JAPAN'S DE-INDUSTRIALIZATION: Is China a Threat?

by

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Introduction

Japan's manufacturers are continually reminded that as global conditions change, they must be flexible enough to respond in a timely and decisive way. Constant updating of knowledge of overseas markets and opportunities is crucial. The more carefully Japanese manufacturers review their sources of competitive advantage, the greater their prospects of locking out competitors as global markets evolve. In part, the ability to influence competitive advantage requires a consideration of appropriate manufacturing location. Given the low costs and rising skill levels of workers in Asian developing countries, Japanese manufacturers face increasing pressure to relocate their operations outside Japan, a symptom of Japan's overall 'hollowing out' or de-industrialization. The de-industrialization is characterised by the displacement of Japan's exports by expatriate Japanese firms, rising imports that place increasing pressure on domestic manufacturers and domestic manufacturing job losses due to relocation or stiffer foreign competition. The resulting concern is that the de-industrialization may erode Japan's capacity for long-term economic growth (Cabinet Office 2002).

Several explanations have been advanced for Japan's hollowing out problem. One approach, focusing on government failure, relates a sustained appreciation of the yen to strong export performance relative to imports. The failure of import growth to match that of exports, in this view at least, is attributed to government protectionist policies, including import barriers associated with government unwillingness to deregulate domestic markets. The desire to protect and promote domestic production becomes counter-productive, as the trade surplus pushes up the value of the yen and places increasing pressure on exporters to relocate overseas. Essentially, the protected, import-substituting and service sectors penalise the export-oriented sectors. The government failure approach is linked to the trade

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friction view, a second explanation, whereby the Japanese trade surplus leads other countries to initiate their own protectionist policies to redress the imbalance. For example, the export restraints imposed on Japanese auto manufacturers in the 1980s resulted in the relocation of major Japanese car firms to the US as the Japanese sought to circumvent US trade restrictions.

This paper emphasises a third explanation: the international specialization of labor as Japanese companies coordinate their production activities in a global context. Here, domestic activities focus on research and development (R&D), technology development and the design of high value-added products that are innovative, differentiated or service-enhanced. The specialization requires that activities be coordinated on a global scale, with the mass production shifting to labor abundant economies, particularly in Asia. Supporters of this view cite Japan's currently large trade surplus in high-tech products (including industrial electronics, parts and components), shrinking surplus in standardised goods (such as consumer electronics), and rapid rise in technology exports (Paprzycki 1998).

In accordance with the international specialization view, we examine Japan's hollowing out using a framework of dynamic comparative advantage. Changes in comparative advantage can follow logical patterns. We outline a simple and intuitive framework, called the flying geese model, that combines both the demand and supply sides of inputs and outputs in an economy. The model is intended to help assess the underlying economic forces that alter comparative advantage and to anticipate how these forces influence, among other things, the location and type of Japanese manufacturing. The paper places the hollowing out problem in the context of 'natural' economic forces that shape comparative advantage. Given the logic of the economic forces, we shall see that Japan may have little choice but to accept the relocation of certain manufacturing offshore if its companies are to remain internationally competitive.

The Flying Geese Model

Imagine a formation of geese, flying in an "inverted-v" tier pattern. For our purposes we can think of the geese as representing economies (Akamatsu 1962). In Asia the lead goose is Japan. The second tier comprises Singapore, Hong Kong, Taiwan and South Korea. Malaysia, the Philippines and Thailand could be in the next level, and so on. A country might move up a tier as it increases, for example, its output of capital-intensive products, perhaps due to rising domestic labor costs. With the

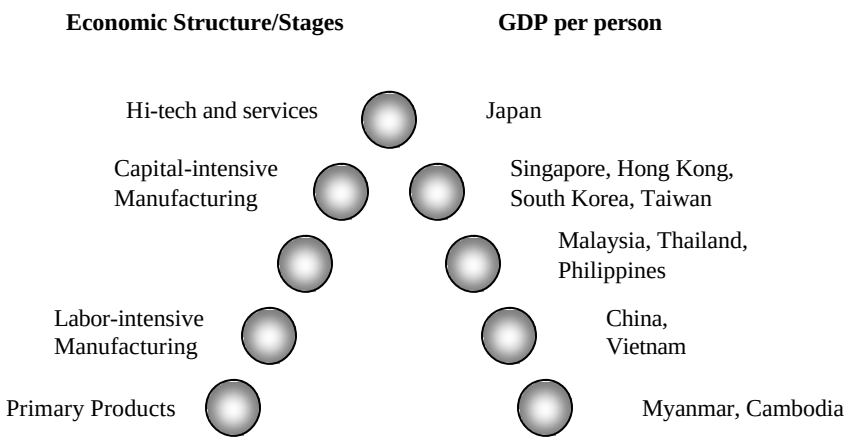
loss of its international competitiveness in cheap labor, labor-intensive production will then shift to another economy, which elevates itself into the labor-intensive industrialisation stage as its labor and other resources shift out of primary production.

In the immediate post-WWII period, Japan had a comparative advantage in labor-intensive manufacturing, producing goods such as textiles and footwear. Over time its per capita GDP increased dramatically, with its economic structure changing in favour of capital-intensive manufactures and then into hi-tech and services. Indicative of this latter change is the fact that Japan now imports more electronic goods, such as televisions, than it exports. Japan faces a hollowing out of its manufacturing base as industries shift to Malaysia, China and so on. In turn, Malaysia and Thailand have seen their comparative advantages in labor-intensive manufacturing eroded by newcomers like China and Vietnam, which continue to move labor out of primary production into industry.

The figure below depicts a schematic flying geese pattern, where the position of each country is based loosely on GDP per person and economic structure (or stages of development).

There is a fundamental logic to the progression through the four broad production stages of the flying geese model. By anticipating how the stages evolve within a country, Japan will be better placed to anticipate new opportunities and adjust their manufacturing location as new doors open and old ones close. The key points relate to the left and right hand sides of Figure 1. The right hand side ranks

Figure 1: An Asian Flying Geese Pattern



countries according to GDP per person. According to World Bank statistics for 2000, Japan had a per capita gross national income of US$35,620, ranking it first in Asia. South Korea had US$8,910; Malaysia, US$3,380; Thailand, US$2,000; China, US$840 and Vietnam, $390 (World Bank 2002).

