THE IMPACT OF CHINA'S ACCESSION TO THE WORLD TRADE ORGANISATION ON ASIA

China's accession to the World Trade Organisation (WTO) is likely to bring fundamental changes to China itself and to the rest of the world. Asian economies, given their proximity to China, their openness to external flows of trade and capital, and the comparative advantages that they share with China, will probably be among the most affected.

One common concern is the heightened competitive pressure that a more liberalised trade regime could pose to Asian countries. Our empirical analysis suggests that, on an aggregate basis, China's exports have not crowded out Asian economies' exports, although there is evidence suggesting significant trade competition in particular sectors. These results testify to the ability of other Asian economies to adjust their export structures as they accommodate China's growing export capacity.

I. Introduction

Much of the discussion of the implications of China's "WTO accession package" (summarised in Box 1) focuses on the reduction of trade barriers. While this aspect is significant, there are other aspects of the associated economic liberalisation which may serve to redefine China's relationships with the outside world and thus have longer-term implications. This paper analyses the overall implications for trade and investment in the region.

The rest of this paper is organised as follows. Section II examines the implications of China's accession to the WTO for Asia from the trade perspective. It first provides a brief literature review on this subject, and highlights the key findings of a number of large-scale quantitative models. This is followed by an analysis of the existing pattern of sectoral comparative advantage in Asia, and how it may be changed by China's accession to the WTO. Section III assesses the impact on foreign direct investment (FDI) in Asia by briefly reviewing FDI determination and identifying what changes in the determinants of FDI will be induced by China's accession to the WTO. Section IV offers conclusions.

II. The Trade Impact

One concern arising from China's accession to the WTO is the heightened competitive pressure that a more liberalised trade regime could pose to Asian economies. In this respect, it is important to note that China has adopted the "open door policy" since the early 1980s, under which the foreign-owned export-oriented sector was given tariff incentives on intermediate goods imports. Since then, China's exporting capacity has been greatly enhanced with relatively unrestricted access to major overseas markets. Thus, such competitive pressure has already existed for many years before China's accession to the WTO.

Nevertheless, China's accession to the WTO could reinforce its export strength in several ways. First, its access to the international apparel market will benefit from a gradual phasing-out of MFA quotas. Secondly, a more accessible domestic market may induce producers to relocate from other Asian economies to China, with markets in the rest of the region being served from the production base in China. Lastly, domestic market opening will increase competition for domestic firms in China. This may sharpen China's comparative advantage and further increase the country's power in the markets of its key exports.

The analysis below focuses on how Asia will be affected through these channels.

(a)   Literature review

In recent years, increasing research has been devoted to the impact of China's entry into the WTO. Studies that employ Computable General Equilibrium (CGE) models provide a glimpse of the probable impact on Asian economies.[1] Many researchers have used CGE models to evaluate different tariff reduction scenarios following China's entry into the WTO. While their conclusions focus on the impact on China and other major economies, the results also cover Asia. A summary

of recent work is provided in Table 1. As expected, the results show China to be a major beneficiary, with its apparel industry unambiguously gaining from the removal of MFA quotas. Most studies point to a positive impact on China's major western trading partners as lower import tariffs stimulate their exports to China. Industrial nations in the Asia Pacific region such as Japan and Australia will also benefit modestly from their "significant comparative advantages in producing capital- or land-intensive products" (Ma, 2001).

With regard to developing countries or specific sectors, these studies are more equivocal. Lejour (2000) pointed out that there is a lack of

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1   CGE models are large-scale, computer-based models that are based on an input-output structure classified by industrial sectors and countries of origin. This allows researchers to model inter-industrial dependencies, substitution among destinations, and to estimate the responses to changes in policies or financial variables. Two better known models are the GTAP model and the G-Cubed world model. See www.gtap.agecon.purdue.edu/default.asp and www.anu.edu.au/emba/models/gcubed.htm.

Table 1
Asia-related Predictions from Selected Studies

Author	Country-wise	Industry-wise
Francois and Springer (Oct, 2001)	Japan and ASEAN5 gain marginally. Strong boost to Korea. Mexico is the main loser.	Taiwan and South Asian countries gain in textile exports at the expense of Mexico.
Bhattasali and Kawai (Feb, 2001)	Largest gain accrues to China in terms of the net impact of accession to the WTO. North America, Europe and Japan also seen to benefit due to more liberalised trade with China. Asian NIEs, especially Taiwan, benefit significantly while South and Southeast Asian countries lose.	Gains to NIEs mainly attributed to expanded exports of textiles and other manufacturing goods to China and their engagement in intra-industry trade. Loss in South and Southeast Asian countries due to removal of quotas on Chinese textile and apparel products.
Martin (Jun, 2001)	China sees strong growth in the share of world trade. Asia, especially North Asia, benefits from China's strong demand for imports. "Greater China" and NIEs enjoy biggest welfare gain. South and Southeast Asia suffer welfare loss due to removal of MFA quota on China's apparel exports.	China sees 263% increase in apparel production in ten years, and its share of world output rising from 8.8% (baseline) to 20%. China's imports for textiles will surge. The automobile and petrochemical sectors in China suffer the biggest losses in output. Asia gains in exports of textile, petrochemical, forestry, and metal products.
Chow, Tuan and Wang (2001)	World exports gain US$60 billion, 60% of which come from China.	Winners for China: clothing, light manufactures, machinery and electronics; Loser: agriculture. North Asia gains in textile exports, light manufactures; South Asia gains in food and non-grain crops; All lose in clothing.
Ma (Dec, 2001)	NIEs gain most. ASEAN economies suffer some trade losses. Indonesia and India suffer GDP loss.	For China, "growth in its apparel and textile industries will be significantly enhanced but the agricultural and automobile sectors will lose". Korea: textiles, petrochemical, non-ferrous metals, and forestry products to benefit. Singapore: processed food, electronics and petrochemicals. India, Indonesia, the Philippines, Thailand lose in apparels. ASEAN economies under pressure to shift to primary commodities.

