4 Towards a Strategic Realignment of Production Networks

Japanese Electronics Companies in China

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Investments in East Asia

The Japanese electronics industry started to develop in the late 1950s and has evolved to become the leading sector in the Japanese economy. The increase in domestic demand for household electric appliances, together with the protection of the domestic market by high tariffs, stimulated growth in the Japanese electronics companies. The companies soon succeeded in expanding exports to the United States, taking advantage of low labour cost and cheap yen. Then they turned their attention to the Asian market, and around 1960 started to set up factories there. These early investments in Asia were intended to avoid the trade barriers imposed by these countries and to supply the domestic markets. For example, in 1961, Matsushita established National Thailand to produce dry batteries, the first foreign operation to be set up by the company after World War II, followed by Taiwan Matsushita Corporation in the next year. By setting up these factories, Japanese electronics companies could avoid paying the high import tariffs imposed by these countries when they sold their products to these markets.

This early strategy of Japanese electronic companies in East Asia is perhaps best exemplified in the development of the so-called 'Mini-Matsushita' strategy. Under this strategy, Matsushita Electric Industries set up one factory in each major Asian countries which manufacture the full line-up of its household electric appliances, such as television sets, refrigerators, and rice cookers for the domestic market of the respective host countries. Other companies, such as Toshiba Corporation and Hitachi, followed suit and establish their own 'Mini-Toshibas' and 'Mini-Hitachis' in Asia. Typically, the Japanese electronic companies would build one factory in each of the relatively large markets in Asia, such as Taiwan, Thailand, Malaysia and South Korea. Judging from the small size of the markets, what the 'Minis' actually did might have been nothing more than the assembly of knocked-down parts imported from Japan.

Table 4.1: **Production Sites Established by Japanese Electronics Multinationals**

	Before 1960	1961–1970	1971–1975	1976–1980	1981–1985	1986–1990	1991–1995	1996–2000	Cumulative	Present
South Korea	0	3	11	2	1	4	1	1	23	12
China	0	0	0	0	7	5	81	47	140	136
Hong Kong	0	1	0	0	2	4	1	1	9	7
Taiwan	1	14	1	1	1	6	2	2	28	20
Vietnam	0	0	2	0	0	0	2	3	7	5
Thailand	0	5	2	1	2	20	8	7	45	39
Singapore	0	1	10	7	2	9	1	1	31	22
Malaysia	0	2	6	5	3	20	5	0	41	36
Philippines	0	3	2	0	1	3	5	7	21	17
Indonesia	0	1	1	0	0	2	18	12	34	33
India	0	4	3	0	1	2	3	5	18	14

Note: 1 This table shows the total number of establishments of nine Japanese electronics multinationals, i.e. Matsushita, Hitachi, Sony, Mitsubishi Electric, Toshiba, NEC, Fujitsu, Sanyo, Sharp, and their subsidiaries in Asia.
2 This table includes factories and software houses but excludes sales branches and service stations.
3 The figures include establishments by each companies' subsidiaries. In the case of Matsushita, however, the establishments of Victor Company of Japan are excluded, while those of Matsushita Electric Works are included.

Source: Shukan toyo keizai, 1980, 1985, 1995, 2001.

Table 4.1 shows the total number of production facilities that Japanese electronics companies established in East Asia since the 1950s. If we break the figures down by company, we can see that before 1970 each one had only one establishment in an East Asian country, indicating that the companies were following the abovementioned 'Mini-Matsushita' strategy.

The exception is Taiwan, where Mitsubishi Electric Corporation, Toshiba and Matsushita established more than two factories before 1970, and Hitachi had five factories. This marks the emergence of a new investment strategy of Japanese electronics companies in the 1960s, which is to use East Asia as a production base for export, mainly to the North American market, by taking advantage of the cheap labour in the region. Among the five factories of Hitachi in Taiwan, at least three were export-oriented factories producing television sets and electronic parts for the North American market. As the labour cost rose sharply in Japan in the

1970s, Japanese electronics companies further pursued this strategy of building export-oriented factories in East Asia, including South Korea, Singapore, Malaysia and Taiwan (Suehiro 1981). In South Korea, Sanyo and Toshiba built large scale electronic components factories. Matsushita established five subsidiaries in Singapore and three in Malaysia in the 1970s, all owned 100 per cent by Matsushita, to serve as export bases for electronic parts and compressors. Sharp established a factory for audio components in Malaysia in 1974. During the late 1970s and early 1980s, however, Table 4.1 shows that the amount Japanese electronics companies invested in East Asia decreased, mainly due to the trade friction with the United States and Europe on the issue of electronic exports. In order to alleviate this trade friction, Japanese companies increased investments to North America and Europe (Sasaki and Esho 1987). Since the internal resources that could be allocated to foreign investment were limited, this led to the reduction of direct investments in East Asia.

Trade friction may have skewed Japanese FDI, but following the appreciation of the yen after the Plaza Accord in 1985, Japanese electronics companies began to resume shifting their export bases from Japan to Southeast Asia. They increased the number of factories in Malaysia and Singapore, which they had been cultivating since the 1970s, as export bases for television sets, semiconductors and household electric appliances to North America and Europe. Also in this period, Japanese electronics companies began to target Thailand for new investments, where they built production facilities for microwave ovens and refrigerators. Unlike the previous FDI in these countries, there was a greater division of labor in the manufacture of electronic goods across the East Asian countries, deepening the realignment of Japanese production networks to include business support functions.

