



# CHINA'S INDUSTRIAL RISE

East Asia's Challenge



**Australian Government**

**Department of Foreign Affairs and Trade**  
Economic Analytical Unit



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National Library of Australia Cataloguing-in Publication date:

China's Industrial Rise: East Asia's Challenge.

Bibliography.

ISBN 0-9750627-4-3

Typesetting by Lyn Lalor. Production by Adcorp Green #17470.

**ACKNOWLEDGEMENTS**

David Lowe, Deputy Director, Economic Analytical Unit, directed this report. Dr Frances Perkins, Executive Director and, in the early stages, Brendan Berne, then Director, Economic Analytical Unit provided overall editorial direction and input. Vanda Dei-Tos provided administrative support, while Joanne Frederiksen and Joanne Loundes provided useful input in the final stages.

Within the Department of Foreign Affairs and Trade in Canberra we thank Dr Geoff Raby, Deputy Secretary; David McGrath, Assistant Secretary, Alison Airey, Director and Michael Growder, Executive Officer, North Asia Division; Graeme Lade, Director and Paul Gibbons, Executive Officer, South and South East Asia Division; and Ron Wickes, Director and Sue Begley, Manager – Client Services, Trade Development Division. Within the Australian Embassy in Tokyo we thank James Wiblin, First Secretary.

In Australia, within the Office of National Assessments we thank Mike Waslin, Assistant Director-General, International Economy Branch. At the Australian National University, we thank Dr Ligang Song, Fellow, Australia–Japan Research Centre. We also thank Rowan Callick of the Australian Financial Review.

In Hong Kong, we thank Simon Ogus, DSGAsia.

In Indonesia, we thank Dr Hadi Soesastro, Centre for Strategic and International Studies, Jakarta.



**ECONOMIC ANALYTICAL UNIT**

Initially called the East Asia Analytical Unit, the Economic Analytical Unit was established in 1990 as the main agency within the Australian Government responsible for publishing analyses of major economic and political issues in Asia and other emerging markets. In 1999, the Unit's research scope was expanded to include important emerging market issues outside East Asia, so in November 2001, it was renamed the Economic Analytical Unit. Part of the Department of Foreign Affairs and Trade, to date the EAU has released 30 reports on major issues related to Australia's trade and investment policy interests.

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**EXECUTIVE SUMMARY**

Is China developing so fast that it threatens to dominate completely regional manufacturing, even high technology manufacturing, undermining developing and developed East Asian economies' economic prospects? This report seeks to answer this question by examining the major restructuring underway in regional economies' trade flows China appears to be causing, drawing implications for regional economic prospects and Australian business. This report finds China's industrial rise is a positive sum game for the region and Australia; overall, all economies appear to be gaining. However, some economies like Australia are gaining more than others that are constrained by rigid policies and weak markets. This is because the comparative advantage of China, Australia and other regional economies is dynamic. Firms, markets and economic policies must be flexible and open to remain winners in this rapidly evolving environment.

China's strong growth and large economy is causing rapid changes in production patterns and trade flows within East Asia and between the region and third markets. These changes not only are affecting regional economies but also could significantly influence Australian exporters, most of whom supply industrial inputs to China and other East Asian economies.

This report firstly examines recent production and export growth patterns, assessing concerns China's expanding exports of assembled high technology products could damage middle and high income East Asian economies by making redundant many advanced industrial plants. It also examines concerns China's rapidly expanding production of more traditional labour intensive manufactures is damaging economic prospects in developing South East Asian economies.

China already is, or is fast becoming, the region's largest exporter of many products, from fully assembled high technology products to traditional labour intensive manufactures. At first glance, human capital and technology abundant economies such as Taiwan, the Republic of Korea and Singapore seem to confront rising Chinese competition in markets for some of their high technology exports. Labour abundant economies in South East Asia also appear to face increased competition in world export markets for clothing, footwear, toys, consumer electrical goods and other labour intensive products.

However, detailed analyses of regional trade flows over the past decade this report undertakes shows China's continuing industrial expansion is not damaging but benefiting other regional economies. China is more closely integrating into mutually beneficial regional production chains, stimulating regional trade growth. In more advanced regional economies, exports of advanced components and capital equipment to China and elsewhere are more than compensating for losses in labour intensive manufacturing sectors. In developing regional economies, China's industrial expansion certainly is challenging competing regional industries, encouraging them to specialise and adjust but, overall, competing sectors are still expanding strongly. Furthermore, China's expanding imports, including of advanced components, capital equipment and raw materials, are generating lucrative new markets

for East Asian and Australian exporters. Nevertheless, the study highlights the fact that policy settings need to promote flexibility and resource mobility within regional economies to maximise benefits from China's expansion.

As a major raw material supplier and a smaller but still significant exporter of advanced manufactures and services to China, Australia already is benefiting significantly from China's rapid growth. Furthermore, as other East Asian economies appear to be adjusting successfully to the rise of China's industry, Australia also should retain and expand its traditional markets in these economies. This detailed understanding of how East Asian economies are adjusting to the rise of Chinese industry aims to assist Australian businesses anticipate and benefit from these major emerging market trends.

### **Regional Hollowing Out Concerns Unfounded**

This report's analysis indicates concerns of widespread hollowing out are unwarranted. It shows China's core competitiveness still lies largely in labour intensive production. To produce more technologically advanced products, it mainly assembles imported components from developed East Asian economies. Most developed East Asian economies continue to expand their exports of more technologically advanced products. They also are responding to China's efficiency in labour intensive manufacturing by contracting exports in these industries and expanding exports from more capital and human capital intensive industries where they retain relative strength. By developing new markets and maintaining old ones most developing East Asian economies are achieving strong export growth even in sectors where they compete with China.

While China's more high technology exports appear to be expanding into sectors other East Asian economies supply, closer examination indicates a key driver in this apparent trade convergence is the internationalisation of production chains. Export similarity analysis using gross export data appears to show China's export profile gradually is becoming more similar to the export profiles of many developed East Asian economies in recent years. However, export similarity analysis undertaken using net (export minus import) data shows China's overall export specialisation is not becoming more similar to those of most other East Asian economies. This is because rather than taking over the whole production process for computers, televisions and other electronic products, China is becoming more embedded in regional production chains producing these products. These chains typically take advantage of the strengths of different regional economies to produce the range of required components and assemble completed products. They often involve industrialised Japan, the ROK and Taiwan producing sophisticated components and shipping them to low cost China and South East Asia for assembly into final consumer goods. Once trade flows associated with these integrated production chains are factored in to analyses of regional net trade flows, no overall trend emerges of Chinese exports encroaching on its neighbours' export markets.

In addition, China is becoming an increasingly important market for other East Asian economies and Australia through their increasing trade complementarity. China's expanding industries are providing all East Asian economies with rapidly expanding markets for raw material, component and capital

equipment exports. Australia's exports to China are growing rapidly, particularly raw materials and energy. Regional economies with more established consumer bases, such as Japan, Hong Kong, Singapore and Australia, also are benefiting from cost competitive Chinese consumer good exports.

### **Chinese Manufacturing Expands**

Sectoral analysis of Chinese trade flows confirms significant restructuring and some movement up the value chain is underway in Chinese manufacturing. China maintains a strong competitive edge in labour intensive products like clothing, footwear and toys and rapidly is becoming a more competitive office machine assembler. Over the last five years China also has reduced its comparative trade weakness in more capital intensive industries like non-office machinery and synthetic textiles while its comparative strength in traditional labour intensive products like clothing and footwear is waning. However, China now relies more on imports for human capital intensive products like integrated circuits and energy imports like crude oil.

### **Strongly Complementary Japan Consolidates Advanced Manufacturing**

Japan faces moderate competition from Chinese exports but is responding by moving out of the labour intensive sectors where China is more competitive. Japan is facing increasing competition from Chinese exports in about a quarter of its net export sectors by value. In two thirds of these sectors, mainly labour intensive industries like assembled computers, Japan's net exports are declining. Japan continues to expand its net exports of the other third of export categories, which includes more advanced products like video and digital cameras, mobile phones and motorcycles. Another quarter of Japanese net exports by value, including integrated circuits and steel, complement Chinese net imports and this complementarity is increasing. Around a quarter of Japanese net imports, such as clothing, are complementary with Chinese net exports. Japan retains a strong specialisation in capital and human capital intensive products including non-office machinery and passenger vehicles, and an equally strong reliance on imports for primary commodities like crude oil and meat and labour intensive goods such as clothing.

### **ROK Expands Exports Regardless of Chinese Competition**

The Republic of Korea, ROK, faces competition from Chinese net exports in about half of its export sectors but continues to expand exports of these products regardless, at a similar rate as China. For example, ROK net exports of mobile phones, digital and video cameras, computers and computer parts continue to expand strongly in the face of China's expansion in similar industries. The mutually advantageous intra-industry component and finished product trade between China and the ROK probably explains part of the ROK's success. Another quarter of the ROK's net exports by value, including plastics in primary forms and steel complement Chinese import demand. Hence, the ROK is integrating its industry effectively with China, with few apparent negative impacts in competing sectors and strong growth in clearly complementary sectors.

### **Taiwan Restructures to Adjust to Strong Competition**

Taiwan also faces strong competition from China, competing with Chinese exports in well over half its net export sectors by value. In a majority of these competing sectors, including clothing and fully assembled computers, Taiwan is reducing its net exports but it continues to expand its net exports of other products, such as computer parts. About a quarter of Taiwan's total net exports by value, including synthetic textiles and electronics components, are complementary with Chinese net import demand. By specialising in its comparative strengths, such as computer parts and products China demands, like textiles and steel, Taiwanese industry has continued to expand its exports strongly.

### **Hong Kong's Entrepot Role Strongly Evident**

As Hong Kong is a major re-exporter of Chinese goods, with local firms adding some value to many of these re-exports as they pass through Hong Kong, even analysing net trade flows between Hong Kong and China appears to show the two economies have very similar net export profiles. However, only 9 per cent of Hong Kong's workforce now is in manufacturing; most of its workforce is in service industries, many of which also service China. Meanwhile, 20 per cent of Hong Kong's net merchandise exports complement Chinese net import needs and around a third of Chinese net exports match Hong Kong's net import requirements. While goods trade data analysis provides only a partial picture, the close integration of the two economies is clear. Hence, China's growth should provide Hong Kong strong long term prospects.

### **Indonesian Resources Complement Chinese Growth**

While China is a competitor in almost half of Indonesia's net export markets, mainly for labour intensive manufactures, overall Indonesia is expanding its net exports strongly in these competing sectors. So long as Indonesia retains flexible labour markets and its financial system can recover sufficiently to finance new investment in sectors competing with China, this competition could promote Indonesian efficiency and product specialisation. With its strength in primary commodity exports, Indonesia also is well placed to benefit from Chinese industry's expanding demand for inputs.

### **Malaysia Boosts Exports despite Chinese Competition**

Malaysia, like Indonesia, relies heavily on resource and labour intensive manufactured exports, but has significantly more overlapping export sectors with China than Indonesia. Almost two thirds' Malaysia's net exports compete with China's, including a wide range of electronics. In the past six years, despite strong Chinese net export growth in these markets, Malaysia significantly increased its exports in the majority of these competing sectors. Hence, Chinese competition does not appear to be damaging Malaysia's manufacturing export sector and could well be strengthening it. Although its complementarity with China currently is lower than that of most other regional economies, Malaysia also is benefiting from China's increased demand for resources and components.

### **The Philippines Benefiting from Complementarity**

The Philippines appears to be adjusting successfully to changing international demand and Chinese competition, increasing its net exports in a majority of sectors where it competes with China. However, China may present a low and declining competitive challenge to the Philippines' net exports in part because the Philippines is not a strong exporter of the labour intensive products economies at a similar level of development usually rely on. Nevertheless, the Philippines is highly complementary with China's net import demand, particularly in electronic components, which should assist its future export growth.

### **Singapore Goes High Tech, Strongly Complementary**

As one of the region's most developed economies, Singapore has a strong technological edge over China; it continues to move rapidly out of more labour intensive sectors where China is strong, focusing on higher technology exports. This ongoing restructuring is increasing Singapore's trade complementarity with China. Like other developed East Asian economies and Australia, Singapore is well placed to take advantage of China's growth by exploiting its complementarities, including by exporting components and capital goods and accessing China's low cost exports to supply its mature consumer market.

### **Thailand Faces Toughest Competition: Continued Reform Important**

Of all East Asian economies, Thailand has the most similar net export profile to China's and faces competition from China in the great majority, 70 per cent, of its net export sectors. Competitive pressure from expanding Chinese exports appears to be pressing many Thai industries to either become more efficient or move into more specialised markets. Thailand's complementarity with China is the lowest in the region but is growing rapidly. Provided the Thai economy can restructure flexibly it should gain from this competition; however, if Thai economic reform programs were to stall, Chinese competition could prove a serious challenge.

### **China's Economy Could Surpass Japan's by 2030**

Over the next few decades, if China's reforms stay on track its economy could expand until it approaches the size of Germany in 2010 and rivals Japan by 2030. As its income per capita expands, China already is moving gradually up the value chain and producing an increasingly wide range of goods. However, it is unlikely to become a competitive net exporter of human capital intensive products like high technology components or capital intensive industrial goods for some decades. China's huge, low cost but on average low skill workforce means its relative strength, and hence its trade specialisation should remain in labour intensive exports for some decades.

## Positive Implications for Australia and the Whole Region

Due to its complementary trade specialisation and role as a major input supplier to Chinese industry, Australia should continue to profit from Chinese economic expansion. In other East Asian economies, China's industrial expansion is stimulating restructuring that should help boost industrial efficiency and growth; this also should promote Australian exports to the region. However, destinations of some Australian exports will continue to shift as developed regional economies move out of labour and resource intensive industries to more human capital intensive industries.

Vastly different Australian and Chinese economic endowments and strengths mean Australia faces relatively little competition from China in export markets and strongly complements China as a trading partner. As a net exporter of many products China demands, particularly minerals, energy and agricultural commodities, Australia is well placed to benefit from its rapid growth. Australia also is a large net importer of goods China supplies to world markets, including a wide variety of more labour intensive consumer goods. This strong trading partnership will continue to generate considerable benefits for Australia and China.

Over time, as China's raw material requirements continue to increase and other economies restructure into more human capital and less raw material intensive goods and services, some Australian exports will shift from other East Asian economies to China. Economic Analytical Unit commissioned modelling results indicate Chinese demand for many major Australian exports, including copper and natural gas, should continue to grow strongly in the next decade. Resource exports to maturing developed economies like Japan are likely to grow more slowly and in some cases may fall. In the case of coal, Australia's largest export to the region, while its exports to East Asia will continue to rise in absolute terms, its share in total East Asian coal consumption could fall if China's coal industry satisfies more Chinese and regional coal demand.

As China continues to grow, its rapid economic development and on-going integration into regional production chains should benefit the rest of East Asia and Australia. To date, East Asian economies appear to have been sufficiently flexible to restructure and maintain competitiveness to meet the challenge of China's industrial rise. However, developing South East Asian economies require ongoing reforms to ensure they maintain market flexibility so they remain competitive with Chinese exports and capture rapidly growing export opportunities in China. Chinese industries' growing appetite for resources, components and capital goods expands total regional demand and provides significant opportunities for regional economies to gain from increased specialisation, ensuring benefits for Australia and its East Asian trading partners. Hence, China's industrial rise is a major boon for the region, providing a strong engine of growth, but the most flexible economies will reap the greatest benefits in the significant industrial restructuring now underway.

## CHINA'S IMPACT ON EAST ASIAN TRADE

### KEY POINTS

- China's emergence as an industrial power is raising concerns over the possible industrial 'hollowing out' in the rest of East Asia.
- China is producing and exporting a rapidly expanding volume and range of manufactured goods, and is an increasingly strong competitor in regional economies' traditional markets.
- China also is growing much faster and attracting more foreign direct investment, FDI, than any other economy in the region with many regional and multi-national companies establishing production plants in China.
- However, China's expansion and its growing role in regional trade is not at the expense of the rest of East Asia. While China's gross export profile gradually is converging with those of some other East Asian economies, the profile of its net exports, exports minus imports, is more stable. This is because China's economy is integrating into international, and particularly East Asian, production chains, heightening regional intra-industry trade flows. Further analysis shows China's specialisation continues to reflect its traditional comparative advantage in labour intensive production.
- Detailed trade flow analysis indicates East Asian economies' net exports face moderate to substantial competition from Chinese exports. Some regional economies are restructuring out of these competing sectors and into complementary sectors reducing competition with China; others are holding their own. However, all economies are expanding their exports, including to China, in the face of competition from China.
- Trade flow analysis suggests most East Asian economies have significant and growing complementarity with China, ensuring they benefit from China's continuing economic growth. Economies with more flexible policy settings and more open trade regimes are better placed to take full advantage of these opportunities.

## SURGING CHINA

Over the past five years, China's economic growth, industrial exports and FDI inflows have consistently outperformed other major regional economies, causing concern among some regional analysts that China is gradually 'taking over' their traditional markets.

### REGIONAL CONCERN RISING ABOUT CHINA'S INDUSTRIAL PROWESS

After enduring a decade of economic woes, many Japanese commentators view China as a threat to Japan's recovery. For example, former Japanese foreign minister Yukihiko Ikeda indicated he believes dealing with China as a major economic power will be the largest issue facing Japan in the first half of the twenty first century. A survey of Japan's largest companies revealed that half planned to increase production overseas and 71 per cent of those planned to expand in China. Meanwhile, another poll found 65 per cent of people believe imports from China threaten the Japanese economy. Andy Xie, Morgan Stanley economist in Hong Kong, forecasts China's exports will exceed those of Japan by 2005.

In the Republic of Korea, ROK, the media reported the Federation of Korean Industries and the Ministry of Commerce, Industry and Energy had produced a confidential report expressing concern China is surpassing the ROK in key industrial sectors, including the ROK's six key industries; electronics, steel, automobiles, textiles, petrochemicals and shipbuilding. The report pointed out that in the 1990s, China's exports to the United States from these six industries grew 23.1 per cent per annum while the ROK's grew 7.4 per cent per year; Chinese exports from these industries to Japan also grew 13.1 per cent while ROK's grew only 2.7 per cent annually. The report predicted China would surpass the ROK in competitiveness in the auto industry by 2010 and suggested local companies consider relocating some of their assembly lines to China to maintain price competitiveness.

In Taiwan, Stan Shih, the chairman of Acer, Taiwan's leading producer of personal computers, cautioned that Taiwan's information technology sector needed to move away from a dependence on hardware manufacturing towards design and advanced services. He urged Taiwanese industry to transform rapidly or risk being overtaken by China.

Malaysia is concerned about a series of electronics factories relocating to the Pearl and Yangzi River deltas from Penang, an island once touted as a South East Asian Silicon Valley.

Source: *New York Times*, 20 November 2001; *Korea Herald*, 17 July 2002; *International Herald Tribune*, 18 August 2001; *The Economist*, 13 February 2003.