agreement on the sectoral impacts even among studies employing the same model and data.[2] This paper also illustrated that whether, and how, trade barriers are included could materially affect the results. He argued that, aside from the statutory tariff rates that most studies tend to focus on, tariff exemptions, indirect subsidies and non-tariff barriers are important determinants of the true level of protection. By taking into account tariff exemptions on intermediate goods and investment goods, he argued that Southeast Asian countries currently suffer the highest tariffs entering China and would thus stand to gain the most from the latter's accession to the WTO.

Thus, there is a concern that these large-scale models fail to fully capture what is essentially a complex and multi-faceted regime change into their parameters and provide only partial views of the issue. Furthermore, it should be noted that these models, by design, focus on the most quantifiable elements in the accession, namely tariff reductions. However, WTO membership also introduces many elements into China's economic regime that, while less quantifiable, could be more significant in shaping the trade structure in the region.

(b) Observations on existing trade pattern

Table 2 shows three indicators that describe how Asian economies have oriented their exports across major product categories. The first expresses exports as a percentage of the world export total and serves to measure the absolute level of market dominance for each economy. The second measure uses the economies' own total exports as denominators and highlights the contribution of particular export sectors to their total export revenue. The third, "revealed comparative advantage" (RCA), is the ratio of own export shares to world export shares that attempts to proxy the bias in export pattern using world export pattern as a benchmark.[3]

Several observations can be made. After Japan, China is the most significant regional exporter of manufactured goods, with a share of 4% of total world exports in this sector. Within this sector, China competes in different sub-sectors from Japan, with the former concentrated in consumer goods and the latter capital goods. We also see that while non-Japan Asia claims a much smaller share of the world market because of their sizes, they also display an export pattern that differs significantly from China, and is instead more akin to that of Japan. Capital goods exports constitute the bulk of manufactured exports in all Asian economies except Indonesia. Yet Indonesia is also the least dependent on manufactured goods due to its crude oil resources. Most South Asian countries are also notable for having a larger food/agricultural sector than China. On the other hand, India and Pakistan share a striking similarity with China in their reliance on light manufacturing as a source of export income.

The RCA statistics capture the distribution of national advantages by expressing the export shares of particular commodity groups of one country in terms of the corresponding world averages. This measure of relative export strength shows that: the three NIEs (or NIE-3, including South Korea, Taiwan and Singapore) that specialise in capital goods exports, the four ASEAN countries (or ASEAN-4, including Indonesia, Malaysia, the Philippines and Thailand) that rely heavily on agricultural produce and raw commodities, and China, India and Pakistan that have a bias towards light manufactured goods. Malaysia and Indonesia exhibit export concentrations in more than one of these categories. However, that does not affect the conclusion that the export patterns among Asian countries defy a single characterisation.

Inspection of the specific areas of "revealed advantage" using a more detailed SIC 3-digit breakdown shows the overlapping export capacity to be mainly in the apparel sectors including garment and footwear and particular commodities

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2   For example, the textile industry in China suffered a negative impact in Bach et al (1997) but is the sector experienced the second largest positive impact (behind Apparel) in Yang (1996).

3   Revealed comparative advantage is defined as a country's sectoral share divided by the world sectoral share. It measures a country's trade specialisation in a commodity group. If the ratio is one, this indicates an equal share of trade in the group as in total trade, so no specialisation in that commodity group. Values greater than one indicate trade specialisation in the commodity group.

Table 2
Measures of Export Structure (1999 data)

