Price-competitiveness of China and its Asian neighbor competitors

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Abstract

A theoretical model is developed to study the effects on the Chinese bilateral exports of three real exchange rates, corresponding respectively to the price-competitiveness of Chinese products on the market of the considered import country (traditional effect), on China's other export markets (third importing-country effect), and the price-competitiveness of Chinese Asian competitors on the market of the considered import country (third exporting-country effect). This model is then applied for Chinese bilateral exports towards eleven industrialized countries for the period from 1980 to 2004. The econometric results confirm the effects of the three real exchange rates on the Chinese bilateral exports.

Keywords: bilateral exports, China, real exchange rates

JEL: F14, F31, P22

1. Introduction

During last twenty-five years, China has quickly increased its exports towards industrialized countries. The annual average growth of the Chinese exports towards the eleven most important industrialized countries,[1] expressed in current dollars, is 19.5% for the period 1981 to 2004, compared to 15% for total exports during the same period. The part of the Chinese exports towards these countries thus passed from 45% in 1981 to 72% in 2004[2]. The geographical distribution of these exports has itself changed considerably. Although the United-States and Japan remain the two most important markets for Chinese products, Chinese exports towards the United-States increased much more quickly than towards Japan, so that the respective shares of these two countries have been reversed. The shares of Chinese exports towards the United-States relative to total exports towards the industrialized countries passed from 12.8 % in 1980 to 41.4 % in 2004, and the share towards Japan from 53 % to 24 % during the same period. The objective of this paper is to analyze the role of real exchange rates, often considered as indicators of international price-competitiveness, in this upheaval of the geographical repartition of Chinese exports.

This subject is important for two reasons. First, facing to the increasing Chinese exports, the industrialized countries, in particular the United-States, exert a strong pressure in favor of the re-evaluation and the flexibility of China's exchange rate regime to reduce the Chinese exports towards these countries (Goldstein M., Lardy N., 2003a, 2003b; U.S.-China Economic and Security Review Commission, 2003, etc.). The stability parity between Renminbi and the American dollar (around 8.27 Yuans/dollar since 1998 after a light appreciation of 4% following to exchange rates unification in 1994) is considered as a price advantage for the Chinese products on the American market. China is accused to export its deflation towards the industrialized world (Hu, 2003). Several American politicians and entrepreneurs think that this parity stability is responsible of the increasing American trade deficit towards China (which is estimated to 43 billion US dollars in 2002) and of the unemployment (which in estimated to 2.7 millions for the period from 2001 to 2003) in the manufactured sector.

Second, due to Balassa-Samuelson effects, Chinese currency will certainly appreciate in the future because of its sustainable high economic growth. The change of China's exchange rate policies on July 21, 2005 marked the beginning of this reevaluation. In fact,

[1] The United-States, Japan, Germany, France, Canada, United-Kingdom, Italy, Netherlands, Australia, Spain, Belgium.

The current debate on reforming Chinese exchange rate regime is actually the level of Renminbi under-devaluation, and thus the rhythm of the reevaluation. Because of the sensibilities of Chinese exports to real exchange rates, it is therefore important for the Chinese government to analyze the economic consequences of its exchange rate policies and to know how to avoid the long economic recession as what happened in Japan after the adoption of a flexible exchange rate regime in 1985.

In this paper, we develop a theoretical model explaining these bilateral exports, which are estimated for the period from 1980 to 2004. In this model, the economic activities of China and the considered import industrialized country are employed as explanatory variables, as well as several other variables of relative prices between countries or real exchange rates, corresponding to different kinds of competitiveness relating to Chinese products. Thus, three kinds of price competitiveness will be taken into account, which are associated with three different real exchange rates. 1) The price competitiveness between Chinese products and domestic products of the importing industrialized country considered, measured by the real bilateral exchange rate of this same country against China (a traditional price effect). A real depreciation of Renminbi improves Chinese competitiveness and allows to win the market share in this import country. 2) The price competitiveness between Chinese products and domestic products of the other industrialized countries importing Chinese products, measured by the real effective exchange rate of these other import countries against China (a third importing-country effect). An improvement in Chinese competitiveness on these other export markets allows China to win market share on these other export markets. 3) The price competitiveness between Chinese products and those of other developing countries exporting towards the same importing industrialized country, measured by the real effective exchange rate of this import country in terms of these developing countries (a third exporting-country effect).

As the coefficients of real exchange rates may be different for each country, this model is also estimated for the Chinese exports toward the United-States. One advantage to estimate the exports between two countries is to avoid the estimation errors associated to exports considered totally. In fact, one statistically significant price-elasticity with a trade partner may be offset by another statistically non-significant one, and this leads finally one statistically non-significant one at global level ((Bahmani-Oskooee, 2003).

[2] According to CHELEM data, i.e. Harmonized Accounts on Trade and World Economy developed by CEPII. For more details, see http://www.cepii.fr/anglaisgraph/bdd/chelem.htm.

From a methodological point of view, this paper has a double originality. Most works on China have studied the total of Chinese exports without taking into account their geographical destination (Cerro and Dayal-Gulati, 1999; Dées, 2002; Guillaumont and Hua, 1995; Hua, 1996; Song, 2000). Other studies relative to industrialized countries have explained the geographical destination of their trade, but few of them have taken into account the different kinds of competitiveness, which are just recalled. One exception however is that of Bayoumi (1999) relative to bilateral trade between industrialized countries.

This article is organized as follows. The second section present the evolution of three real exchange rates which are susceptible to influence Chinese export competitiveness. The third section presents the evolution of the geographical distribution of Chinese bilateral exports on the markets of industrialized countries and compare them to those of other Asian countries, in order to show the concurrences these countries exert on Chinese exports. The forth section presents a theoretical model, which analyzes the effect of three real exchange rates, corresponding to three kinds of competitiveness, on the geographical distribution of Chinese exports and its estimation for the period from 1980 to 2000 is presented in the last section. The econometric results show that Chinese bilateral exports are positively influenced by a real depreciation of Renminbi in terms of the currency of the considered import country, a real appreciation of Renminbi against the currencies of other industrialized import countries and by a real appreciation of the currencies of Asian countries competing with China in terms of the currency of the considered import country.

2. Evolution of three real exchange rates influencing Chinese exports competitiveness

The strong fluctuation of bilateral exchange rates between the different countries throughout the world results from their exchange rate policies. We present firstly China's exchange rate policies and briefly those of its importing industrialized countries and its Asian competitors. We analyze then the evolution of three real exchange rates which will be used in econometric estimation in section.

2.1. Exchange rate policies

First, China practiced an active devaluation policy to promote exports, in particular manufactured goods, for the period from 1981-1993 (Guillaumont and Hua, 1996; Hua, 1996) by successively introducing an internal rate (1981-1984), an administered rate (1985-1986) and a market rate, named "swap" (1987-1993) higher than the official rate (figure 1). Export companies should sell part of their obtained foreign exchange at the official rate, and could use the rest of their foreign exchange to import for themselves, or sell them to other

companies at a higher rate. These two exchange rates were modified several times until 1993 and led a strong depreciation of the Chinese currency during this period. The unified market exchange rate at the beginning of 1994, the parity of US dollar against Renminbi, appreciated lightly of 4% from 1994 to 1998, and then remained stable (figure 1). On July 21, 2005, the Renminbi was appreciated by 2.1% against the US dollar and, moreover, the peg of the Renminbi changed from the US dollar to a basket of major currencies.

(Figure 1 here)

This exchange rate policy in China led a real depreciation of the Chinese currency against U.S. dollar almost continued until 1994 (with only two years of appreciation, 1988 and 1989). From 1994 to 1997 Renminbi appreciated however of 20% in real terms, followed by a real depreciation of 9% from 1997 to 2000, due to the different price evolution in China and in the United States (figure 2). Thus the Renminbi stability policy practiced even after the 1997 Asian financial crisis did not noticeably decrease the price-competitiveness of Chinese products on the market of the United States, the largest importer for China and other Asian countries. The depreciation of other Asian currencies increase moreover the price-competitiveness of Chinese processed exports which include a high share of imported inputs from Asian countries.

