

Industrial Restructuring in Mexico after NAFTA

Kim, Chong-Sup
Seoul National University

I. Introduction

More than ten years has passed since NAFTA was established, but nevertheless, the evaluation of its effect on the Mexican economy is not easy. This is because there were many other changes both within and outside of the Mexican economy.

In terms of economic performance after NAFTA, Mexico succeeded in increasing exports to the United States and receiving larger amount of FDI from both the United States and other countries. However, the growth rate did not increase in parallel with the exports and FDI. Moreover, even if there was a significant structural change in exports, there was little structural change in manufacture production. To add concerns about the effectiveness of NAFTA, recently the growth rate of GDP and exports decreased to levels lower than before NAFTA.

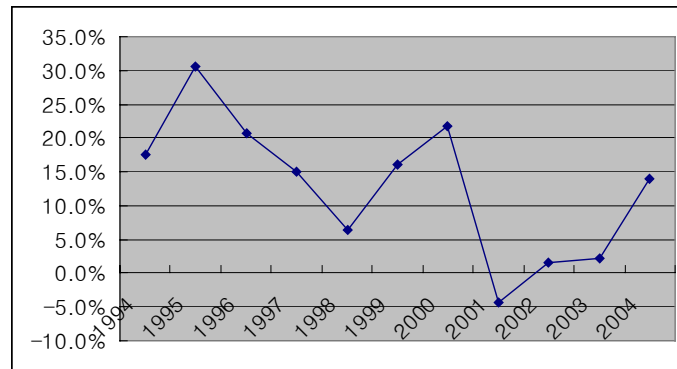
The questions we want to answer in this paper are: Why exports and GDP growth slowed down after 2000? Why GDP did not grow as much as exports? Why the structure of GDP did not change whereas that of exports did?

II. Evolution of the Mexican Economy after NAFTA

A. Exports, FDI, and GDP

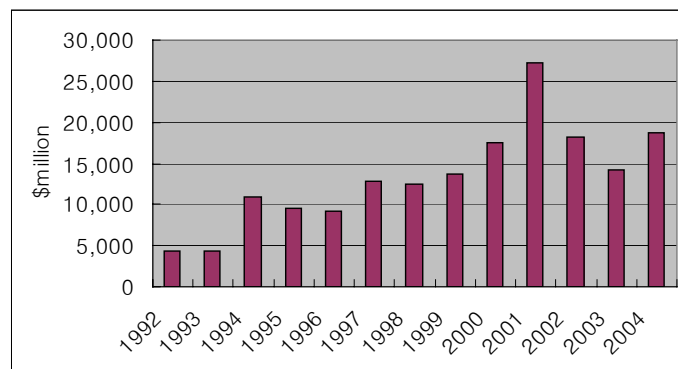
As a result of the establishment of NAFTA and the easier access to the US market, Mexican exports increased 17.7% in 1994, with most of these increase directed to the US market. At the end of 1994, balance of payments crisis broke out in Mexico and the economy submerged in a recession. However, because of the huge increase in competitiveness brought by the devaluation, exports increased by another 30.6% in 1995. Even after 1995, the exports increased at an annual rate of 16% during the 5 subsequent years.

[Figure 1] Export growth in Mexico: 1994~2004



With NAFTA, FDI in Mexico increased from \$4.4 billion in 1993 to \$11.0 billion in 1994, and in 2001 it reached the maximum of \$27.2 billion. After 2001, the FDI in Mexico decreased, but still is maintaining a level several times larger than that before NAFTA. The motives of FDI are various. There is some FDI from US seeking efficiency, that is, the lower wage in Mexico. There is also FDI from non-member countries, locating close to the border with US, and exporting the products to the US market.

[Figure 2] FDI in Mexico: 1992~2004

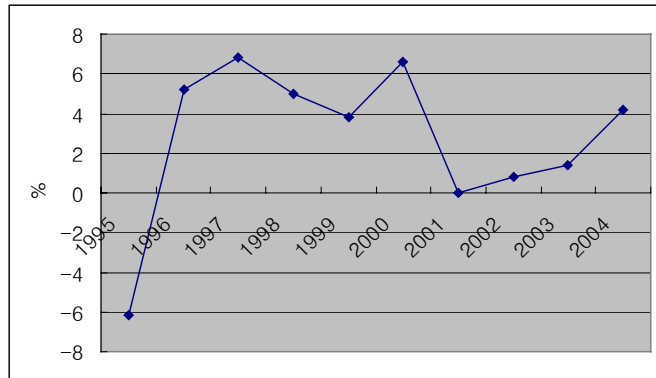


The FDI in Mexico is expected to have generated technical and technological spill over effects on the Mexican industries. Researches show that firms with larger participation of foreign capital and larger orientation to the foreign market experienced higher increase in productivity.

In the case of GDP growth, it is very difficult to discern the effects of NAFTA, especially because of the balance of payments crisis in 1994. Due to the crisis, the GDP growth recorded -6.2% in 1995. The growth rate jumped to 5.2% in 1996 and 6.8% in

1997, but a large part of this increase must be considered as a recovery from the large drop in 1995. However, Mexico could maintain a growth rate of approximately 5% until 2000. The problem was that the growth rate drop to less 1% during 2001~2003. Even the growth rate after NAFTA, is very low taking into account the large increase in the exports.

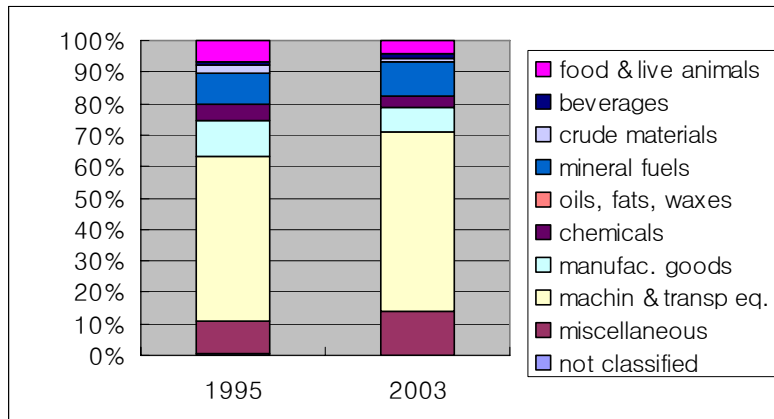
[Figure 3] Growth rate: Mexico 1995~2004



B. Structural change in exports and manufacture

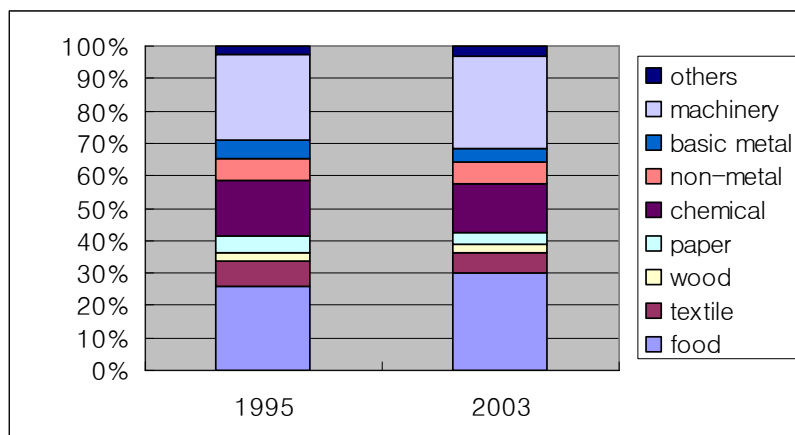
Mexican export not only increased at a high rate; its composition changed rapidly. Electric and electronic products were the most dynamic products, whose share increased from 27.8% in 1995 to 36.9% in 2001. The share of textile and apparel products increased from 6.1% in 1995 to 8.2% in 1999, but decreased thereafter because of the strong competitiveness of Chinese products.

[Figure 4] Change in Export Structure: 1995 and 2003



Compared to the structural change of exports, the structure of manufacture production did not change that much. As can be seen from [Figure 5], the manufacture structure in 2003 was very similar to that of 1995.

[Figure 5] Change in Manufacture Structure: 1995 and 2003



To measure the structural change of manufacturing production or exported goods, we can use Structural Change Index (SCI). SCI is defined as follows:

$$SCI = \left\{ \sum_i \frac{1}{2} |S_{i,t} - S_{i,t-1}| \right\} \times 100$$

Structural Change Index (SCI) is 9.37 for the case of exports and 6.59 for the case of manufacturing production.

III. Factors affecting the economic performance of Mexico after NAFTA

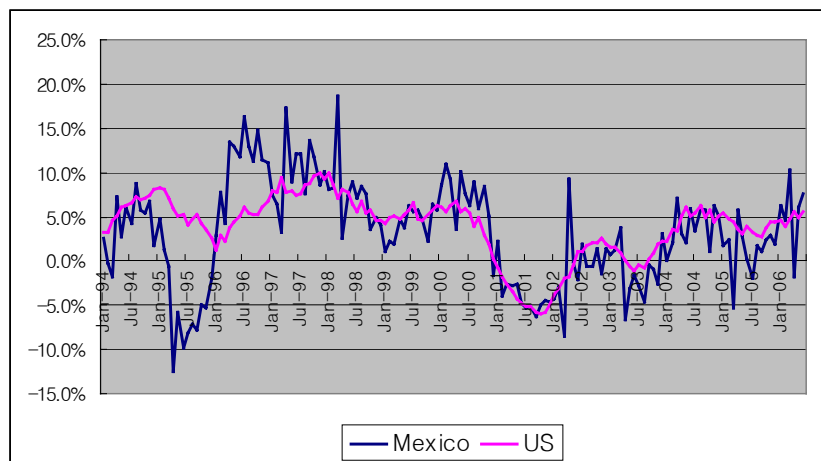
A. Why exports and GDP growth slowed down after 2000?

The share of US in Mexico's accumulated FDI inflow increased from about 46.7% in 1994 to 65.6% in 2001.¹ The share of US in Mexico's total export increased from 83% in 1993 to 88% in 2001. Because of Mexico's large dependence on the US, the synchronization between the two economies is increasing after NAFTA.

¹ Ministry of Economy, Mexico

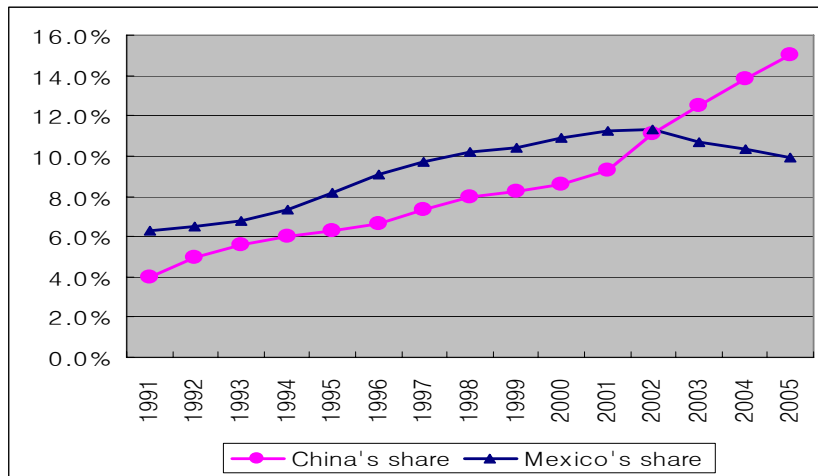
This would be beneficial to Mexico's economy if the US economy is in boom. However, if the US economy goes into recession, the negative impact would be instantaneously reflected in the Mexican economy. As shown in [Figure --], the growth in US manufacturing production drop in 2001, and this led to a drop in Mexico's manufacturing production.

[Figure 6] Growth in Manufacturing Production: Mexico and US



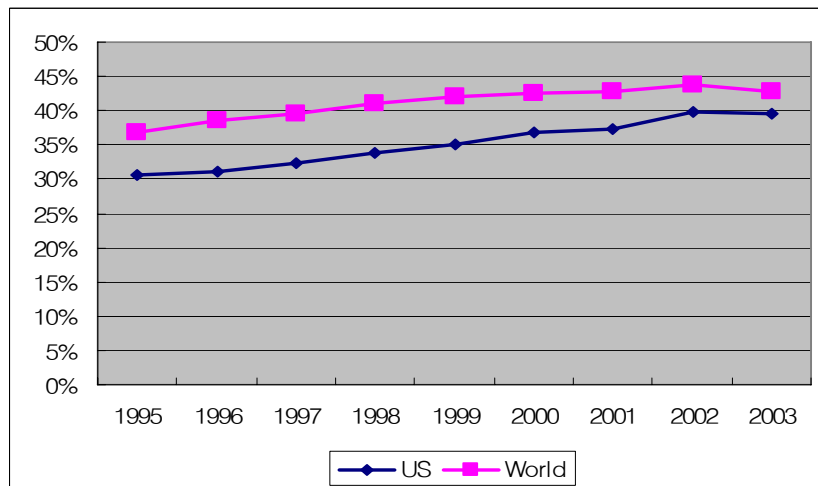
Another factor was the strong competitiveness of China products and the increase of the Chinese share in the US market. Due to NAFTA, Mexico's share in US market increased from 6.8% in 1993 to 11.3% in 2001, as shown in [Figure 7]. During the same period, the Chinese share also increased from 5.6% to 9.3%. However, after 2002 China's share continued increasing whereas Mexico's began to decline. From 2003, China's share exceeded that of Mexico in the US market, and the gap between the two is increasing.

