distinguish the different products corresponding to the categories of the SH6 nomenclature (5,017 products)[4]. We retain all of the manufactured products (including those of agri-food industries), which we regroup into four broad categories according to Lall's classification[5]: products intensive in natural resources (for example, refined sugar)[6], products with low technological content (a pair of cotton trousers), with medium technological content (a car) and finally with high technological content (a radar). These four groups contain a total of 4,474 products imported by the United States corresponding to 653 billion dollars in 1995 and 1,189 billion in 2004[7].

The simple breakdown of the products that the different emerging countries exported to the United States at the start and end of the period is revealing. Out of the 4,474 products, 3,485 were exported by China in 1995[8], 2,861 by India, 2,299 by Brazil, 3,805 by Mexico and finally 1,335 by Argentina. In 2004, the diversification of these exporters is such that China now exports 3,941 products, India 3,598, Brazil 2,973, and Argentina 2,112. Only Mexico experiments a reduction in the number of exported products (3,730). By comparison, on the same date, Germany exported 3,910 products to the United States, that is 31 products less than China (in 2004, China exported 267 products to the United States that Germany did not export to that market and, reciprocally, Germany sold 236 products that China did not sell).

In terms of market share, the emerging countries gained more than 9 points over the period (Table 1). The two best placed countries in 1995, Mexico and China, gained 2 and 6 points respectively (China became the world's leading exporter of manufactured products to the United States). Our data shows that though these two countries gained market share in all of the groups of products, their growth was particularly strong in the high technology products: China gained almost 13 points, Mexico 4. On a different scale, the phenomenon was repeated with Brazil (which stagnated or lost ground slightly in the low and average technology product groups but gained almost one point in the high technology products) or Argentina (which only looses ground in the low technology products). Amongst the countries that we have picked out, there were only two exceptions: India, whose market share grew more in the low end of the technology range than in the high (+0.9s vs. + 0.2 points), and the other Asian emerging countries, whose markets shares grew in the low technology products but shrunk in the medium and high technology products. Whereas Japan's market share fell markedly, in particular in high technology products, the European Union made as much progress as Mexico, due to German performance, in particular (growth of almost one point).

Table 1 – Gains and losses of market share in the United States for different exporters by category of products (1995-2004)*

p.p. change	All manufactured products	Intensive in natural resources	Low technology	Medium technology	High technology
Argentina	0	0.2	-0.2	0	0
Brazil	0.3	0.6	-0.2	0	0.9
Mexico	2.4	0.2	2.1	2.9	3.8
China	6.3	2.2	6.5	3.9	12.8
India	0.4	0.4	0.9	0.1	0.2
Rest of emerging Asia	-2	-0.8	0.5	-1	-5.7
Total emerging countries	9.3	2.5	9.6	6.6	17.8
EU25	2.6	5.6	-3	1.6	5.9
including Germany	*0.8*	*0.1*	*-0.4*	*1.5*	*1.4*
Japan	-6.6	-1.4	-2.4	-5.6	-14

* Average 1995-96 and 2003-2004.
Source: BACI, the authors'calculations.

4. The detailed international trade data is generally of limited reliability. Hence, CEPII does work to harmonise the declarations by partners, taking the quality of declarations into account. For further details, see http://www.cepii.fr/anglaisgraph/bdd/baci.htm
5 S. Lall (2000), "The technological structure and performance of developing country manufactured exports, 1995-98", *Oxford Development Studies*, 28(3):337-369. This classification differs from the so-called "OECD-Eurostat list of technological products", which only includes two categories: technological and non-technological. Like all classifications, it sometimes seems arbitrary.
6 Some products considered as manufacturing in the ISIC classification, are considered to be "primary" goods in Lall's classification. We have added these products to the "products intensive in natural resources" list.
7 These are FOB values, after reconciliation of the exporters' data and the importer's data. Therefore, they differ slightly from the WTO data.
8 To limit the impact of annual fluctuations on our observations, we take the average of two years at the start and end of the period.

