

Multinational Enterprises, foreign investment and intrafirm trade in East Asia

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The previous chapters analyze organizational characteristics of indigenous East Asian business systems. The focus in this chapter shifts to the multinational enterprises (MNEs) producing in the region, their foreign direct investment (FDI) in local affiliates in China, Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Taiwan and Thailand¹ and the patterns of intrafirm trade among these affiliates. What influences these FDI-trade linkages and what is their impact on the host economies?² A major theme of the chapter is that these trade-FDI linkages have become more complex because of the interaction between governments and MNEs; but the impacts of these linkages on the host economies are mixed. As MNEs have “unbundled” their activities into value-added segments, host governments have influenced this trend by attracting certain segments to locate in their economies. This FDI and the related trade have helped to diversify and modernize economic structures and have brought new knowledge and skills. The interaction has also promoted integration among the economies in the region and the region’s integration into the world economy. But with many economies diversifying their economies in the same way, the resulting similarity of industrial structures contributed to excess capacity in certain key industries. When world demand declined, as it did in the recent financial and economic crisis, this excess capacity exacerbated the crisis.

The chapter is organized as follows. In the next section, I summarize patterns of inward FDI by host economy and industry and introduce the conceptual framework for the analysis, beginning with a review of the literature on multinational behavior in the region. In the third section, I present primary research data comparing cross-border transactions in host economies among affiliates of multinationals from different home countries. In the fourth section, the focus shifts to the multinational itself with three case studies -- of US, Japanese and Taiwanese firms -- which map the locations of their cross-border activities in East Asia. In the final section, I draw some generalizations and conclusions.

Multinationals in East Asia: a conceptual framework

¹Korea, which until recently restricted inward FDI, is not included.

² Work in this chapter draws on Dobson and Chia (1997) which studied the links between FDI and trade and their impact on regional integration (the process by which barriers to flows of goods, services and capital are reduced, allowing the freer play of market forces.)

Patterns of FDI

Historically, Japanese and American firms have been major foreign investors in the more advanced East Asian economies of Taiwan, Hong Kong and Singapore, with firms from those economies and South Korea becoming significant sources of investment in the follower economies of China, Indonesia, Malaysia and Thailand (Table 1)³. European investors have also entered the region in increasing numbers; they are included in the Other category in Table 1 and account for significant shares of FDI flows into Singapore and the Philippines. Since most of the empirical work in this chapter focuses on Japanese and American firms, the background which follows focuses mainly on them.

First, however, a note on the industrial distribution of inward FDI is in order. Most of the stocks of FDI in the region are in non-manufacturing industries including natural resources, services and trading activities. Significant shares of the stocks in manufacturing, however, are concentrated in the electronics, auto textiles and apparel and chemicals industries (UNCTAD, various issues). Taken together, these manufacturing industries accounted for nearly 50 percent of world merchandise trade in 1994 and 60 percent of Asian exports (WTO, 1996). The electronics industry is a major focus of the empirical enquiry in this chapter.

US tariff provisions under Tariff Schedules 807.00 and 806.30 adopted in the 1970s contributed to the growth of offshore processing and intrafirm transactions. US firms located the labor-intensive segments of their value chains abroad and exported output to the US market, paying import duties on only the value that was added abroad. In the early 1980s, as the US dollar climbed and severely disadvantaged US exporters, falling trade barriers and improved communications and coordination made it economic to locate more and more of their labor-intensive activities abroad and to source such standard-technology activities outside the firm. East Asia became a target in the 1970s and 1980s for this kind of investment, particularly in the electronics industries (Grunwald and Flamm 1985).

Japanese FDI in the region began in labor-intensive industries as early as the 1950s and 1960s and was followed by firms in the heavy and chemical industries and the resource-seeking multinationals. The magnitude of FDI was initially negligible, however, because of capital controls.

³ Comparative data on FDI are scarce because of different standards for data collection in different economies. FDI flows are measured by East Asian governments as either intended (but not realized) investments or as actual investments. In the table, FDI data are reported on a notification basis by Malaysia, Indonesia and China, and as actual investments in the other economies. The distribution of FDI in this table is based on stock data.

Ninety seventy two was the watershed year for outward FDI, triggered by the large yen appreciation and its negative impact on domestic production costs, and positive impact on the relative prices of foreign assets that occurred at the time of the collapse of the Bretton Woods fixed exchange rate system (Komiya 1990). This FDI was largely subcontracting-dependent, assembly-based as multinationals transplanted operations to serve the Asian market (Ozawa 1991). The oil shock and resulting slowdown quickly moderated this surge, as did the undervalued yen.

The second major surge of outward direct investment was triggered by yen appreciation in the 1985-88 period⁴. At that time, the rapidly-growing current account surplus was becoming an increasing focus of US-Japan political friction. Such frictions and the impact on production costs of the largely-unanticipated yen shock caused corporations to rethink their strategies for production and sales abroad. Although strategies varied, electronics and auto firms restructured their operations to place labor intensive standard technology production activities in lower cost offshore locations, moving Japanese operations into high value added activities more consistent with the higher skilled labor and higher cost structure in Japan. In the 1990s, further rationalization occurred so that offshore operations expanded into a broader line of products formerly produced in Japan (Dobson and Chia 1997).

Theories of cross border investment and trade by multinational enterprises

Descriptions of MNE organizational characteristics and explanations of their production decisions span the literatures of strategy, economics, sociology and organizational behavior. Economics and strategic analysis focus on MNEs' pursuit of strategic advantages and cost minimization as factors driving their decisions to produce abroad rather than relying on exporting or other market-based arrangements such as strategic alliances to serve foreign markets. Sociology and organizational behavioralists seek to describe how and why MNEs organize their production at home and abroad.

Economists reason that FDI would not occur in a world of perfect competition since it requires incurring transactions costs that would disadvantage MNEs over their local rivals (Graham 1994). These considerations have led them to seek the explanation for foreign production decisions within the MNE's internal characteristics, and particularly decisions on the mandates and location of affiliates. The rationale for what became known as "internalization" suggested that firms could exploit their proprietary advantages by keeping them within the organization and expanding the firm into foreign markets. This approach was supplemented by analyses of the determinants of their decisions to place their operations in various locations. This extensive literature is reviewed in Caves (1996) and Dunning (1993). Determinants of locational decisions that stand out are barriers to trade, distance (transport costs), exchange rate realignments, availability of natural resources, risk and political stability. Other factors, such as fiscal incentives, play a role, other things equal, in choices of alternative locations in adjacent locations. Vernon (1966; 1971) was one of the first to combine these two approaches with oligopolistic competition

⁴ Some authors identify the 1980s as the third wave of outward investment, the second wave having taken place after 1978 yen appreciation.

among firms by use of the product cycle. Porter (1990) also combined internalization and location variables in his “diamond” of national competitive advantages. Vernon’s 1966 model described the product cycle behavior of innovating firms in industrialized countries. Once the product innovation of an oligopolistic firm achieves dominance in its home market, it begins to export. As costs rise and imitators appear, the producer invests abroad in locations with lower comparative costs. In a later version (Vernon 1979), allowing for strategic competition by global MNEs, he questioned whether information and coordination costs would mean that this would apply only to MNEs with decentralized nationally-oriented operations.

The Japanese literature contains a similar approach to that of Vernon. Kojima (1978) following Akamatsu (1962) described a process, based on Japanese experience, by which a product of superior quality is first imported; as domestic demand for the product increases, it is produced domestically. After a learning process, often fostered by trade protection, costs are sufficiently reduced and quality is sufficiently improved to export the product. FDI plays a role insofar as it assists the learning process. Akamatsu had earlier adapted this framework to his “flying geese” model of diversification and industrial upgrading (in this case the sequencing was from one industry to another, rather than from imports to domestic production to exports). In this process, the leading country invests in the follower country in industries in which the leading country encounters comparative cost disadvantage relative to the follower. Kojima (1995) expanded the industry-level of analysis, noting that as domestic industries mature and exports peak, outward FDI occurs, both to secure the lower cost intermediate goods needed to retain comparative advantage and to maintain market share through local sales or re-exporting.