	China	Taiwan	Japan	S. Korea	Singapore	Malaysia	Thailand	Indonesia	Philippines	Pakistan	India
Share of world export (%)											
All food items	2.7	0.3	0.5	0.6	0.7	1.5	2.3	1.3	0.3	0.2	1.2
Agricultural raw materials	2.2	1.1	1.8	1.2	0.5	2.2	1.5	1.6	0.1	0.1	0.4
Fuels	1.1	0.2	0.3	1.4	2.3	1.4	0.2	2.8	0.0	0.0	0.0
Ores and metals	2.3	0.8	3.0	1.1	0.8	0.5	0.3	1.3	0.3	0.0	0.5
Manufactured goods	4.0	2.6	9.3	3.0	2.3	1.6	1.0	0.6	0.3	0.1	0.6
Chemical products	1.9	1.2	5.6	2.0	1.6	0.5	0.5	0.4	0.0	0.0	0.6
Other manufactured goods	7.3	2.8	5.4	2.8	0.9	0.8	1.1	1.3	0.2	0.4	1.6
Machinery and transport equipment	2.5	2.9	12.0	3.4	3.3	2.3	1.0	0.2	0.4	0.0	0.1
Share of own economy's total export (%)											
All food items	6.0	1.3	0.5	1.9	2.8	7.9	17.0	11.7	4.5	13.0	14.4
Agricultural raw materials	1.2	1.0	0.4	0.9	0.5	2.9	3.0	3.7	0.5	1.4	1.4
Fuels	2.3	0.8	0.3	4.0	7.9	6.8	1.8	23.0	0.6	0.9	0.2
Ores and metals	1.9	1.2	1.2	1.3	1.2	1.1	1.0	4.6	1.4	0.2	2.5
Manufactured goods	88.2	95.2	94.0	89.5	85.9	80.2	73.8	53.8	41.2	84.1	79.1
Chemical products	5.2	5.5	7.1	7.3	7.7	3.1	5.0	4.8	0.8	0.8	9.9
Other manufactured goods	52.9	33.9	18.5	27.9	11.8	14.8	26.9	38.1	8.7	82.8	62.2
Machinery and transport equipment	30.1	55.7	68.4	54.2	66.2	62.3	41.9	10.8	31.6	0.5	6.9
Revealed comparative advantage*											
All food items	0.7	0.1	0.0	0.2	0.3	1.0	2.1	1.5	0.5	1.6	1.8
Agricultural raw materials	0.6	0.5	0.2	0.4	0.2	1.4	1.5	1.8	0.2	0.7	0.7
Fuels	0.3	0.1	0.0	0.5	1.1	0.9	0.2	3.2	0.0	0.1	0.0
Ores and metals	0.6	0.4	0.4	0.4	0.4	0.3	0.3	1.5	0.4	0.0	0.8
Manufactured goods	1.1	1.2	1.2	1.1	1.1	1.0	0.9	0.7	0.5	1.1	1.0
Chemical products	0.5	0.5	0.7	0.7	0.8	0.3	0.5	0.5	0.0	0.0	1.0
Other manufactured goods	2.0	1.3	0.7	1.1	0.4	0.5	1.0	1.5	0.3	3.2	2.4
Machinery and transport equipment	0.7	1.3	1.6	1.3	1.6	1.5	1.0	0.2	0.7	0.0	0.1

* This measure refers to the ratio of own export shares to world export shares, which is used to proxy the bias in export pattern using world export pattern as a benchmark. A figure larger than 1 implies specialisation in that particular commodity group.

Source: UNCTAD data, HKMA calculation

such as tin. Furthermore, there appear to be greater differences than similarities in their patterns of comparative advantage. The breakdown illustrates the specialisation among NIE-3 in areas such as heavy industrial products and capital goods, and ASEAN-4 in those such as agricultural commodities and raw materials.

These observations form the basis for an evaluation of the impact of China's accession to the WTO on production structures. Specifically, they reveal China's dominant position in several consumer product categories. More importantly, this analysis points to significant differences between the trade patterns of other Asian economies and that of China. While China's accession to the WTO may further unleash China's untapped labour resources and heighten competitive pressure in consumer product exports, the limited exposure of most Asian countries in these industries could

mitigate the adverse shock. In fact, India and Pakistan are the countries that seem most exposed to the immediate trade impact, since they are even more dependent on light manufacturing than China as a source of export income.

(c) Empirical evidence of displacement

Our analysis thus does not lend credence to the fears of destabilising "displacement" in Asia's economies due to China's entry into the WTO, as the existing export structure in Asia already exhibits considerable differentiation that would mitigate the short-term increase in China's export competitiveness due to a relaxation of trade barriers.

Indeed, this should not be surprising, for a review of China's economic history indicates that

such competitive pressure probably started when it began the open door policy. Thus, Asian economies have probably already adjusted to the Mainland's export competitiveness. This can be seen by changes in the trade patterns of the Asian economies concerned in Table 3. Over the last decade, NIE-3 and ASEAN-4 (except Indonesia) saw a relative decline in light manufactured goods exports, the area in which China was taking an increasingly dominant share. However, the increase in capital goods exports made up for the shortfall, and as a result most of these economies continued to maintain some degree of specialisation in manufactured goods exports. Moreover, although China's RCA figure in machinery and transport equipment remained below unity in 1999, it increased quite significantly from 1990. This suggests that this capital- and technology-intensive

Table 3
Shift in Revealed Comparative Advantage in the 1990s

	China		Taiwan		Japan		S. Korea		Singapore	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
All food items	1.3	0.7	0.4	0.1	0.1	0.0	0.3	0.2	0.6	0.3
Agricultural raw materials	1.2	0.6	0.5	0.5	0.2	0.2	0.4	0.4	0.9	0.2
Fuels	1.0	0.3	0.1	0.1	0.1	0.0	0.1	0.5	2.2	1.1
Ores and metals	0.6	0.6	0.3	0.4	0.3	0.4	0.2	0.4	0.4	0.4
Manufactured goods	1.0	1.1	1.3	1.2	1.3	1.2	1.3	1.1	1.0	1.1
Chemical products	0.7	0.5	0.4	0.5	0.6	0.7	0.4	0.7	0.7	0.8
Other manufactured goods	1.8	2.0	1.8	1.3	0.7	0.7	1.9	1.1	0.5	0.4
Machinery and transport equipment	0.5	0.7	1.0	1.3	1.9	1.6	1.0	1.3	1.3	1.6

	Malaysia		Thailand		Indonesia		Philippines*		Pakistan		India	
	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999	1990	1999
All food items	1.2	1.0	3.0	2.1	1.2	1.5	2.0	0.5	1.0	1.6	1.6	1.8
Agricultural raw materials	4.8	1.4	1.8	1.5	1.8	1.8	0.7	0.2	3.6	0.7	1.4	0.7
Fuels	2.2	0.9	0.1	0.2	5.2	3.2	0.3	0.0	0.2	0.1	0.4	0.0
Ores and metals	0.6	0.3	0.3	0.3	1.3	1.5	2.4	0.4	0.1	0.0	1.7	0.8
Manufactured goods	0.7	1.0	0.9	0.9	0.5	0.7	0.5	0.5	1.1	1.1	1.0	1.0
Chemical products	0.2	0.3	0.2	0.5	0.3	0.5	0.4	0.0	0.0	0.0	0.8	1.0
Other manufactured goods	0.6	0.5	1.5	1.0	1.2	1.5	0.8	0.3	2.9	3.2	2.0	2.4
Machinery and transport equipment	1.0	1.5	0.6	1.0	0.0	0.2	0.3	0.7	0.0	0.0	0.2	0.1

* Data for the Philippines may provide an inaccurate picture of the country's comparative advantage, since a significant share of its total exports are unclassified items in the raw data, while national data, which is based on a different classification standard, suggest that the majority of the country's exports are manufacturing goods.