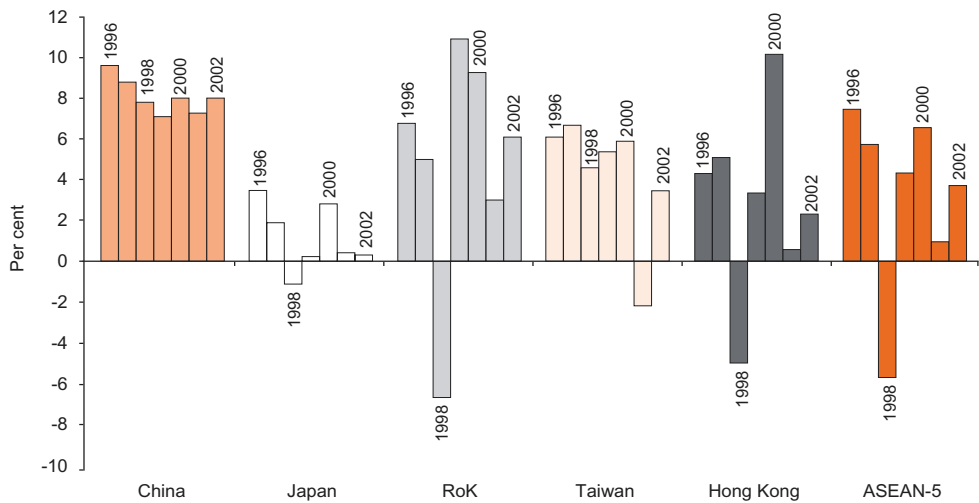
## Economic Growth

China has continued to be the strongest and most consistent economic performer in the region in the past 20 years. No period better demonstrates China's resilience than 1997 to 2002, when East Asia suffered the 1997-99 Asian financial crisis and the 2000-01 'tech wreck'. China's economy continued to grow strongly through these setbacks while other economies faltered (Figure 1.1).

Figure 1.1

### China's Strong Economy

#### Economic Growth Rates of Major East Asian Economies, 1996-2002



Note: ASEAN-5 is comprised of Indonesia, Malaysia, the Philippines, Singapore and Thailand.

Source: International Monetary Fund, 2003a.

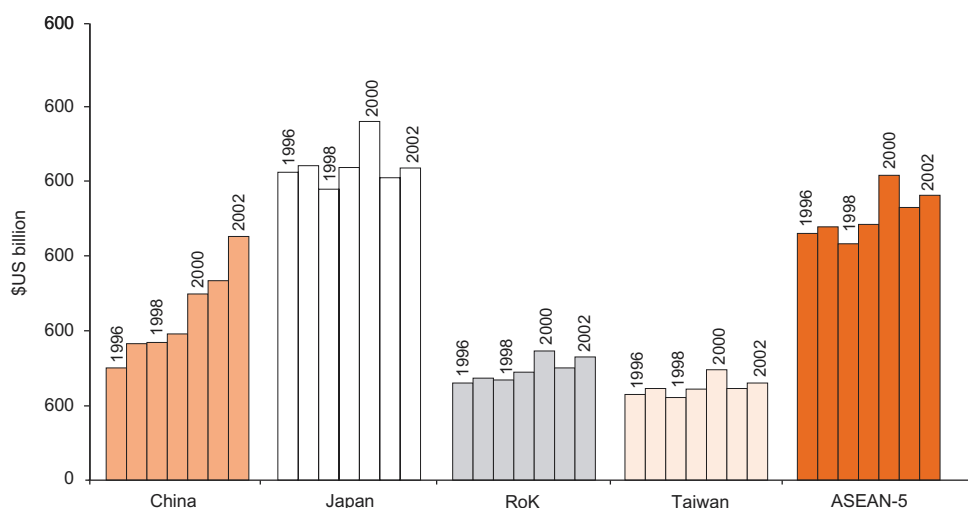
## Expanding Exports

China's export performance is striking, with merchandise exports reaching more than US\$325 billion in 2002, more than double its 1996 level of US\$150 billion. By contrast, apart from a brief rally in 2000, exports from Japan, ROK, Hong Kong, Taiwan and ASEAN have remained at 1996-99 levels (Figure 1.2). World Trade Organization, WTO, entry is likely to sustain or even improve China's export momentum (Economic Analytical Unit, 2002).

Figure 1.2

### China's Expanding Exports

#### Total Annual Merchandise Exports of Selected East Asian Economies, 1996-2002



Note: ASEAN-5 is comprised of Indonesia, Malaysia, the Philippines, Singapore and Thailand.

Source: Department of Foreign Affairs and Trade data, 2003.

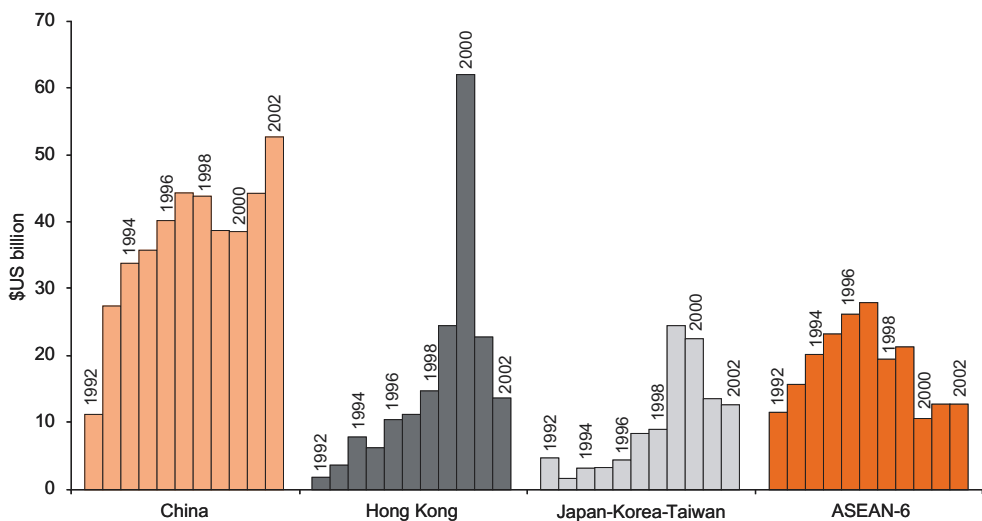
## Inward Investment

Another indicator of China's economic strength is its attractiveness to foreign investors. While FDI into ASEAN has declined since the mid to late 1990s, FDI into China has doubled over the ten years since the early 1990s (Figure 1.3). In 2002, buoyed by WTO entry, China received a record US\$53 billion in FDI, exceeding even the United States to become the world's largest FDI recipient (dX Database, 2003). China and Hong Kong now account for more than two thirds of FDI into the region, up from around 40 per cent in 1992.<sup>1</sup> Some regional analysts are concerned that the concentration of FDI into China and away from other developing economies in South East Asia will deliver to China a significant technology advantage, boosting its ability to produce a much wider range of manufactured goods and challenging other regional producers (for example, *Asia Times*, 12 November, 2002).

Figure 1.3

### China Dominates Inward FDI

#### Inward FDI Selected East Asian Sub-regions, 1992-2002



Notes: <sup>a</sup> ASEAN-6 includes Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam.

<sup>b</sup> The jump in FDI into Hong Kong in 2000 is largely due to Hong Kong based China Mobile's US\$33 billion acquisition of several Chinese mobile phone networks and associated international capital raising (United Nations Conference on Trade and Development, 2001).

Source: International Monetary Fund 2003b; United Nations Conference on Trade and Development, 2003.

<sup>1</sup> Numerous analysts argue China and Hong Kong's FDI figures are exaggerated by 'round-tripping' of capital, where Chinese capital is sent overseas, mainly to tax havens, to be reinvested back into China via a foreign intermediary to take advantage of numerous tax and other concessions.

Over the past decade, many multinational and regional companies have built factories in China to access China's competitive production costs. Some of these investments relocated operations from elsewhere in East Asia and many involve assembly and export of high technology products. Examples include investments by Motorola, Hana Microelectronics, LG Electronics, Toshiba and Minolta.

### **EXAMPLES OF RECENT FOREIGN DIRECT INVESTMENTS IN MANUFACTURING IN CHINA**

#### **Motorola**

Motorola China has a staff of around 15 000 in China producing wireless telecom equipment, mobile phone handsets and semiconductors. In June 2002, Motorola outlined a new five year plan designed to build China into its worldwide manufacturing and R&D base. By 2006, Motorola China aims to achieve annual production worth US\$10 billion. By 2002, Motorola had invested around US\$3.5 billion in its Chinese plants, reportedly making it the largest foreign investor in the Chinese electronics industry.

#### **Hana Microelectronics**

In 1996, Hana Microelectronics, a Thai company that specialises in a range of microelectronic manufactures, including printed circuit boards and integrated circuit assembly, expanded into China. The Shanghai operations use fully automated machinery to assemble a range of microelectronics on a sub-contracted basis for products including smart cards, camera control modules, timer controls and automotive instruments. In 2002, it announced plans to expand production at its Shanghai plant.

#### **LG Electronics**

Korean multinational LG Electronics, LGE, part of the LG chaebol, has several factories in China manufacturing cathode ray tube televisions and monitors, including flat screen versions. LGE is responding to the growing demand for monitors in China and considers investing in China's 'great growth potential' an important part of their strategy.

#### **Toshiba**

Toshiba has 24 subsidiaries and affiliates in China. In 2003, it started producing PCs from a new base in Hangzhou taking its locally employed workforce to around 17 000 people. Toshiba no longer produces televisions in Japan and in 2001 it opened a factory in Shenzhen to make 75 per cent of its copiers.

#### **Minolta**

In October 2001, Minolta announced it would phase out camera production in Japan and Malaysia over 2002 and 2003 and instead would increase production at its factories in Shanghai. Minolta will double production of cameras at the Shanghai plants to 3 million per year and increase staff levels from 1 100 to 2 000.

Sources: [www.internetnews.com](http://www.internetnews.com), 6 June 2002; [www.hanagroup.com](http://www.hanagroup.com); *The Nation*, 30 March, 2002; [www.lge.com](http://www.lge.com); [www.toshiba.com](http://www.toshiba.com); *Digital Photography Review*, [www.dpreview.com](http://www.dpreview.com), 18 October 2001.

## CHINA'S EXPORTS COMPARED WITH EAST ASIA'S

One way of assessing whether China is becoming the region's dominant manufactured goods exporter is to compare how the trade composition of China, other East Asian economies and Australia has changed over time, using a trade similarity index.<sup>2</sup> This index aims to measure the level of similarity in economies' merchandise trade profiles over time. To calculate the similarity index, one economy's merchandise exports are broken down into over 1 200 sub-sectors and each sector's proportion of total exports is compared line by line with the same sector's proportion of exports in another economy. Based on this comparison, an index is calculated in which 100 per cent represents an identical trade profile of each pair of countries considered and 0 per cent signifies no similarity exists whatsoever.<sup>3</sup> Calculating the index for China and each other East Asian economy over successive years shows whether the similarity between China's exports and those of other East Asian economies and Australia has increased or decreased over time.

While services trade is an increasingly important part of international trade, the high level of aggregation of available services trade data does not lend itself to inclusion in this analysis. Also, China's services trade is not the main focus of regional 'hollowing out' fears.

### Is China Out-Competing the Region?

Since 1998, the export similarity indexes using gross export data appear to indicate China's export profile is gradually converging to those of many East Asian economies (Figures 1.4 and 1.5). Taiwan and the ROK's export profiles appear to be becoming more similar to China's, while South East Asian economies, in particular Thailand, all have similar and converging export profiles to China's although this convergence in most cases does not appear to be as strong as many may think. This indicates increased potential competition between China and most East Asian economies. In North East Asia, Hong Kong's total profile including re-exports to and from China is the most similar to China's, but this is because Hong Kong's role as an entrepot for China dominates its trade figures.<sup>4</sup> (See also Chapter 2, *East Asian Economies Respond*.) Removing the large volume of re-exports from the analysis, the similarity between Hong Kong's domestic export profile and China's is much lower and falling, mainly reflecting Hong Kong's rapid shift out of labour intensive manufacturing. On the other hand, Australia's trade profile is very different from China's and its profile is diverging over time.

This apparent convergence between the export profiles of China and many East Asian economies appears to support concern that China is becoming a major competitor for these economies' exporters.

<sup>2</sup> Xu and Song (2000) uses an 'export similarity index' to test whether East Asian economies are on convergent development paths.

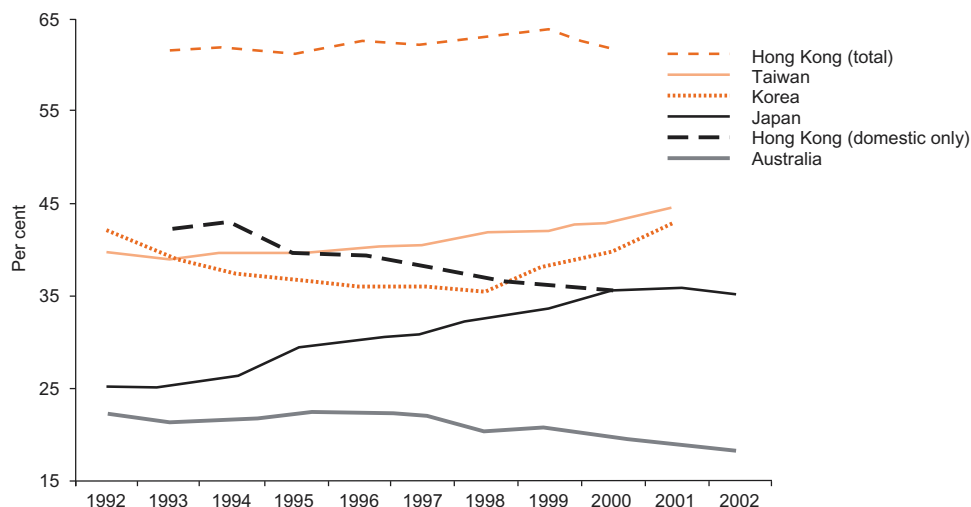
<sup>3</sup> See Appendix 1.1 at the end of this chapter for further information on how the similarity index is calculated and for more detailed results.

<sup>4</sup> The level of similarity between the Chinese and Hong Kong export profiles, around 60 per cent, therefore serves as a benchmark of a very similar trade profile.

Figure 1.4

**Chinese Exports Appear Increasingly Similar to North East Asia's**

**China's Gross Export Similarity with Other North East Asian Economies and Australia, 1992-2002**

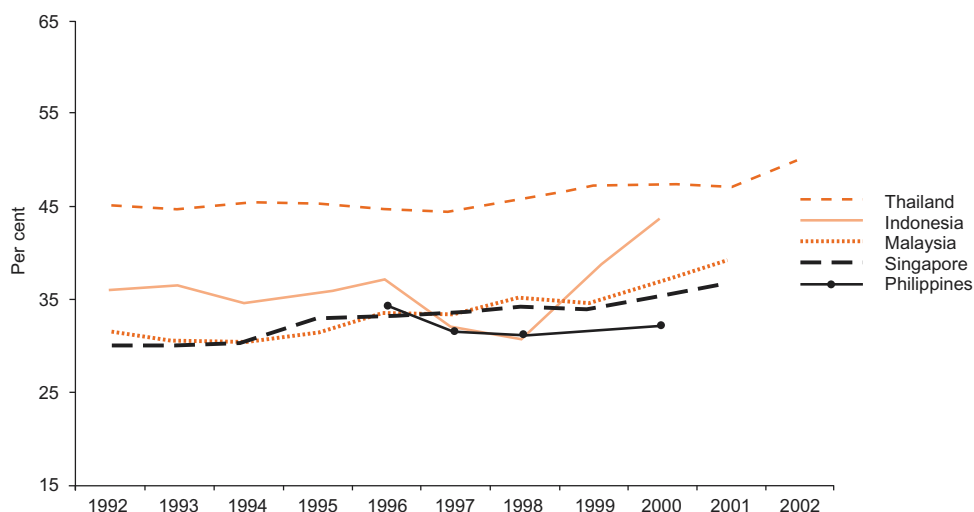


Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Figure 1.5

**... and to South East Asia's**

**China Gross Export Similarity with South East Asian Economies, 1992-2002**



Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

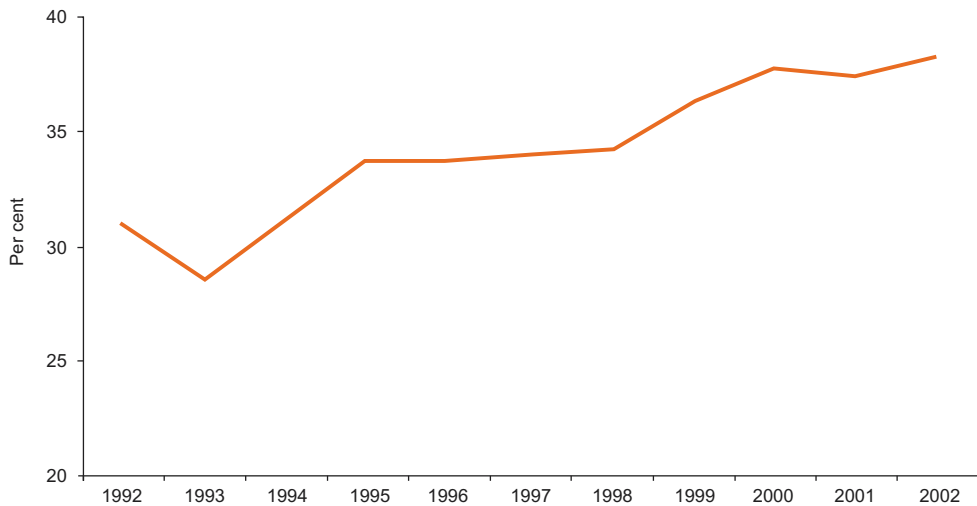
## Changing Trade Flows

Using the same similarity index to measure the similarity between China's merchandise exports on the one hand and its merchandise imports on the other shows China's export and import patterns are becoming more similar (Figure 1.6). Because standard trade classification systems often group major components, semi finished goods and final products of a particular good into the same category, rising intra-industry trade typically appears in trade statistics as increasing imports and exports within the same product classification. Hence this convergence appears to indicate China's intra-industry trade is increasing.<sup>5</sup> This is particularly evident in the growth of Chinese imports of manufactured electronics components for assembly and re-export as finished electronics goods (United Nations Conference on Trade and Development, 2002).

Figure 1.6

### China's Intra Industry Trade: Continues to Grow

#### Similarity of China's Export and Import Profile, 1992-2002



Notes: While the Grubel and Lloyd (1975) index is the standard measure of intra-industry trade, for simplicity, the similarity index was adapted for this purpose.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

<sup>5</sup> While this measure also will pick up intra industry trade undertaken for reasons other than a more integrated production chain, for example, due to competition between domestic and foreign brands, the dramatic changes in the level of this measure are more likely to be attributable to internationalisation of production. This is because China is importing components and exporting finished products in the same categories. Increases in similarity between the exports and imports of the same economy also typically are observed for other economies undergoing internationalisation of their production chains, like the ROK and Taiwan.

The rise in China's imports and exports of the same products over the 1990s reflects China's increasing integration into international and regional production chains, particularly for electronics (Figure 1.7).

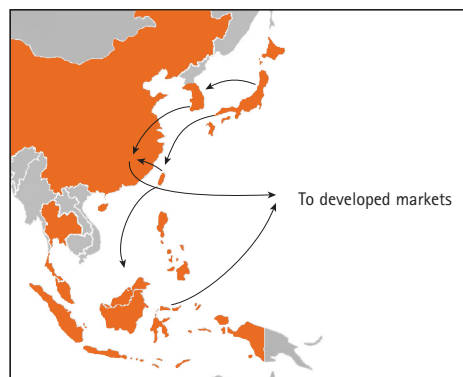
Figure 1.7

### The Changing International Electronics Production Chain

The way things used to be –  
1980s to early 1990s



The way things are now –  
mid 1990s onwards



Source: Goldman Sachs, 2002.