These locational approaches have two implications. First, they help to conceptualize the links between trade and FDI, which the economists’ traditional theoretical approaches have tended to be treated separately. Second, they imply a focus on certain determinants of FDI. Market size, for example, is likely to encourage firm presence through FDI. Comparative advantage of various locations in terms of their natural or created factor endowments affect trade and FDI location decisions; conversely, the existence of trade barriers also provides an incentive for FDI. Government policies provide a third influence through the impact of policy on demand and cost factors (Safarian 1993).

Business school academics have sharpened the focus of exactly what is being analyzed. MNEs first became the focus of sustained attention from academics and policy makers in the 1960s, when FDI and cross-border production activities were at early stages of development. “Location” meant location of production in two or more countries with the intent of serving the local market. With the development of sophisticated information technology and managerial techniques, it became possible to coordinate and control far flung activities and the MNE as an organizational form changed considerably. One of the major innovations was to “unbundle” the value chain. In the 1990s, location decisions are made with respect to various functions within the MNE; that is, the location of final assembly as distinct from components production and sub-assembly, support activities and marketing functions -- as well as the location of external sources of supply. In addition, business academics have demonstrated the evolving rationale for networks rather than the traditional hierarchical form that is assumed by economists. Both have tended to view the MNE as a hierarchy in which decisions are made at head office in the technologically advanced central

location that produces all the innovation for the followers in the periphery (with the implied one-way transfer). By the 1990s, this model gave way to ones allowing for more diverse intrafirm relations for the purpose of mobilizing innovation throughout the entire organization. It was the growing importance of knowledge creation that began to show the incongruence between the centralized decision making that is implicit in the internalization/ transactions cost model and the goal of constant innovation to which decentralized networks that can take advantage of the diversity among subsidiaries are more relevant (Barlett and Ghoshal 1989; Nohria and Ghoshal 1997). In another study in this volume, Gary Gereffi delves more deeply to describe the behavior of these value chain segments, in what he calls commodity chains. By paying particular attention to the impact of the firm's activities on the chosen location, he emphasizes the two-way interaction between location as a determinant of FDI (as seen in this study) and FDI as an influence on location.

The economist sees both the unbundling phenomenon and the appearance of intrafirm networks as characteristics of firms allocating foreign production in value added segments by "slicing up the value chain" (Krugman 1995) and relocating affiliates and value added segments as the comparative advantage of a location for investment changes. Helpman and Krugman (1985) developed a model which links a firm's FDI decisions with intrafirm trade when scale economies and imperfect competition provide additional incentives for trade. Firms, particularly in assembly-based industries such as textiles and apparel, electronics and autos, link these value added activities into production networks as ways to increase international competitiveness. Faced with intensifying competition because of such factors as deregulation, falling trade barriers and increasing capital mobility, they seek production efficiencies by unbundling value added activities which were previously vertically integrated within a single location or production unit. Locational factors, particularly factor endowments and government policies, are determinants of where those activities will be allocated.

In this chapter, I use the segment as the unit of analysis and do not expect that entire industries will relocate from one economy to another, but that industry *segments* will. Value-added activities with low entry barriers, price sensitivity, and standard technologies will be located -- and relocated -- to sites with comparative advantage in, for example, supplies of low cost labour or plentiful natural resources. Services or products that embody recent innovations, or are capital or technology intensive with high entry barriers, will be allocated to sites with comparative advantages in skilled labour, low cost communications and infrastructure. Production networks are created by these cross-border trade linkages, either within a firm or among cooperating firms, since the many intermediate goods in the assembly-based industries must be shipped from where they are produced to other locations (with different comparative advantage) where further value is added in the form of finishing, testing, assembly or marketing. In this study, the networks that are studied are *intrafirm* rather than networks involving entities of cooperating firms. This means that outsourcing, an increasingly common phenomenon, is not a focus in this study.

In East Asia, government policies have been a significant influence on locational decisions. Of course, the direction of causation is two-way; the activities of foreign firms also affect the industrial structures of host economies. My focus, however, is on East Asian governments'

determination to use locational incentives (in the forms of direct intervention such as fiscal incentives and indirect intervention by creating new sources of comparative advantage in the form of supplies of more advanced skills, more sophisticated infrastructure, etc.) to attract certain value added activities. One of the outcomes of both directions of causation is industrial upgrading -- a willingness, often found among follower economies, to restructure entire industries (and more recently value added activities within industries), in line with desired comparative advantage.

Governments aim to promote growth in living standards and employment. Most East Asian governments have been adept at attracting foreign capital in various forms to achieve faster development than would have been possible had they relied only on domestic savings. Korea and Taiwan, like Japan before them, restricted FDI inflows, preferring to protect and encourage local firms, while the Southeast Asian economies encouraged all forms of external capital, particularly FDI. China has been more selective. It still has a “closed” capital account which prevents inflows of any but selected forms of FDI. During the past 30 years, these governments have changed their trade policies to encourage exports instead of to encourage import substitution. Hong Kong and Singapore have pursued export-led growth with free trade; Singapore has actively encouraged the inflow of multinationals, so much so that its industrial structure is dominated by foreign firms. Indonesia, Malaysia, Philippines and Thailand have promoted FDI inflows at the same time that they have emphasized the development of local private conglomerates and large state-owned enterprises.

Governments' economic policies have had significant impacts on trade and investment patterns. Macroeconomic policies changed after the early 1980s when currencies were devalued (except in Singapore), fiscal policy generally avoided accumulation of large debts (except in the Philippines), and monetary policy was conservative and inflation moderate. Low rates of interest and inflation and high savings rate provided firms with an environment conducive to long term planning and investment⁵.

In Taiwan and Singapore, macroeconomic policies have played roles in, even encouraged, the evolution of locational characteristics as these economies respond to rising domestic costs with efforts at industrial upgrading to higher value added activities. Strategic policies have also played a role in transforming their industrial structures to include advanced manufacturing and services activities such as finance and R&D. Singapore has become a regional “hub” in which key

⁵ Of course, much changed during the 1997-98 financial and economic crisis when currencies in Thailand and Indonesia, which had become pegged to the US dollar, were set afloat and promptly depreciated to dramatic lows in 1998 before recovering again later in the year. Malaysia attempted to reduce its vulnerability to exchange rate volatility by imposing controls on certain capital flows and fixing the exchange rate at a set parity against the US dollar.

economic activities such as finance, shipping, transportation, communications and information functions are concentrated to serve the southeast Asian hinterland. Taiwan has attracted advanced component production and related R&D activities and its government seeks to become a regional hub for finance and operational headquarters. Hong Kong's regional hub activities increasingly focus on the Chinese hinterland and its manufacturing operations are increasingly relocated to neighbouring south China (Tu 1997 and Chia 1997).

Table 2 summarizes this positive relationship between governments' objectives of industrial upgrading and MNEs' location of higher value added segments in manufacturing. In this table, the major economies are located according to rankings by comparative advantage (on the vertical axis) developed in Dobson and Chia (1997) and the value added business segments in the electronics industry located in those economies (on the horizontal axis). At the bottom of the table are the factor-driven economies of Guangdong, Indonesia and Philippines. These economies have sales and service affiliates and labor-intensive assembly operations. Each is also increasingly the site of low-value added components production, as is Thailand. Malaysia is moving towards more capital accumulation and related sophistication of production as affiliates located there upgrade components production facilities. Singapore, Taiwan and Hong Kong are moving towards the innovation-driven stage; Singapore has benefited from highly-focused government policies targeted at attracting managerial and design and research segments of the value chain in addition to its high value added components production. Taiwan is the site of design, research and development and production of high value added products and components.

In summary, locational factors are seen to be significant determinants of trade-FDI linkages as MNEs unbundle their value added segments into increasingly far flung intrafirm networks. In the following sections, these patterns are analyzed in two ways, first by comparing the intrafirm trade of US and Japanese MNEs in the electronics industry, holding the host economy constant. The second analysis holds the firm constant and examines the variation in activities by host economy.