Source: UNCTAD data, HKMA calculation

sector is gaining importance in China, and the other Asian economies that specialise in this sector may need to adjust their export structure further towards the high value-added sub-sectors.

While the above analysis provides evidence of the adjustments that Asian economies have made in response to China's entry into the world market, it does not address directly the question of whether such adjustments have benefited or hurt Asian economies. Despite the assertions of classical trade theory that free trade benefits all participants, in reality it is conceivable that countries could incur significant adjustment costs and output losses when they confront an adverse trade shock.

To address this question, an econometric estimation is performed of how China has affected the export growth of Asia's economies (see Appendix). The results suggest that, on an aggregate basis, China's exports did not have a negative impact on NIE-3, ASEAN-4 and Japan after adjusting for external demand growth and relative price changes. Furthermore, for ASEAN-4, these results lend support to a complementary, instead of competitive, view of regional trade relationships. Similarly, on an aggregate level, Chinese exports did not crowd out Japan's exports. Nonetheless, when the estimation is performed for particular industries, there are signs of significant trade competition in individual sectors.[4] This analysis testifies to the microeconomic realignments that have taken place among Asian economies as they accommodate China's rising export capacity.[5]

Following the Asian financial crisis, there have been further efforts by Asian exporters to adopt a more comprehensive approach to the global market and place more emphasis on non-price dimensions. Korean automobiles and electronics, for example, have gained world market share as a result of successful branding and marketing efforts.[6] According to a recent IMF Article 4 report, Singapore has made a significant shift to high valued-added manufacturing sectors such as electronics and biomedicine. Thailand also saw a strong rise in its tech-sector exports in 2000. This reflects efforts by Asian countries to break away from the traditional commodity-style export structure and to move up the value ladder.

(d) China as a market to Asia's exporters

Accession to the WTO could represent the opening of the Chinese market that has so far denied world exporters the opportunity to exploit their full potential. Most researches expect expanding income and lower trade barriers to underpin a robust growth in China's general import demand. However, as Table 4 shows, China's imports from the Asia region are strongly biased towards North Asia, particularly Japan, and to a lesser degree Taiwan and Korea, while the Chinese market appears to be relatively unimportant to the Southeast Asian countries.

Table 4			
China's Imports from Selected Economies			
	As a percentage of Total China Imports		**As a percentage of the Country's Total Exports**
	1993	**2000**	**2000**
Japan	22.4	18.4	6.3
United States	10.2	9.9	2.1
Germany	5.8	4.6	1.6
Taiwan	12.4	11.3	2.8
Korea	5.2	10.3	10.7
Singapore	2.5	2.2	3.9
Malaysia	1.0	2.4	3.1
Thailand	0.6	1.9	4.1
Indonesia	1.4	2.0	3.6
Philippines	0.2	0.7	1.7

Source: CEIC

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4   Japan is not included in this sectoral analysis since the industries covered account for a relatively insignificant share of its exports.

5   The above results concur with a number of studies, including Fernald, Edison and Loungani (1999), Loungani (2000), and Diwan and Hoekman (1999), that dispute the alleged "trade competition" between China and other Asian economies.

6   According to US Department of Commerce (2002), sales of Korean branded cars and non-commercial vehicles in the US accounted for around 1% of the US market from 1996 to 1998 but has since risen to 3.6% in 2001.

Table 5
How Nominal Tariffs Understate True Import Barriers

Product Category	Nominal Tariff		Avg Actual Tariff		NTB Tariff Equivalent		% share of imports covered by NTB in 1996
	2001	2006	2001	2006	2001	2006	
Rice	70.4	62.1	0	0	37.5	18.8	100
Wheat	2	2	1.6	1.6	73.9	48	100
Cotton	3	3	0.9	0.9	13.3	3.6	72.9 under non-grain crops
Other agricultural product	14	11.6	8.9	7.4	38.7	19.5	
Oil and gas	0	0	0	0	7.5	1.5	59.5 under natural resources
Wood and paper	8.1	4	3.3	1.6	5.3	1.1	
Petrochemicals and coal	6.9	6.7	5.0	4.9	2.6	0.5	
Chemical / rubber	14	10.4	4.7	3.5	11.4	2.3	
Motor vehicles & parts	24.1	13.7	18.1	10.3	21	4.2	42.4 under transport equipment
Other transport equipment	3.7	3.5	3.2	3.0	10.0	2.0	
Electrical products & equipment	6	2.7	1.7	0.8	6.3	1.3	26.8 under machinery & equipment
All imports	11.1	6.9	3.5	2.2	8.3	2.4	32.5

Source: Ma(2001), Martin(2000)

An analysis of China's trade regime helps explain these patterns, and how its accession to the WTO could help bring about a boost to intra-regional trade, especially between China and Southeast Asia. China currently imposes highly restrictive import barriers on agricultural products and several machinery categories that appear prominently in the export pattern of Asian economies, especially ASEAN economies. Although import tariff rates on agricultural commodities, motor parts and capital goods are low, research has revealed that the most binding import barriers in these products are mostly non-tariff in nature.