In the 1990s, Japanese electronics companies turned their attention to Indonesia and the Philippines. A large number of computer peripherals manufacturers set up in the Laguna Industrial Park in the Philippines where Hitachi, NEC, Toshiba, and Fujitsu built factories for the manufacture of hard disk drives. In Indonesia, Matsushita established eight production sites during the 1990s, while Sanyo established five and Toshiba four. No doubt Indonesia has the largest gross national product among the member countries of ASEAN and its wage level is one of the lowest, but it is unclear why Japanese companies were so aggressive in establishing a foothold in this country in light of the ASEAN free trade agreement (AFTA). Under this agreement, the ASEAN member countries would gradually remove trade and investment barriers allowing companies to economize on direct investments by exporting products from their existing factories in Thailand and Malaysia to Indonesia.

One possible consideration among the major Japanese companies may have been to locate production facilities so as to create a more balanced development among the ASEAN member countries. As can be seen in Table 4.1, the Japanese companies had concentrated their investments in Malaysia, Singapore and Thailand until the 1980s, leading to an unbalanced development of electronics exports among major ASEAN nations. Investing in Indonesia and the Philippines would help these nations to expand electronics exports, and eventually be advantageous for these companies to establish good relationship with their government. The affluence of the Japanese companies in the asset bubble days allowed them to make investments based on such political considerations, but this option was shattered by the 1997 Asian financial crisis. This paper explores the continuing realignment of the production networks of Japanese electronics companies, with a special focus on China, and discusses the prospects for its future change.

BUSINESS IN CHINA

Japanese electronics companies started their involvement in China soon after the initiation of economic reforms in this country. Between 1979 and 1981, Japan exported around one million television sets every year to China, but the Chinese soon launched a localization policy, strictly limiting imports and asked the Japanese to transfer assembly lines of television sets to local companies. Since then, the sales of factory facilities and product technology became the main business of Japanese electronics companies in China. They sold hundreds of assembly lines for colour television sets, refrigerators, and washing machines to the state-owned enterprises in China during the 1980s. Until 1993, the Chinese government basically relied on domestic enterprises, mainly state-owned enterprises, to develop the consumer electronics industry. The government not only paid attention to the localization of the final assembly, but also eagerly promoted the localization of components.

In the case of the colour television, the government set up factories with technology introduced from Japan to produce cathode ray tubes, tuners and linear ICs. The Chinese government did not refuse FDI, but it was difficult to maintain a manufacturing operation before 1993, unless it exported most of its products abroad. The fate of a joint venture which tried to sell products to the domestic market is illustrated by Fujian Hitachi Television Co. Ltd., which was one of the earliest joint ventures to be established by the Japanese following economic reforms. Hitachi's initial reason for investing in China was to penetrate the huge domestic

market. This strategy was quickly disrupted in 1985, when the Chinese government demanded that enterprises with foreign investment maintain a 'foreign exchange balance'. This meant the government wanted foreign companies to use their foreign exchange earnings from exports and other sources to counterbalance whatever expenditures of foreign exchange they needed to pay for imports (parts, machinery, etc.) and expatriate managers. Since Fujian Hitachi was not ready to export its products, the company went on the verge of bankruptcy in 1985. In order to revive its business, in the late 1980s, then, the company decided to export television sets. It soon became clear that the 'Fujian Hitachi' brand was competing against the 'Hitachi' brand produced at its other production bases in East Asia. It was not in Hitachi's initial strategy to let Fujian Hitachi be another export base in East Asia. The problem of competition between Fujian Hitachi and other Hitachi's remained unsolved for many years since then. In this manner, Fujian Hitachi was able to gain the necessary foreign exchange through exports and managed to continue sale of television sets in the domestic Chinese market. But it was unable to fully exploit the domestic market because the Chinese government restricted its sales to 200,000 units per year. Even though Hitachi was the first Japanese electronics company to come to China, it has been unsuccessful in the Chinese television market. In March 2002, Hitachi decided to withdraw from the joint venture by selling its shares to its Chinese partner (*Nihon Keizai Shinbun* 2002).

As the above case shows, it was difficult for foreign electronics companies to enter the end-product market. The Chinese government did not welcome foreign investments because it thought that there were too many domestic producers engaged in the assembly of consumer electronics. In the case of key components, however, the government encouraged foreign companies to enter. As the production of key components, such as cathode ray tubes for colour television sets, required sophisticated production technology and a large amount of investment, it was difficult for the Chinese government to build up domestic suppliers on its own. Matsushita, Hitachi and Philips responded to the government's plan to boost domestic production of cathode ray tubes launched in the late 1980s and set up joint ventures.

Video cassette recorders (VCRs) became popular among Chinese people in the late 1980s and some state-owned enterprises tried to produce them using knocked-down components imported from Japan. The government decided to set up only one supplier of key components – cylinder heads and chassis – for the whole country. Domestic VCR makers would have the right to buy the key components from the sole supplier according to the interest they had invested in the project.