Intrafirm transactions: an empirical enquiry

This section analyzes intrafirm trade data from a more extensive firm-level survey of 241 firms in the electronics, auto, textiles and garments and chemicals industries in eight host economies, China, Hong Kong, Indonesia, Malaysia, Philippines, Singapore, Taiwan and Thailand (Dobson and Chia 1997). Surveys were carried out in 1993. It should be noted at the outset that it was not possible to break out the patterns of exchange beyond the intrafirm distinction to analyze, for example, trade with in the *keiretsu*. The analysis is divided into two parts. In the first part, (data in tables 3,4 and 5) compare transactions in Japanese, American and Southeast Asian firms, holding host economy and corporate nationality constant. In the second part, the firm is held constant and patterns of FDI and trade across economies are studied (table 6).

Holding the host economy and corporate nationality constant

Patterns of intrafirm trade provide interesting insights into the local impact of MNE operations in

terms of industry (do the impacts vary by industry?) and home country effects (do all MNE firms have the same impacts or do they vary by the corporate nationality of the firm?). Some analysts have drawn well-defined comparisons between Japanese and US investing firms in the electronics industry, portraying Japanese production networks as more centralized and closed than those of US producers (Borras 1994; 1997). This view implies that Japanese firms source fewer of their production inputs from non-Japanese and local suppliers (relying instead on Japanese suppliers), hire fewer local employees and transfer technology to the local operations. But others who have studied differing types of Japanese MNEs and the historical phases of Japanese FDI strategies have argued that Japanese behavior has evolved with the evolving nature of the vertical *keiretsu* -- whereby Japanese plants at home often are doing only final product assembly (Westney 1996), and that as Japanese MNEs' international business strategies have become more mature producers have become less closed and more locally embedded (Dobson 1993; Ernst 1997).

Evidence from the electronics industry in three economies at different stages of development is presented in Table 3. The electronics firms surveyed accounted for 41 percent of industry sales in Malaysia, 36 percent in Taiwan and 76 percent in Thailand. Intrafirm transaction patterns of Japanese and US firms resemble each other in ways that are clearly suggested in this table. First, sales by both through market channels increase (ie, intrafirm transactions decline) as the host economy develops and matures. Market channels are used more heavily in Taiwan than in the other two host economies. Second, both producers sell more to the local market as the economy develops and matures; around 40 percent of sales by both American and Japanese firms are to the local market in Taiwan whereas such sales are negligible in Thailand and Malaysia.

On the procurement side, a similar pattern is evident for Japanese firms, but it is less pronounced for US firms. Japanese firms procure nearly half their inputs locally in Taiwan (compared to less than 30 percent in Thailand and Malaysia), while US firms fail to show such a pattern for reasons explained below.

Few differences by corporate nationality are apparent in trade behavior. The main difference is that US industrial electronics firms engage in more intrafirm trade than do Japanese consumer electronics firms (see bottom line of sales and procurement panels). Why might this be? One of the most plausible explanations is that US firms, in industrial electronics, export more of the components produced in these economies back home and procure more from home -- and mostly through intrafirm channels -- in order to protect proprietary advantages and to meet strict quality standards. Japanese producers, in contrast in consumer electronics, target local markets more heavily and procure from Japanese SMEs which have located in the region (indeed these Japanese suppliers count as their customers producers of most other nationalities).

In Tables 4 and 5, these data are analyzed holding corporate nationality constant. Marked differences by industry are apparent. Table 4, which presents data for Japanese firms in autos, electronics and textiles and garments (T/G), shows that, in Thailand, Japanese electronics producers export most of their output, while Japanese auto producers export almost nothing because of the local import substitution policy. Similarly, in Indonesia, most Japanese electronics producers export more than two-thirds of their output while Japanese auto and T/G producers

country export less than a third. Procurement data in those tables show slightly less industry variation, in that Japanese firms in Thailand import more than half of their inputs in both the electronics and auto industries (and largely through intrafirm channels), although larger shares of auto than electronics parts are procured locally. In Indonesia, most of the inputs used by Japanese producers in both the electronics and auto industries are imported from the home economy through intrafirm channels. In T/G, however, inputs are largely procured locally.

The comparison of US producers in Table 5 shows a similar dichotomy between electronics and auto sales (reflecting host government policies), with somewhat greater similarities in procurement by industry. A more detailed comparison is not possible because of the absence of US producers from one or more of the industries in the economies studied.

In summary, the comparative analysis of intrafirm trade in East Asian economies by firms of different corporate nationality suggests that when firms locate production abroad patterns of exchange may converge in part because of the impact of locational determinants, such as host government policies. This finding supports the view that Japanese production structures are not, in some intended way, closed and centralized. Production structures, such as the internal procurement practices of the *chaebol* and *keiretsu*, may be replicated abroad initially, although here again, host government policies requiring local sourcing may, over time, reduce the degree of internalization.

Studying the MNE as it crosses borders

The data in Table 6 hold the firm constant and vary the host economy. These data are based on 17 affiliates of six firms operating in six of the host economies in the study⁶. These affiliates produce a wide cross-section of products including colour TVs, heat exchangers, welding machines, hard disk drives, audio and video cassettes and other consumer electronics components, computer peripherals, semiconductors and communications equipment and services. The industrial activity (industrial or consumer electronics, components production or assembly, and services) of each affiliate is noted in the table.

Corporate nationality is controlled for by reporting Japanese and American firms separately. Data for each affiliate, whose identity must remain confidential, are reported separately. The results in Table 6 provide four dimensions of comparison. First, while the behaviour of American affiliates on available measures is reasonably uniform, Japanese firms, that is among affiliates of the same Japanese firm, show considerable variation, with some affiliates selling locally and others to Japan. This difference may be explained by greater horizontal diversification of Japanese electronics firms, which are more diversified in terms of businesses and organized structurally on more narrowly-defined business units, than are the US firms. These functional and business units are then separately incorporated abroad.

⁶ These firms include Acer, AT&T, Matsushita Electric Industrial (MEI), Motorola, Sony and Texas Instruments.

Second, with respect to their sales activities, Japanese affiliates sell more locally than do US firms which rely heavily on the home market or on Singapore regional headquarters for sales. Two-thirds of the Japanese firms sold locally or to Singapore; only one firm exported more than half its output outside the region. One of the obvious reasons for this behaviour is that Japanese firms are consumer electronics producers, and therefore more likely to supply local markets, while US firms are industrial electronics producers, exporting to world markets.

Third, on the procurement side, US firms again relied heavily on the home market or on Singapore; only one firm reported local procurement (20 percent). Half the Japanese firms, on the other hand, obtained up to 50 percent of their inputs locally; of the other half, 25 percent obtained 50-70 percent within the region -- suggesting regional production networks; and 25 percent relied heavily on the home market.

Finally, distinctions were also noticeable in the ratio of intrafirm transactions. For sales, Japanese firms relied less on intrafirm transactions than did US firms. Japanese firms tended to make use of the market. Procurement by both groups, however, tended to rely heavily on intrafirm transactions.

Interviews turned up some of the reasons for these patterns. In Malaysia, for example, many firms operate in the free trade zones which require that output be exported. But these zones also isolate foreigners from local suppliers and reinforce reliance on intrafirm and therefore foreign procurement. More detail on the actual local sources of Japanese firms would be useful; it was not possible to determine, for example, whether local suppliers were inside or outside a *keiretsu* grouping. Industry variables could provide another explanation for the dissimilarities: consumer electronics products are in many cases aimed at local markets while industrial electronics components produced in the region still take advantage of low-cost skilled labor doing subcontracted semiconductor assembly, in the Philippines for example, for products which are assembled elsewhere, and exported to still other destinations.

Singapore's "hub" role in the operations of Southeast Asian electronics affiliates is also evident in the number of firms identifying Singapore in their sales and procurement transactions. Singapore's specialization is associated with changing capabilities of MNEs (unbundling) and local investment by the host government to provide the services MNEs require to coordinate their regional activities.

