

Japanese Multinational Enterprises in the United States

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This chapter examines some of the major issues regarding the activities of large Japanese-based multinational enterprises (NINEs) in the United States. As the most conspicuous competitors with leading U.S.-based MNEs during the 1980s, Japanese firms' activities here, and the effects of U.S. Government policy on those activities, offer an opportunity to assess how the national policy on foreign-based firms affects our interests.

Throughout the business and academic literature on foreign direct investment (FDI) and U.S. international competitiveness, one theme is constant: the competitive challenge of Japanese corporations. Major manufacturing corporations such as Toyota, NEC, and Mitsubishi have been central to Japan's remarkable postwar economic resurgence. They have also been among the principal players in Japan's late 1980s overseas investment boom.

U.S. firms were among the first to expand production significantly to foreign locations; European firms have made significant international investments, particularly within other European countries. But it is clear at any level of analysis that Japanese firms have greatly expanded their presence in the world economic system and especially within the United States during the last decade. (See figures 1-4 and 3-3.)

Between 1981 and 1991, the number of Japanese firms in the Fortune 500 rose from 78 to 119, with 20 in the top 100 in 1991, twice the number as at the beginning of the decade. As can be seen in table 4-1, Japanese companies increased FDI faster than those from any other nation during the 1980s, accounting for 11

**Table 4-I—Foreign Direct Investment Position
in the U. S., Selected Years
(in billions of dollars)**

Country	1980	1985	1991
All	83.0	184.6	407.8
Developed	72.0	161.2	381.5
EC-12	47.3	107.4	232.0
Japan	4.7	19.3	86.7
Canada	12.2	17.1	30.5

NOTE: Data are based on historical cost and are not adjusted for inflation.

SOURCE: John Rutter, "Recent Trends in Foreign Direct Investment in the United States: The Boom of the 80's Vanishes," U.S. Department of Commerce, International Trade Administration, December 1992, appendix table 2.

percent of FDI by major developed countries and 21.3 percent of cumulative direct investment in the United States by the end of the decade.² Japanese direct investment in the United States increased at an average annual rate of 32.5 percent from 1980 to 1985, and continued at a rate of 28.4 percent for the second half of the decade, far outdistancing similar rates for other developed countries.³

Although investment leveled off significantly after the 1980s, in 1990 Japanese firms had stakes of 50 percent or more in 1,088 U.S. manufacturing and assembly operations, and smaller stakes

in 136 more enterprises. The majority-owned enterprises together operated more than 1,500 factories and employed 284,000 Americans, with another 86,000 jobs at minority Japanese-owned establishments.⁴ Despite the decline in Japanese investment in the first 2 years of the 1990s, many analysts suggest that this is only a temporary lull. Indeed, one analyst estimates that by the end of the century, Japan may invest another \$700 billion overseas, 40 percent of which can be expected to take the form of direct investment. This would amount to a shift of 15 percent of Japanese production abroad.⁵

By the end of the 1980s, the Japanese presence in the United States was well-established. Japanese direct investment in manufacturing in the United States focused on electric and electronic equipment, primary and fabricated metals, and transportation equipment.⁶ Counting both imports into the U.S. and domestic production, Japanese firms accounted for significant market shares in many key industries, reaching 20 percent of the semiconductor market,⁷ 29.9 percent of the automobile market,⁸ and significant holdings in the steel market.⁹

These changes have stimulated public debate over the competitive challenge from Japanese

¹ John M. Stopford and Susan Strange, *Rival States, Rival Firms: Competition for World Market Shares* (Cambridge, England: Cambridge University Press, 1991), p. 17.

² Based on book value. John W. Rutter, Department of Commerce, "Recent Trends in Foreign Direct Investment in the United States: The Boom of the '80s Vanishes," December 1992, appendix table 1.

³ Ibid.

⁴ Japan Economic Institute, "Japan's Expanding US Manufacturing Presence, 1990 Update," *JEI Report*, June 1992, pp. 3-4. (The U.S. Government defines a foreign-controlled firm as one with at least 10 percent of its equity held by one foreign owner.)

⁵ Kenneth Curtis, Tokyo economist for Deutsche Bank, cited in Robert L. Cutts, "Capitalism in Japan: Cartels and Keiretsu," *Harvard Business Review*, July/August 1992, p. 54.

⁶ John W. Rutter, U.S. Department of Commerce, "Trends and Patterns in Foreign Direct Investment in the United States," *Foreign Direct Investment in the United States: Review and Analysis of Current Developments*, August 1991, p. 25.