Eleven VCR makers joined the project and made investments. The government then called on major electronics multinationals to join the project. Matsushita won the bid, and built a factory in Dalian spending 24 billion yen.

Since 1993, the 'foreign exchange balance' requirement and the obstacles placed before foreign companies wishing to sell products in the domestic market has been largely relaxed thanks to the development of foreign exchange swap centres and reforms in the foreign exchange system. Until this period, Japanese-brand consumer electronic goods maintained a very high reputation among Chinese people, although it was not easy for them to buy the goods unless they had foreign cash earnings. This constraint virtually disappeared in the early 1990s, as millions of Japanese-brand colour television sets and VCRs, which were smuggled via Hong Kong by local traders, swamped the Chinese market. In the case of colour television sets, Table 4.2 shows Matsushita (Panasonic) ranked first in 1994 and several other Japanese brands were ranked among the top ten during the period 1993–1996, even though the Japanese makers except for Hitachi and Sanyo had not yet started production in China. There is no similar data for the VCR market but according to my estimation, Japanese brands occupied more than 90 per cent of the market in the early 1990s.

Encouraged by the high popularity of their products and the relaxation on foreign exchange constraints, Japanese electronics companies rushed to China after 1993 to set up production facilities. The number of factories built in China from 1993 to 1996 is even larger than the number of those established in ASEAN after the Plaza Accord (see Table 4.1). Matsushita was the most aggressive, establishing 37 subsidiaries since 1992, covering most of the company's product line-up, ranging from the assembly of television sets to refrigerators, washing machines, air conditioners, microwave ovens, cellular phones and manufacturing the key components for each one. At present, the company has 44 subsidiaries producing in China, including those of Matsushita Electric Works. Second to Matsushita is Sanyo, which has 25 subsidiaries in China. Unlike Matsushita, Sanyo concentrates on air conditioning and refrigeration equipment and electronic parts.

The figures for other Japanese electronics companies are shown in Table 4.3. From this table, we can see that all nine companies have more production facilities in China than in any other host country in East Asia. The production sites in China are concentrated in Shanghai, Jiangsu, Guangdong, Beijing and Liaoning.

Table 4.2: **Production Volume and Market Shares of Major Color Television Brands**

			Shares (%)								Estimated Sales Volume (Ten thousand sets)					Production Capacity (Ten thousand units)	
Brand	**Maker**	**Ownership**	**1993**	**1994**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**1996**	**1997**	**1998**	**1999**	**2000**	**Short Term Plans**	**Long Term Plans**
Changhong	Changhong Electronics	State owned	4.2	5.0	20.5	25.0	33.7	13.2	16.72	16.51	410	570	954	448	486		
Konka	Kangjia Electronics	Joint stock with state equity	13.4	11.0	12.2	15.1	13.7	15.9	13.95	12.71	244	345	388	540	405		
TCL	TCL Group	State owned			6.2	9.5	7.8	11.0	12.30	14.12	124	216	221	374	357		
Hisense	Qingdao Haisin Electric	State owned	1.9			3.1	5.6	8.5	10.32	9.92		70	158	289	300		
RGB	Chuangwei-RGB	Hong Kong				4.4	2.6	4.5	6.58	8.16		100	74	153	191		
Haier	Haier Group	Collectively owned					7.9	7.8	6.80	6.80			224	265	189		
Philips	Suzhou Philips Consumer Electronics	Dutch				4.5	2.4		4.36	3.21		103	68		127		
Xodeco	Xiamen Xiahua Electronic	Philipino Chinese	3.3		2.7	3.8	2.0	6.5	3.96	3.02	54	87	57	221	115		
Sony	Shanghai Suoguang	Japanese		3.5	5.5		2.3	3.6	3.61	3.26	110		65	122	105	60 in 1996	300 in 2000
Jinxing	Shanghai Guangdian Group	State owned	4.2	3.7	2.7	4.5	2.0	2.8	3.48	2.68	54	103	57	95	101		
Toshiba	Dalian Toshiba Television	Japanese	2.1		4.2		2.1		2.77	2.95	84		59		80		
Panda	Panda Electronics Group	State owned	11.2	11.0	4.6	3.9	5.6	2.9	2.37	2.56	92	89	158	99	69		
LG	LG Electronics Shenyang	Korean					3.6		2.03	2.20			102		59		
Lehua	Guangzhou Lehua	Formerly state owned							1.97	2.11					57		
Panasonic	Shandong Matsushita	Japanese	10.7	14.7	13.3	6.7	2.3		1.93	1.93	266	153	65		56	40 in 1998, 80 in 1999	
Sharp	Nanjing Sharp Electronics	Japanese							1.36	1.04					39	NA	
Xihu	Xihu Electronics	State owned							0.91	0.58					26		
Sanyo	Dongguang Huaqang Sanyo Electronics	Japanese							0.71	1.27					21		
Caihong	Caixing Electric	Hong Kong							0.62	0.73					18		
Hitachi	Fujian Hitachi Television	Japanese							0.56	0.29					16	80 in 1993	
Chunlan	Chunlan Group	Collectively owned							0.51	0.33					15		
Beijing	Tianjin Tongxin Guangbo	State owned	5.4	4.0	7.1				0.40	0.09	142				12		
Gaohuhua	Guangdong Gaohuhua Television	Hong Kong							0.37	2.04					11		
Samsung	Tianjin Tongguang Samsung	Korean							0.29	0.60					8		
Kangli	Kanghui Electronics	Hong Kong (State owned)							0.18	0.13					5		
Shanghai	Shanghai Radio Equipment Factory	State owned							0.16	0.08					5		
Fujian-Hitachi	Fujian Hitachi Television	Japanese							0.14	0.02					4		
Thakral	Shanghai Thakral Electronics Industrial Co. Ltd.	Singaporean							0.14	0.00					4		
JVC	Wuhan JVC	Japanese							0.10	0.05					3	12 in 1996	
Mudan	Mudan Visual Electronics	State owned							0.08	0.03					2		
Kawa	Zhongshan Kawa Electronics	Hong Kong							0.06	0.10					2		
Others			43.5	47.2	21.0	19.5	6.4	23.3	0.60	0.50	420	445	181	792	16		
Japanese									11.20	10.80					325		
Foreign excl. Japanese									18.40	20.10					535		
Chinese									69.90	68.70					2028		
Top Ten brands			56.5	52.8	79.0	80.5	85.2	76.7	81.78	80.66							
Estimated domestic consumption (ten thousand units)											2000	2282	2830	3397	2904		

