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JAPANESE CORPORATE ACTIVITIES IN ASIA: IMPLICATIONS FOR U.S.-JAPAN RELATIONS

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Japanese Corporate Activities in Asia: Implications for U.S.-Japan Relations

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In Japan, certain business practices that are employed by the keiretsu to maintain stability and prices have the effect of raising the costs and risks of doing business for outsiders, and of making it difficult to access the market. A central question about Japanese investments abroad is whether similar organizational structures and practices of keiretsu are in evidence in markets with extensive Japanese investments. If this is the case, what are the likely implications for foreign market access as a result of such activities? There is a possibility that the keiretsu integrated across borders and operating in downstream distribution channels could become exclusive or closed to non-keiretsu companies. In both cases, from an international trade policy viewpoint, this could constitute a "Transplanted Trade Barrier" (TTB) or measures, policies or practices which, when transferred from one economy to another may have the impact of impeding imports or market access. This paper provides additional insight into the organization and functions of keiretsu in selected countries, particularly with regard to their implications for market access. Based on a survey of Japanese companies in three Asian economies, a majority of Japanese affiliated companies have ties to the keiretsu in Japan. The companies include manufacturers, suppliers, retailers, banks and trading companies which are involved in the production and distribution of both capital and consumer goods. The "keiretsufication" of certain industries may affect market opportunities in Asia for non-keiretsu suppliers and distributors, including both domestic and foreign firms.

JAPANESE CORPORATE ACTIVITIES IN ASIA: IMPLICATIONS FOR U.S.-JAPAN RELATIONS[2]

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[1] The information presented in this paper reflects the views of the author and not necessarily those of any U.S. government institution.

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Introduction

There are complex and overlapping patterns of trade and investment in Asia, much of which is associated with Japanese foreign direct investment (FDI). Numerous studies have been conducted on the role of Japan's FDI, trade and foreign aid as a contributor to regional economic growth and integration. Recently more attention has been given to Japanese corporate activities in Asia.[3] According to several studies, Japanese investments are promoting intra-industry trade and vertical integration in Asia, particularly in the manufacturing sector. Japanese firms have integrated their Asian affiliates on a regional scale, invested in complementary production or assembly operations in different countries, and many have established their regional headquarters in Singapore. Japanese firms' global production and trading activities are supported by networks of suppliers in Asia. These networks, especially prominent in electronics and auto industries, are often intended to serve the regional markets as well as export bases and "are hierarchically organized, with much of the decision-making authority, technological capabilities, and sourcing remaining in Tokyo."[4]

A central question about the movement of Japan's production networks[5] offshore is whether the organizational structures and practices of Japanese corporate groupings (keiretsu), are in evidence in those Asian markets with extensive Japanese investments. If so, what are the likely economic implications, particularly regarding market access? and for U.S.-Japan relations? While previous research has largely focused on upstream manufacturer-supplier relations, there is also a possibility that the keiretsu, integrated across borders and operating in downstream distribution channels, could become exclusive or closed to non-keiretsu companies. If so, from an

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support for this research paper.

[3] See Wendy Dobson, *Japan in East Asia* (Singapore: Institute of Southeast Asian Studies, 1993) and Richard Doner, "Japan in East Asia: Institutions and Regional Leadership," Workshop on Japan in Asia, Cornell University, March 31-April 2, 1995.

[4] Eileen M. Doherty, with Dieter Ernst, Michael Borrus, Stephen S. Cohen, and John Zysman, "Production Networks in Asia: International Production Networks in a Rapidly Changing World" (Berkeley University of California at Berkeley: Berkeley Roundtable on the International Economy, September 1994).

[5] Doherty has defined networks as "the organization across borders of research and development activities; product definition and design manufacturing; distribution; and service activities".

international trade policy viewpoint, this could constitute a “transplanted trade barrier” or TTB. A TTB is a measure, policy or practice which, when transferred from one economy to another, singularly or in combination with others, may have the impact of impeding imports or market access to outside firms.[6]

There are divergent views among economists, industrial organization and management specialists, antitrust or legal specialists, and international trade analysts about the implications of Japanese corporate organization and operations (including keiretsu) for performance and market access.[7] The debate among representatives of these various disciplines centers on whether the interdependent, long-term relationships and practices of keiretsu firms result in efficiencies and welfare enhancement with pro-competitive consequences, or inefficiencies, exclusivity and market closure.[8] The tradeoffs, however, are not mutually exclusive, i.e., some practices may be efficiency enhancing in the short-run, yet exclusionary. With regard to downstream distribution operations, research has shown that certain business practices associated with keiretsu operations, at least within Japan, may be efficiency enhancing in terms of providing assured supplies, increased customer service and accurate product information to consumers. However, these same practices (particularly exclusive dealings, territorial restrictions, refusals to deal and rebates) may also have exclusionary effects for non-keiretsu firms, both foreign and domestic.[9] Japanese

[6] This paper focuses on the structures and practices associated with keiretsu. However, TTBs could also include discrete items such as standards or design specifications or packages of assistance such as financial incentives, administrative guidance and other policies which support firms’ overseas activities.

[7] Paul Sheard, “The Economics of Japanese Corporate Organization and the Structural Impediments Debate: A Critical Review,” *Journal of Japanese Economic Studies* (Summer 1991): 30-77.

[8] According to one set of views, Japanese corporate organization and behavior (specifically long-term, buyer-supplier relations) are recognized as potentially efficiency enhancing, encouraging long-term adjustment, promoting innovation and contributing to higher economic growth. Aoki [1984] and Dore [1986] are among those who have pointed to certain Japanese management corporate practices such as life-time employment, close inter-firm ties, quasi-integrated subcontracting networks, and long-term trading arrangements as providing positive benefits such as provision of information and risk-sharing. The theory of industrial organization suggests that the effects of buyer-supplier relationships among keiretsu members are comparable to full vertical integration and therefore should not be objectionable from a foreclosure perspective. [Williamson, 1985] Another set of views, however, holds that many of the same characteristics of Japanese corporate organization and operation result in exclusionary behavior that make it difficult for outside firms to enter the markets in which Japanese keiretsu operate and lead to distorted trade patterns and markets. Tyson and Zysman [1989] have argued that long-term contractual arrangement associated with Japanese corporate organizations make it difficult to gain access to Japan's market and give Japanese industry a type of "natural immunity" to imports. Lawrence [1991] has examined the impact of keiretsu on intra-trade flows to Japan and found that while vertical keiretsu tend to increase exports, the horizontal keiretsu lower imports.