Second, following the adoption of flexible exchange rate regimes, the bilateral exchange rates between the industrialized countries become strongly instable, in particular the strong appreciation of the American dollar during the early eighties, followed by a nominal depreciation from 1985 to 1995 and finally by a nominal appreciation from 1995 to 2001. Since then, the Euro appreciates against the dollar. The parity between the American dollar and the Euro passed from 1.12 Euros/dollar in 2001 to 0.80 Euros/dollar in 2005. This depreciation of American dollar relative to the Euro becomes furthermore a current discussion between the United-States and the countries of the Euro zone. The Japanese yen appreciated considerably against the U.S. dollar since the Japanese government adopted a floating exchange rate regime in 1985. Its nominal exchange rate passed from 239 yens/dollar in 1985 to 110 yens/dollar in 2005. As the Renminbi is pegged on the American dollar since 1998, the fluctuation of bilateral exchange rates between the United-States and the other industrialized countries leads mechanically the fluctuation of Renminbi vis-à-vis the currencies of these other countries which should influence price-competitiveness of the Chinese goods and thus lead a reorientation of the Chinese exports among the market of these countries.

Finally, the Southeastern Asian countries thought that China, by taking their market share, had some responsibilities for 1997 Asian financial crisis. They have strongly devalued

their currencies following to this crisis, while China played one stability pole by not devaluing its currency in order to avoid the competitive devaluations. In 1998, the nominal devaluations of the currencies of these countries relative to dollar were 224% for Indonesia, 47% for the South Korea, 39% for Malaysia and the Philippines, and 32% for Thailand.

2.2. Evolution of three real exchange rates

The size of the variation in the real value of these currencies can be inferred from the evolution of real exchange rates which are generally considered as price-competitiveness indicators.

Table 1 show the evolution of real bilateral exchange rate of China against its eleven importing industrialized countries. We observe the depreciation of the Renminbi against the currencies of these last ones until 1993, followed a real appreciation from 1994 to 1998. Since then, the evolution become different according to import country. In particular, we remark that Reminbi re-depreciates against the American dollar, while it appreciates again Japanese yen.

The appreciation of real effective exchange rate of the dollar in terms of the other ten industrialized countries is 37% for the period from 1980 to 1985, followed by a real depreciation of 46% from 1985 to 1995 and finally by a real appreciation of 45% from 1995 to 2001. The evolution of the real effective exchange rate of the ten industrialized countries (except for the United-States) relative to the Renminbi[3] is similar until 1998 to that of the dollar exchange rate against the Reminbi and since then diversifies from it (figure 2). The Renminbi depreciated by 34% relative to the other ten industrialized countries in real terms from 1984 to 1994 and followed by one real appreciation of 33% from 1994 to 2002. The different evolution of Renminbi real exchange rate allow thus to explain why China won quickly its market share in the United-States.

Concerning the developing countries, potentially competing with Chinese products on the markets of the eleven industrialized countries, they also experienced a relatively contrasting evolution of their real exchange rates. In this study, four ASEAN[4] countries (Thailand, the Philippines, Indonesia and Malaysia) and four newly industrialized economies (NIEs) (Hong Kong, Taiwan, South Korea and Singapore) are considered as potential competitors of Chinese exports on the markets of the eleven industrialized countries. In fact,

[3] The real effective exchange rate of the United States in terms of ten industrialized countries is calculated as the product of the geometric average of the nominal bilateral exchange rates of dollar against the currencies of these ten countries and the price ratio in the United States and in these industrialized countries. The weighting is calculated as the share of Chinese exports towards an industrialized country in relation to total Chinese exports towards this country.

these industrialized countries are also the main import markets for goods from these eight Asian economies and, moreover, these economies have a tendency to export the same kinds of goods as China[5]. Table 2 shows the evolution of real bilateral exchange rate of Renminbi against its eight Asian competitors. We observe, except for Indonesia, a real depreciation of Renminbi until 1993, followed by a real appreciation since then.

Figure 2 shows the evolution of the real effective exchange rate of the United-States against these countries[6]. These Asian countries experienced a real depreciation of their currencies against the dollar during the early eighties, followed by a real appreciation until 1996. In 1998 their currencies depreciated of 32% in real terms following the Asian financial crisis, and followed finally by a real appreciation of 6% from 1998 to 2002.

3. Evolution of Chinese exports towards industrialized countries and comparison with those of other Asian countries

3.1. The available data on China's bilateral exports

The bilateral export data for China and its principal industrialized partners are the subject of regular discussion, particularly for the case of China and the United-States (Arora et al., 1995; Feenstra et al., 1998; Fung et al., 2001; Schindler et al., 2005).

The discrepancy between the statistical sources reported by export countries and import ones comes from firstly regulation, which consists that imports are measured in c.i.f. while exports in f.o.b. (free on board). This regulation introduces automatically a gap between the statistics published by export country and imports by import country, which is not specific to Chinese exports towards the important industrialized countries. The second and principal source of discrepancy comes from the re-exports of Chinese products via Hong Kong. We know that these re-exports towards the United-States represent more than the half of its exports towards this country. China and its trade partners measure differently these re-exports. The import countries consider all Chinese products via Hong Kong as their imports from China, while China includes them in its exports only since 1992 when international harmonized system is adopted. The third source of discrepancy comes from the fact that Hong Kong adds markups on the Chinese products it re-exports. This leads a gap between the

[4] Association of South East Asian Nations.
[5] See the details in the following section.
[6] The real effective exchange rate is calculated here as the product of dollar exchange rates in terms of the Asian countries' currencies and the ratio of consumer price indices in the United States and in these countries, weighting each year by the geographic structure of the exports of these Asian countries towards the United States.

values of the Chinese products exported by China and those of products imported by the country of final destination. Moreover, the estimation of these markups by Hong Kong is often approximate.

CHELEM statistics correct the effect of Chinese re-exports *via* Hong Kong for data concerning bilateral trade by using the statistics recorded by China's trade partners and those provided by the Hong Kong Administration (Dramé, 1994). They also correct the errors and incoherence of official statistics collected by international organizations (UN, WB, IMF, etc.). In order to use harmonized data for the entire period, we use here CHELEM statistics, not those published by China, its import countries and its competitors.

3.2. Evolution of Chinese exports towards eleven industrialized countries

The Chinese exports (in current prices) towards eleven industrialized countries increased from 7.71 billion US dollars in 1980 (45 % of total exports of China) to 125 billion dollars in 2004 (51 % of total), i.e. an average annual growth rate of 19.5%. This growth accelerated after 1988. Thus, the share of China's exports towards the eleven industrialized countries relative to its total exports increased from 45% in 1980 to 51% in 1993. It then stabilized until 2000.

Table 3 shows the change in the geographical distribution of China's exports for each market of the eleven industrialized countries. The United-States and Japan are by far the biggest trade partners of China, totaling more than 65% of China's exports towards the eleven industrialized countries during the period studied, while the total of the other industrialized countries is hardly more than the imports of these two partners.

In 1980, Japan was the major market of China (53%). But since 1989, the United-States has become the leading market of China to the detriment of Japan. In 2004, Chinese exports towards the United-States represented 41% of China's total exports towards the eleven industrialized countries while they totaled only 13% in 1980. Japan has become the second importer for China, totaling 24% in 2004, while it imported 53% in 1980. Germany is the third market for Chinese goods, but on a much smaller scale. It imported 9% in 1980 and 8% in 2004 of Chinese goods sold on the eleven industrialized markets. Among the other countries, the share of Chinese exports towards Canada, the United Kingdom, the Netherlands and Spain increased, while it stabilized or decreased for the other countries, including France.

(Table 3 here)

Table 4 presents the change in the proportion of Chinese products exported towards each industrialized country in the total imports of this same country. Despite the fact that the market shares of Chinese goods in the total imports of each industrialized country increased

from 1980 to 2000, they are still low. The market share of Chinese goods in total Japanese imports is the largest for the entire period, increasing from 2.9% in 1980 to 19% in 2004. It increased from 0.4% to 9% on the United States market, from 1% to 9% on the Australian market and from 0.2% to 3.5% on the Dutch market. On the other industrialized markets, the market shares did not exceed 0.4% in 1980 and 3% in 2004. It is therefore difficult to conclude that the weak prices of Chinese export goods are a major cause of deflation in these import countries, an argument out forward by the United-States and Japan for a re-evaluation of Chinese currency.

(Table 4 here)

3.3. Competitiveness of Chinese exports towards industrialized countries with those of other Asian countries

We explain here why four ASEAN countries (Thailand, the Philippines, Indonesia and Malaysia) and four newly industrialized economies (NIEs) (Hong Kong, Taiwan, South Korea and Singapore) are considered as potential competitors of Chinese exports on the markets of the eleven industrialized countries. In fact, China and these Asian countries export their goods to the same destination and, moreover, they export the same kinds of goods.