Firms' cross-border activities: 3 case studies

Another way to look at the interaction between locational variables and MNE activities is to examine the patterns of firms' crossborder activities. We would expect the positive relationship between locational variables hypothesized in table 2 to show up in the form of higher value-added activities allocated by MNEs to affiliates in the more advanced economies. We might also expect, based on the analysis in the previous section, that we would not expect much difference in the patterns of firms from different countries, although the newer MNEs, such as those growing up in east Asia, might behave differently than the more mature ones. In this section, I examine the

patterns and timing of value chain activities of three firms, Acer from Taiwan, Matsushita Electric Industrial (MEI) from Japan and Texas Instruments (TI) from the United States⁷. Much of the information in these case studies dates to the mid-1990s; it has been updated as far as possible, but does not attempt to assess changes in MNE strategies in the wake of the 1997-98 financial and economic crisis.

Acer

While there are many examples of emerging East Asian multinationals, Acer, a Taiwan-based firm, is one which illustrates an Asian-based firm going global, aiming to transform itself from an OEM producer into a professionally-managed widely-held firm with a globally-recognized brand name.

Acer was created in 1976 as a low-cost original equipment manufacturer (OEM) with a broad focus. In order to achieve a globally-recognized brand name, Acer switched its strategy from that of low-cost producer to a more focused strategy. Its founder also set an ambitious goal for the year 2000: to become one of the world's top five PC makers with worldwide sales of US\$ 10 billion (Texas Instruments' 1993 net revenues were US\$ 8.5 billion, by comparison) through a network of 21 listed companies.

As an OEM producer, Acer initially took advantage of Taiwan's relatively low labour costs. By 1991, 70 percent of its sales were international. Acer makes most of its own components in order to ensure quality while underselling its major competitors and to allow it to continue its OEM business. Production was pushed into high-end workstations, more sophisticated laptops and high resolution colour monitors. With product cycles becoming ever-shorter and prices more volatile, upgrading key components was essential (Asian Business, October 1994). In 1989, Acer teamed up with Texas Instruments (TI) to build a US\$ 250 million 4 Megabit DRAM semiconductor plant at Hsinchu Science Park in Taiwan. Acer owned 58 percent, TI 26 percent and the Taiwan government 16 percent. TI subsequently sold its share; the memory chip market collapsed and Acer began to realize large losses in the late 1990s. In 1999 Acer sold 30 percent of the unit to Taiwan Semiconductor manufacturing Company (*Financial Times* June 8 1999).

Success in its switch to a brand name in the early 1990s was also thought to be contingent on moving production close to sophisticated OECD customers and to technology available in OECD markets. To access those markets and technology, Acer invested in joint ventures and acquisitions of local companies, including the acquisition of US companies like Counterpoint Computers, a small Silicon Valley maker of multi-user systems, a joint venture with Smith Corona to produce PCs, and the acquisition of Altos, a small California maker of desktop workstations. This US entry strategy encountered significant problems and major losses throughout the 1990s which caused it to recall its American business division in 1999 and retrench to more cost-effective

⁷ These case studies are drawn from a larger number presented in Dobson and Chia 1997.

OEM supply to that market through partnerships with companies such as IBM (*Asian Business* July 1999). In Europe, Acer entered into joint ventures with ICL (UK) to build mini-computers in Taiwan, with Messerschmitt (Germany) to manufacture high-density semiconductor packaging in Germany, with National Semiconductor to develop a specialized type of integrated circuit, and in 1992 acquired Dutch PC maker Kangaroo Computer to establish a European manufacturing base.

The evolution of Acer's management structure is also identified as essential to its strategy. The structure is described as one that is decentralized and highly-flexible resembling client-server computers with independent units linked into a flexible network. Six groups are accountability centres which simultaneously cooperate and compete. The parent decides major development policies and delegates implementation to the groups. This structure allows for faster growth than do more traditional structures because final products are marketed through joint ventures with local sales firms (Dubashi, 1991).

Acer also became more dependent on external sources of funding as it grew. Financing for the TI joint venture in the early 1990s came from foreign bank financing and from one of Taiwan's policy banks. Acer began to split itself into 21 public companies listed on stock exchanges around the world in order to open the company to more foreign capital. Acer Computer International, the Asian regional distribution arm, was the first public offering on the Singapore Stock Exchange. By the late 1990s, Acer was planning an international share issue, but this had to be postponed in the face of large losses from its memory chip operations.

Acer shifted its sights to the Asian region in the early 1990s (beyond a 1976 investment in a monitor plant in Penang, Malaysia, where capacity was doubled in 1993) when growth in the OECD economies slowed relative to that in East Asia. In 1993, Acer located its Asian sales headquarters in Singapore, taking advantage of the latter's growing reputation as a business centre and government incentives. In 1995, Acer located a new affiliate at Subic Bay, Philippines, to produce computer motherboards for export. In 1992, Acer began exploring possibilities for investing in the People's Republic of China (PRC). The strategic rationale was to enter China's service industries, set up a PC sales networks, and gain permission to manufacture components locally (since imported PCs face a 38 percent import tax), especially low-end assembly operations which were facing intense price competition at home. Cheaper engineering talent could also be tapped.

Acer's business presence in East Asian markets was part of its strategy to become a global brand name. Seeking low-cost production sites to support this strategy, Acer has differentiated itself from other East Asian informatics firms by starting from final products and moving upstream into components production in order to control both quality and costs. Government policy has taken Acer only so far. Although its operations have become internationalized, over-capacity in the memory chip industry, fierce competition and narrow margins in the turbulent economic environment of the late 1990s have constrained its goal of becoming one of the world's top PC brands. Instead, it has taken advantage of the popularity of outsourcing to become one of the world's top OEM PC suppliers.

Matsushita Electric Industrial (MEI)

Matsushita Electric Industrial Co. Ltd. is one of the world's largest companies. Its international and regional activities are mature and deeply rooted, beginning with a simple product cycle approach in the 1960s when it transferred its low end appliance production from Japan to Thailand and Taiwan. By the mid-1990s, Matsushita had 150 plants in 38 countries located in affiliates known by their brand names of Panasonic, Matsushita Electric and a variety of local names. At that time, nearly half of its sales were foreign sales.

As one of the world's main consumer electronics firms, Matsushita has been forced by currency appreciation, the protracted Japanese recession and decline of Japanese sales, like other Japanese electronics manufacturers, to place most of its labour-intensive standard technology production outside of Japan and to restructure its Japanese operations into higher value-added activities. The spectacular failure of its expensive acquisition of the Hollywood entertainment firm MCA as part of a multimedia strategy was undoubtedly also a factor.

Restructuring is not new to this Japanese firm. Matsushita began to exploit the product cycle as early as 1961 with its investment in Thailand. Building factories abroad gave older production systems from Japan a second life. Lately MEI has been adding full-fledged R&D labs overseas with authority to redesign products.

Nor is the East Asian market new to Matsushita. Between 1961 and 1985, it established 19 operations in Southeast Asia, all transplants that assembled products with parts from Japan for sale in the United States. Since 1985, the number of plants has doubled (employing 40 thousand workers, 500 of which are Japanese) who produce the entire line of MEI consumer electronics and parts. Exports to Japan are expected to account for much of the future growth. These operations and their evolution are mapped in Tables 7 and 8.

Table 7 summarizes Matsushita's activities in Singapore between 1986 and 1995. In 1990, Matsushita located its regional headquarters in Singapore to help manage regional manufacturing, technical and engineering operations. Nine affiliates produce electrical appliances and components; electric motors; electronics; fax machines (Matsushita has a 25 percent share of the world market); refrigerators (Singapore plant makes 20 percent of world output of rotary compressors). A technical centre is also located there. Prior to 1986, Singapore operations consisted of consumer electronics goods (record and CD players) and components (semiconductors) for export (50 percent to the US market; 3 percent to Japan). After 1987, facilities were upgraded, production extended into small motors, fax machines and key components (formerly imported from Japan), industrial control systems (through a joint venture with a local firm to supply the regional market) and investment in higher value added activities. Regional procurement activities were also added. As part of its localization strategy, Matsushita began to open up its supply chain; it agreed to join LIUP to source more inputs from local suppliers. MEI has also taken advantage of the externalities associated with Singapore's cluster of disk drive manufacturers. MEI's plant will make some components and carry out sub-assembly. This decision was influenced by Singapore's skilled

manpower, excellent infrastructure and supportive industrial base.

