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INTRODUCTION TO "CHINA'S GROWING ROLE IN WORLD TRADE"

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This is an introductory chapter to the volume, "China's Growing Role in World Trade." A table of content with information on the contributing authors to each chapter and the discussants appears at the end of this paper. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

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ABSTRACT

Over the last three decades, the value of Chinese trade has approximately doubled every four years. This rapid growth has transformed the country from a negligible player in world trade to the world's second largest exporter, as well as a substantial importer of raw materials, intermediate inputs, and other goods. This paper provides an overview of the microstructure of Chinese trade, its macroeconomic implications, trade disputes with other WTO member countries, and the role of foreign firms.

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In less than three decades, China has grown from having a negligible role in world trade to being one of the world's largest exporters, as well as a substantial importer of raw materials, intermediate inputs, and other goods. This tremendous growth is seen by some observers as posing a threat to China's trading partners.[1] But since trade is a positive-sum rather than a zero-sum game, this growth must bring opportunities as well. For industrial countries, China presents the opportunity of a low-cost labor force. Whether the goods are simple toys sold by Mattel, or personal computers sold by Lenovo (the Chinese owner of what used to be IBM's PC division) or sophisticated components for the European Airbus, a large part of Chinese exports involves contracting manufacturing in China for goods that are designed elsewhere. This phenomenon is known as "processing trade," and involved importing inputs into China, which are assembled there and then exported again. This role that China plays in contract manufacturing means that its own success is intricately tied to the fortunes of its trading partners.

Even while China acts as a manufacturing base for firms worldwide, its sheer size and rapid growth also creates challenges for many countries. On the export side, China is a formidable competitor in many markets, overlapping in its export composition with other countries such as India, Malaysia, Mexico, Pakistan, the Philippines and Thailand. These countries often attribute declines in their own export demand to competition from China. And on the import side, too, China's impact is felt worldwide. Its demand for raw materials, especially to fuel the investment boom of recent years (including the 2008 Olympics), creates market pressure and higher prices for building materials. Likewise, the slowdown in China's industrial production in the midst of the 2008-2009 global crisis has contributed to a dramatic fall in the commodity prices. The industrial production in China is also believed to have led to pollution in

[1] Even Samuelson (2002) presents a case where the United States could be harmed by growth in China, if this growth occurs in products where the U.S. has a comparative advantage.

the country, which can spill over international borders, too. So the challenges created by China's rapid growth and expanding trade are both domestic and international in scope. The goal of this volume is to investigate these issues raised by China's growing role in world trade.

Some of the major trends in China's exports and imports are summarized in Tables 1-10. In Table 1, we list the nominal value (in billions of U.S. dollars) of exports and imports attributed to "ordinary" versus "processing" trade, along with the share of export and import values in these categories. As their names suggests, "ordinary" trade includes imports that enter the country and are not destined to be incorporated into exported goods, or exports that did not rely specifically on imported inputs. Conversely, "processing" trade includes imports that enter the country duty-free and will be incorporated into exported goods, and exports that rely on these processing imports. These two categories do not exhaust the value of trade: besides ordinary and processing trade, there are also international aid flows, contracting projects, goods on lease, barter trade, and other categories of trade flows. But ordinary and processing trade make up the vast majority of trade flows, and together account for over 95% of exports and over 80% of imports.

As shown in Table 1, the nominal value of exports and imports has risen by roughly 10 times over 1992 – 2006 in both the ordinary and processing trade categories. That growth is especially rapid in the later years, however: the value of trade roughly doubled in the first seven years, to 1999, and then grew by nearly five times over the next seven years, to 2006, for a remarkable 25% annual growth rate in the last seven years. Despite this very rapid growth, the shares of processing trade does not change that much. On the export side, the share of processing trade rose from 47% in 1992 to a high of 57% in 1999, and then fell back to 53% by 2006. Likewise, on the import side, with the share of processing trade rising from 39% in 1992 to a

high of 49% in 1998, and then returning to 41% by 2006. These results show that the very rapid growth in both exports and imports is roughly balanced between ordinary and processing trade, and both of these categories will be important in the chapters that follow.[2]

A further distinction that can be made in the trade data is between imports or exports made by foreign-invested enterprises (FIEs), or those made by all other firms, including Chinese state-owned enterprises, town and village collectives, and private firms. The foreign-invested enterprises include both joint ventures between foreign and Chinese firms and, in later years, wholly-owned foreign enterprises. In Table 2, we report the share of ordinary and processing trade accounted for by FIEs and all other firms. For both exports and imports, FIEs accounted for only 5% of ordinary trade in 1992, and 39% and 45 % of processing exports and imports, respectively. So joint ventures with foreign firms accounted for very little of ordinary trade flows, and less than half of processing trade flows in early years. But the presence of joint ventures and wholly-owned foreign firms increased in both types of trade, so that by 2006, FIEs account for 28% and 32% of ordinary exports and imports, respectively, and 84% and 85% of processing exports and imports, respectively. That indicates a very dominant presence of foreign firms in processing trade, and a substantial presence in ordinary trade, too. The chapters by Wang and Wei and by Blonigen and Ma document the growth of foreign firms in the Chinese economy, and their special presence in processing trade activities. The chapter by Branstetter and Foley compares U.S. firms in China with those from other source countries.

A final way of breaking down the trade data is by type of product. The most commonly used trade classification today is the Harmonized System (HS), used by most countries. The

[2] The chapters by Amiti and Freund, Wang and Wei, Deng and Harrigan, Feenstra and Hong, and Blonigen and Ma, all make use of detailed trade statistics from China Customs Statistics (various years), which include a breakdown by ordinary versus processing trade. These detailed Harmonized System trade data can be purchased by contacting: George Shen, General Manager, CCS (China Customs Statistics) Information Center, Hong Kong; Tel.+852 9472 6072 / Fax.+852 2891 2963 / georgeshenhkg@yahoo.com.

Chinese customs authorities records both exports and imports at HS numbers with up to 8 digits, such as: “Live pure bred breeding horses,” HS 01011100; “Mulberry feeding silk-worm cocoons,” HS 50010010; and “Antiques of an age exceeding one hundred years,” HS 97060000. A number of chapter in this volume make use of such disaggregate trade categories. To give an initial impression of the importance of each major type of product, in Table 3 – 10 we record the values and shares of ordinary and processing exports and imports by major industries. These industries are as follows:

Animals, Food – animals, vegetable products and foodstuffs (HS 01 – 24)

Minerals, Wood – mineral and wood products, stone & glass (HS 25–27, 44–49, 68–71)

Chemicals, Plastic – chemicals & allied industries, plastics & rubbers (HS 28 – 40)

Textiles – textile products, with leather & fur items (HS 41–43, 50–63)

Footwear, Headgear – footwear and headgear articles (HS 64 – 67)

Metals, Articles – base metals & articles of base metal (HS 72 – 83)

Machinery, Electrical – machinery and electrical products (HS 84 – 85)

Transportation – transportation equipment (HS 86 – 89)

Miscellaneous Manufacturing – miscellaneous manufactured articles, including cameras, clocks, toys, musical instruments, and furniture (HS 90–92, 94–96)

Omitted[3] – arms (HS 93), antiques (HS 97), special categories (HS 98–99)

For ordinary exports in Tables 3 and 4, the largest dollar increase in exports is in textiles, which increased from about $14 billion to $108 billion over 1992 – 2006, with most of the growth taking place subsequent to China’s membership in the World Trade Organization (WTO)

[3] The trade omitted from Tables 3 – 10 is less than one percent of the total value in each table. Exports of antiques may be under-reported to evade controls on such goods. See Fisman and Wei (forthcoming) for evidence of under-reporting on exports by China and other countries to the United States.

at the end of 2001, when the country could begin to enjoy the benefit of the end of the Multifiber Arrangement and the Agreement on Textile and Clothing. This is a subject studied in the chapter by Brambilla, Khandelwal and Schott. By 2006, the other largest export industries are machinery and electrical ($76 billion), metals and articles of metal ($65 billion), chemicals and plastics ($40 billion), minerals and wood ($39 billion) and miscellaneous manufacturing ($32 billion), which includes toys. Note that Chinese food and animal products exports continued to grow in absolute value after its membership in the WTO in 2001, in spite of the fear that its agriculture could be decimated by foreign competition once its tariff and quota protection was reduced. The reason behind the agricultural expansion is analyzed in the chapter by Huang, Liu, Martin and Rozelle.