Firstly, as for China, the eleven industrialized countries are the most important markets for the goods of the eight Asian countries, which represented more than 45% of their total exports in 1993 (table 5). Despite that these markets decreased in favor of China in 2004, they represent at least 35% in 2004. The United-States and Japan are also the two major markets for all Asian countries, which total in 1993 between 29% of their exports for Singapore and 39% for Taiwan. The United Kingdom is the third market for Hong Kong, Korea, the Philippines, Singapore and Thailand, as are the Netherlands for Indonesia, Malaysia and Taiwan. France is the forth market for the Philippines.

(table 5 here)

Figure 3 shows the evolution of the share of Chinese exports on the markets of the eleven industrialized countries as a whole relative to those of the four NIEs and 4-ASEAN countries. It seems that there is an inverse relation between Chinese exports towards industrialized countries and those of the NIEs. China's share increased from 11% in 1981 to 32% in 2000 and fell from 54% to 46% for the NIEs. This evolution is not surprising. In fact, during this period, NIEs delocalized their intensive unskilled-labor production in order to develop processing activities in China because of low labor costs. It is thus normal that the share of exports of these economies towards the eleven industrialized countries decreased in

favor of those from China. This is the redistribution consequence inside Asian exports on the industrialized markets in favor of China. Thus, it is difficult to conclude that the strong growth of Chinese exports is a major source of employment destruction in the industrialized countries. This change in the share of exports does not exert negative effects on NIE economies, which export intermediary consumption towards China for processing activities. On the contrary, the increase in Chinese export processing activities stimulates the economic growth of these countries. In this sense, China is becoming a motor for economic growth in this Asian zone.

Figure 3 also shows that there is an inverse relation in the share of NIE exports towards the eleven industrialized countries relative to that of the 4-ASEAN countries. The export share of the 4-ASEAN countries suffered a reduction from 1981 to 1987 in favor of NIEs, remaining stable thereafter at around 22%. The increase in the Chinese export share on the markets of the eleven industrialized countries does not influence this stability.

(Figure 3 here)

In a general way, the competition between Chinese goods and those of the 4 NIEs is stronger than between Chinese goods and those of the 4 ASEAN countries. As a result, we expect the estimated coefficient of real effective exchange rate of Asian countries to be higher for the 4 NIEs than for the 4 ASEAN countries.

Secondly, eight Asian economies have a tendency to export the same kinds of goods as China such as clothing, textiles, footwear, electrical machinery, telecommunications and office machines. As shown in the first part of Table 6 relative to 1993 and 2004, these six categories of products are very important in total exports of each country, although they represent no more than 10% of world exports. The export part of these products represents 50% of total in China for 1993, and increased to 56% in 2004. This figure is even higher for Hong Kong and Singapore in their exports, with percentages of 64% and 56% for the first and 57% and 61% for the second respectively during the same period. These products also represent a considerable share of the exports of other countries.

The table 6 presents also two competitiveness indicators of these products: export-share revealed comparative advantage indices, developed by Balassa (1965) and world share of each country in world exports.

The revealed comparative advantage indices of country *j* in the trade of product *i* (RCA_{ij}) is measured by the item's share in the country j's exports relative to its share in world exports as following: $RCA_{ij} = (X_{ij}/X_{tj})/(X_{iw}/X_{tw})$. X_{ij} and X_{iw} are the exports of product *i* respectively for country *j* and the world. X_{tj} and X_{tw} are respectively total exports of country j

and the world. If it takes a value of less than 1 (which indicates that the share of product *i* in country *j*'s exports is less than the corresponding world share), this implies that the country has a revealed comparative *disadvantage* in the product. Similarly, a RCA index greater than 1 implies that the country has a revealed comparative *advantage* in the product.

The indices of RCA for six products are calculated by country and by product for 1993 and 2004 (Table 6). China and other eight Asian economies have RCA indices bigger than one. Thus, these economies have a comparative advantage in these groups relative to the rest of the world. On the one hand, China has RCA indices particularly higher in the unskilled-labor intensive products such as leathers (5.5), clothing (6.2) and textile (3.8) in 1993, as Hong Kong, Taiwan, Korea, Indonesia and Thailand. On the other hand, the indices of China's RCA in skilled-labor intensive products, such as electrical machinery, telecommunications and office machines, are low in 1993 (with 0.4, 1.1 and 0.9), but they are increasing (with 3.2, 1.5 and 1.9 respectively in 2004) (see table 7). As several Asian economies have strong RCA indices in these products, China faces more competition from these economies in its exports.

Finally, China and the other Asian economies are the main producers of these six products in world exports. Although the total exports of these countries share only 17 % of total world exports in 2004, their exports of clothing, textile, leather products, office machines, electrical machinery and telecommunications represent 32%, 35%, 33%, 48%, 21% and 44% of world exports respectively. The market shares of these goods exported by China and other Asian countries are very significant in world market.

(table 6 here)

Three conclusions can be drawn from these statistical analyses. The diversity of Chinese exports towards each industrialized country justifies our explaining the evolution of Chinese bilateral exports by the real exchange rate of China against the import country and other industrialized countries, potential importers of Chinese goods. The existence of competition between China and its Asian competitors fully justifies our taking into account the real exchange rate of China against these Asian countries in order to explain the evolution of Chinese bilateral exports. Finally, despite the fact that the market share of total Chinese exports in the total imports of each industrialized country is low, it is relatively high in several categories of goods where China and its Asian competitors are the major world producers.

4. Theoretical model of the effects of real exchange rates on the geographical distribution of Chinese exports

4.1. Theoretical framework

We suppose that China, as well as its Asian competitors, has some market power and can decrease the prices to win market shares. In fact, for several goods, China is the major world producer. This is more important if China and its eight Asian competitors are considered together. We have observed that for total world exports of clothing, textiles, electronic machines, telecommunications, office machines and footwear, the market shares of China and its Asian competitors in world exports range from 29% to 46% in 1997. For China alone, they range from 3% to 18% (cf. table 3). Moreover, most exports in China and in its competitors are realized by multinational companies, which certainly have some market power to fix the prices of exported goods according to destination faced with the fluctuation of exchange rates (*pricing to market* according to Krugman, 1997). Consequently, we can suppose that China and its Asian competitors are confronted by a demand for their goods, which is not infinitely elastic. In these conditions, a real depreciation of the currencies of these countries can give their exporters the opportunity to decrease their prices in the currency of the import country and thus to win market parts.

A traditional way to estimate the sensitiveness of multilateral exports to real effective exchange rate is to use a reduced form export equation which is derived from assuming an equilibrium between the export demand and supply functions in order to avoid simultaneous equation bias that may result from estimating the functions alone (Goldstein and Khan, 1988). The export demand depends the relative price between Chinese exports and the goods of its trade partners and the world demand. This relative price, measured by real effective exchange rate of Renminbi is thus used as a traditional indicator of price-competitiveness of Chinese multilateral exports (Guillaumont Jeanneney and Hua, 1996; Hua, 1996, Dées, 2002).

When this function is applied into bilateral data, the volume of the Chinese exports in the market of the import country j depends on the relative price between the Chinese exported goods and home goods, measured by real bilateral exchange rate between two countries and the demand of import country j such as:

$$\ln\frac{X_{ij}^{d}}{P_{ij}^{x}}=a_0+a_1\ln\frac{P_j E_{ij}}{P_{ij}^{x}}+a_4\ln Y_j \qquad (1)$$

X_{ij}^{d} : export demand for Chinese goods of import country j, in nominal values expressed in yuans.

P_{ij}^{x} : price of Chinese exports in the market of import country j, in Yuans;

P_j : price of alternative goods of import country j in the currency of import country ;

E_{ij} : nominal bilateral exchange rate of import country j in terms of China. An increase signifies a nominal depreciation of the Chinese currency, i.e. Renminbi.

Y_j : real income of the import country j, in the currency of import country.

However, the consumers of importing country j can choose between three types of goods: domestic goods, Chinese goods and the goods from all other exporters, i.e. China's competitors. The exports of Chinese goods can be diminished if the other countries exporting on the same market of China meet real depreciations of their currencies which are more important than those of Renminbi, and inversely. In order to capture these "third-exporting-country" effects on the Chinese exports towards the market of the import country j, the relative price between the goods of these third-exporting-countries and the domestic goods should be taken into account.

Secondly, the exports of Chinese goods towards the market of the import country j can be influenced by its price competitiveness on the market of the other import countries. The real depreciation of Renminbi vis-à-vis the currencies of these others countries increase the demand for the Chinese goods by the consumers of these other import countries. The Chinese exporters take thus this opportunity to win the market shares of these other import countries. It is therefore probable that one part of the Chinese goods will be oriented from the considered import country towards these import countries.