One common way to express the degree of non-tariff trade barriers (NTBs) is the so-called tariff equivalent.[7] Ma (2001), in his CGE model, computes the NTB tariff equivalent rates in selected sectors, which are listed in Table 5. As seen, for agricultural commodities and motor parts they reveal high NTBs that are far above the formal tariff rates. From this perspective, the introduction of the WTO's non-discrimination principles and related apparatus can also be a potential stimulant for Asian exports. Furthermore, the WTO could also affect trade within the region through its role as an impartial trade facilitator.

A 1999 study by APEC using a CGE model estimated that the trade liberalisation and facilitation measures taken to date among APEC countries had expanded the region's annual income by US$75 billion, or 0.4% of the region's GDP. However, of the total, US$46 billion was attributed to trade facilitation alone, suggesting significant economic benefit from multinational trade organisations. Considering the extent to which Asian exporters could have been discouraged or denied access to China by a less transparent trade regime, the potential efficiency gain from the trade facilitation aspect of the WTO could be even more significant and lasting than one-time reductions of tariffs and quotas. This holds promise for Asian economies that the WTO will serve as an effective platform for them to secure better trade terms for their exports to China.

III. The FDI Impact

The above discussion has focused on trade as the primary channel through which China's accession to the WTO would affect Asian

7 Tariff equivalent is an estimate of the tariff rate that is needed to achieve the same economic impact as the specific NTB.

economies. However, Asia is also likely to be affected through the channel of foreign investment. Specifically, since China has committed to further liberalising its existing rules and regulations regarding foreign ownership and the business rights of foreign entities, China is likely to attract more foreign direct investment (FDI) at the expense of Asian economies. In this section, the FDI impact of China's accession to the WTO on Asia is assessed.

(a) Determinants of FDI

While undertaking FDI is a firm-based decision, it is affected by macroeconomic factors. Shatz and Venables (2000) review the determinants of FDI, and show that local market size and production costs are two major driving factors. Investment induced primarily by the market size factor usually takes place among the more affluent industrial nations and accounts for a substantial share of global FDI flows. This kind of FDI is often described as "horizontal", and is designed to serve the host country's local market, and usually substitutes for trade and reduces costs of serving a foreign market by setting up production facilities there. "Vertical" FDI, induced mainly by the production cost factor, is usually made in the less developed economies by multinational firms. It involves dividing the production process into various stages and relocating part of the process in low-cost countries. This form of foreign establishment in Asia often serves as a production base of intermediate goods, which will be shipped to other locations for further processing before becoming final products that will be sold to markets in the other regions.

In addition to market size and production costs, empirical studies suggest that the political and economic environment, openness of the host country, the distance between home and host countries, and the existing stock of FDI in the host country, may also affect FDI decisions. These drivers of FDI may interact with each other so that it may be difficult to determine whether a particular foreign establishment represents horizontal FDI or vertical.

(b) Patterns of FDI in Asia

In emerging Asian economies, FDI is primarily vertical. Such a view is supported by several observations. First, horizontal FDI usually occurs in high-income countries. While incomes in a few of the Asian economies have already reached levels comparable to the key industrial nations, most others, including China, are still at their early stages of economic development (Table 6).

Secondly, while a substantial part of horizontal FDI occurs in the service sector, vertical FDI tends to occur in the manufacturing sector, the area in which most Asia's FDI concentrates (Table 7).

Table 6
Per Capita GDP: Asian Economies and Key Industrial Nations

Asian economies	US$	Industrial economies	US$
Hong Kong	24,066	US	36,155
Singapore	23,500	Japan	37,609
Taiwan	13,925	UK	23,800
S. Korea	9,670	Germany	22,800
Malaysia	3,780	Canada	22,700
Thailand	1,910	France	21,700
The Philippines	959	Italy	18,600
China	860		
Indonesia	742		

Source: The Economist (2000 data)

Table 7
Sectoral Breakdown of US and Japan's FDI in Asia (as percentage of total)

	US (net basis)			Japan (gross basis)		
	Manufacturing	Services*	Others	Manufacturing	Services**	Others
China	61.9	18.1	20.0	75.0	19.9	5.2
Hong Kong	14.3	61.9	23.8	20.7	71.1	8.1
Taiwan	60.9	32.9	6.2	68.7	23.1	8.2
Singapore	43.1	51.0	5.9	42.7	54.7	2.6
S. Korea	51.9	21.0	27.1	60.0	31.2	8.8
Thailand	41.8	47.3	10.9	69.3	20.8	9.9
Indonesia	57.6	38.9	3.5	54.1	21.4	24.5
The Philippines	n.a.	n.a.	n.a.	68.4	27.6	4.0
Malaysia	49.2	16.7	34.1	74.6	20.8	4.6

* Include wholesale trade, finance, insurance, real estate and other services.

** Include trade, finance, insurance, real estate, transportation, and other services.

Source: US Bureau of Economic Analysis, and Japan's Ministry of Finance (1994-2000 data)

Thirdly, vertical FDI generates more trade flows between the host countries and the source countries. The most outstanding example is US investment in Mexico, where US affiliates sell as much as 40% of their production back to the US. As for Asia, the corresponding figure is 15%, substantially higher than the 8% of advanced economies (Table 8). Finally, there is strong industry-level evidence for the view that Asia's FDI is mainly vertical. For instance, it is well known that the electronics industry in Asia has become an important part of the global supply chain of technology products, composed of a large number of foreign-owned electronics producers in the region, mainly serving the key industrial markets rather than local markets of the host countries.