When measured by the share of ordinary exports, textiles has a declining share, as do the resource-based industries of minerals and woods and animals and foods, despite a rising nominal value of exports in each case. Conversely, the greatest increase in export shares are for the machinery and electrical industry, which triples from 6% to 18% of exports over 1992 – 2006; and metals and articles of metal, which doubles from 6% to 12% of exports over 1992 – 2004, and then to 16% by 2006. Overall, ordinary exports are more diversified across industries than the pattern seen in processing exports, shown in Tables 5 and 6.

For processing exports, machinery and electrical products experienced phenomenal growth, from $9 to $323 billion over the period, or from 22% to 63% of the total value. Telecommunications equipment, a subset of machinery and electrical products, is one example of a processing export that has experienced very substantial growth. Besides machinery and electrical, most other categories of processing exports experience a growth in their value of roughly ten times over the 14 years, so their shares stay roughly constant. The two most significant exceptions are textiles and footwear and headgear, whose combined exports expand

from $17 billion to $48 billion, so their combined share falls substantially from 43% to 10%. (In addition, miscellaneous manufacturing has a declining share). While these traditional export industries still expand in dollar terms, it is at a rate slower than the total for processing exports, and *much* slower than the more technologically advanced products in the machinery and electrical industry. These industry trends in processing exports are studied in the first two chapters in the volume, by Amiti and Freund and by Wang and Wei.

Turning to ordinary imports, in Tables 7 and 8, these show the highest value and growth in minerals and woods: imports of those products rise from $5 billion to $118 billion, and its import share more than doubles from 16% to 35%. These imports are likely used for construction in China, as well as intermediate inputs needed in other industries. Their rising value and share are indicative of the pressure exerted by China on world markets for such construction and investment materials. Most other categories of imports have roughly constant shares, with import values rising roughly six or seven times over the 14 years.

Finally, in Tables 9 and 10 we report the values and shares for processing imports by major industries. Such imports are brought into the country duty-free, and must be incorporated into goods that are subsequently exported. Often, the major industries of the import and export products are the same. So it is not surprising to see that a rapid growth in the value and share of processing imports within the machinery and electrical industry, which mirrors its very rapid growth in processing exports. Conversely, textiles also has a falling share (though rising value), which again is similar to what we found for processing exports of those products. Besides those two cases, most other industries in Table 10 have constant or slightly declining shares. The exception is miscellaneous manufacturing, whose share of processing imports doubles from 6% to 12%. Overall, the trends we see in processing imports will be determined by the production of

processing exports, and the difference between these two categories of trade indicates the *value added* in processing activities. Because processing exports rely on imports, the value added in this activity is less than for ordinary exports or domestic production. This difference in value added and in the employment created by processing versus ordinary trade is studied in the chapter by Feenstra and Hong.

The Microstructure of Chinese Trade

The volume begins with several chapters that take a detailed look at the microeconomic structure of Chinese trade, by which we mean the details of how China's exports compare with other countries in terms of product quality and variety, firm ownership, contractual trade, and the impact of government policies.

From trade statistics, a striking feature about Chinese exports is its apparent similarity to exports by the United States, Japan, and Europe, where this similarity appears to be increasing over time. For example, during the period from 1996 to 2005, the fraction of HS 6-digit product lines exported (by at least US$ 1 million) by both the high-income countries and China rose from 71.3% to 86.3%. This is a surprising finding, since China's factor endowments, with a vast pool of cheap labor, is not the same as those of the high-income countries. Both Rodrik (2006) and Schott (2008) document this apparent rise in sophistication in China's exports. If China has truly managed to export higher quality products than their endowment would imply, this could represent competitive pressure on firms in the developed world outside traditional labor-intensive sectors.

The first chapter in the volume, by Amiti and Freund, challenges the findings of the existing literature on the product quality and variety of China's exports. They begin by noting that while Broda and Weinstein (2006) find that China was the largest contributor to growth in

U.S. varieties, most of that growth was in the early (1972 – 1988) period. Furthermore, while Schott (2008) and Rodrik (2008) both argue that China's exports are in high-quality sectors, more typical of a highly-developed country, that conclusion does not take into account the large amount of processing exports in sectors that may be labeled as high-tech industries.

Since 1992, Amiti and Freund find a substantial reallocation of China's exports away from apparel, textiles, footwear and miscellaneous manufacturing (including toys), and towards electrical machinery, office machines (which includes computers) and telecommunications. But these are precisely the sectors that rely most heavily on processing trade. That fact that China exports rose in these sectors means that its skill-content of exports also rose, making it appear closer to the export structure of a highly-developed country. But that effect vanishes when processing trade is omitted. In that case, there was no change in the average skill intensity of China manufacturing exports. Rather, it was a rising skill intensity of *processing imports* that appears to explain the same change for processing exports, but not for the rest of exports. Note that processing trade is disproportionately located in government policy zones. The next chapter by Wang and Wei suggests that, once a separate policy zone effect on export sophistication is accounted for, the processing trade effect only shows up in the form of a high unit value within a product category.

Wang and Wei uses more detailed micro data than that of the previous chapter to study the factors behind this apparent rise in sophistication. As suggested in the chapter by Amiti and Freund, this phenomenon could be nothing but a statistical mirage due to processing trade. For example, while both the United States and China may export notebook computers, the Chinese producers may have to rely more on importing the most sophisticated components, such as processors (CPUs) made by Intel or ADM in the United States. In such a case, the Chinese

producers could specialize in the unsophisticated stage of production, even though the final product is classified as sophisticated when it shows up at the customs. If one were able to classify a product further into its components, China and developed countries might be found to produce different components. In this case, they would not compete directly with each other. So under this scenario, there is very little for the developed countries to worry about.[4]

On the other hand, the Chinese authorities at both the regional and central levels, have been actively promoting quality upgrades in China's product structure through tax and other policy incentives. A particular manifestation of these incentives is the proliferation of economic and technological development zones, high-tech industrial zones, and export processing zones around the country. Their collective share in China's exports rose from less than 6% in 1995 to about 25% by 2005. These policy incentives could increase the sophistication of China's exports, though they are unlikely to be efficient (unless learning by doing confers a significant positive externality). If policy is the primary driver for rising sophistication (rather than the mis-measurement induced by processing trade) then China may indeed represent a more direct competition with producers in developed countries.

Foreign-invested firms in China straddle these two explanations. The share of China's total exports produced by wholly foreign-owned firms and Sino-foreign joint ventures has risen steadily over time, from about 31% in 1995 to more than 58% by 2005. These foreign-invested firms may choose to produce and export much more sophisticated products than would indigenous Chinese firms. In this scenario, while China-made products may compete with those from developed countries, the profits from such activities go to the GNPs of developed countries. Of course, the presence of foreign firms may help indirectly to raise the sophistication of Chinese

[4] Koopman, Wang and Wei (2008) find that the share of domestic value in Chinese exports is only on the order of 50%, and the share is lower in sectors that are normally labeled as sophisticated such as telecommunication equipment, and in exports by foreign invested firms.

exports through various spillovers to domestic firms. These three possible scenarios can reinforce each other. For example, a foreign-invested firm may engage in processing trade while located in a high-tech zone.

Taking into account all these possibilities, Wang and Wei report evidence that neither processing trade nor foreign invested firms play the key role in generating the increased overlap in the structure of exports by China and the high-income countries. Instead, improvements in human capital and government policies in the form of tax-favored high-tech zones appear to contribute most to the rising sophistication of China's exports. Since most processing trade takes place inside an incentive zone, it is not easy to identify the separate roles of processing trade and government incentives without the kind of detailed micro data used in this chapter. By explicitly analyzing the independent role of government policies in the form of high-tech and other incentive zones, this chapter goes beyond the analysis of Amiti and Freund.