When multilateral data on exports are used, these third exporting and importing effects are generally incorporated directly into the weights used in the real effective exchange rate calculation (Bayoumi, 1999). However, real bilateral exchange rate in this bilateral export function does not permit to capture the effects of "third-exporting-country" and "third-importing-country". It is therefore pertinent to introduce the relative price between the Chinese competitors and the import country and the relative price between China and other import countries into equation (1) as following:

$$\ln\frac{X_{ij}^{d}}{P_{ij}^{x}}=a_0+a_1\ln\frac{P_jE_{ij}}{P_{ij}^{x}}+a_2\ln\frac{P_jE_{kj}}{P_{kj}^{x}}+a_3\ln\frac{P_mE_{im}}{P_{im}^{x}}+a_4\ln Y_j \qquad (2)$$

P_k^x : price of the Chinese competing countries' exports towards import country j, expressed in the currencies of competing countries;

E_{kj} : nominal effective exchange rate of import country j in terms of third exporting countries. An increase signifies a depreciation of the currencies of third-exporting-countries.

E_{im}: nominal effective exchange rate of the other import countries m in terms of China. An increase signifies a depreciation of the Renminbi vis-à-vis the currencies of other importers m.

P_m : price of alternative goods of the other import countries in local import currencies.

P_{im}^x: price of alternative goods of the other import countries m in their local currencies.

Consequently, bilateral export data allow to estimate separately the third-exporting country effects, the third-importing country effects from the traditional price effects.

We follow the traditional function to suppose that the bilateral supply of Chinese exports towards import country j depends the relative price of the Chinese exports in yuans and its alternative goods in the Chinese market, and the Chinese production activities such as

$$\ln\frac{X_{ij}^s}{P_{ij}^x}=b_0+b_1\ln\frac{P_{ij}^x}{P_i}+b_2\ln Y_i \qquad (4)$$

X_{ij}^s : export supply of Chinese goods towards import country i, in nominal value in yuans;

P_i : price of alternative goods of China in yuans;

Y_i : production capacity of China, expressed in yuans.

Assuming that the actual level of the Chinese exports towards import country j represents an equilibrium condition, the reduced form equation can be obtained from eliminating the terms P_{ij}^x and equalizing the equation 3 and the equation 4. We get thus the following export equation such as:

$$\ln\frac{X_{ij}}{P_i}=c_0+c_1\ln\frac{P_jE_{ij}}{P_i}+c_2\ln(\frac{P_jE_{kj}}{P_k^x})+c_3\ln(\frac{P_mE_{im}}{P_{im}})+c_4\ln Y_j+c_5\ln Y_i \qquad (5)$$

Where $c_0=\frac{(a_0+a_0b_1-b_0+b_0a_1)}{a_1+b_1}$; constant

$c_1=\frac{a_1(1+b_1)}{a_1+b_1}$: real bilateral exchange rate elasticity of the import country in terms of China;

$c_2=\frac{a_2(1+b_1)}{a_1+b_1}$: real effective exchange rate elasticity of the import country in terms of Chinese competitors;

$c_3=\frac{a_3(1+b_1)}{a_1+b_1}$: price elasticity of real effective exchange rate of the other import countries in terms of China;

$c_4=\frac{a_4(1+b_1)}{a_1+b_1}$: demand elasticity;

$c_5=\frac{b_2(a_1-1)}{a_1+b_1}$: supply elasticity;

The expected signs are as follows: $c_1>0$; $c_2<0$; $c_3<0$; $c_4>0$; $c_5>0$.

Consequently, real bilateral Chinese exports towards country j are determined by the real bilateral exchange rate of the import country vis-à-vis China (price-competitiveness of Chinese goods i on the export market j), the real effective exchange rate of the import country vis-à-vis the Chinese competitors (price-competitiveness of other export countries' goods on the same export market j), the real effective exchange rate of other import countries against China (price-competitiveness of Chinese goods on the other export markets m), as well as the economic activity of importer j and the production capacity of China.

One potential problem of this export equation (6) is the multicolinearity of the three exchange rates. One easy solution is to use real effective exchange rate of Renminbi instead of the above three exchange rates, as in multilateral data. However, this does not correspond to the objective of this paper which just tries to separate the traditional price effects from third country effects. By controlling for the "third-importing-country" effects, the real exchange rate of the considered import country vis-à-vis China captures not only the traditional impact of the real depreciation of Renminbi on the Chinese export demand towards the import country (i.e. traditional price effect), but also the reoriented effect on the Chinese exports demand of the considered import country from the other import countries (i.e. third import-country effects). These last effects are equal to zero in the case that the variation of real effective exchange rate of the other import countries in terms of China is at the same level to that of real exchange rate of the import country against China (no reoriented exports). In this case, the coefficient of real bilateral exchange rate captures only its effect on the Chinese exports towards the considered import country, i.e. traditional price-competitiveness effects.

A special character of the Chinese exports is that the part of re-exported processed goods using imported intermediate goods from other Asian countries is very important. The depreciation of other Asian currencies not only improves the price competitiveness of the goods exported directly by these countries, considered thus as China's competitors, but also increase the price-competitiveness of Chinese re-exported goods including a high share of imported inputs from Asian countries which are not in this last case not competitors.

4. Econometric estimations

The above equation (6) is estimated for Chinese bilateral exports towards eleven industrialized countries (United-States, Japan, Germany, France, Canada, United-Kingdom, Italy, Netherlands, Australia, Spain, Belgium) in constant prices (panel data), as well as for

the Chinese exports towards the United-States (time series data) for the period from 1980 to 2000. All variables are calculated in logarithms.

4.1. Definition and calculation of variables

Chinese bilateral exports towards the eleven industrialized countries (X_{ij}), which are employed in the previous statistical analyses, are in nominal terms. We require exports in real terms for econometric analyses, in accordance with the theoretical model (equation 6). According to the equation, the volume of Chinese bilateral exports (which include all exported goods), i.e. nominal bilateral exports towards eleven industrialized countries in yuans divided by price of alternative export goods in yuans, is calculated as nominal exports in dollars deflated by export unit value of China in dollars.

The production capacity of China (Y_i) and the economic activity of the importer (Y_j) are represented by their real GDP in 1995 constant national currencies. The data are taken from *World Development Indicators*, World Bank. They are in 1995 constant dollars and are converted in 1995 constant national currencies.

The real bilateral exchange rate of the considered import country j against China i (ER_{ij}) is defined as the price of home goods relative to the price of the Chinese exported goods, expressed in the same currency. It is calculated as the product of the nominal bilateral exchange rate of the importer's currency against the Renminbi (yuans/the importer's currency) and the ratio of consumer price indices in import country j and in China (1995=100)[7] such as:

$$ER_{ij}=\frac{P_j E_{ij}}{P_i}$$

The nominal bilateral exchange rate of the importer's currency against the Renminbi is the rapport between nominal exchange rate of dollar in terms of renminbi (Yuans/dollar) and nominal exchange rate of dollar in terms of the importer's currency (importer's currency/dollar). As we explained in section 2, China practiced two regimes of double exchange rates from 1981 to 1984 and from 1985 to 1993, respectively. Nominal exchange rate of dollar in terms of renminbi (n) is computed for this period as the weighted average of the tow exchange rates, simultaneously used in china, with the retention rate of exports (a) as weights, such as $n=(1-a)e_0+a*e_m$, where e_0 represents respectively internal settlement rate for 1981-1984 period and official rate for 1985-1993 period and while e_m is the administrated rate

[7] It would have been better to build up this indicator based on bilateral export prices, but such series are not available).

and swap rat, respectively, for the tow periods. The internal settlement rate is calculated in Guillaumont Jeanneney and Hua (1996) and Hua (1996), as well as the retention rate of exports, while the free market rates of the Renminbi are from World Bank (1994) and *China Monthly Statistics* (various issues). The official exchange rates for all countries come from IMF *International Financial Statistics,* as well as consumer price indexes.

An increase of this indicator stimulates well the Chinese exports towards the considered import country, i.e. one of the eleven industrialized countries. It capture therefore price-competitiveness of the Chinese goods in the market of one of eleven industrialized countries.

The real effective exchange rate of the considered import country (one of the eleven industrialized countries) in terms of the Chinese competitors, represented here by eight Asian countries, (ER_{kj}) is defined as the price of home goods relative to the price of the exported goods of the Chinese competitors expressed in the same currency. It is calculated as a product of the geometric average of the nominal bilateral exchange rates of its Asian competitors against one of the eleven industrialized import countries (currencies of the Asian countries/currency of one industrialized country) and the ratio of consumer prices in the import country and in these competitors. The weighting is calculated as export share of each competitor towards the considered import country relative to the total exports of these competitors towards the importer.

$$ER_{kj}=\prod_{k=1}^{p}\left(\frac{P_j E_{kj}}{P_k}\right)^{\alpha k} \text{ with } \sum_{k=1}^{p} a_k = 1$$

An increase of this indicator signifies a real depreciation of the currencies of China's competitors. It captures therefore price-competitiveness of the Chinese competitors' goods in the market of the considered industrialized country (j); and thus stimulates the Chinese competitors' exports towards this country (j) in disfavor of the Chinese goods. This indicator is calculated for eight Asian countries (k=1…8), for four Asian news industrialized countries (k=1….4) and forth ASEAN countries (k=1…4).