[Figure 7] Share of China and Mexico in US Market: 1991~2005



The problem is even more serious if we consider that China and Mexico are exporting increasingly similar products not only to the US market but to the world market as well. Export similarity index (ESI) between China and Mexico in the world market increased from 36.9 in 1995 to 43.8 in 2002.² The increase in ESI between Mexico and China in the US market was even larger. The ESI in the US market increased from 30.6 in 1995 to 39.8 in 2002.

[Figure 8] Mexico-China Export Similarity Index in US Market



² The export similarity index (ESI), first used by Finger and Kreinin (1979), measures the competition between country a and country b in country c, and is computed as follows:

$$S(ab, c) = \left\{ \sum_i \text{Min}[X_i(ac), X_i(bc)] \right\} \times 100$$

Where $X_i(ac)$ is the share of the product i in the exports of country a to country c , and $X_i(bc)$ is the share of the product i in the exports of country b to country c .

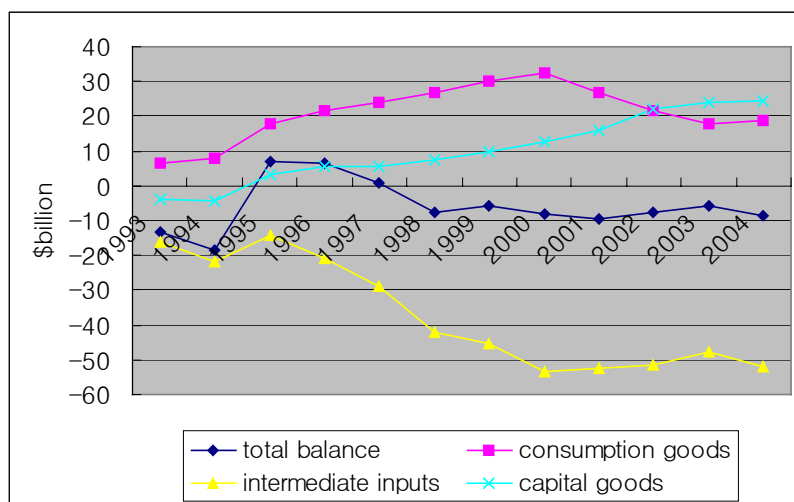
In summary, the slow down of exports and GDP growth in Mexico was due to the synchronization of the Mexican economy with the US economy, and the recession in the US economy after 2001. Another factor was the increased competition with Chinese products in the world market and especially in the US market.

B. Why GDP did not grow as much as exports? Why the structure of GDP did not change, whereas that of exports did?

Even if Mexican exports drastically increased after 1994, this increase did not leave as much of value added in Mexico. This was because a large part of the exports consisted of products assembled in Mexico using imported intermediate inputs. The production of intermediate inputs generates much larger value added than the assembling process, but because of the underdevelopment of the industry of intermediate inputs, Mexico could not increase the value added in manufacture.

As shown in [Figure 9], the deficit in the trade of intermediate inputs kept increasing after 1996, whereas the trade of consumption goods and capital goods is producing surplus. This means that to export more, Mexico had to imports more intermediate inputs.

[Figure 9] Trade balance of intermediate inputs



Because of the small value added in the industry of intermediate inputs, the manufacture value added is not increasing in at a similar rate as the exports. The

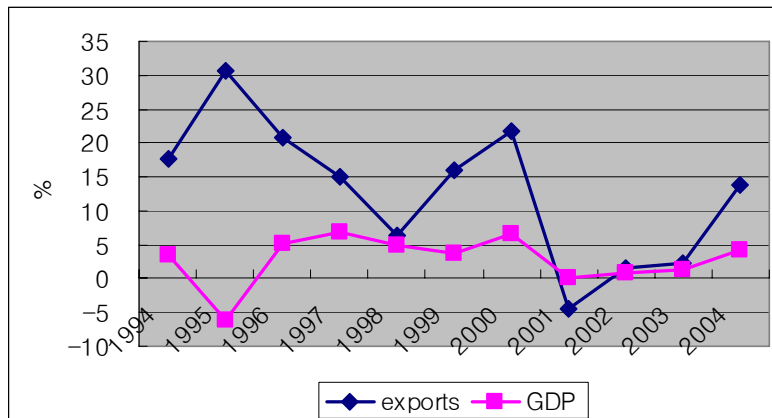
structure of manufacturing production is not changing as the structure of exports for the same reason. One of exported products with the highest increase rate is electronic products. However, as most of the intermediate inputs used in the production of electronic products are imported, the share of electronic products in manufacturing value added is not changing so rapidly.

IV. Consequences of the underdevelopment of the intermediate inputs industry

A. Small increase in GDP despite the large increase in exports

If domestically produced intermediate inputs were used in the production of exported products, value added and GDP would increase keeping pace with the exports. However, as imported intermediate inputs were intensively used, GDP did not grow as much as exports.

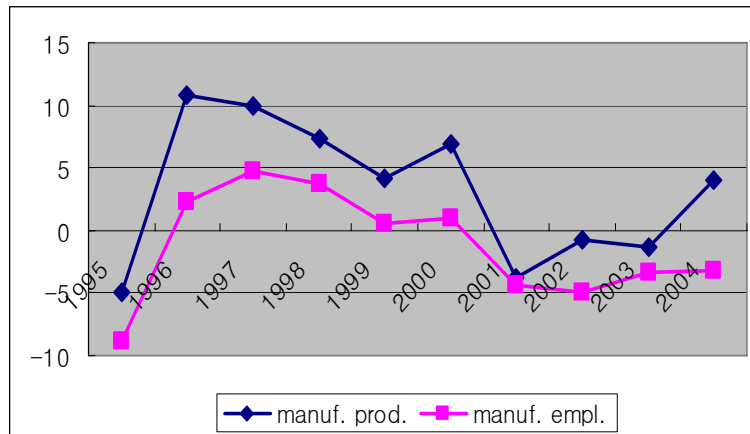
[Figure 10] Growth rate: Exports vs. GDP



B. Small increase in employment compared to the increase in GDP

In the case of Mexico, the assembly process is operated by large companies, and is more capital intensive than the production of intermediate inputs. Therefore, GDP growth based on the assembly process does not generate as much of employment as that based on the production of intermediate inputs.

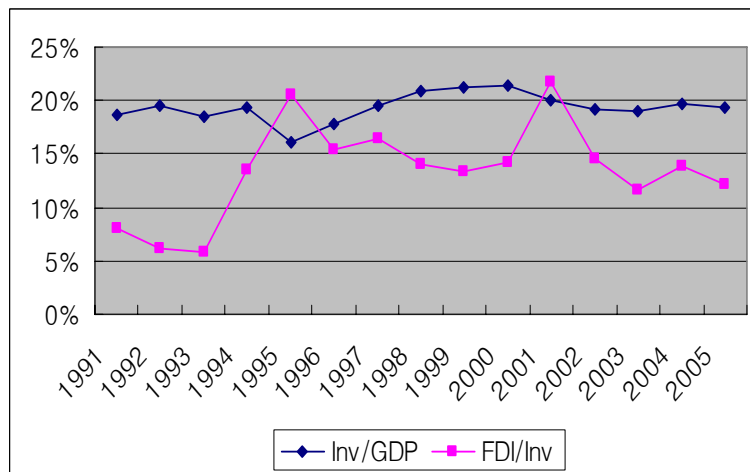
[Figure 11] Growth rate GDP vs. Employment



C. Small increase in investment and large participation of FDI

A large part of assembly process is operated by multinational corporations, whereas the production of intermediate products is accomplished by domestic companies. As the industry of intermediate inputs is underdeveloped, there is no much investment opportunities for domestic investors. Therefore, investment to GDP ratio remains low after NAFTA, whereas FDI to investment ratio increased significantly.

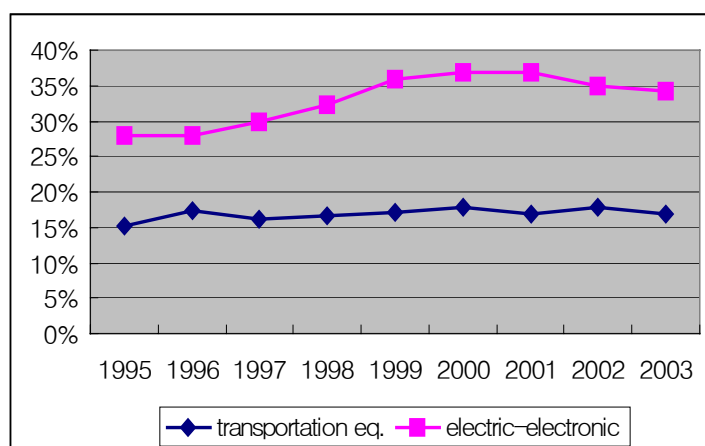
[Figure 12] Investment/GDP vs. FDI/Investment



V. Causes of the underdevelopment of the industry of intermediate inputs: Auto industry and Electronics industry

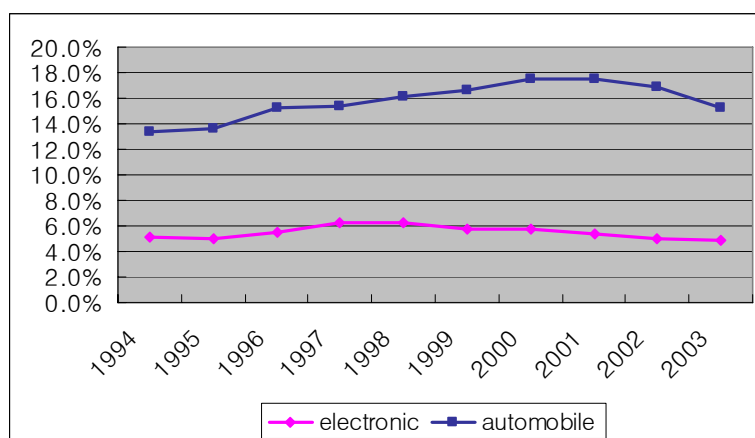
The automobile industry and electronic industry in Mexico make a striking contrast in terms of the performance of exports and production. In terms of exports, electric and electronic products were the most dynamic products, whose share in total exports increased from 27.8% in 1995 to 36.9% in 2001. The automobile industry was not so dynamic and maintained a share around 17% during 1995~2003.

[Figure 13] Export Shares of Transportation equipment and Electric & Electronic Products



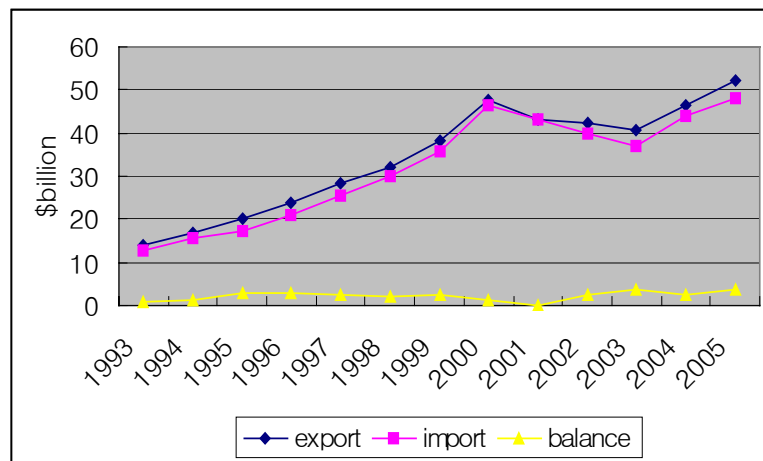
However, in terms of value added electronic industry was not at all dynamic, and its share in manufacturing production never exceeded 7%. On the contrary, its share decreased since 1997 reaching 4.9% in 2003.

[Figure 14] Share of Transportation equipment and Electric & Electronic Products in Manufacturing Production



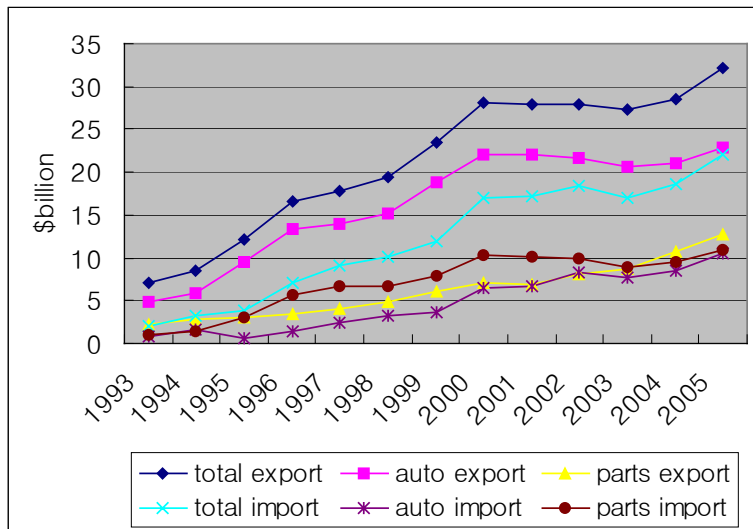
The reason of this is because the electronic industry relies too heavily on imported intermediate inputs. In [Figure 15], we can see that the Mexican exports moves on similar path as its imports. This reflects the fact that the Mexican electronic industry uses most of its intermediate inputs from outside of the country. Because of this, the value added generated in this industry is very low compared to the amount of exports.