An analysis of unit values in trade by Wang and Wei adds further insights. Processing trade is positively associated with higher unit values. In the absence of data on value added from imported inputs versus domestic inputs, it is difficult to say whether processing trade has generated any skill upgrading for China. However, after controlling for processing trade, exports by foreign-invested firms tend systematically to have higher unit values, suggesting that they produce higher-end product varieties (beyond promoting processing exports). High-tech zones and other policy zones set up by the government are likewise associated with higher unit values (beyond promoting processing trade). Therefore, both foreign investment and government policy zones have helped to raise product sophistication, but through somewhat different channels.

For the range of export varieties, or the extensive margin of trade, Amiti and Freund find that its growth over the 1997 – 2005 period has been surprisingly modest. Depending on whether

they focus on China's exports to the world or to the U.S., and on which country's data are used, they find that the growth in exports due to expanding variety cannot explain more than one-quarter of the overall export growth. That means that the remaining three-quarters or more of the export growth over the decade is explained by the intensive margin, i.e. rising exports in product categories that China was exporting all along. We should expect this growth in the intensive margin bring a drop in prices for imports of China's trading partners, which they confirm for the U.S.: over 1997 – 2005, they find that average export prices from China to the U.S. fell by 1.5% per year, whereas prices from the rest of the world to the U.S. rose by 0.4% per year.

Falling prices from China is a terms of trade gain for the countries importing these goods, but poses a challenge to the other countries exporting such goods on international markets. The next two chapters in the volume investigate the impact that China's growing trade has had on its trading partners and other exporters, both in the Asia region and beyond.

Harrigan and Deng adopt a simple version of the Ricardian model with stochastic technologies, due to Eaton and Kortum (2002). In that framework, the market share achieved by each country in their trading partners will depend on that country's size, technical capability, and transport costs to its partners. An improvement in China's technical capability increases the market share in partner countries by an amount that is rising in its initial market share: China gains the most in those markets that it already serves most strongly. Likewise, other exporting countries lose the most in those market already served by China. Harrigan and Deng find some support for this hypothesis for several of China's neighbors – South Korea, Taiwan, and Japan – in their sales to China's top 20 markets.

Harrigan and Deng further investigate how China's exports to nearby versus distant markets vary with weight and transportation mode. They confirm a version of the "Washington

apples" hypothesis, whereby China's export prices of goods *net* of transport costs rise to more distant markets: goods shipped farther are higher quality, or of higher value relative to weight. The mode of transport also depends on weight, and in theory, heavy goods should only be sold in nearby markets and air transport only used for distant markets. Interestingly, they find that air transport from China is used predominantly by private and foreign firms, not the state-owned or collectives, and primarily for their shipments of processing exports. That finding is consistent with a high value of time being placed on processing trade (Harrigan, 2006).

Hanson and Robertson also investigate the impact of China's growing trade on other exporters, and consider 10 developing countries that are similar to China in their share of manufacturing in GDP and exports: Hungary, Malaysia, Mexico, Pakistan, the Philippines, Poland, Romania, Sri Lanka, Thailand and Turkey.[5] They adopt the conventional "gravity" specification of international trade flows, whereby exports in a sector depend on the range of products in that sector, production costs, partner GDP, and the country's distance (and hence trade costs) to its partners. As China grows, its export sales will divert demand away from other exporters selling to the same markets. In the gravity equation, this potential diversion is captured by the "supply capacity" of China, which in turn should reflect the range of products it exports and its production costs. Hanson and Robertson consider a counter-factual exercise where the "supply capacity" for China is held constant at its 1995 estimated value, and then project the increase in exports for the 10 other developing countries selling to a large set of importers in 2005. That is, they are using the gravity equation to estimate how the exports of the 10 developing countries would have evolved had China not grown over 1995 – 2005.

[5] India to also similar to China in its manufacturing share of GDP and exports, but Hanson and Robertson omit that country due to its own strong growth in recent years.

In their results, Hanson and Robertson find a modest impact of China on the competing exporters. For all manufacturing industries, the counterfactual difference in export demand in 2005 does not exceed 2.8%, for the Philippines, and could be as low as 0.2%, for Mexico.[6] The impacts are somewhat larger when excluding all resource industries, or when focusing on particular manufacturing industries. In the combined group of apparel, footwear, electronics and toys, for example, the increase in exports sales for several countries (Pakistan, Poland and Romania) is about 5%; followed by 4% for Mexico; 3% for Turkey; and about 2% for Hungary, Malaysia, the Philippines, and Thailand.[7] One reason that these estimates are modest in size is that the counterfactual exercise whereby China's "supply capacity" is held constant is limiting the growth in the *range of products* exported from China, and limiting the change with its production costs. From the chapter by Amiti and Freund, we know that the extensive margin of China's exports did not rise that much over 1997 – 2005. The counterfactual exercise used by Hanson and Robertson allows for the intensive margin China's export to grow in response to higher import demand or lower tariffs, but holds constant the extensive margin of exports as well as production costs. But since the extensive margin did not rise that much over 1997 – 2005, this counterfactual still allows for substantial growth in Chinese exports relative to what actually happened. This helps to understand why the counterfactual growth in export sales by other developing countries is not that large.

The Macroeconomic Implications of China's Trade

The second set of chapters shifts the focus to the macroeconomic consequences of China's trade. There is no doubt that the boom in China's exports during the past decades is large

[6] Table 6, column (1). This range of estimates ignores Sri Lanka, which is found to benefit from China's growth, and therefore exports less in the counterfactual exercise where China's supply capacity is held constant.
[7] Table 6, column (7)

enough to have significant impacts on its domestic employment and production, as well as on the price levels of its trading partners and pressure for exchange rate adjustment. The big macroeconomic question is the sustainability of the current international equilibrium, whereby China (and other countries) are financing the current account deficits of the United States (and some other countries). In a series of papers, Dooley *et al* (2003, 2004a,b,c) argue that China is willing to finance the current account deficits of the U.S. because it generates urban employment there. In their view, this system is sustainable so long as expanding exports continue to generate employment gains in China, and they suggest these desired gains are on the order of 10–12 million persons per year, with about 30% of that coming from export growth. Feenstra and Hong investigate whether such employment increases have actually occurred in China due to export growth, relying on input-output analysis to quantify the link between exports and employment.

Like other chapters in the volume, Feenstra and Hong make the distinction between processing and ordinary (i.e. non-processing) exports. Processing exports cannot be expected to generate the same employment gains as ordinary exports, particularly when we take into account the direct plus indirect use of labor in each industry: the indirect use comes from labor used to produce the intermediate inputs used in exports. Static estimates of the employment gains generated from $1,000 of exports are about 0.44 person-years for ordinary exports and 0.13 person-years for processing exports, for 2000. But applying these coefficients to the very large increase in exports since 1997 vastly overstates the actual employment gains, by an order of magnitude or more. In other words, the static estimates of employment gains from the input-output tables are unreliable as predictors of future employment growth. Feenstra and Hong argue this finding is due to technological change as well as the shifting composition of industries:

exports have shifted toward industries with high labor productivity, implying lower employment gains from any given increase in exports.

Making corrections for the shifting composition of industries, as well as for technological change (proxied by the growth in wages), the predictions from the input-output analysis can match the actual employment growth more closely. Feenstra and Hong find that the predictions of Dooley *et al* (2003, 2004a,b,c) are quite close to what occurred in China: employment grew by 7.5–8 million per year over 1997–2002, with export growth explaining about 30% of that increase, and the other employment gains coming from non-traded goods like construction. Surprisingly, the *domestic* demand for traded goods did not add anything to employment over this period: the increase in demand was offset by productivity growth, leading to negligible job gains from domestic demand for tradable. Exports grew much faster over the 2000-2005 period, and so did domestic demand, though the breakdown between nontraded and traded goods is not available. Feenstra concludes that exports have become increasingly important in stimulating employment in China, but that the same gains could be obtained from growth in domestic demand, especially for tradable goods, which has been stagnant until at least 2002.

