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Competing for the U.S. Import Market: Direct investment and export competitiveness

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Série
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Introduction

There have been major changes in the composition of U.S. imports by countries of origin in the past fifteen years. China has been by far the main gainer of market share in the U.S., whilst Japan has been the main loser. Mexico has also increased her market share in U.S. imports, probably benefiting from the North American Free Trade Agreement (NAFTA). On the other hand, the share of Canada in U.S. imports has declined compared to its level in the late 1980s and early 1990s, especially after 1996.

In this same period, Japanese and North American multinationals have invested large amounts of resources abroad. China and Mexico were two of the countries that have benefited from inflows of foreign direct investments.

Although Brazil is not among the major gainers or losers of market share in the U.S., it gained market share in the period between 1992 and 2004. However, in the same period, Brazil lost a significant share of the U.S. market to Mexico.

This paper attempts to make some of the main connections between the gains and losses of market shares of the main exporters to the U.S. and the large outflows of FDI from Japan and the United States. The role of NAFTA on Mexico's gains of market share is also discussed in this paper. In particular, an attempt is made to estimate the effects of NAFTA on Brazil's losses to Mexico.

The paper is organized as follows. Section 1 presents the constant market share model and an extension to it that is aimed at distributing the competitiveness effect of each exporting country to its competitors. Section 2 shows the main gainers and losers of competitiveness in the U.S. import market in the period 1992-2004. It also reveals from which countries China, Japan and Mexico gained market share and to which countries they lost. The gains of Mexico from Brazil and the role of NAFTA in these gains are examined in Section 3. Section 4 looks at the global relocation of the automotive and electronics industries through Japanese and North American direct investments abroad and its effects on the composition of U.S. imports. The relevance of FDI in China, Mexico, and Brazil to their exports to the U.S. is also examined in this section. Section 5 provides some concluding remarks.

1. The CMS model and the method of attributing a country's gains and losses of competitiveness to competitors

In order to address these questions I shall apply the well known method of constant-market-shares analysis to the U.S. import market, comparing imports by country of origin in 2004 with the same import data in 1992 and 1999. I shall also apply a new extension to this method designed to identify for each exporting country the competing countries from which they gained market shares and those to which they lost market shares in these periods.

The Constant-Market-Shares (CMS) model is based on an identity between the change in the market share of a particular exporting country **H** in a given market **K**[1] from the initial year **t** to the final year **t+1** and the so-called product composition and competitiveness effects. The model can be expressed as follows[2]:

$$[1]\quad \Delta k_H \equiv k_H^{t+1} - k_H^t \equiv \underbrace{\left(k_{Hi}^{t+1} - k_{Hi}^t\right) m_{Ki}^{t+1}}_{\text{competitiveness effect}} + \underbrace{k_{Hi}^t \left(m_{Ki}^{t+1} - m_{Ki}^t\right)}_{\text{product composition effect}}$$

Where:

$k_H^t \equiv X_H^t / M_K^t$, is the macro share of country **H**'s exports $\mathbf{X_H}$ in **K** imports $\mathbf{M_K}$ both at the initial year **t**;

$k_{Hi}^t \equiv \left(\frac{X_{H1}^t}{M_{K1}^t}, \ldots, \frac{X_{Hz}^t}{M_{Kz}^t} \right)$, is a row vector of dimension **z** of the micro shares of country **H** in **K** imports of commodity **i= 1,…,z** at the initial year **t**; and

$m_{Ki}^t \equiv \left(\frac{M_{K1}^t}{M_K^t}, \ldots, \frac{M_{Kz}^t}{M_K^t} \right)$, is a column vector of dimension z of the shares in market **K** of commodity **i=1,…,z** at the initial year **t.**

Using these definitions, identity [1] may be re-written as:

$$[2]\quad \left(\frac{X_H^{t+1}}{M_K^{t+1}} - \frac{X_H^t}{M_K^t} \right) M_K^{t+1} \equiv \underbrace{\sum_{i=1}^{z} \left[X_{Hi}^t \left(\frac{M_{Ki}^{t+1}}{M_{Ki}^t} - \frac{M_K^{t+1}}{M_K^t} \right) \right]}_{\text{product composition effect}} + \underbrace{\sum_{i=1}^{z} \left[\left(\frac{X_{Hi}^{t+1}}{M_{Ki}^{t+1}} - \frac{X_{Hi}^t}{M_{Ki}^t} \right) M_{Ki}^{t+1} \right]}_{\text{competitiveness effect}}$$

Therefore, the *product composition effect* calculates to what extent the macro share gain (or loss) of country **H** can be attributed to the concentration of its exports in goods for which import spending is growing more rapidly (or slowly) in relative terms. The *competitiveness effect* calculates to what extent the macro share gain or loss of country **H** can be attributed to the sum of gains and losses of market shares on individual products[3].

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[1] The analysis may be extended to include several destination markets.

[2] This presentation, using vector notation, follows that of Fagerberg and Sollie (1987).

[3] See Leamer and Stern (1970) for a detailed and critical analysis of the constant-market-shares model. Their version of the model is slightly different from the one presented here, since they focus on changes in export revenue rather than on change in market share. As a result, a demand effect appears in their version. But if the demand effect is subtracted from the change in export revenues, the result is the difference between actual export revenue at the end of the period and the value that would have been necessary to maintain the macro

Let us now consider that there are **n** exporters to market **K** so that[4]:

[3] $k_H^t \equiv X_H^t / M_K^t$ are the macro shares of each exporting country **H=1,…,n**;

The change in market share between time **t** and time **t+1** of exporter **H** may be defined as:

$$[4]\ \Delta k_H \equiv k_H^{t+1} - k_H^t \equiv \left(X_H^{t+1} / M_K^{t+1} \right) - \left(X_H^t / M_K^t \right)$$

The changes in micro shares may also be defined as:

$$[5]\ \Delta k_{Hi} \equiv k_{Hi}^{t+1} - k_{Hi}^t \equiv \left(X_{Hi}^{t+1} / M_{Ki}^{t+1} \right) - \left(X_{Hi}^t / M_{Ki}^t \right)$$

Dropping the subscript **i** to ease the notation, $\Delta k_{H,J}$ may be defined as the part of the change in the micro share of exporter **H** that can be ascribed to the change in the micro share of exporter **J**, so that:

$$[6]\ \Delta k_H \equiv \sum_{J \neq H}^{n} \Delta k_{H,J} \equiv \sum_{J \neq H}^{n} \left[\left(X_J^t / M^t \right) - \left(X_J^{t+1} / M^{t+1} \right) \right], \text{ bearing in mind that:}$$

$$\sum_{J}^{n} \left[\left(X_J^{t+1} / M^{t+1} \right) - \left(X_J^t / M^t \right) \right] \equiv 0 .$$

There are basically four desirable properties for $\Delta k_{H,J}$. First, as competitor H cannot gain from or lose to itself, I would like to make $\Delta k_{H,H} = 0$. Second, I would like the gain of exporter H from exporter J to be equal to the loss of exporter J to exporter H, or $\Delta k_{H,J} = -\Delta k_{J,H}$. Third, the sum of the gains and losses of any supplier to all its competitors would be equal to the total gain or loss of that supplier in the period, as established in identity [6]. The fourth, and perhaps the most important property, is that $\Delta k_{H,J}$ ought to have the same sign and be a function of $(\hat{x}_H - \hat{x}_J)$, where $\hat{x}_H$ and $\hat{x}_J$ are the rates of growth of the values sold by exporters **H** and **J**, respectively between **t** and **t+1**. In other words:

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share of the exporting country constant. This, in turn, is equal to the change in market shares times the size of the import market at the final year. That is the left hand side of identity [2].

[4] The analysis here follows Chami Batista (2005), which presents a step by step description of the method of attributing a country's gains and losses of competitiveness to competitors.

$\Delta k_{H,J}=\lambda_{H,J}\cdot\left(\hat{x}_H-\hat{x}_J\right)$, where $\left(\hat{x}_H \equiv \frac{X_H^{t+1}-X_H^t}{X_H^t}\right)$, $\left(\hat{x}_J \equiv \frac{X_J^{t+1}-X_J^t}{X_J^t}\right)$ and $\lambda_{H,J}>0$.