The left hand side indicates the changing composition of the country's economy, and therefore the *supply* side of the economy. Gaps between the supply and demand sides create opportunities for trade and investment cycles to emerge.

Trade and investment cycles: A deterministic view

Discernable trade and investment patterns arise as countries move through stages of increasing technological sophistication (Dowling and Cheang 2000). The progression is accompanied by changing comparative advantage. In our version of the flying geese model, we focus on labor abundance as the key driver of change.

Consider a hypothetical Asian economy in the *primary production stage* of Figure 1. Let the country have abundant labor, some land and other natural resources, but little capital. The country imports capital equipment to increase the efficiency of its primary producers, and consumer goods, given the high cost and lower quality of domestic production in these sectors. It exports mainly primary products to pay for the imports. Together with supportive government policies, the imported capital equipment and technology raise the productivity of farmers and others, facilitating the growth of a virtuous circle of higher incomes, more farm investment, higher incomes, and so on. The labor-saving farm investments release labor from agriculture, allowing their transfer to other sectors, such as rural manufacturing enterprises. The surplus savings by farmers, generated from their rising incomes, can be channelled into manufacturing start-ups.

The labor transfer depresses wages in manufacturing, resulting in a production structure biased towards *labor-intensive manufacturing*. The relatively cheap unskilled labor generates a comparative advantage in light industry, particularly consumer goods. Textiles, toys and clothing, among others, assume greater importance in the country's exports. Rising export revenues facilitate imports of raw or partly processed products, such as components for assembly, even more capital and technology to expand production, inputs for the manufacturing industries, and food and other consumer items that may

be unavailable or more expensive domestically. Agriculture may expand, but its share of GDP falls. Infrastructure development accelerates, the workforce becomes more educated and skill levels increase over time. Light industry expands further, placing increasing demands on the workforce. Industrial wages rise as the ability of agriculture to release workers to industry diminishes.

The rising wage structure erodes the country's comparative advantage in cheap labor. Higher labor costs spur capital-intensity in manufacturing. As capital, technology and skills rise, comparative advantage shifts to *capital-intensive manufacturing*. The country's exports might include synthetic fibres, cars and electronic appliances. Imports might include raw materials and labor-intensive manufactured goods, whose production has now shifted to other economies with lower wages.

As wages keep rising, the more skilled workforce and more advanced technology allow comparative advantage to shift yet again, this time into *technology, information and skills*. Exports of high tech, high value-added manufactures, services and information facilitate imports of consumer products for an increasingly wealthy population, raw materials, and processed components for the high value-added manufacturing industries (Lim 2002).

The move through the stages to higher levels of GDP/head suggests the 'inevitability' of hollowing out. For Japan to reach the apex of the Asian flying geese model, it had to progress through the stages implicit in the model. And if it wants to continue to have a high GDP per person, and therefore high wages, it must accept that some industries will eventually become uncompetitive if they remain in Japan. An alternative is to make Japan a low wage economy through the import of many more foreign workers, a situation seemingly unpalatable to Japanese policy makers. Moreover, even relatively low wage economies such as Malaysia are feeling the pressure from China. At one Japanese plant in Penang, for example, manufacturing workers were paid an average of $1.50/hour. An employee performing similar work in China earns about $0.60/hour (Wong and Hamid 2003).

The China issue

China is receiving increasing attention as an investment location for Japanese firms. In the last financial year, for example, Matsushita Electric Industrial made a dramatic financial recovery, reporting over 100 billion yen in operating profits by obtaining parts from and shifting production to China. The

company operates 43 plants in China, producing electronic products ranging from rice cookers to semiconductors. Clarion doubled its operating profit to 9.5 billion yen from a year ago, by relocating half of its overseas production to China. (Overseas production now accounts for 70 percent of its overall production capacity.) Konica cut production costs by 10-20 percent by contracting out photocopier production to a Taiwanese firm in Shenzhen and producing digital camera lenses at its own subsidiary in Dalian (Anon. 2003).

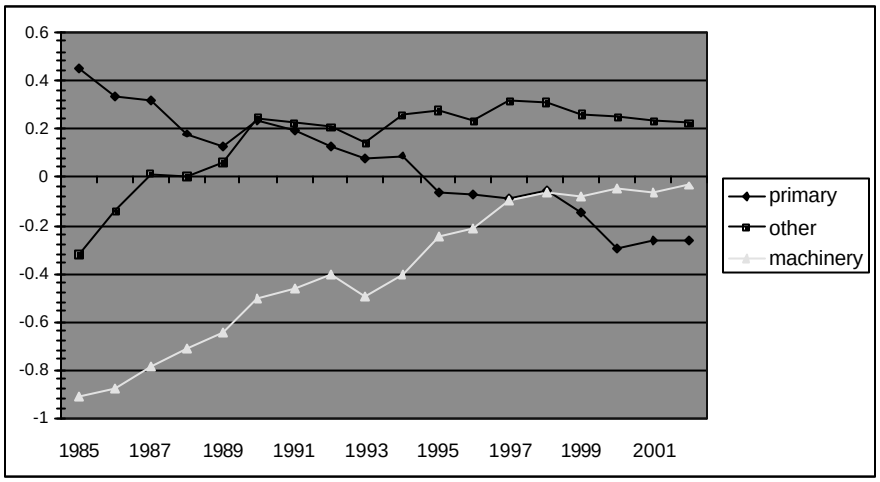
The pace of China's structural transformation is rapid and has significant implications for Japan's hollowing out problem. To place the flying geese model in more concrete terms, especially the speed at which China is progressing through the flying geese model, consider Figure 2. This figure shows specialization indices for China. For a given industry, a specialization index is given by a country's trade balance divided by the volume of two-way trade; i.e.,

$$\textit{Specialization index} = \frac{Exports - imports}{Exports + imports}.$$

The index offers a rough guide to changing comparative advantage, as suggested by a country's trade structure, and therefore a country's approximate position in the flying geese model in Figure 1. Strong comparative advantage in a product would predict a high ratio of exports to imports. For example, if exports of a product were $10m and imports were $0, the index would equal 1, the upper limit. The lower the index, the lower the level of exports relative to imports, and therefore the weaker the comparative advantage in the product.

Following Kwan (2001), we construct specialization indices for China. Figure 2 considers three main sectors in China: primary commodities (comprising food and live animals, beverages and tobacco, crude materials, fuels, and animal and vegetable oils and fats), other manufactures (chemicals and manufactured goods), and machinery (machines and transport equipment). 'Other manufactures' are a proxy for labor-intensive manufactured products, while 'machinery' proxies capital- and knowledge-intensive products (Kwan 2001).