## Accounting for Import Patterns Tells a Different Story

It is necessary to remove the effects of rising intra-industry trade to understand whether China really is encroaching on other regional exporters' markets or merely has become more integrated into intra-regional trade. This can be done by examining trade similarity indices between economies for each category on the basis of net exports, that is, exports minus imports. By subtracting imports from exports and separating out sectors where an economy is a net exporter from those where it is a net importer, it is possible to create a net trade similarity index. (Appendix 1.1 gives a fuller description of this methodology). This approach allows comparison of economies' trade composition based on sectors in which they are exporting 'value added'.

Particularly in North East Asia, similarity indices based on net exports provide a very different picture to those using gross exports (Figure 1.8). With intra industry trade largely removed from the picture, the net exports of China and the other North East Asian economies do not appear to be converging consistently. In fact, in the early 1990s, China's net export profile diverged from those of the ROK and Taiwan, probably reflecting their shift out of some labour intensive industries like clothing and footwear in which China specialises (Drysdale, 2000). Based on net exports, Hong Kong's total profile remains the most similar to China's because of Hong Kong's entrepot status, again making it a good benchmark

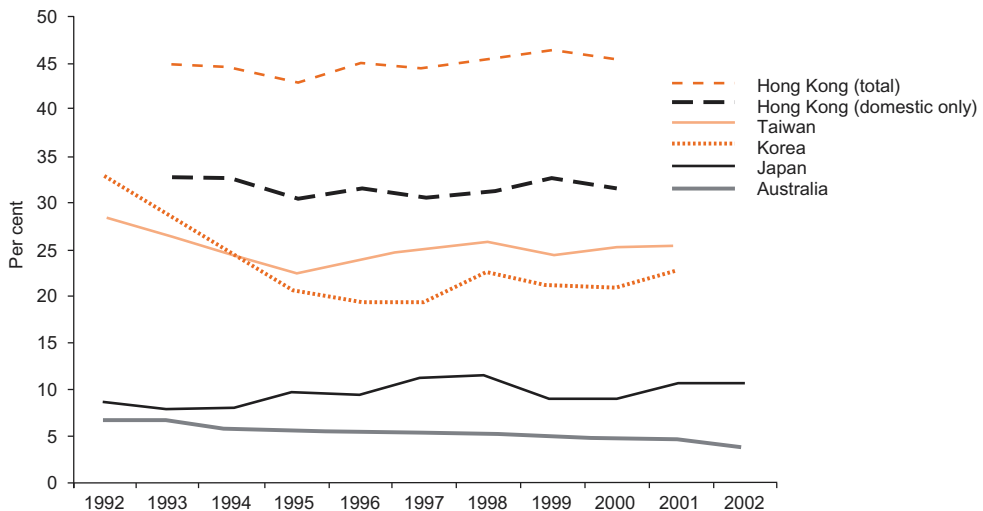


against which to compare the values derived for other economies.<sup>6</sup> Hong Kong's domestic export profile is also reasonably similar to China's.<sup>7</sup> Australia and Japan have low levels of similarity with China, indicating vastly different specialisations based on very different comparative advantage.

Figure 1.8

### Chinese and North East Asian Net Exports Not Converging

#### Similarity of China's and Major North East Asian Economies' and Australia's Net Export Profiles, 1992-2002



Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

In South East Asia, only Indonesian and Malaysian net export profiles appear to be converging to China's (Figure 1.9). Thailand's export profile remains the most similar to China, but these two profiles are diverging. The Philippines' profile is diverging rapidly, reflecting its dramatic shift out of clothing, footwear and leather goods. Singapore's export profile, as a mature producer of advanced manufactures, is very different from China's.

<sup>6</sup> While measuring net import data removes some of this effect, as often some value adding occurs in Hong Kong the prices of the re-exported goods are higher than when they were imported. Any transfer pricing by manufacturers located in China to avoid Chinese taxes would accentuate this phenomenon, increasing the apparent similarity of China and Hong Kong's net export profiles.

<sup>7</sup> Gross domestic exports appear in this similarity index calculation because of the lack of Hong Kong import data to correspond with the domestic export data. This biases the values upwards, contributing to its apparent higher similarity with China than Taiwan or the ROK. Nevertheless, using domestic exports provides a superior estimate of similarity than using net exports.

Figure 1.9

**China's Net Exports Converging with Indonesia's and Malaysia's**

**Similarity of China's Major South East Asian Economies' Net Export Profiles, 1992-2002**



Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

This analysis indicates China's progressive inclusion in international and regional production chains explains most of the convergence in its gross export profile with the rest of Asia's. Intra-regional trade has expanded two way trade dramatically but has caused China's net merchandise exports to converge with only a few economies in the region. The flat trends in net export similarity suggest that at an aggregate level China's expansion is not making significant inroads into other regional exporters' markets, with the exception of Malaysia's and perhaps Indonesia's.<sup>8</sup> This is because China mostly is succeeding in areas middle income and even some developing East Asian economies are vacating, so that it now complements these economies. However, the analysis undertaken to date does not identify whether other regional economies withdraw as China moves into a sector, giving the appearance that other regional economies are not targeting the same sectors as China. To better understand China's impact on specific industries in regional economies, a more detailed sectoral analysis is required.

<sup>8</sup> The fluctuations in Indonesian and Chinese exports' similarity coincide with the Asian financial crisis, which strongly affected Indonesian labour intensive exports, temporarily reducing similarity.

## SECTORAL ANALYSIS

Analysing sectoral merchandise trade data helps assess where other East Asian economies' trade could complement China's, where it faces competition from China and how these economies are adjusting. In general, this analysis identifies growing complementarity between China and other regional economies, demonstrating the strong links that should ensure China's growth benefits the whole region. However, it also identifies several economies in North and South East Asia engaged in stiff competition with China in specific sectors. This competition is stimulating affected industries to either improve efficiency and target niche areas to maintain their export markets or to shift out of these sectors into others where China is not a net exporter.

The sectoral analysis summarised below compares net merchandise trade statistics for about 1 270 products traded by China and other East Asian economies, identifying individual products for which China and other regional economies are net competitors and net 'complementors'.<sup>9</sup> The proportion of an economy's net export value concentrated in goods that China also exports on a net basis indicates the level of competition between the two economies.<sup>10</sup> The proportion of expanding net exports compared to the proportion of contracting net exports also measures regional economies' changing trade focus in response to domestic and international developments, including China's industrial expansion.<sup>11</sup> Chapter 2 analyses this sectoral data in more detail for each regional economy.

This summarised trade flow analysis shows Thailand, Hong Kong, Malaysia and Taiwan all experience relatively high levels of net export competition with China, while Japan, Australia, the Philippines and Indonesia face lower levels of competition (Table 1.1). This analysis supports the net export similarity analysis, which also shows Hong Kong and Thailand have the most similar net export profiles to China's.

<sup>9</sup> That is, the analysis identifies products for which both China and other regional economies are net exporters and those for which one economy is a net exporter and the other a net importer. This analysis was undertaken at the four digit Harmonised System level.

<sup>10</sup> For ease of comparison between economies, in this analysis any positive level of net exports for each economy registers them as competitors. Hence, the values here exceed the net export similarity index values. Effects also may vary between economies.

<sup>11</sup> Expanding and contracting exports are determined by comparing current and 1996-97 exports.

Table 1.1

**Thailand, Hong Kong, Malaysia and Taiwan Facing Competition; Japan Not**  
**Proportion of Regional Economies' Net Exports Competing with Chinese Net**  
**Exports, 2000-01**

	Proportion of net exports competing with China		
	Total	Expanding <sup>d</sup>	Contracting <sup>d</sup>
Japan <sup>b</sup>	18	8	10
ROK	50	41	9
Taiwan	61	26	35
Hong Kong <sup>a</sup>	66	40	26
Indonesia <sup>a</sup>	47	36	12
Malaysia	64	51	13
Philippines <sup>c</sup>	46	40	6
Singapore	50	8	42
Thailand <sup>b</sup>	70	45	25
Australia <sup>b</sup>	39	34	5

Notes: <sup>a</sup> 1999-2000 <sup>b</sup> 2001-02 <sup>c</sup> 2000 <sup>d</sup> compared with 1996-97 levels, in US dollars.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

While Malaysia, Thailand, ROK, the Philippines, Hong Kong and Indonesia all are expanding exports of most of their competing export products regardless of competition from China, Taiwan and Singapore are moving out of a majority of the mainly labour intensive manufactured exports where they compete with China. Australia also is expanding most of its net exports that compete with China, while the majority of Japan's net exports that compete with China are contracting.

The proportion of an economy's net export value concentrated in goods that China imports on a net basis, and vice versa, is a good method of summarising the level of complementarity between China and other regional economies. For example, almost half the Philippines' net exports, 38 per cent of Taiwan's net exports and around a third of Singapore's net exports are goods China imports on a net basis (Table 1.2). Most economies in the region, except Thailand, Malaysia and possibly Hong Kong exhibit a high level of export complementarity with China.<sup>12</sup> Hence, regional economies stand to gain significantly from China's economic growth. Furthermore, nearly half Australia's net imports, around a third of Hong Kong's and Japan's and nearly a quarter of Singapore's are goods for which China is a net exporter, indicating a high level of complementarity with China's exports.

<sup>12</sup> However, Hong Kong's significant complementarity with China lies mainly in services trade. (See Chapter 2 – *East Asia Responds*.)

Table 1.2

**Philippines, Taiwan and Singapore Benefit from Complementarity**  
**Proportion of Regional Net Trade Complementing Chinese Net Trade, 2000-01**

	Proportion of net exports complementary with Chinese net imports	Proportion of net imports complementary with Chinese net exports
Japan <sup>b</sup>	23	31
ROK	28	13
Taiwan	38	14
Hong Kong <sup>a,d</sup>	20	34
Indonesia <sup>a</sup>	27	18
Malaysia	19	17
Philippines <sup>c</sup>	48	19
Singapore	34	23
Thailand <sup>b</sup>	16	15
Australia <sup>b</sup>	26	44

Notes: <sup>a</sup> 1999-2000 <sup>b</sup> 2001-02 <sup>c</sup> 2000 <sup>d</sup> domestic exports/imports

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

## IMPLICATIONS

While China's economic and export growth and FDI attractiveness outstripped most other regional economies in the 1990s and 2000s, fears about its detrimental impacts on regional economies appear unfounded. Initial analysis appears to suggest many of China's regional neighbours are facing strong Chinese competition for a significant proportion of their exports. However, closer examination of trade trends shows increasing internationalisation of production chains accounts for much of the apparent convergence in regional economies' export patterns. Even where competition is intensifying in specific sectors, most developing regional economies are expanding their exports regardless of Chinese competition. While more developed regional economies are continuing to contract their net exports of labour intensive products they also are expanding their net exports of higher value added goods, some of which China also assembles. In addition, most East Asian economies and Australia have significant complementarity with China, ensuring they benefit from continuing Chinese economic growth. This analysis and the more detailed sectoral level analysis in the following chapter indicates the trade of all regional economies is benefiting from China's emergence as a major industrial exporter which provides more opportunities than threats for its neighbours.

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## APPENDIX 1.1 TRADE SIMILARITY INDICES

This appendix explains the methodology and data used to calculate the trade similarity indices.

Trade similarity indices provide a single number to represent the degree of similarity between the trade profile of one economy and that of another.

### Methodology

This report uses similarity statistics based on the Finger-Kreinin index (1979).

$$S_{jk} = \left\{ \sum_i \min \left[ \frac{X_j^i}{X_j}, \frac{X_k^i}{X_k} \right] \right\} \cdot 100$$

The index measures the similarity of the export profiles of economies  $j$  and  $k$ , where  $X_j^i$  denotes the exports of product  $i$  from economy  $j$ . Thus, the formula calculates the share of product  $i$  in the total exports of economies  $j$  and  $k$ , taking the minimum of these for each product and summing across all exports. The index will take the value 100 if the export profiles of  $j$  and  $k$  are identical and the value 0 if the profile is completely dissimilar.

This report uses the similarity of export profiles of two economies to assess the level of export competition between the two economies. This index was calculated for all regional economies and China for the period 1992 to 2002. If the index is increasing over time, it indicates the export profiles of the two economies are becoming more similar. Some analyses employ export or production similarity indices to measure convergence or 'catch-up' by less developed economies to more developed economies.

### Net Trade Similarity

The above analysis is susceptible to increased linkages due to internationalised production chains, which create increasing exports of finished products but in the background require increasing imports of components and semifinished goods. Internationalised production chains for various firms bring about increasing exports and imports in the same products, causing increasing similarity between the exports and imports of economies involved in the production chains. Increasing similarity between each economy's export profile and its import profile is also evidence of this weakness.<sup>13</sup>

Therefore, a modified approach was chosen in order to focus on where economies are exporting value added and where they are importing value added. Similarity indices based on the net exports and net imports of economies, by calculating the trade balance in each product and separating them into net exports and net imports, enable analysis based on the reliance of economies on particular products for export revenue in order to pay for the import of other products.

<sup>13</sup> In 2001, similarity indices for the exports and imports of ROK and Taiwan, both large exporters and importers of components and semifinished goods, exceeded 43 per cent and 47 per cent respectively.

After separation, net exports consist of only those products where there is a positive trade balance, with all other products taking zero values. Total net exports, used as the denominator in the export shares, were calculated by summing together net exports. This can be thought of as the total net value of products sold overseas to gain foreign currency for the purchase of products where the economy is a net importer. Net imports and total net imports were calculated in the same fashion.

Using this form of the similarity index, high or increasing index values can be interpreted as genuinely representing similar or increasingly similar reliance on particular products for export revenue, implying high or increasingly high levels of competition between their exports.

## Data

This study uses UNCTAD and World Trade Atlas data, classified under the Harmonised System 4-digit classification system, with 1260 classifications. The analysis included China, Hong Kong, Japan, ROK, Taiwan, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Australia.



## **EAST ASIAN ECONOMIES RESPOND TO CHINA**

### **KEY POINTS**

- An industry level analysis of how individual regional economies are responding to international competitive pressures, including China's industrial expansion, provides deeper insights into the dynamics of industrial and trade change underway in the region.
- In most advanced regional economies, including Japan, Taiwan and Singapore, Chinese competition appears to be accentuating existing cost pressures, accelerating a long term movement out of labour intensive sectors where China is increasingly competitive. These economies are refocussing in more technology and capital intensive industries to keep ahead of Chinese competition and producing more of the more sophisticated inputs China needs for its expanding manufacturing industries.
- In most developing South East Asian economies and the Republic of Korea, ROK, China's expanding export capacity and competitiveness is an important stimulus for many competing industries to move up the value chain and increase their production efficiency and quality. Most regional economies are responding to this pressure, expanding net exports of competing products in US dollar terms over the last six years; Thailand appears to be facing the most direct competition.
- It is important for regional economies to maintain policy settings that promote flexibility and openness to world markets to continue a smooth adjustment to these competitive pressures.
- China's expansion is not a zero sum game. As China expands, its industrial production increasingly demands raw materials and manufactured components which, in turn, stimulates rapid growth in net exports from regional economies. Japan, Taiwan, Indonesia, the Philippines, Singapore and Australia are particularly well placed to benefit from the complementarity of their exports with China's import requirements.
- Regional economies with more established consumer bases, including Japan, Hong Kong, Singapore and Australia also are benefiting from the increasing volume of cost competitive Chinese consumer product exports.

Analysing how key industries in each East Asian economy are responding to China's emergence as an industrial powerhouse provides significant new insights into the dynamics of East Asia's adjustment and useful information for Australian businesses wishing to anticipate and capitalise on future regional industrial restructuring. Detailed examination of trade flows identifies the specific sectors in which China and its regional neighbours are competing most directly, those sectors where competition with China is increasing and declining, and how regional economies are responding to this competition. It also identifies goods that China and its regional neighbours, including Australia, can trade to mutual advantage, because of their trade and production complementarity.

Analysing trade flow and revealed comparative advantage data for China and all other major East Asian economies, this chapter draws out the impact of Chinese economic expansion on local industrial and primary commodity restructuring. Comparing total net trade flow data by product for China and each other East Asian economy allows us to identify the main sectors in each economy facing competition from China, whether this is increasing or decreasing and the extent of an economy's complementarity with China.<sup>1</sup> We also calculate regional economies' trade specialisation using the Michaely revealed comparative advantage index.<sup>2</sup> A large positive value of this index for a specific product indicates a country relies heavily on this product for export income, while a large negative value signifies the country relies heavily on imports of this product to satisfy domestic demand. Measuring this index over time for all products and regional economies helps identify economies' changing trade and production specialisation, some of which will stem from shifts in underlying comparative advantage and to infer China's impact on the region's comparative advantage.<sup>3</sup>

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<sup>1</sup> These revealed comparative advantage indices are calculated for China, Hong Kong, Japan, the ROK, Taiwan, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Australia. Competition occurs where both China and the other economy are net exporters, complementarity where one economy is a net exporter and the other a net importer.

<sup>2</sup> The Michaely index compares each commodity's share of total exports to the rest of the world with its share of total imports from the rest of the world. (See Appendix 2.1 for more details). Unlike other measures of revealed comparative advantage, the Michaely index is a measure of net specialisation, so the high levels of both exports and imports associated with internationalising production chains do not affect the index level.

<sup>3</sup> Trade barriers, restrictive labour laws and other distortions can also affect an economy's specialisation. Reform of these policies will enable an economy to shift towards its comparative advantage. Where such policies are significant these are highlighted. Importantly, this analysis differs from export similarity indexes in that it indicates changes in a country's area of global specialisation rather than compared to a given economy in the region. This means it is not possible to conclude that because China is increasing its revealed comparative advantage in a specific industry that it necessarily is threatening other regional countries' exports in that industry. To reduce the impact of short term fluctuations in identifying medium term trends, this analysis compares the trade patterns of China and other regional economies for the two year average of 1996 and 1997 and the two year average of the most recent data available.

## CHINA'S CHANGING COMPARATIVE ADVANTAGE

As would be expected in a developing country with a large population, Michaely index measures indicate China's comparative advantage remains primarily in labour intensive products. Large positive values for clothing, footwear, toys, furniture, leather articles and plastic articles indicate China has a significant comparative advantage in these items (Table 2.1). In addition, assembled high technology articles like office machines and parts have become China's second major area of comparative advantage. However, as China integrates into the international computer production chain it also has become a significant net importer of computer components like integrated circuits and micro assemblies. Hence it appears Chinese industries mainly are assembling office machines from imported components, in line with their competitiveness in labour intensive production. China has a comparative disadvantage in capital and technology intensive industries such as non-office machinery, plastics in primary forms, chemicals and steel, and in particular resources such as crude oil, mineral ores and refined copper.

By way of demonstration of the properties of the Michaely index and changes in regional production chains, it is important to note that China is a significant importer of office machines and parts, particularly due to the highly internationalised nature of computer production. In 2002, Chinese imports of office machines and parts amounted to over US\$16 billion, or nearly 6 per cent of its gross imports. Nevertheless, the Michaely values show that on balance China has an apparent advantage in exporting assembled office machines and parts (Table 2.1).