In order to obtain a method that fulfills the four conditions established above, identity [6] may be re-arranged as follows. Multiplying and dividing each term in brackets by the same amounts,

$$\sum_{J\neq H}^{n}\Delta k_{H,J} \equiv \sum_{J\neq H}^{n}\left[\left(\frac{X_J^t}{M^t}\right)\left(\frac{M^{t+1}}{M^{t+1}}\right)-\left(\frac{X_J^{t+1}}{M^{t+1}}\right)\left(\frac{M^t}{M^t}\right)\right]$$, and re-arranging, we have:

$$\sum_{J\neq H}^{n}\Delta k_{H,J} \equiv \sum_{J\neq H}^{n}\left\{\left(\frac{X_J^t X_H^{t+1}}{M^t M^{t+1}}\right)-\left(\frac{X_J^{t+1} X_H^t}{M^t M^{t+1}}\right)+\sum_{J\neq H}^{n}\left[\left(\frac{X_J^t}{M^t M^{t+1}}\right)\sum_{J\neq H}^{n}X_J^{t+1}-\left(\frac{X_J^{t+1}}{M^t M^{t+1}}\right)\sum_{J\neq H}^{n}X_J^t\right]\right\}$$

The second term on the right hand side of the above identity is actually equal to zero, so identity [6] may be re-written as:

[7] $$\sum_{J\neq H}^{n}\Delta k_{H,J} \equiv \sum_{J\neq H}^{n}\left[\left(\frac{X_J^t X_H^{t+1}}{M^t M^{t+1}}\right)-\left(\frac{X_J^{t+1} X_H^t}{M^t M^{t+1}}\right)\right].$$

Note that taking each change in market share $\Delta k_{H,J}$ as the change in the market share of exporter H attributed to exporter J, we have:

$\Delta k_{H,J} \equiv \left(\frac{X_J^t X_H^{t+1}}{M^t M^{t+1}}\right)-\left(\frac{X_J^{t+1} X_H^t}{M^t M^{t+1}}\right)$, which can be rewritten as:

[8] $\Delta k_{H,J} \equiv \frac{\left(\hat{x}_H-\hat{x}_J\right)}{1+\hat{m}}\cdot k_H \cdot k_J$, where $\hat{m} \equiv \frac{\left(M^{t+1}-M^t\right)}{M^t}$

It is easy to see that identity [8] fulfills the four desirable conditions set up above.

2. Main Gainers and Losers of Competitiveness in the U.S. Import Market

Table (1) shows the competitiveness effects by exporting countries that result from applying the constant-market-shares analysis to U.S. imports in the period 1992-2004[5]. China is by far the largest gainer of competitiveness with almost half of the total gains. Mexico comes second with export revenues in 2004 near $50 billion in excess of what would have been necessary to maintain constant its 1992 shares of all products in U.S. imports. On the other hand, Japan is the main loser of competitiveness in the period, followed by Taiwan and Canada. It should be noted that the loss of Japan is of the same order of magnitude of the gain of China, both over the extraordinary mark of $100 billion. The loss of Canada in the period may seem surprising in view of NAFTA's implementation. But, in fact, previous agreements had already given Canada almost free access to the U.S. import market[6], and Mexico turned out to be a fierce competitor for Canada in the U.S. market after NAFTA.

Table (1): Main Gainers and Losers of Competitiveness in the U.S. Market: 1992-2004 ($billion)

Gainers	Gains		Losers	Losses	
China	134.0	46%	**Japan**	-112.6	38%
Mexico	48.9	17%	**Taiwan**	-36.0	12%
Ireland	17.1	6%	**Canada**	-27.5	9%
Russia	9.4	3%	**U.K.**	-20.9	7%
Others	83.4	28%	**Others**	95.8	33%
TOTAL	292.9	100%	**TOTAL**	292.9	100%

Table (2) reveals the competitiveness effects for the subperiod 1999-2004. China accounted for almost 60 percent of the total gains in this subperiod, showing that 68 percent of China's gains between 1992 and 2004 took place in the last five years[7]. Mexico, on the other hand, lost competitiveness in the period, revealing that its gain between 1992 and 2004 took place entirely in the period 1992-1999. Canada became the second main loser of competitiveness right after Japan in the subperiod 1999-2004. By noting the differences between the two periods, it is possible to infer that Canada gained competitiveness in the subperiod between 1992 and 1999. Ireland was the second main gainer in 1999-2004, followed by three exporters with large shares of resource-based products in their total export revenues: Nigeria, Brazil and Vietnam.

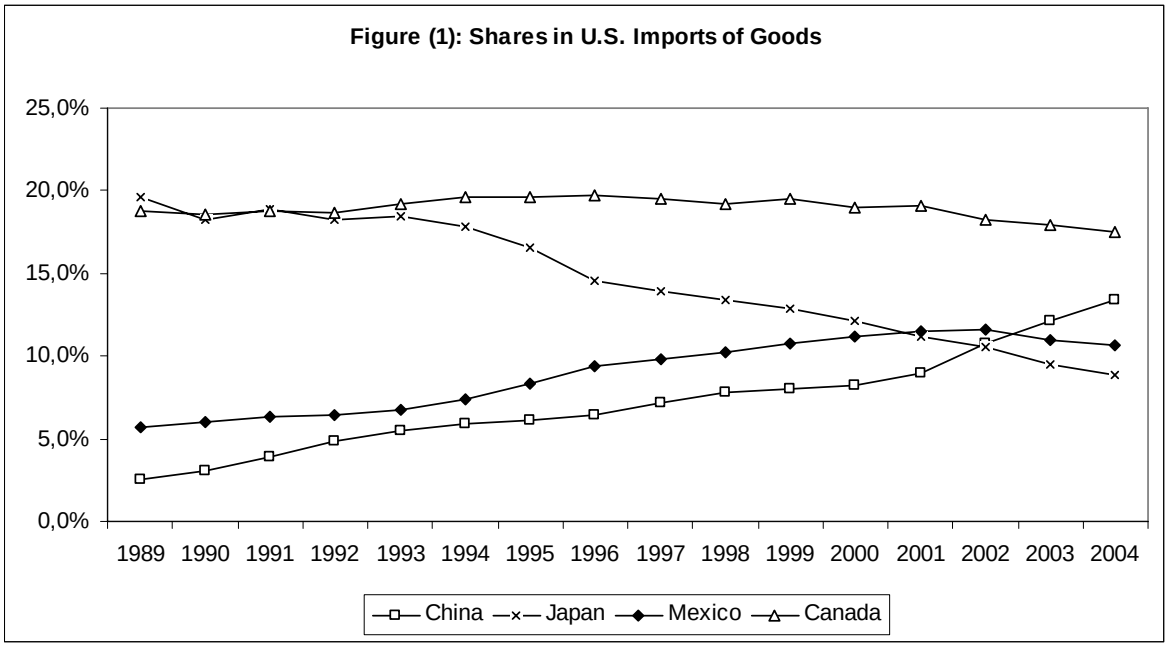
Considering the period from 1989 to 2004, Figure (1) reveals the evolution of the aggregate shares[8] in U.S. imports of the main gainers and losers of competitiveness, highlighting the dynamics of the gains and losses of macro shares. It shows quite clearly the rise in

[5] Data for U.S. imports by country of origin are based on 5-digit SITC, Revision 3, imports for consumption, customs value (FOB), from United States International Trade Commission - USITC.
[6] Although all tariffs on U.S.-Canada trade in goods originating in the two countries were only eliminated as of January 1, 1998, "much of trade within U.S. multinational companies between the United States and Canada had already been tariff-free under the provisions of the 1965 United States-Canada Auto Agreement", Zeile (2003), p.12.
[7] Gains or losses in 1992-1999 are calculated by difference between the figures of 1992-2004 and 1999-2004.
[8] The changes in aggregate shares include the product composition and the competitiveness effects together.

Mexico's share since 1989, the acceleration between 1993 and 1996 following the implementation of NAFTA and the depreciation of the peso, and the decline after 2002. China's share grew fast until 1993, decelerated after that, but showed a spectacular increase after 2001, probably reflecting her accession to WTO membership. The fall in Japan's share was also impressive, especially between 1993 and 1996. The decline in Canada's share was smooth and took place after 1996.