The macroeconomic consequences of China's growth on its second-largest trading partner – Japan – are the focus of the chapter by Broda and Weinstein. They begin with a quotation from the Ministry of Finance in Japan, drawn from a widely-read editorial in the *Financial Times,* arguing that China and other East Asian countries bring a "deflationary force" in the global economy, due to their high "supply capacity." The words used here mirror the discussion of China's "supply capacity" in the chapter by Hanson and Robertson. But in this case the officials in Japan are not worried about the impact of China's rising export sales on other exports of other developing countries; rather, they are concerned about the impact of low prices

from China on Japan itself. China's share of imports in Japan rose starting in 1990, and the U.S. share fell from 1998. At the same time, from 1992 to 2002 the import price index for Japan fell. This coincidence of events has led officials in Japan to believe that the rising imports from China have contributed to deflation.

Broda and Weinstein argue that this belief is misplaced, and in fact, that the fall in import prices is due more to technical issue of the construction of the import price index than to any deflationary pressures from China. When adopting the same formula that is used for the consumer price index, import prices rise instead; the same is true when using superlative formulas (the Tornqvist or Fisher Ideal indexes) constructed over import unit-values. Furthermore, statistical analysis shows that the unit-values from China did not fall faster than those from countries exporting to Japan (though the Chinese unit-values are lower). Broda and Weinstein find, however, that the quality and variety of Chinese exports to Japan rose considerably, but even these effects have only a very small impact on Japanese deflation.

As China's trade surplus explodes in recent years, the role of Chinese exchange rate in generating this surplus has become an intense subject of debate. In particular, has China's currency been kept artificially low to give its exporters a competitive edge? Would Chinese trade adjust in a responsive way to an RMB appreciation? In Chapter 8, Cheung, Chinn, and Fujii provide an analysis of these issues. Their chapter has two parts. First, they assess whether the Chinese real exchange rate is consistent with long run equilibrium by casting the question in a setting of a cross-country comparison. Second, they estimate the elasticities of China's trade to real exchange rate on both a multilateral and a bilateral (i.e., vis-à-vis the United States) basis.

When assessing the level of real exchange rate, Cheung, Chinn and Fujii's most important claim is that there is a distinction between *finding* undervaluation and *proving*

undervaluation. In terms of point estimates, the Chinese currency is shown to be substantially undervalued from a variety of specifications, sometimes on the order of 50%. However, none of the point estimates is obtained with much precision. The estimates are typically within two standard deviations from the regression line (conditional mean). In other words, despite the large value of the point estimates, one cannot reject statistically the null hypothesis that there is no undervaluation of the Chinese currency. This does not prove there is no undervaluation, because one equally cannot reject statistically the hypothesis that there is a 50% undervaluation. What Cheung, Chinn, and Fujii show is that, given the nature of the noise in the relationship between exchange rates and other variables, there is considerable amount of uncertainty associated with the battery of statistical tools they use. Perhaps future development of statistical tools would allow one to make more precise statements. Frankel, in discussing this chapter, argue that Cheung, Chinn and Fujii might be overly conservative in acknowledging a lack of precision of the estimates. If several different procedures all point to the same conclusion of an RMB undervaluation, perhaps the uncertainty about this conclusion is smaller than each of the procedures taken alone.

In the second part of the chapter, Cheung, Chinn and Fujii examine whether and how Chinese trade flows respond to its exchange rate (holding constant other determinants of trade). Economic theory would predict that when the RMB appreciates, Chinese exports are likely to decline, and its imports are like to increase. While Cheung, Chinn and Fujii confirm the effect on the exports in the data, they find it difficult to corroborate the predicted effect on imports. In fact, the imports appear to decline also in response to an RMB appreciation. They try a number of fixes, such as separating processing imports from ordinary imports and adding cumulative FDI as a control variable. These modifications do not change the estimated relationship on the import

side. A likely remedy in the future is to use much more disaggregated trade data as in some of the other chapters in this volume.

Sectoral Issues and Trade Policies

The third set of chapters in the volume investigates various important sector-level issues. It begins by examining the use of "non-traditional" trade protectionist tools, in particular, antidumping investigations, both against China and by China. This is followed by a chapter that reflects on the country's experience under the Multifiber Agreement (MFA) and the Agreement on Textile and Clothing (ATC). China's agricultural trade reform and rural prosperity is the subject of the third chapter, and an investigation into the relationship between China's trade and the environment concludes this section.

On December 1, 2001, China became a full-fledged member of the World Trade Organization (WTO), after an arduous 14-year period of negotiations with existing members of the GATT/WTO. Because of China's size, and its rising share in world trade, its share in international trade disputes naturally increases over time, and in fact at a pace that is more than proportional to the growth of its share in world trade. China's WTO membership makes many policy makers and economists anxious about whether the WTO's relatively new dispute settlement mechanism could be stretched beyond its capacity.

Using several newly compiled data sets, Bown provides a rich and systematic look at the incidence and characteristics of trade disputes involving China since its WTO membership. The discussion is placed in a comparative framework: how discriminatory treatment against China by other countries has evolved as compared to the period prior to its membership, and how China's own use of antidumping measures compares to their use by other countries.

Bown reports a number of interesting findings. Antidumping is one of the increasingly popular tools of protectionism used by countries around the world, in part because of the success of the GATT and the WTO in achieving negotiated reductions in tariff rates. Before China acquired its membership in the WTO in December 2001, its exporters faced substantial discriminatory treatment relative to other exporting countries during 1995-2001: Chinese exporters were more likely to face antidumping charges than exporters from most other countries, relative to the volume of their exports. For example, while Chinese exports accounted for only 8% of the US imports, its share in US antidumping investigations was 13%. Similarly, while its share in the European Union's imports was only 6%, its share in the EU antidumping investigations was 14%. We do not know from the data whether Chinese exporters were actually dumping more that other producers. But because China was defined as a non-market economy, these importing countries used benchmark cost calculations that were biased towards finding dumping by Chinese producers. Partly as a result of this, antidumping cases against Chinese exporters were three to four times more likely to be successful than those against other producers. Some of the "new" countries using antidumping tools were even more aggressive. For example, Argentina and Brazil targeted 21% and 16%, respectively, of all of their antidumping cases against China, even though China only accounted for 4% and 2%, respectively, of their import shares.

When China was negotiating its entry into the GATT/WTO during 1991-2001, one might hypothesize that China's trading partners may strategically target antidumping cases in sectors in which China had higher tariffs, as a way to pressure China to increase the scope of its own trade liberalization. If this is true, it could give a relatively benign interpretation. Bown formally tests this hypothesis but finds no support in the data. In other words, it is unlikely that China's trading

partners employed antidumping investigations systematically as a tool to encourage China to undertake bigger trade liberalizations in the corresponding sectors.

After 2001, the year China joined the WTO, other countries appear to have *increased* their actions against Chinese exports, including the use of China safeguards. For example, both the United States and the European Union have increased the share of Chinese exporters in their overall antidumping investigations against foreign producers. Antidumping, tariff barriers and other trade protection tools are substitutes. Because the Chinese membership in the WTO has placed new limitations on the use of other more traditional protectionist tools, and because antidumping cases against China could still invoke the non-market economy clause for the purpose of calculating exporters' costs, it is perhaps not surprising to see the rise of antidumping cases against China. Interestingly, although Chinese textile and garment exports were growing at a phenomenal rate, its trading partners have not raised the frequency of using the antidumping tool against the Chinese in this sector. Part of the reason is that they could use China-specific "special safeguards" to directly impose quantitative restrictions on Chinese exports, as discussed in the next chapter.

Bown then turns to examining China's own use of antidumping investigations against exporters from other countries. Ironically, China had no antidumping and safeguard provisions prior to mid-1990s. They were imported by China as part of "international best practices". It launched its first antidumping case in 1997 (one of the editors of this volume was a consultant on behalf of the Canadian and US exporters involved in this case), and its first safeguard investigation in 2002. China has since become one of the top five users of antidumping measures in the world. Just as for its trading partners, the use of antidumping is a substitute for other protectionist instruments for China. While its WTO accession obligations require it to

progressively reduce tariff rates across the board, antidumping appears increasingly more attractive to import competing firms seeking government relief. In the data, Bown finds that industries that had the biggest tariff reductions during the WTO accession are more likely to seek antidumping measures against foreign producers in subsequent years.