Table 2.1

### China Still Mainly Exports Labour Intensive Manufactures

#### Michaely Indexes Showing China's Major Areas of Comparative Advantage and Disadvantage, 2001-02

China's Top 10 Comparative Advantage Groupings		China's Top 10 Comparative Disadvantage Groupings	
Clothing	12.6	Non-office machines	-7.2
Office machines and parts	4.2	Electronic integrated circuits and microassemblies	-6.8
Footwear	3.5	Plastics in primary forms	-4.4
Toys and sporting goods	3.4	Crude oil	-4.1
Furniture	2.8	Chemical products	-3.4
Leather articles	2.5	Steel	-3.2
Plastic articles	1.6	Instruments (not timekeeping or musical)	-1.9
Iron and steel articles (exc tubes and pipes)	1.4	Copper and copper articles	-1.7
Prepared foodstuffs	1.4	Mineral ores	-1.5
Video and digital cameras; mobile phones	1.1	Aircraft	-1.4

Note: See Appendix 2.1 for details on the calculation of the Michaely index.

Source: Economic Analytical Unit calculations using Department of Foreign Affairs and Trade data, 2003.

Comparing China's index values for 1992-93 and 2000-01 reveals product groupings where its comparative advantage is changing, or where China's trade patterns are moving towards its comparative advantage. China is quickly gaining strength in current weak areas like non-office machinery, non-rail vehicles and steel, while its comparative advantage is declining in clothing, footwear and vegetable and animal products (Table 2.2). These data provide some evidence China is moving up the value added chain. China's worsening comparative disadvantage in integrated circuits and microassemblies reinforces the evidence China is a major and expanding electronics assembler, rather than a producer of higher value added components. China's comparative disadvantage also is worsening in crude oil, organic chemicals and oil seeds as it imports more energy and raw materials to meet its growing industrial demand.

Table 2.2

**China Moving Up the Value Added Chain**

**Michaely Indexes Showing China's Changing Revealed Comparative Advantage, 1992-93 to 2000-01<sup>a</sup>**

China's Top 5 Areas of Strengthening Advantage		China's Top 5 Areas of Improving Disadvantage	
Office machines and parts	+4.1	Non-office machines	+8.9
Video and digital cameras; mobile phones	+1.7	Non-rail vehicles	+3.5
Iron and steel articles	+1.6	Steel	+3.0
Video recorders	+1.4	Fertilisers	+1.9
Furniture	+1.3	Synthetic fibres and fabrics	+1.9
China's Top 5 Areas of Declining Advantage		China's Top 5 Areas of Worsening Disadvantage	
Clothing	-6.8	Electronic integrated circuits and microassemblies	-5.8
Vegetable products	-2.9	Crude oil	-4.9
Animals and animal products	-1.8	Organic chemicals	-1.7
Footwear	-1.5	Oilseeds	-1.7
Prepared foodstuffs	-1.4	Diodes, transistors and semi conductors	-1.1

Notes: <sup>a</sup> Difference between index values for 1992-93 and 2000-01.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Hence, while China still is a dominant producer and exporter of traditional labour intensive manufactures like clothing, it is moving rapidly into assembling a much wider range of manufactures, placing competitive pressure on other regional economies producing and exporting such products. China's higher reliance on imports for many manufacturing inputs such as complex computer components, crude oil, chemicals and oilseeds provides opportunities for regional economies exporting these products.

## **NORTH EAST ASIA'S REPONSES TO CHINA**

### **JAPAN**

Still the most sophisticated economy in the region, Japan is facing only moderate competition from China for export sectors; nevertheless this pressure is encouraging contraction of residual labour intensive manufacturing sectors. As Japan mainly specialises in producing high technology and capital intensive goods and imports labour intensive manufactures and primary goods, it exhibits a high degree of complementarity with China, making it one of the region's major net beneficiaries from China's expansion.

### **Trade Flow Comparisons**

Japan is facing competition from Chinese exports for only about 18 per cent of its net exports by value, by far the lowest of any regional economy including Australia (Table 1.1, Table 2.3). Japan is reducing its net exports in two thirds, or 165, of these sectors including for more labour intensive products like assembled computers and video recorders, possibly because China is out competing Japan in these sectors. For the other 72 products, including various consumer goods and motorcycles, Japan continues to expand its exports, indicating Japan is holding its ground against increasing net exports from China, presumably by moving into higher value added and quality segments of these sectors.

Table 2.3

**Japan-China Competition Low and Declining**

**Competition from China in Japanese Export Sectors between 1996-97 and 2001-02**

	Number of products <sup>a</sup>	Japanese Net Exports 1996-97 (US\$ bill)	Japanese Net Exports 2001-02 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 2001-02 (US\$ bill)
<b>Competition from China<sup>b</sup></b>	237	75.2	54.8	23.6	61.8
(per cent of total net exports)		27	18	21	33
<b>Japan expanding regardless</b>	72	16.0	24.6	4.5	14.9
eg: Video and digital cameras; mobile phones		4.5	8.6	-0.5	3.6
Televisions, monitors etc		0.7	1.7	0.5	2.0
Motorcycles		3.8	4.3	0.1	0.7
<b>Japan contracting</b>	165	59.3	30.2	19.1	47.0
eg. Office machines and parts		11.7	1.5	3.6	14.1
Video recorders		1.6	0.2	0.4	3.4
<b>Total Net Exports</b>	551 <sup>c</sup>	282.0	302.7	114.4	188.8

Notes: <sup>a</sup> Products analysed at Harmonised System 4-digit level, covering 1 270 products.

<sup>b</sup> Total number or value of Chinese net exports of products that both China and Japan exported on a net basis in 1996-97.

<sup>c</sup> 2001-02.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Considerably more of Japan's trade complements China's trade, US\$71 billion or 23 per cent of net exports, than competes with China's trade, US\$55 billion or 18 per cent of net exports (Table 2.4). Furthermore, Japan's complementary trade has risen 63 per cent since 1996-97, the strongest percentage increase in complementarity of all North East Asian economies. China provides a booming market for Japanese exports of integrated circuits and semi conductors for electronics, television tubes and for capital intensive manufactures such as steel, organic chemicals and plastics in primary forms, confirming China's rising importance as an assembler of Japanese manufacturing inputs. China also supplies US\$62 billion, or 31 per cent, of the net exports Japan requires, mainly labour intensive clothing, footwear, furniture and travel goods.<sup>4</sup>

Hence, Japan is well positioned to take advantage of China's development by continuing to contract production and increase importation of products where China is more competitive, and specialise in exporting higher value added inputs Chinese industry requires and cannot produce competitively.

<sup>4</sup> Japan also is likely to have a high degree of services trade and direct investment complementarity. In recent years, high levels of Japanese FDI into China imply it is an increasingly important production site for Japanese corporates seeking to reduce production costs and boost profits.

Table 2.4

**China–Japan Increasingly Complementary****Trade Complementarity between China and Japan between 1996-97 and 2001-02**

	Number of products <sup>a</sup>	Complementarity 1996-97 US\$ billion <sup>b</sup>	Complementarity 2001-02 US\$ billion <sup>b</sup>
<b>Japan net exporter and China net importer</b>	325	43.6	71.1
eg. Integrated circuits and microassemblies		2.4	8.6
Steel		4.9	8.6
Plastics in primary forms		4.2	3.8
Semi conductors, diodes and transistors		0.6	3.2
Organic chemicals		0.0	3.1
Television tubes		0.7	1.8
<b>China net exporter with Japan net importer</b>	481	47.6	61.8
eg. Clothing		18.3	18.5
Furniture		3.4	3.6
Travel goods, other articles of leather		3.2	3.4
Footwear		3.2	2.9

Notes: <sup>a</sup> Harmonised System 4-digit level, made up of 1 270 products.<sup>b</sup> Defined as minimum of the economy A's net exports of a particular product and economy B's net imports of that product. This figure therefore represents the maximum level of bilateral trade possible in that product if all economy A's net exports were sent to economy B.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

**Japan's Revealed Comparative Advantage**

As would be expected, analysing Japan's revealed comparative advantage shows it specialises in complex manufactured goods and relies on imports for primary products and labour intensive manufactures. Its main strengths are in capital and technology intensive goods such as cars and motor vehicle parts, general machinery and electrical machinery (Table 2.5). It relies heavily on imports for energy sources like crude oil, petroleum gas and coal, labour intensive items like clothing and for agricultural, fishery and forestry products.

Changes in Japan's Michaely indices between 1992-93 and 2001-02 indicate its external sector is undergoing significant restructuring. Japan is increasing its strength in some capital and knowledge intensive goods like cars and iron and steel while its advantages in other high technology areas such as electrical machinery, assembled computers and general machinery is declining (Table 2.6). Meanwhile, imports of wood, seafood and vegetable products are becoming less important in its total import mix, while its disadvantage in clothing, natural gas and furniture is worsening. The overall focus of the Japanese economy on capital and technology intensive industries for export revenue is not changing, but the mix within those industries is rebalancing.

Table 2.5

**Japan Specialised in High Technology Manufactures**

**Michaely Indices Revealing Japan's Major Comparative Advantage and Disadvantage Product Groupings, 2001-02**

Japan's Top 10 Comparative Advantage Groupings		Japan's Top 10 Comparative Disadvantage Groupings	
Motor cars	12.3	Crude oil	-11.0
Non-office machines	10.2	Clothing	-5.4
All electrical machines	9.3	Petroleum gases	-4.8
Motor vehicle parts and accessories	3.3	Prepared foodstuffs	-3.8
Instruments (not timekeeping or musical)	2.3	Vegetable products	-3.4
Steel	2.2	Seafood	-3.1
Cargo/cruise ships, ferry boats etc.	2.1	Wood and wooden articles	-2.8
Goods vehicles	1.3	Meat	-2.0
Motorcycles	1.0	Mineral ores	-1.9
Rubber and rubber articles	0.9	Coal	-1.8

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Table 2.6

**Japan Moving out of Electrical Machines and Computers**

**Michaely Indices Showing Japan's Changing Revealed Comparative Advantage, 1992-93 to 2001-02<sup>a</sup>**

Japan's Top 5 Areas of Strengthening Advantage		Japan's Top 5 Areas of Improving Disadvantage	
Iron and steel	+0.8	Wood and wooden articles	+2.6
Motor cars	+0.6	Seafood	+1.7
Fibres and textiles	+0.6	Vegetable products	+1.6
Organic chemicals	+0.5	Crude oil	+1.2
Copper and copper articles	+0.5	Gold	+0.8
Japan's Top 5 Areas of Declining Advantage		Japan's Top 5 Areas of Worsening Disadvantage	
Electrical machines	-6.9	Clothing	-0.8
Assembled office machines	-4.5	Petroleum gases	-0.6
Non-office machines	-1.3	Furniture, bedding, lamps	-0.5
Goods vehicles	-1.2	Clocks and watches	-0.5
Photocopiers	-0.8	Medical instruments	-0.4

Notes: <sup>a</sup> Difference between index values for 1992-93 and 2001-02.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.



Japan's export oriented manufacturing sectors appear to be responding to change, including Chinese competition, and withdrawing further from labour intensive sectors such as assembled computers, clothing and clocks and watches and repositioning into sectors where it retains greater comparative advantage, such as cars and fibres and textiles.<sup>5</sup>

### COMPUTER PRODUCTION CHAINS ARE CHANGING

Trade data analysis in this chapter reveals a number of parallel trends in economies' export structures driven by changes in the regional production chains for office machines. China's expanding role in the final assembly of office machines is demonstrated by its increasing specialisation in exports of office machines and parts and rapidly increasing imports of integrated circuits and semi conductors. Japan's specialisation in assembled office machines and parts is declining, while Taiwan is focussing more on parts and accessories and less on assembled machines and Singapore is specialising more in integrated circuits and less in assembled computers. Meanwhile, the ROK, Indonesia and Malaysia are each moving more into assembled machines and parts, like China. Thailand is specialising more in computer parts and semi conductors, while the Philippines is specialising into integrated circuits and away from assembled machines. While individual economies' circumstances differ somewhat, the changing roles of economies in computer production chains is having considerable impacts on their economic structures. Most developed economies move into the production of components and most developing economies, including China, specialise in final assembly.

## REPUBLIC OF KOREA

As 50 per cent of the ROK's net exports compete with China's, more than twice as many as Japan's net exports, one would expect it is confronting considerably more competitive pressure from China for export sectors (Table 1.1). While the ROK's export similarity index indicates it is moderately concentrated in export industries similar to China's, the ROK's technological and human capital edge seem to be sufficient for the ROK to benefit from this competition via continued specialisation and focussing on higher value adding. Accordingly, the ROK is expanding strongly, even where its net export sectors overlap with China's.

### Trade Flow Comparisons

The ROK faces competition from China in nearly two thirds of its 440 net export sectors, accounting for half its net exports by value (Table 2.7). However, the ROK is proving resilient to this challenge; it expanded its exports of these competing products by about 60 per cent over four years to 2000-01,

<sup>5</sup> Some analysts have pointed to a duality within the Japanese economy, where sectors competing in international markets respond well to international pressures while large but less open domestic sectors are stagnating (see for example, McKinsey Global Institute, 2000).

or twice as rapidly as its overall exports, matching China's net export growth in these sectors, also 60 per cent. Despite the pressure from Chinese products, in a majority of sectors, including video and digital cameras, mobile phones, computers, ships and even clothing, the ROK is expanding its net exports. However, in the other 137 sectors where it faces Chinese competition, predominantly labour intensive products such as televisions and footwear, the ROK is withdrawing, reducing its net exports as China expands its (Table 2.7).

Table 2.7

**China-ROK Competition Intensifying**

**Competition from China in Korean Export Sectors between 1996-97 and 2000-01**

	Number of products <sup>a</sup>	Korean Net Exports 1996-97 (US\$ bill)	Korean Net Exports 2000-01 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 2000-01 (US\$ bill)
<b>Competition from China<sup>b</sup></b>	299	28.5	45.6	72.0	115.3
(per cent of total net exports)		41	50	63	70
ROK expanding regardless	162	14.5	37.2	35.1	60.1
eg: Video and digital cameras; mobile phones		0.6	6.7	-0.5	2.4
Office machines and parts		2.2	9.8	3.6	8.6
Clothing		2.9	3.2	26.9	34.7
Ships, ferry boats etc		5.6	7.4	1.0	1.4
Air conditioners		0.4	1.2	0.0	0.9
<b>ROK contracting</b>	137	14.1	8.4	37.0	55.2
eg. Televisions, monitors and projectors		1.8	1.4	0.5	1.4
Footwear		0.7	0.5	7.5	9.6
<b>Total Net Exported Products</b>	440 <sup>c</sup>	69.6	91.3	114.4	164.8

Notes: As for Table 2.3.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Even more than Japan, Korean exports benefit from their complementarity with China's import needs (Table 2.8). China is a net importer of 161 products the ROK produces accounting for 28 per cent of its net exports by value. These products consist mainly of manufacturing inputs like plastic in primary forms, steel, synthetic fibres, television tubes, electronic components and refined petroleum oils. By contrast, China is a net exporter of a comparatively small proportion of Korea's net import requirements; coal is the only significant good in this category.

Table 2.8

**Korean Exports Increasingly Complementarity with China**

**Trade Complementarity between China and the Republic of Korea, 1996-97  
and 2000-01**

	Number of products <sup>a</sup>	Complementarity 1996-97 US\$ billion <sup>b</sup>	Complementarity 2000-01 US\$ billion <sup>b</sup>
<b>ROK net exporter and China net importer</b>	161	20.1	25.7
eg. Plastics in primary forms		2.8	3.9
Steel		1.7	3.1
Man-made fibres and textiles		5.2	3.9
Television tubes		0.7	2.2
Non-crude oil		0.6	1.6
<b>China net exporter and ROK net importer</b>	392	10.8	10.6
eg. Coal		1.0	2.0

Notes: <sup>a</sup> As for Table 2.4.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

In contrast to Japan, ROK exports more often compete with China's than complement them. However, the ROK competes successfully with China in most of its net export sectors, giving ground in relatively few.

**ROK Revealed Comparative Advantage**

Again as would be expected, the ROK's comparative advantage lies mainly in technology and capital intensive manufacturing industries, such as cars, office machines and parts, electrical machinery, shipbuilding as well as man made fibres and textiles (Table 2.9). Michaely indices also indicate the ROK has a very large revealed comparative disadvantage in crude oil, natural gas and coal and relies on imports for other industrial inputs like chemicals, instruments, pig iron and non-office machines.

Table 2.9

**ROK Strong in Manufacturing, Weak in Mineral Fuels**

**Michaely Indices Revealing ROK's Major Comparative Advantage and Disadvantage Product Groupings, 2000-01**

ROK's Top 10 Comparative Advantage Groupings		ROK's Top 10 Comparative Disadvantage Groupings	
Motor cars	7.3	Crude oil	-15.4
Office machines and parts	5.7	Petroleum gases	-3.4
Electrical machines	4.7	Chemical products	-3.4
Cargo/cruise ships, ferry boats etc.	4.6	Instruments (not timekeeping or musical)	-2.9
Synthetic fibres and fabrics	2.5	Pig iron	-1.6
Plastics in primary forms	2.1	Non-office machines	-1.6
Refined petroleum oils	2.0	Coal	-1.5
Clothing	1.9	Mineral ores	-1.4
Knitted fabrics	1.5	Cereals	-1.0
Steel	1.5	Wood and wooden articles	-1.0

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

At least partially in response to China's expansion, the ROK also is moving up the value chain. It has strengthened its comparative advantage in higher value added manufactures like video and digital cameras, mobile phones, cars, computers and their parts, all but eliminating its previous weakness in non-office machinery (Table 2.10). Meanwhile its competitiveness in clothing and footwear exports is waning, as is its capability in man made fibres and textiles. The ROK is relying much more on imports of mineral energy, especially crude oil and natural gas and some more assembled manufactures, including phones and faxes.

Korean manufactures are switching to more human and technology intensive products, but unlike Japan, the sectors where it is strengthening its position often overlap with China's. For example, both economies are expanding their net exports of general machinery and office machines. This confirms the results of the trade flow analysis, which shows the resilience of demand for Korean products and their flexibility to fill different consumer demand segments in the face of expanding Chinese exports (Table 2.7).

Table 2.10

**ROK Strengthening in Machinery; Weakening in Clothing, Footwear**

**Michaely Indices Showing ROK's Changing Revealed Comparative Advantage, 1992-93 to 2000-01 <sup>a</sup>**

ROK's Top 5 Areas of Strengthening Advantage		ROK's Top 5 Areas of Improving Disadvantage	
Video and digital cameras; mobile phones	+4.1	Non-office machines	+7.9
Office machines and parts	+3.8	Aircraft	+1.7
Motor cars	+3.4	Wood and wooden articles	+1.5
Refined petroleum oils	+2.8	Organic chemicals	+1.4
Ships	+1.2	Motor vehicle parts and accessories	+0.8
ROK's Top 5 Areas of Declining Advantage		ROK's Top 5 Areas of Worsening Disadvantage	
Clothing	-4.5	Crude oil	-4.1
Integrated circuits and microassemblies	-3.2	Petroleum gases	-1.9
Footwear	-3.1	Telephones, faxes and modems	-1.3
Synthetic fibres and fabrics	-2.7	Animals and animal products	-1.1
Leather articles	-2.4	Diodes, transistors and semi-conductors	-0.6

Notes: <sup>a</sup> Difference between index values for 1992-93 and 2000-01.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

## TAIWAN

Taiwan's export focus also has some similarities to China's, but unlike the ROK, Taiwan is reducing its net exports of many products competing directly with China's. Taiwan's net exports also are more complementary to China's net import requirements, positioning Taiwan well to take advantage of China's expansion.

### Trade Flow Comparisons

Taiwan faces competition from China in 61 per cent of its net export sectors by value (Tables 1.1 and 2.11). In two-thirds of these net export sectors, Taiwan's net exports are declining, especially in labour intensive products like clothing, toys, televisions and even fully assembled computers. This suggests the Taiwanese economy is restructuring in response to China's expansion. In the remainder of its export sectors, including computer components and iron and steel articles, Taiwan is expanding despite competition from China. Evidently, Taiwan now is focussing more on computer parts and components than on fully assembled computers.