Table (2): Main Gainers and Losers of Competitiveness in the U.S. Market: 1999-2004 ($billion)

Gainers	Gains		Losers	Losses	
China	91.7	59%	**Japan**	-35.6	23%
Ireland	8.9	6%	**Canada**	-32.3	21%
Nigeria	5.8	4%	**Taiwan**	-13.3	9%
Brazil	5.2	3%	**U.K.**	-12.5	8%
Vietnam	4.4	3%	**Mexico**	-8.6	6%
Others	38.5	25%	**Others**	-52.3	34%
TOTAL	154.5	100%	**TOTAL**	-154.5	100%

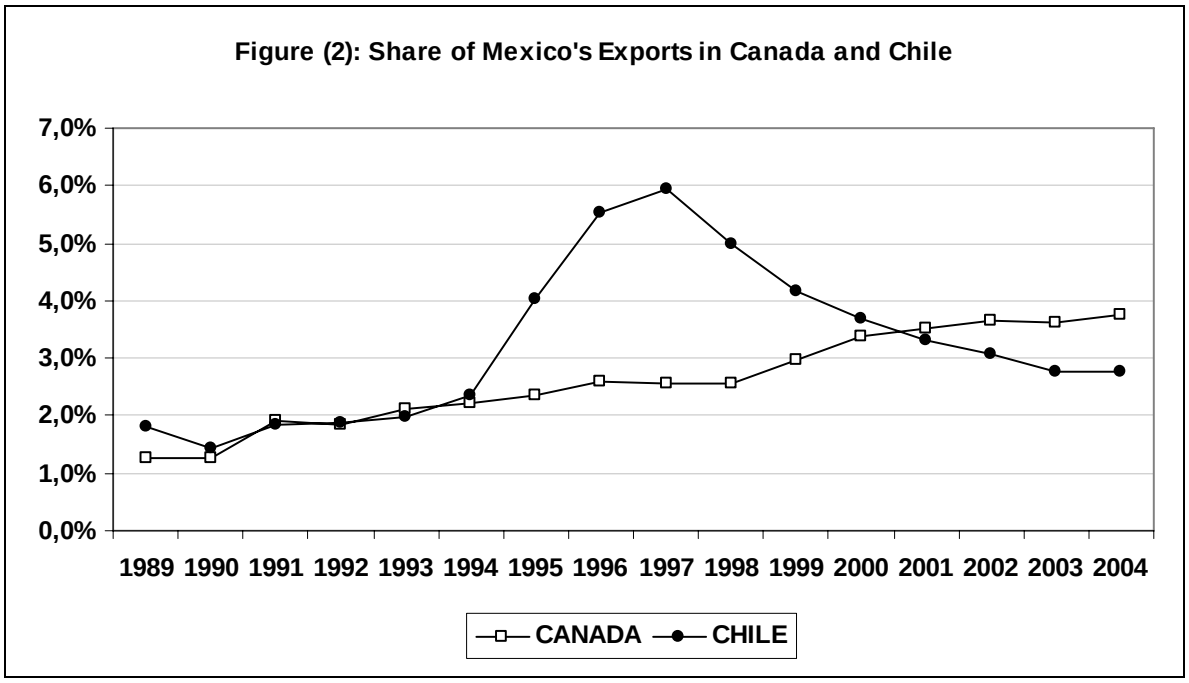


Source: USITC

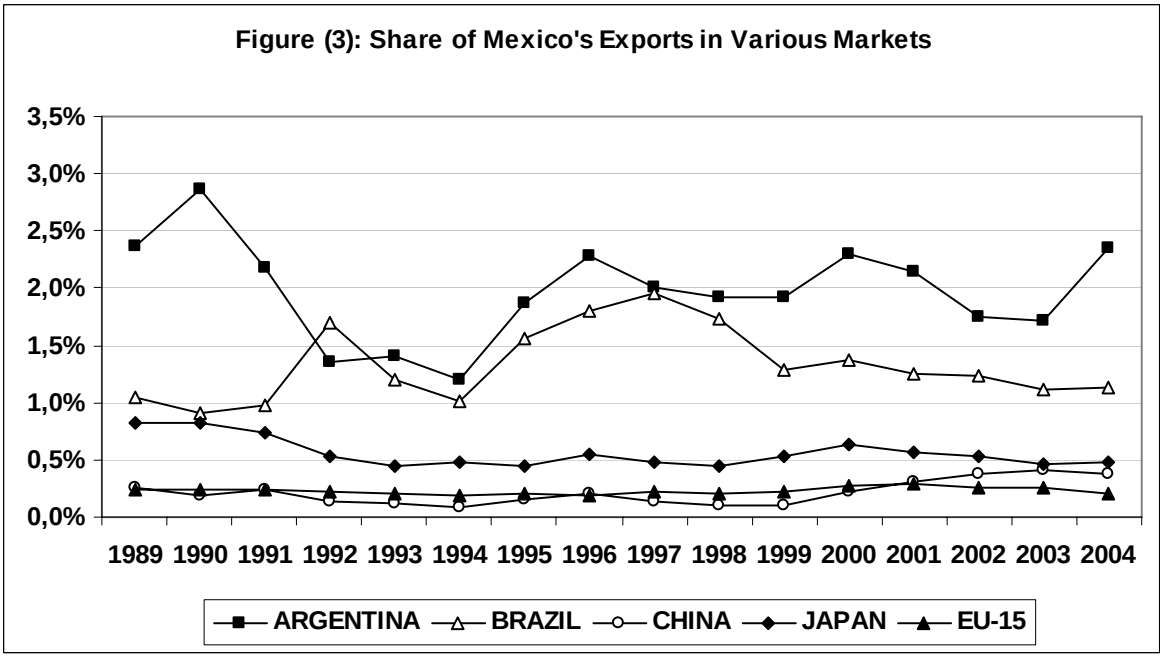
Figure (2) reveals that Mexico's exports also tended to rise as a share of imports of goods in Canada and Chile. In both cases, Mexico appears to have benefited from the FTAs with these countries[9]. However, it is interesting to observe that the performance of Mexico's exports in other import markets was not as good as in the North American and Chilean markets. Figure (3) shows the shares of Mexico in the imports of goods by Argentina, Brazil, China, Japan, and the European Union (15). The rise in the very small market share of Mexico in the EU (15) after 1998 follows the start of the FTA between these countries,

[9] In Chile, most of Mexico's gains, but not all, proved to be only temporary.

but it is short lived, coming back in 2004 to the same levels as in 1998, 1996 and 1994. In Argentina, Brazil, China, and Japan, the shares of Mexico's exports fluctuated in the period, showing no clear trend[10].



Source: Comtrade, UN.



Source: Comtrade, UN.

[10] Mexico's share of the Chinese import market shows a rising trend after 1999, though from a very small base.

Therefore, the continuous rise in the U.S. market share of Mexico from 1992 to 2002 appears to be related to NAFTA, since the performance of Mexico's exports was relatively modest in the same period in markets where it did not benefit from FTAs. In contrast, China tended to gain market shares in all these markets[11].

2.1 Attributing the gains and losses of China to her competitors in the U.S. import market

Let us now apply the method of attributing a country's gains and losses of competitiveness to competitors. Table (3) shows the gains and losses of China by the main competing countries in the period 1992-2004. In this period, most of China's gains came from the main overall losers: Japan, Taiwan and Canada. Together, they accounted for half of China's gains. Note that, despite NAFTA, China gained from Mexico. China also gained from the other more industrialized countries of Asia: Republic of Korea, Singapore, Malaysia, Hong Kong, and others.

In point of fact, China's loss was very small in the period, only $3 billion, and none of the exporters that gained from China is a developed country. Almost all of them are poor countries and they gained from China in natural resource-based products (petroleum and its derivatives; and shrimps) and textiles (clothing and footwear), often made of cotton. China lost competitiveness in only 327 products out of 3015 products[12] exported to the United States in the period. Although this loss still is very small, it is possible to see that resource rich and low wage countries are beginning to gain from China in resource-based-low-wage products. This is because Chinese wages are bound to rise and the exchange rate tends to appreciate as a result of China's development. China's losses to Vietnam were concentrated in the subperiod 1999-2004 (98%) and in articles of apparel and clothing accessories (56%), and footwear (22%).

Table (3): China's Gains & Losses by competitors in the U.S.: 1992-2004			
Gross Gain ($billion)	**137.2**	**Gross Loss ($billion)**	**-3.2**
Japan	24%	Vietnam	24%
Taiwan	18%	Pakistan	7%
Canada	8%	Cambodia	7%
Korea	7%	Nigeria	5%
Mexico	6%	Saudi Arabia	5%
Singapore	5%	Honduras	5%
Germany	4%	El Salvador	4%
Malaysia	3%	India	4%
Hong Kong	3%	Russia	4%
Net Gain ($billion)	**134.0**		

[11] The share of China in import goods of the EU (15) market rose continuously from 0.7 percent in 1989/1990 to 1.7 percent in 1994/1995, 2.7 percent in 1999/2000 and 4.4 percent in 2003/2004. Similar performances occurred in the import goods markets of Brazil, Canada, Chile and Mexico, starting with less than 1 percent in 1989/1990 the share of China rose to between 5.5 percent in Brazil and 7.9 percent in Chile. The share of China in Japan's imports of goods rose from 5.2 percent in 1989/1990 to 20.2 percent in 2003/2004. Data are from the United Nations, Comtrade database, http://unstats.un.org/unsd/, accessed in November 2005.

[12] 5-digit SITC, revision 3.