⁷ Semiconductor Industry Association, *Obtaining Access to the Japanese Market: Interim Report on the 1991 US-Japan Semiconductor Agreement* (Washington DC: May 1993), p. 7.

⁸ In 1992; U.S. Department of Commerce, "Motor Vehicles and Parts," *US Industrial Outlook 1993* (Washington, DC: US Government Printing Office, January 1993), p. 35-7.

⁹ The Department of Commerce reported that foreign steel makers held substantial positions in almost 25 percent of domestic integrated mills by the late 1980s, with Japanese firms the dominant foreign investors. Ibid., p. 13-3.

corporations and the Japanese economy. Some analysts suggest that the impressive performance of Japanese firms is due primarily to efficient industrial organization and production techniques. Others stress business relationships among Japanese industrial companies along with banks that allow them to obtain capital more cheaply, compete for market share rather than short-term profits, and weather hard economic times. Some argue that government protection and aid to developing industries, and restrictions on foreign sales and investment, are the keys to Japanese success.

Japanese firms have lagged behind their U.S. and European counterparts in the globalization process. This is at least partly due to their latecomer status; the industrial infrastructure of the nation suffered greater destruction during World War II than that of most European nations. But while the physical damage was substantial, much of the structure and operating style of Japanese firms survived from the prewar era. Some aspects of the Japanese system go back to the establishment of the first zaibatsu, or family-based commercial empires, in the 19th century (although parts of the system emerged as early as the 17th century).

Thus, some of the powerful organization evident in modern-day Japanese corporations has developed over time—with influence from governmental planners—as the firms have developed. This may explain the companies' conservatism, their strong identification with Japan, and their reluctance, in many cases, to adapt to what many in the United States consider appropriate forms of corporate behavior and community participation.

Japanese managers tend to view relationships with foreign firms, customers, and governments as opportunities to absorb knowledge and tech-

nology. Just as the aristocrats who steered the new Japanese state after the Meiji Restoration of 1868 modeled social and governmental institutions on what they saw as the best of the West, so Japanese corporations have absorbed Western institutions—such as Fordist mass production and the global corporation—and adapted them to Japanese sensibilities and goals. In this view, it may be useful to think of the Japanese firms that loom large in many technology-intensive, high value-added industries as possessing a national ideology of technology absorption.¹⁰

This chapter addresses factors that have aided the expansion of Japanese firms in the United States, both through exports and direct investment. It discusses the competitive challenge to U.S. industries posed by these firms, and the assistance provided by Japanese Government policies and keiretsu business groupings to the activities of large Japanese enterprises in the United States. The chapter concludes by examining an area of particular concern to Congress: Japan's significant investments in both small and start-up companies in high-technology industries, and in domestic university research. Critics have suggested that such practices result in Japanese firms profiting disproportionately from U.S. strengths in basic sciences and technology research and development (R&D).

CHAPTER FINDINGS

1. The Japanese Government has supported and preserved the competitive position of Japanese firms doing business in the United States, using "administrative guidance" of domestic enterprises and government-to-government activism.
2. Japanese corporate ties, particularly as represented by the keiretsu industrial groupings,

¹⁰ For a description of Japan's ideological predisposition toward technology absorption, see David B. Friedman and Richard J. Samuels, "How To Succeed Without Really Flying: The Japanese Aircraft Industry and Japan's Ideology," paper presented for National Bureau of Economic Research Conference, San Diego, CA, Apr. 1-3, 1992.

have helped Japanese firms establish global sales, distribution, and production networks. In the United States, keiretsu-type organization has accompanied the establishment of some Japanese-owned production facilities.

3. **Many Japanese** producers in the United States are gradually increasing the U.S. content of their domestic production—although they have not reached the levels of domestic content of either their U.S. rivals or other foreign investors—as local suppliers become more qualified and more competitive. This process is in conflict, however, with maintenance of the Japanese producers' keiretsu ties. The issue is further complicated by inconsistent U.S. Government definitions and methods of determining domestic content.
4. Japanese firms look to both U.S. university research in basic and applied sciences, and small, innovative U.S. firms in high-technology areas, as valuable technology resources. They have made extensive efforts to draw on these resources through strategic investments, alliances, and other ties.