Table 2.11

**Taiwan Moving Out of New Chinese Sectors**

Competition from China in Taiwanese Export Sectors between 1996-97 and 2000-01

	Number of products <sup>a</sup>	Taiwanese Net Exports 1996-97 (US\$ bill)	Taiwanese Net Exports 2000-01 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 2000-01 (US\$ bill)
<b>Competition from China<sup>b</sup></b>	368	48.8	44.4	81.0	126.2
(per cent of total net exports)		68	61	71	77
<b>Taiwan expanding regardless</b>	117	13.1	19.2	19.9	30.2
eg: Office machine parts		7.4	10.5	-0.5	0.7
Articles of iron and steel		2.7	3.0	1.7	3.9
<b>Taiwan contracting</b>	251	35.7	25.2	61.2	96.0
eg. Clothing		2.2	1.7	26.9	34.7
Computers		9.2	7.4	3.5	7.3
Toys, games and sporting goods		2.2	1.7	6.3	8.9
Televisions, monitors, projectors		1.1	0.5	0.5	1.4
<b>Total Net Exports</b>	526 <sup>c</sup>	72.1	72.7	114.4	164.8

Notes: As for Table 2.3.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Taiwan also enjoys a high level of complementarity with China with more than a third of its net exports complementary with China's net import demand (Table 2.12). Taiwan is a net exporter of many Chinese manufacturing inputs including synthetic fibres and textiles, steel, plastics in primary forms and telecommunications equipment. These complementary exports expanded 42 per cent over the period considered, probably spurred by China's rapid growth and falling trade, investment and communication barriers between China and Taiwan. Taiwan is a net importer of a smaller amount of goods that China exports, including coal and video and digital cameras and mobile phones.

Table 2.12

**China-Taiwan Trade Complementarity Growing****Trade Complementarity between China and Taiwan, 1996-97 and 2000-01**

	Number of products <sup>a</sup>	Complementarity 1996-97 US\$ billion <sup>b</sup>	Complementarity 2000-01 US\$ billion <sup>b</sup>
<b>Taiwan net exporter and China net importer</b>	201	19.4	27.6
eg. Man-made fibres and textiles		3.6	2.7
Steel		0.6	2.3
Plastics in primary forms		1.3	1.8
Telephones, fax machines, modems		-	1.3
<b>China net exporter and Taiwan net importer</b>	325	6.1	8.4
eg. Coal		1.0	1.5
Video and digital cameras; mobile phones		-	1.0

Notes: <sup>a</sup> As for Table 2.4.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Taiwan's complementarity with China, like that of the ROK, remains much lower than the level of competition between their net exports. However, unlike the ROK, Taiwan is restructuring away from a majority of sectors which compete with China. The gradual liberalisation of rules on Taiwanese investment in China allows Taiwanese firms to shift their more labour intensive operations to China, freeing resources to produce higher value added goods in Taiwan (Chan et al., 2002). Taiwan also increasingly produces components China requires, linking into and gaining longer term benefits from China's expansion. Taiwanese and Chinese accession to the World Trade Organization in 2001 should further boost prospects for economic integration with China.

**Taiwan's Revealed Comparative Advantage**

Like the ROK, Taiwan's comparative advantage is largely in capital and reasonably technology intensive manufactures, like office machines including parts and accessories, natural and man made fibres and textiles, plastics and printed circuits but is still competitive in labour intensive products like bicycles, toys and clothing (Table 2.13). Taiwan has a comparative disadvantage in manufacturing inputs such as crude oil and organic chemicals and in some capital and technology intensive goods such as non-office machinery, instruments and integrated circuits.

Table 2.13

**Taiwan Strong in Computer Parts and Textiles**

**Michaely Indices Revealing Taiwan's Major Comparative Advantage and Disadvantage Product Groupings, 2000-01**

Taiwan's Top 10 Comparative Advantage Groupings		Taiwan's Top 10 Comparative Disadvantage Groupings	
Office machine parts and accessories	7.7	Crude oil	-6.1
Fibres and textiles	7.0	Non-office machines	-4.3
Computers	5.0	Instruments (not timekeeping or musical)	-3.5
Plastics	2.9	Integrated circuits and microassemblies	-3.2
Printed circuits	2.2	Organic chemicals	-2.8
Iron and steel articles	2.2	Misc chemical products	-1.5
Steel	1.5	Vegetable products	-1.4
Bicycles and parts	1.3	Oscilloscopes, spectrum analysers; apparatus for measuring electrical quantities or radiation	-1.4
Toys, games, sporting goods	1.2	Prepared foodstuffs	-1.3
Clothing	1.2	Coal	-1.3

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Like the ROK's, Taiwan's Michaely indices indicate it also is moving up the value added chain. Its revealed comparative advantage is strengthening in a wide variety of manufactured goods like office machine parts and accessories as well as in steel and vegetable products. Its comparative disadvantages in technology intensive inputs such as television tubes, organic chemicals and liquid crystal devices also are improving (Table 2.14). Meanwhile, it is weakening in assembled computers and fibres and textiles, and increasingly relying on imports for mineral energy sources like crude oil and specialised instruments such as oscilloscopes.

Like others in the region, Taiwan's economy also is restructuring to adjust to the changing international competitive environment and China's development. For example, it now relies less on man made fibres and computers for export revenue, reflecting China's increasing strength in those industries. It increasingly exports steel and organic chemicals, sectors of expanding Chinese import demand. Thus, Taiwan appears to be restructuring flexibly, withdrawing from many sectors where China is competitive and expanding production in many sectors supplying China's import needs. As they reduce production of certain products in Taiwan, Taiwanese firms often are establishing new plants in China. The associated direct investment in and emigration of hundreds of thousands of personnel to China also is a key factor in integration between the two economies (Deloitte and Touche, 2002).



Table 2.14

**Taiwan Moves out of Assembled Computers and into Parts****Michaely Indices Showing Taiwan's Changing Revealed Comparative Advantage, 1996-97 to 2000-01 <sup>a</sup>**

Taiwan's Top 5 Areas of Strengthening Advantage		Taiwan's Top 5 Areas of Improving Disadvantage	
Steel	+1.9	Thermionic or cathode valves and tubes (inc television tubes)	+1.7
Office machine parts and accessories	+1.5	Organic chemicals	+1.6
Vegetable products	+1.0	Liquid crystal devices, lasers etc	+1.5
Unrecorded media for sound recording	+0.8	Motor cars	+0.8
Printed circuits	+0.8	Automatic regulating or controlling instruments and apparatus	+0.8
Taiwan's Top 5 Areas of Declining Advantage		Taiwan's Top 5 Areas of Worsening Disadvantage	
Assembled office machines	-2.6	Crude oil	-1.5
Fibres and textiles	-1.5	Oscilloscopes, spectrum analysers; apparatus for measuring electrical quantities or radiation	-1.0
Pork	-0.8	Photographic laboratory equipment	-0.9
Machine tools and parts	-0.7	Video and digital cameras; mobile phones	-0.5
Clothing	-0.6	Petroleum gases	-0.4

Notes: <sup>a</sup> Difference between index values for 1996-97 and 2000-01.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

**HONG KONG**

Hong Kong is a major re-exporter of Chinese goods, with local firms adding some value to many of these re-exports as they pass through Hong Kong; even looking at the net goods trade, Hong Kong appears to have a very similar trade focus to China. However, only 9 per cent of Hong Kong's workforce is now engaged in manufacturing so Hong Kong is not a major competitor with China. In the past 20 years, Hong Kong has moved out of most of the light manufacturing sectors China now dominates and mostly produces complementary services. As this is not evident when looking at the net merchandise trade flow data this study employs for other economies, the following analysis is based only on Hong Kong's domestic exports and 'domestic imports', imports minus re-exports.<sup>6</sup>

<sup>6</sup> Hong Kong authorities measure domestic exports by subtracting re-exports from total exports. However, differentiating domestic exports from re-exports is a difficult process and the data is not perfect, creating some potential for anomalies. 'Domestic imports' are estimated by subtracting re-exports from total imports.

## Trade Flow Comparisons

Even comparing Hong Kong's gross domestic merchandise exports with Chinese net exports appears to show a majority, 66 per cent, of Hong Kong's outward trade by value competes with China (Table 2.15).<sup>7</sup> More than half these sectors are various types of clothing, a generally labour intensive product, but anecdotal evidence indicates Hong Kong has moved into the high fashion end of these product lines. Hong Kong is expanding several of these exports, including some forms of clothing but is reducing its domestic exports of items such as computer parts. However, a significant proportion of re-exported merchandise probably remains in the statistics, making robust conclusions hard to draw.

Table 2.15

### Hong Kong Symbiotic with China

Competition from China in Hong Kong Export Sectors between 1996-97 and 1999-2000

	Number of products <sup>a</sup>	Hong Kong Domestic Exports 1996-97 (US\$ bill)	Hong Kong Domestic Exports 1999-2000 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 1999-2000 (US\$ bill)
<b>Competition with China<sup>b</sup></b>	58	16.6	15.1	44.5	56.5
(per cent of domestic/net exports)		61	66	39	39
<b>Hong Kong expanding</b>	19	7.8	9.2	41.2	51.6
eg. Certain types of clothing		7.1	7.9	2.6	2.7
<b>Hong Kong contracting</b>	39	8.8	5.8	27.5	36.7
eg. Office machine parts, accessories		1.0	0.6	-0.5	0.1
Certain types of clothing		1.8	1.5	6.3	7.5
Jewellery		0.7	0.7	0.9	1.6
<b>Total Domestic/Net Exports</b>	176 <sup>c</sup>	27.4	23.0	114.4	143.8

Notes: As for Table 2.3, except domestic exports of a particular product must be greater than US\$50 million to classify Hong Kong as in competition with China.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

About 20 per cent of Hong Kong's domestic exports complement China's import demand, down slightly from 23 per cent in 1996-97 (Table 2.16). Meanwhile, China is a net exporter of a much greater value of goods, including computers that meet Hong Kong's import demand.

<sup>7</sup> Gross domestic trade data was used because trying to subtract 'domestic imports' from domestic exports gives the same net trade data used for other economies, which includes a high level of value adding to Chinese re-exports.

While this analysis appears to indicate China is more a competitor with Hong Kong than a complementary economic partner, Hong Kong's special role as an entrepot explains much of this apparent similarity in their net export profiles. Looking only at merchandise trade, Hong Kong and China appear to have relatively weak complementarity and be significant competitors. However, this is not actually the case, as the services Hong Kong entrepreneurs supply Chinese manufacturers show up as value added to Chinese re-exports.

Table 2.16

### Re-exports Mask Underlying Complementarity

Trade Complementarity between China and Hong Kong between 1996-97 and 1999-2000

	Number of products <sup>a</sup>	Complementarity 1996-97 US\$ billion <sup>b</sup>	Complementarity 1999-2000 US\$ billion <sup>b</sup>
<b>Hong Kong domestic exporter and China net importer</b>	29	6.4	4.6
eg. Integrated circuits and microassemblies		2.0	1.9
<b>China net exporter and Hong Kong domestic importer<sup>c</sup></b>	83	12.1	10.8
eg. Computers		2.0	1.9

Notes: <sup>a,b</sup> As for Table 2.4.

<sup>c</sup> Domestic imports estimated by subtracting re-exports from total imports.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Two-way merchandise trade between China and Hong Kong should expand further when the Hong Kong–China Closer Economic Partnership Arrangement commences in January 2004 (*Far Eastern Economic Review*, 10 July 2003). China will eliminate tariffs applying to 273 types of Hong Kong-made goods, accounting for 67 per cent of its exports to the mainland. The number of goods covered will gradually increase over the next two years.

### Hong Kong's Revealed Comparative Advantage

Again, due to data limitations, Hong Kong's comparative advantage appears to be in labour intensive manufactures, like clothing, toys and sporting goods and watches, but as discussed previously, this is unlikely to be the case in reality (Table 2.17). The analysis also reveals Hong Kong has a large range of manufacturing inputs such as integrated circuits and refined petroleum oils though these mostly are on-shipped to China. It also has a comparative disadvantage in capital and technology intensive products like video and digital cameras and mobile phones and non-office machinery; some of these are destined for Hong Kong's regionally oriented retail sector. Furthermore, Hong Kong's economy is dominated by its burgeoning services sector, so its revealed comparative advantage in merchandise trade tells a limited part of its trade story.

Table 2.17

**Hong Kong Comparative Advantage in Light Manufacturing**

**Michaely Indices Revealing Hong Kong's Major Comparative Advantage and Disadvantage Product Groupings, 1999-2000**

Hong Kong's Top 10 Comparative Advantage Groupings		Hong Kong's Top 10 Comparative Disadvantage Groupings	
Clothing	35.5	Video cameras, digital cameras; mobile phones	-9.4
Toys	10.8	Integrated circuits and microassemblies	-9.2
Instruments (not timekeeping or musical)	5.6	Non-office machines and parts	-8.6
Watches	5.4	Refined petroleum oils	-7.8
Plastic articles	3.2	Diamonds	-5.9
Bags, cases	3.1	Computers	-5.7
Electrical transformers, converters etc	3.0	Chemical products	-5.7
Telephone, faxes etc	3.0	Diodes, transistors and semi conductors	-5.2
Stereos etc	2.8	Motor vehicles	-3.9
Entertainment articles	2.6	Seafood	-3.9

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Michaely indices indicate Hong Kong's reliance on imported gold, motor cars and man made fibres and fabrics is declining, while its net exports of clothing and electrical machinery including telephones, faxes and modems, transformers and converters and stereos, is strengthening (Table 2.18). Meanwhile, it is gradually moving out of office machines and parts, while further relying on imports for consumer goods like video and digital cameras, mobile phones, computers and semi conductors.

Hong Kong's re-export business also is restructuring to adjust to the changing international competitive environment, particularly China's increased capacity to directly export more labour intensive manufactures. Hong Kong relies less on re-exports of labour intensive products like clothing for export revenue and increasingly depends on imports and re-exports of more sophisticated consumer goods, reflecting China's increasing strength and Hong Kong manufacturers' growing Chinese investments in those industries.

Table 2.18

**Industrial Fine Tuning in Hong Kong Adjusts Trade Mix****Michaely Indices Showing Hong Kong's Changing Revealed Comparative Advantage, 1993-94 to 1999-2000<sup>a</sup>**

Hong Kong's Top 5 Areas of Strengthening Advantage		Hong Kong's Top 5 Areas of Improving Disadvantage	
Clothing	+5.0	Gold	+6.4
Instruments (not timekeeping or musical)	+4.5	Motor cars	+2.9
Telephone, faxes etc	+2.8	Video recorders	+2.1
Stereos etc	+2.6	Synthetic fibres and fabrics	+1.7
Liquid crystal devices	+2.5	Televisions	
Hong Kong's Top 5 Areas of Declining Advantage		Hong Kong's Top 5 Areas of Worsening Disadvantage	
Office machine parts and accessories	-3.3	Video cameras, digital cameras; mobile phones	-8.6
Television, radio, radar etc parts	-1.2	Refined petroleum oils	-4.8
Petroleum gas	-1.0	Diodes, transistors and semi conductors	-4.4
Capacitors	-0.9	Computers	-4.3
Rubber/plastic working machinery	-0.7	Integrated circuits and microassemblies	-2.5

Notes: <sup>a</sup> Difference between index values for 1993-94 and 1999-2000.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

**SOUTH EAST ASIAN RESPONSES TO CHINA****INDONESIA**

Indonesia's export strengths lie mainly in primary resources and labour intensive manufactures. Its primary commodity exports are well placed to benefit from China's expansion. While Indonesia is a competitor with China for labour intensive manufactures, China's competitive pressure could increase Indonesian efficiency and promote specialisation of production best suited to the Indonesian economy. Policy settings need to be right to ensure maximum flexibility in the economy and allow this adjustment to occur.

**Trade Flow Comparisons**

Indonesia faces competition from China in more than two thirds of its 549 net export sectors, accounting for almost half its net exports by value (Table 2.19). However, Indonesia is proving resilient to this challenge; despite the Asian financial crisis from 1996-97 to 1999-2000 it expanded its net exports of

these products by 35 per cent in US dollar terms. Resilience of these sectors was important for Indonesia as its net exports of products not competing with China actually fell over the same period, partly due to lower oil prices. In a majority of these sectors, including clothing, furniture and assembled computers, Indonesia is expanding its net exports rapidly. In the other 105 sectors where China competes, such as televisions and footwear, Indonesia gradually is reducing its net exports.

Table 2.19

**China-Indonesia Competition Increasing**

**Competition from China in Indonesian Export Sectors between 1996-97 and 1999-2000**

	Number of products <sup>a</sup>	Indonesian Net Exports 1996-97 (US\$ bill)	Indonesian Net Exports 1999-2000 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 1999-2000 (US\$ bill)
<b>Competition from China</b>	383	15.8	21.3	89.5	116.6
(per cent of total net exports)		38	47	78	81
<b>Indonesia expanding regardless</b>	278	9.1	16.1	67.8	88.8
Clothing		3.2	4.3	26.9	31.8
Furniture etc.		0.8	1.4	3.3	6.0
Computers		0.1	1.0	3.5	5.6
<b>Indonesia contracting</b>	105	6.8	5.2	21.7	27.7
eg. Footwear		1.7	1.6	7.5	9.0
<b>Total Net Exports</b>	549 <sup>c</sup>	41.9	44.9	114.4	143.8

Notes: As for Table 2.3.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

In addition, Indonesia's energy and other net exports increasingly complement China's requirements, indicating the huge potential China's growth provides for the Indonesian economy (Table 2.20). Indonesia produces 190 products for which China has a net import demand, representing over a quarter of its net exports by value. The value of complementary net exports, which include energy exports like crude oil and petroleum gases, rose by 64 per cent over the period. China is a net exporter of a much smaller proportion of Indonesian net import requirements, accounting for less than 10 per cent of Indonesian net imports.

Table 2.20

**Indonesia's Energy Exports Complement China****Trade Complementarity between China and Indonesia, 1996-97 and 1999-2000**

	Number of products <sup>a</sup>	Complementarity 1996-97 US\$ billion <sup>b</sup>	Complementarity 1999-2000 US\$ billion <sup>b</sup>
<b>Indonesia net exporter and China net importer</b>	190	7.3	12.0
eg. Crude oil		1.7	3.2
Petroleum gases		0.6	1.1
<b>China net exporter and Indonesia net importer</b>	301	3.4	3.3

Notes: As for Table 2.4.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

**Indonesia's Revealed Comparative Advantage**

Michaely index analysis reveals Indonesia's comparative advantage encompasses natural resources, such as natural gas, wood, paper, fats and oils, copper ore and seafood, labour intensive manufactures, such as clothing, footwear, assembled office machines and parts and electrical machinery (Table 2.21). Indonesia has a comparative disadvantage in many capital intensive manufactured goods including general machinery, refined petroleum oils, organic chemicals, motor vehicles and iron and steel.