China's major gains from Japan and other Asian countries in 1992-2004 were concentrated in products of the computer industry (Japan, Singapore, Taiwan and Korea), some consumer electronics such as video recording (Japan and Korea) and video games (Japan), transmission apparatus or cellular phones (Japan and Singapore), and leather footwear (Korea and Taiwan). China's gains from these countries were more or less split in the subperiods 1992-1999 and 1999-2004.

China's main gains from Mexico in the same period came largely from the telecom industry (TV sets, parts and accessories), from the computer industry (digital processing units, components and parts), from the electrical industry (insulated electric conductors and static converters), and from metal finished products (domestic cooking appliances). The gains of Mexico from China were relatively small, totaling $1.4 billion against losses of $9.8 billion, and were mainly in natural resources (petroleum and shrimps), articles of apparel and clothing accessories, cellular phones, and electrical machines and apparatus.

China's gains from Mexico were larger in the period 1999-2004 than in 1992-2004, especially in electronics[13], implying that Mexico actually gained from China in 1992-1999 on the basis of the 2004 U.S. import structure[14]. Note that Mexico is the sole exception, no other country among the top 15 losers to China in 1992-2004 gained from China in 1992-1999. Canada lost to China in 1992-2004, particularly in computer products (SITC 75997 and 75230), auto parts (SITC 78439), and furniture (SITC 821), and 92 percent of these losses were concentrated in the period 1999-2004.

2.2 Attributing the gains and losses of Japan to her competitors in the U.S. import market

Table (4) shows that Japan lost to the main gainers: China and Mexico. In fact, Japan lost to all the gainers and to all of the big losers of competitiveness in the U.S. market except Hong Kong. Note, however, that Japan's total gross gain was negligible.

Japan's main losses to China were already analyzed and found to be largely concentrated in the electronics industries. The losses to Mexico were mainly in the automotive industry (29 percent), electrical equipment (17 percent), telecom products (13 percent) and computers (10 percent)[15]. The losses to Canada were heavily concentrated in products of the automotive industry[16]. Two products accounted for 62 percent of the gains of Korea from Japan: automobiles (40 percent) and cellular phones (22 percent). Automobiles also accounted for 61 percent of Germany's gains from Japan, while 57 percent of the gains of Malaysia from Japan were in products of the computer industry. Ireland obtained 78 percent of her gains from Japan in products of the chemical industry. To Taiwan, the main

[13] Electronic products or industry includes computers, telecom equipment, electrical equipment and appliances, and consumer electronic products or industries.
[14] Recall that the competitiveness effect is calculated by the difference in market shares times the value of the import market at the final year; i.e, 2004.
[15] The main products were automobiles (18 percent) and trucks (SITC 78120 and 78219); computers (75230 and 75260); boards for electric control or distribution of electricity (77261); cellular phones (76432) and radio receivers with sound recording apparatus (76211).
[16] The automotive industry accounted for 58 percent of Japan's losses to Canada, with only cars (SITC 78120) accounting for 48 percent and trucks (SITC 78219) for 6 percent.

losses of Japan were in unrecorded media (17 percent), integrated units (18 percent), computers and parts (14 percent), TV sets (2 percent), and video recording apparatus (2 percent).

Table (4): Japan's Gains & Losses: 1992-2004	
Gross Loss ($billion)	**-113.2**
China	**29%**
Mexico	**15%**
Canada	**12%**
Korea	**9%**
Germany	**8%**
Malaysia	**4%**
Ireland	**4%**
Taiwan	**3%**
Gross Gain ($billion)	**0.5**
Hong Kong	**76%**
Net Loss ($billion)	**-112.6**

2.3 Attributing the gains and losses of Mexico to her competitors in the U.S. import market

Mexico also gained mostly from the large overall losers in the U.S. import market in 1992-2004, though Canada and some European countries had a much larger weight in Mexico's gains than in the overall losses shown in Table (1). It should be noted in Table (5) that China accounted for 70 percent of Mexico's relatively small losses in the period[17]. Almost all the other countries to which Mexico lost in this period were exporters of some specific resource-based products, such as petroleum and derivatives from Iraq, Algeria, and Russia, but these losses totaled just $4 billion.

Mexico's gains from Japan were already analyzed. Canada's losses to Mexico were heavily concentrated in products of the automotive industry which accounted for 57 percent of Canada's total losses to Mexico: trucks (37 percent); passenger cars (6 percent); road tractors for semi-trailers (6 percent); parts (6 percent); and others (2 percent). This does not include the losses in internal combustion piston engines which accounted for another 4 percent of Canada's losses to Mexico.

Mexico's gains from Taiwan include computers (21 percent), transmission apparatus and cellular phones (9 percent), lighting fixtures (6 percent), padlocks and locks of metal (7 percent), ignition wiring sets used in vehicles and other electric conductors (16 percent), and articles of apparel and clothing accessories (10 percent)[18].

[17] As we already know, Mexico's losses of competitiveness were concentrated in 1999-2004, especially after 2002.

[18] According to SITC: computers (75230 and 75260); transmission apparatus and cellular phones (76431, 76432); lighting fixtures (81311); padlocks and locks of metal (69911); ignition wiring sets used in vehicles and other electric conductors (77313 and 77315) articles of apparel and clothing accessories (84).

Mexico's gains from the UK were mainly in crude petroleum (SITC 33300) and computers (75230), while from Germany they were mainly in engines for vehicles and their parts (SITC 713); pumps for engines (74220); other pumps (74319); some metals (67,68,69), electrical products (77); instruments and appliances for medical purposes (87229 and 87221); and other professional, scientific and controlling instruments (87).

Table (5): Mexico's Gains & Losses: 1992-2004	
Gross Gain ($billion)	**60.9**
Japan	**28%**
Canada	**23%**
Taiwan	**7%**
U.K.	**5%**
Germany	**5%**
Gross Loss ($billion)	**-12.0**
China	**70%**
Net Gain ($billion)	**48.9**

3. Mexico's Gains from Brazil

Mexico competitiveness gain from Brazil amounted to $686 million in the period 1992-2004. Although this represented only 1.1 percent of Mexico's gross gains, it represented 15 percent of Brazil's gross losses of $4.6 billion in the period. In point of fact, Brazil was a net gainer of competitiveness in the period, but lost first to China, which accounted for 37% of Brazil's gross losses, and second to Mexico.

Considering Brazil's gains and losses by competing countries in the subperiod 1999-2004, it is possible to see that Brazil gained from Mexico in this period, which implies that Brazil's losses to Mexico in 1992-2004 were entirely concentrated in the period between 1992 and 1999. NAFTA was implemented during this last subperiod, but this was also the subperiod in which the Brazilian currency suffered a major appreciation against the Mexican currency. Furthermore, the second subperiod coincides with a strong depreciation of the Brazilian currency against the Mexican currency. Therefore, the effects of NAFTA and exchange rate changes on Mexico's gains and losses to Brazil need to be disentangled.

Examining Brazil's gross losses to Mexico by product in the period 1992-2004, it turns out that 29 percent of these losses occurred in the steel industry and 23 percent in the automotive industry, including engines, vehicles and parts. More interestingly, out of a total gross loss of $1.27 billion to Mexico, 10 percent were in a group of products for which Brazil gained competitiveness overall[19] in the period; 37 percent were in a group of products for which Mexico accounted for at least 75% of Brazil's losses; and 34 percent were in a group of products for which Mexico accounted for between 10 percent and less than 75 percent of Brazil's losses. Altogether, these products accounted for $1.04 billion, 81 percent of Brazil's gross loss in the period, or 4.7 percent of Brazil's exports to the U.S.

[19] That is against all competitors taken as a group, including Mexico.

in 2004. Just the first two groups of products accounted for $600 million, 47 percent of Brazil's gross loss, or 2.8 percent of Brazil's exports to the U.S. in 2004.

Brazil paid import tariffs in 1994 and 2004 for the products which accounted for at least 98 percent of the losses made in the products of the first group, 96 percent of the second group, and 78 percent of the third group. One should bear in mind that the existence of a margin of preference to Mexico does not necessarily imply that Brazil's losses were entirely due to NAFTA. On the other hand, NAFTA may have played a part even in products for which imports are tariff-free in the U.S., due to economies of scope, economies of scale and externalities generated by NAFTA regarding the production and transportation to the U.S. of all goods from Mexico.

Furthermore, one can argue that even in products where Brazil gained market share from Mexico, NAFTA may have reduced these gains. Therefore, one could rather conservatively estimate the negative effect of Mexico's participation in NAFTA on Brazil as something between 2.8 percent and 4.7 percent of Brazil's exports to the U.S., compared to an expectation, before the implementation of NAFTA, of less than 1 percent of Brazil's exports to the U.S.[20].