Although Asia's FDI appears to be chiefly vertical, the market size may also play a role. This is particularly true for investment in the service sector.[8] Moreover, some researchers have found that the pace of economic growth, in addition to the GDP level (as a proxy of market size), of host countries is also a significant determinant of FDI in emerging Asian economies (Chen, 1997). This

Table 8
Production by US Foreign Affiliates Sold in the US

	Percentage of production by US affiliates sold in the US		Percentage of production by US affiliates sold in the US
All countries	10.1	Developing	18.0
Advanced	7.8	of which:	
of which:		Asia	15.3
EU-15	4.2	of which:	
of which:		Singapore	21.8
UK	6.0	China and Hong Kong	11.8
Canada	28.0	Latin America	20.5
		of which:	
		Mexico	39.9

Source: Shatz and Venables (2000)

8   One exception is FDI in the regional financial sectors of Singapore and Hong Kong.

suggests that FDI is influenced by the size of a host country's market as well. However, it could also be argued that factors such as infrastructure and other operating conditions would usually improve along with rapid economic development, helping to reduce the costs of doing business and thus attract more foreign investment.

*(c) Impact of China's accession to the WTO on the region's FDI outlook*

Whether China will absorb an increasing share of FDI at the expense of other Asian economies depends on how the determinants of FDI will be altered by China's accession to the WTO. Walmsley, Hertel and Ianchovichina (2001) use the dynamic GTAP model to analyse the impact of China's and Taiwan's accession to the WTO. Their results suggest that China's accession to the WTO will progressively raise China's rate of return between 2003 and 2007, with the effect gradually dissipating afterward. Their model also indicates that China's stock of foreign investment is expected to rise by 23% by 2020 due to the WTO effect (Chart 1). They also find that Southeast Asia and South Asia are the two most affected regions in that they are likely to receive less foreign investment from the rest of the world.

Moreover, China's accession to the WTO may reduce the perceived risk of investing in this country. For instance, foreign producers that have utilised their Asian operations as a low-cost production base to serve the US market may see a lower risk of investing in China, since it has been granted the permanent Normal Trade Relations (NTR) status by the US, eliminating the uncertainty caused by the need of annually seeking renewal of the NTR status. Such reduction in the perceived risk could also help China to absorb a bigger share of FDI, possibly at the expense of the other economies.

Although foreign investors may expect a higher rate of return when investing in China because of the accession to the WTO, the higher expected rate is unlikely to be attributable to changes in cost structure, which is a crucial determinant of vertical FDI. In fact, most liberalisation measures contained in the accession package are related to market opening, and appear to have limited imminent effect on China's comparative advantage. Furthermore, China has already been open to vertical FDI since early 1990s, with few restrictions imposed on foreign ownership in export-oriented manufacturing industries. Thus, China's cost advantage has been exploited by foreign investors for a considerable

Chart 1

Accumulated Effects of China's Accession to the WTO on Foreign Investment by 2020

accumulated percentage difference from the base case scenario
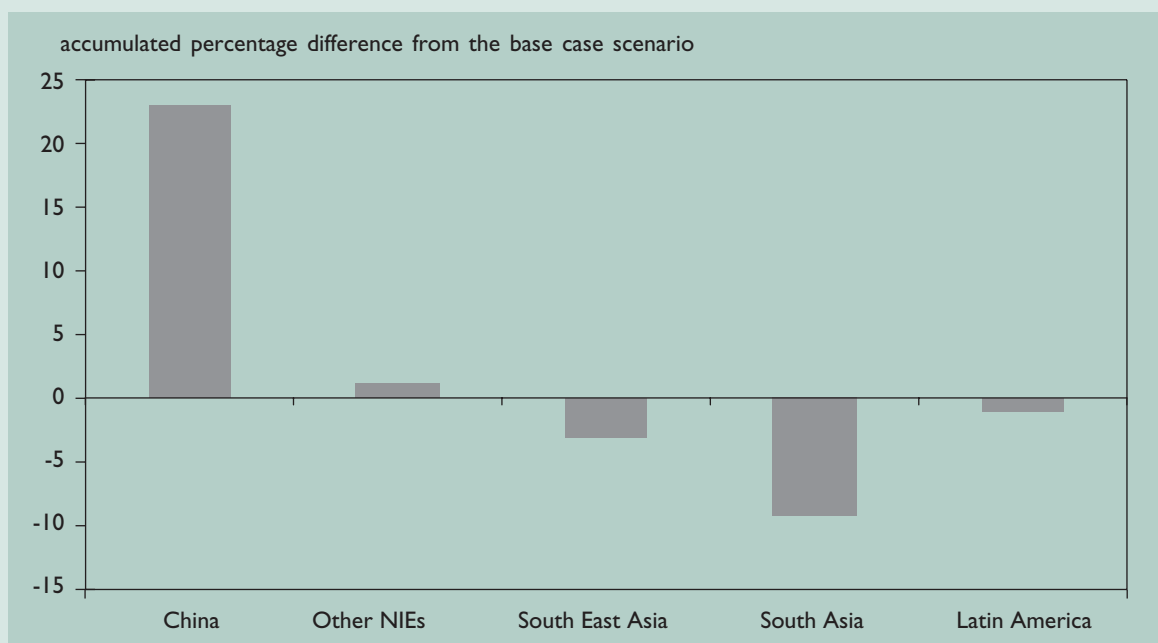
Source: Extracted from Walmsley, Hertel and Ianchovichina (2001)

period, suggesting that accession to the WTO may have limited additional impact in this regard.