Table 2.21

**Indonesia's Strengths in Primary Goods and Light Manufactures****Michaely Indices Revealing Indonesia's Major Comparative Advantage and Disadvantage Product Groupings, 1999-2000**

Indonesia's Top 10 Comparative Advantage Groupings		Indonesia's Top 10 Comparative Disadvantage Groupings	
Petroleum gases	9.8	Non-office machines and parts	-12.8
Clothing	7.8	Refined petroleum oils	-7.1
Electrical machines	4.3	Organic chemicals	-6.2
Plywood	3.9	Non-rail vehicles	-3.5
Fats and oils	3.2	Rice	-3.2
Office machines and parts	3.0	Iron and steel	-2.7
Paper	2.9	Cotton	-2.5
Footwear	2.7	Wood pulp	-1.9
Copper ores and concentrates	2.6	Iron and steel articles	-1.8
Seafood	2.6	Plastics in primary forms	-1.7

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Indonesia has eliminated its previous comparative disadvantage in electrical machinery to the point where it now has a comparative advantage (Table 2.22). It also has dramatically reduced its comparative disadvantage in non-office machinery. In addition, it has strengthened its advantage in office machines and parts and paper. Meanwhile, its revealed comparative advantage in some primary goods, like crude oil and plywood, has weakened considerably and it relies more on imports for refined petroleum, rice and organic chemicals.

Table 2.22

**Indonesia Industrialises, Reducing Reliance on Resources**

**Michaely Indices Showing Indonesia's Changing Revealed Comparative Advantage, 1992-93 to 1999-2000<sup>a</sup>**

Indonesia's Top 5 Areas of Strengthening Advantage		Indonesia's Top 5 Areas of Improving Disadvantage	
Office machines and parts	+3.2	Electrical machines	+12.0
Paper	+2.5	Non-office machines and parts	+10.8
Palm oil	+1.2	Iron and steel articles	+1.7
Furniture, bedding	+0.9	Plastics in primary forms	+1.3
Parts for sound recording apparatus	+0.9	Iron and steel	
Indonesia's Top 5 Areas of Declining Advantage		Indonesia's Top 5 Areas of Worsening Disadvantage	
Crude oil	-8.4	Refined petroleum oils	-6.5
Plywood	-6.6	Rice	-3.0
Clothing	-1.8	Organic chemicals	-2.4
Petroleum gases	-1.7	Sugar	-1.2
Natural rubber	-1.3	Floating platforms etc	-0.7

Notes: <sup>a</sup> Difference between index values for 1992-93 and 1999-2000.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Indonesia's labour intensive net exports such as clothing face increasing competition from Chinese products. Despite this, Indonesia is expanding net exports of a number of items and appears to be holding its own. In addition, its energy and other net exports are increasingly complementary with China's requirements, indicating the huge potential China's growth provides for the Indonesian economy. It is important that Indonesia's reform process, particularly bank and corporate restructuring, remains on track, to ensure Indonesian industry can continue to adjust to China's competitive pressure. For example, lack of access to new investment finance could disadvantage Indonesian companies seeking to compete with Chinese imports.



## MALAYSIA

Malaysia, like Indonesia, relies heavily on resource and labour intensive manufactured exports, but has significantly more overlapping sectors with China than does Indonesia. As with Indonesia, this means Malaysia will benefit strongly from increased demand for resources China's expansion creates; competitive pressures also should boost efficiency and encourage better specialisation.

### Trade Flow Comparisons

Competition between Malaysia and China for export sectors is comparatively high with over two thirds of Malaysia's net exports by value competing with China's (Table 2.23). However, Malaysia increased its net exports by half in these sectors, despite a 58 per cent increase in Chinese net exports. A large majority of these net exports, including office machines and parts, expanded strongly despite Chinese competition, while the remaining 20 per cent declined marginally.

Table 2.23

#### China–Malaysia Competition Intensifying

##### Competition from China in Malaysian Export Sectors between 1996-97 and 2000-01

	Number of products <sup>a</sup>	Malaysian Net Exports 1996-97 (US\$ bill)	Malaysian Net Exports 2000-01 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 2000-01 (US\$ bill)
<b>Competition from China<sup>b</sup></b>	296	20.3	30.3	73.1	115.5
(per cent of total net exports)		52	64	64	70
<b>Malaysia expanding regardless</b>	173	11.1	24.1	41.6	70.9
eg. Office machines and parts		5.9	14.2	3.6	8.6
Video and digital cameras; mobile phones		-0.4	1.7	-0.5	2.4
<b>Malaysia contracting</b>	123	9.3	6.2	31.5	44.7
eg. Stereos and video recorders		4.3	3.5	3.0	4.8
<b>Total Net Exports</b>	383 <sup>c</sup>	39.1	47.3	114.4	164.8

Notes: <sup>a</sup> As for Table 2.3.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Less than 20 per cent of Malaysia's net exports complement Chinese net import demand, indicating a relatively low level of integration with the supply chain for Chinese industry (Table 2.24). As with Indonesia, Malaysia's main complementary exports are of energy. Meanwhile, China is a net exporter of a wide range of goods with a slightly lower value that satisfy Malaysian net demand for imports.

Table 2.24

**China-Malaysia Complementarity Low but Improving**

Trade Complementarity between China and Malaysia between 1996-97 and 2000-01

	Number of products <sup>a</sup>	Complementarity 1996-97 US\$ billion <sup>b</sup>	Complementarity 2000-01 US\$ billion <sup>b</sup>
<b>Malaysia net exporter and China net importer</b>	123	5.7	9.0
eg. Crude oil		1.7	2.0
Petroleum gases		0.6	1.2
<b>China net exporter and Malaysia net importer</b>	402	5.4	5.0

Notes: As for Table 2.4.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Malaysia provides another example of an economy facing a high level of competition from Chinese net exports that still is achieving significant net export growth. However, outside energy, Malaysia has not yet positioned itself to benefit significantly from exports to the growing Chinese economy.

**Malaysia's Revealed Comparative Advantage**

Malaysia's comparative advantage lies in assembled elaborately transformed manufactures including office machine parts, computers and stereos and primary products like natural gas, timber and palm oil (Table 2.25). They also indicate a large revealed comparative disadvantage in other manufactures, such as integrated circuits, non-office machinery and chemicals.

Table 2.25

**Malaysia's Advantage in Computers and Resources**

Michaely Indices Revealing Malaysia's Major Areas of Comparative Advantage and Disadvantage, 2000-01

Malaysia's Top 10 Comparative Advantage Groupings		Malaysia's Top 10 Comparative Disadvantage Groupings	
Office machine parts and accessories	7.6	Integrated circuits and microassemblies	-9.4
Computers	6.4	Non-office machines	-6.5
Petroleum gases	3.7	Chemical products	-2.1
Wood and wooden articles	3.0	Steel	-1.5
Stereos etc	2.6	Vegetable products	-1.5
Palm oil	2.5	Switches etc	-1.2
Televisions, monitors etc	2.0	Motor cars	-1.2
Crude oil	1.8	Gold	-1.1
Video and digital cameras; mobile phones	1.7	Instruments (not timekeeping or musical)	-1.0
Furniture, bedding, lamps	1.5	Paper	-1.0

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Like China, Malaysia's economy is changing its focus towards more high technology manufactured goods. It has strengthened its comparative advantage in computers, their parts and accessories, video and digital cameras and mobile phones, while making strong progress in reducing comparative disadvantage in non-office machines and aircraft (Table 2.26). Its relative strength in resource and labour intensive exports such as timber, palm oil, crude oil, rubber and clothing is waning; also it is relying much more on imports of integrated circuits to supply its manufacturing industries.

Table 2.26

### Malaysia Industrialising Further into Computers and Machines

Michaely Indices Showing Malaysia's Changing Revealed Comparative Advantage, 1992-93 to 2000-01<sup>a</sup>

Malaysia's Top 5 Areas of Strengthening Advantage		Malaysia's Top 5 Areas of Improving Disadvantage	
Computers	+6.2	Non-office machines	+5.5
Office machine parts and accessories	+4.7	Powered aircraft	+2.0
Video and digital cameras; mobile phones	+1.7	Chemical products	+1.8
Petroleum gases	+1.2	Textiles	+1.5
Furniture, bedding, lamps	+0.6	Refined petroleum oils	+1.4
Malaysia's Top 5 Areas of Declining Advantage		Malaysia's Top 5 Areas of Worsening Disadvantage	
Wood and wooden articles	-6.7	Integrated circuits and microassemblies	-9.5
Crude oil	-5.7	Prepared foodstuffs	-0.4
Palm oil	-1.8	Confidential items	-0.4
Natural rubber	-1.6	Transformers, static converters and inductors	-0.4
Clothing	-1.5	Electric sound or visual signalling apparatus	-0.3

Notes: <sup>a</sup> Difference between index values for 1992-93 and 2000-01.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

The Malaysian economy has repositioned itself strongly in a range of manufacturing sectors to meet changing international demand. Unlike many other economies, the sectors where Malaysia is strengthening its presence often overlap with China's strengthening areas of comparative advantage; one major example is in office machines. In this respect, the Malaysian economy appears to be developing in a similar way to the ROK economy.

## THE PHILIPPINES

The Philippines economy appears to be successfully adjusting to changing international demand and Chinese competition; it has high complementarity with China's net import demand and is expanding strongly in the areas where it is competing with China. However, China may present much less of a competitive challenge to the Philippines because the Philippines is not a strong exporter of many traditional labour intensive exports, rather than because its manufacturers are adapting flexibly to China's competition.

### Trade Flow Comparisons

The Philippines appears to be facing competition from Chinese net exports in just under half of its net exports by value (Table 2.27). However, between 1996-97 and 2000, the Philippines increased its net exports in these sectors by over two thirds, in US dollar terms, while Chinese net exports rose by only one third. Of the 108 net exports whose value rose over this period, office machines and parts grew the most strongly, quadrupling between 1996-97 and 2000. Net exports of the other 97 products fell.

Table 2.27

#### China-Philippines Competition Relatively Low

##### Competition from China in Philippine Export Sectors, 1996-97 and 2000

	Number of products <sup>a</sup>	Philippine Net Exports 1996-97 (US\$ bill)	Philippine Net Exports 2000 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 2000 (US\$ bill)
<b>Competition from China<sup>b</sup></b>	206	6.1	10.4	70.9	94.6
(per cent of total net exports)		64	46	62	60
<b>The Philippines expanding regardless</b>	108	3.9	9.0	43.8	61.0
eg. Office machines and parts		1.2	4.8	3.6	7.5
Clothing		2.3	2.5	26.9	32.9
<b>The Philippines contracting</b>	97	2.2	1.4	27.0	33.6
<b>Total Net Exports</b>	244 <sup>c</sup>	9.5	22.7	114.4	158.9

Notes: As for Table 2.3.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

The Philippines is benefiting from its economic complementarity with China. US\$10.8 billion of its net exports complement Chinese net import demand, compared to US\$10.4 billion which compete with Chinese net exports (Table 2.28). This complementarity has risen from only US\$1.8 billion in 1996-97, the biggest percentage increase of complementarity with Chinese net imports of all the economies included in this study. China provides a rapidly growing market for Philippine net exports of commodities such as integrated circuits for electronics. The Philippines' relatively well educated workforce provides it with a strong advantage in producing these more technology intensive products. China supplies a much smaller quantity of net exports that the Philippines requires.

Table 2.28

### Philippine Exports Increasingly Complementary

#### Trade Complementarity Between China and The Philippines, 1996-97 and 2000

	Number of products <sup>a</sup>	Complementarity 1996-97 US\$ billion <sup>b</sup>	Complementarity 2000 US\$ billion <sup>b</sup>
<b>The Philippines net exporter and China net importer</b>	68	1.8	10.8
eg. Integrated circuits and microassemblies		0.5	8.2
<b>China net exporter and the Philippines net importer</b>	384	3.3	3.5

Notes: As for Table 2.4.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

### The Philippines' Revealed Comparative Advantage

The Philippines appears to have a strong comparative advantage in high technology components, such as integrated circuits, assembled computers, several primary commodities and clothing (Table 2.29). This may be largely because high minimum wage legislation encourages investment in relatively high technology capital intensive plants producing and assembling more technology intensive products, rather than in labour intensive industries, which may take better advantage of Philippine endowments.<sup>8</sup> The analysis also reveals a comparative disadvantage in crude oil and a large range of manufacturing inputs, such as non-office machinery, chemical products, fibres and textiles.

<sup>8</sup> Despite having an average per capita income about the same as China's, the Philippines does not appear to exhibit strong comparative advantage in many traditional labour intensive sectors, such as toys or footwear. Its relatively high minimum wage rates and restrictive labour market regulations may discourage new investment in these sectors. For example, minimum wage rates in Manila are as much as 60 per cent higher than those in Bangkok, while the Philippines' GDP per capita is only just over half Thailand's (World Bank, 2003).

Table 2.29

**Philippine Comparative Advantage in High Tech Components**

**Michaely Indexes Show the Philippines' Major Areas of Comparative Advantage and Disadvantage, 2000**

The Philippines' Top 10 Comparative Advantage Groupings		The Philippines' Top 10 Comparative Disadvantage Groupings	
Integrated circuits and microassemblies	19.1	Crude oil	-9.4
Computers	11.6	Non-office machines	-6.1
Clothing	6.4	Chemical products	-5.6
Diodes, transistors and semi-conductors	2.4	Fibres and textiles	-3.4
Printed circuits	2.0	Steel	-2.0
Insulated wire/cable, optical fibre cable	1.3	Cereals	-1.8
Coconut oil	1.2	Telephones	-1.8
Fruit	1.0	Prepared foodstuffs	-1.6
Leather articles	0.9	Plastics in primary forms	-1.5
Furniture, bedding, lamps	0.8	Non-rail vehicles	-1.5

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Michaely indices indicate the Philippines' revealed comparative advantage is strengthening rapidly in integrated circuits and assembled computers, while its comparative disadvantage in other manufactured goods, including non-office machinery, aircraft and cars is declining (Table 2.30). Meanwhile, the Philippines' relative strength in clothing and office machine parts and accessories is declining steeply, again probably due to its labour market policies, and it is relying increasingly on imports of crude oil, prepared foods and telecommunications equipment. As Philippine exports are concentrated in high technology components for electronic manufactures, it is benefiting from the expanding electronics industry, including in China.

Table 2.30

**The Philippines Specialising in High Tech Industries**

**Michaely Indexes Show the Philippines' Areas of Changing Revealed Comparative Advantage, 1996-97 and 2000<sup>a</sup>**

The Philippines' Top 5 Areas of Strengthening Advantage		The Philippines' Top 5 Areas of Improving Disadvantage	
Integrated circuits and microassemblies	+7.1	Non-office machines	+2.9
Assembled office machines	+5.3	Powered aircraft	+1.8
Printed circuits	+1.8	Motor cars	+1.1
Cargo/cruise ships, ferry boats etc.	+0.2	Semi-finished iron or non-alloy steel products	+0.7
Open glass bulbs and tubes for lamps, TV tubes etc	+0.2	Switches etc	+0.7
The Philippines' Top 5 Areas of Declining Advantage		The Philippines' Top 5 Areas of Worsening Disadvantage	
Clothing	-3.7	Crude oil	-2.4
Office machine parts and accessories	-2.5	Prepared foodstuffs	-2.0
Coconut oil	-1.5	Telephones, faxes and modems	-1.8
Unwrought copper	-0.8	Chemical products	-1.3
Diodes, transistors and semi-conductors	-0.7	Turbo-jets, turbo-propellers; other gas turbines	-0.5

Notes: <sup>a</sup> Difference between index values for 1996-97 and 2000.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

## SINGAPORE

As one of the region's most developed economies, Singapore has a strong technological edge over China. It has moved out of sectors where it competes directly with China and consolidated in areas of complementarity. Like the more developed North East Asian economies and Australia, Singapore is well placed to take advantage of China's growth by exploiting its complementarities.

### Trade Flow Comparisons

Nevertheless, Singapore still faces competition from China in half its net export sectors by value (Table 2.31). Furthermore, in over 80 per cent of net export sectors where China competes, including fully assembled computers and stereos, Singapore's net exports are declining, indicating the Singaporean economy is restructuring to other strengths.

Table 2.31

**Singapore Adjusting Rapidly**

**Competition from China in Singaporean Export Sectors between 1996-97 and 2000-01**

	Number of products <sup>a</sup>	Singaporean Net Exports 1996-97 (US\$ bill)	Singaporean Net Exports 2000-01 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 2000-01 (US\$ bill)
<b>Competition from China<sup>b</sup></b>	183	23.0	17.5	31.5	56.3
(per cent of total net exports)		70	50	28	34
<b>Singapore expanding regardless</b>	95	0.3	2.7	14.7	24.4
<b>Singapore contracting</b>	86	22.8	14.8	16.8	31.9
eg. Office machines		16.5	12.1	3.5	7.3
Stereos		1.5	0.5	2.6	2.8
<b>Total Net Exports</b>	300 <sup>c</sup>	32.8	34.9	114.4	164.8

Notes: As for Table 2.3.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

About a third of Singapore's net merchandise exports complement Chinese net import demand and its complementarity has grown rapidly in the last five years (Table 2.32). Singapore produces many key Chinese manufacturing inputs, including integrated circuits, microassemblies, refined petroleum and organic chemicals. These complementary net exports have more than doubled over the period considered. Singapore is a net importer of a wide variety of products that China produces, but in value terms these are less significant.<sup>9</sup>

While Singapore appears to be losing out in many of its traditional markets, new markets are replacing them. This will support Singapore well into the future.

<sup>9</sup> As with other advanced economies in the region such as Japan and Hong Kong, aspects of Singapore's services industry, including air services and telecommunications services, are highly competitive internationally. Anecdotal evidence suggests services are a further area of complementarity with China.



Table 2.32

**China-Singapore Complementarity Growing Strongly****Trade Complementarity between China and Singapore between 1996-97 and 2000-01**

	Number of products <sup>a</sup>	Complementarity 1996-97 US\$ billion <sup>b</sup>	Complementarity 2000-01 US\$ billion <sup>b</sup>
<b>Singapore net exporter and China net importer</b>	155	4.9	11.7
eg. Integrated circuits and microassemblies		-	2.8
Refined petroleum oils		2.0	1.6
Organic chemicals		-	2.2
<b>China net exporter and Singapore net importer</b>	511	8.4	7.0

Notes: As for Table 2.4.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

**Singapore's Revealed Comparative Advantage**

Singapore's merchandise trade comparative advantage is in complex manufactured goods; it relies on imports of primary products and labour intensive manufactures. Its main strengths are in technology intensive goods such as assembled computers, integrated circuits and computer parts, as well as petrochemical products like refined petroleum and organic chemicals (Table 2.33). Singapore relies on imports of crude oil, non-office machines, aircraft and cars and several heavy industry intermediate goods like steel and aluminium.

Table 2.33

**Singapore Specialised in Computers, Chemicals and Components****Michaely Indexes Show Singapore's Changing Comparative Advantage and Disadvantage, 2000-01**

<b>Singapore's Top 10 Comparative Advantage Groupings</b>		<b>Singapore's Top 10 Comparative Disadvantage Groupings</b>	
Computers	9.1	Crude oil	-6.5
Refined petroleum oils	2.5	Non-office machines	-3.6
Organic chemicals	1.7	Powered aircraft	-1.2
Integrated circuits and microassemblies	1.5	Motor cars	-0.8
Records, tapes and other recorded media	1.2	Instruments (not timekeeping or musical)	-0.6
Office machine parts and accessories	0.8	Iron and steel articles	-0.6
Plastics in primary forms	0.6	Steel	-0.6
Diodes, transistors and semi-conductors	0.5	Animals and animal products	-0.5
Television, radio, radar etc parts	0.4	Vegetable products	-0.4
Stereos	0.3	Aluminium and aluminium articles	-0.4

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Singapore is undergoing significant economic restructuring to fine tune its already technology intensive economic restructure, increasing its strength in technology intensive products like integrated circuits, recorded media and semi conductors and relying less on imports for crude oil, silicon wafers and ships (Table 2.34). Meanwhile, its exports of refined oil and computers are declining significantly. Singapore's comparative disadvantage is not worsening greatly in any particular industry, although it is importing more gold and silver jewellery, furniture and tobacco.