The evolution of MEI's Singapore operations also illustrates how a company as large as Matsushita is rationalizing its regional operations (Table 8). Former Japanese design and production audio activities have been shifted to Singapore where facilities have been upgraded. At the same time, low-end Singapore activities were shifted to Malaysia and low-end Malaysian production shifted to the Xiamen, China plant. This move is logical since Southeast Asia now produces 60 percent of Matsushita's overseas output.

Table 8 maps the location of Matsushita's value added activities in ASEAN and the Chinese Economic Area. Malaysia hosts an ever-large cluster of affiliates (15 in 1995) which produce air conditioners and television sets. When Malaysian production began in 1965, the local affiliate was a multi-domestic firm. Investment increased sharply after 1986 in order to shift production out of Japan, and subsequently to supply the rapidly-growing consumer market in the region. These facilities now produce most of Matsushita's air conditioners, of which 90 percent is exported elsewhere in Southeast Asia, Japan and the Middle East. Only high value-added air conditioners continue to be made in Japan. Other MEI facilities in Malaysia produce one million colour TV sets a year for the Japanese market.

China is another major market. There, a cluster of activities has been created since its arrival in 1978 to produce lighting fixtures, home appliances, relays, wiring devices and laminates in a large number of joint ventures. Colour cathode ray tube (CRT) production began in Beijing in 1989 using a recycled assembly plant shipped from Japan. Learning from the Malaysian experience, Chinese production is organized into at least 16 joint ventures each of which makes specific items in large volumes. Highly automated key components for other Chinese ventures are produced in Dalian (Eisenstadt, 1994). MEI has representative offices in Shanghai and Guangzhou.

Activities in other ASEAN and greater China economies are more modest, but gradually appear to be fitting into a region-wide value chain. The Thai affiliate has been assigned audio products, refrigerators and appliances production and sales and service. Siam Matsushita Steel Co and MEI increased production lines of appliances in 1992 and initiated the manufacture of wiring devices. The Philippines, Indonesia and Hong Kong are other modest locations. Local economic factors have played a role in limiting the MEI presence in the Philippines; the Indonesian presence is similarly modest, while the Hong Kong affiliates make watches for Southeast Asian markets and provide sales and service support. Activities in Taiwan include sales and service, electrical appliance production and engineering activities at the MEI Institute of Technical Engineering Center in Taiwan established with Matsushita Denko (yet, the MEI affiliate is Taiwan's largest foreign firm). Finally, the company's presence in India is being levered on other activities in Southeast Asia. A joint venture to make air conditioners is planned with a Malaysian affiliate.

In summary, this mapping of MEI's regional activities illustrates a broad strategy spanning many segments. These activities are now mature and large enough to obtain substantial economies of both scale and scope. MEI can take advantage of the shifting comparative advantage of host economies to advance its own competitiveness. But the interaction is two-way, as Table 7 implies;

as MEI transfers its activities from one economy to another, the host economies benefit as well. It has also decentralized to some extent through use of large numbers of highly focused affiliates. MEI's Singapore operations also illustrate how it has begun to open up its supplier network as it internationalizes its operations.

Texas Instruments

Texas Instruments (TI) is a global supplier of semiconductors to producers of end products (see Table 9). It has one of the most focused strategies, producing semiconductors and computers, and relying on the barriers to entry posed by the sophistication of its technology and the quality premium commanded by its brand name. Its chips are a brand unto themselves. Many semiconductors produced in East Asia are components for exported products such as Taiwanese PCs, Singaporean disk drives, Japanese video players exported from Thailand and Malaysia, and microwaves from Korea. TI has had a heavy defence industry focus for many years. It is also a laptop brand name in computers. Historically, TI has been seen as a technology leader (with Kilby's 1958 patent of the integrated circuit), but has been slow to seize market opportunities. Indeed, a group of its executives left the company to start Compaq. Even so, TI has earned sustained market leadership in chosen segments with long-term sole-source relationships with many customers. Because of the high costs and risks entailed in creating increasingly powerful semiconductors, TI has entered into a number of joint ventures and alliances with regional players including governments and other firms.

The core of TI's focused strategy is customer support. This means setting up more electronic circuit design centres and regional technology centres and hiring more technical experts. Customers will then be linked into technical support systems anywhere in the world via the TI satellite network. By forging alliances, the company aims to obtain Asian partners to supply most of the capital for its new factories. TI is also developing a global research strategy which uses university contacts to provide "stocks" of innovations which are then matched to market opportunities. TI has set up a technology council in the Asia Pacific region charged with looking for universities with which to work on information delivery problems. Its program at the National University of Singapore, for example, sponsors research on ICs; "failure analysis" needed to reduce cycle time in memory products is being carried out at TI's semiconductor Singapore wafer fabrication plant.

TI has sunk deep roots in the region to create sufficient semiconductor manufacturing capacity to gain market share. It has interests in a dozen chip factories in East Asia including 5 in Japan (Clifford, 10 September 1993). Its East Asian affiliates (in 1992, Asia accounted for 30 percent company's non-military turnover; 15,000 workers on payroll) include thirteen manufacturing facilities, of which three are joint ventures: Kobe-TI in Japan; TI-Acer in Taiwan; and TECH in Singapore. Half of TI's worldwide sub-micron CMOS manufacturing facilities are in East Asia. It is difficult, however, to estimate the share of TI production located in the region because of the portability of semiconductors which are produced at 43 manufacturing operations in 18 countries and are shipped to different locations for packaging and testing before being shipped to the final customer.

TI's first semiconductor plant was located in Japan in 1968. During the next two decades, it built the operations of this subsidiary into three chip factories. Kobe Steel, wishing to diversify its Japanese operations, paid for most of a factory to make 16 Mb DRAM chips. These chips are currently the industry's main technology driver -- the providing grounds for new design and manufacturing technologies that will diffuse to other IC markets like microprocessors. TI also tied up with Hitachi in 1989 to produce chips in order to hedge its bets and spread risk; it also joined Motorola, DuPont and 40 Japanese companies in a MITI-financed project in atom technology. TI has a wholly-owned R&D centre in Tsukuba.

In Taiwan, TI entered into a joint venture with Acer which it subsequently exited in the mid-1990s. It also created a strategic alliance with the local government to penetrate Asian markets and cooperation in R&D, marketing, manufacturing, service and technical training and shifted its regional headquarters to Taipei.

TI's Singapore operations are even higher-tech and also government- assisted⁸. It has begun a five year US\$ 7.4 million R&D program to develop packaging for 64 Mb. and 256 Mb. DRAM chips. Critical skill sets and knowhow are needed to support its future generation of processes and products such as large-die/ultra-thin packages, 3-dimensional memory cube packages, multi-chip modules and advanced interconnect technology (Business Times, 18 July 1994). A US\$ 330 million wafer plant is being bankrolled by customers including Hewlett Packard and Canon (two customers each with 24 percent shares) and the Singapore government¹. Local partners add to risk of investment, but ensure that local players share profits as well as provide access to foreign technologies and managerial expertise. This venture uses TI's CMOS DRAM 0.5 micron technology to produce 16Mb DRAMs. Each partner is entitled to buy chips at a discount to world prices.

Texas Instrument's other Southeast Asian operations are few; they include a chip factory in Malaysia. A subcontracting relationship for low-end chips with a Thailand-based producer existed before that producer encountered serious financial problems and became a victim of the Thai financial crisis in 1997-98.