The increasing value of exports

The ability of an emerging country to increase its market share at the same time as the unitary value of its exports is the sign of a successful integration in the international division of labour. On the other hand, higher prices but falling market shares may indicate a loss of competitiveness. The emerging countries export in all of the sectors, based on different strategies. Some profit from regionalism, like Mexico, or from very low costs, like China, to be participate in the international fragmentation of production processes. But the ability to transform these strategies into increased value of exports and therefore, ultimately, into a rise up the ladder of living standards, is not systematic. In order to observe it, we calculated the change in market share and unit vales for each of the products and then we aggregated the results according to the categories of products already used[9] (Table 2).

Table 2 – Variations in prices and market shares in the United States for different exporters by category of products (1996-2004*)

percent change	Intensive in natural products		Low technology		Medium technology		High technology	
	Price	Market share	Price	Market share	Price	Market share	Price	Market share
Argentina	15	33	46	-30	-22	43	8	-33
Brasil	-6	30	-8	-10	-6	7	44	231
Mexico	6	9	-6	13	-23	15	-6	32
China	-13	152	-7	41	-14	147	45	308
India	-5	19	-2	39	-2	73	-10	114
Germany	9	16	1	-8	7	11	32	47
Japan	-10	-31	11	-40	2	-20	-16	-55

* We use a chained Tornqvist price index which makes us retain the 1996-2004 period, for a 1995-2004 database. The method was taken from G. Gaullier, J. Martin, I. Méjan and S. Zignago. International Trade Price Indices, *CEPII Working paper*, Forthcoming.
Source: BACI, the authors'calculations.

Argentina managed to increase the value of its advantage in manufactured products that are intensive in natural resources: in this field it increased its market share at the same time as its prices. Conversely, in the other categories of products, where production is more footloose, it lost market share or gained it by reducing its prices. Mexico had difficulty in taking advantage of its proximity to the United States' market and its advantageous position in the ranking of that country's trade preferences. With the sole exception of products that are intensive in natural resources, Mexico gained market share at the price of a decrease in the value of its exports. With less drastic price cuts, it was the same for India, which, did not manage to increase both its market share and prices in any category of products.

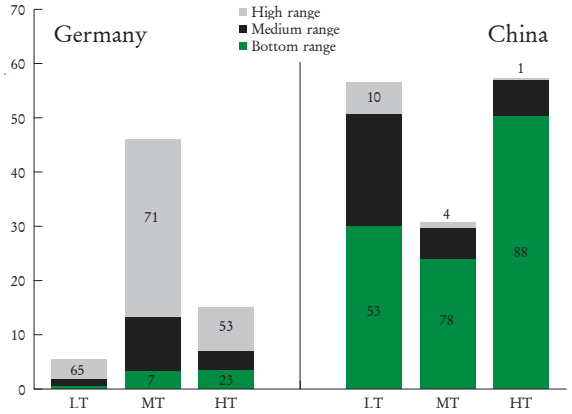
Brazil seemed to get its act together better. Its share increased significantly in the products that are intensive in natural resources with prices falling slightly. Moreover, it grew strongly in the American market for high technology products, concomitant with an increased value of its exports. The same applies to China. With the same increase in prices in this category (45%), it managed to further increase its market share[10]. In all of the other categories of products, Chinese gains in market share were accompanied by falling prices[11].

Looking at developed countries, the contrast between Japan and Germany performances is striking. Germany combined increased value of products with gains in market share everywhere (except for low technology). Japan exports did not exhibit this virtuous combination.