Around the time that China's WTO membership took effect, some observers were worried that China will be involved in a huge number of trade disputes both as a complainant (plaintiff) and as a respondent (defendant). This could then pose the risk of overwhelming and even paralyzing the WTO dispute settlement mechanism (as distinct from the antidumping regulations). So far, this has not turned out to be case. China has not been an active participant in WTO litigations against other countries. Similarly, it has been relatively infrequently on the defensive side in WTO litigations. However, the United States has brought several new cases against China in 2008. It will be interesting to see if this signals a change in strategy in general by China's trading partners. Moreover, China has signed up as an "interested third party" in cases involving other complainant and respondent countries. As of 2006, China has been very active in 40 different disputes in this indirect capacity. One possible interpretation is that China is actively learning about the dispute settlement mechanism, and preparing to become a more active initiator of cases against other countries (as well as a respondent in cases against itself). In this sense, the past may not be a reliable predictor of the future.

The specific trade policies of the textile and apparel industry are discussed in the next chapter, by Brambilla, Khandelwal and Schott. Under the GATT, exports of textiles and apparel to developed countries were restricted under the Multifiber Arrangement (MFA), renamed as the Agreement on Textiles and Clothing (ACT) under the WTO. These quotas were eliminated in 2005 at which time exports from China surged. As a result, special "safeguard" quotas were re-

imposed against Chinese exports in both the United States and Europe. While such safeguard quotas are normally not permitted under the WTO, a special provision agreed to upon China's entry to the WTO in 2001 allowed for their use in textiles and apparel.

Brambilla, Khandelwal and Schott document the evolution of China's export in textiles and apparel since before its accession to the WTO. They argue that China had faced quotas that were more binding than for many other exporters. For example, they find that the "fill rate" in quota categories, which equals exports divided by the base quota, was 88% for China, similar to that in Bangladesh, Cambodia, India, Indonesia and Pakistan. But all other countries had fill rates that were lower, indicating that the quotas were less binding. In addition, China was not eligible for any growth in its quotas, as most other countries enjoyed.

All that changed when China joined the WTO in 2001. Then it could benefit from the phased reduction in quota levels that other exporters had already experienced. Phase III of the reduction in quotas occurred in 2002, which was the first time that China was eligible for the reductions since joining the WTO. China's overall textile and apparel exports increased by 306% that year, which amounted to nearly three-quarters of the total export increase from all countries. By comparison, in 2005, China's exports increased by 271%, while global exports fell slightly. In both years, most of the increase in Chinese exports occurred in the intensive margin (selling more within existing categories of goods) rather than the extensive margin. Furthermore, they find some evidence that the increase in exports was accompanied by quality downgrading, as expected when quotas expire.

Thus, the growth in Chinese exports really dates from 2001, and reflects past treatment under the MFA and ACT that put China in a disadvantaged position. From this perspective, the surge in China's textiles and apparel exports after the MFA/ACT expired in 2005 was not

surprising. Countries that were impacted most by the growth in Chinese exports in 2005 include those in Central America, Oceania, East Asia, and Sub-Sahara Africa. The largest South Asian exporters – Bangladesh, India and Pakistan – were not impacted to the same degree. The fact that both the United States and Europe re-imposed special safeguard quotas on Chinese exports in 2006 will limit its future export growth to those developed countries (while the safeguards are due to expire in 2008, they may be renewed up to 2013). That may allow other countries to re-establish their export position. But for these other developing countries exporting textiles and apparel, the more important trend for the future will be China's shift away from labor-intensive goods and towards more capital and skill-intensive industries. Already, China's former production in textiles and apparel is shifting to lower-wage countries, such as Vietnam, which joined the WTO in 2007. For these reasons, fears that China will permanently displace other exporters of textiles and apparel are probably misplaced.

Under its WTO accession, China had to agree to radical reductions in agricultural tariffs. As the pre-WTO tariff levels were high on many products, most economists and other observers predicted that agriculture was going to be one area in which Chinese producers were not going to be competitive, so that rural income was going to fall and rural poverty was likely to rise after the accession. Fortunately for Chinese rural households, these predictions did not turn out to be true. In fact, agricultural growth continued, which poses a puzzle. Chapter 11 by Huang, Liu, Martin, and Rozelle provides an answer to this puzzle.

China agreed to major reductions in agricultural tariffs as a part of the conditions for gaining the WTO membership, and it followed through on these liberalization promises after the accession, so the phrase-in were completed by 2005 as scheduled. The key resolution to the puzzle is to recognize that the high pre-accession tariff protection was largely offset by a long list

of policy distortions such as a high agricultural tax and a low state mandatory procurement price, that generally were unfavorable to rural households and agricultural production. As a result of the domestic policy distortions, the net rate of protection before the WTO membership was in fact negative for many crops. Coinciding with the WTO accession, the Chinese have undertaken numerous domestic reforms that gradually remove these anti-agricultural policy distortions. The net effect of trade and domestic policy reforms is a positive boost to many agricultural producers.

The basic tool that Huang et al use to gauge the net effect of policies is the Nominal Rate of Assistance (NRA), which is based on a comparison between domestic prices of agricultural products and corresponding international prices. The NRA was negative for farmers that produce rice and many other import-competing commodities until around 1995. The NRA continued to improve even after the WTO accession. In addition to removing discriminatory policies against agriculture, the Chinese government also invested in the development and dissemination of agricultural technology which improved farmer's productivity. Huang, Liu, Martin and Rozelle give the example of investment in R&D for plant biotechnology; the growth of government sponsored R&D was 5.5% per year between 1995 and 2000. They report that China now ranks among the global leaders in agricultural biotechnology, with public spending in this area second only to the United States. Therefore, in the period leading up to the WTO accession and in the period since the WTO membership, farmers have gained on net from the whole package of policy reforms and public investment more than they have lost from the reductions in agricultural tariffs.

The final chapter in this section, by Dean and Lovely, deals with China's environment. Here again, conventional wisdom points towards a very negative prognosis: press reports of the pollution in China and the cost to human health and both frequent and disheartening. Without

questioning that existing pollution levels (i.e. the stock of pollution) in China are very high, Dean and Lovely argue that a different picture is obtained if one focuses instead on the pollution intensity of industries (i.e. the flow of pollution) over time. In fact, Chinese industrial emissions of water pollution (measured by the chemical oxygen demand, or COD), and air pollution (measured by soot and dust particles) have been declining since 1995, while sulfur dioxide shows only a small increase. What factor can explain the decline in emissions for three out of these four pollutants?

Dean and Lovely use the emissions data to calculate the pollution intensity of 33 Chinese sectors, for 1995 and 2004. Using that information, they can compute whether the decline in aggregate industrial emissions reflects the same decline at an industry level (a “technique” effect), or reflects a shift towards cleaner industries (a “composition” effect). They find that the pollution intensity of production has fallen over time for all four pollutants, and across nearly all sectors. Thus, there is evidence in favor of a shift towards cleaner production techniques. That may very well reflect the increasing attention given to environmental regulation by government agencies in China, though these agencies are still small and underfunded compared to the scale of the environmental problem.

In addition, Dean and Lovely find that there has been a shift towards cleaner industries in China. From 1995 to 2004, the water pollution intensity of exports fell by 84%, and the drop in air pollution intensity is nearly as large. Most of that drop is due to the technique effect rather than a composition effect, however. By re-weighting the pollution intensities using processing exports rather than ordinary exports, they find that processing exports are cleaner than ordinary exports for all four pollutants. In addition, ordinary or processing exports are cleaner than the respective imports. They then develop a model to assess the role that production fragmentation

through processing trade plays in explaining the pollution intensity of Chinese trade, and find empirical support for the hypotheses arising from the model.