Figure 2: Specialization indices for China



By 1990/91, the specialization index for 'other manufactures' overtook that of primary commodities, even though the expansion of (labor-intensive) rural industry only began in 1985. Until the beginning of the rural industrial reforms, the Chinese economy had suffered from major sectoral imbalances. In the countryside the focus was mainly on grain production; in the cities heavy industry was emphasized. Light industry was a low priority, particularly in consumer goods. The biased production structure changed dramatically from the mid-1980s with the liberalization of rural manufacturing activity. Light industrial growth boomed as agricultural and other resources shifted to more profitable rural enterprises. This is reflected in the rapid increase in the 'other manufactures' index between 1985-90, as labor and other resources were drawn out of the 'primary' sectors following the liberalization of rural industry. Perhaps even more remarkable is the rapid ascent of 'machinery' in the specialization stakes, hinting at possible future competition with Japan in heavy industry and technology (discussed later).

A graphical interpretation

But what do Figures 1 and 2 actually imply for specific industries in China and Japan? Concretely, where are the actual threats and opportunities for Japan's industrial sector? To offer snapshot illustrations, we turn to a more disaggregated approach – sectoral 'bubbles'. Here we use Japan-Rest of World export data to disaggregate investment opportunities predicted by the flying geese model and

the specialization indices. The data and figures in this section are taken from the International Trade Center (ITC), an organization of UNCTAD/WTO.[1] Figure 3 in the Appendix presents 'bubbles', whose size represents the value of important Japanese exports to the rest of the world. The industries selected for inclusion in the figure represent the 20 largest export industries for Japan at the 4-digit trade classification level. More detailed information on the industries is given in Table 1 in the Appendix.

The horizontal axis of the diagram represents the percentage change in Japan's world market share for a given product group. The vertical axis shows the percentage increase in world trade growth per annum (ie, growth in world demand/imports), again for the product group under consideration. For both axes the per annum changes are averaged over the period 1997-2001. Note the horizontal reference line denoted 'Growth for world trade, all': this shows average per annum growth in world trade for all product groups, which is slightly over 4% for the given period. This reference line, together with the vertical axis, defines four quadrants. The quadrants are characterised by the ITC as Champions, Achievers in adversity, Declining sectors and Underachievers. For example, a Champion industry is one whose exports are winning an increasing share of the world market for the product group and where world trade in the product group is growing (eg, 'parts suitable for use solely or principally with televisions and appliances'). An Underachiever is an industry in which world trade in the industry is growing, but where Japan's share of the world market is declining (eg, 'cars').

Inspection of Figure 3 reveals that most of Japan's top 20 export industries fall within the Underachievers category. Note that the 'underachieving' is couched solely in terms of declining world market share in trade. This may still be consistent with rising Japanese corporate profits, if the declining market trade share is the result of firms optimizing their global operations by relocating overseas. Figure 4 shows the corresponding export portfolio for China over the same period. Comparison of Figure 3 with Figure 4 highlights significant Japanese export industries that may be facing pressure to relocate to China. 'Parts and accessories of computer and office' are China's second largest export industry and are characterized as Champions. This is a reasonably significant Japanese industry too, but in the Japanese case the industry is losing world market share. Pressure to increase profitability may force the Japanese to relocate to China to take advantage of cheaper labor.

[1] See www.intracen.org for further details.

It is difficult to gauge the extent of the forces leading to relocation to China. But current Japanese investment in China appears to be small, both relative to the size of the Japanese economy and in comparison with Japan's foreign direct investment globally. Japan's cumulative foreign direct investment in China stands at only around 3 percent of its cumulative FDI outflows, with its cumulative outflows to the US at roughly 40 percent and to the EU at about 23 percent. From 1998 to 2001 Japan invested over 10 times more in the US than China ($51 billion to $4.3 billion). Japan's direct investment in the EU was even higher than in the US over the same period (Economic Research Institute 2003).

In terms of Japan's imports from China, about 60 percent are re-imports from Japanese companies operating in China. Table 1 in the Appendix highlights possible examples. Consider, for instance, product group 8529 'part suitable for use solely/princ with televisions,…'. In 2001 Japan exported US$3,346m of such products, mainly to the US and China. China made up a 14 percent share of these exports from Japan. Yet Table 2 suggests that for this same product group, Japan was China's leading export destination, with Japan taking almost a third of China's exports of this product group. Although China exported US$3,120 of these products in 2001, their net exports amounted to –US$460 (ie, China imported more of this product group than it exported). A likely interpretation involves the international specialization of production, namely Japanese firms exporting products to China for value-adding activities, such as assembly, and the products being re-imported to Japan for eventual export to markets such as the US. In such cases of intra-industry trade, the rise in Japan's imports from China is the result of increased Japanese exports to China. Given the high proportion of Japan's imports from China that actually originates from Japanese firms in China, and therefore the profits that return to Japan, the concern about hollowing out due to imports from China may be overstated.

Indeed, almost all the high- and medium-technology products that China exports are made by foreign firms. China imports intermediate goods, components and packaged technology to process these goods, and pay dividends, royalties and other fees to the foreign owners. According to Chinese statistics, increasing exports by US$1 million requires importing US$500,000 worth of intermediate goods and components, suggesting strong opportunities for complementary trade between China and Japan (Economic Research Institute 2003).

Moreover, China and Japan do not appear to be major competitors in the 'part suitable for use

solely/princ with televisions,…' product market, since they fail to share a common, major export market. Overall, perhaps only as little as 16 percent of China's merchandise exports compete directly with Japanese manufactured goods in the US market. According to the Economic Research Institute (2003): 'China's exports to the U.S. compete more directly with Indonesia's than with any of the more advanced Asian nations. And while China's share of high-tech exports has grown to 17.5% of China's total exports in 2001, up from 2.5% over the previous year, most of them are not really high-tech but rather medium-tech, as is evident with their increasing competition with such countries as Thailand and Malaysia.'