[9] The existence of such practices has been well-documented in studies by Japanese government agencies including the Japan Fair Trade Commission (JFTC), the Ministry of International Trade and Industry (MITI), and the Economic Planning Agency (EPA). Other scholars who have examined the role of both horizontal and vertical

manufacturers utilize such practices in order to control distribution and supply activities and to support their sales and pricing policies. The result of these practices, in many industries characterized by keiretsu relations is that Japanese suppliers and purchasers are less likely to
switch to new suppliers solely on the basis of price. Vertical and horizontal practices have the effect of raising the costs and risks of doing business for outsiders.

Keiretsu structure and organization have been the subject of previous trade negotiations between the United States and Japan. During the Structural Impediments Initiative (SII) from 1989 to 1991, U.S. negotiators raised specific aspects of keiretsu buyer-supplier relations and Japanese competition policy.[10] In response, Japan agreed "to make keiretsu relationships more open and transparent" so that they will not hinder fair competition and the entry of foreign firms into the Japanese market. Subsequently, short-term or limited changes were made with regard to stricter enforcement of the Antimonopoly Law. However, many of the same issues resurfaced during the Framework talks which began in 1993 and more recently during the Kodak-Fuji film dispute. In general, U.S. negotiators remain concerned about the perceived non-transparencies and potentially exclusive effects of keiretsu relations for non-keiretsu firms in Japan and elsewhere. A major question for consideration is which, if any, keiretsu business practices are employed in Asia and whether similar effects regarding limitations on access to distribution channels or supplier opportunities might be expected. Given the different conditions of competition within industries and legal systems in each country, the impact of such practices would necessarily have to be evaluated on a country-by-country, industry-by-industry basis. To the extent that keiretsu structures and exclusive interfirm transactions are found to be associated with Japanese FDI in Asia, these concerns may be heightened and U.S. policymakers may be pressured by U.S. businesses to respond.

This paper seeks to provide additional insight into several of the topics above relating to Japan's role in Asia. Most importantly, it analyzes the potential implications of Japanese corporate activities, particularly those

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business practices and the legal system in Japan include: Matsushita [1978], Yamamura [1982], Ishida [1983], Hahn [1984], Iyori [1995], Batzer and Laumer [1989], and Young [1990].

[10] See for example, *Joint Report of the U.S.-Japan Working Group on the Structural Impediments Initiative*, June 1990.

associated with keiretsu in selected Asian economies, from an international trade policy viewpoint, for U.S.-Japan relations and foreign market access. Based on an analysis of statistical information and other evidence, it appears that a majority of Japanese affiliates in selected Asian economies are associated with one or more keiretsu. In industries where there is an extensive keiretsu presence, there may be a high degree of intra-keiretsu purchasing. Anecdotal evidence suggests that some exclusive business practices associated with the keiretsu in Japan are being replicated in Asia. These practices may affect market opportunities and access for non-keiretsu suppliers and distributors.

Overview of Keiretsu Structure and Operations

Keiretsu in Japan's economy

The structure and operations of the keiretsu in Japan's market and their importance to Japan's economy has been studied extensively.[11] Certain characteristics of keiretsu organization and behavior may also be applicable to an analysis of the impact of their activities on market access in Asia. The keiretsu are a key feature of Japan's economy, directly or indirectly affecting economic transactions in both upstream and downstream channels, within and across industries.[12] According to the Japan Fair Trade Commission (JFTC), almost 20

[11] For a comprehensive analysis of keiretsu structure and operations see, Michael Gerlach, *Alliance Capitalism* (University of California: Berkeley, 1992) and Kenichi Miyashita and David Russell, *Keiretsu: Inside the Hidden Japanese Conglomerates* (New York: McGraw-Hill, 1994). Some of those scholars who have analyzed keiretsu and Japanese corporate behavior in general from a transactions cost, risk-sharing, or sociological approach are as follows: Richard E. Caves and Masu Uekusa, *Industrial Organization in Japan* (Washington, D.C.: The Brookings Institution, 1976); Michael Yoshino, *Japan's Multinational Enterprises* (Cambridge, MA: Harvard University Press, 1976); Masahiko Aoki and Ronald Dore, *The Japanese Firm* (New York: Oxford University Press, 1994); Masahiko Aoki, ed. *The Economic Analysis of the Japanese Firm* (New York: Oxford, 1984); and Rodney Clark, *The Japanese Company* (New Haven, Conn.: Yale University Press, 1979). See, also, various chapters of *Inside the Japanese System*, eds. Daniel I. Okimoto and Thomas P. Rohlen (Stanford: Stanford University Press, 1988) including Rodney Clark, "Industrial Groups," Hiroshi Okumura, "The Closed Nature of Japanese Intercorporate Relations," and Kenichi Imai and Itami Hiroyuki, "Allocation of Labor and Capital in Japan and the United States."

[12] Although some variations have been suggested by observers, in general, keiretsu can be categorized into three types. The first type is known as the intermarket, horizontal, or financial keiretsu which are descended from the prewar zaibatsu and are typically organized around a major bank, trading company, insurance company, and large manufacturing company. The second type, variously known as intramarket, industrial, production or vertical keiretsu (firms representing successive stages of production or closely connected industries) are usually organized around a large independent company and its subsidiaries and affiliates. These types of keiretsu are generally found in the auto, steel, and electronics industries and are characterized by extensive subcontracting networks. The third type, distribution or marketing keiretsu include distribution, sales, and marketing firms in the

percent of Japan's capital was held by the six major corporate groupings (Mitsui, Mitsubishi, Sumitomo, Fuyo, Sanwa and Dai-Ichi Kangyo or DKB) and their subsidiaries in JFY 1992.[13] By another estimate, approximately 50 percent of Japan's capital is controlled by all of the keiretsu.[14] The keiretsu are composed of firms from a wide range of commercial and industrial fields, including trading companies, banks, suppliers, distributors and retailers. The groupings often have overlapping relationships with members of their own group, other groups and nominally independent firms. Approximately one-half of small and medium-sized manufacturing firms serve as subcontractors to large manufacturers associated with a keiretsu.[15] Through their extensive networks of affiliated firms, few areas of Japan's economy are untouched by keiretsu activities.