■ Japanese Government Activism

One factor often cited to explain Japan's international commercial success is the skillful intervention of government bureaucrats, particularly the Ministry of International Trade and Industry (MITI). According to numerous examinations of the Japanese system,¹¹ government officials work closely with industry leaders, strongly influencing firms under the guise of "administrative guidance" in order to foster the development of specific domestic industries and prevent what is often described as "excessive

competition. Among the tools at their disposal are government subsidies, loan guarantees, and technology consortia, as well as various measures aimed at restricting the entrance of foreign firms into the domestic market.

Recognizing the difficulties that confront foreign firms, the Japan Export and Trade Organization (JETRO), an agency of MITI, in recent years has encouraged imports to Japan, offering information and introduction services to foreign firms interested in cracking the Japanese market. Similarly, in a program called the "Business Global Partnership Initiative," MITI announced its intention to encourage large domestic firms to increase imports, expand local procurement for overseas production activities, and help foreign firms make direct investments in Japan.¹² Although such plans may invite skeptical responses from foreign observers, they indicate the Japanese Government's sensitivity to outside pressure.

Although financial and economic developments, such as capital liberalization and the rise in value of the yen, were major impetuses during the 1980s for increased Japanese investment in the United States (see ch. 3), the influence of the Japanese Government—in tandem with U.S. actions—was also significant. In the auto industry, for example, the Japanese Government explicitly encouraged firms to invest in the United States and other nations to avoid protectionist measures and threats of further action by the U.S. Government. The intergovernmental relations that led to the bilateral Voluntary Export Restraints of 1981 are a good example of this phenomenon.

The Japanese Government has a history of discriminating against not only foreign firms but

¹¹ Chalmers A. Johnson, *MITI and the Japanese Miracle: the Growth of Industrial Policy, 1925-1975* (Stanford, CA: Stanford University Press, 1982). Alternative interpretations that stress the role of big business and the interplay of different interest groups are provided by Richard Samuels, *The Business of the Japanese State* (Ithaca, NY: Cornell University Press, 1987); and Karel van Wolferen, *The Enigma of Japanese Power: People and Politics in a Stateless Nation* (New York, NY: Vintage Books, 1990).

¹² Ministry of International Trade and Industry, MITI Overseas Public Affairs Office, "Business Global Partnership Initiative, Fact Sheet, November 1991, p. 3.

also certain domestic firms.¹³ Those firms that traditionally had been the biggest beneficiaries of government policy in the auto industry were the least enthusiastic about investing in the United States, and were uncharacteristically vocal in articulating their views. They feared that moving production to the United States would reduce their productivity, subject them to unfavorable U.S. regulations over issues such as hiring practices, and affect their ability to maintain close control over the activities of subsidiaries.

Conversely, those firms that previously received fewer benefits from government policies were more receptive to the idea of change; when MITI officials approached all the auto manufacturers in late 1979 with the idea of building U.S. facilities, Honda alone announced that the company would build a U.S. plant in Ohio in January of 1980. Honda apparently implemented an overseas investment strategy that won favor with Japanese Government officials while reducing their influence on the company.

Both Nissan and Toyota in contrast, announced that they would not build U.S. plants.¹⁴ Their continued resistance provoked strong and public criticism from MITI.¹⁵ The two firms subsequently responded rather differently: Nissan capitulated, announcing that it would build a U.S. plant, while Toyota balked.

In the United States, the United Auto Workers (UAW and Ford filed petitions with the U.S. International Trade Commission (ITC) under Section 301 of the Trade Act, requesting protection on the grounds that imports were the primary

cause of the auto industry's distress. MITI officials met with U.S. Trade Representative (USTR) officials in June 1980, promising them that Japanese firms would exercise restraint in imports, and MITI's head publicly criticized the companies for their lack of cooperation, particularly Toyota,

What had hitherto only been hints that U.S. protection was a possibility then became more explicitly stated, if not formalized, in September 1980, with a request for a Voluntary Export Restraint (VER) order transmitted by the U.S. ambassador in Tokyo. Tokyo agreed, but the major Japanese auto producers reneged. MITI officials encouraged U.S. officials to demand Japanese responsiveness.¹⁶

The U.S. Justice Department declared that a VER would not violate U.S. antitrust law if it was administered by the Japanese state. Further negotiations between U.S. and Japanese Government officials then settled on a VER of between 1.5 and 1.8 million automobiles per year. MITI thus reasserted its authority to supervise the allocation process and thereby exercise significant leverage over the domestic firms. Within a week, MITI and USTR officials agreed on a figure of 1.68 million units for 3 years.