In order to explore why China and Mexico gained while Japan lost competitiveness in the U.S. import market in 1992-2004, it will be interesting to examine the role played in these trade gains and losses by multinational companies, especially Japanese and North American companies, considering their location decisions. It is well known that U.S. imports of the automotive and electronics industries are to a large extent related party trade[21]. In point of fact, related party trade accounted for 93.4 percent of U.S. imports of motor vehicles, 70.2 percent of computers, 72.5 percent of communications equipment, and 66.2 percent of chemicals in 2004[22]. Related party trade also accounted for 61 percent of U.S. imports from Mexico, 79 percent of U.S. imports from Japan, but only 27 percent of imports from China, compared to an average of 48% of total U.S. imports in 2004[23].

Therefore, the analysis of foreign direct investment into the U.S. and of U.S. foreign direct investment abroad as well as U.S. imports from U.S. affiliates abroad may shed some light on the factors behind the gains and losses of some exporting countries to the U.S. import market. In the next sections, an attempt is made to relate the operations of Japanese and U.S. multinationals to the gains and losses of exporters in the U.S. import market, especially in the automotive and electronics industries.

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[20] See Chami Batista and Azevedo (2002) for a similar result for the period 1992-2001.

[21] Related party trade includes trade by U.S. companies with their subsidiaries abroad as well as trade by U.S. subsidiaries of foreign companies with their parent companies. The definition of related party for imports is based on an ownership share of at least 6 percent; see Zeile (2003), p.1.

[22] Exhibit 4 - Imports for Consumption for Selected Four-digit NAICS Codes: 2004; U.S. Census Bureau News, U.S. Department of Commerce, 12 April 2005. These data may contain a bit of double-counting in special cases where a U.S. parent company is itself a foreign-owned affiliate; see Zeile (2003), p.8.

[23] Overall related party share of imports has remained relatively constant since 1992, varying only from 45 to 48 percent of imports. Related party trade with Canada, Mexico and Japan has also remained quite stable as a proportion of U.S. total imports of goods from these countries, but the related party shares of Korea, Taiwan, China and Eastern Europe have shown a substantial increase since 1992. See U.S. Census Bureau News, U.S. Department of Commerce, 12 April 2005.

4. Relocation of the Automotive and Electronics Industry

It comes out clearly from the previous analysis that most of the gains and losses of the main exporters to the U.S. are concentrated in the automotive and electronics industries. Japan is always the main loser as an exporter to the U.S. of products of these two industries. In the automotive industry, Japan lost mainly to Mexico, Korea, Germany and Canada, but Canada also lost to Mexico. In computers, Japan lost mainly to China, Mexico, Korea, Taiwan and Malaysia, China gained from Canada, Mexico and Taiwan, and Mexico gained from Korea and Taiwan. In the telecom industry, Japan lost mainly to Korea and Malaysia, Canada lost to Korea, and Mexico to China. Finally in consumer electronics, Japan lost mainly to China, Taiwan, and Malaysia, and Mexico lost to China.

These changes in market shares of the main exporters to the U.S. reflect a major relocation of these industries in the world. In particular, Japanese FDI abroad appears to be especially relevant to explaining the losses of Japan's exports in the U.S. market. Indeed, although the share of Japan in U.S. imports of automotive and electronic products decreased drastically in the period, Japanese companies seem to have maintained their position in the market through massive foreign investments in these industries abroad. U.S. FDI in Mexico has also been very important for Mexico's exports back to the United States. China's exports, on the other hand, benefit from FDI from Hong Kong, Taiwan, as well as from the U.S. and Japan, among others.

4.1 Japanese direct investments in affiliates abroad

Japanese cumulative outward foreign direct investments totaled $733 billion[24] in the period from 1989 to 2004, of which $264 billion (36 percent) went into manufacturing industry abroad. The electrical-and-electronics industry accounted for 29 percent of the outward direct investments in manufacturing industry from Japan in the period, while the transportation equipment industry accounted for 17 percent[25]. Therefore, these two industries accounted for little less than half of Japanese outward direct investments in manufacturing industry in the period. These were the two most important manufacturing industries in which Japan has invested abroad. The result has been a phenomenal relocation of Japanese industrial production capacity.

A large part of these outflows of Japanese investment went to North America, especially in the period 1989-98, as Table (6) shows. In the last five years, from 1999 to 2004, Japanese multinationals made an interesting move, relocating their foreign investments towards Europe and Latin America[26]. This was particularly true for Japanese investments in the transportation equipment industry in Europe, which accounted for almost half of all

[24] This figure was obtained by converting the annual figures from yens into dollars using the average exchange rate from the IMF. The total outward direct investment from Japan was 87587 billion yen in the period. See Ministry of Finance of Japan: http://www.mof.go.jp/english/e1c008.htm.
[25] These percentages are based on values in yens.
[26] Although total Japanese outward FDI per year fell in 1999-2004 compared to 1989-1998, Japanese outward FDI in manufacturing industry per year actually increased when these subperiods are compared, both in current yens and current U.S. dollars.

Japanese FDI in this industry in this subperiod[27]. China has also received a large and increasing proportion of Japan's investment, especially in manufacturing, and more specifically, in the transportation equipment industry. This might represent a big threat for exporters of products from the automotive industry in the future, since Chinese auto assemblers have so far focused on the domestic market. Chinese exports of auto parts, nevertheless, have already been gaining market share in the U.S. import market[28].

TABLE (6): Outward Foreign Direct Investment from Japan (in percent based on Japanese yens)

Regions and Countries	Total			Manufacturing Industry		
	1989-2004	1989-1998	1999-2004	1989-2004	1989-1998	1999-2004
North-America	37.9	43.8	26.3	40.1	43.3	35.7
USA	36.4	42.1	25.1	37.5	40.6	33.3
Canada	1.5	1.7	1.2	2.6	2.7	2.4
Latin America	11.2	9.4	14.9	4.5	3.8	5.5
Brazil	1.4	1.3	1.8	2.0	1.7	2.3
Mexico	0.5	0.4	0.9	1.3	1.0	1.8
Asia	17.3	17.9	16.1	27.7	30.5	23.7
China	3.8	3.2	4.9	8.1	7.5	9.0
Europe	27.8	21.8	39.6	24.7	18.4	33.6
Other	5.8	7.1	3.0	3.0	4.0	1.6
Regions and Countries	**Transportation Industry**			**Electrical & Electronics**		
	1989-2004	1989-1998	1999-2004	1989-2004	1989-1998	1999-2004
North-America	25.8	40.4	12.5	54.4	48.9	61.5
USA	23.6	36.1	12.3	53.6	47.6	61.5
Canada	2.2	4.3	0.2	0.7	1.3	0.0
Latin America	9.2	8.9	9.5	2.5	2.2	2.9
Brazil	2.1	2.6	1.7	1.5	0.6	2.6
Mexico	6.2	5.3	7.0	0.1	0.1	0.0
Asia	24.9	23.0	26.6	24.2	28.2	19.0
China	9.1	5.4	12.6	6.6	6.9	6.3
Europe	36.1	21.9	49.0	18.6	20.3	16.3
Other	4.0	5.8	2.4	0.3	0.3	0.4

Source: Ministry of Finance of Japan, http://www.mof.go.jp/english/e1c008.htm. Access in November 2005.

As it is well known, investments of Japanese car makers in the U.S. began in the early 1980s, in response to U.S. threats of a trade war. The share of Japanese imported cars in the

[27] The fact that the UK accounts for a large part of the relative rise in Japanese FDI in Europe in the period 1999-04 suggests that this move was not related to the monetary union of Europe. The relative rise in the UK as a destination for Japanese FDI was largely due to investments in the food industry. The Netherlands, which together with the U.K accounted for most of the relative rise in Japanese investments in Europe, received a large proportion of Japanese investments in transportation equipment, electrical-and-electronics, and chemical industries. The share of Japanese investments in the transportation equipment industry also went up in France, Belgium and Sweden. In Ireland, the relative rise has to do with the chemical industry, which accounted for 78 percent of Japanese investments in manufacturing industry in that country from 1989 to 2004 and for 95 percent in the period from 1999 to 2004. As already seen, the chemical industry also accounted for 78 percent of Japan's losses to Ireland in the U.S. import goods market in 1992-2004.

[28] The competitiveness gain of China in the U.S. import market of auto parts (SITC 784) totaled $1.3 billion in 1992-2004, of which 75 percent took place in 1999-2004. The main losers to China were Canada (44%), Japan (25%), Mexico (10%), and Germany (5%).

U.S. car market had increased from 12 percent in 1978 to 20 percent right after the second oil shock, widening the U.S. trade deficit with Japan. The Japanese government compromised, agreeing with "voluntary" export restraints (VERs)[29]. Honda started its transplant production in the U.S. in 1982, Nissan in 1983, and Toyota (New United Motor Manufacturing Inc., NUMMI) in 1984[30]. The appreciation of the Japanese yen after the Plaza agreement in 1985 gave a further incentive to Japanese foreign direct investments abroad.