The real effective exchange rate of the currencies of the other ten import industrialized countries (m=1…10) (except for the considered import country j) in terms of China (ER_{mi}) is defined as the price of home goods of these other import countries (m=1…10) relative to the price of the Chinese exported goods, expressed in the same currency. It is calculated as the product of the geometric average of the bilateral nominal exchange rate of other importers' currencies in terms of the Renminbi (Yuans/other ten import countries' currencies) and the ratio of consumer prices in these other importer countries and in China. The nominal bilateral

exchange rate of one of the other importers' currencies against the Renminbi (Yuans/currency of one of the other ten importers) is the rapport between nominal exchange rate of dollar in terms of renminbi (Yuans/dollar) and nominal exchange rate of dollar in terms of one of the other ten importers' currency (currency of one of the other ten importers/dollar). The weighting is calculated as the export share of China towards one of the other ten industrialized countries relative to total exports of China towards these last countries. The formula of calculation is following:

$$ER_m = \prod_{m=1}^{10} \left(\frac{P_m E_{im}}{P_i^x}\right)^{\beta_m} \text{ with } \sum_{m=1}^{10} \beta_m = 1$$

Where m represents the other ten importing industrialized countries m except for the considered import country j. β_m represent the Chinese export part towards one of these other ten import countries relative to the total Chinese exports towards these last countries.

An increase signifies a real depreciation of the Renminbi against the currencies of the other ten industrialized countries. It determines thus the price-competitiveness of the Chinese goods in the market of the ten other industrialized import countries m except for the considered import country i. It stimulates thus the Chinese exports towards the markets of these other import countries, thus diminish the Chinese exports towards the considered import country i.

We recall that consumer prices are used here to calculate real effective exchange rate index. As these prices are composed of the prices both of tradable goods and non tradable goods, the exchange rate translate the different evolution of tradable goods in different countries (absence of the law of unique price), but also the different evolution of non tradable goods, in other words, production cost. The use of consumer price indices tends to underestimate the level of Chinese competitiveness.

By taking the United-States as the considered import country, figure 2 shows the evolution of these three real exchange rates which are susceptible to influence Chinese export competitiveness in the market of the United-States.

4.2. Econometric tests

Before estimating the export equation, it is necessary to analyze the stationarity of the series, especially we work for a quite long period (1980-2000). The results of Levin-Lin-Chu panel unit root test allow us to reject unit root null hypothesis for all variables of our estimation: real exports, real exchange rates, real GDP of China and its trade partners (see statistics reported in table 5).

(table 5 here)

The results of Breusch and Pagan LM test and Hausman test (table 6) allow the adoption of a model with fixed effects. The endogeneity problem of the Chinese real GDP may be doubted, as often explained in an export-led growth hypothesis (Hua, 2002). In the same way, it may be doubted for real exchange rates of the import country against China. The retained instruments for these variables are real exchange rate of the import country in terms of China lagged one and two years, the ratio of fixed investment relative to GDP and employment. The results of a DWH test do not allow us to reject the endogeneity of these variables (table 6). The results of a Pagan/hall heteroskedasticiy test, which is the most pertinent in estimation with instrumental variables, allow to prefer a Generalized Moments Model with instrumental variables to a model with fixed effects (Baum, Schaffer and Stillman, 2003). Consequently, we use Generalized Moments Model with instrumental variables to estimate the Chinese bilateral exports on eleven industrialized import countries (panel data) and TSLS for the estimation of the Chinese exports towards the United States (time series data). Finally, the pertinence and the validity of the instruments are tested using the Sargan over-identification test. The results do not allow us to reject the hypothesis that the instruments are independent of error terms (table 6).

4.3. Results of the econometric estimations

The results of the econometric estimations are reported in table 6. As expected, the GDP of China and its trade partners are both statistically significant and with a positive sign. The GDP elasticities of demand and supply are respectively estimated to 1.62 and 1.35 for China and its trade partners. The high GDP elasticity of the import country confirm the good adoption of the Chinese exported goods relative to the demand in the market of developed countries. This allows China to gain quickly its market share. We observed moreover that the Chinese GDP elasticity is higher than that of the import country. This marks a special character of China and other Asian countries with an economic growth model strongly led by exports.

The three real exchange rates are statistically significant and with waited signs. An increase of real bilateral exchange rate of the considered import country j's currency vis-à-vis the Renminbi (a real depreciation of Renminbi) of 1% increases the Chinese exports towards the import country j of 1.81% (column 1, table 6). This coefficient is estimated to 2.12 for the estimation of the Chinese exports towards the United-States (column 4). A real depreciation of the Renminbi vis-à-vis the other importers' currencies of 1% disfavors Chinese exports towards the importer j market by 1.08% and towards the United-States by 1.05% (Column 4).

By controlling the "third-import-country effect," the coefficient of the above real bilateral exchange rate captures both the traditional price effect and the reoriented effect of third-import-country. The traditional price effect is therefore the difference between this coefficient and third-importing country effect which is equal to 0.73 (1.81-1.08) for the considered import country and to 1.07 (2.12-1.05) for the United States.

A real depreciation of 1% of the eight Asian countries' currencies reduces Chinese exports towards importer j by 1.62% and by 2.01% towards the United-States. As expected, this price-elasticity is more important for the 4 NIEs (estimated to -2.06 and –2.64 respectively for eleven industrialized countries and for the United-States, columns 2 and 4) than for the 4 ASEAN countries (-0.98 and -0.88, columns 3 and 6).

We observe that the traditional price effect of real exchange rate obtained in this article is higher that that obtained in Guillaumont Jeanneny and Hua (1996), Hua (1996) and Dées (2002), estimated respectively for 1980-1993, 1978-1994 and 1994-2000 periods. The elasticity obtained in the first two papers is 0.40 for total exports and 0.58 for manufactured goods, while that it is 0.29 for total exports in Dées' paper. The weak elasticity of the last paper is firstly explained by the choice of Chinese export deflator, as the author explained in note 4. Instead of using Chinese export unit value, the author uses an export world price index. This supposes implicitly that China is a price-taker. Secondly, all these three papers use both import and export partners in the calculation of real effective exchange rate index. This tends to underestimate the export elasticity of real bilateral exchange rate.

As the traditional price effect is less high than those of the import country' GDP and Chinese GDP, it is well the good Chinese specialization in the goods with a strong world demand and the Chinese capacity to supply these goods which determine the Chinese exports. Thus, the negative choc of the future gradual reevaluation of Renminbi can be mitigated by the export reorientation from unskilled labor intensive goods (such clothing, textiles and footwear) to skilled labor intensive ones (electrical machinery, telecommunications and office machines), as this is the case today in South Korea.

(Table 6 here)

As the Chinese currency will reevaluate progressively in the future, we try to understand the effects of this reevaluation on the Chinese bilateral exports. We suppose firstly a real appreciation of Renminbi of 10% relative to the currencies of the other industrialized countries and stability parities between the Renminbi and the dollar and between the Renminbi and the currencies of the Chinese competitors. In this case, there is not traditional price effect. Due to third-importing country effect, all other things being equal, the real

appreciation of the Renminbi will decrease price competitiveness of the Chinese goods in the market of the other industrialized countries. It will reorient the Chinese exports to the American market. It increases of 10.5% the volume of the Chinese exports towards the United-States. In order to reduce its trade deficit, the American government practice a policy of weak dollar against Euro since several years.