Note: Before 1999, only the shares of top 10 brands are known.

Source: Bureau of Trade and Material Statistics (1994, 1995), Zhongguo dianzi bao (various issues), Qingshiwang (2002), Nihon keizai shinbun, Nikkei sangyo shinbun.

Table 4.3: **Geographic Distribution of the Production Sites of Japanese Electronics Multinationals**

	Total	Mitsubishi Electric	Matsu-shita	Fujitsu	Hitachi	Toshiba	Sanyo	Sony	Sharp	NEC
South Korea	12	1	0	2	2	2	3	1	1	0
China	136	11	44	13	16	14	18	6	5	9
Beijing	16	2	8	1	2	0	0	1	0	2
Tianjin	3	0	1	1	0	0	0	0	0	1
Hebei	2	0	1	1	0	0	0	0	0	0
Shanxi	0	0	0	0	0	0	0	0	0	0
Inner Mongolia	0	0	0	0	0	0	0	0	0	0
Liaoning	15	1	3	0	1	4	5	0	0	1
Jilin	0	0	0	0	0	0	0	0	0	0
Heilongjiang	0	0	0	0	0	0	0	0	0	0
Shanghai	25	4	7	2	5	2	0	2	2	1
Jiangsu	24	0	6	6	3	2	2	2	3	0
Zhejiang	5	0	4	0	0	1	0	0	0	0
Anhui	1	0	0	0	0	0	1	0	0	0
Fujian	5	0	2	1	1	1	0	0	0	0
Jiangxi	1	0	0	0	0	1	0	0	0	0
Shandong	4	1	3	0	0	0	0	0	0	0
Henan	2	0	1	0	0	1	0	0	0	0
Hubei	3	0	0	0	0	0	0	0	0	3
Hunan	1	0	0	0	1	0	0	0	0	0
Guangdong	25	1	8	0	3	2	10	1	0	0
Guangxi	1	0	0	0	0	0	0	0	0	1
Hainan	0	0	0	0	0	0	0	0	0	0
Chongqing	0	0	0	0	0	0	0	0	0	0
Sichuan	0	0	0	0	0	0	0	0	0	0
Guizhou	0	0	0	0	0	0	0	0	0	0
Yunnan	0	0	0	0	0	0	0	0	0	0
Tibet	0	0	0	0	0	0	0	0	0	0
Shaanxi	3	2	0	1	0	0	0	0	0	0
Gansu	0	0	0	0	0	0	0	0	0	0
Qinghai	0	0	0	0	0	0	0	0	0	0
Ningxia	0	0	0	0	0	0	0	0	0	0
Xinjiang	0	0	0	0	0	0	0	0	0	0
Hong Kong	7	0	2	1	0	0	2	0	0	2
Taiwan	20	5	5	2	4	0	2	0	1	1
Vietnam	5	0	1	2	0	0	0	1	0	1
Thailand	39	7	8	4	5	6	1	4	2	2
Singapore	22	0	8	0	5	2	4	2	0	1
Malaysia	36	1	14	2	5	3	3	2	4	2
Philippines	17	1	4	2	2	1	2	0	1	4
Indonesia	33	4	10	0	3	4	6	2	2	2
India	14	1	7	2	1	0	0	1	2	0

Source: Same as Table 1.

Business Performance in China

The main reason Japanese electronics companies set up so many subsidiaries in China in such a short time was to penetrate the Chinese market. In this respect, they have not been as successful as they had expected. In the case of colour television sets, for example, Table 4.2 shows the market share for Japanese brands has actually dropped since 1997, when Japanese companies started operating their television plants in China. The Chinese market has become a battlefield for domestic giants, such as Changhong Electronics, Kangjia Electronics and TCL Group, leaving little room for the Japanese to increase their share.