By limiting exports, the two governments created an incentive for direct investment by the Japanese firms to sustain market share. Toyota and Nissan both resisted moving production to the United States but their loss of market share to Honda¹⁷ motivated them to invest in the United States.

¹³ For a discussion of this point, see Simon Reich, *The Fruits of Fascism: Postwar Prosperity in Historical perspective* (Ithaca, NY: Cornell University Press, 1990).

¹⁴ Paul A. Summerville, "The Politics of Self-Restraint: The Japanese State, and the Voluntary Export Restraint of Japanese Passenger Car Exports to the United States in 1981" (unpublished doctoral dissertation, University of Tokyo, 1988), p. 322.

¹⁵ Noboru Fujii, "The Road to the U.S.-Japan Auto Crash," *U.S.-Japan Relations: New Attitudes for a New Era, Annual Review 1983-1984* (Cambridge, MA: The Program on U.S.-Japan Relations, Center for International Affairs, Harvard University, 1984), p. 41.

¹⁶ Summerville, op. cit., footnote 14, pp. 326, 356.

¹⁷ Honda increased its share of Japanese companies' automobile sales in the United States from 21 to 26 percent between 1981 and 1985. Ibid., p. 395.

Foreign direct investment in the United States (FDIUS) did have advantages for Japanese firms. It allowed them to insulate themselves from further export cutbacks and the effects of currency variations, to compete with U.S. firms directly in their home market, and to reduce the influence of both the Japanese and U.S. Governments. The Japanese Government lost influence over these firms by encouraging the globalization of production, while the U.S. Government lost influence because it could no longer threaten protectionist restraints. The United States instead had to deal with transplants that were able to develop domestic political strength by signing agreements with State governments regarding job, investment, and production levels.

The new transplants were able to compete effectively against their domestic counterparts by locating plants with cheaper labor costs, and by transplanting their efficient production systems. They did this in part by encouraging or coercing Japanese subcontractors and suppliers to move production capacity to the United States, thus to a large extent reproducing the domestic system of industrial groupings, or 'keiretsu,' in this country, as the following section describes.

KEIRETSU

There is increasing evidence that the structure of the Japanese business groups known as keiretsu gives them an advantage against U.S. firms. The keiretsu, a general term for horizontally or vertically organized networks of companies, provide member firms with preferential procurement by group members, low-cost capital, stable shareholding, and support in hard economic times. There has been extensive academic and media

examination of the keiretsu, as well as government attention, both in bilateral trade negotiations and in domestic antitrust actions. This section examines the relevance of the keiretsu to the activities of large Japanese firms in the United States, and whether there are grounds for congressional concern.

Many keiretsu relationships have been transplanted to this country as part of the highly efficient production systems of the large Japanese manufacturing firms. Examination of the geographical dispersion of Japanese manufacturing facilities demonstrates quite clearly that supplier firms have established production facilities in the United States to service their important customers.¹⁸ This transplantation is based at least partly on cultural preferences for doing business with other Japanese companies, but it can also be seen as a rational economic decision to maintain established, reliable supplier relationships. As Japanese producers form relationships with domestic suppliers and customers, however, the keiretsu relationships may weaken. U.S. Government demands and media attention appear to speed this process.

Many Japanese firms producing in the United States apparently prefer to do business with Japanese suppliers that have established their own U.S. manufacturing affiliates, thus denying business to U.S. companies. When such practices have been challenged, Japanese manufacturers typically respond that they have been unable to find U.S. suppliers capable of meeting their high quality standards at acceptable prices.¹⁹ Toyota for example, claimed in 1990 that the average defect rate of parts it bought from U.S. suppliers

113 Michael L. Gerlach, 'relight of the Keiretsu? A Critical Assessment,' *Journal of Japanese Studies*, 18:1, winter 1992, pp. 112-115.

19 Martin Kenney and Richard Florida, "How Japanese Industry is Rebuilding the Rust Belt," *Technology Review*, February/March 1991, p. 28.