Keiretsu members are linked together through various formal and informal practices. Some of the most common means of integrating firms in the horizontal keiretsu or in controlling subsidiaries or affiliates in the other two types of keiretsu are: stable shareholding and cross-shareholding; networks of debt capital; shared directorships and mutual appointment of key personnel;[16] and common traditions and practices. Even in cases where capital or equity ties are absent or minimal, business transactions serve to link the companies together. A firm may own only 10 percent of a smaller company's stock, but still manage to wield control over the small company as if it were a subsidiary through control of parts or supplies, loaning of debt capital or personnel.[17]

By several measures, despite press reports to the contrary, keiretsu ties appear to have strengthened somewhat rather than weakened in recent years. The ratio of cross-shareholding for the six keiretsu groups rose from 43.3 percent in JFY 1989 to 44.1 percent in FY 1991 and then declined slightly to 44.0 percent in JFY 1992 (table 3).[18] The ratio of stock held by members of the same group ranking among the top 50 stockholders rose from

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wholesale and retail sectors. For additional information on the different types of keiretsu, see USITC (1990), Caves and Uekusa (1976) and Douglas Ostrom, "Keiretsu and Other Large Corporate Groups in Japan," *Japan Economic Institute Report* (January 12, 1990).

[13] Japan Fair Trade Commission, *FTC/Japan Views*, No. 20, March 1995, 31.

[14] David W. Edgington, *Japanese Business Down Under* (London: Routledge, 1990), 23.

[15] Gerlach, xvii.

[16] In addition, high-level government and public corporation officials are often employed by keiretsu firms upon their retirement. According to Miyashita and Russell, the Minister who supervises an industry is actually a member of its keiretsu. Miyashita and Russell, 182.

[17] Miyashita and Russell, 80.

[18] Japan Fair Trade Commission, *FTC/Japan Views*, No. 20, March 1995, 31.

35 percent to 36 percent during JFY 1989 to 1992. The intra-group business relations ratio for the major horizontal groups in 1992 ranged from a high of approximately 64 percent for Sumitomo to a low of just over 30 percent for Sanwa and Fuyo. Mitsubishi and Mitsui exhibited relatively high intra-business relations ratios of 51.3 percent and 45.3 percent respectively (table 4).[19] A majority of intra-group transactions involve the trading companies, according to the JFTC.[20]

In general, the relationships among keiretsu members, and other Japanese companies for that matter, can be characterized as being long-term and mutually beneficial, based on loyalty and obligation.[21] The benefits of membership in the group include insulation from external market forces, sharing of risks, easy access to funds, and stabilizing corporate performance.[22] The sharing of information about developments in technology and management provides members with benefits under changing competitive conditions.[23] While keiretsu members may not experience improved profitability or efficiency in the short-term, they may benefit from stability in performance over the long-term. Various business practices that may be economically rational or efficient, but nonetheless exclusionary and nontransparent, are employed by keiretsu firms to ensure allegiance to the group. These practices include, but are not limited to, abuse of purchasing power, reciprocal transactions, exclusive dealings, paying of rebates, resale price maintenance and purchasing codes of conduct. Non-price considerations, including a preference for Japanese products and firms, appear to play an important role in purchasing and other types of business decision-making. In industries dominated by keiretsu, the net effect of keiretsu business practices and relations is to maintain stability and prices, to lower the costs and risks of doing business for those inside the "group" and to raise them for other "outside" firms. Foreign firms, in particular, may be excluded or limited in their ability to buy or sell to keiretsu firms.

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[19]In JFY 1992, the ratio of dependence on borrowing from financial institutions of the same group ranged from a low of 13 percent for DKB to a high of 29 percent for Sumitomo. The ratio of companies receiving executives dispatched from other keiretsu members ranged from a high of 100 percent for Mitsubishi to a low of 34.6 percent for Mitsui in JFY 1992. Japan Fair Trade Commission, *FTC/Japan Views*, No. 20, March 1995, 50.

[20]Japan Fair Trade Commission, *FTC/Japan Views*, No. 20, March 1995, 49.

[21]Long-term transactional business relations also exist outside of the keiretsu where there are no equity or personnel linkages.

[22]Miyashita and Russell, 197.

[23]Ibid.

For both Japanese buyers and sellers, the opportunity cost of ending their long-term business dealings are high.[24] In order to break into a keiretsu relationship, according to the Tokyo Chamber of Commerce and Industry, an outside firm must offer a product or service to the parent that is not offered by the existing supplier. According to anecdotal evidence, sometimes even price discounts of 30 to 40 percent are not enough to convince parent companies to switch to a new supplier.[25] A major question for consideration is which if any of the practices discussed above are employed in Asia and what are the effects of such practices on market access.

Trading Companies

The trading companies, along with the banks and insurance companies, provide leadership and integrating functions to the keiretsu, both horizontally and vertically. The role of Japanese trading companies within Japan's economy in serving as intermediaries in trade, investment, distribution, finance, resource development, business organization and information collecting has been well-documented.[26] There are approximately 10,000 companies in Japan classified as trading companies, including the 17 largest ones, known as *sogo shosha* or general trading companies. The six largest general trading companies are Mitsui, Mitsubishi, Sumitomo, Marubeni, Nissho Iwai and Itochu. Their total sales amounted to $772.4 billion in JFY 1993 (table 5).[27]

With ties to tens of thousands of Japanese companies, including the keiretsu, the trading companies play a significant role in Japan's exports and imports, including domestic distribution activities. They are essentially gatekeepers for Japan's economy. In JFY 1993, the nine top trading companies (includes Tomen, Nichimen and

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[24] Hisashi Yaginuma, "The Keiretsu Issue: A Theoretical Approach," *Japanese Economic Studies* 21 (New York: M.E. Sharpe, 1993), 3:33.

[25] Tokyo Chamber of Commerce and Industry, "Building a New Corporate Network," *World Trade Materials*, (April 1993), 48.

[26] See for example, M.Y. Yoshino and Thomas Lifson, *The Invisible Link: Japan's Sogo Shosha and the Organization of Trade* (Cambridge: Westview Press, 1986); Kunio Yoshihara, *Sogo Shosha: The Vanguard of the Japanese Economy* (Oxford: Oxford University Press, 1982); Alexander Young, *The Sogo Shosha: Japan's Multinational Trading Companies* (Cambridge: Westview Press, 1979); and Kiyoshi Kojima and Terutomo Ozawa, *Japan's General Trading Companies: Merchants of Economic Development* (Paris: OECD, 1984).