The mutually beneficial aspects of Japan-China trade can be seen more clearly elsewhere in Tables 1 and 2. China may be thought of as a 'friend' to Japan, in the sense that it produces and exports goods that complement Japan's needs. This trade pattern conforms to expectations from the flying geese model. About 60% of China's exports to Japan are labor intensive and most of the rest are either low- or medium-technology (Economic Research Institute 2003). Japan is the leading market for four of China's top ten export product groups (6204 'women's suits,…', 6110 'jerseys,…', 6203 'men's suits,…' and 4202 'trunks,…), while 8529 'part suitable for use solely/princ with televisions…' and 2701 'coal,…' fall in the top 20. With the exception of 8529, which has already been discussed, none of these product groups feature in Japan's top 40 exports.

Still, there is the potential for Japan and China to clash in common export markets. Two of Japan's top ten export industries (8473 'parts & access of computers…' and 8521 'video recording…') share with China the US as the leading export market. The speed with which the Chinese have made inroads into higher stage industries is evident from comparing Figure 4 with Figure 5, where the composition of China's Champions is quite different. The two figures differ only by three years. Thus a question mark remains about the future, especially in terms of the speed of China's progression to higher technology products and production processes. Figure 2 hints at the changes – the task is now to forecast the anticipated changes in the specialization indices.

Forecasting results

We now turn to the dynamics implied by the flying geese model, using a forecasting model to extend the specialization indices of Figure 2. A principal approach to the analysis of time-series data

involves the identification of the component factors that influence each of the periodic values in the series – ie, the decomposition of the time series. In turn, these components are projected individually and combined to forecast the aggregate series. Three components are found in an annual time series including the trend component, the cycle component and irregular fluctuations. The forecasting approach employed here is as follows. The series are fitted as a smooth curve (such as linear, quadratic, or linear-log) and residuals are obtained from 1985 to 1998. Observations from 1999 to 2002 are then used to undertake ex-post forecasts. The values of the residuals from trend fitting include cycle and irregular components that can be related to variables that might explain the fluctuations around the trend. From Figure 5, 'primary products' exhibit a steadily decreasing trend, while 'other manufactures' and 'machinery' exhibit a strong upward trend. However, it appears that three series have a different trend pattern. After some regression experiments, the series are fitted to three different trends, as shown in Table 3.

The results from Table 3 suggest that various time trends can explain nearly 90 percent of the series variation. The residual analysis shows that they are white noise processes (identical and independently distributed). So it is not necessary to model the cycle. The future residuals can be simulated by random numbers from a normal distribution with zero mean. The future trend component can be easily computed from regression models. The forecasting combines the trend and residual components. The results are shown in Figure 6.

From Figure 6, 'machinery' is projected in our model to match the 'other manufactures' series in 2008 and finally cross it in 2010. If correct, these changes in China's economy suggest a rather more threatening scenario for Japan, as China quickly moves to higher stages in the flying geese model.

Table 3

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.424	0.027	15.656	0.000
T	-0.040	0.003	-15.842	0.000

The regression model is:
$Prim_t = a + bT + e_t$
Adjusted-R-square = 0.94

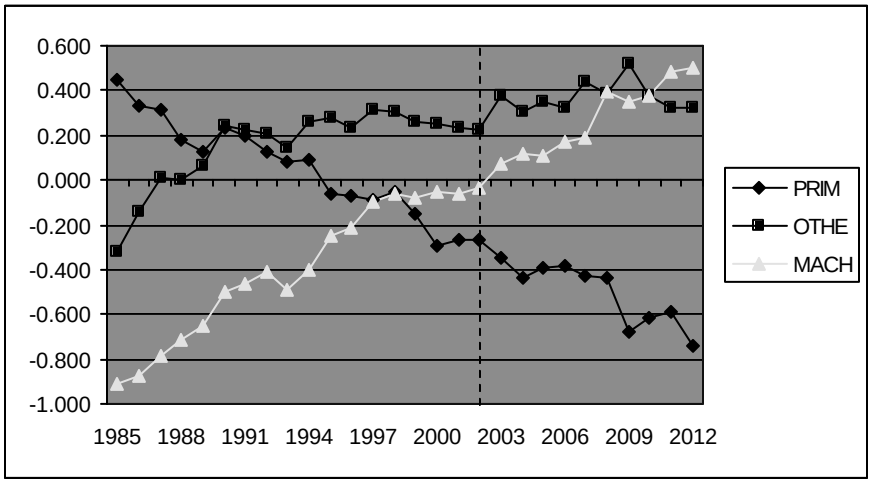
	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-0.247	0.042	-5.811	0.000
Ln(T)	0.199	0.020	10.138	0.000

The regression model is:
$Othe_t = a + b\ln(T) + e_t$
Adjusted-R-square = 0.86

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	-0.999	0.046	-21.575	0.000
Ln(T)	0.119	0.051	2.307	0.036
T	0.039	0.008	4.995	0.000

The regression model is:
$Mach_t = a + b\ln(T) + cT + e_t$
Adjusted-R-square = 0.95