At the same time, the United-States exert a strong pressure in favor of the re-revaluation of Renminbi against the dollar. We suppose thus that the Renminbi appreciates of 10% relative to the dollar and stability parity between the Renminbi and the currencies of other import countries. Due to traditional price effect and third-importing country effect, this decreases 21.2% the volume of the Chinese exports towards the United-States, all other things being equal. However, the most probable case is that the Chinese currency appreciates at the same time relative to the dollar and to the currencies of the other import industrialized countries. In this case, there is no third-import-country effects. A real appreciation of Renminbi relative both to the dollar and the currencies of the other industrialized import countries reduces of 10.7% (-21.2%+10.5%) the volume of the Chinese exports towards the United-States, all other things being equal. Concerning for the other Asian countries, if the real depreciation of the Renminbi may lead to competitive depreciations of its Asian competitors, these countries will probably not re-evaluate their currencies (i.e. therefore their exchange rates against the dollar do not vary), but take advantage of a real appreciation of the Renminbi to gain market shares in the industrialized countries they lost in 1980s and 1990s. This real appreciation of the Renminbi favors thus the export increase of the Chinese Asian competitors towards the United-States and this is in the same degree, as the estimated coefficients of the real exchange rates of the United-States in terms of China and its competitors are similar (2.12 and -2.01 respectively). Consequently, the real appreciation of the Renminbi against the industrialized countries may lead once again the redistribution of Asian exports towards the industrialized market in disfavor this time of China. However, it is more probable that the currencies of the Chinese Asian competitors appreciate also in the long terms (Balassa effect). The currency appreciation of China and its Asian countries will lead again a redistribution of exports in favor of the other emerging Asian countries, like India, Vietnam, etc.

5. Conclusion

There are several contributions in this paper. Despite the fact that a new body of literature has recently concentrated on bilateral trade, it is still limited to bilateral trade

between industrialized countries, in particular between the United-States and its trade partners. Working on Chinese bilateral exports, this paper makes a contribution to this body of studies. Second, this paper was the first to estimate the effects of three kinds of price-competitiveness on the bilateral exports of developing countries. The results of this paper show that Chinese bilateral exports are influenced in a statistically significant way by three real exchange rates, as well as China's production capacity and the economic activity of the import country.

If the real appreciation of the Renminbi may decrease effectively the volume of the Chinese exports towards the industrialized countries, this decrease may lead a redistribution of Asian exports in favor of the Chinese competitors, and thus not necessarily improve the trade deficit, nor resolve the unemployment in the manufactured sector where the industrialized countries have not any comparative advantage. Secondly, as the market parts of the Chinese goods in industrialized countries are very weak, we cannot conclude that China is exporting deflation in industrialized countries.

Finally, the Chinese government seems to adopt a gradual reevaluation and tries at the same time to upgrade its exports to absorb the negative choc of the reevaluation. The maintain of a relative controlled exchange rate regime for the moment is also to avoid strong exchange rate adjustments, as what have happened in other emerging economies such as Asian economies before the 1997 financial crisis, CEECs (as Poland, Republic of Czech or Hungary), or Latino American countries after their fully liberalization of capital movements. For the near coming years, it seems that an equilibrium should be established between China and the United-States in such way that the high level of Chinese foreign exchange reserves (with its high accumulation in U.S. dollars) finances the American double deficit.

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Table 1. Evolution of real bilateral exchange rate of China against eleven importing industrialized countries

	1980	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**
United-States	36	73	78	79	80	79	95	103	98	89	98	89	117
Japan	21	42	38	40	40	38	65	79	82	68	70	67	92
Germany	35	55	54	52	46	43	69	89	83	70	87	75	107
France	38	62	58	53	49	48	75	94	88	74	94	81	113
Canada	39	79	86	89	86	80	97	112	114	109	121	112	138
United-Kingdom	44	78	74	66	59	57	80	98	102	88	109	99	131
Italy	40	65	63	63	59	56	90	115	109	96	122	108	147
Netherlands	37	57	57	54	48	45	72	91	85	70	88	77	108
Spain	37	61	58	49	48	46	72	91	92	84	109	98	135
Belgium	38	60	53	50	46	44	70	90	84	70	90	78	109
Australia	42	85	83	80	79	63	78	93	102	97	107	95	116
	1993	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2 001**	**2002**	**2003**	**2004**	**2005**
United-States	132	117	100	95	94	96	100	102	105	107	108	107	108
Japan	117	111	100	80	71	66	77	80	70	68	72	75	71
Germany	116	105	100	89	76	76	75	65	64	69	83	89	88
France	119	107	100	91	79	79	77	68	66	72	87	94	93
Canada	145	119	100	94	91	87	89	91	89	91	103	109	116
United-Kingdom	125	113	100	93	98	103	104	99	96	102	113	125	125
Italy	132	116	100	101	90	91	90	79	81	84	85	83	83
Netherlands	115	104	100	89	76	77	87	77	77	84	102	110	108
Spain	125	107	100	94	80	81	80	71	71	78	95	104	104
Belgium	114	105	100	89	76	76	75	66	66	71	85	92	92
Australia	120	114	100	100	92	79	83	78	72	79	95	106	110

Note: an increase means a real depreciation of Renminbi.

Table 2. Evolution of real bilateral exchange rate of China against eight Chinese Asian competitors

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
KOREA	34,13	68,00	67,96	64,98	62,32	56,11	67,22	78,12	85,53	85,99	92,59	84,29	107,75
CHINA,P.R.:HONG KONG	30,58	54,90	56,14	50,57	49,72	48,99	59,83	66,60	65,20	62,80	72,47	69,73	98,21
SINGAPORE	31,13	62,82	64,51	64,86	64,21	59,32	69,83	76,38	73,74	67,99	79,13	74,10	102,87
INDONESIA	68,50	140,47	147,03	117,29	111,83	102,62	111,09	99,67	95,43	84,44	91,41	81,56	107,86
MALAYSIA	46,03	87,82	91,77	93,93	94,15	84,57	96,81	104,68	93,87	81,46	87,51	77,52	112,23
PHILIPPINES	42,14	83,41	84,16	66,78	63,49	66,58	71,56	76,92	76,49	72,17	76,36	69,09	103,44
THAILAND	41,74	81,22	81,19	82,61	78,97	66,77	82,97	91,50	87,78	79,46	88,41	80,89	108,25
Taiwan	31,10	63,31	61,90	60,95	60,57	56,83	75,89	99,76	93,14	91,41	96,00	90,39	122,55

	1993	1994	1995	1996	1997	1998	1999	2000	2 001	2002	2003	2004	2005
KOREA	120,64	110,86	100,00	92,46	79,19	58,21	70,15	75,11	68,02	72,66	78,06	80,97	90,47
CHINA,P.R.:HONG KONG	117,53	110,77	100,00	97,78	100,21	103,77	100,90	96,35	94,04	91,90	88,64	84,92	83,55
SINGAPORE	116,58	110,07	100,00	93,66	87,99	78,42	78,53	77,95	75,22	75,58	77,14	77,79	77,19
INDONESIA	126,45	114,74	100,00	95,26	79,01	36,62	57,04	54,97	49,95	62,08	70,98	69,63	68,89
MALAYSIA	126,38	111,31	100,00	94,67	84,30	64,08	68,95	69,73	70,22	72,07	71,96	70,26	70,66
PHILIPPINES	114,30	110,07	100,00	96,92	88,29	70,03	78,71	72,08	66,25	67,97	66,15	65,25	69,48
THAILAND	123,36	112,97	100,00	95,62	79,13	65,32	72,67	69,31	63,14	66,25	69,00	70,38	71,56
Taiwan	132,18	120,86	100,00	93,88	77,40	80,31	83,73	80,36	75,13	76,14	76,72	79,86	76,76

Note: an increase means a real depreciation of Renminbi.

Table 3

Evolution of geographical distribution of Chinese exports towards the eleven industrialized countries (in percentage)

	1980	1993	2000	2004
United States	12.8	36.7	38.72	41.1
Japan	53.0	34.1	30.92	24.1
Germany	9.0	8.6	6.89	7.8
France	5.1	2.8	2.76	3.3
Canada	1.7	2.6	2.34	2.7
United-Kingdom	4.0	4.2	4.68	4.9
Italy	4.8	2.8	2.82	3.0
Netherlands	3.1	3.5	4.96	6.1
Spain	1.3	1.2	1.60	1.8
Belgium	2.1	1.3	1.75	2.2
Australia	3.1	2.3	2.55	2.9
Total	100	100	100	100

Source: Chelem.

Table 4. Evolution of the market share of Chinese goods

	1980	1993	2000	2004
United States	0.38	3,05	4,69	9,33
Japan	2.85	7,96	13,20	18,82
Germany	0.38	1,24	2,11	3,52
France	0.25	0,65	1,25	2,29
Canada	0.22	0,94	1,40	3,26
United Kingdom	0.49	0,95	1,94	3,45
Italy	0.35	0,97	1,65	2,71
Netherlands	0.22	1,23	3,24	6,08
Spain	0.15	0,71	1,46	2,22
Belgium-Luxembourg	0.08	0,55	1,39	2,41
Australia	1.00	2,56	5,09	8,98

Source: Chelem.