As a result of these investments, Japanese automakers increased their production in the U.S. from 0.6 million vehicles in 1986 to 1.7 million in 1992, whereas Japanese exports of vehicles to the U.S. fell from 3.4 million units to 1.8 in the same period. However, this process deepened after 1992 and, in 2004, Japanese exports were down to 1.6 million units, while Japanese production in the U.S. reached 3.2 million units. Japanese affiliates in the U.S. also produced 3.2 million engines in 2004[31]. Therefore, although this relocation did not start with NAFTA, it continued under NAFTA.

Locally built vehicles accounted for 67 percent of the total supply of Japanese cars and trucks in the U.S. market in 2004 compared to 48.6 percent in 1992 and 12 percent in 1986. Import penetration from Japan in the U.S. retail market of passenger cars fell from 20.1 percent in 1985 to 17.7 percent in 1992 and 8.8 percent in 1997[32]. However, the retail market share of passenger cars from all Japanese manufacturers[33] increased from 20.1 percent in 1985 to 30.1 percent in 1992 and 31 percent in 1997[34]. Daimler AG purchased Chrysler Corporation in 1998, but the market share of the "Big 3" (GM, Ford, and DCX) fell from 73.7 percent in 1993 to 59.2 percent in 2003[35]. On the other hand, Japanese manufacturers of cars and trucks increased their share of the U.S. market from 19.3 percent in 1985 to 24 percent in 1992 and to 28.2 percent in 2003[36].

According to a Japanese annual survey[37], sales to the U.S. transportation equipment market of a sample of Japanese affiliates located in the U.S. rose from $20 billion in 1992 to $70 billion in 2001, an increase of $50 billion in the period. However, sales of Japanese affiliates from China and Europe to the U.S. transportation equipment market increased only $260 million and $8 million in the same period, respectively, while sales from other Asian countries actually declined $1.48 billion in the same period.

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[29] For a review of these negotiations see Ichira (2005).
[30] See JAMA (2005a) and McAlinder and Swiechi (2005).
[31] The Japanese cumulative investment in U.S. auto and auto parts manufacturing plants grew from $11 billion in 1993 to $28 billion in 2004, while the number of plants grew from 11 in 1993 to 25 in 2004 and is expected to rise to 28 in 2006. See JAMA (2005b).
[32] Including trucks, import penetration from Japan in the U.S. was 19 percent in 1985, 14.2 percent in 1992, and 8.2% in 1997. Import penetration is calculated as units imported over sales in the U.S. market.
[33] Locally build cars plus imports.
[34] Data are from AAMA (American Automobile Manufacturers' Association), http://www.economagic.com/aama.htm, Accessed in November 2005.
[35] See McAlinder (2004).
[36] For 1985 and 1992, data are from AAMA and for 2003 from McAlinder (2004).
[37] See Survey of Japanese Foreign Affiliates (Kaigai Jigyo Katudou), Ministry of Economy and Trade of Japan, available only in Japanese. Out of 14991 Japanese foreign affiliates from all industries and countries, 62.9 percent responded to the survey.

According to another survey of Japanese affiliates in the U.S.[38], the number of Japanese plants in transportation equipment and parts rose from 311 in 1997 to 398 in 2002. Procurement of U.S.-made raw materials and parts was quite high, with over half of the plants reporting local content ratio of over 70 percent and two-thirds of the plants reporting a ratio of over 50 percent. Japan is the main import source of materials and parts, with 85 percent. However, local content and imports from Japan are declining and are expected to continue to decline as Japanese plants in the U.S. are changing their procurement sources to China, especially in electric-electronic parts, and to Mexico, especially in auto parts. Competition from Chinese imported products was strongly felt by Japanese plants in the U.S. in the textile[39], electric and electronic related industries, but had limited impact on transportation equipment related industries.

Japanese outward foreign direct investments in electrical-and-electronics industry were heavily concentrated in the U.S. economy, according to the evidence presented in Table (6). Brazil, Korea and Taiwan also increased their share of Japanese foreign investments in this period, but Mexico, Canada, Europe and the rest of Asia, including China, saw a decrease in their shares. It appears that, except for Brazil, Japanese foreign investments in this industry were channeled to countries with skillful labor, specialized knowledge and R&D infra-structure. In Brazil, these investments seem to be largely related to new assembly plants for the production of cellular phones, whose exports to the U.S. experienced a recent boom.

Sales of electrical and electronic products of a sample of Japanese affiliates in the U.S. to the local market increased from $20.3 billion in 1992 to $46.1 billion in 2001, whereas in the same period exports of Japan to the U.S. of these products fell from $33.1 billion to $31.6 billion. Sales of these products of Japanese affiliates from China, from other Asian countries and from Europe to the U.S. market increased $1.63 billion, $4.27 billion, and $33 million in the same period, respectively[40]. Exports of this sample of Japanese affiliates in China to the U.S. in 2001 were equivalent to just 5.5 percent of China's total exports of electrical and electronic products.

According to a government report[41] "…Japanese companies saw their global market shrink as the electronics industry continued shifting its production operations overseas"… But "to acquire a high share of world markets, production in China and other Asian countries is essential". However, "Japanese companies have also begun rebuilding their development and production systems within Japan, through management reforms, development of new products, improvement of high-mix low-volume production methods, reduction of product development and delivery times and costs, and increased domestic production of semiconductors. As a result, manufacturers of digital consumer electronic products such as flat screen TVs and digital cameras have succeeded in capturing large global market shares

[38] See Jetro (2003).
[39] "among textile plants, as much as 47.1 percent indicated the plan to stop manufacturing in the U.S. as a result of increased influx of imports from China", Jetro (2003), page 13.
[40] See Survey of Japanese Foreign Affiliates (Kaigai Jigyo Katudou), Ministry of Economy and Trade of Japan.
[41] See Jetro (2004), p.21.

by bringing to market new products that were first experimentally manufactured and then mass produced in Japan". The ratio of domestic production to world production of Japanese manufacturers and the world share of Japanese manufacturers of some consumer electronic novelties such as car navigation systems (100%, 99.7%), plasma display panels - PDPs (99.1%), video tape recorder - VTR cameras (87.2%, 84.6%), liquid crystal displays - LCD TVs (81.5%), compact/small and medium color liquid crystal parts (78.1%), DVD recorders (65.4%) and digital cameras (81.2%, 57.7%) were both over 50% in 2003[42]. In point of fact, Japanese companies in the electronics sector, despite the fall in the share of Japanese exports in this sector, remain at the top of the 2002/3 world rank, occupying five of the top ten in electronics revenues and ten of the top thirty[43].

Note that Japanese total and manufacturing industry FDI in Mexico was smaller than in Brazil in both subperiods of Table (6), except for the transportation equipment industry, in which Japanese FDI was almost three times higher in Mexico than in Brazil, increasing in the most recent subperiod. NAFTA may have definitely played an important role here, attracting Japanese investment for the Mexican automotive industry and thus helping to raise exports to the U.S. market. More recently, the agreement between Mexico and the EU and the prospect of an agreement between Mexico and Japan may have helped to raise Japanese investments in Mexico.

4.2 U.S. Imports of Goods Shipped by U.S. Affiliates from Abroad

U.S. imports of goods shipped by U.S. affiliates from abroad reflect the development of export capacity resulting from foreign direct investments of U.S. multinationals abroad. NAFTA countries have accounted for a dominant share of imports from affiliates of U.S. companies abroad, as shown in Table (7)[44]. This table also reveals that Mexico has benefited the most from the relocation of manufacturing export capacity of U.S. affiliates since the late 1980s and early 1990s. Indeed, the share of Mexico in U.S. imports of goods shipped from all U.S. affiliates in manufacturing industry abroad increased from 9.0 percent in 1989/90 to 22.7 percent in 2002/03. Other countries such as Ireland, Malaysia, Singapore[45], and China have also benefited significantly from the relocation of export capacity of U.S. affiliates abroad in this period. On the other hand, the shares of the largest

[42] Figures in parenthesis refer to the ratio of domestic production in Japan in 2000 and 2003 or just 2003, see Jetro (2004), p.22.
[43] Electronics revenues are based on segmentation information and Reed Research Group estimates. Electronics revenues include revenue from the sale, service, license, or rental of electronics/computer equipment, software or components. Reed Research Group, e-inSITE Yearbook 2003, http://www.reed-electronics.com/electronicnews/index.asp?layout=article&articleid=CA278896 - accessed in November 2005.
[44] The share of U.S. imports from U.S. affiliates in total U.S. imports of goods was 20.6 percent on average in the three years from 1989 to 1991 and 18.6 percent in the three years from 2001 to 2003. See Bureau of Economic Activity, U.S. Direct Investment Abroad, Tables Tab2H22 for 1989, Tab18 for 1990 and 1991, and Tab2I19 for recent years.
[45] There is no data available for Singapore in 2002 and 2003, but it is possible to see that the shares of this country in U.S. imports shipped from all U.S. affiliates in manufacturing industry rose from 2.0 percent in 1989/90 to 8.6 percent in 1998, falling then to 6.8 percent in 2001.

economies of Europe, Canada[46], and Japan, in particular, fell drastically in the same period. The shares of Hong Kong[47] and Brazil also declined sharply in the period.