Figure 6: Forecasting results



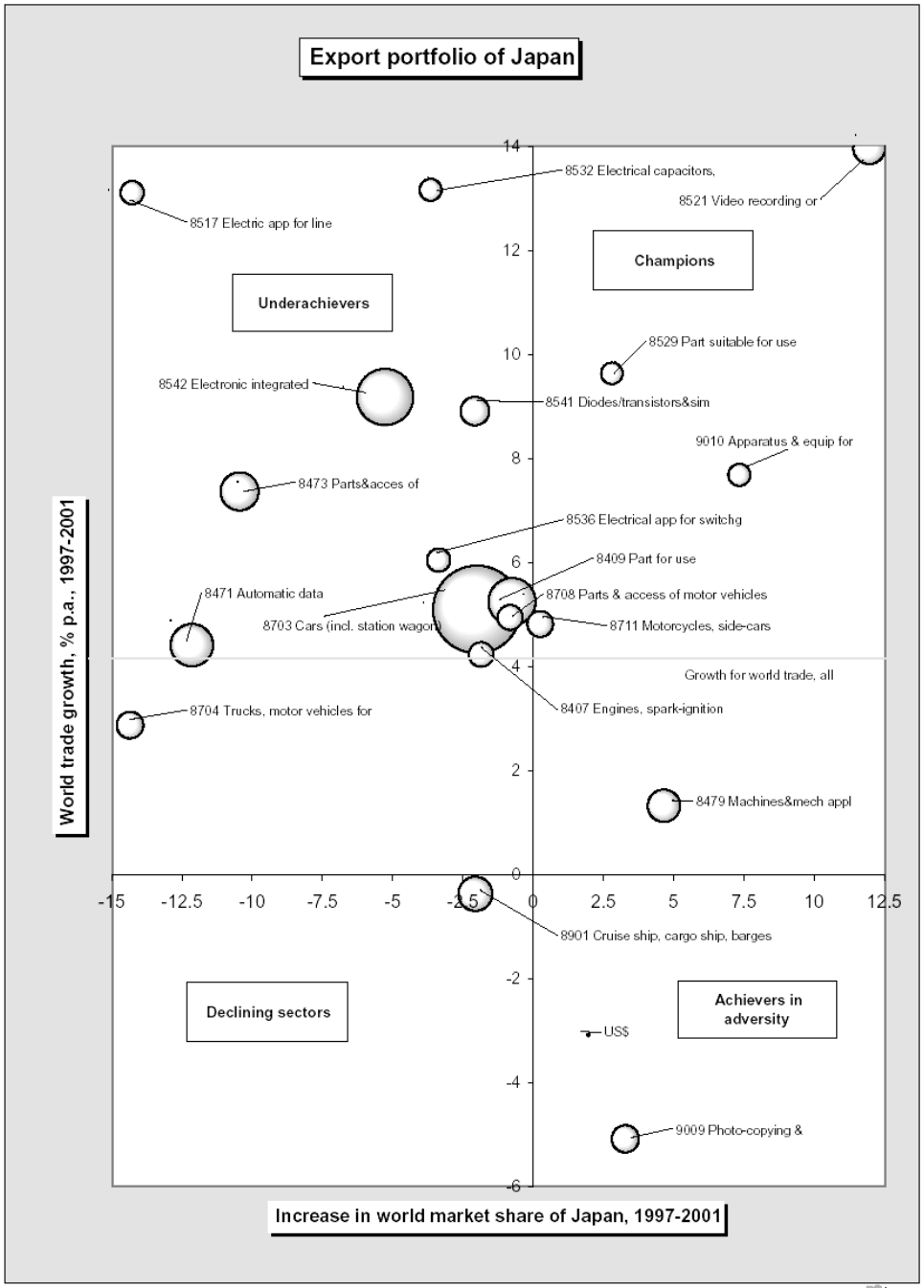
Conclusion

In Asia, comparative advantage can alter quickly (Rana 1990). The flying geese model suggests that Japanese manufacturers should treat the Chinese market as one that is continually changing, and changing in fairly logical and predictable ways. Over time the market will become increasingly sophisticated and skilled, but the large pool of labor is likely to keep wages low. Japanese manufacturers will need to factor this into their analysis in determining their production location.

We have attempted to show why, overall, China might not *currently* be considered a major threat to Japan. Yet as Chinese skills, technology and industrial production base increase, Japan is likely to face strong pressure at both the low and high ends of the industrial spectrum. Despite the hollowing out problem, China also represents an economic opportunity for Japan. The explosive growth in the China market, especially in infrastructure projects, has given a boost to Japanese heavy industry. For companies such as Hitachi Construction Machinery, China has proven to be a strong market for sales of heavy construction machinery, more than offsetting the decline in its domestic sales. Overall, Japan's exports to China rose 50 percent from the previous year in the first half of 2003, the fifth consecutive first-half rise since1999 (McMahon 2003). A key issue in Japan's future domestic industrial structure, then, will relate to the relative sizes of the hollowing out and job creation effects as China and others evolve economically.

APPENDIX

Figure 3: Japan's exports, 1997-2001



Note: the area of the circles correponds to the export value of the product group for Japan. See explanatory sheet for details.
Source: ITC calculations based on COMTRADE statistics.