To summarize, TI has the most focused strategy of the three companies. The "map" of its activities in East Asia illustrates the key success factor in its strategy: heavy technology- and research-orientations. As might be expected, TI's activities are located in the more advanced economies. Chip manufacturing facilities are located near research facilities with location decisions strongly influenced by the availability of joint venture partners (usually large customers) and government financing. This case illustrates the more general point that governments may have

⁸ The Economic Development Board took a 26 percent equity share with an option for TI to buy it out in 5 years. TI has a 26 percent share. EDB's investment is part of its drive to encourage the development of higher value-added industries in Singapore's increasingly labour-scarce economy and to bring chips manufacture to Singapore in order to ensure adequate supplies of inputs for customers located there.

more bargaining power with highly-focused firms like TI if they are willing to share the high costs and risks of technology development.

Conclusions

This chapter has examined the FDI-trade linkages within eight East Asian economies using survey data on intrafirm transactions and publicly-available evidence in the mid-1990s on firms in the electronics industry. In this section, I draw the main conclusions from this analysis. I begin with some reflections on carrying out Asian business research. I then draw conclusions about the impact of MNE investment on host economies and the converse -- the impact of locational factors on MNE behavior. Finally, I look to the future and discuss the implications of two key developments -- the financial and economic crisis and the rules of the World Trade Organization.

A note on firm-level empirical research

The data in this chapter were gathered from interviews with individual firms. Researchers were constrained to obtain comparable data from affiliates of the same MNEs in eight different economies from managers who themselves had only rudimentary statistics for their plant or firm and who lacked the time and incentive to obtain the detail sought. The distinction desirable among the Japanese firms -- whether transactions were intra *keiretsu* or not -- was almost impossible to get at in many cases and had to be left out of the study. The difficulties of carrying out empirical research on other Asian business networks are many for similar reasons. These networks consist of intrafirm and interfirm networks, definitions which can shift through time. Thus, while the network itself would have been a much more interesting unit of analysis, the data problems in defining and measuring the linkages in one network, never mind constructing a statistically significant number of networks, obviated this methodology as well. This reduced the options to the narrow one of measuring procurement and sales of affiliates on an intrafirm basis. Even there, the statistical problems were considerable as many managers could provide only interval data rather than point estimates. And the data, in most cases were only available in point estimates for one time period (the most recent) rather than for a time series, which would have provided much richer insights.

FDI data were also limited for several reasons. First, the data are collected in different forms. Some countries report approvals of intended investments which usually over-estimate the magnitudes of realized investments. Others report actual investment and reinvestment on an historical cost basis. Cross-national comparisons must, therefore, be made with great caution, if at all. Second, if an affiliate in Singapore, for example, invests in other affiliates in the region, the statistical record will show Singaporean, not American or European investments. Increasingly these are the kinds of investments that are being made. Third, the age of the affiliate must be factored into investment data. Intrafirm sourcing by both Japanese and American firms is positively related to intraregional investment, implying that a motivation for intraregional investment indeed is to create regional production networks. Such networking may be more cost-effective for affiliates in the more advanced, higher-cost economies.

Impacts of MNEs on host economies

MNE strategies influence their locational decisions and, therefore, the industrial structures of the host economies. MNE decisions are driven by the desire to reduce transactions costs and, increasingly, to mobilize innovation. Affiliates, as part of international division of labour within intrafirm production networks, are assigned the components they will produce. Affiliates in Malaysia and Thailand produce low-end semiconductors and components for consumer products; in Taiwan they are increasingly high-end semiconductors, higher value added components like liquid crystal displays, telecom oscillators and filters. Almost no production in the electronics industry takes place in Hong Kong any more. Singapore continues to be a production site, but for higher value added components, such as disk drives, and costly high-risk semiconductor production, such as wafer fabrication, in which the government participates as an initial co-investor to mitigate front-end risk.

The MEI case in Table 7 demonstrates the dynamic behavior of larger firms. As the economies of China and Vietnam open up, low-end production segments are transferred to sites in those economies from other locations in the region. The other locations do not lose their investments, however. They receive higher value-added mandates. In this way, everyone gains. MNE capabilities to unbundle value added activities like this are also part of the reason for the growth of service industries in the region, because of the need to coordinate increasingly farflung operations. Unbundling creates opportunities for locations like Hong Kong and Singapore to become service hubs serving their respective hinterlands. Unbundling also creates an intraregional dynamic which is a positive sum game. To promote this positive sum game in future, it is essential that economies facilitate movement up the value-added chain by ensuring domestic investment also occurs so that those that restructure are not confronted with a hollowing-out problem (ie, the loss of value-added activity which is not replaced).

The empirical analyses in this chapter also examined the influence of corporate nationality. Few distinctions stand out between the cross-border operations of Japanese and American firms. One which does is TI's willingness to locate R&D facilities in the region. Yet, industry factors, such as differences in firm strategies in consumer and industrial electronics, for example, and factors such as vintage and capability to manage diverse locational characteristics, appear to be more important. The younger the firm, the less developed the cross-border management capability.

While the structure of ownership in joint ventures or alliances was not a focus of this study, it does help to explain why US firms are present in some economies and absent in others. US companies are obsessed, relative to the Japanese and other Asians, with majority ownership. They even opt out of markets rather than give up majority control (in large part because it is then easier for the parent to consolidate revenues on financial statements). The foreign corrupt practices act is another reason; when firms have majority ownership they can control both the venture and the partner's behaviour more easily.

The focus of this study was on the internal operations of MNEs, but increasingly inter-firm transactions, in the forms of subcontracting and external sourcing, are being undertaken to reduce transactions costs still further. Strategic alliances are formed to take advantage of risk sharing, to

provide market access and to access technologies and the need to specialize. In Malaysia, Sieh Lee and Yew (1997) noted that sourcing and marketing transactions are intrafirm, especially within electronics firms, because of the simple but essential requirement that components embody proprietary technology. This technology was specified in product design, of course, but beyond that, intrafirm transactions helped to protect it from imitation.

Intrafirm trade increases because of vertical dis-integration of numerous discrete value chain activities within the firm in order to reduce transaction costs. The associated complementarity between FDI and trade has both positive and negative effects on host economies and on the region, however. Our case studies imply that rising intrafirm trade is a positive development in economies pursuing industrial upgrading. Production networks provide opportunities for the host economy to migrate up the value chain. Follower economies can inherit activities reallocated by firms from economies that have lost comparative advantage. Intrafirm trade has also enabled East Asian economies to embark on export manufacturing without having to undergo a lengthy and costly period of building up technological, exporting and marketing capabilities.

The impact of locational factors on MNE behavior

One of the main hypotheses in this study is that factor endowments and government policies are important determinants of MNE decisions in locating value-added activities in the region. Linkages between firms and governments are evident in the analysis. Singapore, Hong Kong and Taiwan, the more advanced economies, encourage sophisticated R&D and headquarters activities including finance, design and regional procurement. Singapore is a favoured location for advanced manufacturing and service activities because of its sophisticated communications and technical infrastructure, skilled labour and supportive policy environment.

The diverse roles of governments in influencing particular value-added activities is also evident. The Acer case illustrates government's role in the evolution of an Asian multinational. Financing, guidance in the Brand International Promotion Association, direct subsidies of home base operations, links with Singapore and, conversely, opposition to mainland operations have influenced its evolution and its pattern of operations. Governments' contributions take several forms: for example, subsidies for high-risk, technology- and capital-intensive activities are noticeable factors in location decisions. Some have acted to create locational factors which emphasize upgraded skills and infrastructure (Singapore being an obvious case).

The maps of MNE value-added activities in the electronics industry in Tables 8 and 9 show a positive and dynamic relationship between location and business segments allocated by MNEs. Those economies with favorable factor endowments and policies to create new endowments attract the costlier, riskier, higher value-added activities.

Looking to the future

A second set of conclusions looks to the future. What are the implications of WTO

prohibitions on direct incentives by governments for FDI which will take effect in 2000?
What are the implications of the 1997-98 financial and economic crisis?

