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Japan's IC Exports to China Dominated by Low Priced Products: "Value-added Manufacturers" Demystified

Ryuichi Ushiyama,
Associate Senior Economist

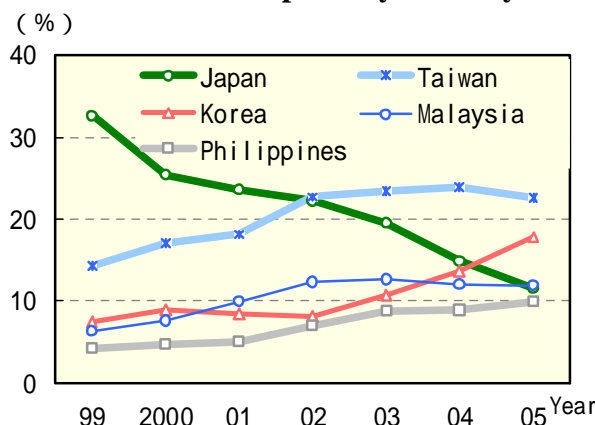
Division of labor between Japan and other Asian countries is often characterized as a regional structure in which the latter make an offensive attack with lower-end products while the former counters such moves by specializing in high value-added products at higher price points. The opposite, however, is the case with IC (integrated circuit) imports of China, the growth center of the region. Exports from Japan are dominated by low priced products and have been lopsidedly losing their market share in China.

China became the world's largest importer of ICs in 2002 surpassing the US and its import value, having grown eight-fold over the past five years, accounted for approximately 20% of the global total in 2004. This phenomenal growth has been caused by China's increasing output of electronic products including personal computers and home appliances and burgeoning demand for ICs as their key components. The impact has been amplified by the country's import dependence for ICs due to low levels of domestic production. Notwithstanding this booming market, Japan is free falling as a source country for China's IC imports. This paper aims to examine the actual conditions of Japan's IC exports to China from trade statistics.

Japan's Share Nearing 10%

Japan's share in IC imports by China has steadily declined from over 30% in 1999 to a little over 10% in the most recently published data for the period between January and October 2005. (Please see Exhibit 1) Over these years, Taiwan, Korea and Malaysia have outstripped Japan, which now ranks fourth, and the Philippines is close behind. China's IC imports from Japan multiplied almost

Exhibit 1: Growth of Taiwan, Korea and Malaysia Past Japan: Shares in China's IC Imports by Country of Origin



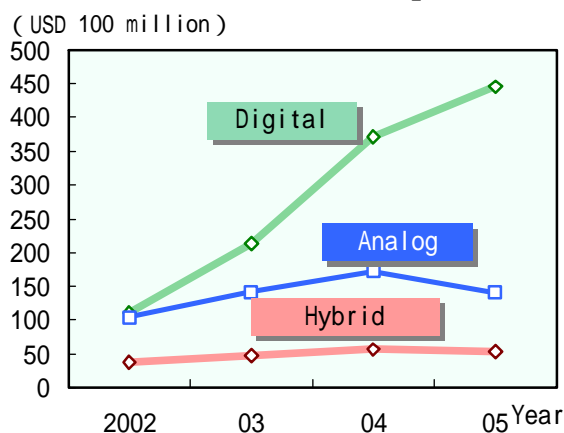
Source: compiled from World Trade Atlas.

Note: All figures are based on value. Data up to October 2005 is included.

four-fold in value over the five years to 2004 but the growth was far slower than that of the total imports.

Among ICs imported by China, digital ICs, analog devices and hybrid ICs rank in this order by import value. (Please see Exhibit 2) Particularly, the imports of digital ICs are rapidly growing and, in the most recent data, amounted to 70% of China's total IC imports. Digital ICs integrate electronic devices that handle digital data and include microcontrollers, memories and various other types. Their demand has been quickly ramping amid the digitalization of home appliances and other products.

**Exhibit 2: Rapid Increase in Digital IC Demand
(Value of China's IC Imports)**



Source: same as Exhibit 1. Categorized by 6-digit HS code.

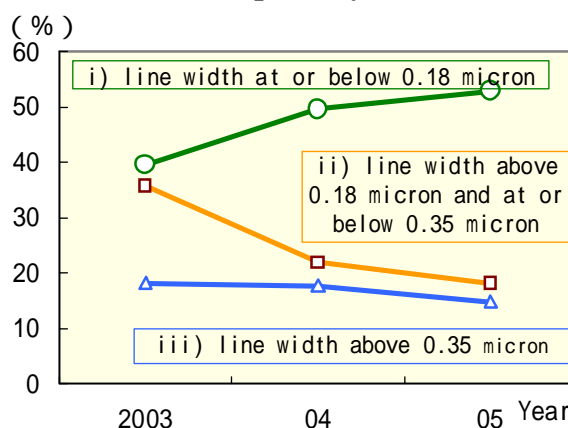
Note: HS codes of the categories shown in the chart above are as follows: Digital IC: 854221, Analog IC: 854229 and Hybrid IC: 854290.