Figure 4: China's exports, 1997-2001

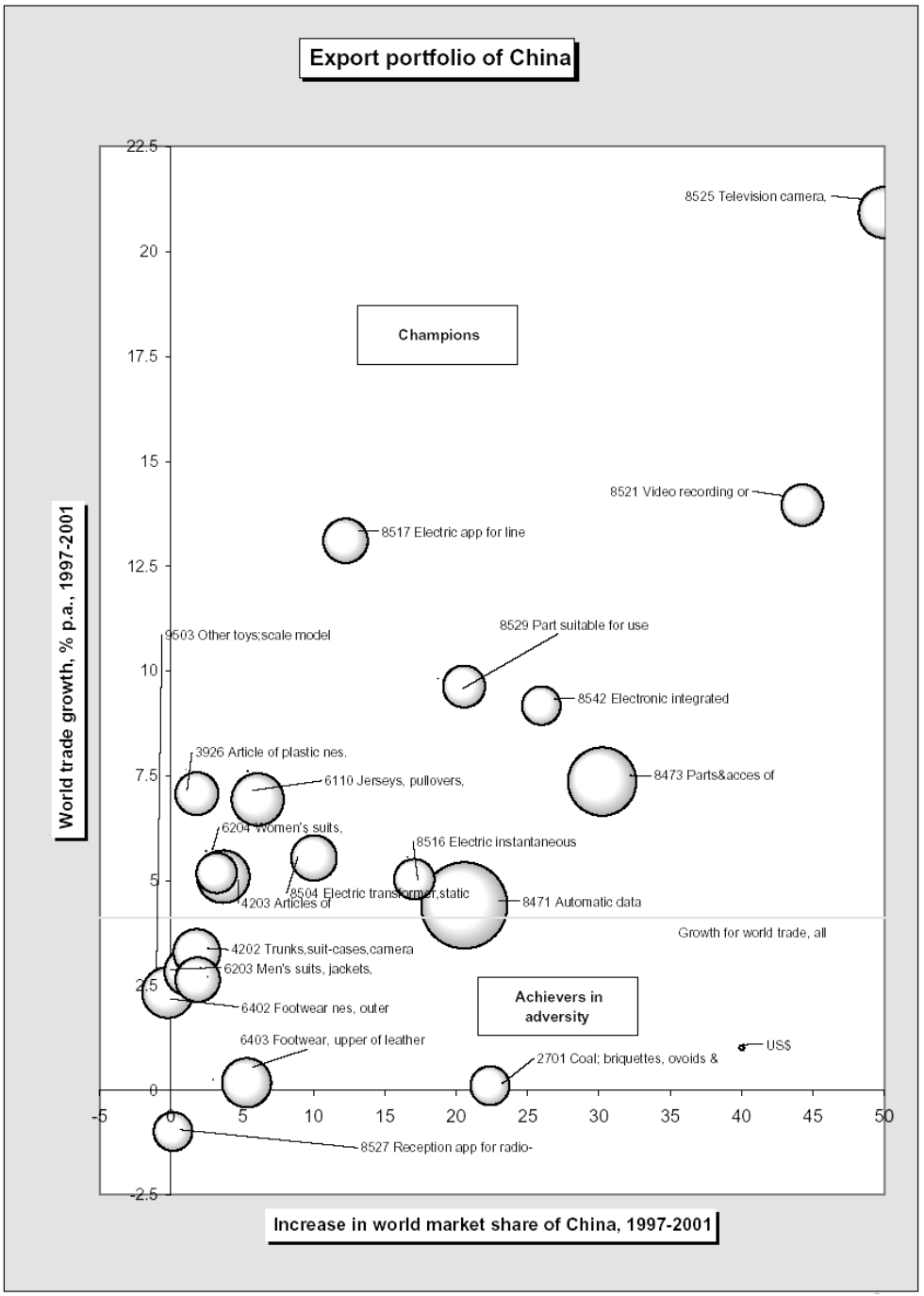


Figure 5: China's exports, 1994-1998

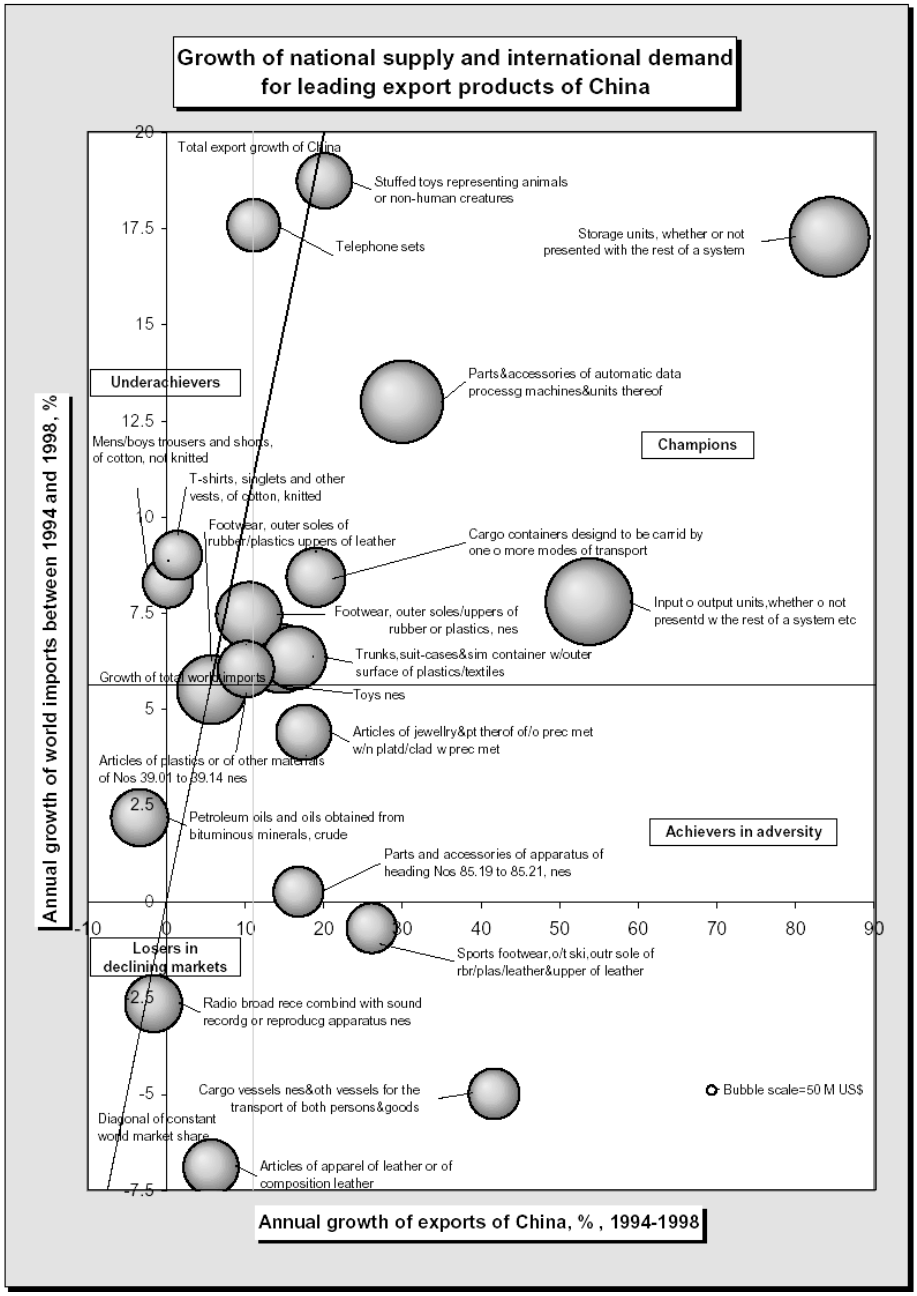


Table 1

Exports of Japan

RANK	HS code and product label	Exports 2001 (US$ m.)	Net exports 2001 (US$ m.)	Volume exports 2001 quant.	unit	Export growth 1997-2001 % p.a. value	quant.	World trade growth, 97-2001 % p.a. value	quant.	Share in world (%)	Leading markets 1st	%	2nd	%
.	ALL GOODS	403,340	.	.		1	.	.	.	.	.	.	.	.
.	ALL GOODS (WTO)	403,496	54,407	.		.	.	.	.	.	.	.	.	.
25	4011 New pneumatic tires, of rubber	2,923	2,494	1044	W	-2	1	1	8	13.8	USA	28	AUS	7
35	7208 Flat-rolld products of iron/non-al/s width>/=600mm,hr,not clad	2,174	1,660	9088	W	5	18	-5	1	15.1	KOR	41	THA	13
15	8407 Engines, spark-ignition reciprocating or rotary int. combust. Piston	4,262	3,944	414	W	2	1	4	5	16.1	USA	64	CAN	4
14	8409 Part for use solely/principally with the motor engines	4,405	4,019	321	W	4	5	5	8	17.7	USA	38	THA	6
31	8411 Turbo-jets, turbo-propellers and other gas turbines	2,356	-462	29	W	23	40	10	9	4.9	USA	51	GBR	17
22	8414 Air, vacuum pumps; hoods incorp a fan	3,090	2,241	210	W	2	3	3	6	12.8	USA	20	NLD	13
24	8429 Self-propelld bulldozer, angledozer, grader, excavator,etc	2,930	2,888	1061	W	-3	1	-3	0	24.1	USA	28	HKG	9
5	8471 Automatic data processing machines;optical reader, etc	12,644	-2,394	55043	N	-8	-11	4	7	6.7	USA	44	NLD	19
6	8473 Parts&acces of computers & office machines	10,155	2,667	160	W	-3	2	7	8	7.9	USA	30	NLD	13
8	8479 Machines&mech appl having indiv functions, nes	7,358	5,899	136	W	6	3	1	2	23.4	TWN	22	USA	18
36	8482 Ball or roller bearings	2,048	1,667	161	W	1	1	1	6	17.0	USA	20	SGP	8
26	8483 Transmission shafts&cranks, bearing housing; gearing; etc	2,662	2,165	247	W	2	4	4	4	16.3	USA	34	DEU	6
38	8504 Electric transformer,static converter (for example rectifiers)	1,996	-180	80	W	-2	-5	6	7	5.8	USA	20	CHN	14
27	8507 Electric accumulator	2,624	2,377	63	W	4	0	6	8	25.6	USA	14	CHN	12
17	8517 Electric app for line telephony,incl curr line system	3,852	-156	.		-1	.	13	8	5.3	USA	44	DEU	6
9	8521 Video recording or reproducing apparatus	7,269	5,827	.		26	.	14	9	33.7	USA	40	DEU	10
34	8523 Prepared unrecordd media for sound record (tapes)	2,206	1,620	53	W	-4	-9	-3	0	23.4	USA	40	NLD	13
29	8525 Television camera, transmissn app for radio-telephony	2,583	2,288	9	W	-12	-16	21	18	4.1	USA	32	CHN	18