Foreign Investment and Trade

Foreign direct investment is another area in which there has been substantial changes in China. The country metamorphosed from being closed to foreign investment in the 1970s to now being the single largest developing country host of foreign direct investment. Foreign invested firms are an important of China's trade story, accounting for more than half of its total exports and imports. Moreover, in recent years, China's modest but increasing outward direct investment has started to attract attention and sometimes anxiety. The last set of chapters examines various issues with regard to foreign direct investment.

The chapter by Blonigen and Ma examines the degree to which foreign invested firms have spurred the growth of domestic Chinese firms. Do Chinese firms catch up with foreign invested firms in terms of export volume, product composition and product quality? Blonigan and Ma examine these questions systematically by utilizing the same detailed data at the level of product, region, firm ownership type (as well as other dimensions).

Over the last twenty years, as the Chinese trade volume rises, the share of exports by state owned firms has declined steadily, while the share accounted for by foreign invested firms has been rising steadily. Blonigen and Ma employ two approaches to investigate this topic for the period 1997-2005. First, within a typical 6-digit product code, they ask whether Chinese firms take up an increasing big share. Second, for a given product, they ask whether the quality gap between the variety produced by domestic Chinese firms and that by foreign invested firms narrows over time.

One might guess the answer to the first question from the aggregate data: if the share in total exports by FIEs has been rising, it is also likely to be on an upward trend within a product code, on average. This indeed turns out to be true, but Blonigen and Ma do not stop here. They also ask which factors could either speed up or slow down the expansion of export shares by FIEs across products, by exploring cross-product variations in policies that may encourage technological transfers, and variables that may proxy the degree of competition between FIEs and Chinese firms.

The answer to the second question is “not really.” That is, there is no evidence of a steady narrowing in export quality (measured by difference in unit values) between FIEs and domestic firms. By this metric, Chinese firms appear to be “falling behind,” rather than “catching up,” as the unit values of their exports appear to become progressively lower relative to the unit value of the same product produced by FIEs.

The government policies toward FDI are not neutral across sectors. FDI in various sectors can be placed in three categories: (a) encouraged, (b) neutral, and (c) restricted. In the “encouraged” sectors, while there is no reduction in the quality gap between domestic and foreign firms, the share by domestic firms in those sectors’ total exports actually declined. This suggests that the sector-biased FDI encouragement policies do not systematically help domestic firms to catch up with FIEs, at least not by the criteria that Blonigen and Ma use.

The chapter by Branstetter and Foley sets out to dispel four commonly held perceptions regarding US FDI in China. The first question: Is the U.S. FDI in China large? The answer is no. This can be understood from two levels. First, U.S. multinational firms’ investment in China is only a small fraction of their total overseas investment. In 2004, for example, their China operation’s shares in their total overseas affiliate sales and assets were mere 1.9% and 0.7%,

respectively. Second, U.S. FDI in China as a share of China's total inward FDI is also small. In fact, the most important source "country" for FDI in China is Hong Kong. However, this does not mean that FDI is unimportant for China. As we have previously noted, China is among the world's top recipient of FDI.

The second question: Is U.S. FDI in China heavily export-oriented? The answer from Branstetter and Foley is no. They use data on benchmark surveys of US multinational firms, and compute sales to local market versus exports. They found no evidence that US affiliates in China are more export oriented than elsewhere. The notion that US firms invest in China and then sell their products back to the U.S. *en mass* does not turn out to be supported by a careful look at the data. Note, however, the authors are not rejecting the possibility that there could be a good deal of indirect exports by U.S. affiliates in China back to the U.S. For example, U.S. affiliates could sell machineries and other intermediate inputs to local Chinese firms or other unaffiliated FIEs in China, which in turn may export to the U.S. and other markets. Checking out this possibility would require data that go beyond what these authors have.

The third question is: does investment by U.S. multinational firms in China displace their investment in the U.S.? The answer is again no. Branstetter and Foley examine whether a U.S. firm's investment in the U.S. tends to contract whenever it expands its investment in China, and find no evidence supporting this notion. In fact, firms that increase employment in China also appear to increase, not decrease, employment in other locations. This suggests that investment in China tends to be a complement to investment in the U.S. and other locations.

Finally, the fourth question is: are U.S. firms aggressively engaging R&D in China? At a first glance, the answer may be yes. By the end of 2004, multinational firms had established more than 700 R&D centers in China. Global companies like Microsoft make repeated

statements about engaging world-class research in its China-based R&D centers. But after examining data on counts of patents registered in the U.S. by multinational firms, including those with investors who reside in China, Branstetter and Foley conclude that most multinational firms engage relatively little true cutting-age research in China. Even for Microsoft, China-generated patents accounts for only 4% of the stock of all its patents (though the China share in its flow of new patents may be higher and rising). As of now at least, most of the China-based R&D centers probably focus on customizing technologies developed elsewhere to the Chinese market.

China's investment in resource-rich countries in Africa and Latin America, and its attempt to acquire various US companies, have generated attention to its overall outbound FDI. China's newly established sovereign wealth fund – the China Investment Corporation – has further focused the spotlight on its overseas investment activities. The chapter by Cheng and Ma provides a timely and systematic analysis of China's outbound FDI during 2003-2006. They reach a number of interesting findings.

First, in spite of the international attention, China's outbound FDI is quite small, accounting for less than 2% of global FDI flow in 2006. Second, while the attention has been focused on China's overseas investment in resource sectors, business services turn out to be the biggest area of its investment. It is possible that overseas business services are an important input into the Chinese exports. The importance of business services investment by Chinese firms simply reflects the importance of exports for the Chinese economy. Cheng and Ma caution, however, that the true sector composition of the Chinese outbound FDI may be different from the official data as a significant fraction of its outbound FDI is reported to go to tax havens. In all likelihood, these investment projects wind up elsewhere, but their true destination and sector composition are not well recorded. Third, the destination country's GDP (but not income),

foreign reserve, and currency appreciation, are all positively related to China's FDI in that country.

Conclusions

While Chinese GDP doubles once every eight years, its exports and imports have been growing at an even more impressive pace, roughly doubling in value once every 3-4 yeas. This poses both opportunities and challenges for China and for the rest of the world. Magazines and airport bookstores are filled with publications with sometimes outlandish claims about the causes and consequences of China's growing trade in the world. This book, by putting together a group of prominent empirical trade economists, aims to clarify a number of misconceptions and enhance our understanding of issues related to China's trade.

In the pages to follow, readers will find detailed analyses of the microstructure of trade, the macroeconomic implications, sector-level issues and foreign direct investment. While the topics are diverse, a common feature is a careful examination of micro data that is conducted under the guidance of economic theories. Some conventional wisdom is overturned; many new data patterns are documented. While this volume is unlikely to be the last word on China's trade, it hopefully will inspire more follow-up research and contribute to well-informed discussion of China's role in world trade.

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Table 1: China's Exports and Imports, By Ordinary and Processing Trade (Billions of U.S, dollars and Share of total value)

	Billions of U.S. dollars				Share of total export or import value			
	Export		Import		Export		Import	
Year	Ordinary	Processing	Ordinary	Processing	Ordinary	Processing	Ordinary	Processing
1992	43.7	39.6	33.6	31.5	0.51	0.47	0.42	0.39
1993	43.2	44.2	38.0	36.4	0.47	0.48	0.37	0.35
1994	61.6	57.0	35.5	47.6	0.51	0.47	0.31	0.41
1995	71.4	73.7	43.4	58.4	0.48	0.50	0.33	0.44
1996	62.8	84.3	39.4	62.3	0.42	0.56	0.28	0.45
1997	78.1	99.7	39.0	70.2	0.43	0.55	0.27	0.49
1998	74.2	104.4	43.7	68.6	0.40	0.57	0.31	0.49
1999	79.2	110.9	67.0	73.6	0.41	0.57	0.40	0.44
2000	105.2	137.6	100.1	92.6	0.42	0.55	0.44	0.41
2001	111.9	147.4	113.5	94.0	0.42	0.55	0.47	0.39
2002	136.2	179.9	129.1	122.3	0.42	0.55	0.44	0.41
2003	182.0	241.8	187.7	162.9	0.42	0.55	0.45	0.39
2004	243.6	328.0	248.2	221.7	0.41	0.55	0.44	0.39
2005	315.1	416.5	279.7	274.0	0.41	0.55	0.42	0.42
2006	416.3	510.4	333.2	321.5	0.43	0.53	0.42	0.41