Japanese electronics companies are also facing stiff competition in the market for household electric appliances. In the washing machine market, Japanese makers have decent shares compared to domestic giants,

Table 4.4: **Market Shares of Washing Machine Makers** (%, Ten thousand units)

Company	Nationality	Market Shares		Estimated sales volume		Production Capacity	
		Jan 1999	Jan 2001	1999	2000	Short Term Plan	Long Term Plan
Haier	Domestic	35.5	28.8	476	416		
Xiaotiane	Domestic	19.6	19.5	263	281		
Rongshida	Domestic	11.4	12.8	153	185		
Xiaoya	Domestic	7.1	7.4	95	107		
Hangzhou Matsushita	Japanese	4.6	5.4	62	78	60 in 1995	160–170 in 2000
LG Xiwang	Korean	2.2	4.9	30	71		
Wuxi Siemens	German	2.4	4.0	32	58		
Shanghai Whirlpool	American		3.8		55		
Jinling	Domestic	3.7	3.0	50	43		
Shanghai Hitachi	Japanese	3.2	2.1	43	30	24 in 1997, 60 in 1999	
Suzhou Samsung	Korean		1.6		23		
TCL	Domestic		1.3		19		
Changsha Electrolux	Swedish		1.2		17		
Shanghai Sharp	Japanese		0.9		13	50 in 1997	
Haitang	Domestic		0.7		10		
Weili	Domestic	3.8	–	51			
Domestic Brands		84.8	75.8	1138	1094		
Foreign Brands		15.2	24.2	204	349		
Estimated domestic consumption (Ten Thousand)				1342	1443		

Source: From Eastern Electric Resources (2002)
Nihon keizai shinbun (various issues), Nikkei sangyo shinbun (various issues).

Table 4.5: **Market Shares of Refrigerator Makers** (%, Ten thousand units)

Company	Nationality	Market Shares (%)		Estimated Sales Volume		Production Capacity (Short term plan)
		Jan 1999	Jan 2001	1999	2000	
Haier	Domestic	39.0	29.7	472	380	
Chuzhou Siemens	German		10.2		130	
Changsha Electrolux	Swedish	4.0	9.7	48	124	
Rongsheng	Domestic	14.6	9.6	177	123	
Meiling	Domestic	8.6	8.9	104	114	
Changling	Domestic	3.4	6.6	41	84	
Xinfei	Domestic	9.1	6.1	110	78	
Suzhou Samsung	Korean	2.3	4.0	28	51	
Chunlan LG	Korean		3.1		40	
Wuxi Matsushita	Japanese	1.8	1.9	22	24	35 in 1996
Hualing	Domestic		1.8		23	
Shangling	Domestic	5.0	1.5	61	19	
Kelon	Domestic		1.5		19	
Rongshida	Domestic		1.4		18	
Shanghai Sharp	Japanese	4.2	1.1	51	14	50 in 1997
Domestic Brands			69.7		891	
Foreign Brands			30.3		388	
Estimated domestic consumption (Ten Thousand)				1210	1279	

Source: From Eastern Electric Resources (2002)
Nihon keizai shinbun (various issues) Nikkei sangyo shinbun (various issues).

such as Haier (Table 4.4). Many foreign makers assemble washing machines in China, including LG, Samsung, Siemens, Whirlpool and Electrolux, but they are also struggling against the Chinese producers. In the refrigerator market (Table 4.5), Haier again has the largest share followed by Siemens and Electrolux, while the Japanese companies only have tiny shares. Haier also dominates the air conditioner market (Table 4.6). Mitsubishi Electric and Hitachi have fairly large shares. The shares of Hitachi and Sharp declined sharply after 1999.

What has been most disappointing for the Japanese electronics companies was China's VCR market. In the early 1990s, domestic demand for VCRs was robust, which attracted a huge amount of Japanese-made VCRs to the market through illegal channels. Consequently the government placed great importance on the localization of VCRs and listed the aforementioned project on the agenda of the Eighth Five-Year Plan (1991–95). But when the VCR component factory started operation, the Chinese population began to buy video CD players instead of VCRs. The reason

Table 4.6: **Market Shares of Air Conditioner Makers** (%, Ten thousand units)

Company	Nationality	Market Shares (%)		Estimated Sales Volume		Production Capacity (Short term plan)	
		Jan 1999	Jan 2001	1999	2000	Short Term Plan	Long Term Plan
Haier	Domestic	32.4	23.4	433	428		
Midea	Domestic	2.4	13.1	32	239		
Shanghai Mitsubishi	Japanese	4.7	6.8	63	124	55 in 2000	
Shanghai Hitachi	Japanese	14.1	5.7	189	104	40 in 2000	70 in 2002
Hisense	Domestic	3.1	5.4	41	99		
Chunlan	Domestic	4.6	4.9	62	90		
Glee	Domestic		4.4		80		
Lehua	Domestic		4.0		73		
Tianjin LG	Korean	4.4	3.6	59	66		
Shanghai Sharp	Japanese	17.4	3.4	233	62	66 in 1999	
Hualing	Domestic		2.2		40		
Guangzhou Matsushita	Japanese		2.2		40	60 in 1999, 100 in 2001	
Kelon	Domestic	3.1	2.0	41	37		
Changhong	Domestic		1.8		33		
Domestic Brands		54.8	72.3	733	1321		
Foreign Brands		45.2	27.7	604	506		
Estimated domestic consumption (Ten Thousand)				1337	1827		