[Figure 15] Mexico's trade of Electronics & Electro-domestics products



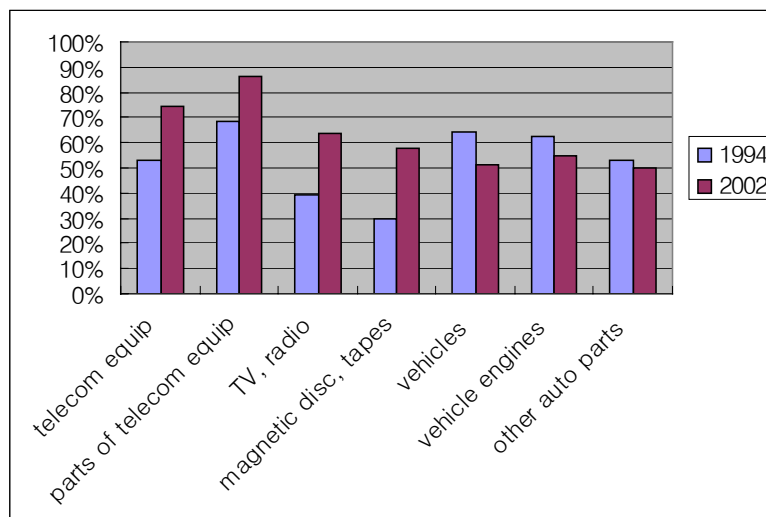
On the contrary, the automobile industry uses a lot of domestic intermediate inputs, and therefore generates a large value added. In [Figure 16], we can see that the import of auto parts is much smaller than the export of finished automobiles, and even the export of auto parts is increasing rapidly.

[Figure 16] Mexico's trade in Automobile industry



After the establishment of NAFTA, the ratio of imported intermediate inputs increased in electronics industry, but decreased in automobile industry. Because of this increase in the production of auto parts, automobile industry could increase its share in manufacturing production without increasing the share in total exports.

[Figure 17] Ratio of imported intermediate inputs



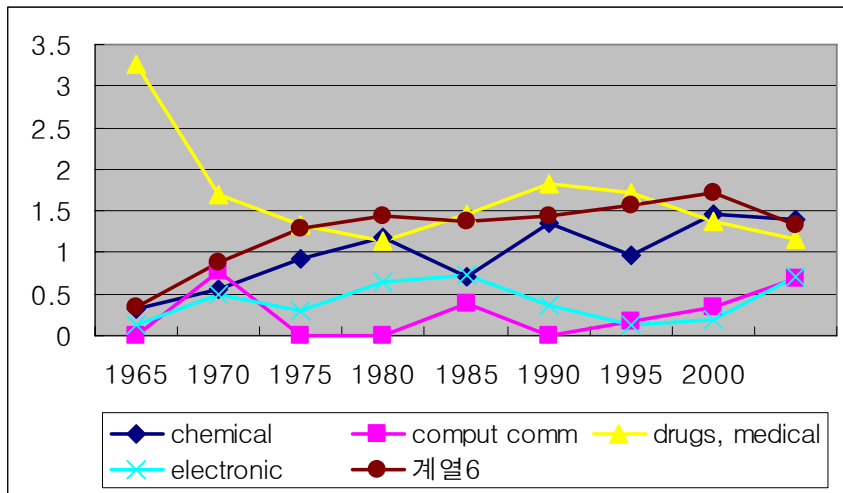
A. Situation before NAFTA

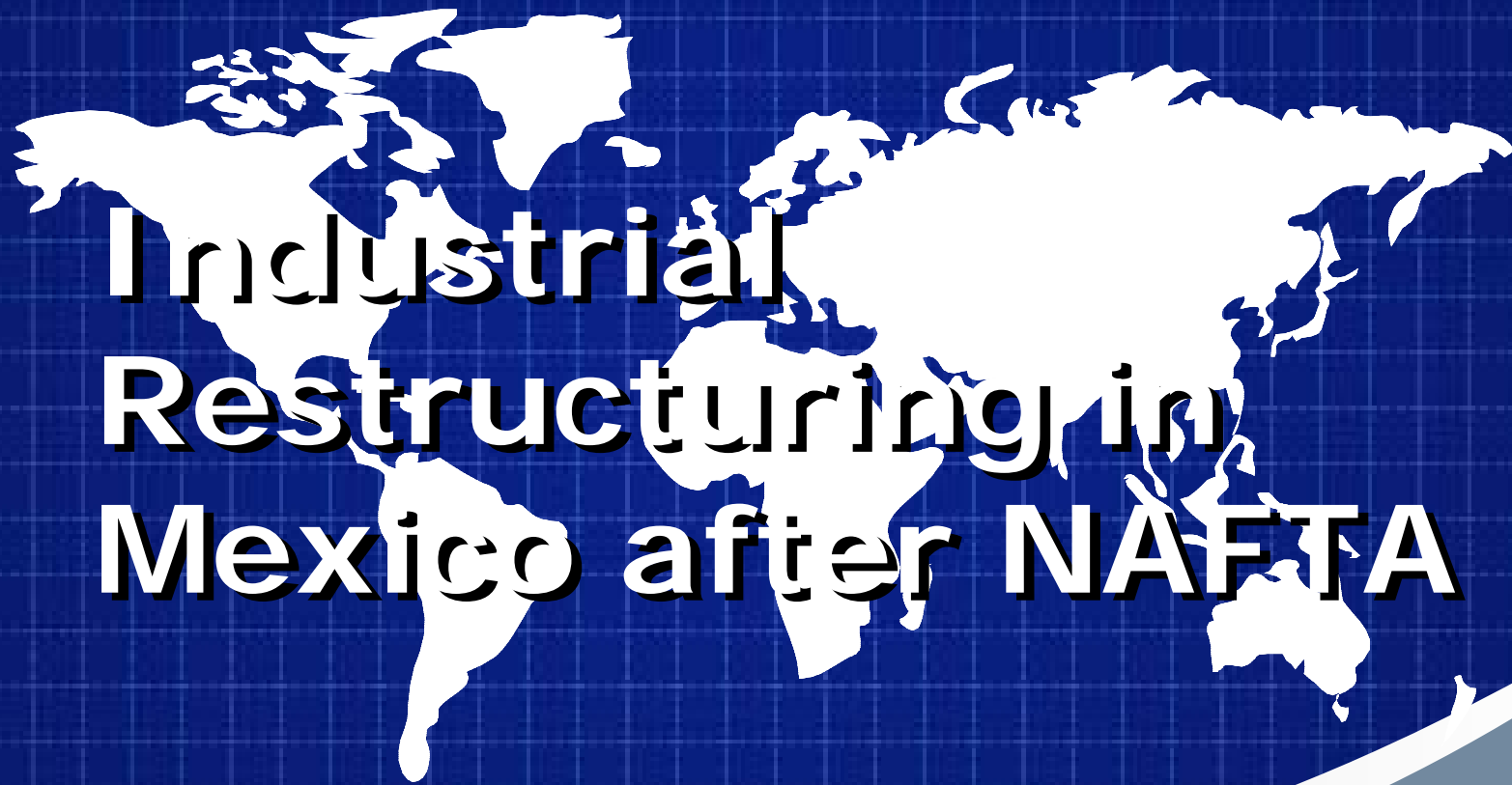
- i. Auto: developed parts industry led to economies of scale
- ii. Electronics: underdeveloped parts industry led to programs like PROSEC and to the collapse of the weak parts industry

iii. North American production network vs. assembly

B. Technological competitiveness

[Figure 18] Mexico's RTA





Industrial Restructuring in Mexico after NAFTA

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Seoul National University

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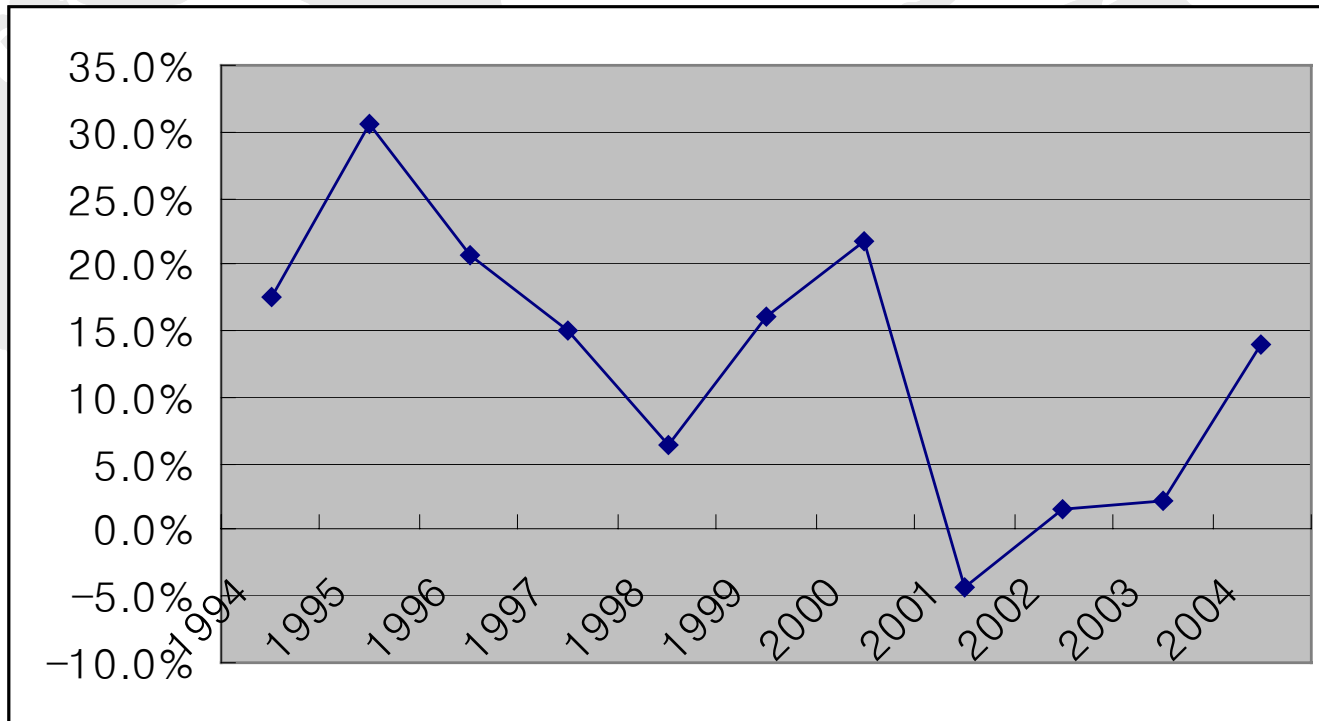


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Evolution of the Mexican Economy