The future of government policies towards multinationals: WTO rules will require East Asian governments to phase out the use of financial incentives and performance requirements imposed on foreign producers. It has been shown elsewhere that government incentives and subsidies that attract investment from one location to another that would otherwise have taken place on transactions costs grounds alone represent both transfers from taxpayers in the country providing the subsidy to the firm and its shareholders and compensation of the firm for increased costs and reduced overall efficiency (Graham, 1996). Since many empirical studies have demonstrated that such incentives are not important to location decisions, it seems unlikely that phasing them out will reduce economic growth rates or have much impact on production networks. Indeed, host government policies are evolving in the direction of framework policies which create new endowments, of skilled labour for example, through policy shifts from mere removal of illiteracy and supply of vocational education to the supply of technical and engineering manpower and information technology.

Agreement among APEC members to achieve free trade by 2020 and to adopt the APEC Nonbinding Investment Principles covering transparency, national treatment and most-favoured-nation treatment are welcome steps in this direction. More is needed; competitive pressures are providing some stimulus to liberalize FDI regimes and converge towards common standards on right of establishment, fair and equitable treatment, protection against nationalization, international dispute settlement, and assurances for the repatriation of earnings and capital.

FDI and trade are increasingly complementary, so it is no longer logical to separate FDI and trade in domestic policy formation. Trade-related investment measures (TRIMS) and investment-related trade measures (IRTMS) should be integrated to achieve policy coherence and effectiveness, for example. The high degree of intrafirm trade means a loss of policy sovereignty by governments, particularly with respect to transfer pricing, which must be dealt with through tax policy. Perhaps most significant, while FDI inflows represent the augmentation of domestic with foreign savings as well as technology transfers and opportunities to migrate up the industry value chain, the negative implication is that host economies become more vulnerable to fluctuations in the world economy because of the increasing homogeneity of the region's manufacturing industrial structure (which exports final goods outside the region). When the world economy slows, as it has in 1998-99, demand for the region's consumer durables and consumer goods declines, with a cascading effect through the region's production networks.

These arguments strengthen the case for regional intergovernmental cooperation. Governments should bow to the market forces pushing integration by removing obstacles to intraregional trade flows; they should open domestic economies to allow for greater participation in the international division of labour; they should cooperate in providing favorable conditions for investment including the freer flow of product information and accelerated preferential trading arrangements; and they should cooperate to remove restrictions on new forms of firm cooperation such as strategic alliances.

Multinationals and governments after the crisis: In the post-crisis environment, what are MNEs likely to do? Many local firms and indigenous business groups have been set back by the negative impact on their finances of failing to hedge their cross-border financial transactions; by high domestic interest rates imposed to stabilize local currencies; and by the largescale depreciation of local currencies which will make imported components more expensive. With the steep decline in international demand, serious excess capacity has appeared in the electronics and auto industries in the region which has implications for the strategies of parent companies. Japanese MNEs show little signs of re-evaluating their presence in the region, although in 1998-99 they are suffering from a fluctuating yen and seriously depressed demand in the home market. American MNEs are in much better shape financially and have been active investors and participants in the financial restructurings by local firms throughout the region.

In conclusion, one of the main lessons from the crisis is very relevant to this chapter's focus on governments and the use of domestic resources to influence MNE locational decisions. MNE production networks have undoubtedly contributed to regional integration through the exchange of intermediate goods and the export of final goods. But these benefits were not without their costs in terms of structural and cyclical vulnerability, since final goods markets, particularly at the high end, lie outside the region. The question of whether, in pursuing rapid growth in this way East Asia's firms and governments introduced structural vulnerability through heavy reliance on a few industries, is a significant one. The WTO prohibitions will force greater reliance on market forces in locational decisions. In the long term, restraining governments to framework policies will not only be a more effective use of domestic resources but will provide more sustainable economic benefits.

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Table 1 Inward FDI stocks, selected East Asian economies, 1980 and 1994

Host Economy	United States	Japan	East Asia	Others
China				
1986	16.8	10.7	61.7	10.8
1994	8.1	8.0	74.0	9.5
Hong Kong				
1984	53.7	21.0	2.1 ^a	23.2
1994	31.6	32.5	10.1	21.8
Indonesia				
1980	4.7	37.5	13.7	44.1
1994	4.4	15.8	36.6	43.2
Malaysia				
1986	10.3	25.7	23.7	40.3
1993	6.2	33.7	36.8	23.3
Philippines				
1980	54.6	16.8	5.4	23.2
1994	38.2	18.2	10.9	32.7
Singapore				
1980	22.5	11.7	19.6	46.2
1994	17.9	21.5	13.0	47.6
Taiwan				
1980	35.0	18.6	30.3	16.1
1994	26.1	28.2	21.0	24.7
Thailand				
1980	35.6	28.9	17.5	18.0
1994	17.1	30.9	33.0	19.0

Sources: Dobson and Chia (1997:8); APEC Economic Committee (1995) and unpublished data from Industry Canada.

Note: See footnote 3 discussion of differences in data standards among host economies.

Table 2. Harnessing diversity: host economies and firms' value-added activities

		Firms' value added activities	
Host economy' s comparative advantage	Low	Medium	High
Innovation driven			Hong Kong Taiwan
Investment driven		Malaysia	Singapore
Factor driven	China Indonesia Philippines	Thailand	

Source: Dobson and Chia (1997:252).

Table 3. The electronics industry: sales and procurement by corporate nationality, Thailand, Malaysia and Taiwan, 1992-93

(shares in percent; shares of intrafirm transactions in parentheses)

	Japanese Firms			US Firms		
	Thailand	Malaysia	Taiwan	Thailand	Malaysia	Taiwan
Sales						
Local Economy	11 (17)	0 (0)	40 (2)	0 (0)	1 (100)	36 (0)
Home Economy	19 (98)	19 (64)	20 (91)	24 (100)	63 (100)	48 (94)
Third Country	71 (94)	81 (57)	40 (49)	76 (100)	36 (64)	16 (76)
Total	100 (86)	100 (59)	100 (39)	100 (100)	100 (87)	100 (57)
Procurement						
Local Economy	27 (19)	29 (0)	46 (0)	20 (100)	9 (13)	19 (0)
Home Economy	56 (91)	45 (74)	44 (63)	25 (100)	40 (100)	65 (84)
Third Country	17 (52)	26 (28)	10 (17)	55 (100)	52 (64)	16 (49)
Total	100 (64)	100 (41)	100 (29)	100 (100)	100 (74)	100 (63)

Source: Dobson and Chia, eds. 1997.

Table 4. Sales and procurement by Japanese MNEs: Thailand and Indonesia, 1993
(shares of intrafirm transactions in parentheses)

	Thailand			Indonesia		
	Electronics	Autos	T/G	Electronics	Autos	T/G
Sales						
Local Economy	10.8 (16.8)	98.5 (100.0)	na	1/4 (0)	>67 (>90)	2/3 (100)
Home Economy	18.6 (98.3)	0.5 (100.0)	na	- ¹	- ¹	- ¹
Third Country	70.6 (93.8)	1.0 (100.0)	na	3/4 (100)	<33 (>90)	1/3 (0)
Total	100.0 (86.3)	100.0 (100.0)	na	3/4 (100)	<1/3 (>67)	<1/3 (100)
Procurement						
Local Economy	27.2 (18.6)	43.8 (74.6)	na	1/4 (25)	0 (0)	2/3 (100)
Home Economy	55.6 (90.7)	56.2 (100.0)	na	- ¹	- ¹	- ¹
Third Country	17.2 (51.5)	0.0 (0.0)	na	3/4 (75)	0 (0)	1/3 (0)
Total	100.0 (64.4)	100.0 (88.8)	na	3/4 (75)	>90 (100)	<1/3 (0)

Source: Dobson and Chia, eds. 1997; Thai survey results from Ramstetter in Dobson and Chia, eds.; Indonesian survey results from Pangestu in Dobson and Chia, eds.

1. Included in third country.

Note: Measures in the Thai survey are in percent shares; in Indonesia shares are measured in intervals.