The large relative increase in U.S. imports from U.S. affiliates in Mexico provide evidence that NAFTA helped Mexico to attract export capacity from U.S. affiliates abroad that could otherwise have gone to other countries[48]. On the other hand, export capacity of U.S. affiliates abroad has moved away from Brazil, the principal Latin American competitor of Mexico as a recipient of foreign direct investment. Had U.S. affiliates in manufacturing industry in Brazil kept their shares in U.S. imports of goods in 2002/03 equal to their shares in 1990/91, total U.S. imports of goods from Brazil would have increased 16 percent in 2002 and 13 percent in 2003.

The increase in Mexico's share in U.S. imports from U.S. foreign affiliates in manufacturing industry between 1989/90 and 2002/03 was largely due to imports of the transportation equipment industry. U.S. affiliates in Mexico accounted for 9 percent of U.S. imports of affiliates of this industry in 1989/90 compared to 17.3 percent in 1994, 21 percent in 1998 and 28.5 percent in 2003. Canada seems to have lost relative export capacity as the share of Canada in U.S. imports of goods from U.S. affiliates in the transportation equipment industry declined from an estimated 58 percent in 1989 to 57% in 2000 and an estimated 52 percent in 2003[49].

The share of China in imports from U.S. affiliates of the electrical and electronics industry rose from zero in 1989/90 to 2.5 percent in 1994, 4 percent in 2002 and over 5 percent in 2002/03. U.S. affiliates in Malaysia also increased their share in imports from all U.S. affiliates in this industry, reaching over 20 percent in 2003. However, the share of all the countries in Asia and the Pacific region has fluctuated around 50 percent in the period[50]. Mexico had 22.6 percent of imports from U.S. affiliates of the electrical and electronics industry in 1989, 26.1 percent in 1997, and 18.8 percent in 2000, but is estimated to have reached approximately 30 percent in 2002/03[51]. Therefore, Mexico has clearly benefited from U.S. foreign direct investments in this industry.

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[46] In fact, the share of Canada actually fluctuated up to the mid-1990s before showing a clear declining trend. This is in line with the share of Canada in U.S. total imports of goods as shown in Figure (1).

[47] Again, there is no data for 2002 and 2003, but the shares of Hong Kong fell from 6.0 percent in 1989/90 to 3.0 percent in 2001.

[48] Waldkirch (2002) provides econometric evidence that "NAFTA has had a significantly positive effect on FDI in Mexico, due almost entirely to raising investment from the United States and Canada", p.3.

[49] Due to data confidentiality, there are no figures for U.S. affiliates in transportation equipment industry in Canada in 1989 and 2003. The share of U.S. imports from affiliates in other manufacturing industry in 1989 and 2003 had therefore to be estimated on the basis of the shares in 1991/92 and 2000, respectively. The share in transportation equipment industry was then calculated as a residual.

[50] The share of Singapore in U.S. imports of electrical-and-electronics from U.S. affiliates fell from a peak of 21 percent in 1990 to 6.5 percent in 1998, went up again to 28.8 percent in 1999, but declined continuously since then to reach 14.2 percent in 2003.

[51] Due to data confidentiality, there are no figures for Mexico in this industry in 2002/03. The share of it was estimated by the difference between the figures for manufacturing industry and for all other industries. Whenever there was no data available for the other industries, their shares in manufacturing industry for other years (2001, 2002 or 2003) were applied.

It should be noted that U.S. affiliates accounted for 58.6 percent of total U.S. imports of electrical-and-electronic products from Singapore to the U.S. in 2003, 39.2 percent from Malaysia, but only 3.3 percent from China. U.S affiliates accounted for 24 percent of total U.S imports of electrical-and-electronic products from Canada in 2001 and 2003 and 25.5 percent from Mexico in 1997 and 2000.

Therefore, generally speaking, the relocation of export capacity of U.S. affiliates in manufacturing industry among foreign countries was quite consistent with the gains and losses of competitiveness of exporting countries to the U.S. import market.

Table (7): Shares of U.S. Imports of Goods Shipped by U.S. Affiliates by Regions and Countries (in percent)

	All industries		Manufacturing Ind.	
Regions and Countries	**1989/90**	**2002/03**	**1989/90**	**2002/03**
NAFTA Countries	**48.8**	**55.7**	**53.3**	**60.8**
Canada	41.1	36.6	44.3	38.1
Mexico	7.7	19.2	9.0	22.7
Asia and Pacific	**27.8**	**17.9**	**28.2**	**17.7**
Japan	10.9	4.6	12.7	5.1
Malaysia	1.5	3.2	1.8	3.8
China	0.0	1.2	0.0	1.3
Thailand	0.8	0.4	1.0*	0.4
Taiwan	1.6	0.6	1.7	0.5**
Korea, R.	0.9	0.3	1.0*	0.3
Other	12	7.6	10.0	6.1
Europe	**15.4**	**21.0**	**14.3**	**19.2**
Ireland	0.7*	6.3	0.8*	4.1**
United Kingdom	5.7	4.3	4.7	3.6
Germany	2.4	2.2	2.8	2.3
France	1.9	1.5	1.4	1.2
Italy	0.7	0.6**	0.7	0.7**
Other	4.2	6.2	3.9	7.2
Other	**8.1**	**5.4**	**4.1**	**2.3**
Brazil	2.0*	0.8	2.5*	0.9
All Countries	**100.0**	**100.0**	**100.0**	**100.0**

* Either 1989 or 1990 only; ** Either 2002 or 2003 only.
Source: U.S. Bureau of Economic Analysis, Department of Commerce, http://www.bea.gov/bea/ai/iidguide.htm#link12b.

4.3 FDI in China and Exports to the United States

China has been one of the world's leading destinations of foreign direct investment. However, official estimates of inward flows and stocks are generally regarded as overestimated. This is due to the so-called Chinese capital "round tripping", a mechanism by which capital from Chinese residents flows abroad, typically to Hong Kong (HK), and returns dressed as foreign capital to escape regulations and benefit from government

incentives given to Foreign Invested Enterprises (FIEs)[52]. As a result, Hong Kong (HK) and Macao appear in the official statistics as accounting for 45 percent and 1 percent, respectively, of the total realized FDI in China in the period from 1992 to 2002[53].

Whatever the portion of FDI that is truly from HK or Macao or, in fact, is originally from residents of mainland China, the fact of the matter is that about half of the capital of what is called Foreign Invested Enterprises (FIEs) are held by Chinese residents of HK, Macao or China itself, not to mention Taiwan, which accounted for another 7.6 percent of realized FDI in China in the period from 1992 to 2002. The United States, Japan and the main European investing countries[54] accounted for 8.8, 7.8, and 6.4 percent, respectively, of total FDI in China in the same period.

Considering that exports to the U.S. of Japanese and U.S. affiliates in China accounted for only 5.5 percent in 2001 and 3.3 percent in 2003 of China's exports of electrical and electronic products to the U.S, respectively, U.S. and Japanese direct investments in China seem to have a very limited capacity to directly explain the gains of China in the U.S. import market. The cumulative value of European FDI in China, being smaller than that of the U.S. or Japan, is likely to also have a very small direct effect on China's exports to the U.S. market.

According to the China Chamber of Commerce for Import & Export of Machinery and Electronic Products, Foreign Invested Enterprises (FIEs), including cooperative, joint venture and solely owned foreign enterprises, accounted for most of China's exports of electronic products in 2002[55]. In household electric appliances and consumer electronics, FIEs accounted for 57 and 67 percent, respectively, of China's exports. The shares of FIEs in exports of electronic components and automatic data processing equipment were as high as 85 and 86.5 percent, respectively. In telecommunications products, FIEs, especially large multinationals, accounted for over 99 percent of mobile phones, 96 percent of mobile communication equipment, and 92 percent of telecommunications parts. The exception was exports of telephone sets, for which State-Owned Enterprise (SOEs) accounted for one third of exports, while FIEs were responsible 62 percent. Exports based on processing and assembling with imported materials and parts accounted for 70.5 percent of household

[52] Estimates of this type of capital vary from 26 percent to 54 percent of total FDI. The incentives include a corporate tax rate applied to FIEs of 15% for three years, after a two year tax holiday once they have recorded a profit, compared to a standard 33% rate for domestic firms, as well as duty-free concessions for imported equipment, improved land use rights and other advantages. See Erskine (2004), Geng (2004), and World Bank (2002).