Table 2.34

**Singapore Moves into High Tech Components, Out of Oil Refining**

**Michaely Indexes Show Singapore's Changing Revealed Comparative Advantage, 1992-93 to 2000-01<sup>a</sup>**

Singapore's Top 5 Areas of Strengthening Advantage		Singapore's Top 5 Areas of Improving Disadvantage	
Integrated circuits and microassemblies	+1.9	Crude oil	+1.6
Records, tapes and other recorded media	+1.0	Chemical elements for use in electronics, in the form of discs, wafers etc	+1.2
Diodes, transistors and semi-conductors	+0.8	Cargo/cruise ships, ferry boats etc.	+1.0
Organic chemicals	+0.7	Fibres and textiles	+0.5
Plastics in primary forms	+0.5	Steel	+0.5
Singapore's Top 5 Areas of Declining Advantage		Singapore's Top 5 Areas of Worsening Disadvantage	
Refined petroleum oils	-6.3	Jewellery of precious metal	-0.3
Assembled office machines	-3.1	Furniture, bedding, lamps	-0.2
Stereos etc	-1.6	Tobacco	-0.2
Televisions, monitors etc	-1.0	Electric water and space heaters, hair dryers, hand dryers etc	-0.2
Clothing	-0.9	Oscilloscopes, spectrum analysers; apparatus for measuring electrical quantities or radiation	-0.2

Notes: <sup>a</sup> Difference between index values for 1992-93 and 2000-01.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

As in the North East Asian economies, Singapore continues to rapidly reduce its net exports of fully assembled computers, stereos and televisions and increasingly is concentrating in high technology electronic component exports. Singapore is responding to its rising relative cost structures by continuing its ongoing process of moving out of more labour intensive products and moving into more physical and human capital intensive sectors where its comparative advantage is stronger.

## THAILAND

Of all economies in South East Asia, Thailand has the most similar net export profile to China's and faces competition from China in the great majority of its net export sectors. Competitive pressure from expanding Chinese exports appears to be forcing many Thai companies and industries to either become more efficient or move into more specialised sectors. Provided the Thai economy is allowed to restructure with minimal impediments it should gain from this pressure. However, if Thai economic reform programs were allowed to slip, Chinese competition could prove a serious challenge.

### Trade Flow Comparisons

Thailand faces competition from China in over three quarters of its 505 net export sectors, accounting for 70 per cent of its net exports by value (Table 2.35). Thailand is having mixed success in these sectors; it expanded its net exports in a majority of sectors but achieved only an 8 per cent increase in five years. Meanwhile, China increased its net exports of the same products by 68 per cent over the same period. Thailand had some success with exports of office machine parts and accessories but its net exports of assembled computers contracted.

Table 2.35

#### Competition Tight Between Thailand And China for Export Sectors

Competition from China in Thai Export Sectors between 1996-97 and 2001-02

	Number of products <sup>a</sup>	Thai Net Exports 1996-97 (US\$ bill)	Thai Net Exports 2001-02 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 2001-02 (US\$ bill)
<b>Competition from China<sup>b</sup></b>	386	25.3	27.2	88.9	149.4
(per cent of total net exports)		75	70	78	79
<b>Thailand expanding regardless</b>	215	10.2	17.6	33.7	64.8
eg. Office machine parts		1.2	2.9	-0.5	2.5
<b>Thailand contracting</b>	171	15.1	9.6	55.1	84.6
eg. Computers		2.6	0.9	3.5	10.8
Clothing and footwear		4.6	3.9	34.4	47.5
<b>Total Net Exports</b>	505 <sup>c</sup>	33.6	38.9	114.4	188.8

Notes: As for Table 2.3.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

While less than 20 per cent of Thai net exports are complementary with Chinese net import demand, its complementarity is growing rapidly (Table 2.36). Notable net exports complementing Chinese demand include rubber, semi conductors and plastics in primary forms, indicating Thailand's mixed competitive strengths. Meanwhile, China is a net exporter of many goods, including video and digital cameras and mobile phones, but with a lower value that satisfy Thai net demand for imports.

Table 2.36

**Complementarity Low but Increasing**

**Trade Complementarity between China and Thailand between 1996-97 and 2001-02**

	Number of products <sup>a</sup>	Complementarity 1996-97 US\$ billion <sup>b</sup>	Complementarity 2001-02 US\$ billion <sup>b</sup>
<b>Thailand net exporter and China net importer</b>	148	2.0	6.1
eg. Natural rubber		0.5	0.6
Diodes, transistors and semi conductors		0.1	0.5
Plastics in primary forms		-	0.6
<b>China net exporter and Thailand net importer</b>	320	3.3	5.5
eg. Video and digital cameras and mobile phones		-	1.3

Notes: As for Table 2.4.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

At present, Thailand appears to be the least well placed of all South East Asian economies to compete with Chinese exports though increasingly it is positioning itself to benefit from its growing import demand.

**Thailand's Revealed Comparative Advantage**

Michaely indices for Thailand suggest its comparative advantage lies in labour intensive and some capital intensive manufacturing including clothing, office machines parts, goods vehicles, air conditioners, and primary products including rice, rubber and seafood (Table 2.37). Thailand has a significant revealed comparative disadvantage in crude oil and heavy industry products, such as general machinery, chemicals and steel and in technology intensive manufactures including integrated circuits, video and digital cameras and mobile phones.

Table 2.37

**Thailand's Strengths Diversified Amongst Manufactures****Michaely Indexes Showing Thailand's Major Areas of Comparative Advantage and Disadvantage, 2001-02**

Thailand's Top 10 Comparative Advantage Groupings		Thailand's Top 10 Comparative Disadvantage Groupings	
Clothing	4.7	Crude oil	-8.5
Office machine parts and accessories	4.2	Non-office machines exc air conditioners	-6.4
Rice	2.4	Chemical products	-5.9
Natural rubber	2.3	Integrated circuits and microassemblies	-3.4
Goods vehicles	1.9	Steel	-2.3
Preparations of crustaceans, molluscs	1.7	Video and digital cameras; mobile phones	-2.0
Air conditioners	1.6	Motor vehicle parts and accessories	-1.6
Televisions	1.4	Aircraft	-1.5
Preparations of fish	1.3	Iron	-1.4
Furniture, bedding	1.3	Gold	-1.1

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Thailand is restructuring its industry, strengthening its presence in computer parts and accessories, goods vehicles, air conditioners and electric motors and generators while reducing considerably its comparative disadvantage in general machinery, steel, cars and refined oil (Table 2.38). Thailand's strength in clothing, foodstuffs and precious stones and metals is waning and it is relying much more on imports of crude oil and petroleum gas and high technology manufactures including integrated circuits, video and digital cameras, mobile phones and aircraft parts.

The Thai economy is adjusting to rising cost pressures and China's competitive pressures but its net exports are expanding only slowly in sectors competing directly with China. Economic problems confronting Thailand since the Asian financial crisis, particularly in the banking system, may be inhibiting its capacity to invest in new technology to compete successfully with China. However, rapidly increasing complementarity between Thailand's exports and China's imports provides encouragement for future development.

Table 2.38

**Thailand Industrialising into Heavier and Higher Tech Industries**

**Michaely Indexes Showing Thailand's Changing Revealed Comparative Advantage, 1992-93 and 2001-02<sup>a</sup>**

Thailand's Top 5 Areas of Strengthening Advantage		Thailand's Top 5 Areas of Improving Disadvantage	
Office machine parts and accessories	+2.3	Non-office machines exc air conditioners	+6.4
Goods vehicles	+2.2	Steel	+4.0
Air conditioners	+0.9	Motor cars	+3.3
Electric motors and generators	+0.7	Refined petroleum oils	+3.2
Diodes, transistors and semi-conductors	+0.6	Plastics in primary forms	+2.1
Thailand's Top 5 Areas of Declining Advantage		Thailand's Top 5 Areas of Worsening Disadvantage	
Clothing	-6.2	Crude oil	-4.4
Crustaceans	-2.7	Integrated circuits and microassemblies	-3.2
Precious stones and metals	-2.5	Video and digital cameras; mobile phones	-1.7
Sago and high starch tubers exc potatoes	-2.0	Petroleum gases	-1.2
Prepared foodstuffs	-1.9	Aircraft parts	-0.9

Notes: <sup>a</sup> Difference between index values for 1992-93 and 2001-02.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

## IMPLICATIONS

The great majority of North East Asian and South East Asian economies are successfully restructuring their economies, enabling them to benefit from China's expansion as an industrial powerhouse. Most more advanced East Asian economies, including Japan, Taiwan and Singapore, are moving rapidly out of more labour intensive sectors and increasingly supplying the capital and human capital intensive inputs Chinese industry demands.

As their economies are more similar to China's, developing South East Asian economies could be expected to confront more acute challenges competing with Chinese exports. However, most appear to be expanding their net exports of competing products quite strongly and also are benefiting from increased trade complementarity with China. However, competing net exports from Thailand, whose net export profile is the most similar to China's, have grown relatively little in recent years.

China's industrial expansion is good news for most East Asian economies, but it is contributing to pressures for rapid restructuring throughout the region which is likely to have significant commercial implications for exporters. The following chapter analyses in more detail the commercial implications of these developments for Australian business.

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## APPENDIX 2.1

### MICHAELY INDICES OF REVEALED COMPARATIVE ADVANTAGE

Revealed comparative advantage measures like the Michaely index use trade data to assess economies' specialisation in particular products or product groups and thus 'reveal' where their comparative advantages lie.<sup>10</sup> Measuring and comparing these indices over time reveals changes in economies' comparative advantage shown by their changing specialisation.

#### Methodology

The analysis of trade similarity indices identifies the impact of internationalised production chains on trade in particular products. In particular, the large volume of two way intra-industry trade means high levels of gross exports of particular products may not necessarily be associated with an advantage in producing these products compared to other products. In these circumstances, levels of gross exports or imports can provide a distorted picture of an economy's strengths and weaknesses.

With this in mind, the analysis of regional economies' revealed comparative advantage was conducted using the Michaely index. The index can be characterised as follows:

$$RCA_i = \frac{X_i}{X} - \frac{M_i}{M}$$

The index measures a product's share of exports minus its share of imports. It takes a positive value when the economy is a net exporter and a negative value when it is a net importer. An advantage of the index is that the value can be roughly interpreted as the contribution of net trade in a product to an economy's balance of trade in goods.<sup>11</sup>

#### Data

This analysis uses data classified under the Harmonised System 4-digit classification system, with about 1 270 classifications for China, Hong Kong, Japan, ROK, Taiwan, Indonesia, Malaysia, the Philippines, Singapore and Thailand, comparing average Michaely revealed comparative advantage values for each product for 1996-1997 and 2000-2001. After calculating these Michaely indexes, products were aggregated into like products where the sign and direction of change of the values was substantially the same. The most significant results from both the disaggregated and aggregated data feature together in tables in this chapter.

<sup>10</sup> Trade allows economies to specialise in industries where they possess a comparative advantage, due to their available human or physical resources. This enables them to produce goods in these industries more efficiently than in other industries. By exporting the products from those industries, they can purchase goods produced comparatively cheaply by other economies.

<sup>11</sup> When the balance of trade in goods is zero, total exports will equal total imports and this interpretation will hold exactly. Provided the goods trade surplus or deficit is low as a proportion of total trade, as is often the case, this serves as a good approximation.



## IMPLICATIONS FOR AUSTRALIA

### KEY POINTS

- Australia is well placed to benefit as China's growing and restructuring industry demands increasing volumes of raw materials and other inputs.
- Australia and China have highly complementary economies; Australia is a competitive exporter of agricultural, energy and mineral resources and some higher value added manufactures, while China is a highly competitive producer of labour intensive manufactures. This complementarity should continue and even deepen in the short to medium term, providing direct benefits to Australia and China.
- Regional trade will continue to benefit all participants. China's supply of low cost manufactures and growing appetite for resource and intermediate good imports, including food stuffs, metals, plastics, chemicals and components provide significant opportunities for regional economies, including developing regional economies, to gain from increased specialisation. These gains should more than offset the costs of economic restructuring, ensuring impacts on East Asian trading partners and hence Australia are positive.
- Modelling results indicate Chinese demand for many major Australian exports, particularly minerals, should continue to grow rapidly. Destinations for some Australian exports will shift to China over time, as China's raw material requirements increase and other economies restructure into niche markets and higher value added activities.
- While the value of Australia's largest commodity export to the region, coal, will continue to rise, Australian coal's share in total East Asian coal consumption could fall. China's coal industry may satisfy an increasing share of expanding domestic coal demand and continue to be a more significant exporter.

Australia is one of the best placed of all regional economies to benefit from China's rapid industrial growth. Australia is a direct competitor with China in relatively few markets, especially compared with other regional economies, while Australia and China also are complementary in many of the goods they export. China's continuing growth, falling Chinese trade barriers post WTO entry and declining Australian trade barriers in labour intensive manufactures will ensure growing synergies and mutually beneficial trade between the two economies.

## TRADE FLOW COMPARISONS

The level of competition for export markets between Australia and China is low compared with most other regional economies (Table 3.1). Less than 40 per cent of Australia's net exports by value are in competition with Chinese net exports. Australia is expanding its exports in an overwhelming majority of these competing export products, reflecting the incidental nature of competition between the two economies. In fact, while Australia's overall net exports in US dollar terms declined over the period 1996-97 to 2001-02, due to the depreciation of the Australian dollar, net exports of commodities in competition with China actually increased.

Table 3.1

### **Australian Net Exports Resilient to Limited Competition from China** **Competition from China in Australian Export Markets between 1996-97 and 2001-02**

	Number of Commodities <sup>a</sup>	Australian Net Exports 1996-97 (US\$ bill)	Australian Net Exports 2001-02 (US\$ bill)	Chinese Net Exports 1996-97 (US\$ bill)	Chinese Net Exports 2001-02 (US\$ bill)
<b>Competition from China<sup>b</sup></b>	210	15.6	16.1	13.1	20.6
(per cent of total net exports)		37	39	11	11
<b>Australia expanding regardless</b>	85	11.8	14.0	4.6	8.1
eg. Coal		6.3	6.7	1.0	2.4
<b>Australia contracting</b>	125	3.8	2.1	8.5	12.5
<b>Total Net Exports<sup>c</sup></b>	337	42.4	41.2	114.4	188.8

Notes: <sup>a</sup> Commodities analysed at Harmonised System 4-digit level, covering 1 270 commodities.

<sup>b</sup> Total number or value of Chinese net exports of commodities that both China and Australia exported on a net basis in 1996-97.

<sup>c</sup> 2001-02.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

Unsurprisingly, given the low level of export market competition between Australia and China, a high level of complementarity exists between the two economies (Table 3.2). Australia is a key net supplier of resources such as iron and copper ores, alumina, natural gas, copper, non-crude oil, wool and wheat which China's manufacturing industries require. In turn, China is a major net exporter of many products that Australia requires, such as computers, clothing and footwear, video and digital cameras, mobile phones, toys and sporting goods. China's complementarity with Australia's net import requirements is considerable; these sectors represent nearly half Australia's total net imports.

Table 3.2

### China and Australia Highly Complementary

#### Trade Complementarity between China and Australia, 1996-97 and 2001-02

	Number of Commodities <sup>a</sup>	Value of Complementary Sectors 1996-97 US\$ billion <sup>b</sup>	Value of Complementary Sectors 2001-02 US\$ billion <sup>b</sup>
<b>Australia net exporter and China net importer</b>	170	7.7	10.7
eg. Iron and copper ores		1.9	3.2
Petroleum gases		0.6	1.3
Wool		0.5	0.8
Wheat		1.1	0.1
Refined petroleum oils		0.6	0.4
Refined copper		0.1	0.6
Alumina		0.1	0.6
<b>China net exporter and Australia net importer</b>	515	9.0	19.2
eg. Office machines and parts		2.7	3.1
Clothing and footwear		1.8	2.2
Video and digital cameras; mobile phones		-	0.9
Toys, games and sporting goods		0.6	0.6

Notes: <sup>a</sup> Harmonised System 4-digit level, made up of 1 270 commodities.

<sup>b</sup> Defined as minimum of the economy A's net exports of a particular commodity and economy B's net imports of that commodity. This figure therefore represents the maximum level of bilateral trade possible in that commodity if all economy A's net exports were sent to economy B.

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

China is not a strong competitor in Australia's net export markets. Moreover, China's net imports of many minerals that Australia exports are expanding; this should ensure Australia continues to benefit from China's ongoing growth. Two way complementarity between China and Australia is strong and expanding rapidly.

## AUSTRALIA'S REVEALED COMPARATIVE ADVANTAGE

Australia's revealed comparative advantage is mainly in primary commodities.<sup>1</sup> While no manufactured commodities fall within the top ten groupings, this in part reflects the focus of the Michaely index on net export specialisations.<sup>2</sup> Australia has a strong comparative advantage in minerals and energy including coal, iron ore, alumina, key non-ferrous metals, natural gas and gold and agricultural products including beef, wheat and wool (Table 3.3). Australia is a net importer of a large range of manufactured goods, both capital intensive, including machinery, motor vehicles, instruments, plastics, organic chemicals and pharmaceuticals and labour intensive, like clothing. Australia does not rely substantially on any primary good imports.

Table 3.3

### Australian Comparative Advantage Lies in Primary Goods

**Australia's Major Comparative Advantage and Disadvantage Commodity Groupings, 2001-02**

Australia's Top 10 Comparative Advantage Groupings		Australia's Top 10 Comparative Disadvantage Groupings	
Coal	10.5	Electrical machines	-9.3
Iron ore	4.2	Non-rail vehicles	-9.1
Beef	3.6	Non-office machines and parts	-8.2
Wheat	3.5	Office machines and parts	-4.8
Alumina	3.4	Clothing	-2.6
Unwrought aluminium	3.3	Instruments (not timekeeping or musical)	-2.5
Petroleum gases	2.8	Plastics and plastic articles	-2.3
Wool	2.5	Aircraft	-2.1
Gold	2.4	Organic chemicals	-2.0
Dairy	1.7	Pharmaceuticals	-2.0

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

<sup>1</sup> Revealed comparative advantage is measured using the Michaely index, defined as a good's share of an economy's exports minus its share of the economy's imports, as a measure of relative export performance by country and industry.

<sup>2</sup> For example, while Australia has substantial exports of elaborately transformed manufactures, accounting for 21 per cent of total merchandise exports in 2002, in the comparative advantage measurements included in this report, these gross exports are swamped by the larger value of imports of each of these items.

Michael indices indicate Australia is strengthening its advantage in selected primary products, such as wine, natural gas, dairy products and oil seeds while reducing its reliance on imports of manufactured goods like man-made fibres and fabrics, instruments and paper (Table 3.4). Meanwhile, Australia's advantage has weakened in the production of some other primary goods like gold, wool, coal and beef. Its reliance on imports is intensifying with respect to steel, pharmaceuticals, video and digital cameras, mobile phones and clothing.