In this vital category of digital ICs, the most recent data on import values showed that Japan ranked fifth after countries including Korea and Taiwan and had a single digit share of 9%. The situation marks a stark contrast to that in 2002, when Japan commanded the top position with a 20% market share. The downward trend in this growth segment was the principal cause of the share losses that Japanese products have suffered in China's IC import market. Why is Japan faring so badly?

Low Unit Price of Japanese Products

Chinese trade statistics subcategorize digital ICs by line width, or the width of line that is etched onto a silicon wafer in the semiconductor manufacturing process, and give the import breakdown more in detail by 8-digit HS code (international standardized numerical method of classifying traded products). Specifically, they include i) digital IC products manufactured in process technologies at or below 0.18 micron (1 micron is one millionth of a meter), ii) products manufactured in process technologies above 0.18 micron and at or below 0.35 micron and iii) products manufactured in process technologies above 0.35 micron.

**Exhibit 3: Increasing Share of Higher Precision ICs
(Chinese IC Imports by Line Width)**



Source: same as Exhibit 1. The category of Digital ICs includes wafers and other items, in addition to the three subcategories shown in the above chart, and therefore the shares of the three subcategories do not add up to 100%.

The ICs in the first category with the highest level of precision are, according to a source at a Japanese semiconductor manufacturer, “in rapidly growing demand due to reduction in the form factor and weight of personal computers and mobile handsets that are manufactured in China” and now account for more than half of China’s IC import value. (Please see Exhibit 3) The average unit cost of imports in January through October 2005 of these high-end products was the highest among the three subcategories at \$3.97, which was a gap above the average unit prices of \$1.24 and \$0.76 for the categories ii) and iii), respectively.

Turning to Japan, however, categories i) through iii) each accounted for 35%, 23% and 31% of China’s digital IC imports from the country in the same period. This is quite different from the overall market composition with the low percentage of high-end products and the high percentage of low-end components. (Please see Exhibit 4) These discrepancies in volume and value have persisted since 2003, the first year for which the data was available. The average price of imports from Japan was \$1.40, compared with the overall average of \$3.97. The Philippines had the highest average at \$11.53, or a little over eight times the Japanese average.

On the other hand, since 2003, Japan has maintained the top two share positions both in volume and value in the subcategory iii), where unit prices have always been lower than those in the other two subcategories. These observations lead to the conclusion that Japan has lost its share in the China’s IC import market as the market shifted to high unit price products while Japanese supply was limited mostly to the lower end of the spectrum.

**Exhibit 4: Japan-made Precision ICs: High Volume and Low Value
(China's Imports of ICs Manufactured in Process Technologies of
0.18 Micron or Below)**

Ranking	Source country	Import value	Import volume
1	Malaysia	44.3	6.8
2	Taiwan	43.6	16.1
3	Philippines	40.4	3.5
4	Korea	27.8	6.3
7	Japan	14.8	10.6
	Total	235.9	59.4

Note: import values in \$100 million and import volumes in 100 million units. Data for the period between January and October 2005.

Then, what are the main IC exports from Japan to China? According to the statistics released by the Ministry of Finance, Japanese IC exports to China principally consisted of MCU (microcontrollers), ROM (read-only memories), other microcomputers and MPU (microprocessors) for the period between January and June 2005. MCU chips integrate certain functions of computer and memory onto a single chip and are used in various products including home appliances.

According to an industry source, Sub 0.18-micron ICs that China imports from Japan are relatively cheaper because a higher percentage of Japanese exports consist of MCU. MCU chips tend to cost as little as 100 to 200 yen per unit, while deploying sub 0.18-micron process technologies. In the subcategory of 0.18 to 0.35 micron line width, Japan leads the other exporters due to its strength in general-purpose logic ICs. These are low priced chips used in the functions of electronic circuit switching and simple power management.

Increasing Domestic Production Could Jeopardize Japanese Exports

The dominance of low priced products in IC exports from Japan to China may be viewed as a consequence of the fact that Japanese semiconductor manufacturers have lost global competitiveness and utilized antiquated domestic manufacturing facilities for the production of those low-end products to be exported to China.

This would be totally different from what Japan is generally considered to be. In the case of growing trade in mechanical components within East Asian countries, Japan plays the role of exporting high value-added, high priced components. As other countries in the region specialize in low value-added, low priced parts, division of labor is believed to have led to increases in intra-regional trade.

As far as China's IC imports are concerned, the popular view of Japan as "specialist in high value-added manufacturing" does not depict the reality, in which the country is rather a source of low priced commodities. These products will someday be

manufactured domestically in China and the import demand may possibly fade. ICs, when categorized by 4-digit HS code, are Japan's largest export item to China now but it is most likely that the Japanese market share will further decrease in the future.

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Japan Center for Economic Research (JCER)

Nikkei Kayabacho Bldg. 2-6-1 Nihombashi Kayabacho, Chuo-ku, Tokyo 103-0025, Japan
Phone:81-3-3639-2810 / FAX:81-3-3639-2839 / E-mail:jcernet@jcer.or.jp