Table 5. Sales and Procurement by US MNEs: Thailand and Indonesia, 1993
(shares of intrafirm transactions in parentheses)

	Thailand			Indonesia		
	Electronics	Autos	T/G	Electronics	Autos	T/G
Sales						
Local Economy	0.0 (0.0)	-	-	na	100 (>90)	-
Home Economy	23.7 (100.0)	-	-	na	0 (0)	-
Third Country	76.3 (100.0)	-	-	na	0 (0)	-
Total	100.0 (100.0)	-	-	na	100 (>90)	-
Procurement						
Local Economy	20.0 (100.0)	-	-	na	10-33 (67-90)	-
Home Economy	25.0 (100.0)	-	-	na	0 (0)	-
Third Country	55.0 (100.0)	-	-	na	67-90 (67-90)	-
Total	100.0 (100.0)	-	-	na	na (na)	-

Source: Dobson and Chia, eds., 1997; Thai survey results from Ramstetter in Dobson and Chia, eds.; Indonesian survey results from Pangestu in Dobson and Chia, eds.

-: US producers not present.

Note: Measures in the Thai survey are in percent shares; in the Indonesian survey, shares are measured in intervals; US automobile MNEs are not present in Thailand.

Table 7. The Dynamics of Upgrading: Matsushita in Singapore
(1986 - 1995)

Year	Activity
pre-1986	* production of record players, CD players, chips
1987	* technical support centre set up * joined LIUP * expanded audio production * investments in facsimile plant; plant for small motors for audio and video products
1988	* fridge affiliate based in Singapore invested in new plant in the United States making the same products for US market
1989	* upgraded production facilities
1990	* received OHQ status
1992	* EDB award for pioneer work * IPO opened * invested in key component facilities for CD and high-end audio
1993	* tie-up with Eutech (local software company) to produce industrial control systems
1994	* invested in disk drive plant * upgraded audio to high-end audio production * low-end audio production shifted to Malaysian plant (Malaysian production shifted to China) * opened first design base outside Japan

Source: Author's sources; public information from annual reports and newspaper reports.

Table 8. Matsushita Electric Industrial Co.: Mapping the Asian network

Economy (affiliates)	Value Added Activities						
	Products	R&D	Procurement	Raw Material / Component Production	Assembly / Manufacturing	Marketing & Sales	Services
Taiwan (2)	* electrical appliances				* one affiliate	* one affiliate	
Singapore (9) 1990: OHQ	* fridge compressors * motors * tuners * CD players * chips	* 1994: design centre * 1993: software JV	* 1992: IPO * 1987: member of LIUP	* 1994: disk drive production * 1992: key components production	* 1994: high end audio production upgrade * 1989: upgrade * 1987: audio production expansion * 1987: fax machines, small motors expanded	* one affiliate	* 1988: affiliate invests in US fridge plant * 1987: technical support centre
Hong Kong (2)	* Seiko watches					* one affiliate	* one affiliate
Malaysia (12)	* electric motors * fridges * TVs			* 1993: electrolytical capacitors production * 1987: ceramic electronic device production	* 1991: air conditioners expansion to be the largest plant in the world * 1991: audio and video products shifted from Singapore * 1988: colour TV production shifted from Japan	* one affiliate	* one affiliate
Thailand (1)	* audio * fridges * home appliances					* one affiliate	
Indonesia (4)	* batteries * appliances					* one affiliate	
Philippines (3)	* floppy disks					* one affiliate	
China	* electrical appliances * lighting			* CRT plant from Japan * 1994: low end audio production from Malaysia * 1992: JV in lighting, home appliances, wiring * 1991: components production		* one affiliate	

Table 9. Texas Instruments: Mapping the Asian network

Economy (affiliates)	Value Added Activities						
	Products	R&D	Procurement	Raw Material / Component Production	Assembly / Manufacturing	Marketing & Sales	Services
Japan	* semiconductors * DRAMs	* one facility * 1995: Hitachi JV to develop DRAMs * 1994: Kobe Steel JV * 1989: Toshiba JV		* 4 semiconductor facilities * 1995: expansion of semiconductor plant * 1968: opened wholly-owned semiconductor plant			
Korea					* one facility	* one facility	
Taiwan 1994: regional head- quarters moved from Hong Kong	* logic systems * DRAMs * wafer packaging	* 1994: cooperation with government * 1994: linear logic products and systems products		* 1995: start-up of TI-Acer second dynamic memory chip production line * 1994: TI-Acer JV to finance silicon wafer plant		* 1994: sales contract with First International Computer Inc. * 1994: alliance with government	
Singapore	* semiconductors * wafer packaging	* 1994: government grant (semiconductor packaging) * 1990: development of knowledge-based transportation systems		* 1995: technology consortium (TI, Canon, HP) expanding semiconductor fabrication capacity	* 1994: Alphatec JV to assemble and test EPROM (2 facilities)	* one facility	
Malaysia	* semiconductors * software			* 1972: opened semiconductor plant		* 1994: appointed AutoComp as distributor for software products * ?: alliance with Mesiniaga to open sales and support office	
Hong Kong TI Asia						* 1967: headquarters for sales and marketing of semiconductor products	
Thailand	* semiconductors			* 1994: low end chips facility			
Indonesia							
Philippines	* semiconductors			* semiconductors		* one facility	
PRC					* one facility	* one office	
India				* 200 engineers providing semiconductor design support		* one facility	

**Table 6. Intraregional and intrafirm cross-border transactions,
Japanese and US affiliates: 1994**

(destination of sales and procurement in percent; shares of intrafirm trade in parentheses)

A: US Firms⁽¹⁾

Sales (by company)	Local	Regional	Home Country	Third Country (non-Asian)
A 1 (indust. cpt)	0	13 (HK) (100)	72 (100)	12
A 2 (indust. cpt)	21 (80)	6 (100)	73 (100)	0
A 3 (services)	40	0	27 (100)	32 (EC) (na)
B 1 (indust. cpt)	0	0	0	100
B 2 (indust. cpt)	0	47 (S'pore) (100)	0	53 (100)
C 1 (indust. cpt)	na	0	0	100 (100)
D 1 (indust. cpt)	0	75 (S'pore) (100)	24 (100)	1 (0)
Procurement	Local	Regional	Home Country	Third Country
A 1	0	36 (100)	43 (100)	8 (100)
A 2	0	na	73 (100)	24 (100)
A 3	20 (100)	0	80 (100)	0
B 1	na	na	na	na
B 2	0	24 (S'pore) (100)	49 (100)	21
C 1	na	na	na	na
D 1	20	53 (S'pore)	24	1

(1) Parent firms are identified by letter; affiliates by accompanying digit.

B: Japanese Firms

Sales	Local	Regional	Home Country	Third Country
E 1 (cons. assmbly)	94 (0)	5 (100)	1 (0)	0
E 2 (cons. cpt)	0	10 (na)	16 (na)	46 (na)
E 3 (cons. cpt)	0	42 (na)	20 (100)	48 (100)

E 4 (cons. assmbly)	40 (na)	0	0	60 (na)
E 5 (cons. cpt)	95 (70)	0	0	3 (0)
E 6 (cons. cpt/dist)	73 (0)	0	12 (100)	15 (0)
E 7 (cons. cpt)	0	0	0	100 (N. Amer.) (na)
F 1 (cons. assmbly)	90 (na)	0	0	10 (na)
F 2 (cons. assmbly)	1 (0)	65 (S'pore) (0)	20 (0)	15 (0)
F 3 (cons. cpt)	0	12	1	82

Procurement	Local	Regional	Home Country	Third Country
E 1	31 (na)	52 (na)	17 (100)	0
E 2	52 (na)	27 (na)	10 (na)	11 (na)
E 3	37 (0)	46 (100)	18 (100)	0
E 4	na	na	na	0
E 5	15 (na)	8 (na)	78 (94)	0
E 6	50 (0)	0	40 (100)	10 (0)
E 7	0	50 (na)	50 (na)	0
F 1	30 (0)	70 (na)	0	0
F 2	8 (0)	8 (0)	83 (0)	1 (0)
F 3	35 (0)	55 (50)	12 (100)	0

Notes: ind = industrial electronics; cons =consumer electronics; cpt = components; assembly = assembly.

Source: Dobson and Chia 1997