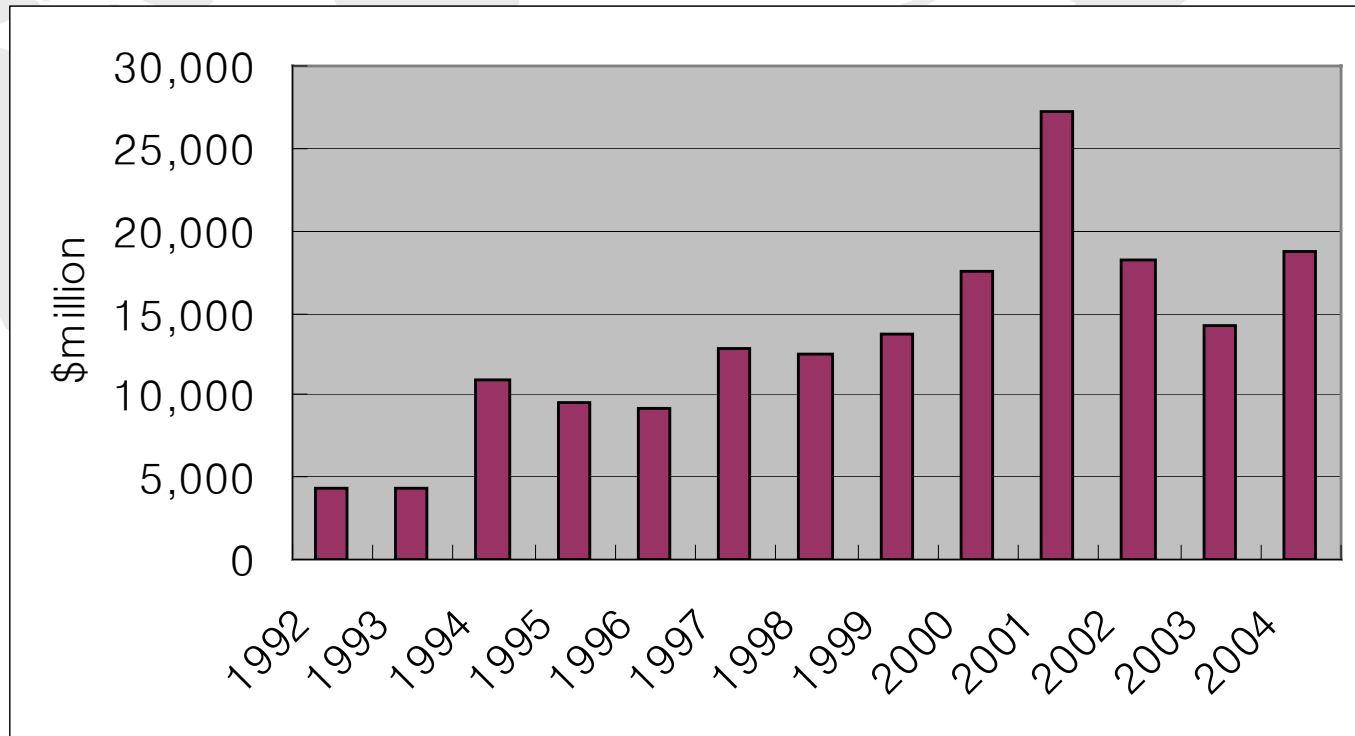


Export Growth



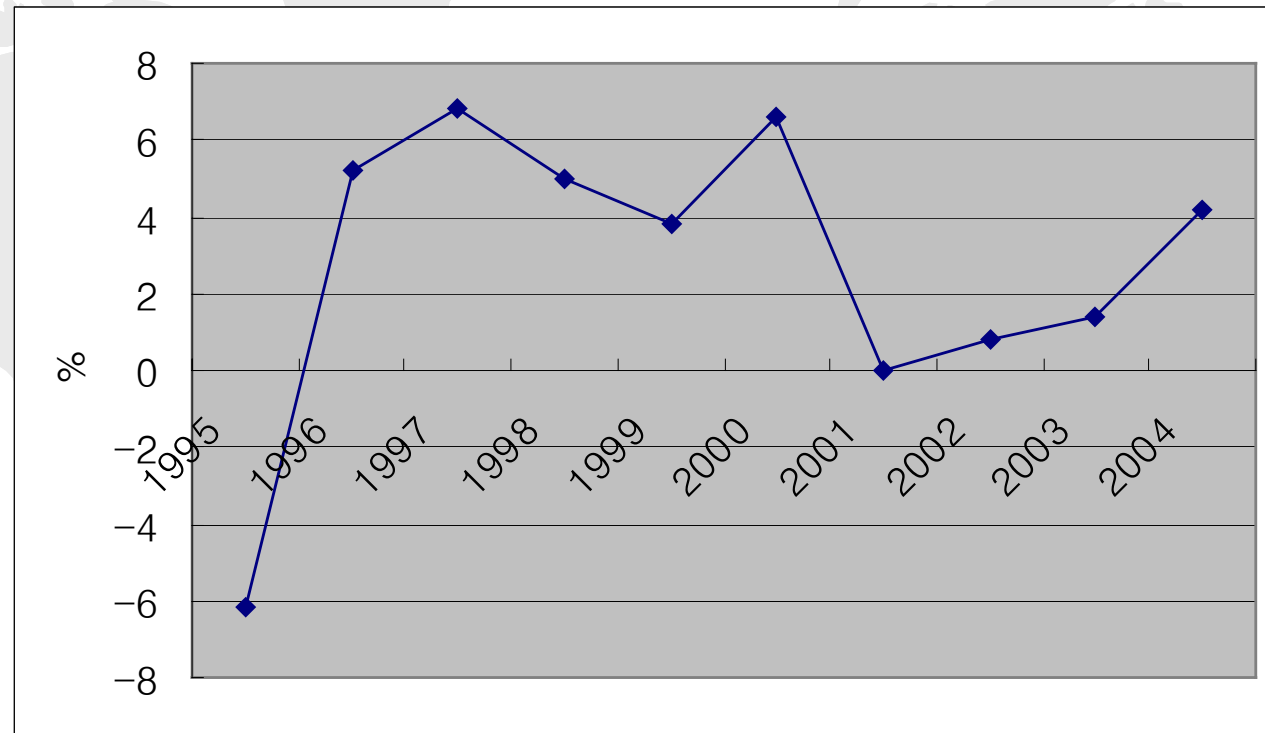
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FDI



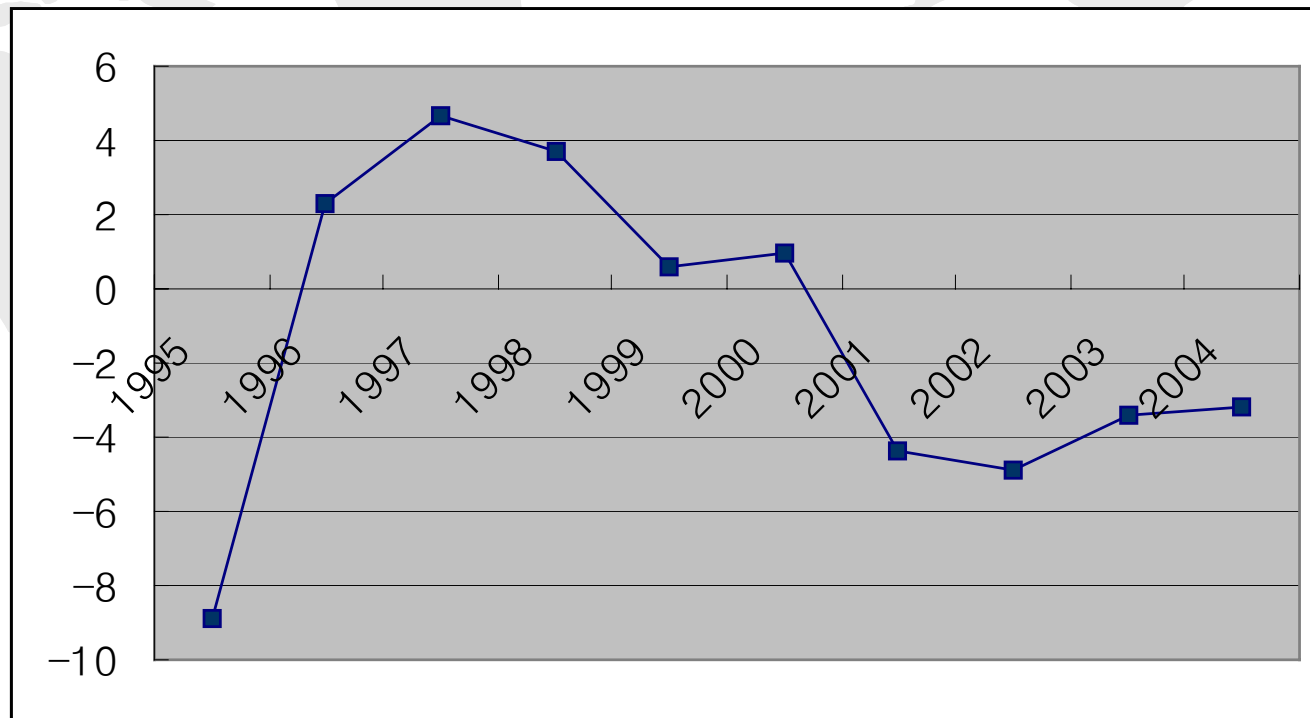
source: IMF

GDP growth



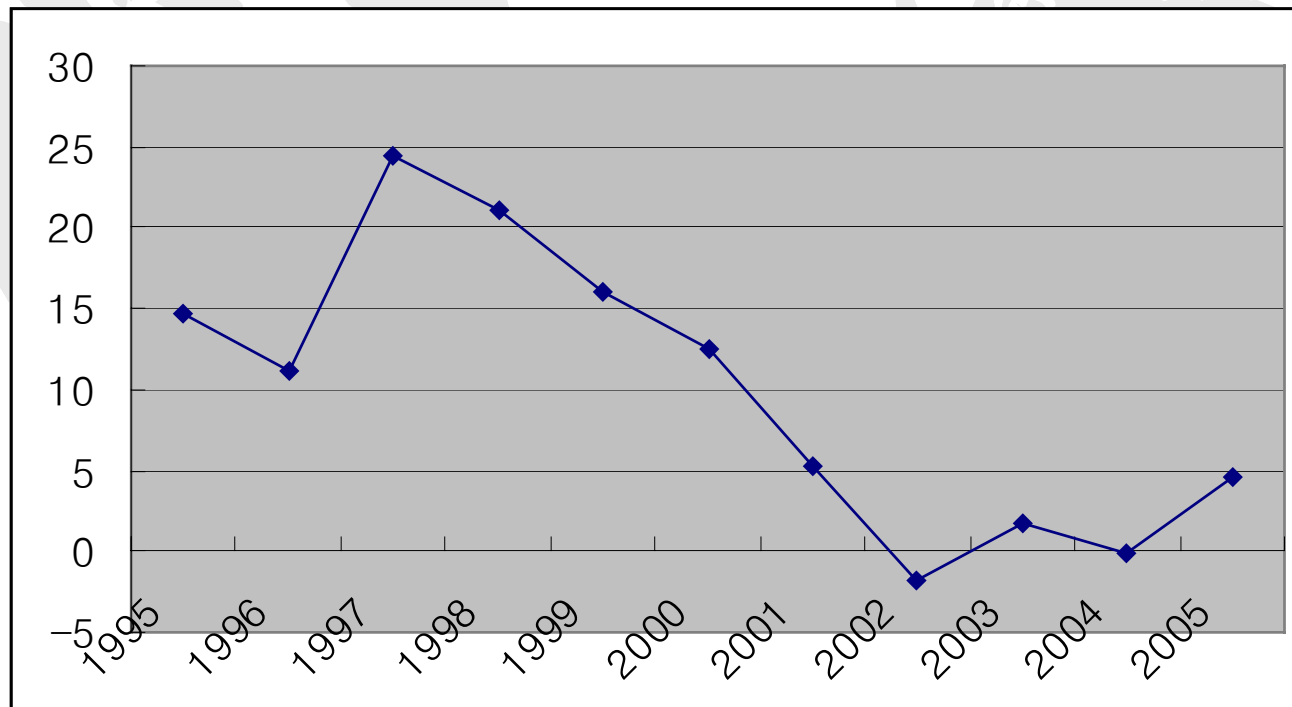
source: INEGI

Manufacture employment



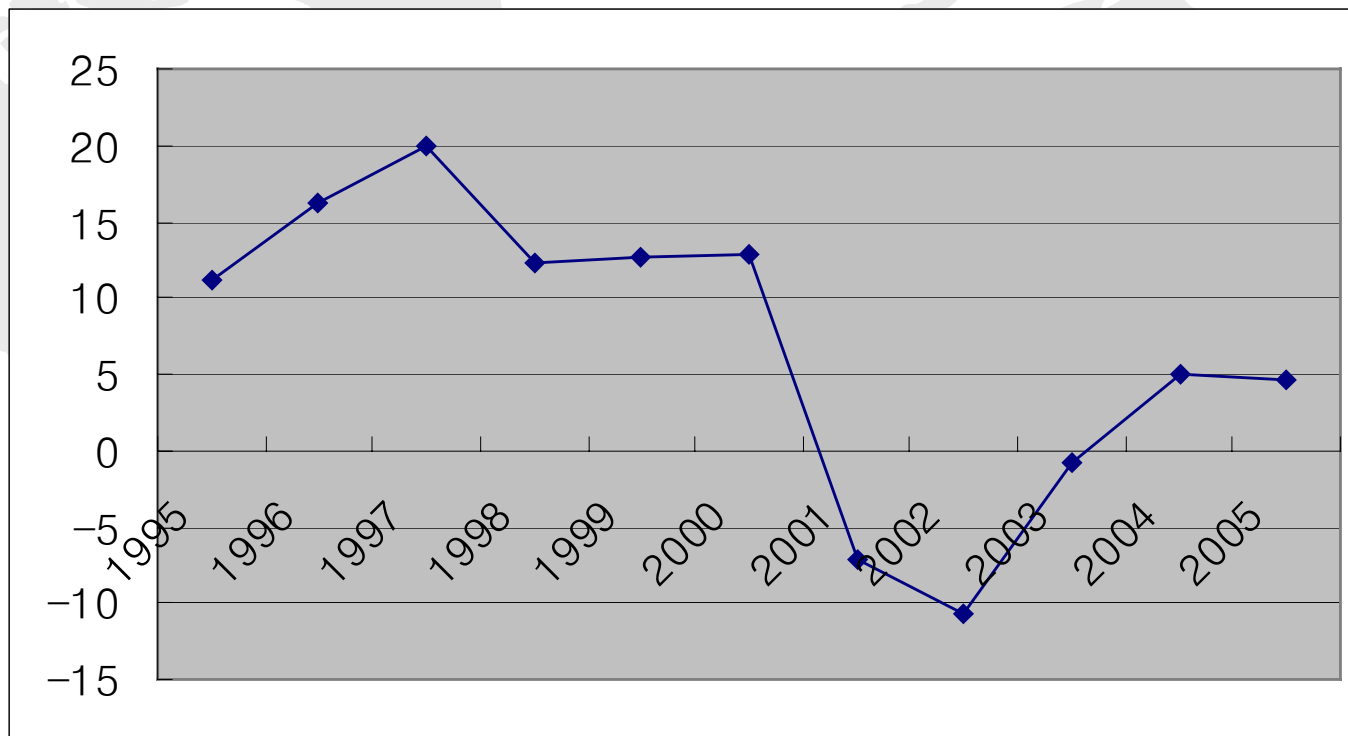
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Maquiladora Production