Rather, the higher expected rate of return is attributable to a more open market. Although becoming a member of the WTO will not instantaneously increase the size of goods and services markets in China, the measures contained in China's "WTO accession package" will increase the accessibility of these markets via reducing tariffs, liberalising trading and distribution rights for foreign entities, and opening up various service industries (Table 9). This will attract more horizontal FDI in these service industries.

Table 9
Liberalisation of Restrictions on Foreign Ownership and Business Rights

Area of liberalisation	Percentage of foreign ownership allowed	Phase-in time	Business rights	Phase-in time	Geographic restrictions phase-out time
Trading and Distribution			• Rights to import and export, wholesaling, retailing, maintenance and repair, and transportation • Covers agricultural and industrial products	3 years	3 years
Telecommunications • Paging • Mobile voice and data • Domestic and International services	50% 49% 49%	2 years 5 years 6 years			2 years 5 years 6 years
Insurance • Life • Non-life • Reinsurance	50% 51% 100%	Immediately Immediately Immediately	• Scope of activities allowed expanded to include group, health and pension	3 years	3 years *Non-life - internal branching permitted immediately
Banking			• Full market access • Able to conduct local currency business with Chinese enterprises and individuals • Non-bank financial companies to offer auto-financing	5 years 2 years 5 years Immediately	5 years
Securities	49%	3 years	• Minority-owned joint ventures permitted to engage in fund management on same terms as Chinese firms		
Audio-visual entertainment	49%		• Allowed joint ventures engaged in distribution of video and sound recordings		
Travel and tourism • Hotel	Majority 100%	Immediately 3 years			

Source: "Summary of U.S.-China Bilateral WTO Agreement", The White House, November 19, 1999.

Moreover, an increasingly accessible Chinese market could also motivate foreign companies in Asia to consolidate their manufacturing operations in the region for economy-of-scale reasons, and maintain their presence only in China for serving the domestic market and the rest of the region. Indeed, even before China's accession to the WTO, some major multinational corporations (MNCs) have already been utilising China as a production base to serve both the local market and the region.[9]

IV. Conclusion

This paper casts doubt on forecasts of adverse competitive pressure on Asia, as empirical analysis of recent trade performance of Asian countries indicate that whatever negative impacts China may have exerted on their exports were prevalent only among certain industrial sectors but not on an economy-wide level. This points to an ability of Asian economies to transform their industrial structures to accommodate the rising export capacity of China. Moreover, China's accession to the WTO also represents an opportunity to enlarge the market for their exports due to a more efficient and transparent trade regime.

From an FDI perspective, China's "WTO accession package" contains mainly market-opening measures and should not have any material impact on the region's patterns of comparative advantage and hence vertical FDI. However, a more accessible Chinese market could potentially motivate MNCs to relocate their manufacturing bases to China from the rest of the region for economy-of-scale reasons, for serving both the Chinese domestic market as well as the rest of Asia.

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9 For example, Motorola has built a substantial presence in Tianjin since 1992. Apart from serving the domestic market, the company also uses China as an export base to serve the Asian region. In 2000, the company reportedly ranked fifth in exports among all enterprises in China.

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ESTIMATION OF CHINA-AUGMENTED TRADE EQUATIONS

Data

Real export data (except Taiwan) came from the export volume estimates by the Economist Intelligence Unit. Real export growth for Taiwan was calculated using CEIC data. World real GDP data were obtained from various issues of IMF World Economic Outlook. Real effective exchange rate indices were obtained from JP Morgan and IMF International Financial Statistics. The estimation period is 1987-2001.

For estimation of by-industry export equations, US import data are obtained from the World Trade Atlas published by the US Census Bureau, which contains trade data on a by-country, by-product basis. The five double-digit, Harmonised-System-based commodity groups - knit apparel (61), woven apparel (62), footwear (64), electrical machinery (85) and toys & sports equipment (95) - were chosen as they represent China's top five exporting sectors, which altogether accounted for roughly half of China's exports to the US in the late 1990s. Relevant US import price sub-indices were used as deflators. Bilateral REERs between Asian countries and US were constructed using nominal exchange rates adjusted for the difference in CPIs, with the raw data coming from CEIC.

Estimation

This analysis is based on a standard export equation, which expresses export growth of a country as a function of world demand and a measure of relative prices, in this case, the real effective exchange rate (REER).

NIE-3 - Korea, Singapore and Taiwan - and ASEAN-4 - Malaysia, Thailand, Indonesia and the Philippines - are pooled separately for panel data regressions. Japan is analysed independently. The following specification is first estimated using general least squares for NIE-3, ASEAN-4 and Japan respectively.

$$(1) \quad X_{i,t} = \alpha_i + \beta_1 M_t + \beta_2 REER_{i,t} + u_t$$

where $X_{i,t}$ is real growth of total exports from country i, M_t world real GDP growth, $REER_{i,t}$ percentage change in the real effective exchange rate of country i (a rise in $REER$ means a real appreciation of the currency), and α_i country-specific fixed effects.

A general-to-specific approach is employed to test alternative hypothesis by adding lagged values of both dependent and independent variables and a "post-Asian financial crisis" dummy variable where they result in a better fit of the regression.

$$(2) \quad X_{i,t} = \alpha_i + \lambda X_{i,t-1} + \beta_1(L)M_t + \beta_2(L)REER_{i,t} + \beta_3 D\_ac + u_t$$

where D_ac is the "post-Asian financial crisis" dummy.