Source: From Eastern Electric Resources (2002)
Nihon keizai shinbun (various issues), Nikkei sangyo shinbun (various issues).

for the change in preference is that the video CD is much cheaper to buy, especially if it is a pirated version, and there is a greater variety of selections than videotapes in China. Unexpectedly, the market for VCRs virtually disappeared overnight. Without a market for its product, the VCR component factory, namely Hualu Matsushita AVC Co. Ltd., had to change its business activities. The joint-venture has now become an export base for Matsushita, producing VCRs and DVD players as well as their key components.

Obviously, the Japanese electronics companies are not successful in China in terms of market share, despite giving it first priority among their managerial objectives. Since the Chinese market for consumer electronics is so huge, however, even a small market share may translate into a large production volume. If this production volume exceeds the break-even point, a factory can justify continuing operations. Conversely, a high market share in China does not necessarily translate into large profits. The battle for market share among domestic companies is so fierce that

the price of end-products can drop quickly. For example, the price of 21 inch colour televisions fell more than half from RMB 2972 in 1994 to RMB 1400 in 1999 and then almost half again to RMB 800 in 2000. According to the Chinese newspaper *Guoji Jinrong Bao* (2001), the total profits for television manufacturers were negative in 2000, although the Ministry of Information Industry later denied this news report (*Renmin Ribao* 2001).

Since Japanese electronics companies have advantages in brand image, quality, and technology over domestic companies, they must, and they can, step aside from the price competition and sell high-value-added products. Judging from my estimates on the average price of various colour television brands sold in China, Japanese companies are apparently adopting this strategy. In Table 4.7, the average prices of colour television sets were calculated from the data on market shares both in terms of value and quantity. It turned out that the average price of Sony's colour television sets sold in China in 2002 was more than four times more expensive than that of Changhong's, the most popular brand in China. Matsushita and Toshiba's colour television sets were almost as expensive as Sony's.

Table 4.7: **Market Share and Unit Price of Major Colour Television Brands** (January to November 2002)

Brand/Company	Market share (%)	Unit price index (Changhong=1.0)
Changhong	16	1
TCL	13	1
Kangjia	13	1
Haixin	10	1
Chuangwei	10	1
Haier	7	1
Shanghai VA	3	1
Sony	3	4
Toshiba	3	4
Shenyang LG	3	2
Panda	3	1
Xiahua	3	1
Sanyo	2	1
Matsushita	2	4
Samsung	2	2

Source: Calculated from Qingshiwang (2002).

The profit and loss data for the production sites of Japanese electronics companies is unavailable, but we can hazard a guess by estimating the rate of operation in the factories. If a factory operates at more than 70 per cent of capacity, it can be judged as successful or at least worthwhile to maintain. In Tables 4.2, 4.4, 4.5, 4.6, I estimated the sales volume of each brand by multiplying its market share by the total domestic sales volume. The total domestic sales volume is estimated by deducting exports and adding imports to the domestic production volume data. Based on news coverage by *Nihon Keizai Shinbun* and *Nikkei Sangyō Shinbun*, I have added the production capacities for the makers with Japanese investment to the tables. This method has many shortcomings: firstly, it does not take into account the stockpiling by enterprises, so the total domestic sales volume might be overestimated; secondly, the data on market shares is based on a limited number of sample surveys, which have been criticized by some companies for being biased; and third, as the newspapers only report a company's initial investment plan or expansion, it is unclear whether the plans are realized or not.

Even with all these shortcomings, the data helps in understanding the condition and behaviour of Japanese invested enterprises. In the case of colour television sets (Table 4.2), Sony's share (Shanghai Suoguang) seems to be very small (3.26 per cent), and yet the actual sales volume (1,050,000 sets) exceeds its initial plan of 600,000 units in 1996. Therefore we can judge this joint venture has been a success. In the case of Matsushita (Shandong Matsushita), the operation rate must be around 70 %, which is not very high but satisfactory percentage. On the other hand, the operation rates for Hitachi (Fujian Hitachi) and Victor Company of Japan (Wuhan JVC) are only 25 %. It is not surprising that these companies have decided to withdraw from their joint ventures recently. In other markets (Table 4.4, 4.5, 4.6), Shanghai Hitachi and Shanghai Sharp's washing machines, Shanghai Sharp's refrigerators, and Guangzhou Matsushita's air conditioners are not very successful. Yet Guangzhou Matsushita announced in 2000 that it will expand its capacity from 600,000 units to one million units a year. Matsushita intends to export half of the air conditioners produced in the factory to other markets including Japan (*Renmin wang* 2001).