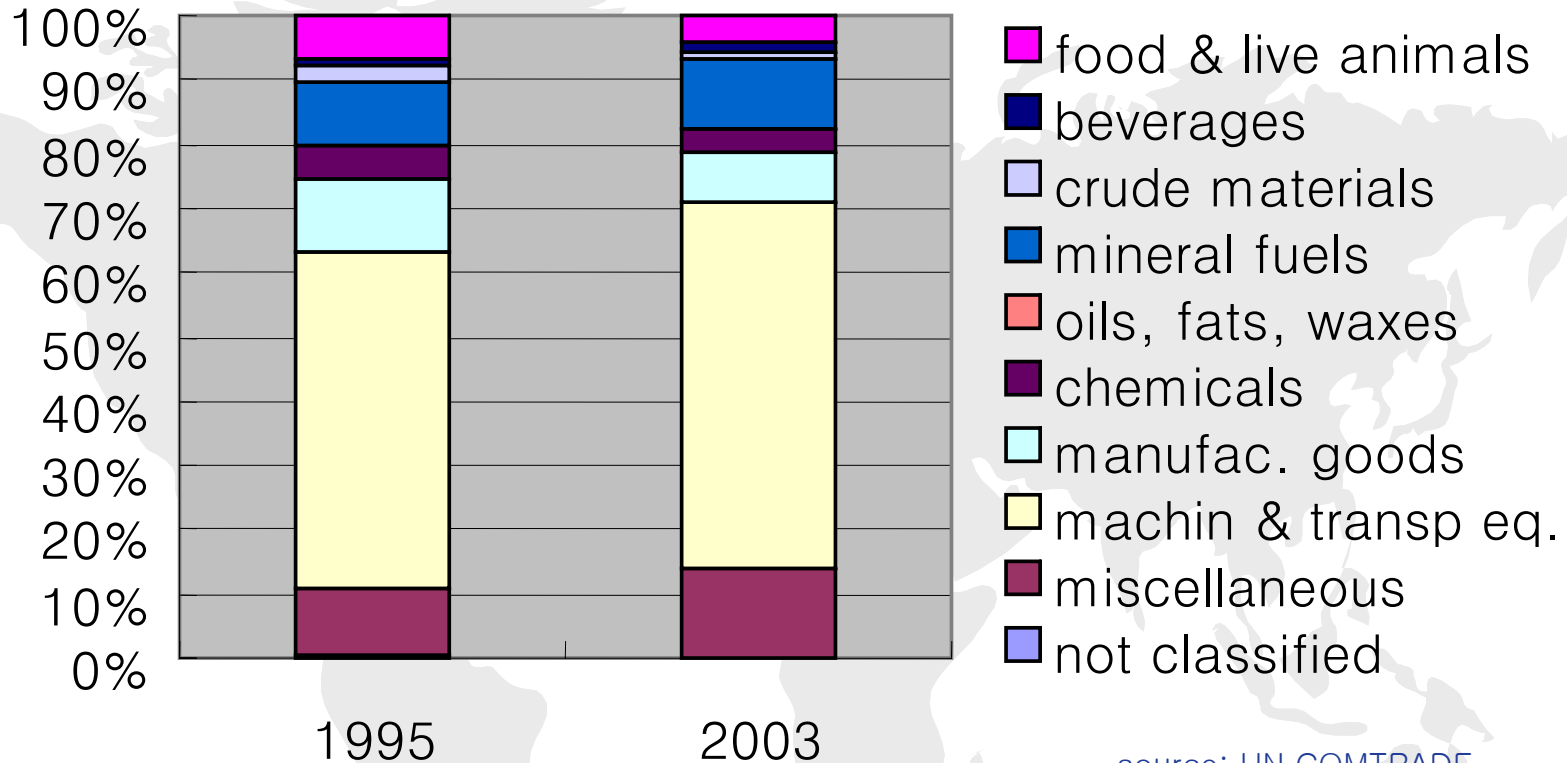
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Maquiladora Employment



source: INEGI

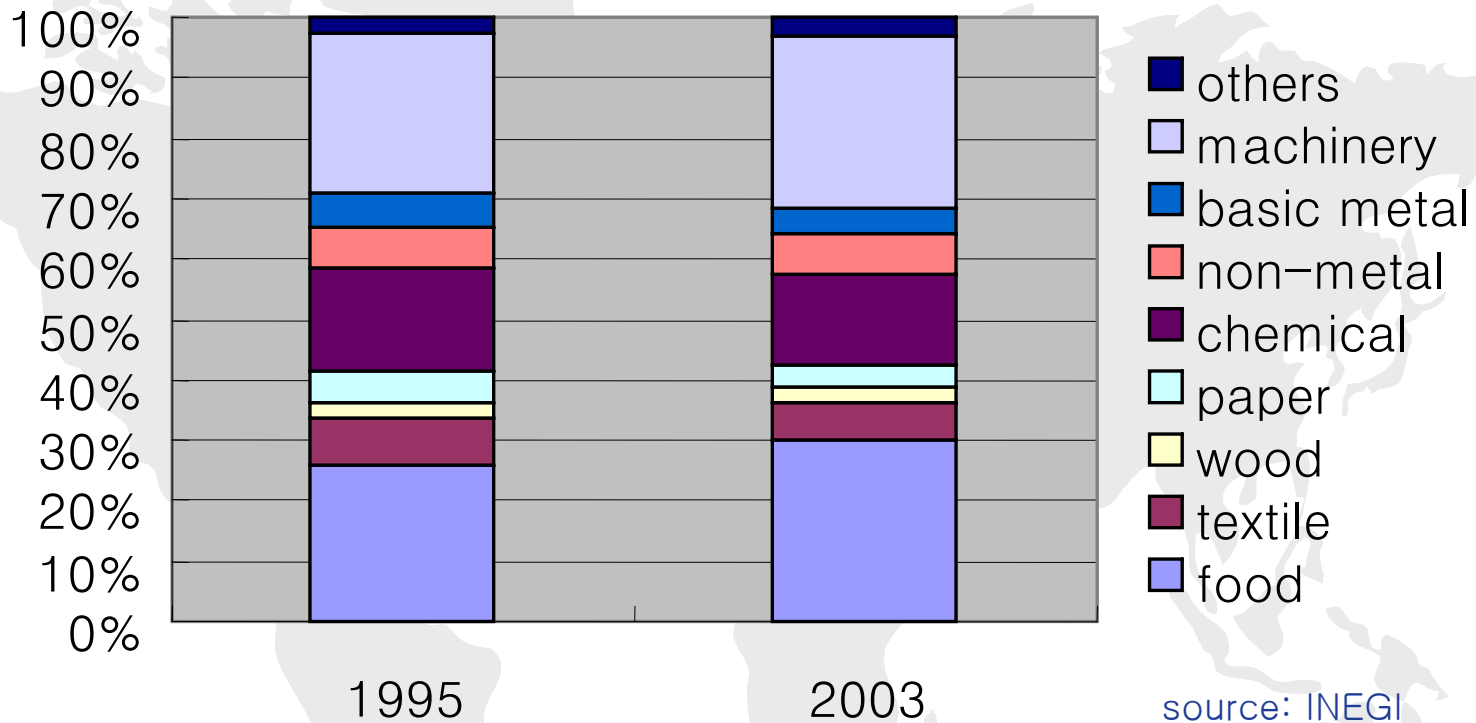
Change in Export Structure



source: UN COMTRADE


Structural Change Index = 9.37

Change in Manufacture Structure



Structural Change Index = 6.59

Questions

- 
- ❖ Why exports and GDP growth slowed down after 2000?
 - ❖ Why GDP did not grow as much as exports?
 - ❖ Why the structure of GDP did not change whereas that of exports did?

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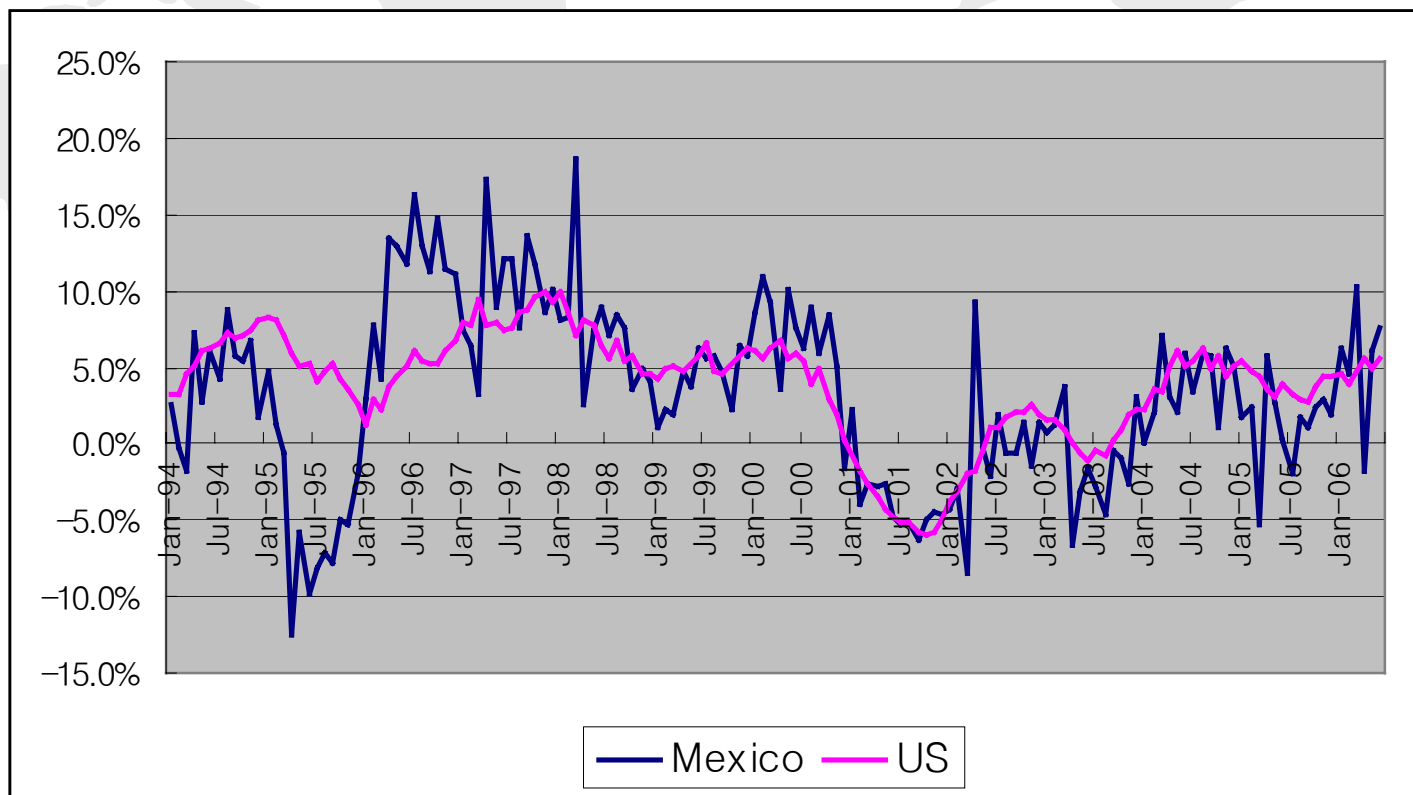
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Evolution of the Mexican Economy

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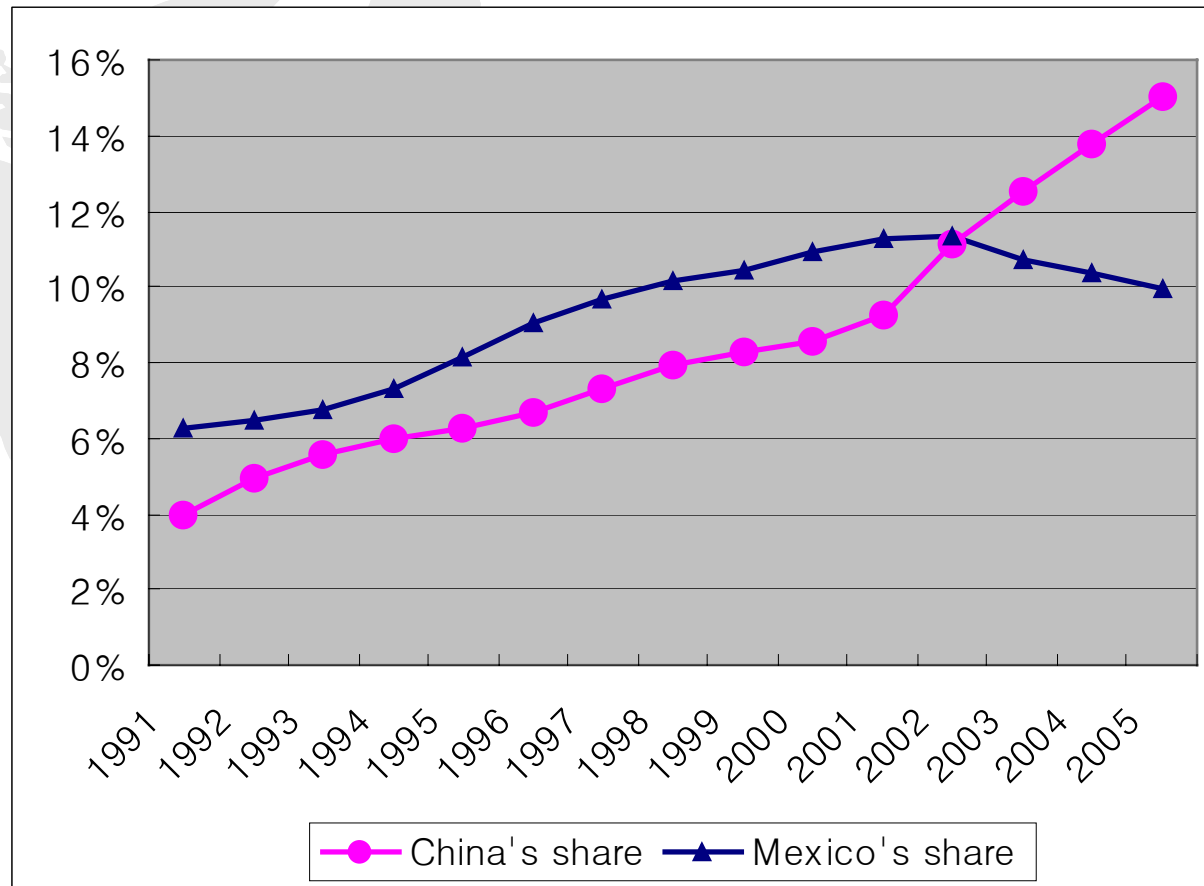
Causes of the lower than expected performance