Source: China Customs Statistics (1992-2006)

Table 2: China's Exports and Imports,
by Foreign Invested Enterprises (FIE) and all other firms
(Share of total export or import value)

	Share of export or import value in ordinary or processing trade							
	Export				Import			
	Ordinary		Processing		Ordinary		Processing	
Year	FIEs	Other	FIEs	Other	FIEs	Other	FIEs	Other
1992	0.05	0.95	0.39	0.61	0.05	0.95	0.45	0.55
1993	0.09	0.91	0.48	0.52	0.06	0.94	0.53	0.47
1994	0.07	0.93	0.54	0.46	0.05	0.95	0.59	0.41
1995	0.06	0.94	0.57	0.43	0.12	0.88	0.63	0.37
1996	0.12	0.88	0.63	0.37	0.17	0.83	0.67	0.33
1997	0.13	0.87	0.64	0.36	0.22	0.78	0.68	0.32
1998	0.14	0.86	0.66	0.34	0.22	0.78	0.70	0.30
1999	0.16	0.84	0.67	0.33	0.25	0.75	0.72	0.28
2000	0.19	0.81	0.71	0.29	0.26	0.74	0.74	0.26
2001	0.22	0.78	0.72	0.28	0.27	0.73	0.75	0.25
2002	0.23	0.77	0.75	0.25	0.27	0.73	0.77	0.23
2003	0.24	0.76	0.79	0.21	0.29	0.71	0.81	0.19
2004	0.26	0.74	0.81	0.19	0.29	0.71	0.83	0.17
2005	0.27	0.73	0.83	0.17	0.29	0.71	0.84	0.16
2006	0.28	0.72	0.84	0.16	0.32	0.68	0.85	0.15

Source: China Customs Statistics (1992-2006)

Table 3: Ordinary Exports By Major Industries (Billions of U.S. dollars)

Year	Animals, Food	Minerals, Wood	Chemicals, Plastics	Textiles	Footwear, Headgear	Metals, Articles	Machinery, Electrical	Transport	Misc. Manufact.
1992	9.1	7.8	3.9	13.9	0.9	2.6	2.8	0.8	1.5
1993	8.0	6.9	4.1	14.9	1.1	2.4	3.0	0.6	1.8
1994	10.5	8.2	5.8	22.8	1.7	3.7	4.4	0.8	3.3
1995	10.1	11.1	8.2	22.1	2.1	6.0	6.3	1.2	4.0
1996	9.6	10.5	7.6	18.1	2.0	5.0	5.1	1.0	3.6
1997	10.4	12.2	8.9	24.9	2.6	6.5	6.0	1.1	5.1
1998	10.1	10.4	8.7	22.9	2.6	6.7	6.1	1.1	5.1
1999	9.7	10.4	9.2	23.9	2.8	7.4	8.4	1.5	5.7
2000	11.5	14.2	11.2	31.1	3.6	10.4	12.0	2.7	8.0
2001	11.8	15.2	12.2	32.5	4.0	10.1	14.1	3.1	8.4
2002	13.3	16.5	14.4	41.3	5.0	11.8	18.9	3.6	11.0
2003	16.2	21.2	18.5	55.2	6.4	15.9	27.8	5.5	14.7
2004	16.8	27.8	24.9	67.8	8.3	30.1	39.4	8.1	19.5
2005	19.9	34.4	33.0	84.1	10.8	40.5	53.6	12.0	25.4
2006	22.8	39.0	40.3	108.2	13.1	65.2	76.4	17.0	32.4

Source: China Customs Statistics (1992-2006)

Table 4: Ordinary Exports By Major Industries (Share of Total Value)

Year	Animals, Food	Minerals, Wood	Chemicals, Plastics	Textiles	Footwear, Headgear	Metals, Articles	Machinery, Electrical	Transport	Misc. Manufact.
1992	0.21	0.18	0.09	0.32	0.02	0.06	0.06	0.02	0.03
1993	0.18	0.16	0.10	0.35	0.03	0.06	0.07	0.01	0.04
1994	0.17	0.13	0.09	0.37	0.03	0.06	0.07	0.01	0.05
1995	0.14	0.16	0.11	0.31	0.03	0.08	0.09	0.02	0.06
1996	0.15	0.17	0.12	0.29	0.03	0.08	0.08	0.02	0.06
1997	0.13	0.16	0.11	0.32	0.03	0.08	0.08	0.01	0.07
1998	0.14	0.14	0.12	0.31	0.04	0.09	0.08	0.01	0.07
1999	0.12	0.13	0.12	0.30	0.04	0.09	0.11	0.02	0.07
2000	0.11	0.13	0.11	0.30	0.03	0.10	0.11	0.03	0.08
2001	0.11	0.14	0.11	0.29	0.04	0.09	0.13	0.03	0.08
2002	0.10	0.12	0.11	0.30	0.04	0.09	0.14	0.03	0.08
2003	0.09	0.12	0.10	0.30	0.04	0.09	0.15	0.03	0.08
2004	0.07	0.11	0.10	0.28	0.03	0.12	0.16	0.03	0.08
2005	0.06	0.11	0.10	0.27	0.03	0.13	0.17	0.04	0.08
2006	0.05	0.09	0.10	0.26	0.03	0.16	0.18	0.04	0.08

Source: China Customs Statistics (1992-2006)

Table 5: Processing Exports By Major Industries (Billions of U.S. dollars)

Year	Animals, Food	Minerals, Wood	Chemicals, Plastics	Textiles	Footwear, Headgear	Metals, Articles	Machinery, Electrical	Transport	Misc. Manufact.
1992	0.8	1.7	2.0	13.1	4.1	1.8	8.6	1.4	6.0
1993	0.9	1.8	2.2	13.5	5.1	2.0	10.6	1.1	6.9
1994	1.9	2.5	3.0	15.7	5.6	2.9	15.2	1.8	8.4
1995	2.3	2.9	4.2	18.8	6.0	5.9	20.8	2.7	10.1
1996	2.9	3.3	4.8	21.9	6.4	5.2	25.2	3.0	11.6
1997	2.9	4.2	5.7	24.0	7.2	6.7	31.4	3.9	13.6
1998	2.5	3.8	6.4	22.9	7.1	5.6	36.4	5.0	14.6
1999	2.5	4.3	6.7	22.7	6.9	5.0	42.8	4.7	15.3
2000	2.7	5.5	8.0	25.0	7.1	6.0	59.5	6.1	17.8
2001	3.1	5.5	8.5	24.9	7.1	5.7	68.7	5.9	17.8
2002	3.5	6.7	9.7	24.7	7.1	6.8	93.9	6.5	20.9
2003	3.7	8.0	11.7	27.3	7.6	8.5	139.7	9.6	25.3
2004	4.9	10.7	15.4	31.3	8.3	12.1	199.9	12.2	32.8
2005	5.8	14.1	20.3	33.9	9.2	14.4	258.3	15.4	44.8
2006	6.6	17.0	24.7	38.4	10.0	16.1	323.4	19.9	53.6

Source: China Customs Statistics (1992-2006)

Table 6: Processing Exports By Major Industries (Share of Total Value)