[27] Calculated from data of Japan Foreign Trade Council, Inc. in Keizai Koho Center, *Japan 1995, An International Comparison.*

Kanematsu, in addition to the six largest companies) handled $123.8 billion or 34.8 percent of Japan's exports and $134.2 billion or 60.8 percent of Japan's imports. Their total trade accounted for $258.0 billion or 44.7 percent of Japan's total worldwide trade of $577.03 billion (table 6). The share of Japan's trading companies in Japan's overall trade declined, on a fiscal year basis, from 72 percent in FY 1989 to 45 percent in FY 1993. The major trading companies' involvement in Japan's total imports declined from a high of almost 95 percent in JFY 1989 to 61 percent in JFY 1993. The trading companies share of Japan's total exports declined steadily from a high of 54 percent in JFY 1989 to 37 percent in JFY1990 and 1991, to 36 percent in JFY 1992, and to 35 percent in JFY 1993.[28]

Both advantages and disadvantages have been cited by foreign companies regarding the use of trading companies to access Japan's capital and consumer goods markets. The trading companies are able to save their foreign clients time, effort and costs. They internalize and minimize transactions costs through their long-term, close relationships with other companies within their own keiretsu and with other inter-market groups.[29] However, these very relationships and affiliations may also affect the volumes, prices and types of imported foreign products which are handled by trading companies. Nonetheless, many foreign companies with inadequate knowledge of, or experience in, Japan's market employ the trading companies' services to gain at least limited entry to Japan's markets.

In addition to their predominant position within the domestic economy, Japanese trading companies play a leading role in supporting the overseas activities of Japanese firms, including those in Asia, and in facilitating trade between third countries. They serve as the linchpin linking supply and demand points worldwide. Through

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[28]Calculated from data of Japan's Foreign Trade Council, Inc. as reported in Keizai Koho Center, *Japan An International Comparison*, various years.

[29] The trading companies also maintain ties to subsidiaries and affiliated firms, including small and medium-sized firms in Japan's distribution sector. According to one study, about two-thirds of subsidiaries of trading companies were located in Japan while the rest were located abroad. The JFTC has concluded that the trading companies exert significant influence over their affiliates' fiscal and managerial policies through financial and personnel ties. By providing financing to affiliates and non-affiliates, the trading companies are able to create a situation of mutual dependency by which the companies depend on the trading company for loans while the trading company must help the firms earn profits and avoid defaults. Japan Fair Trade Commission, "Survey on the Present State of Business Activities of the Sogo Shosha," Antimonopoly Law Colloquium 97-4 (April 1983):111; and Michael R. Czinkota and Jon Woronoff, *Japan's Market: The Distribution System* (Praeger Special Studies, 1986), 35-36.

their efficient and extensive global communications and information-gathering networks, the trading companies provide key services (sourcing, financing and marketing) to companies with fewer resources and capabilities. The net effect of trading companies' assistance is to minimize the risks associated with changing prices, exchange rates, and local regulations for Japanese firms. They also help to lower the transaction costs associated with the physical distribution of products in foreign markets.[30]

In Asia, as in other overseas markets, the trading companies serve as project organizers on large-scale engineering and construction contracts.[31] They facilitate Japan's overseas development assistance, secure sales contracts and financing, act as the plant supplier, and provide technical advice and consulting services to all stages of the project.[32] There is a "tight corporate hierarchy" between the trading company and its banks, and the trading companies' branch networks. Typically, the parent companies in the networks retain research and development, marketing, and financial analysis functions. The subsidiary, while restricted in its ability to sign contracts or to initiate a new project, is responsible for local shipping and supervisory functions. By maintaining strong interfirm linkages, the trading companies serve as important intermediaries between local suppliers, parent companies and customers in Japan.[33]

Keiretsu Presence in Selected Asian Economies

Given the information about keiretsu activities in Japan, a key question is: how much of a presence do they have in Asia? In order to provide additional understanding of the extent of keiretsu involvement in selected Asian countries (Indonesia, Malaysia, and Thailand), a data base of Japanese affiliates and their respective keiretsu was developed, according to the following methodology. First, the Japanese firm and host country for investment were identified using Japan External Trade Organization's (JETRO) 1994-1995 *Directory of Japanese Affiliated Companies in Asia*. The survey, while not a complete listing, provides extensive coverage of Japanese affiliated firms operating in various business fields in Asia. The 1994-95 survey lists 3,574 companies operating in Hong

[30] Katano, 59, 68, and 72.
[31] Mitsui & Co., Ltd., *Service Guide*, 1995, 7.
[32] Robert M. Orr, Jr., *Japan's Foreign Aid Power* (New York: Columbia University Press, 1994), 60-61.
[33] Edgington, 98-108.

Kong (299), Korea (218), Brunei (3), Indonesia (348), Malaysia (557), the Philippines (237), Singapore (1,244) and Thailand (668). The survey covers those Japanese affiliated companies in which "10 percent or more ownership is held by one or more Japan-based companies." Local subsidiaries and subsidiaries of subsidiaries are also included in the survey coverage. All 1,573 companies in Indonesia, Malaysia, and Thailand that are listed in the JETRO survey were included in the data base.

Secondly, the parent company for each Japanese affiliate and its related corporate grouping was identified by cross-referencing the JETRO directory with Dodwell's *Industrial Groupings in Japan 1994/1995*. Dodwell's categorization of keiretsu (horizontal, vertical, production and distribution) was used for purposes of identifying the affiliated grouping for each Japanese firm investing in the selected countries. However, the survey focuses mainly on the horizontal and vertical keiretsu. The six major horizontal keiretsu are: Mitsubishi, Mitsui, Sumitomo, Fuyo, DKB and Sanwa. IBJ and Tokai are considered to be medium-sized keiretsu. Thirty-eight vertical groups were profiled by Dodwell and used for purposes of this data base. A broad based set of criteria was used to match each overseas investor with its affiliated grouping in Japan. If the parent firm of the overseas affiliate was listed as a Presidential council member, as having equity ties,[89] or as having personnel ties to one of the groups, it was considered to have an affiliation with that group.[90]

According to table 7, the highest number of affiliates associated with one or more keiretsu (both horizontal

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[89] Previous research has indicated that equity ties of even less than 10 percent may be enough to affect the behavior of Japanese firms regarding their relationships with other Japanese firms or groups. As such, a minimum threshold for share-holding was not designated as a criteria for determining a firm’s keiretsu affiliation.