20 Lindsay Chappell, "Double-Edged Sword," *Automotive News*, Mar. 4, 1991, p. 1. At the Toyota plant in Georgetown, KY, Japanese-made parts are reportedly kept on hand as emergency inventory in case the U. S.-made parts that are delivered are unacceptable. Alex Taylor, 'Japan's New U.S. Car Strategy,' *Fortune*, Sept. 10, 1990, p. 68.

was 100 times that of parts from Japanese suppliers.²⁰

There is some evidence that more business is now going to U.S. parts suppliers: total sales of U.S.-made parts and accessories to Japanese automakers (for their operations in both Japan and the United States) increased from \$1.7 billion in 1985 to \$10.5 billion in 1990.²¹ This could, however, be due to political considerations. A Nissan representative was quoted as saying that his company bought U.S.-made parts for its U.S. production even when they were 20 percent more expensive than Japanese products, and that Nissan was willing to push that margin up to 50 percent.²²

Japanese keiretsu have been the focus of significant U.S. Government interest in two important areas. The first was the 1989 U. S.-Japan Structural Impediments Initiative, which identified the Japanese business groups as a barrier to U.S. firms' access to Japanese markets, and as an unfair advantage for Japanese firms in international competition. Although various Japanese Government officials and commissions, as well as private-sector groups, have agreed that the keiretsu do give member firms an unfair advantage,²³ little change appears to have occurred.²⁴

The U.S. Government has also attempted to moderate the potency of the keiretsu through new policies encouraging Justice Department enforcement of antitrust provisions against Japanese firms or their U.S. subsidiaries, on the grounds that the Japanese keiretsu structure amounts to

monopolistic or anticompetitive activity. A 1992 change in the Justice Department's policy on prosecution of antitrust violations by foreign enterprises indicated a new dedication, by at least some parts of the U.S. Government, to protecting domestic firms against bigger and richer foreign competitors, particularly Japanese firms.²⁵ The new policies abandoned a prior interpretation of U.S. antitrust law that required proof that corporate collusion harmed U.S. consumers. Rather, the Justice Department argued in 1992, antitrust laws could also be used to aid U.S. firms seeking access to foreign markets.²⁶ Although the Justice Department emphasized that the new policy was not aimed at specific foreign markets, the implication was clear that there were special grounds for complaint against Japanese organizational structures.²⁷

WHAT ARE THE KEIRETSU?

The Japanese word "keiretsu" means system, lineage, or linkage. The vagueness of that definition is appropriate, because the term is used to cover a broad variety of relationships among companies. In its most fundamental definition, the word describes the cooperative arrangements formed by Japanese companies to reduce the risks of commercial activity.

There are two major types of keiretsu: horizontal, or 'bank-centered,' and vertical, or producer-centered, which include chains of suppliers extending upstream from a principal manufacturing company and chains of distributors downstream.

²¹ U.S. Department Of Commerce, "Motor Vehicles and Parts," *U.S. Industrial Outlook 1993* (Washington, DC: U.S. Government Printing Office, January 1992), p. 35-21. This figure does not distinguish between U.S.-owned firms and U.S. affiliates or subsidiaries of Japanese auto parts makers.

²² Nobuyuki Oishi, "Auto Parts Makers Fear Fallout from 'Buy American,'" *Nikkei Weekly*, Mar. 7, 1992, p. 19.

²³ Keidanren (Federation of Economic Organizations), Ad-Hoc Committee on Foreign Direct Investment in Japan, "Improvement of the Investment Climate and Promotion of Foreign Direct Investment into Japan," Oct. 27, 1992, p. 13.

²⁴ Chalmers Johnson, "Japan's Lesson: Start With A Plan," *The New York Times*, Jan. 12, 1992, section 4, p. 19.

²⁵ Janice E. Rubin and Dick Nanto, "Japan's Keiretsu and U.S. Antitrust Laws," *CRS Review*, Sept. 1992, p. 31.

²⁶ "US Moving to Strengthen Its Antitrust Powers in Trade," *The New York Times*, Apr. 4, 1992, p. 43.

²⁷ John S. Magney, "U.S. Extends Reach of Antitrust Enforcement," *International Financial Law Review*, June 1992, p. 18.

The two types of keiretsu function differently in helping Japanese MNEs compete in high-technology areas.

Although the term keiretsu has become fashionable in U.S. business journalism, the practice of companies cooperating to provide capital and spread out risk has its roots in the prewar zaibatsu, the great industrial combines run by aristocratic families. In fact, the oldest of the zaibatsu, the Mitsui group, was founded in 1616 by Sokubei Takatoshi, a samurai who abandoned his class' traditional contempt for the world of business with the proclamation, "No more shall we have to live by the sword. I have seen that great profit can be made honorably. I shall brew sake and soy sauce, and we shall prosper."