Equation (2) is then re-estimated by adding real growth of China's total exports, $X_{china,t}$, as an additional explanatory variable:

$$(3) \quad X_{i,t} = \alpha_i + \lambda X_{i,t-1} + \beta_1(L)M_t + \beta_2(L)REER_{i,t} + \beta_3 D\_ac + \beta_4 X_{china,t} + u_t$$

A similar exercise is then performed on a by-industry basis on five product categories - knit apparel, woven apparel, footwear, electrical machinery and toys & sports equipment - where China's dominance in the world export market is most prominent.[10] As the Asian countries concerned do not classify their exports along strictly comparable lines, the import data of the US are used to proxy the export growth of these products for each countries. Accordingly, bilateral real exchange rates, constructed by using nominal exchange rates adjusted for the difference in CPIs, are used in replacement of REERs. Similarly, US imports from China in each of these product categories are used as an additional independent variable to test for competitive pressure within these industries.

The corresponding equations estimated then become[11]:

$$(4) \quad M_{i,c,t} = \alpha_{i,c,t} + \beta_1 M_{c,t} + \beta_2 BRER_{i,t} + u_t$$

$$(5) \quad M_{i,c,t} = \alpha_{i,c,t} + \beta_1 M_{c,t} + \beta_2 BRER_{i,t} + \beta_4 M_{china,c,t} + u_t$$

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10 The total of these five commodity groups accounted for roughly half of China's exports to the US in the late 1990s.

11 Due to the short history of real export data in each product category, the estimation period was limited to 1995-2001, which constrains the effort to include lagged variables and dummy variables in the regressions.

where $M_{i,c,t}$ denotes real growth of US imports of commodity c from economy i, $BRER_{i,t}$ the bilateral real exchange rate of currency i against the US dollar.

A statistically significant and negative estimate for the parameter β_4 in Equations (3) and (5) would be consistent with the presence of competitive pressure from China.

Table A
Result of Trade Equation Estimation
(Aggregate Level, 1987-2001, annual data; Industrial Level, 1995-2001, annual data)

On an aggregate basis	Japan			NIE-3 (Korea, Singapore, Taiwan)			ASEAN-4 (Indonesia, Malaysia, Philippines and Thailand)		
Total Exports	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
World GDP Growth	2.15*	2.89**	2.81**	3.39**	4.26**	3.85**	2.67**	3.31**	1.85*
REER	-0.09	-0.05	-0.07	-0.28*	-0.28*	-0.27*	-0.29*	-0.31**	-0.30**
World GDP Growth(-1)					-3.76**	-3.32**		-2.74**	
REER(-1)		-0.14**	-0.17**					0.22**	0.13**
Asian Financial Crisis dummy								-8.78**	-10.39**
China Export Growth			0.24**			0.12			0.43**
Adj. R-sqr	0.27	0.40	0.80	0.18	0.28	0.27	0.16	0.53	0.58

On a by-industry basis	NIE-3 (Korea, Singapore, Taiwan)		ASEAN-4 (Indonesia, Malaysia, Philippines and Thailand)	
HS 61 (Knit Products)	(4)	(5)	(4)	(5)
US Import Growth	0.85**	0.88**	0.16**	0.19**
Bilateral REER w/ US	0.08**	0.10**	-0.41**	-0.39**
China Export Growth		-0.09**		-0.18**
HS 62 (Woven Products)				
US Import Growth	1.36**	2.07**	0.83**	1.15**
Bilateral REER w/ US	-0.26**	0.20**	0.11**	0.16**
China Export Growth		-0.92**		-0.31*
HS 64 (Footwear)				
US Import Growth	-0.68**	-0.36**	1.06**	-0.72*
Bilateral REER w/ US	0.21**	0.17**	0.35**	0.45**
China Export Growth		-0.36**		1.99**
HS 85 (Elect Appliances)				
US Import Growth	1.27**	1.16**	1.13**	1.79**
Bilateral REER w/ US	0.32**	0.38**	0.39**	0.07*
China Export Growth		0.15		-0.98**
HS 95 (Toys & Sports)				
US Import Growth	-0.62**	-1.99**	-0.55**	-0.79**
Bilateral REER w/ US	0.32**	0.27**	0.00	-0.01**
China Export Growth		0.85**		-0.07**

Notes:
a. Fixed effects are included in all regressions but not reported here.
b. (1)-(5) represent the results from regression specifications (1) to (5).
c. * significant at the 10% level, ** significant at the 5% level.

Source: HKMA staff estimates.

The results are summarised in Table A, which suggest that, on an aggregate basis, China's exporting did not have a negative impact on NIE-3, ASEAN-4 and Japan after adjusting for external demand growth and relative price changes. Furthermore, for ASEAN-4, the coefficient of 0.43 is significant at the 5% level, which lends empirical support to a complementary, instead of competitive, view of regional trade relationships. Similarly, the coefficient of 0.24 for Japan is also positive and significant, suggesting that on an aggregate level, Chinese exports did not create any crowding-out effects on Japan's exports as well.

Nonetheless, when the estimation is performed on particular industries, there are some signs of significant trade competition in sectors like apparel.[12] It should be emphasised that these results are only preliminary and should be interpreted with caution. In particular, not all coefficients of US import growth and bilateral real exchange rate show expected signs. This could be due to distortions resulting from the 1997-98 crisis. ✿

12 Due to the relatively short sampling period, our results may be subject to certain limitations. For instance, insignificant results may possibly be due to too few data points.