[90] The term "affiliation" is defined here as meaning to have some type of equity or personnel ties or other business relationship to the group. Although Dodwell provides some indication of the "degree of inclination" of firms to their related keiretsu, no attempt to assess or to quantify the strength of the ties between the investing firm, the parent firm and the group was made. However, in general, it can be said that in many cases the inclination of the parent firm to the group is quite strong. The purpose of presenting information on the Japanese affiliates in East Asia and their related grouping is to indicate the scope and extent of keiretsu presence, regardless of the strength of the ties among members, in the selected countries. The degree of control and closeness of the linkages among firms differs among various keiretsu groups. In addition, individual firms may have relations with more than one keiretsu or have their own vertical group while belonging to a horizontal group, for example. In many cases, the parent firm of the Japanese affiliate could not be identified through available reference sources. Due to incomplete coverage of the actual number of investments in the JETRO survey and difficulties in tracing the identification of the parents or other firms affiliated with the Japanese investments in the selected countries, the totals for the number of firms affiliated with keiretsu is likely understated.

and keiretsu) in Japan, as a proportion of the total sample size occurred in Indonesia (61 percent), followed by Thailand (48 percent) and Malaysia (45 percent).[91] In Thailand, 295 affiliates were associated with one of the horizontal keiretsu, compared with 212 in Malaysia and 211 in Indonesia. (The totals include firms that belong to more than one keiretsu, either vertical or horizontal). Those horizontal keiretsu with the highest number of affiliated firms in the three countries were: DKB (128), Mitsui (116), Sumitomo (109) and Mitsubishi (104). The six major keiretsu had the largest numbers of affiliates in all three countries compared to the two medium-sized keiretsu. By country, DKB, Mitsui and Mitsubishi exhibited the highest numbers of affiliates in Thailand, compared to keiretsu affiliates in the other two countries. Of note, Mitsubishi had relatively fewer numbers of affiliates in Malaysia (23) compared to its presence in Indonesia (31) or Thailand (50) and compared to the other keiretsu with affiliates in Malaysia.

There were 76 affiliates associated with vertical keiretsu in Thailand, 66 in Malaysia and 31 in Indonesia. The vertical keiretsu with the highest numbers of affiliated firms were: Hitachi (26), Toyota (24), Matsushita (19), Toshiba (16), Nippon Steel (14), and Nissan (12). By country, Hitachi and Matsushita's affiliates in Malaysia and Toyota's affiliates in Thailand and Indonesia were the most noteworthy in terms of numbers. Other keiretsu with a moderate presence were Toshiba and Nippon Steel in Malaysia and Thailand (table 8).

When examined by industry, keiretsu were found to have invested in 40 industries in Indonesia, 43 in Malaysia, and 49 in Thailand. Japanese affiliates with ties to keiretsu in Japan were involved in producing or distributing both capital and consumer goods (furniture, housewares, cosmetics, and jewelery, for example) and services (banking, insurance, trading, shipping and freight forwarding). In Indonesia, those sectors with the greatest number of keiretsu affiliates included automotive parts and accessories; banking; chemicals; construction; construction materials, textiles and trading. In Malaysia, those sectors with high keiretsu affiliation included: electrical and electronic appliances; audio and video products; metals; automotive parts and accessories; and trading. In Thailand, the sector with the highest keiretsu affiliation was electrical and electronic appliances while

[91] For purposes of this data base, in cases where a parent firm was identified as having relations with more than one keiretsu, the multiple affiliations are included in table, but were only counted once in the summary statistics provided above.

other sectors with large numbers of keiretsu affiliates included automotive parts and accessories; freight forwarding and warehousing; chemicals; construction; textiles; and trading (table 9). Based on this information, it appears that the keiretsu are involved in a wide variety of manufacturing, distribution and transportation activities in these economies.

Keiretsu Operations in Asia

Given this information about the extent of keiretsu presence in Asia, what are some of the other characteristics of Japanese investments in Asia, including affiliates associated with keiretsu? Surveys of Japanese companies conducted by the Ex-Im Bank and statistics published by the U.S. Department of Commerce and Japan's Ministry of Trade and Industry provide some insight into Japanese investments with regard to ownership, type of investment, reason for investment, and their sales and procurement behavior. The survey evidence suggests that Japanese firms are not just shifting their production bases to Asia to secure lower-cost wages and to export to third markets, but that they are also very interested in gaining local market shares, especially for transport machinery, iron and steel, other manufacturing and chemical products. "Preservation or expansion of market share" is the leading reason given by Japanese firms surveyed for investing in ASEAN or the NIEs while "development of new market" is the main reason for investing in China.[92] According to MITI data, 66 percent of total sales by Japanese affiliates in Asia are directed at the local market. As such keiretsu practices employed in downstream distribution channels could have an affect on market opportunities. At the same time, Japanese affiliates in Asia continue to import almost 38 percent of their inputs from Japan for manufactured goods.[93]

There is increasing statistical and anecdotal evidence that at least some business practices associated with keiretsu in Japan, are also employed in Asia. For example, in some cases Japanese auto firms have demanded lower prices for parts and higher quality standards from their suppliers during economic downturns. The local suppliers, who are locked into producing products according to the Japanese manufacturers

[92] *Ex-Im Review*, Vol. 14, No. 1, 1994.
[93] MITI, *Kaigai Toshi Tokei Soran*, No. 5, 1994.

specifications, have no choice but to comply.[94] As in Japan, the parent or dominant firm supplies the capital, technology, managerial expertise and a market, through established distribution networks. The dominant firm is able to maximize the benefits resulting from quasi-integration and long-term relations and minimize its risks. In exchange, the supplier is expected to produce parts, investment in production equipment and provide training to employees in accordance with the parent's criteria.[95] As in Japan, the effect of such relations may be to limit outside suppliers' opportunities.

There are indications that "buy Japanese" preferences, prevalent in Japan, also appear to be favored by Japanese firms in Asia. Japanese auto producers in Asia, for example, continue to purchase high-end parts from Japan or from Japanese affiliates that have followed them offshore. In Singapore, Japanese electronics firms purchase almost 80 percent of their audio video components from other Japanese companies located there. In fact, Japanese affiliates in Asia continue to import almost 38 percent of their inputs from Japan for manufactured goods.[96] Anecdotal evidence suggests that the effects of these practices and close manufacturer-supplier relations in Asia may be exclusionary. For example, U.S. auto producers claim that they have already experienced difficulties in finding local firms willing to supply them in Asia because of ties to Japanese producers.