Table 5. The share of each industrialized market in the total exports of each Asian country, %

	Indonesia		**South Korea**		**Hong Kong**		**Singapore**		**Taiwan**		**Malaysia**		**Philippines**		**Thailand**		**China**	
	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004
United States	14,3	13,1	21,1	17,3	22,7	20,8	21,5	12,1	28,4	17,1	20,6	18,0	39,1	16,0	22,0	19,1	18,8	21,0
Japan	30,6	15,4	14,2	8,8	4,0	2,0	7,2	5,9	11,1	8,6	13,2	9,7	16,3	17,7	17,3	14,3	17,5	12,4
Germany	3,2	2,5	4,3	3,2	6,1	3,7	3,9	3,8	4,6	2,9	3,7	2,1	5,2	3,2	4,1	2,3	4,4	4,0
France	1,4	1,0	1,3	1,2	1,2	1,3	1,8	1,7	1,6	1,1	1,4	1,4	1,9	0,4	2,2	1,2	1,4	1,7
Canada	0,8	0,7	2,2	1,8	2,4	1,3	1,1	0,7	2,5	1,6	1,0	0,6	1,7	0,6	1,4	1,1	1,3	1,4
United Kingdom	2,8	1,9	2,0	1,9	7,3	10,7	3,6	2,8	2,7	1,9	4,3	2,1	4,8	1,2	3,3	3,3	2,1	2,5
Italy	1,7	1,4	0,8	1,3	0,5	0,8	0,8	0,2	1,0	0,9	0,7	0,6	0,8	0,3	1,3	1,0	1,4	1,6
Netherlands	3,0	2,7	0,9	1,0	2,7	1,9	1,6	3,3	1,8	2,8	2,5	3,1	3,2	7,9	3,2	2,9	1,8	3,1
Spain	0,9	1,3	0,7	1,2	0,4	0,6	0,4	0,3	0,7	0,6	0,3	0,4	0,4	0,2	0,7	0,8	0,6	0,9
Belgium	1,0	1,4	0,4	0,6	0,9	0,3	0,4	0,3	0,5	0,6	1,2	0,4	0,8	0,6	1,6	2,0	0,7	1,1
Australia	2,1	2,8	1,7	1,4	1,1	1,3	2,2	4,3	2,0	1,4	1,4	3,1	1,0	1,1	1,4	2,0	1,2	1,5
share in total	**61,8**	**44,1**	**49,6**	**39,7**	**49,3**	**44,6**	**44,5**	**35,3**	**56,9**	**39,6**	**50,4**	**41,6**	**75,4**	**49,2**	**58,4**	**50,0**	**51,2**	**51,2**

Table 6. Competitiveness of principal products exported by China and its Asian competitors, 1997

	China		HK		Taiwan		Korea		Singapore		Indonesia		Malaysia		Philippines		Thailand		total	
ISIC	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004	1993	2004
1. Xij/Xj : exports of products "i" of country "j" / total exports of country "j"																				
17. textiles	13.7	7.4	14.9	15.6	9.6	4.9	12.3	4.2	0.8	0.4	8.1	5.0	1.6	0.7	2.3	0.9	5.2	3.3		
18. clothing	16.2	7.5	22.9	26.6	3.5	0.9	5.5	0.8	1.2	0.4	7.7	5.4	2.5	0.8	6.1	2.5	7.9	3.7		
19. leather products	7.9	3.8	2.5	2.0	4.0	0.7	5.1	0.7	0.2	0.1	4.9	2.3	0.4	0.2	1.7	0.2	4.7	2.4		
30. office machinery	1.9	15.6	6.5	2.9	13.1	11.2	4.6	8.1	27.8	23.7	0.4	4.8	7.2	16.2	2.2	15.9	7.9	12.8		
31. electrical machinery	4.0	5.9	4.5	1.9	6.1	6.0	3.3	3.2	3.7	3.5	1.1	3.9	3.4	3.5	3.5	3.0	3.9	5.2		
32. telecommunications	5.8	15.8	12.6	7.0	11.8	24.0	18.6	25.1	23.5	33.5	2.8	6.9	31.8	33.8	12.4	31.6	11.2	15.2		
Total	**49.5**	**56.1**	**63.9**	**56.0**	**48.2**	**47.8**	**49.4**	**42.1**	**57.1**	**61.6**	**25.0**	**28.4**	**46.8**	**55.2**	**28.2**	**54.1**	**40.7**	**42.7**		
2. (Xic/Xc)/(Xiw/Xw)= exports of products "i" of country "j" / total exports of country "j" /world exports of products "i"/ total world exports "w"																				
17. textiles	3.8	2.7	4.1	5.7	2.7	1.8	3.4	1.5	0.2	0.1	2.2	1.8	0.4	0.3	0.6	0.3	1.4	1.2		
18. clothing	6.2	3.6	8.7	12.8	1.4	0.4	2.1	0.4	0.4	0.2	2.9	2.6	0.9	0.4	2.3	1.2	3.0	1.8		
19. leather products	5.5	3.6	1.8	1.8	2.8	0.7	3.6	0.6	0.1	0.1	3.4	2.2	0.2	0.2	1.2	0.1	3.2	2.3		
30. office machinery	0.4	3.2	1.5	0.6	3.1	2.3	1.1	1.7	6.5	4.9	0.1	1.0	1.7	3.4	0.5	3.3	1.8	2.7		
31. electrical machinery	1.1	1.5	1.3	0.5	1.7	1.6	0.9	0.8	1.0	0.9	0.3	1.0	0.9	0.9	1.0	0.8	1.1	1.4		
32. telecommunications	0.9	1.9	2.0	0.9	1.9	2.9	3.0	3.1	3.8	4.1	0.5	0.8	5.1	4.1	2.0	3.8	1.8	1.8		
Total	**2.3**	**2.5**	**2.9**	**2.5**	**2.2**	**2.1**	**2.3**	**1.8**	**2.6**	**2.7**	**1.1**	**1.2**	**2.2**	**2.4**	**1.3**	**2.4**	**1.9**	**1.9**		
3. Xij/Xiw : exports of products "i" of country "j"/world exports "w" of products "i"																				
17. textiles	9.4	18.6	3.3	1.3	6.2	3.6	7.7	4.5	0.3	0.2	2.3	1.4	0.6	0.4	0.2	0.2	1.4	1.5	**31.4**	**31.6**
18. clothing	15.4	24.8	6.9	2.9	3.2	0.8	4.7	1.2	0.6	0.2	3.0	2.0	1.2	0.6	0.7	0.6	3.0	2.1	**38.7**	**35.3**
19. leather products	13.7	24.7	1.4	0.4	6.5	1.4	8.1	1.8	0.2	0.1	3.4	1.7	0.3	0.3	0.4	0.1	3.2	2.7	**37.1**	**33.2**
30. office machinery	1.1	22.1	1.2	0.1	7.2	4.7	2.5	4.9	8.7	5.7	0.1	0.8	2.2	5.1	0.2	1.7	1.9	3.2	**25.0**	**48.3**
31. electrical machinery	2.8	10.4	1.0	0.1	4.0	3.1	2.1	2.4	1.4	1.0	0.3	0.8	1.2	1.4	0.3	0.4	1.1	1.6	**14.1**	**21.2**
32. telecommunications	2.3	13.1	1.6	0.2	4.4	5.8	6.8	8.9	5.0	4.8	0.5	0.6	6.6	6.2	0.6	2.0	1.8	2.2	**29.6**	**43.8**

Source : Chelem.