The zaibatsu, organized around holding companies controlled by the founding families, expanded into many different areas of commerce, although they tended to specialize in certain segments.²⁹ Because their manufacturing ability was crucial to the Japanese war effort during World War II, they were identified as a major target of the Allied program to demilitarize Japan during the Occupation. The holding companies and practices such as cross-shareholding were outlawed, and the zaibatsu were broken up.³⁰ However, as part of the 1949 Allied Occupation policy change known as the "reverse course," when Japan was recognized as a vital ally of the West against Communist expansion, zaibatsu dissolution was ended. After regaining autonomy in 1951, the Japanese Government amended the Anti-Monopoly Law imposed by the Allies to allow cross-stockholding and interlocking direc-

torates. Those two practices, along with regular private meetings of executives known as "presidents' clubs," are the three most conspicuous structural elements of modern horizontal keiretsu affiliation.

| The Horizontal Keiretsu

The structure of horizontal keiretsu is roughly similar to that of the zaibatsu, except that the coordinating role of the holding company is split among the main bank, the general trading company, and the presidents' council of the group. In fact, three of the current eight major horizontal groups—Mitsui, Mitsubishi, and Sumitomo—are continuations of traditional zaibatsu.³¹ Most analysts classify three more "new" groups—Fuyo, DKB (Dai-Ichi Kangyo Bank), and Sanwa—with the first three as major horizontal keiretsu. There are two more "medium-sized" keiretsu, the Tokai Group and the group based on the Industrial Bank of Japan.

Horizontal keiretsu usually include a major bank, a trust bank, a major insurance company, and a trading company, with members in most if not all major areas of industrial production: electronic equipment, autos, construction, metals, mining, chemicals, textiles, heavy equipment, financial services, real estate, and transportation. The government encouraged this diversity to stimulate competition and to concentrate resources in critical industries.³² The practice is known as "one-set-ism," (*wan setto-shugi*) since each group has a complete "set" of companies spanning the spectrum of major industries.³³

²⁸ Terutomo Ozawa, "Japan's Industrial Groups" *MSU Business Topics*, autumn 1980, p. 34.

²⁹ *Ibid.*, p. 34.

³⁰ *Ibid.*, p. 35.

³¹ *Dodwell Marketing Consultants, Industrial Groupings in Japan 1988-89* (Tokyo: Dodwell Marketing Consultants, 1988), P. 3. This is the most commonly cited reference for statistical information on the keiretsu. The cited edition identifies 8 horizontal keiretsu and 39 vertical ones. However, these numbers vary not only with time—since companies leave and join keiretsu increasingly frequently—but among sources.

³² Marie Anchordoguy, "A Brief History of Japan's Keiretsu," *Harvard Business Review*, July-August 1990, p. 58.

³³ Ozawa, *op. cit.*, footnote 28, p. 40.

All together, these eight groups accounted for more than a fifth of the total paid-in capital of Japanese firms and nearly 13 percent of total corporate profits in the nation in 1987.³⁴ The six major horizontal groups are estimated to have accounted for about a quarter of Japanese gross national product (GNP) since World War II.³⁵ Furthermore, over two-thirds of Japan's imports pass through the hands of the large trading companies affiliated with the major keiretsu.³⁶

The practice of stable mutual shareholding protects companies against U.S.-style pressures for short-term profits or high dividends, as well as outside takeover attempts.³⁷ Typically, the "main bank" at the center of a keiretsu will hold 5 to 10 percent of member companies' stock, while other keiretsu members may hold 2 to 5 percent of the stock each;³⁸ this often amounts to as much of a quarter of the company's stock held within the keiretsu.³⁹ In addition to creating symbolic bonds among companies, keiretsu members implicitly agree not to trade the stock they

hold.⁴⁰ Financial ties among companies are further strengthened by intragroup loans, usually but not exclusively from the central bank; at one point in 1989, for example, more than 46 percent of Mitsubishi Corp.'s outstanding loans were held by Mitsubishi group banks.⁴¹ Companies within a group reportedly tend to give business to each other, as well as financial support; although a Japanese Government commission estimated that mutual transactions within keiretsu accounted for 30 percent of members' total business, academic estimates describe that figure as extremely low.⁴²

The above characteristics vary among and within groups. Companies may leave, or join, a keiretsu; there are various affiliations across keiretsu; and there are suggestions that keiretsu dynamics are changing. Some observers see the system dissolving as the importance of banks as a source of capital declines,⁴³ while others see some keiretsu strengthening their group identity by increased leadership from the central corpora-

³⁴ Dodwell, *op. cit.*, footnote 31, pp. 36, 38.