This information regarding the characteristics of Japanese investments in Asia, when viewed in the context of the keiretsu affiliate data suggests that for manufactured goods and other industries where there is a keiretsu presence, there may be a high degree of intra-keiretsu purchasing and distribution. A high proportion of overall transactions by Japan's Asian manufacturing affiliates takes the form of intra-firm trade. The most recent statistics available indicate that 59 percent of all sales and 63 percent of all purchases for manufacturing affiliates are intra-firm transactions (Tables 10 and 11).[97] Local and foreign firms, including U.S. companies, are likely to face keen competition in these product areas and face difficulties in accessing both upstream and downstream

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[94] Hatch and Yamamura, p. 31.

[95] Ibid, p. 57.

[96] MITI, *Kaigai Toshi Tokei Soran*, No. 5, 1994.

[97] MITI, *Basic Research on Business Activities Abroad*, reported in *Vision for the Economy of the Asia Pacific Region in the Year 2000 and Tasks Ahead* (August 1992).

channels where there is a predominant keiretsu presence.

Implications for U.S.-Japan Relations

While more research is required to fully understand the practices of individual companies, some conclusions can be drawn based on the available evidence regarding the implications of the keiretsu in Asia for U.S.-Japan economic relations, including market access. Entire Japanese manufacturing and distribution channels have relocated to Asia -- including manufacturers, suppliers, retailers, banks and trading companies. Based on a limited sample, a majority of these companies, in at least the selected countries of Indonesia, Malaysia and Thailand, have ties to the keiretsu in Japan. The companies surveyed are involved in numerous industries, producing and distributing both capital and consumer goods. The “keiretsufication” of those industries where Japanese firms have made extensive investments such as electronics, autos and parts, chemicals, banking, construction and metals, may affect market opportunities for non-keiretsu suppliers and distributors, including both domestic and foreign firms. To the extent that Japanese firms in Asia are duplicating their home-market organizations and practices, there is reason to expect that foreign firms, including U.S. companies, may experience difficulties in entering markets in Asia. This includes purchasing components, becoming keiretsu suppliers or marketing products to local consumers.

Despite some of the potential problems for foreign firms, there may be several advantages for local economies associated with the replication of Japanese keiretsu in Asia. To the extent that some local firms are brought into the keiretsu and transfers of managerial and technological skills occur, there may be gains to the Asian economies in terms of raising productivity, quality control, and production management. Consumers could benefit from the introduction of new products and improved service. Localities adjacent to Japanese production facilities and industrial estates have already witnessed improvements to infrastructure, such as new highways that are built by the investing firms.

From a U.S. perspective, if American firms are found to be excluded from supplier/distributor or other contracting opportunities as a result of Japanese business relationships in Asia, the U.S. or other governments may be pressured to seek negotiations with host countries. However, it may not be that easy to determine the appropriate negotiating partner because the distinction between perceived local barriers to trade and investment and "transplanted trade barriers" is likely to become blurred. The interlinkages between Japanese keiretsu and local economies will make it more difficult to distinguish the actual origins of market access problems which could either be attributed to transplanted keiretsu practices, indigenous practices, or the practices of local firms that have been integrated into the keiretsu. It will therefore be very important that accurate and complete information about any problems that U.S. firms face in Asian markets be relayed to U.S. negotiators in order to minimize misunderstandings and to avoid unnecessary trade negotiations.

In general, researchers are divided in their views about whether the keiretsu and production networks are opening to outside firms in Japan and overseas. According to one view, keiretsu networks are indeed facing pressures to open up as the costs of maintaining less productive group members increases. In addition, as firms are inclined to enter into more cross-national alliances, keiretsu interfirm ties may weaken.[98] However, in the short term, there is less of a chance that keiretsu member ties will ease. It appears that keiretsu firms are likely to switch to new suppliers only as a strategy of last resort. There are not yet enough internal and external pressures to reverse decades of closed purchasing behavior and preferential business relations. This is because the underpinnings of the close firm relations, such as the emphasis on loyalty, obligation, long-term stability and "buy national" preferences have not disappeared even as the economic pressures to do so have. Nor have many of the financial and non-financial incentives which help to cement in-group ties fallen into disuse. For example, a 1996 JFTC report indicates that such practices as rebates and restrictions on non-OE parts sales continue to be prevalent in the Japanese auto industry.

The first step toward addressing market access issues associated with keiretsu overseas is to identify specifically the extent and types of business practices underlying their production and distribution networks. Over the long-term, both regional (APEC) or multilateral fora (OECD, WTO) could address issues regarding differences in competition policy, business organization, and economic structures among countries, beginning

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[98] Ernst, pp. 33-34.

with joint studies.

In the meantime, there is no reason to expect complete convergence between Japanese and U.S. economic systems. Significant differences are likely to remain. It is highly likely that Japan will not abandon the keiretsu in the short-term, despite current economic or political pressures. Their activities will continue to highlight the contraposition of industrial policy and competition law, both overseas and in Japan.

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Table 1. Japan's FDI in Asia, flows, JFY 1987-1995

(millions of dollars)

	1987	1988	1989	1990	1991	1992	1993	1994	1995
China	1,226	296	438	349	579	1,070	1,954	2,683	4,319
	101	170	126	165	246	490	700	636	770
Hong Kong	1,071	1,662	1,898	1,785	925	735	1,447	1,179	1,106
	261	335	335	244	178	154	184	112	119
Indonesia	545	586	631	1,105	1,193	1,676	952	1,808	1,548
	67	84	140	155	148	122	115	116	168
Korea	647	483	606	284	260	225	289	420	433
	166	153	81	54	48	28	34	27	25
Malaysia	163	387	673	725	880	704	892	772	555
	64	108	159	169	136	111	92	51	57
Philippines	72	134	202	258	203	160	236	683	692
	18	54	87	58	42	45	56	75	100
Singapore	494	747	1,902	840	613	670	735	1,101	1,143
	182	197	181	139	103	100	97	69	94
Taiwan	367	372	494	446	405	292	343	292	439
	268	234	165	102	87	48	41	39	52
Thailand	250	859	1,276	1,154	807	657	680	749	1,196
	192	382	403	377	258	130	127	126	147

Source: Ministry of Finance, *Financial Statistics of Japan*, 1989, 1990, 1993, 1995; and *Monthly Finance Review*, June 1996.
Note: Top row = amount
Lower row = number of cases

Table 2. Asia's trade with Japan 1990-1995

(billions of dollars)