Range specialisation and selection of exporters

How can the older industrialised countries face up to the growth of emerging countries, and in particular China, in the American market? First of all, let us remember that growth in Chinese exports has above all been in high technology products, whereas the European and Japanese exports to the United States are mainly made up of medium technology products; graph 1 compares Germany to China on this point[12]. All this being said, the case of Germany illustrates how a different positioning on the varieties of

Graph 1 – German and Chinese exports to the United States by level of technology and range (2004) - *in billions of dollars*

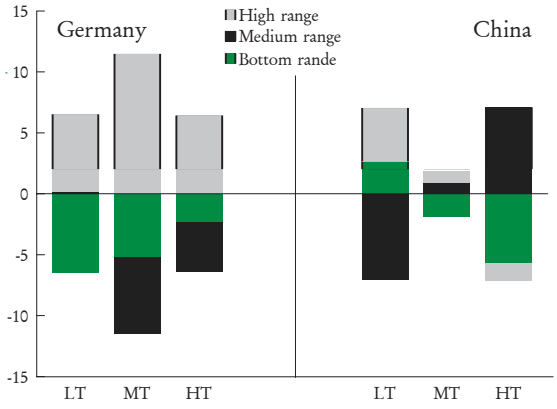


Notes: LT, MT and HT = Low, medium and high technology.
The graph shows the part in % of the different ranges in each group.
Source: BACI, the authors'calculations.

9. Variations in market shares are expressed in percentages in Table 2 (and not in percentage points in table 1); the percentage variation can be very high for some small market shares.
10 Yet we should note that this growth in Chinese unit values for the most technological products is concentrated on a small number of products whose weight in the exports to the United States is important: some types of computers, computer data storage units, mobile telephones and telephone handsets.
11 The conclusion according to which China exports to the United States a set of products that place it at the level of an OECD country, confirms recent work by P.K. Schott. The author shows that Chinese prices even have a tendency to drop in some sectors. P.K. Schott (2006), "The relative sophistication of Chinese exports", *NBER Working Parper* 12173.
12 To make the graph more readable, we have not shown the data for the products intensive in natural resources.

products enables it to preserve and even gain market share when faced with competition from emerging countries. The varieties are identified from the unit values of trade flows, which are used to divide the American imports of each product into three price-ranges (high, medium and low). The products exported by Germany are increasingly located in the high range of varieties (graph 2). Furthermore, this phenomenon is particularly pronounced in the medium technology products, where the vertical differentiation between varieties certainly plays the most significant part. In the case of China, on the contrary, the changes in ranges over the period are very limited for the medium technology products, whereas a gradual rise from the bottom range to the average range takes place in high technology products.

Graph 2 – Changes in the range positioning of German and Chinese exports to the United States by technological level (1995-2004)



Notes: LT, MT and HT = Low, medium and high technology.
Source : BACI, the authors'calculations.

Consequently, the competitive pressure exercised by the emerging countries on the older industrialised countries can be cushioned by the difference in range positioning: the specialisations do not overlap at the finer level of varieties of products. However, let us remember that this form of range specialisation remains... a specialisation. It leads to a reorganisation of companies oriented towards a better valuing of their activity, for example, by a continuous search for quality. This competitive pressure can lead to the disappearance of firms that are insufficiently productive. It can also force firms to select the products from their portfolio on which they have the greatest advantage. In total, the number of products exported by a country to a given market may therefore diminish. Thus, we noted that Germany now exports fewer products to the United States than China. In dynamic terms, the number of German products is tending to decrease (Table 3).

Table 3 – Number of products (HS6) exported to the United States by China and Germany

	All manufactured products	Intensive in natural resources	Low technology	Medium technology	High technology
2004					
China	3 941	1 083	1 274	1 224	360
Germany	3 910	1 037	1 247	1 250	376
Variation 1995-2004					
China	+456	+179	+79	+186	+12
Germany	-33	-15	+5	-10	-13

Source: BACI, the authors'calculations.

To resist the Chinese surge, Europe's champion exporter is relying on range positioning, which, in the end, results in a selection within firms' portfolios of products, even if the phenomenon remains statistically marginal at the level of detail that we are looking at. The selection phenomenon reflects the fact that exports from the older industrialised countries are concentrated on the most productive firms and on their best performing products.

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