Year	Animals, Food	Minerals, Wood	Chemicals, Plastics	Textiles	Footwear, Headgear	Metals, Articles	Machinery, Electrical	Transport	Misc. Manufact.
1992	0.02	0.04	0.05	0.33	0.10	0.05	0.22	0.03	0.15
1993	0.02	0.04	0.05	0.30	0.11	0.05	0.24	0.03	0.16
1994	0.03	0.04	0.05	0.28	0.10	0.05	0.27	0.03	0.15
1995	0.03	0.04	0.06	0.26	0.08	0.08	0.28	0.04	0.14
1996	0.03	0.04	0.06	0.26	0.08	0.06	0.30	0.04	0.14
1997	0.03	0.04	0.06	0.24	0.07	0.07	0.31	0.04	0.14
1998	0.02	0.04	0.06	0.22	0.07	0.05	0.35	0.05	0.14
1999	0.02	0.04	0.06	0.20	0.06	0.05	0.39	0.04	0.14
2000	0.02	0.04	0.06	0.18	0.05	0.04	0.43	0.04	0.13
2001	0.02	0.04	0.06	0.17	0.05	0.04	0.47	0.04	0.12
2002	0.02	0.04	0.05	0.14	0.04	0.04	0.52	0.04	0.12
2003	0.02	0.03	0.05	0.11	0.03	0.04	0.58	0.04	0.10
2004	0.01	0.03	0.05	0.10	0.03	0.04	0.61	0.04	0.10
2005	0.01	0.03	0.05	0.08	0.02	0.03	0.62	0.04	0.11
2006	0.01	0.03	0.05	0.08	0.02	0.03	0.63	0.04	0.10

Source: China Customs Statistics (1992-2006)

Table 7: Ordinary Imports By Major Industries (Billions of U.S. dollars)

Year	Animals, Food	Minerals, Wood	Chemicals, Plastics	Textiles	Footwear, Headgear	Metals, Articles	Machinery, Electrical	Transport	Misc. Manufact.
1992	3.0	5.3	6.4	1.4	0.0	4.2	9.3	2.8	1.2
1993	1.8	7.2	3.8	0.5	0.0	8.2	11.6	3.5	1.2
1994	2.8	5.1	4.3	1.1	0.0	4.8	13.0	3.1	1.2
1995	5.7	5.8	6.3	1.3	0.0	3.5	15.8	3.3	1.6
1996	5.5	7.5	6.5	1.0	0.0	3.4	10.9	3.3	1.2
1997	4.5	10.8	6.2	0.6	0.0	3.0	10.4	2.2	1.2
1998	4.7	9.2	7.2	0.6	0.0	3.4	14.5	2.6	1.5
1999	5.4	14.3	12.2	0.9	0.0	6.1	22.8	2.9	2.4
2000	7.6	27.9	16.7	1.9	0.0	8.8	29.8	3.8	3.2
2001	7.6	26.2	18.5	2.1	0.0	11.0	36.3	6.4	5.2
2002	7.8	28.4	22.0	2.5	0.1	13.6	42.1	7.2	5.1
2003	12.3	42.5	29.6	3.6	0.1	22.1	58.3	11.8	7.3
2004	17.6	69.7	40.7	5.9	0.2	25.1	67.0	13.0	8.9
2005	17.2	90.1	47.4	6.3	0.2	29.2	65.7	12.8	10.2
2006	17.9	117.7	53.6	7.9	0.3	26.5	77.2	19.6	12.0

Source: China Customs Statistics (1992-2006)

Table 8: Ordinary Imports By Major Industries (Share of Total Value)

Year	Animals, Food	Minerals, Wood	Chemicals, Plastics	Textiles	Footwear, Headgear	Metals, Articles	Machinery, Electrical	Transport	Misc. Manufact.
1992	0.09	0.16	0.19	0.04	0.00	0.12	0.28	0.08	0.04
1993	0.05	0.19	0.10	0.01	0.00	0.22	0.30	0.09	0.03
1994	0.08	0.14	0.12	0.03	0.00	0.14	0.37	0.09	0.03
1995	0.13	0.13	0.15	0.03	0.00	0.08	0.36	0.08	0.04
1996	0.14	0.19	0.16	0.03	0.00	0.09	0.28	0.08	0.03
1997	0.12	0.28	0.16	0.02	0.00	0.08	0.27	0.06	0.03
1998	0.11	0.21	0.16	0.01	0.00	0.08	0.33	0.06	0.04
1999	0.08	0.21	0.18	0.01	0.00	0.09	0.34	0.04	0.04
2000	0.08	0.28	0.17	0.02	0.00	0.09	0.30	0.04	0.03
2001	0.07	0.23	0.16	0.02	0.00	0.10	0.32	0.06	0.05
2002	0.06	0.22	0.17	0.02	0.00	0.11	0.33	0.06	0.04
2003	0.07	0.23	0.16	0.02	0.00	0.12	0.31	0.06	0.04
2004	0.07	0.28	0.16	0.02	0.00	0.10	0.27	0.05	0.04
2005	0.06	0.32	0.17	0.02	0.00	0.10	0.24	0.05	0.04
2006	0.05	0.35	0.16	0.02	0.00	0.08	0.23	0.06	0.04

Source: China Customs Statistics (1992-2006)

Table 9: Processing Imports By Major Industries (Billions of U.S. dollars)

Year	Animals, Food	Minerals, Wood	Chemicals, Plastics	Textiles	Footwear, Headgear	Metals, Articles	Machinery, Electrical	Transport	Misc. Manufact.
1992	0.8	3.1	5.4	9.9	0.5	3.0	6.1	0.2	1.9
1993	0.9	3.5	6.3	10.7	0.5	4.2	7.5	0.3	2.1
1994	2.0	4.6	8.8	13.7	0.4	4.9	9.9	0.3	2.3
1995	2.8	5.3	10.6	16.1	0.4	6.0	13.4	0.3	2.8
1996	2.0	6.1	11.3	17.5	0.4	6.1	15.1	0.3	2.9
1997	2.2	7.3	12.4	18.0	0.4	6.9	18.9	0.3	3.0
1998	1.9	6.3	13.0	15.2	0.4	7.0	21.0	0.3	2.8
1999	1.4	6.3	12.8	15.0	0.4	7.5	26.1	0.3	2.9
2000	1.6	7.5	14.8	17.2	0.4	9.3	36.8	0.3	3.8
2001	1.7	6.8	14.6	17.0	0.4	8.8	39.5	0.3	4.0
2002	1.9	7.8	17.8	17.3	0.3	10.3	58.6	0.3	7.1
2003	2.2	9.3	21.2	18.9	0.4	13.2	82.0	0.3	14.5
2004	2.6	13.1	26.2	21.0	0.4	18.0	113.9	0.4	24.7
2005	3.2	16.5	31.5	20.9	0.4	20.8	145.1	0.6	33.6
2006	3.5	19.2	36.5	21.6	0.5	25.9	174.1	0.7	37.9

Source: China Customs Statistics (1992-2006)

Table 10: Processing Imports By Major Industries (Share of Total Value)

Year	Animals, Food	Minerals, Wood	Chemicals, Plastics	Textiles	Footwear, Headgear	Metals, Articles	Machinery, Electrical	Transport	Misc. Manufact.
1992	0.03	0.10	0.17	0.32	0.02	0.10	0.19	0.01	0.06
1993	0.02	0.10	0.17	0.29	0.01	0.11	0.21	0.01	0.06
1994	0.04	0.10	0.19	0.29	0.01	0.10	0.21	0.01	0.05
1995	0.05	0.09	0.18	0.28	0.01	0.10	0.23	0.01	0.05
1996	0.03	0.10	0.18	0.28	0.01	0.10	0.24	0.00	0.05
1997	0.03	0.10	0.18	0.26	0.01	0.10	0.27	0.00	0.04
1998	0.03	0.09	0.19	0.22	0.01	0.10	0.31	0.00	0.04
1999	0.02	0.09	0.17	0.20	0.00	0.10	0.36	0.00	0.04
2000	0.02	0.08	0.16	0.19	0.00	0.10	0.40	0.00	0.04
2001	0.02	0.07	0.16	0.18	0.00	0.09	0.42	0.00	0.04
2002	0.02	0.06	0.15	0.14	0.00	0.08	0.48	0.00	0.06
2003	0.01	0.06	0.13	0.12	0.00	0.08	0.50	0.00	0.09
2004	0.01	0.06	0.12	0.09	0.00	0.08	0.51	0.00	0.11
2005	0.01	0.06	0.11	0.08	0.00	0.08	0.53	0.00	0.12
2006	0.01	0.06	0.11	0.07	0.00	0.08	0.54	0.00	0.12

Source: China Customs Statistics (1992-2006).

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