³⁵ Carla Rapoport, "Why Japan Keeps On Winning," *Fortune*, July 15, 1991, p. 80.

³⁶ Michael S. Gerlach, *Alliance Capitalism: The Social Organization of Japanese Business* (Berkeley, CA: University of California Press, 1992), p. xviii.

³⁷ Kozo Yamamura, "Will Japan's Economic Structure Change? Confessions of a Former Optimist," K. Yamamura, ed., *Japan's Economic Structure: Should It Change?* (Seattle, WA: Society for Japanese Studies, 1990), p. 30.

³⁸ Anchordoguy, *op. cit.*, footnote 32, p. 59.

³⁹ Yoshinari Maruyama, "The Big Six Horizontal Keiretsu," *Japan Quarterly*, April-June 1992, p. 192.

⁴⁰ The practice goes back to the postwar period when Japanese companies felt vulnerable to takeover attempts through equity purchases by foreign firms. Ozawa, *op. cit.*, footnote 28, p. 37.

⁴¹ Maruyama, *op. cit.*, footnote 39, p. 193.

⁴² *Ibid.*, p. 194.

⁴³ As Gary Saxonhouse observes, "with the growth of equity financing and with the equalizing of the terms of access to capital between keiretsu and non-keiretsu firms, one of the main props of the keiretsu system is coming undone. An acceleration of keiretsu hopping and disaffiliation can be expected in the future." (Comment on Robert Z. Lawrence, "Efficiency or Exclusionist? the Import Behavior of Japanese Corporate Groups," *Brookings Papers on Economic Activity*, No. 1, 1991, p. 334); also Hugh Levinson, "Keiretsu relations changing," *Japan Times Weekly Intl. Edition*, Aug. 10-16, 1992, p. 18, and W. Carl Kester, *Japanese Takeovers: The Global Contest for Corporate Control*, (Boston, MA: HBS Press, 1991), p. 206.

tion and mergers of key entities.⁴⁴ The appreciation of the yen and increasing global competition have forced companies to tie up with “the most powerful partners”—not necessarily those in the company’s keiretsu—in particularly expensive and/or risky business areas such as telecommunications, shipbuilding and ocean transportation, and chemicals.⁴⁵ This would include ventures such as the developing cooperation of Mitsubishi with Germany’s Daimler-Benz.⁴⁶

During the first 2 years of the 1990s, the economic contraction that severely affected the activities of many Japanese corporations brought to media attention the capacity of keiretsu networks to aid struggling members. There have been several spectacular rescues of overextended Japanese companies by their keiretsu partners. Although such events can demonstrate the costs of keiretsu membership, they may ultimately result in even closer relationships, as the beneficiaries of such help are obligated both financially and psychologically to their main banks and other principal keiretsu members. Itoman Corp., for example, was acquired by another member of the Sumitomo keiretsu after it could not repay extensive debts to Sumitomo Bank.⁴⁷

To the extent that keiretsu relationships are undermined, Japanese firms could be expected to source in a manner more like that of their U.S. and European counterparts, while suppliers could

expect prices that include an independent equity profit. One convincing analysis of the state of the keiretsu in the early 1990s suggests that if anything, the keiretsu are restructuring rather than collapsing.⁴⁸ Given their historical role in the Japanese industrial system, it seems reasonable to place the burden of proof on those who argue that the keiretsu are breaking down.

| Vertical Keiretsu

The other major type of keiretsu, the vertical group, may have more relevance to the activities of Japanese companies in this country. The vertical keiretsu is essentially a supplier chain leading to a major manufacturer of automobiles, electronics, or other complex products. There are probably 30 to 40 vertical keiretsu of significant size.⁴⁹ The multiple levels of suppliers descending from the apex of a Toyota or a Matsushita can extend into extraordinary numbers: Toyota reportedly contracts with 175 primary suppliers and 4,000 secondary ones.⁵⁰ One researcher cites an automaker with not only 168 primary subcontractors and 4,700 secondary ones, but 31,600 tertiary suppliers.⁵¹ The relationships in the supplier pyramid are intended to be long term, but are not guaranteed sales for the supplier. The manufacturer will often maintain relationships with sev-