	1990	1991	1992	1993	1994	1995
China	9.2	10.3	11.7	15.8	21.5	29.5
	7.7	10.0	13.7	23.3	26.3	29.0
	1.5	(0.2)	(2.0)	(7.5)	(4.8)	(0.5)
Hong Kong	4.7	5.3	6.3	7.0	8.4	10.6
	13.3	16.4	21.5	23.0	25.2	28.6
	(8.6)	(11.1)	(15.2)	(16.1)	(16.8)	(18.0)
Indonesia	10.9	10.8	10.8	11.2	11.7	12.9
	5.5	6.3	6.0	6.2	8.4	11.0
	5.5	4.4	4.7	4.9	3.1	1.9
Korea	12.6	12.4	11.6	11.6	13.5	17.1
	18.6	21.1	19.5	20.0	25.4	32.6
	(5.9)	(8.8)	(7.9)	(8.4)	(11.9)	(15.5)
Malaysia	4.5	5.5	5.4	6.1	7.0	9.4
	7.1	9.6	10.4	12.5	15.9	21.2
	(2.5)	(4.1)	(5.0)	(6.4)	(9.0)	(11.8)
Philippines	1.6	1.8	1.7	1.8	2.0	2.8
	2.4	2.5	3.1	4.0	5.4	6.4
	(0.8)	(0.7)	(1.3)	(2.2)	(3.4)	(3.6)

Table 2 (continued). Asia's trade with Japan 1990-1995

(billions of dollars)

	1990	1991	1992	1993	1994	1995
Singapore	4.6	5.1	4.8	5.5	6.7	9.2
	12.3	14.1	15.2	18.7	22.5	26.3
	(7.6)	(9.0)	(10.4)	(13.1)	(15.7)	(17.7)
Taiwan	8.5	9.5	9.4	9.7	10.8	24.8
	15.4	18.3	21.1	22.1	23.8	12.3
	(6.9)	(8.8)	(11.7)	(12.4)	(13.0)	12.5
Thailand	4.0	5.1	5.7	6.3	7.7	9.5
	10.1	11.0	11.9	14.0	16.4	21.6
	(6.2)	(6.0)	(6.2)	(7.7)	(8.7)	(12.1)

Source: International Monetary Fund, *Direction of Trade Statistics*, Central Bank of China, *Financial Statistics,*
1st row = exports, 2nd row = imports, 3rd row = trade balance (exports - imports)
Exports f.o.b., Imports c.i.f.

Table 3. Cross-shareholding ratio of major keiretsu, JFY 1989, 1991, 1992.

	JFY	Mitsui	Mitsubishi	Sumitomo	Fuyo	Sanwa	DKB	Average of Six Major Groups
Ratio of Intra-Group Stock Shareholding Relations (percentage)	1989	59.6	72.7	93.6	45.4	27.0	29.5	54.6
	1991	58.1	75.1	94.5	46.6	27.4	30.4	55.3
	1992	57.6	75.3	94.5	46.8	27.5	29.4	55.2
Ratio of Intra-Group Stock Shareholding (percentage)	1989	19.5	35.5	27.5	16.4	16.5	14.6	21.6
	1991	19.3	38.1	28.0	17.1	16.8	14.6	22.3
	1992	19.3	38.2	28.0	16.9	16.7	14.2	22.2
Ratio of Intra-Group Stockholding: Cross-Shareholding (percentage)	1989	46.1	59.7	83.7	34.7	17.6	17.8	43.3
	1991	46.1	61.0	85.3	36.0	18.2	18.4	44.1
	1992	45.8	61.2	85.3	36.0	18.3	17.3	44.0

Source: Japan Fair Trade Commission, *FTC/Japan Views 20* (March 1995): 47.
Note: Averages have been rounded.

Table 4. Intra-Group Business Relations Ratio, JFY 1989 and JFY 1992.

(percentage)

	Mitsui	Mitsubishi	Sumitomo	Fuyo	Sanwa	DKB
JFY 1992	44.2	51.7	60.8	29.3	27.6	32.8
JFY 1989	45.3	51.3	64.2	30.8	30.9	34.5

Source: Japan Fair Trade Commission, *FTC/Japan Views 20*, (March 1995):49.

Table 5. Sales and trade of Japan's nine major trading companies, JFY 1993.

(millions of dollars)

Trading Company	Total Sales	Sales in Japan	Exports From Japan	Imports to Japan	Offshore Trade
Itochu	145.1	77.4	15.9	13.4	38.4
Mitsui	142.6	70.9	18.0	19.1	34.7
Marubeni	136.3	70.0	19.8	15.6	31.0
Sumitomo	135.2	69.6	20.5	19.4	25.6
Mitsubishi	127.0	62.2	20.4	21.3	23.9
Nissho Iwai	86.2	39.3	10.0	15.8	21.1
Subtotal	772.4	389.4	104.6	104.6	174.7
Tomen	58.7	27.9	6.1	6.9	17.8
Nichimen	49.4	23.2	4.3	3.5	18.3
Kanematsu	47.4	12.7	8.8	19.2	6.7
Total	927.9	453.2	123.8	134.2	217.5
Share of Trading Companies Total Sales (percentage)	100.0	48.8	13.3	14.5	23.4

Source: Figures calculated from Japan Foreign Trade Council, Inc. as reported in Keizai Koho Center, *Japan 1995: An International Comparison*.
Note: Yen/dollar exchange rate = Y111.2=$1.00

Table 6. **Involvement of Japan's nine major trading companies in Japan's trade, JFY 1989-1993**

(billions of yen)

	FY 1989	FY 1990	FY 1991	FY 1992	FY 1993
Exports of Nine Major Trading Companies From Japan	20,836	15,412	15,639	15,384	13,768
Japan's Total Exports[1]	38,883	41,877	42,696	43,055	39,616
Trading Companies Share of Japan's Exports (percentage)	53.6	36.8	36.9	35.7	34.8
Imports of Nine Major Trading Companies to Japan	28,736	23,077	20,010	18,241	14,926
Japan's Total Imports	30,407	34,171	30,972	29,224	24,550
Trading Companies Share of Japan Imports (percentage)	94.5	67.5	64.6	62.4	60.8
Trading Companies Total Trade (Exports and Imports)[2]	49,572	38,489	35,649	33,625	28,694
Japan's Total Trade	69,290	76,048	73,668	72,279	64,166
Trading Companies' Share of Japan's Total Trade (percentage)	71.5	50.6	48.4	46.5	44.7

Source: Figures were calculated from Ministry of Finance and Japan Foreign Trade Council, Inc. data, as reported in Keizai Koho Center, *Japan: An International Comparison* (various years).