21	8528 Television receivers (incl video monitors & video projectors)	3,242	1,292	5801	N	11	7	9	7	12.4	USA	41	DEU	9
20	8529 Part suitable for use solely/princ with televisions, recpt app	3,346	1,248	26	W	12	4	10	7	10.5	USA	23	CHN	14
19	8532 Electrical capacitors, fixed, variable or adjustable (pre-set)	3,371	2,944	37	W	9	1	13	11	22.5	USA	17	HKG	14
39	8534 Printed circuits	1,938	1,340	12	W	7	-1	13	11	11.0	CHN	21	PHL	12
16	8536 Electrical app for switchg (ex fuse,switche,etc) not exceedg 1000 volt	3,890	2,452	66	W	3	1	6	7	10.2	USA	20	HKG	12
33	8540 Thermionic,cold cathode valves&tube (e.g. tv camera tubes)	2,211	1,941	.		-17	.	1	7	13.5	CHN	20	USA	12
10	8541 Diodes/transistors&sim semiconductor devices; etc	5,792	4,418	.		7	.	9	9	19.3	USA	17	HKG	15
2	8542 Electronic integrated circuits and microassemblies	22,034	7,953	.		4	.	9	5	11.5	USA	14	HKG	14
23	8543 Electrical mach&app having individual function, nes	2,977	898	.		8	.	7	11	21.8	USA	31	KOR	12
32	8544 Insulated wire/cable	2,302	250	211	W	11	11	5	7	6.1	USA	16	CHN	12
1	8703 Cars (incl. station wagon)	52,991	46,738	4178	N	3	1	5	5	17.7	USA	58	AUS	5
12	8704 Trucks, motor vehicles for the transport of goods	5,114	5,023	.		-11	.	3	4	10.1	AUS	11	SAU	10
4	8708 Parts & access of motor vehicles	15,415	13,302	1795	W	4	4	5	7	11.7	USA	43	GBR	5
13	8711 Motorcycles, side-cars	4,726	4,459	1734	N	5	-6	5	5	55.1	USA	40	ITA	10
7	8901 Cruise ship, cargo ship, barges	8,240	8,191	11478	W	-2	6	0	0	99.3	PAN	55	HKG	8
28	9001 Optical fibre, cables; sheets&plate of polarising mat	2,613	1,574	.		34	.	21	18	28.9	TWN	23	KOR	22
11	9009 Photo-copying & thermo-copying apparatus	5,304	4,587	162	W	-2	-5	-5	0	45.0	USA	47	NLD	13
18	9010 Apparatus & equip for photographic laboratories nes	3,432	3,218	.		15	.	8	7	69.9	USA	38	TWN	18
37	9013 Liquid crystal devices; lasers; other optical appl & instruments nes	2,039	1,188	7	W	19	20	25	14	22.8	TWN	24	USA	21
30	9018 Electro-medical apparatus (electro-cardiographs, infra-red ray app, syringes, dental app.)	2,371	-581	.		-1	.	7	8	7.6	USA	35	DEU	14
40	9504 Articles for funfair, table/parlour games&auto bowling alley equipment	1,904	1,387	22	W	-3	-20	3	-3	13.7	USA	48	HKG	22
3	9999 Special Transaction Trade	16,100	10,293	761	W	12	1	7	.	10.8	USA	33	SGP	9
.	Other services, credit	36,358	-11,759	.		-2	.	3	.	5.6	.	.	.	.
.	Transport services, credit	24,006	-8,373	.		4	.	3	.	7.1	.	.	.	.
.	Travel, credit	3,306	-23,225	.		-6	.	2	.	0.7	.	.	.	.