Location Behaviour of Japanese Electronics Companies

The history of foreign direct investment by Japanese electronics companies in each East Asian country followed a common pattern. At the beginning, Japanese companies established a production site in order to

avoid trade restrictions and penetrate the domestic market. Later on, they start to use the country as an export base, establishing new production sites or changing the function of existing sites; even when the country loses its comparative advantage as an export base, Japanese companies still try to utilize the subsidiary by changing its function. Hence the incidence of withdrawal is relatively low. Table 4.1 shows that only 14 per cent of the 397 establishments have disappeared during forty years of investment in Asia. There have also been traces of the bandwagon effect among Japanese electronics companies. In the latter half of the 1980s, Thailand and Malaysia were the focus of their investment. In the mid-1990s, China became the new focus. The investment behaviour in these boom periods seems to be based not only on rational considerations of production costs and market access.

Can these motives explain the location behaviour of Japanese electronics companies? Did they exhibit the bandwagon effect? Tokunaga and Ishii (1995) conducted a quantitative analysis of Japanese electronics companies' location behaviour using the conditional logit model. They found that the economic environmental factors of the host country, namely, the wage rate, the level of infrastructure and the degree of economic instability are significant factors that affect the location behaviour of Japanese electronics companies. On the other hand, the size of the host country market and the degree of agglomeration were not significant factors in explaining investment behaviour. But as Tokunaga and Ishii's analysis is based on data gathered from 1986 to 1992, their analysis does not take into account the huge flow of investment to China since 1993.

I analyze the data for investment projects by the Japanese electronics companies in ten East Asian countries implemented from 1983–2000 using a Poisson regression model along with OLS regression (Table 4.8). The dependent variable is the number of production sites the companies established in an East Asian country in a particular year. The host countries included in the analysis are South Korea, China, Hong Kong, Taiwan, Thailand, Singapore, Malaysia, Philippines, Indonesia and India. The explanatory variables are the market size of the host country, measured by the countries' GDP in USD billion; the exchange rate of the host countries' currency to yen in relative terms, the monthly manufacturing wage in the host country compared to that of Japan in the same year, the cumulative number of production sites established by the companies until the previous year, which measures agglomeration effect; and the average growth rate of the previous three years.

Table 4.8: **Result of the Regression Analyses on Japanese Electronics Multinationals' Investments**
Dependent variable: number of investment projects started in the year

Period	**1983–2000**		**1983–2000**	
Model	**Poisson Regression**		**OLS**	
Explantory Variables	**Coefficient**	**t-value**	**Coefficient**	**t-value**
constant	-1.16	-5.33 ***	-1.76	-2.17 **
GDP	0.00089	2.17 **	0.0045	2.45 **
relative exchange rate	0.086	4.87 ***	0.25	2.31 **
wage	-4.46	-5.91 ***	-4.76	-2.48 **
Number of existing production sites	-0.00046	-0.16	0.015	0.95
Average growth rate of the previous 3 years	0.21	9.53 ***	0.35	3.87 ***
Log likelihood	-307.01			
R-square Pearson	0.72			
adjusted R^2			0.30	
F value			16.32	***
Observations	180		180	

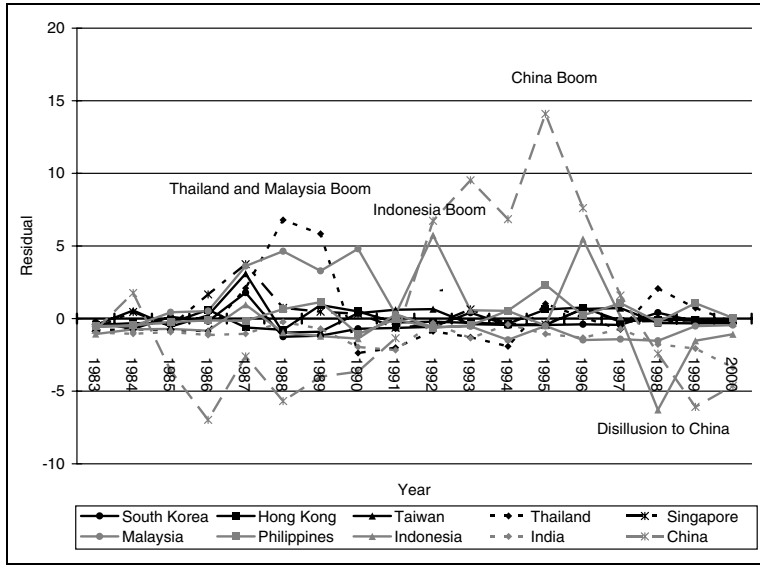
Note: * P<.1, ** P<.05, ***P<.01
The relative exchange rate for country i in year s is, EXYis=(EXDis/EXDi1983)/(EXDjs/EXDj1983), where EXDis denotes country i's exchange rate to USD in year s, and j denotes Japan
The host countries included in the analysis are South Korea, China, Hong Kong, Taiwan, Thailand, Singapore, Malaysia, Philippines, Indonesia and India.
Wage data is adopted from the ILO database. For some countries, however, only some of the wage data for the period 1983–2000 is available. In these cases, wage data for the missing years is extrapolated from existing data.