Manufacturing Production in Mexico and US



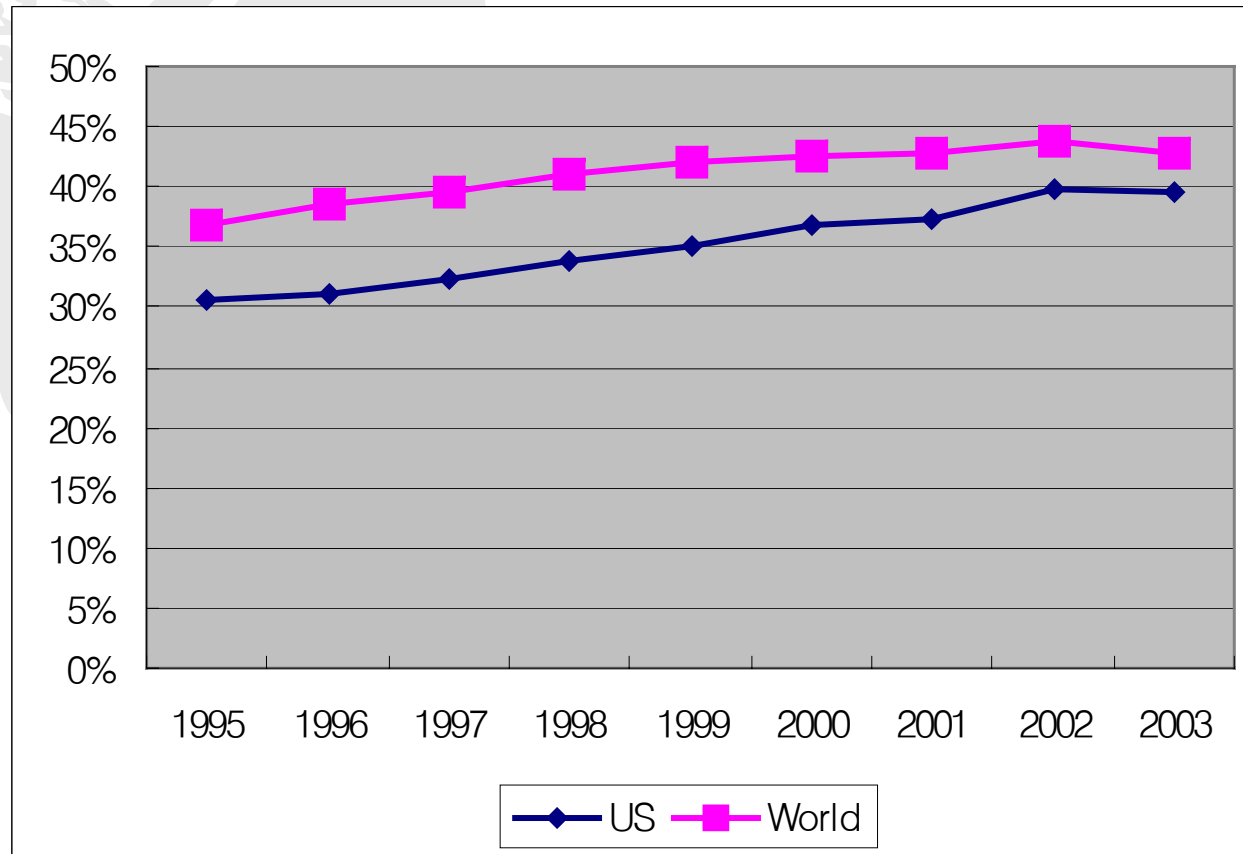
source: INEGI

Share of China and Mexico in US Market: 1991 ~ 2005



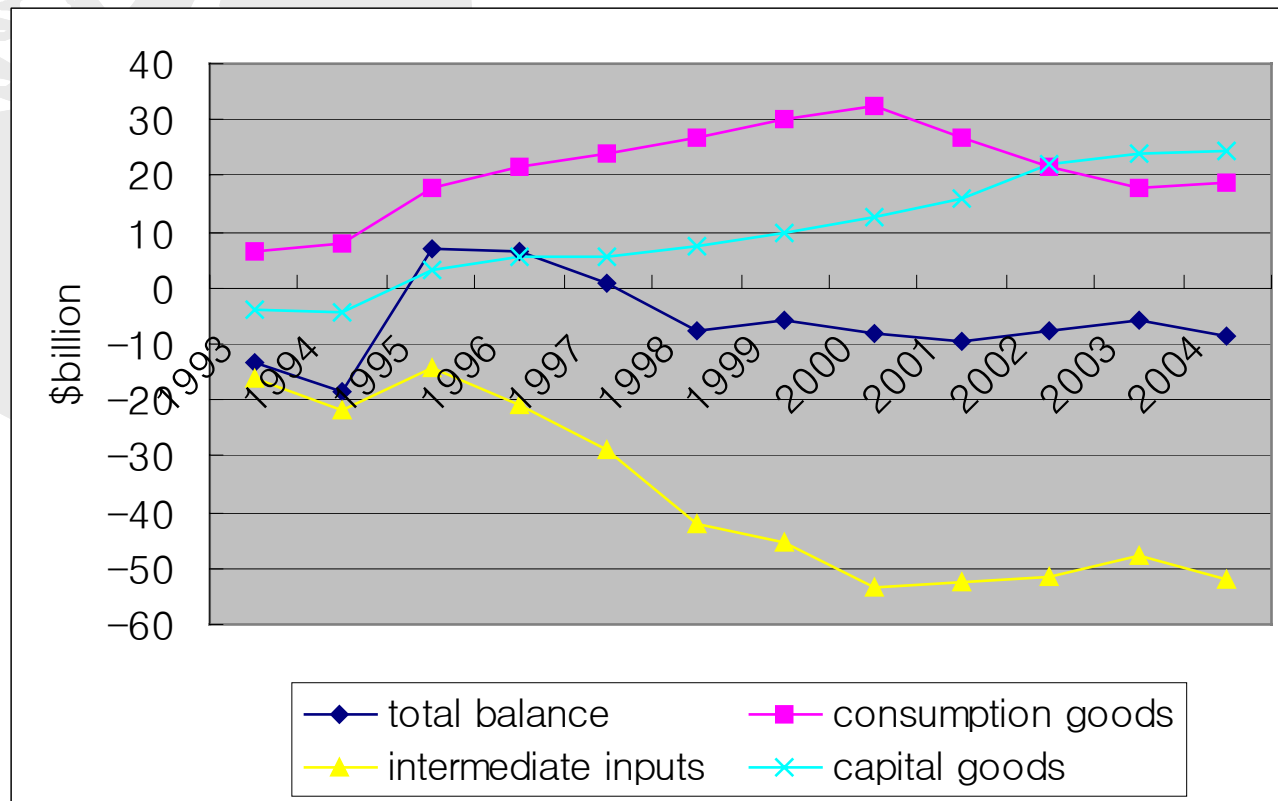
source: DOTS

Mexico-China Export Similarity Index in US Market



source: UN COMTRADE

Trade Balance of intermediate inputs



source: INEGI

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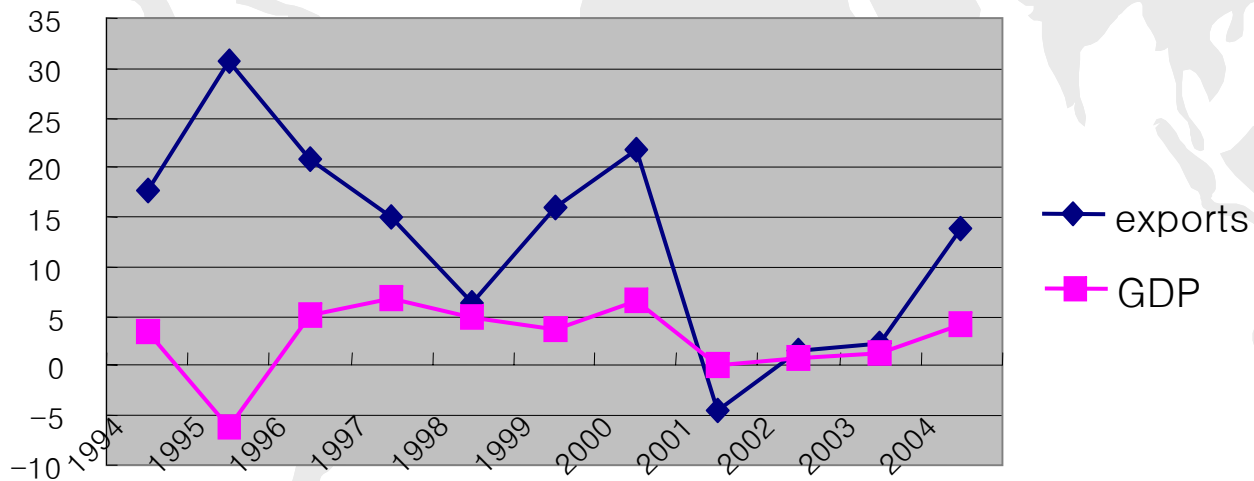
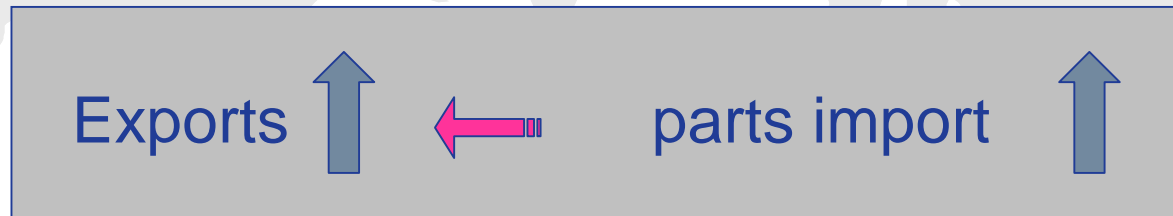
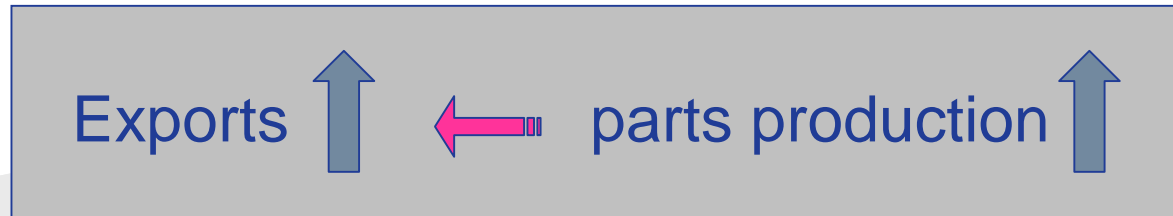
2