[1]Customs clearance basis, exports, f.o.b., imports, c.i.f.

[2]Total does not include trading companies involvement in third country trade.

Table 7. Japanese affiliates in Indonesia, Malaysia and Thailand associated with keiretsu

	Indonesia	Malaysia	Thailand
Number of affiliates associated with vertical keiretsu	31	76	67
Share of total number of affiliates (percentage)	9	14	10
Number of affiliates associated with horizontal keiretsu	188	212	295
Share of total number of affiliates (percentage)	54	38	44
Number of affiliates associated with keiretsu	212	251	320
Share of total (percentage)	61	45	48

Source: Data was compiled from JETRO's *Directory of Asian Affiliated Companies in Asia* and *Dodwell's Industrial Groupings in Japan 1994/1995*.

Table 8. Japanese affiliates in Asia associated with keiretsu, by name of group

Name of keiretsu	Indonesia	Malaysia	Thailand
Horizontal			
Mitsubishi	31	23	50
Mitsui	33	31	52
Sumitomo	32	36	41
Fuyo	23	35	39
Sanwa	25	38	37
DKB	37	36	55
Tokai	19	11	15
IBJ	11	2	6
Vertical			
Toyota	9	4	11
Hitachi	3	18	5
Bridgestone	1	1	1
Nippon Steel	2	7	5
Fujitsu	1	3	0
Tokyu	1	1	2
Honda	3	3	3
Kajima	2	1	0
Matsushita	2	10	7
Shimizu	1	1	0
Sony	1	2	3
Mazda	1	0	0
Nissan	1	5	6
Toshiba	1	8	7
Sharp	0	2	2
Sanyo	0	1	1
Taisei	1	1	0

Table 8 (continued). Japanese affiliates in Asia associated with keiretsu, by name of group.

Isuzu	2	2	5
Kobe Steel	0	1	0
Aeon	0	0	1
NEC	0	5	5
Ito-Yokaido	0	0	1
Kintetsu	0	0	1
Canon	0	0	1
Total	242	288	362

Source: Data was compiled from JETRO's *Directory of Asian Affiliated Companies in Asia* and *Dodwell's Industrial Groupings in Japan 1994/1995*.

Table 9. Japanese affiliates in Indonesia, Malaysia and Thailand associated with keiretsu, by industry.

	Indonesia	Malaysia	Thailand
Advertising	0	0	1
Architects and engineers	0	0	4
Audio and Video products	1	15	8
Automobiles	1	2	11
Automotive parts and accessories	20	11	21
Banking	20	12	6
Bearings	0	0	3
Bicycles and Parts	1	2	0
Chemicals, paints, pigments and related	11	3	16
Clocks and watches	0	0	2
Communications and telecommunications	1	2	3
Computer parts and software	1	6	4
Construction	15	10	15
Construction equipment	3	0	3
Construction materials	9	1	1
Consultants	3	3	1
Cosmetics	1	0	2
Design	0	0	1
Department stores	2	1	5
Electric power and equipment	1	0	7
Electrical and electronics appliances and parts	10	46	40
Feedgrains	1	0	0

Table 9 (continued). Japanese affiliates in Indonesia, Malaysia, and Thailand associated with keiretsu, by industry.

Food and beverages	0	2	8
Fishing	5	0	0
Freight forwarding and warehousing	2	2	17
Furniture	0	1	0
Gas appliances	0	0	1
Garments and accessories	3	0	3
General merchandise	0	0	2
Glass and glass products	1	4	3
Golf courses	1	0	0
Hotels	3	1	0
Housewares	0	1	0
Industrial Ceramics	0	1	0
Insurance	3	9	5
Jewelry	0	0	1
Leasing	8	3	6
Machine parts and components	0	2	0
Machinery	6	4	4
Medical equipment	0	0	1
Metals	10	18	19
Mining, oil and gas extraction	1	0	1
Motorcycles and parts	1	5	3
Office Equipment	0	5	1
Optical and photographic equipment	0	2	3
Petroleum refining	0	1	2
Pharmaceuticals	4	0	

Table 9 (continued). Japanese affiliates in Indonesia, Malaysia and Thailand associated with keiretsu, by industry.

Plastics, resin and molds	2	6	8
Real estate	8	0	2
Restaurant	0	0	1
Securities	2	0	6
Semiconductors	0	1	3
Shipbuilding	2	0	3
Shipping	3	2	3
Textiles	11	4	16
Tires and rubber materials	2	1	0
Tools	0	1	2
Trading firm	22	32	24
Transportation Services	0	2	0
Trucks and industrial vehicles	0	1	2
Wood products	1	3	0
Products, others	6	11	4
Services, others	2	1	4
Others	2	1	4

Source: Data was compiled from JETRO's *Directory of Asian Affiliated Companies in Asia* and *Dodwell's Industrial Groupings in Japan 1994/1995*.

Table 10. Ratio of transactions (procurements) in the same group (proportion of intra-firm transactions to total transactions), JFY 1989.

(percentage)

Procurements	Local	Japan	Third Country	Total
All industries	10.3	63.2	3.7	18.0
All manufacturing	4.1	62.6	23.9	29.1
Chemicals	2.8	83.8	33.6	33.7
Industrial machinery	0.6	79.1	32.3	35.3
Electrical machinery	5.1	65.3	29.8	35.1
Transportation machinery	2.3	48.9	0.7	21.8

Source: MITI, *Basic Research on Business Activities Abroad* reported in *Vision for the Economy of the Asia-Pacific Region in the Year 2000 and Tasks Ahead Report* (August 1992).

Table 11. Ratio of transactions (sales) in the same group (proportion of intra-firm transactions to total transactions), JFY 1989.

(percentage)

Sales	Local	Japan	Third Country	Total
All industries	4.4	34.3	14.8	16.1
All manufacturing	6.5	58.9	37.2	21.0
Chemicals	4.2	40.2	35.1	11.5
Industrial machinery	0.6	98.5	45.4	29.6
Electrical machinery	12.9	60.3	43.9	36.7
Transportation machinery	6.2	35.7	8.5	6.8

Source: MITI, *Basic Research on Business Activities Abroad*, reported in *Vision for the Economy of the Asia-Pacific Region in the Year 2000 and Tasks Ahead* (August 1992).