[53] See Chantasasawat et al. (2004), p.9.

[54] It includes the UK, Germany, France, and the Netherlands.

[55] See China Chamber of Commerce for Import & Export of Machinery and Electronic Products (2004). According to Lall (2004), "the foreign investor's share of China's total exports is estimated at 55% in 2003". Furthermore, according to a report by iSupply, "China's manufacturing market is mostly fragmented. Fifty-seven percent of the electronic equipment manufacturing is done by foreign OEMs. Another 29 percent is done by the top 30 Chinese OEMs. All told, local companies produce only 36 percent of the electronics revenue in China. Except for the top 30 large manufacturers, relatively small local companies do much of China's manufacturing", see "China's Share", Rob Spiegel, *Electronic News*, 12/15/2004, www.reed-electronics.com/electronicnews/article/CA488063?text=ce+and+china, accessed in November 2005.

electric appliances exports, 99 percent of automatic data processing equipment, and 90.3 percent of telecommunications products[56]. The U.S. was one of the main exporting markets for all these electronic products from China in 2002.

Therefore, it is possible to conclude that FIEs, either belonging to residents of HK or China, are the main exporters of electronics from China to the U.S. market. In point of fact, fourteen Chinese companies show up among the 2003 Top 300 electronics companies in the world, according to electronics revenues recorded in calendar year 2002[57]. One Chinese company was in the Top 50, three in the Top 100 and six in the Top 150. In 2000, there were nine Chinese companies in the Top 300[58].

Although Japanese, North American, European, and Taiwanese affiliates in China do not account directly for a significant share of Chinese exports to the U.S., they and their parent companies are often regarded as essential for the competitiveness of Chinese companies. The trade intensity and the formation of international production and distribution networks in East Asia are well known and play an important role in the development of Chinese electronics companies[59]. Just an example, it is said that "of Taiwan's $50.52 billion output of IT products in 2003, 63.3 percent was produced in China"[60].

4.4 Inward FDI in Mexico and Brazil

It has already been shown that Mexico has benefited enormously from the expansion of export capacity of U.S affiliates in the country, especially in the automotive and electronics industries, as well as from Japanese FDI in the automotive industry. Indeed, although Brazil has received a larger inflow of FDI than Mexico, to a large extent as a result of a huge privatization program in telecommunication services, Mexico appears to have received a much greater inflow of FDI in manufacturing industry, as Table (8) reveals.

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[56] See China Chamber of Commerce for Import & Export of Machinery and Electronic Products (2004). According to iSupply, "Chinese OEMs already dominated most consumer-electronics markets in China, but now are gaining prominence in other product areas, including mobile communications. Last year, Chinese OEMs were the top producers in that country of ADSL modems, air conditioners, central-office switches, desktop PCs, television set-top boxes, entry-level servers, microwave ovens, MP3 players, notebook PCs, refrigerators, telephones, televisions, USB flash drives and washing machines. Non-China-based OEMs led production in CRT monitors, digital still cameras, mobile phones, ink-jet printers, laser printers, LCD monitors, dot-matrix printers and mobile-communications base stations", Chinese OEMs Lead Domestic Markets, *Electronic News*, 9/21/2004, http://www.reed-electronics.com/electronicnews/article/CA454520?text=non%2Dchina+based+oems.

[57] This was before the consumer-electronics manufacturer TCL, a large Chinese OEM, took majority control over Thomson's television business near the end of 2003 and Chinese computer maker Lenovo acquired IBM's PC business in 2005. As to exports, telecommunications gear maker Huawei, another top Chinese indigenous OEM, competes directly with Cisco, Lucent and Alcatel and projected that 40 percent of its 2004 revenues were derived from sales outside of China. See Electronics News, "Chinese OEMs Show Strong Growth", 02/15/2005.

[58] See Electronics Industry Yearbook, ed. 2002, and Reed Research Group, e-inSITE Yearbook 2003, http://www.reed-electronics.com/electronicnews/index.asp?layout=article&articleid=CA278896, access in November 2005.

[59] See, for instance, Kimura and Ando (2004).

[60] See Jetro (2004), p.17.

According to ECLAC (2004), however, Brazil appears to have received a larger volume of FDI in the automotive industry from 1994 to 1999 than Mexico.

Table (8): Foreign Direct Investment ($ million)

Brazil	Total	Manufacturing Industry	Electrical&Electronics Industry	Automotive Industry
1985-1993	12,282	8,409	-	-
1994-2004	193,910	53,909	-	-
1999-2004	128,714	40,573	5,804	7,914
Mexico	**Total**	**Manufacturing Industry**	**Electrical&Electronics Industry**	**Automotive Industry**
1985-1993	29,475	13,065	-	-
1994-2004	150,607	73,746	-	-
1999-2004	103,312	45,418	9,501	9,447

Sum of the annual inflows of FDI, except for manufacturing industry in Brazil which was based on the share of manufacturing industry in total FDI calculated by differences in stocks, This share was then applied to the sum of total annual inflows, Source: Central Bank of Brazil for Brazil and Secretaria de Economia and INEGI for Mexico,

But, more important than the inflows of foreign direct investment is the fact that Mexico has become an export platform under NAFTA. On the other hand, Brazil has maintained an inward orientation for both the electronics and automotive industries at the MERCOSUR level, through high common external tariffs and foreign-trade compensation for automobiles among MERCOSUR members.[61] However, as far as U.S. multinationals are concerned, even the value-added of U.S. Majority-Owned Nonbank Foreign Affiliates (MOFAs) was much higher in Mexico than in Brazil in 2002 and 2003, especially in transportation equipment, computers-and-electronic products, and electrical equipment, appliances and components. The value-added of U.S. MOFAs in Brazil was higher than in Mexico in machinery and primary and fabricated metals.[62]

5. Concluding Remarks

The changes in the U.S. merchandise imports by countries have, to some extent, been the result of a phenomenal relocation of Japanese industrial production, only partly affected by NAFTA. Indeed, the strategic decision of some large Japanese companies to heavily invest in new plants in North America occurred in the early eighties, well before NAFTA, but the process of relocating the production capacity of Japanese companies away from Japan and towards North America deepened under NAFTA. It is this relocating process that is the main factor behind the decline in the share of Japan in U.S. imports of goods. The share of Japanese companies in the U.S. market does not appear to have declined, as sales of Japanese affiliates in the U.S. offset the relative fall in exports, especially in the automotive and electronics industries.

The spectacular rise in the share of China in U.S. imports has been made possible by large inflows of foreign direct investments. However, most of these investments have been from residents of Hong Kong and/or mainland China. The shares of Japanese and North

[61] For a comparison between the automotive sectors of Brazil and Mexico, see ECLAC (2004), p.113-133.
[62] See Mataloni Jr (2005), pp.28-29.

American affiliates in China in exports to the United States have been relatively small and are not significant enough to explain China's huge gains in market share in the U.S. import market. On the other hand, Chinese companies in the electrical-and-electronic industry have been climbing up the list of the world top companies in electronics revenues and have a large share of their sales from exports to the U.S. market.

Exports of Mexico to the U.S., especially of products from the automotive and the electrical-and-electronic industries, have clearly benefited from NAFTA, largely due to foreign direct investments from North America and, to a much lesser extent, from Japan. Mexico's competitiveness gains in the U.S. import market in 1992-2004 were due entirely to the gains in 1992-1999, since Mexico lost competitiveness in 1999-2004. This suggests that an FTA with the U.S., however well negotiated, may boost inward FDI and exports, but is not a free ticket to long term development. Whatever the initial positive effect of an FTA, it must be followed by an environment conducive to the continuing transfer of technology from abroad and to both human and physical capital growth.

Therefore, the local sales of Japanese affiliates in the U.S., and U.S. imports from U.S. affiliates in Mexico and Canada, are quite consistent with the losses of competitiveness in the U.S. import market of Japan and Canada, and the gains of Mexico. Although China has also benefited from Japanese, North American and European foreign direct investments, Chinese gains of competitiveness in the U.S. import market are more directly related to exports of Chinese companies, especially in the electronics industry.

The negative effects of NAFTA on Brazil's exports to the U.S. have been significant and much larger than anticipated. U.S. imports shipped by U.S. affiliates have been diverted away from Brazil, while U.S. affiliates in Mexico have sharply increased their share in U.S. imports, Brazil has been missing opportunities to further open its economy, improve its business environment, and thus become more attractive to foreign direct investments, particularly in manufacturing industry.

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