Causes of the lower than expected performance

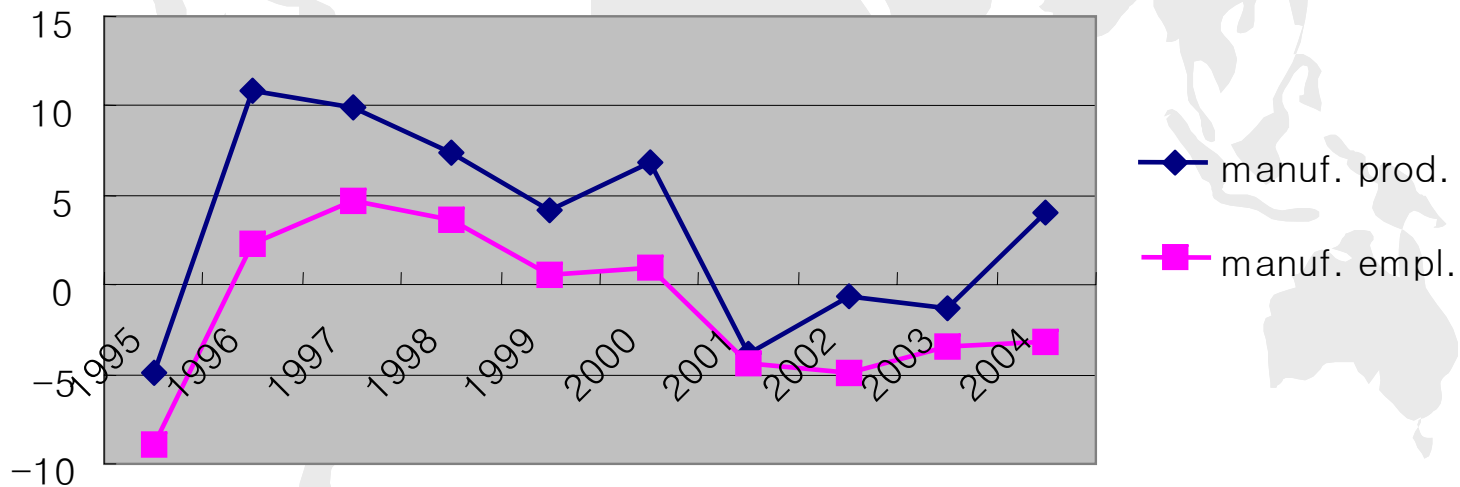
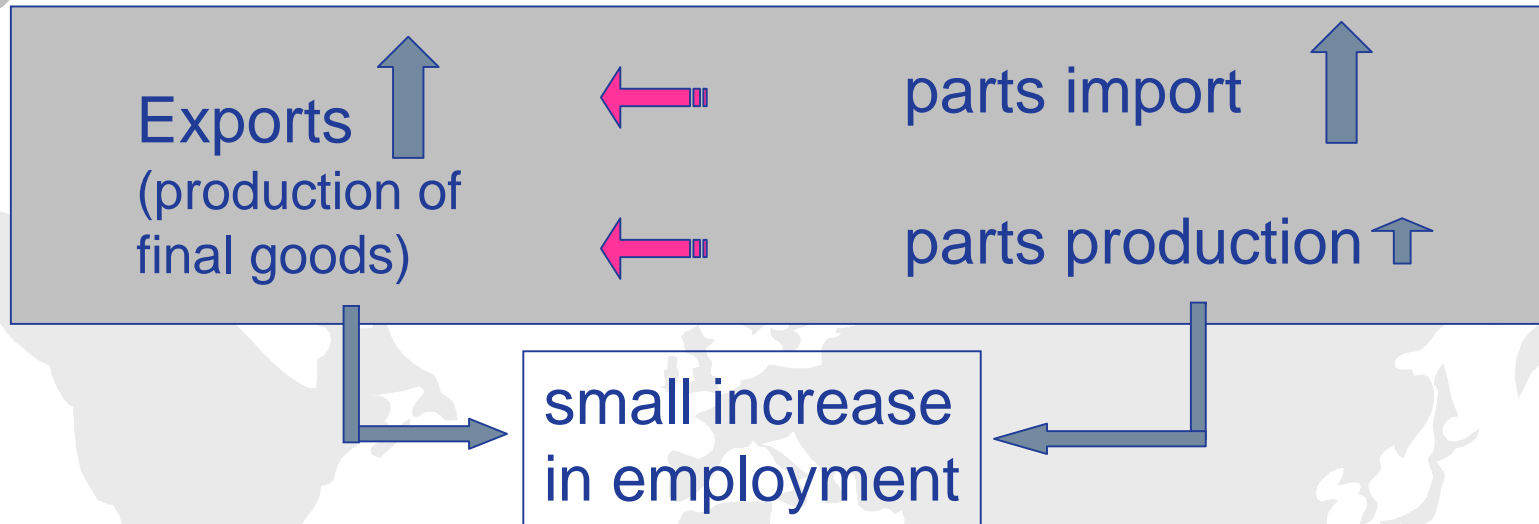
3

Consequences of the underdevelopment of intermediate inputs industry

Large increase in exports vs. Small increase in GDP



Small increase in employment compared to the increase in GDP



Small increase in investment and large participation of FDI

Exports
(production of final goods)



parts import



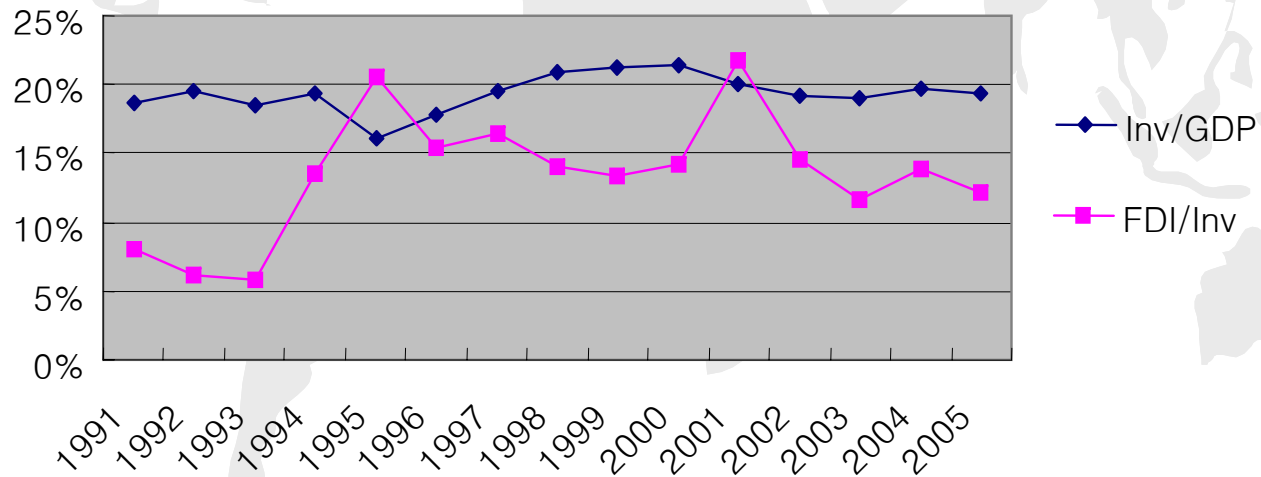
parts production



FDI



Domestic Investment



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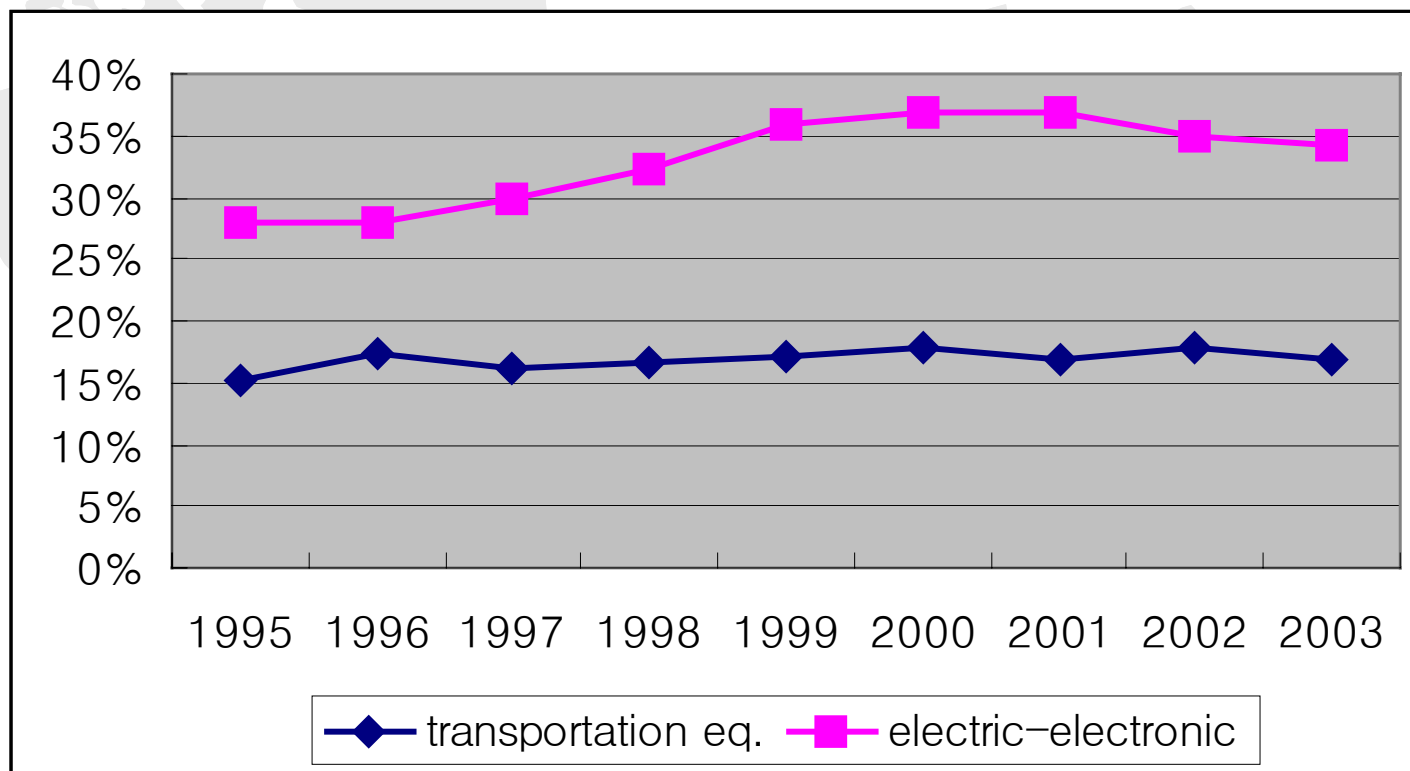
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Consequences of the underdevelopment of intermediate inputs industry

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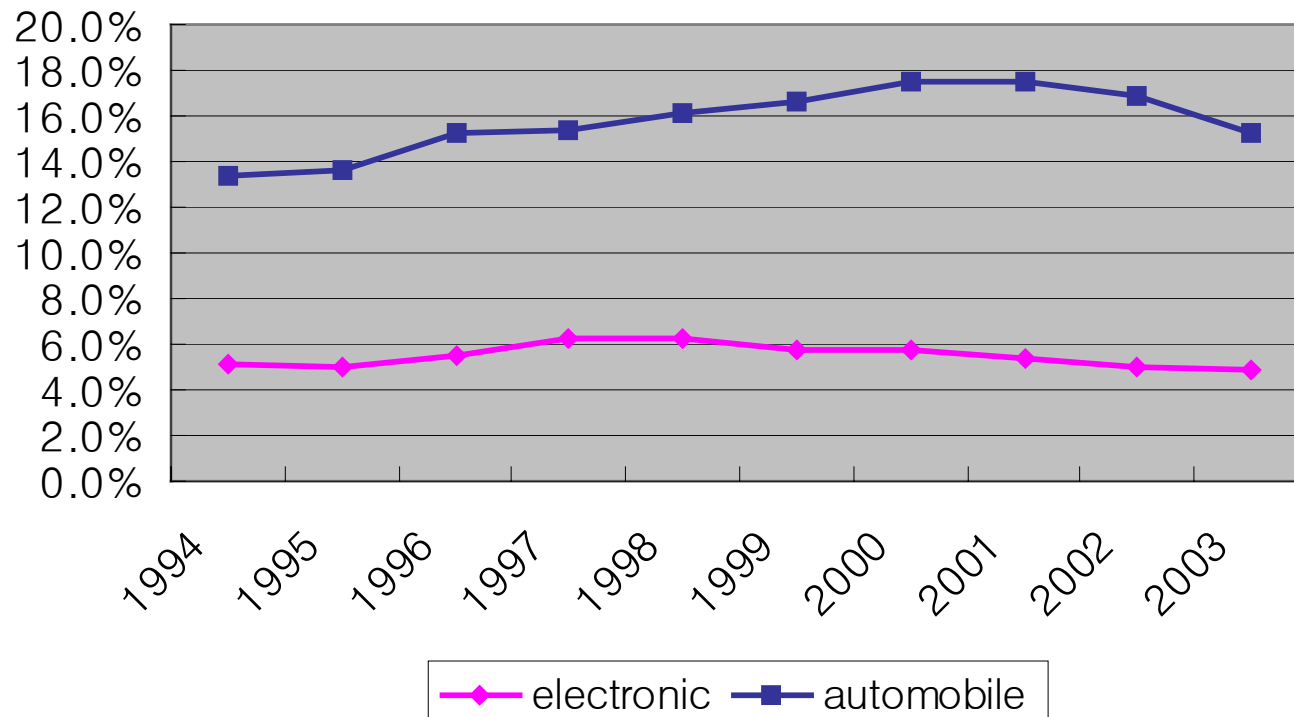
Cases: Auto vs Electronics industry