Table 3.4

### Competitiveness in Wine Increasing; Decreasing in Wool

#### Australia's Major Areas of Changing Revealed Comparative Advantage, 1992-93 to 2001-02

Top 5 Areas of Strengthening Advantage		Top 5 Areas of Improving Disadvantage	
Wine	+1.2	Synthetic fibres and fabrics	+0.9
Petroleum gases	+0.8	Instruments (not timekeeping or musical)	+0.9
Dairy	+0.7	Paper	+0.7
Oil seeds	+0.6	Wood and wooden articles	+0.6
Live animals	+0.5	Motor vehicle parts and accessories	+0.5
Top 5 Areas of Declining Advantage		Top 5 Areas of Worsening Disadvantage	
Gold	-3.3	Steel	-0.9
Wool	-2.5	Pharmaceuticals	-0.8
Coal	-1.9	Video and digital cameras; mobile phones	-0.8
Beef	-1.5	Motor cars	-0.5
Iron	-0.4	Clothing	-0.5

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

## IMPLICATIONS FOR AUSTRALIA

More than most economies, Australia stands to gain from China's emergence as an industrial power and major global trader. China increasingly will demand Australian raw materials, particularly minerals and energy, still one of Australia's main areas of comparative advantage. China's gradual withdrawal from production and increased importation of some broad acre agricultural products should continue with ongoing agricultural reform and World Trade Organization, WTO, entry, further increasing Australian export opportunities for wheat, barley, animal feeds, beef and other land intensive crops (Economic Analytical Unit, 2002). For its part, China should continue to provide Australia with a competitive source of labour intensive manufactured goods, benefiting our terms of trade and keeping prices low for consumers. Australia stands to gain substantially more from its increasing complementarity with a growing China than it is likely to lose from competition with China.

## Changing Export Destinations

As North East Asian manufacturing restructures and China establishes itself further as a key location for labour intensive value adding, China's manufacturing sector is requiring increased volumes of raw material inputs. The shifting focus of raw materials demand already has started to affect Australia, a traditional supplier of many key raw material inputs to East Asian manufacturing. In many circumstances, China does not possess sufficient capacity or is not a competitive supplier of its required raw material inputs, so destinations of some Australian commodity exports gradually are shifting to China. However, in a minority of commodities, China's own agricultural and mining industries are fulfilling some of the increasing demand for raw material inputs, reducing Australia's market share compared to what might otherwise have occurred. Nevertheless, in most cases Australia's absolute export volumes should continue to increase. In this section, we examine trends for the top 20 goods where complementarity exists between Australia's net exports and East Asia's net imports.

Over the last five years, China's share of total East Asian net imports has risen for 13 out of 20 of Australia's major complementary exports (Table 3.5). Chinese import demand now accounts for a majority of total East Asian import demand for wool, alumina and barley, with rapidly increasing shares in alumina, refined copper, wool and copper ore. In other words, the destinations for some consignments of Australia's major mineral and agricultural exports are effectively shifting from other parts of East Asia to China. As heavy manufacturing, steel production and copper refining continue to expand in China and plateau or contract in economies like Japan, an increasing proportion of Australia's exports will go to China.

For another four of the 15 commodities, namely wheat, refined petroleum, raw cotton and coal, Chinese production has supplanted what otherwise may have been Australian exports. In these markets, China's substantial domestic production capacity and reform-driven productivity improvements are increasing China's ability to supply raw materials for burgeoning industry and consumer demand. Over the late 1990s, China has significantly reduced its net import demand for wheat, contributing to region-wide contraction in East Asian import demand, though previously China's annual wheat import demand fluctuated considerably depending on the quality of the season.<sup>3</sup> Refined petroleum, but not crude oil, imports also have declined due to China's expanding oil refining industry. It also became a marginal net exporter of raw cotton, but local production and exports tend to be of lower quality cotton while China imports higher quality cotton, thread and fabrics for its export oriented clothing industry.

China has expanded its net coal exports and established itself as a significant supplier in regional coal markets. China's coal industry is increasingly efficient, allowing it to meet local demand and expand exports. While Australian coal exports should continue to expand in absolute terms, China's regional market share may increase at the expense of Australian and other major coal exporters' shares (Ball et al., 2003).

<sup>3</sup> China also used inefficient command measures in an attempt to increase grain self sufficiency, but has moved away from these policies in recent years.

Table 3.5

**Some Major Australian Exports' Destinations Slowly Shift to China**

**China's Share of Total East Asian Net Imports for Top 20 Australian Complementary Net Exports, 1996-97 and 2000-01**

	China's Share of Total East Asian Net Imports, per cent		Total East Asian Net Imports, US\$ billion		Total Australian Net Exports, US\$ billion	
	1996-97	2000-01	1996-97	2000-01	1996-97	2000-01
Coal	-	-	11.4	10.6	6.3	5.9
Iron ore	23.7	31.7	6.2	6.9	2.4	2.6
Wheat	21.4	3.5	5.3	3.1	3.2	2.2
Beef	-	-	3.4	2.9	1.7	2.2
Aluminium, unwrought	2.0	8.1	7.4	7.2	1.8	2.2
Petroleum gas	3.6	4.9	17.8	25.4	1.3	1.8
Gold, unwrought	-	-	8.0	3.4	3.3	1.7
Wool	42.6	71.2	1.2	1.1	2.3	1.5
Cotton	25.4	-	4.9	2.5	0.8	1.0
Wine	1.6	2.1	0.9	1.0	0.4	0.9
Alumina	31.5	62.0	0.4	0.8	2.0	2.4
Milk, concentrated	0.3	7.1	1.5	1.3	0.6	0.7
Nickel, unwrought	-	9.3	0.8	1.0	0.3	0.6
Copper, unwrought	3.5	33.9	4.0	3.5	0.2	0.6
Refined petroleum	17.2	12.5	11.6	12.7	0.6	0.5
Copper ore	11.6	22.5	3.5	3.8	0.5	0.5
Zinc ore	3.5	10.8	0.5	0.6	0.4	0.5
Barley	48.7	58.0	0.7	0.6	0.6	0.4
Cheese	0.0	0.3	0.7	0.8	0.3	0.4
Wood chips	-	-	2.3	1.9	0.4	0.4

Source: Economic Analytical Unit calculations based on Department of Foreign Affairs and Trade data, 2003.

**CHINESE COAL CONTINUES TO SUPPORT CHINESE INDUSTRIAL EXPANSION**

Traditionally, the Chinese economy has been very coal intensive, relying on coal for more than two-thirds of its primary energy needs and three-quarters of its electricity generation. Its vast coal reserves and significant mine expansion in the 1980s and early 1990s have ensured that despite the heavy reliance on coal to fuel the energy needs of a booming economy, China is on balance more than self sufficient in its coal requirements.<sup>4</sup>

In recent years, significant manufacturing and coal industry reforms have reduced production while increasing efficiency and coal quality. On the other hand, environmental pressures have spurred China to reduce consumption and diversify its energy sources, for example to natural gas. On balance, these changes have boosted China's coal exports nearly threefold, making China the world's second largest exporter of coal after Australia. China's coal mining industry continues to receive industry-specific government subsidises estimated at US\$1.2 billion per annum.

A recent Australian Bureau of Agricultural and Resource Economics, ABARE, report estimated that, despite continued adjustment of the fuel mix away from coal, if China continued to subsidise its coal industry at current levels, increased electricity demand would drive total Chinese coal consumption up by around 37 per cent by 2015. However, it expected an even more rapid expansion of production, 43 per cent, would allow China to more than adequately meet its requirements, subject to specific quality or regional requirements. Consequently, annual Chinese exports could increase by about 17 per cent by 2015. Despite the possibility of China expanding its exports, the ABARE report estimates several factors including impediments to productivity gains in China and the improved competitiveness of Australian coal could combine to boost Australia's total coal exports by around 39 per cent over the same period.

Even if the Chinese government were to remove coal industry subsidies, ABARE anticipates China would remain a competitive and established exporter to Asian markets, with export volumes maintained approximately at current levels. This would stem from a slower, 31 per cent, increase in consumption and a 35 per cent increase in production. Even so, over the same period Australia's total coal exports would increase by over 40 per cent and capture the majority of the markets China would forgo by removing subsidies.

Source: Ball et al, 2003; Western Australian Department of Treasury and Finance, 2003.

<sup>4</sup> Some coal importation does occur, particularly into southern China, but this is more than outweighed by exports from ports in the North.



Of the five markets where non-China East Asia's import demand is increasing, the most notable is the market for petroleum gases. Natural gas's low emission qualities are driving a rapid increase in worldwide demand and production. As a major producer and expanding exporter of natural gas, Australia stands to gain from rapidly increasing import demand in East Asia. For example, another recent ABARE report projected total annual gas consumption in the eastern coastal region of China, which accounts for over a quarter of total Chinese GDP, could expand five fold by 2015, reaching 37 billion cubic metres (Schneider et al., 2003). According to the projections, liquefied natural gas, of which Australia is a major producer, would account for 17.2 billion cubic metres, or nearly half of total demand.<sup>5</sup>

Regardless of China's growing requirements, the large majority of Australia's net exports continue to be in strong demand from non-China East Asia. Of the top 20 commodities, where complementarity exists between Australian net exports and East Asian net imports, non-China East Asian net import requirements exceed Australia's actual net exports for 17 commodities. In 2000-01, these 20 commodities accounted for US\$29.2 billion in Australian net exports, while East Asian net import demand for the same commodities totalled US\$59 billion. Of course, Australia is not the only competitive world producer of these goods, but it demonstrates that even with the rise of China, non-China East Asia requires many more raw materials that Australia is currently able to provide. Continuing productivity improvements in Australian primary industry and transportation sectors should ensure continuing growth in Australian exports to non-China East Asia.

### Forecasts for Chinese Demand for Raw Materials

Reforms associated with WTO entry and accelerating FDI inflows should expand China's economic growth over the next decade, driving significantly higher Chinese demand for the key raw materials Australia produces (Economic Analytical Unit, 2002). Forecasts produced in the Economic Analytical Unit's recent report, *China Embraces the World Market*, suggest China's demand for imports of agricultural commodities will grow by an average 15 per cent per annum and of mineral and energy imports by 13.5 per cent in the ten years to 2010 (Economic Analytical Unit, 2002). A simple linear extrapolation of trends in Chinese net imports of raw materials such as metal ores, petroleum gas, metals and certain agricultural products suggests there will be significant opportunities for Australian exporters to China in coming years (Table 3.6).<sup>6</sup>

<sup>5</sup> For reference, in 2000, total Australian liquefied natural gas exports equated to approximately 7.5 million tonnes, equivalent to 10.3 billion cubic metres of natural gas (Department of Industry, Science and Resources, 2000).

<sup>6</sup> Linear extrapolations of past trends have significant limitations as a forecasting tool. However, barring major reversals in China's reform program or crises associated with its financial system, Chinese demand for the listed commodities should grow approximately in line with past long term trends. More sophisticated forecasts of Chinese import demand, where available, produce generally higher estimates than these linear extrapolations. Nevertheless, estimates presented here are merely a guide; the precise magnitude of increased demand is uncertain.

Table 3.6

**Demand for Major Australian Exports May Increase Strongly**

**Current and Projected Chinese Net Imports of Selected Commodities Exported by Australia, 2002 and 2010, US\$ billion<sup>a</sup>**

	2002 (Actual)	2010 (Projected)	Average Annual Percentage increase
Iron ore	2.77	3.81	4.1
Hides, skins and leather	2.30	3.23	4.3
Petroleum gas	1.35	2.39	7.4
Copper ore	0.81	1.50	8.0
Alumina	0.62	0.90	4.8
Wool	0.80	0.87	1.1
Canola seeds	0.15	0.89	24.9
Barley	0.29	0.53	7.8

Notes: <sup>a</sup> Projections are based on an extrapolation of the linear trend from 1992 to 2002.

Source: Economic Analytical Unit estimates.

If China implements its WTO commitments in full, demand for commodity imports could grow even more rapidly than the linear extrapolations suggest (Economic Analytical Unit, 2002). Modelling done for the Economic Analytical Unit suggested China's demand for imports of agricultural commodities would grow by an average 15 per cent per annum over the ten years to 2010, including a 15 per cent increase for grains imports, 16 per cent for other crops and 18 per cent for livestock. Mineral and energy imports were forecast to grow by 14 per cent per year, including a 17 per cent annual increase for iron ore. This modelling assumes China's gross domestic product, GDP, will grow 8.7 per cent per annum over the period.

Additionally, ABARE forecasts natural gas demand in China could increase as much as 14 per cent per annum to 2015, necessitating further imports of natural gas (Schneider et al., 2003).

Some analysts believe strongly increasing Chinese demand for commodities China must import, such as iron ore and copper, eventually could increase world commodity prices (Xie, 2001). If this occurs, Australia's terms of trade may gradually recover from its current low, further benefiting the Australian economy through higher export prices for all destinations.

## WTO ACCESSION TO INCREASE EXPORT OPPORTUNITIES TO CHINA

China's accession to the WTO should accelerate its ongoing economic reforms, encouraging China to produce more in line with its comparative advantage, increasing productivity and income growth. These developments should expand opportunities for a wide range of Australian goods and services exporters (Economic Analytical Unit, 2002).

Agricultural reforms in China should reinforce existing trends out of lower value added broad acre crops to more labour intensive, higher value added products. This should provide opportunities for Australian broad acre farmers producing commodities such as barley, oil seeds and wool, and perhaps even wheat, cotton and rice. China also should liberalise its market for dairy products, potentially creating opportunities for cheese and other dairy products. In June 2003, China entered into a new market access agreement with Australia for meat, providing better access to the Chinese market for beef, sheep and goat meat. Liberalisation of fruit and vegetable markets also should provide opportunities for Australian exporters to supply off-season produce to Chinese consumers, distribution and storage arrangements permitting.

Growing Chinese industrial and household demand should underpin further increases in Australian resources exports to China. Metal ores, particularly iron ore, alumina and copper ore, will continue to be the mainstay of Australia's mineral exports to China. Demand growth for processed metals is forecast to be slower than for unprocessed minerals as China expands its domestic smelting and processing capacity. While China's immense coal reserves may limit scope for increasing coal exports, perhaps with the exception of high quality coking coal, China's plans to increase its consumption of gas will continue to provide substantial commercial opportunities for Australian natural gas producers.

China's expected strong growth and scheduled tariff cuts are predicted to assist specialised Australian machinery and equipment exports compete in China; Australian producers of motor vehicles and parts, optical fibre, medical and scientific equipment should benefit most from these cuts.

WTO commitments are set to open many services sectors like banking, insurance, tourism and distribution for the first time, providing a wide range of promising opportunities for Australian service suppliers to meet rapidly growing local and multinational company demands.

Source: Economic Analytical Unit, 2002; Vaile, 2003.

## FUTURE PROSPECTS

Over time, China's GDP will rise relative to other major regional and world economies. Based on relatively modest assumptions, by 2010, China's GDP probably will approach Germany's and by 2030 it is likely to rival Japan's (Table 3.7).<sup>7</sup> Large economies inevitably broaden their economic base across a wider range of industries, rather than specialising exclusively in one area of strength. However, China's huge labour supply should ensure its comparative advantage remains in relatively labour intensive products for much of the first half of the 21st century.

Table 3.7

### China Could Match Germany by 2010; Japan by 2030

Projected Relative Size of the Chinese Economy Assuming Constant Exchange Rates, 2000-2050

China's Size Relative to...	2000	2010	2020	2030	2040	2050
United States	0.1	0.2 (0.1 to 0.2)	0.2 (0.1 to 0.3)	0.3 (0.2 to 0.6)	0.4 (0.2 to 0.9)	0.4 (0.1 to 1.2)
Japan	0.2	0.4 (0.3 to 0.5)	0.6 (0.4 to 1.0)	1.0 (0.5 to 1.9)	1.5 (0.6 to 3.7)	1.7 (0.5 to 5.5)
Germany	0.6	0.9 (0.7 to 1.1)	1.4 (0.8 to 2.2)	1.9 (0.9 to 3.9)	2.7 (1.0 to 7.0)	3.1 (0.9 to 10)
The ROK	2.4 times	2.6 (2.0 to 3.4)	2.9 (1.6 to 5.0)	3.5 (1.5 to 8.1)	4.2 (1.3 to 13)	4.4 (1.1 to 17)
Australia	2.6 times	3.7 (3.0 to 4.6)	5.3 (3.4 to 8.1)	6.8 (3.6 to 13)	8.9 (3.8 to 21)	9.6 (3.3 to 28)
Taiwan	3.5 times	3.8 (3.0 to 5.1)	4.2 (2.4 to 7.4)	5.1 (2.2 to 12)	6.2 (2.0 to 19)	6.5 (1.6 to 26)

Note: Figures in brackets reflect the range of shares related to low and high growth rates assumed. Average growth rate assumptions: China: 5-8 per cent until 2020, 4-7 per cent until 2040, 2-5 per cent until 2050; United States and Australia: 2.0-3.5 per cent 2000 to 2050; Japan: 0.25 to 2.0 per cent until 2040, 1-3 per cent until 2050; Germany: 1-3 per cent 2000 to 2050; the ROK and Taiwan: 4-7 per cent until 2020, 2-5 per cent until 2040, 2-4 per cent until 2050.

Source: Economic Analytical Unit estimates.

<sup>7</sup> The analysis assumes exchange rates will stay constant over the period. However, China already faces pressure for currency appreciation and on balance the renminbi is likely to appreciate over the next 50 years. If this eventuated, it could significantly increase the rate at which China catches up and passes other major economies.

## SUMMING UP

China's rapidly developing and restructuring economy, particularly its expanding manufacturing sector, is impacting significantly on other East Asian economies. While some regional policymakers and analysts' alarmist scenarios of widespread hollowing out are unjustified, at least part of the considerable restructuring occurring in North East and South East Asia does appear to be in reaction to China's rapid industrial expansion. However, other East Asian economies are finding new markets in which to specialise and generally are expanding their export revenues in areas competing with China. China's growth also is generating considerable new opportunities due to Chinese industry's expanding input demand. As China develops further, pressure for other economies to restructure will persist, but provided firms can flexibly adjust their workforces and undertake new investments, they should be able to reposition themselves to take advantage of growing world demand, including from China. Their close proximity to a dynamic and increasingly open Chinese economy should strongly advantage other East Asian economies.

Particularly since the Asian crisis, China is absorbing a larger share of FDI entering East Asia, but generally this is not disproportionate to China's population and GDP. New technology accompanying FDI into China and other regional economies continues to invigorate major industries, increasing market competition. Further trade liberalisation from a successful Doha Round, as well as from the negotiation of the ASEAN-China Free Trade Agreement, should stimulate competition and trade, providing opportunities for regional economies to further specialise and expand their economies.

East Asian economies, including Japan, the ROK, Taiwan, the Philippines, and Singapore, that are restructuring to meet China's growing demand for components and resources will benefit significantly. More developed regional economies like Japan, Hong Kong, Singapore and Australia also are benefiting from cheaper imports of final goods from China, particularly labour intensive manufactures.

Particularly via its resource exports, but also by exporting advanced manufactures and services, Australia is benefiting from China's rapid development. Some of Australia's exports may divert to China from traditional regional markets like Japan and, to a lesser extent, the ROK and Taiwan, as they increasingly shift out of capital intensive heavy industry into more human capital intensive advanced goods and services. As Australia's economy is highly complementary to China's, Australia stands to derive substantial benefits from Chinese growth.

On balance, as China's rapid growth expands East Asia's GDP, it should benefit the rest of East Asia significantly, invigorating domestic industries and providing new export opportunities. While such widespread restructuring always generates losers as well as winners, all regional economies, but particularly those with more flexible and open economic policy settings, should benefit considerably from opportunities to refine their specialisations and to access China's growing market.

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