Contrary to Tokunaga and Ishii (1995), the market size of the host country is significant in explaining the number of investment projects made in the country. The difference between our analysis and that of Tokunaga and Ishii mainly stems from the fact that our analysis covered a longer period and included the investment in China after 1993. As discussed in section 2 of this paper, the period which Tokunaga and Ishii analyzed, 1986–92, was a particular period when Japanese electronics companies shifted their export bases from Japan to Southeast Asia, so their analysis strongly reflects this aspect of the investment behaviour of Japanese companies. Taking a longer time period, however, the analysis shows that the investment by these firms is also strongly motivated by the desire to capture the domestic market in East

Asian countries. Note that the coefficient for the three-year average GDP growth rate is also positive, which indicates that investments are attracted not only by the present size of the host countries' GDP but also by their prospective size.

In our analysis, the depreciation of the host countries' currency and low wage levels are also significant factors in attracting investment from Japanese electronics companies. No agglomeration effect is detected by our analysis, which indicates that the companies have shifted the foci of their investment rather than concentrating on a particular country.

Figure 4.1: **Residuals of the Poisson Regression Model**



Assuming that the Poisson regression model in Table 4.8 depicts rational investment behaviour on the part of the Japanese electronics companies, the residuals can be defined as deviations from rational behaviour. The sign (positive or negative) and size of the residuals correlate with our impression that there had been a 'Thailand and Malaysia boom' in the late 1980s, an 'Indonesian boom' in the early 1990s, and a 'China boom' in the mid-1990s (Figure 4.1), of which the 'China boom' has been the largest. This suggests that there were bandwagon effects influencing the investment decisions of the companies.

Towards a Strategic Realignment of Production Sites

Japanese electronics companies established subsidiaries in East Asia in order to serve two functions: the domestic market and export. As the analysis in the previous section shows, their investment behaviour can largely be explained by the size of the domestic market, cheap labour and currency. At the same time, there have been significant deviations from these motives, suggesting Japanese electronics companies are affected by the bandwagon effects. The low incidence of withdrawal is also noteworthy. When a subsidiary turns out to be incapable of attaining the initial investment goal as a result of changes in the market environment and the host country's comparative advantage, Japanese firms often try to maintain the subsidiary by changing its function rather than closing it down. In the case of Matsushita, the 'Mini-Matsushitas', which the company established in Thailand, Indonesia, Malaysia, Philippines and Taiwan from the early 1960s to produce various consumer electronic goods to feed the domestic market, existed until the late 1990s, long after the company started to set up large-scale export bases in the same countries. The cases of Hualu Matsushita and Guangzhou Matsushita described in Section 4 are typical examples of the functions of operations being changed after their failure to fulfil the original motivation to invest. Some operations in Singapore and Hong Kong changed their function from factories to trading centres. They disappeared from Table 4.1 but still exist.

The tendency of investment decisions to be affected by bandwagon effects, together with the tendency to maintain existing operations as long as possible, however, results in the duplication of function amongst the subsidiaries and in over capacity. Matsushita, for example, has a television factory in each of five Asian countries, China, Vietnam, Thailand, Malaysia and Indonesia. If the free trade agreement among the ASEAN countries materializes, four of them will compete in the same market. Now China and ASEAN have agreed upon creating a free trade zone. If Asia transforms itself from a mass of small compartmentalized markets into an integrated market, the Japanese electronics companies may face a serious problem of internal competition among their subsidiaries in China and ASEAN. It seems to be inevitable for the companies to streamline their production sites scattered around East Asia. Those subsidiaries that only catered for the small domestic markets and those that locate in countries that have lost comparative labour-related advantage may be the first candidates to be scrapped, while those that already operate on a large scale and those that are located in a country with an ample labour supply and a wide network of suppliers may survive.

It is very likely that Japanese electronics companies will further concentrate their production bases in China in the near future, because China has many advantages over other host countries in East Asia. First, with a highly-skilled labour force, China has an apparent labour-related advantage, over Southeast Asian countries and Japan. Secondly, the abundance of electronic parts suppliers in Guangdong, Shanghai and Jiangsu exceeds that of Southeast Asia (Kuroda 2001). Japanese electronics companies themselves have also contributed to the creation of suppliers, by setting up many factories producing key components for consumer electronics in order to meet Chinese government localization requirements. The Japanese market share may be small in the end-product market, but it is quite high in the key components market. Two Japanese joint ventures supply nearly 30 per cent of all the cathode ray tubes for colour television sets in China. 90 per cent of the compressors for air conditioners produced in China are supplied by six enterprises with Japanese investment. The Japanese share in the supply of optical pickups for video CD and DVD players must also be very high. Together with these, a vast network of electronic parts suppliers including Japanese small and medium-sized enterprises, Taiwanese enterprises and domestic Chinese enterprises have emerged in Guangdong, Shanghai and Jiangsu, making it possible to purchase more than 90 per cent of the parts for electronic products locally.

Consideration of the political repercussions on the closure of plants may deter the Japanese firms from closing their plants in Southeast Asia. The high cost of cutting workforces in Japan may be an obstacle to the reduction of production capacities in Japan. The financial situation of Japanese electronics companies, however, leaves little time for them in which to hesitate.

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