Export Shares of Transportation equipment and Electric & Electronic Products



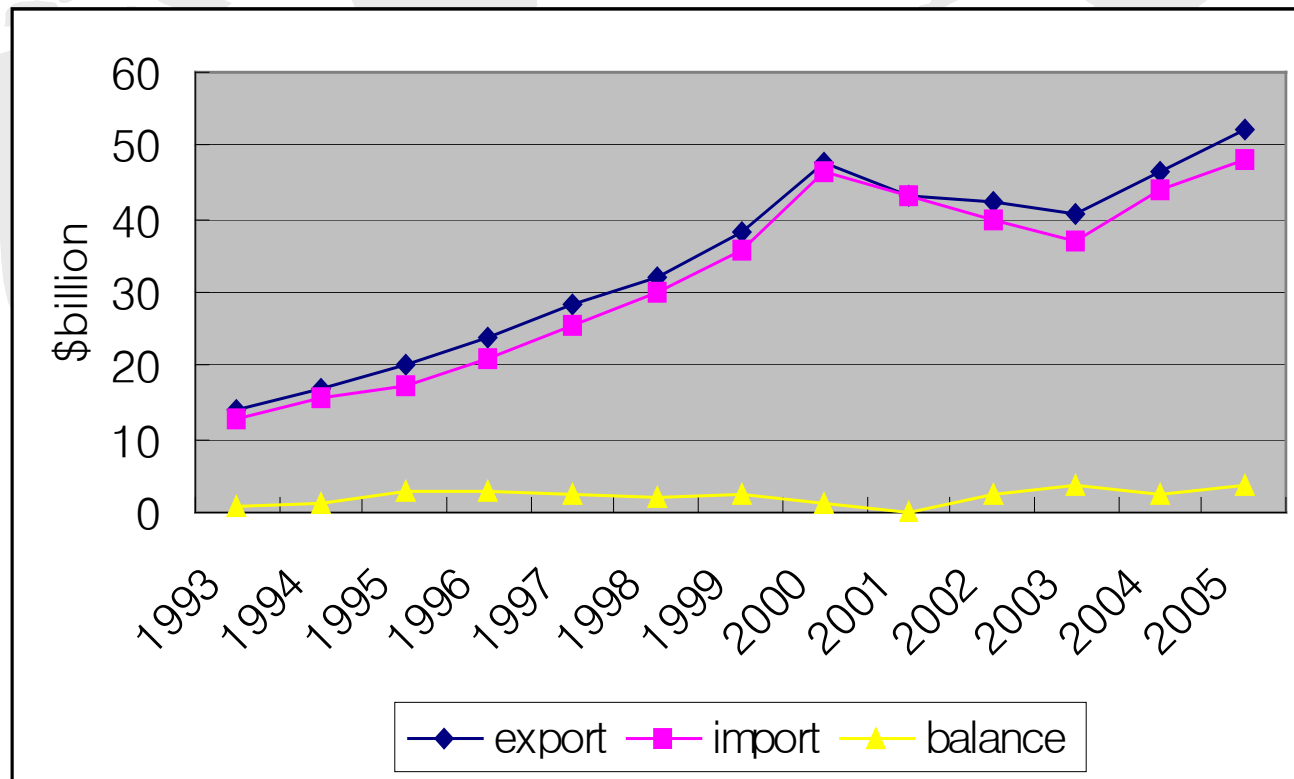
source: UN COMTRADE

Share of Transportation equipment and Electronic Products in Manufacturing Production



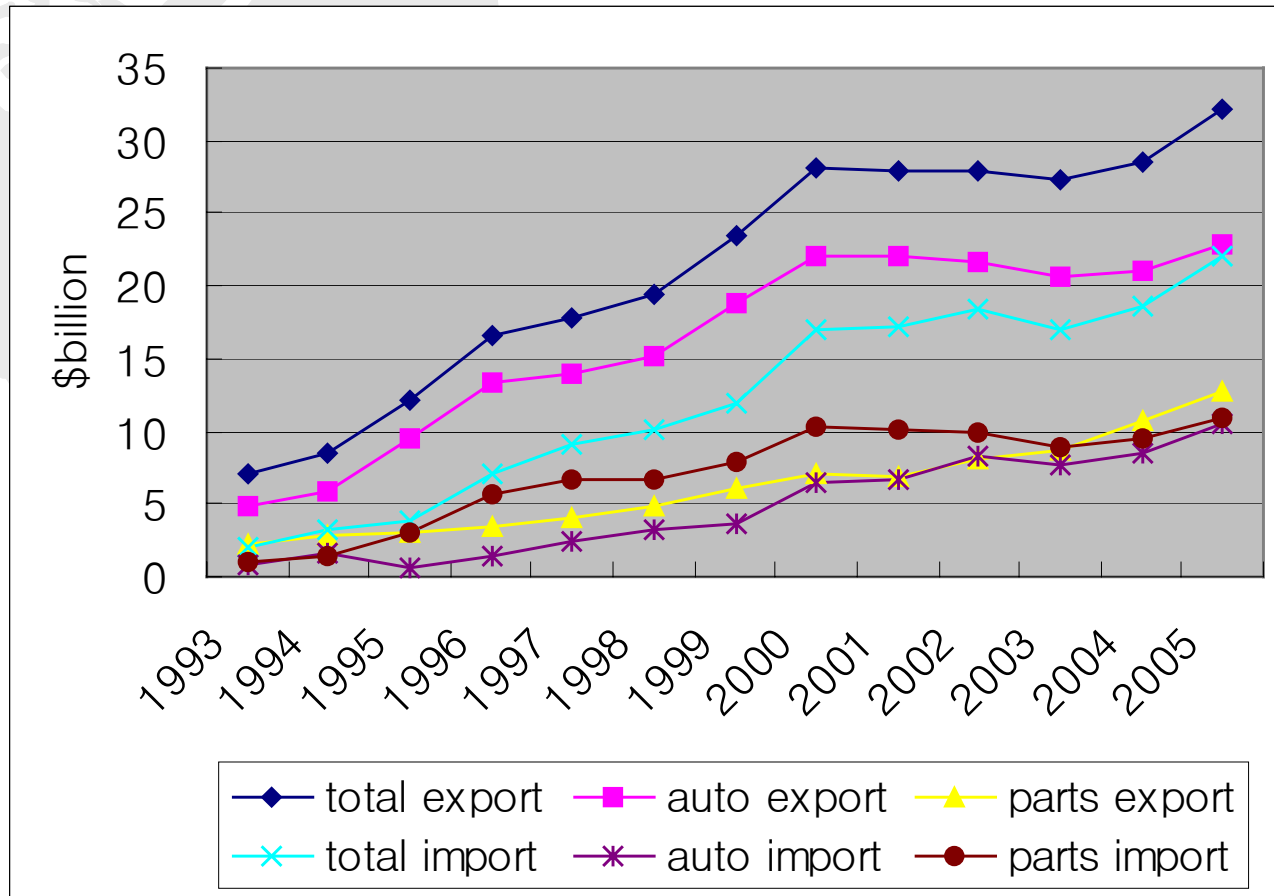
source: INEGI

Mexico's trade of Electronics & Electro-domestics products



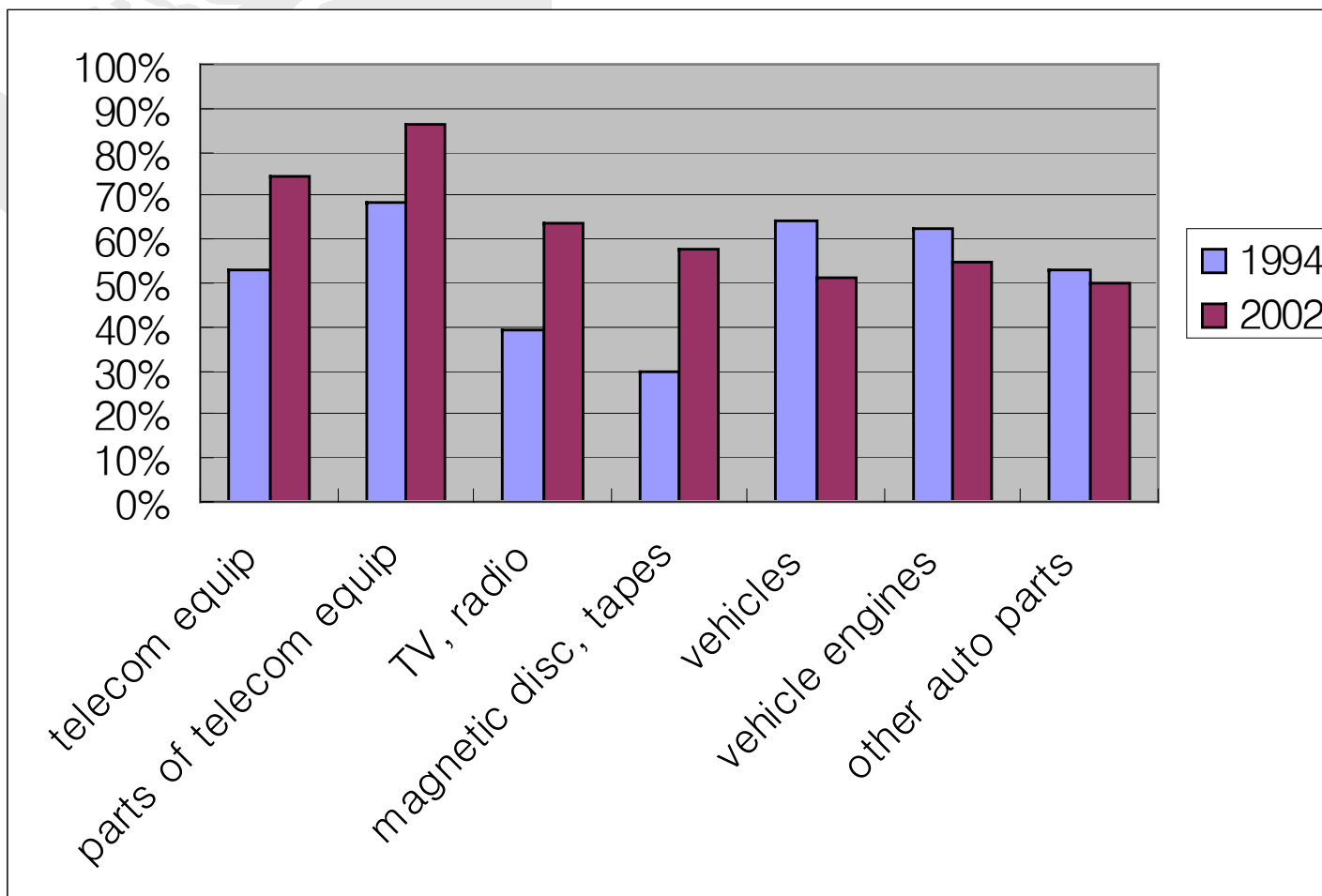
source: INEGI

Mexico's trade in Automobile industry



source: INEGI

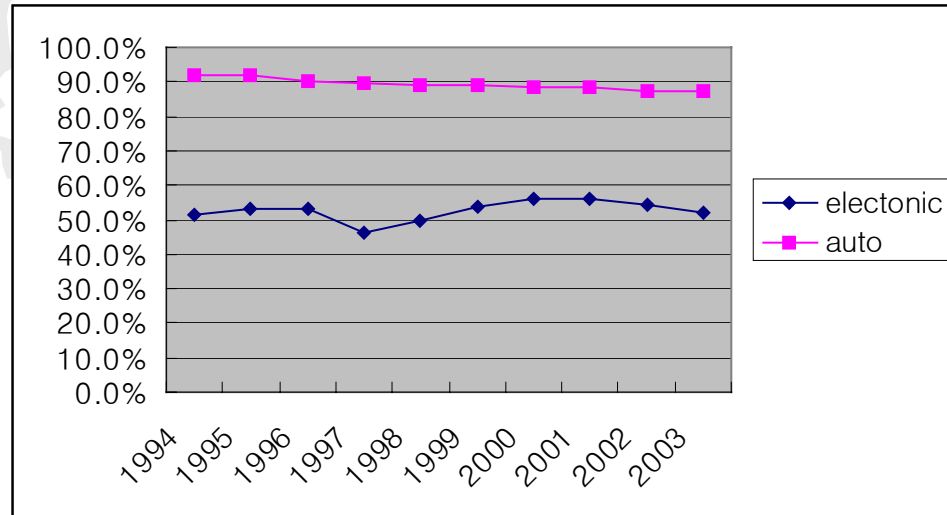
Ratio of imported intermediate inputs



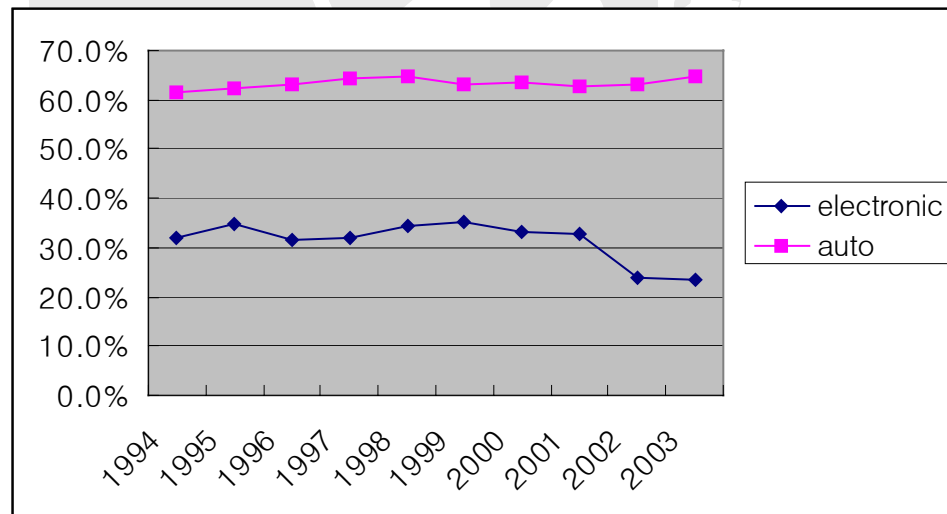
source: INEGI

Underdevelopment of SMEs

ratio of establishments
(parts/finished products)



ratio of number of workers
(parts/finished products)



note: electronic industry includes
telecommunication, TV and radio.

Causes



Situation before NAFTA

- Auto: Auto-parts industry was already developed before NAFTA. NAFTA led enabled the industry to reach economies of scale.
- Electronics: As parts industry was underdeveloped, Mexican government had to implement programs like PROSEC to host investment in assembly industry. However, this policy led still weak parts industry to a collapse.



Mexican auto industry was integrated to North American production network, whereas the electronic industry remained as an assembly center.

RTA: mechanical vs. electronic