Table 7. Competitiveness of principal products exported by China, million U.S. dollars

ISIC	Series name	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
	Xic/Xc												
17	Textiles	13,74	13,68	12,77	11,31	10,59	9,95	10,03	9,58	9,26	8,83	8,13	7,42
18	Wearing apparel; fur	16,16	16,02	12,81	13,16	13,81	12,63	11,55	10,85	10,20	9,36	8,71	7,53
19	Leather products	7,90	7,31	6,75	6,75	6,68	6,53	6,33	5,67	5,60	5,01	4,34	3,85
30	Office and computing machinery	1,91	2,26	3,35	4,64	5,31	6,80	7,20	7,78	9,24	11,73	15,19	15,60
31	Electrical machinery & apparatus	4,00	4,24	4,73	5,00	5,20	5,73	6,57	6,63	6,48	6,38	5,99	5,90
32	Radio, TV and communication	5,84	6,74	7,28	7,60	7,51	8,27	9,58	11,11	12,02	13,35	14,08	15,77
	Xiw/Xw												
17	Textiles	3,62	3,63	3,49	3,41	3,42	3,38	3,28	3,05	3,07	3,08	2,96	2,72
18	Wearing apparel; fur	2,62	2,58	2,38	2,41	2,57	2,60	2,47	2,31	2,34	2,36	2,27	2,07
19	Leather products	1,44	1,42	1,32	1,32	1,28	1,23	1,20	1,13	1,20	1,19	1,12	1,06
30	Office and computing machinery	4,26	4,41	4,62	4,79	5,17	5,34	5,72	5,72	5,39	5,21	5,01	4,81
31	Electrical machinery & apparatus	3,59	3,73	3,84	3,85	3,91	4,02	4,11	4,04	3,98	3,92	3,84	3,87
32	Radio, TV and communication	6,21	6,92	7,43	7,36	7,63	7,84	8,61	9,81	8,51	8,40	8,11	8,23
	Xic/Xiw												
17	Textiles	9,45	10,97	11,02	9,84	10,59	10,33	11,08	12,84	13,66	15,34	16,81	18,60
18	Wearing apparel; fur	15,35	18,08	16,19	16,22	18,42	17,04	16,94	19,15	19,70	21,26	23,49	24,81
19	Leather products	13,66	14,97	15,31	15,14	17,89	18,61	19,15	20,57	21,14	22,57	23,65	24,69
30	Office and computing machinery	1,12	1,49	2,18	2,87	3,52	4,47	4,55	5,55	7,75	12,05	18,57	22,11
31	Electrical machinery & apparatus	2,77	3,31	3,70	3,85	4,56	5,01	5,79	6,71	7,36	8,71	9,54	10,40
32	Radio, TV and communication	2,34	2,84	2,95	3,07	3,37	3,71	4,03	4,62	6,40	8,50	10,62	13,09
	(Xic/Xc)/(Xiw/Xw)												
17	Textiles	3,79	3,77	3,66	3,32	3,09	2,94	3,06	3,14	3,02	2,87	2,75	2,73
18	Wearing apparel; fur	6,16	6,21	5,38	5,47	5,38	4,85	4,68	4,69	4,35	3,97	3,84	3,64
19	Leather products	5,48	5,14	5,09	5,10	5,23	5,29	5,29	5,04	4,67	4,22	3,87	3,62
30	Office and computing machinery	0,45	0,51	0,72	0,97	1,03	1,27	1,26	1,36	1,71	2,25	3,04	3,24
31	Electrical machinery & apparatus	1,11	1,14	1,23	1,30	1,33	1,43	1,60	1,64	1,63	1,63	1,56	1,52
32	Radio, TV and communication	0,94	0,97	0,98	1,03	0,98	1,06	1,11	1,13	1,41	1,59	1,74	1,92

Souce: Chelem.

Table 5. Results of stationnarity tests

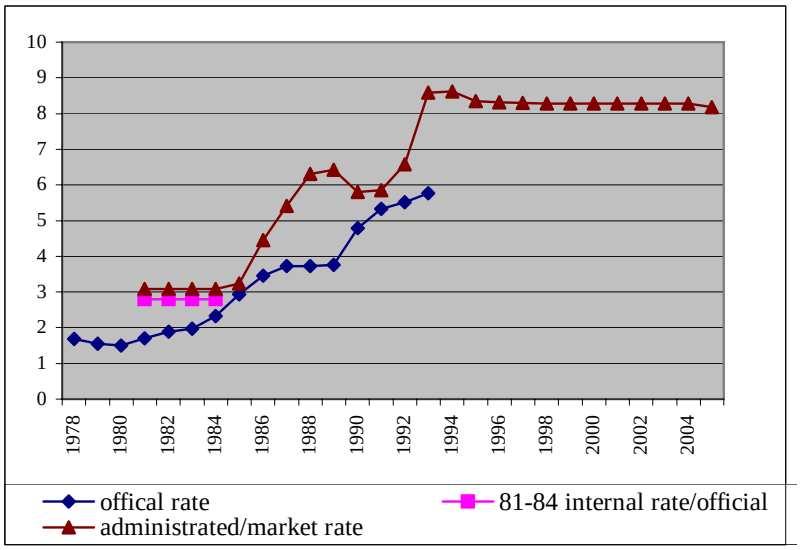
	Levin-Lin-Chu panel unit root test		
	Panel t-statistics (except for China's GDP)	Lagged periods	Deterministic chosen
Exports in volumes	-7.58	2	Constant
Real GDP of China	-4.66	2	Constant
Real GDP of importer j	-7.90	2	Constant & trend
Real exchange rate of importer j in terms of China	-6.89	2	Constant
Real effective exchange rate of other importers m in terms of China	-6.66	2	Constant
Real effective exchange rate of importer j in terms of 8 competitors k	-6.34	2	Constant
Real effective exchange rate of importer j in terms of 4 NIEs k	-6.68	2	Constant
Real effective exchange rate of importer j in terms of 4 ASEAN k	-7.79	2	Constant

Table 6. Effects of real exchange rates on the Chinese bilateral exports

Exports in volume	Towards eleven industrialized countries			Towards the United-States		
	Generalized Moments Model			TSLS		
	1	2	3	4	5	6
Real GDP of China	1.62***	1.42***	1.83***	1.02**	1.08***	1.33***
	(8.23)	(7.00)	(8.96)	(1.97)	(2.36)	(2.53)
Real GDP of import country j	1.35**	1.15*	1.45**	3.45**	2.68**	3.11*
	(1.99)	(1.70)	(2.03)	(2.12)	(1.90)	(1.79)
Real exchange rate of import country j in terms of China	1.81***	1.90***	1.48***	2.12***	2.25***	1.10*
	(5.33)	(5.01)	(4.73)	(3.00)	(3.55)	(1.68)
Real exchange rate of other import countries m in terms of China	-1.08***	-1.08***	-0.82***	-1.05***	-1.24***	-0.24*
	(-4.20)	(-3.85)	(-3.33)	(-2.36)	(-2.97)	(-1.67)
Real exchange rate of import country j in terms of 8-competitors k	-1.62***			-2.01***		
	(-5.74)			(-4.31)		
Real exchange rate of import country j in terms of China in terms of 4-NIEs k		-2.06***			-2.64***	
		(-5.54)			(-4.99)	
Real exchange rate of import country j in terms of 4-ASEAN k			-0.98***			-0.88***
			(4.93)			(-3.15)
Constant				-124***	-101***	-119***
				(-3.38)	(-3.25)	(-3.07)
Adjusted R^2	0.97	0.98	0.98	0.99	0.99	0.99
Number of observations	220	220	220	20	20	20
Breusch and Pagan LM test	956	908	908			
Hausman specific test	13.97	8.05	8.05			
Pagan / Hall heteroskedasticity test[b]	0.01	0.03	0.03			
DWH test of endogeneity [b]	0.005	0.00	0.00			
Sargan over-identification test [b]	0.47	0.76	0.76	0.16	0.15	0.14

Note: b=p-value

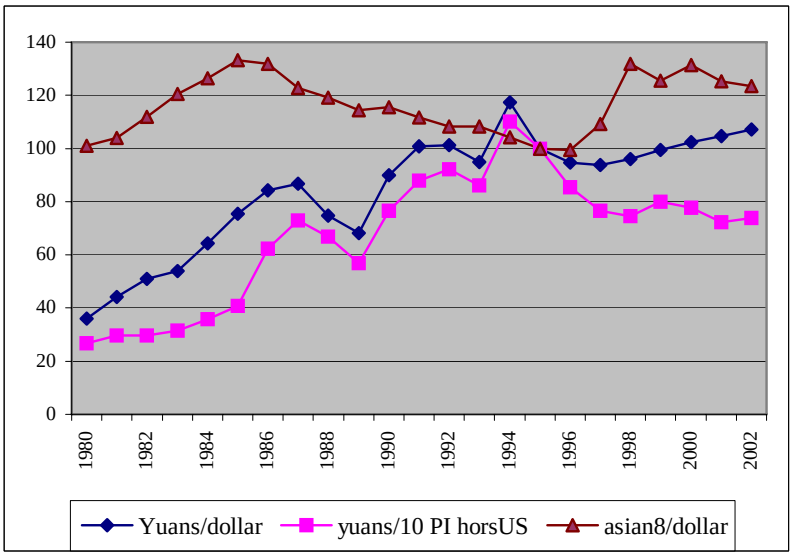
Figure 1. Evolution of the parity of dollar in Renminbi



Note. An increase means a depreciation of Renminbi.

Figure 2.

Evolution of three real exchange rates influencing Chinese exports competitiveness



Note. An increase means a real depreciation of the Renminbi and the currencies of other Asian countries.

Figure 3

Evolution of export shares towards the eleven industrialized countries of China and its Asian competitors in the total exports of these countries towards industrialized countries (percentages)