Table 2

Exports of China

RANK	HS code and product label	Exports 2001 (US$ m.)	Net exports 2001 (US$ m.)	Volume exports 2001 quant.	unit	Export growth 1997-2001 % p.a. value	quant.	World trade growth, 97-2001 % p.a. value	quant.	Share in world (%)	Leading markets 1st	%	2nd	%
.	ALL GOODS	266,055	.	.		11	.	.	.	.	.			
.	ALL GOODS (WTO)	266,155	22,542	.		.	.	.	.	.	.		.	
18	2701 Coal; briquettes, ovoids & similar solid fuels manufactured from coal	2,667	2,579	90119	W	22	31	0	5	12.1	JPN	32	KOR	30
26	2710 Petroleum oils, not crude	2,120	-1,625	9190	W	25	18	13	6	1.7	SGP	24	KOR	14
13	3926 Article of plastic nes.	3,260	2,565	2181	W	9	13	7	8	12.8	USA	41	HKG	12
9	4202 Trunks,suit-cases,camera cases,handbags etc,of leather,plas,tex etc	3,876	3,839	.		5	.	3	5	20.6	JPN	18	HKG	17
17	4203 Articles of apparel&clothing access, of leather or composition leather	2,849	2,838	.		8	.	5	8	41.2	USA	42	RUS	17
33	5208 Woven cotton fabrics, 85% or more cotton, weight less than 200 g/m2	1,628	914	2079	L	2	5	-5	0	26.0	HKG	28	KOR	8
31	6104 Women's suits,dresses,skirt etc&short, knit/croch	1,656	1,634	899228	N	6	17	-3	2	30.1	JPN	34	HKG	15
24	6109 T-shirts, singlets and other vests, knitted or crocheted	2,233	2,193	1755730	N	6	13	9	9	15.8	JPN	44	HKG	15
4	6110 Jerseys, pullovers, cardigans, etc, knitted or crocheted	4,813	4,506	.		13	.	7	9	14.9	JPN	31	HKG	22
8	6203 Men's suits, jackets, trousers etc & shorts	4,159	4,087	.		4	.	3	6	18.0	JPN	40	HKG	14
3	6204 Women's suits, jackets,dresses skirts etc&shorts	4,903	4,757	.		9	.	5	8	15.8	JPN	39	HKG	24
30	6205 Men's shirts	1,659	1,570	551044	N	7	8	0	1	19.3	JPN	30	HKG	17
27	6302 Bed, table, toilet and kitchen linens	1,852	1,845	3194085	N	6	9	4	7	26.5	JPN	38	USA	15
12	6402 Footwear nes, outer soles and uppers of rubber or plastics	3,510	3,507	2073277	P	4	8	3	3	32.4	USA	41	JPN	10
7	6403 Footwear, upper of leather	4,283	4,255	851340	P	5	10	0	2	15.4	USA	65	RUS	6
40	6404 Footwear, upper of textile mat	1,401	1,394	741968	P	7	6	-2	-1	23.8	USA	43	JPN	17
1	8471 Automatic data processing machines;optical reader, etc	13,094	8,113	543859	N	25	29	4	7	6.9	USA	27	HKG	21
2	8473 Parts&acces of computers & office machines	8,177	1,299	734	W	38	25	7	8	6.3	HKG	37	USA	16
28	8501 Electric motors and generators (excluding generating sets)	1,841	676	2456121	N	13	9	4	6	9.9	HKG	26	JPN	26
10	8504 Electric transformer,static converter (for example rectifiers)	3,627	1,498	.		16	.	6	7	10.6	HKG	22	JPN	19
16	8516 Electric instantaneous water heater,space htg; hair dryer	2,851	2,716	.		22	.	5	10	18.1	USA	40	JPN	8
11	8517 Electric app for line telephony,incl curr line system	3,528	-1,748	.		25	.	13	8	4.9	USA	34	HKG	19
35	8518 Microphones&stand;loudspeaker;headphone/earphone; sound amplifier set	1,594	1,139	.		17	.	7	6	13.1	USA	27	JPN	14
15	8521 Video recording or reproducing apparatus	3,057	2,961	56862	N	58	71	14	9	14.2	USA	47	HKG	10
22	8522 Parts and accessories of video, magnetic recorder	2,440	423	.		19	.	1	-2	24.5	HKG	39	JPN	28
5	8525 Television camera, transmissn app for radio-telephony	4,624	2,958	56461	N	77	87	21	18	7.4	HKG	34	DEU	15
19	8527 Reception app for radio-telephony/radio-broadcastg	2,651	2,590	313579	N	-1	3	-1	3	13.0	USA	29	JPN	9
36	8528 Television receivers (incl video monitors & video projectors)	1,591	1,551	21015	N	27	26	9	7	6.1	JPN	41	USA	8
14	8529 Part suitable for use solely/princ with televisions, recpt app	3,120	-460	133	W	30	17	10	7	9.8	JPN	32	HKG	11
38	8534 Printed circuits	1,520	-414	3799604	N	20	32	13	11	8.6	HKG	53	SGP	11
20	8542 Electronic integrated circuits and microassemblies	2,626	-14,372	.		35	.	9	5	1.4	HKG	24	JPN	18
32	8544 Insulated wire/cable	1,653	267	545	W	20	17	5	7	4.4	JPN	29	USA	20
25	8609 Cargo containers designed to be carried by one/more modes of transport	2,198	2,190	915	N	21	31	0	9	270.1	HKG	26	USA	19
34	8901 Cruise ship, cargo ship, barges	1,608	1,496	1	N	0	3	0	0	19.4	DEU	21	HKG	14
39	9009 Photo-copying & thermo-copying apparatus	1,438	885	.		11	.	-5	0	12.2	JPN	28	USA	24
37	9401 Seat (o/t dentists' & barbers' chairs, etc), &part thereof	1,537	1,374	.		27	.	11	7	5.8	USA	59	HKG	10
23	9403 Other furniture and parts thereof	2,421	2,355	.		20	.	7	8	7.6	USA	47	HKG	16
21	9405 Lamps & lighting fittings nes; signs, nameplates illuminated	2,473	2,412	.		19	.	7	8	18.2	USA	44	HKG	8
6	9503 Other toys;scale model (puzzles of all kinds, stuffed toys, electric trains, construction sets, etc)	4,607	4,560	.		2	.	2	4	23.2	USA	53	HKG	13
29	9506 Articles&equip for gymnastics, athletics, or sports/outdoor games nes	1,677	1,614	.		18	.	3	5	15.0	USA	44	DEU	9
.	Other services, credit	10,475	-3,323	.		3	.	3	.	1.6		.		.
.	Transport services, credit	4,635	-6,689	.		15	.	3	.	1.4		.		.
.	Travel, credit	17,792	3,883	.		11	.	2	.	3.9		.		.

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２年前には、『専修大学人文科学研究所月報』198 号に POVERTY, RURAL WOMEN AND HIV の表題で寄稿され、タイにおけるエイズ問題の状況をまとめられましたが、今回の論文は日本の産業空洞化問題を、日中関係からとらえた労作です。