44 See Gerlach, *op. cit.*, footnote 18; James R. Lincoln, Peggy Takahashi, and Michael L. Gerlach, “Keiretsu Networks in the Japanese Economy: a Dyad Analysis of Intercompany Ties,” *Amen-can Sociological Review*, October 1992, pp. 561-585, Lincoln, Takahashi, and Gerlach state that because banks have increased their provision of capital to affiliated companies via the purchase of stocks and bonds (rather than loans), and because supplier relationships are even more important in technology-intensive industries, “it is premature to assume that the keiretsu is an obsolete organizational form”

45 Dodwell, *op. cit.*, footnote 31, p. 21.

46 Charles Smith, “Two’s Company,” *Far Eastern Economic Review*, May 24, 1990, p. 67.

47 Jonathan Friedland, “Systematic Solution: Itoman’s Problems Will Be Spirited Away,” *Far Eastern Economic Review*, Oct. 1, 1990, pp. 86-7; Robert Neff, “For Bankrupt Companies, Happiness is a Warm Keiretsu,” *Business Week*, Oct. 26, 1992, pp. 48-9.

48 Gerlach, “Twilight of the Keiretsu?,” *op. cit.*, footnote 18.

49 Yamamura, *op. cit.*, footnote 37, p. 30.

50 Rapoport, *op. cit.*, footnote 35, p. 77.

51 Helou Angelina, “The Nature and Competitiveness of Japan’s Keiretsu,” *Journal of World Trade*, June 1991, p. 103, footnote 18.

eral suppliers for each component, to ensure competition as well as steady supplies.⁵²

The vertical keiretsu is an efficient means of sharing information, contributing to efficiency and vertical integration. It is also an efficient mechanism for exploiting lower tiers, enabling the top tier firm to extract prices that take advantage of lower wage rates and do not include an arms-length equity profit for the supplier. This aspect of the keiretsu system helps explain why Japanese firms operating abroad may be less likely to source from domestic suppliers.

The term vertical keiretsu also describes the chain extending from major manufacturers through levels of distributors down to the retail level, particularly in consumer goods; this is far less a matter of cooperation among firms than of coercion by powerful suppliers to prevent price reductions and competition from other (especially foreign) brands in the same shop.⁵³ The manufacturer controls distributors by providing capital and offering rebates. Many Japanese retailers of electronics goods, for example, sell only one brand; Matsushita Electric Industrial Co. has 24,000 exclusive retailers, Toshiba has 11,000, Hitachi has 9,000, and so on.⁵⁴ Even where allowed by law, this type of distribution system requires large investments in retail outlets.

In the agreement resulting from the bilateral Structural Impediments Initiative negotiations of 1989-90, the United States noted that "economic rationality of keiretsu relationships notwithstanding, there is a view that certain aspects of keiretsu relationships also promote preferential group

trade, negatively affect foreign direct investment in Japan, and may give rise to anticompetitive business practices."⁵⁵ This ambivalence affects much of the debate on keiretsu, since it appears that many characteristics of the groupings help Japanese firms at the same time that they hurt foreign ones. Highly efficient Japanese MNEs derive much of their advantage from superior management and process technology rather than product technology. Much management skill is embedded in their traditional service, component, and equipment supplier base. Introducing new suppliers to replace existing ones could be highly disadvantageous.⁵⁶ In a similar vein, some defenders of keiretsu suggest that the keiretsu structure is simply a natural result of Japanese cultural values. As one journalist notes, "an attack on [the keiretsu system] runs the risk of being construed as an attack on Japanese culture."⁵⁷

| Keiretsu: Influence on Market Access and Competition

In an analysis of the effect of keiretsu on Japanese imports and exports, one authority concluded that vertical keiretsu are more defensible from the Japanese perspective than horizontal keiretsu, since they appear to improve efficiency in exports while the horizontal groupings do not.⁵⁸ When appraising their effect on activities of Japanese firms in the United States, the vertical keiretsu are of more immediate concern. The apparent preservation of keiretsu ties among major Japanese auto producers and component

⁵² Anchordoguy, 'Brief History,' op. cit., footnote 32, p. 59. Alan S. Blinder notes that the companies can vary the 'market share' of each supplier for reward and punishment. "A Japanese Buddy System That Could Benefit U.S. Business," *Business Week*, Oct. 14, 1991, p. 32.

⁵³ Chalmers A. Johnson, "Keiretsu: An Outsider's View," *Economic Insights*, September/October 1990, p. 16.

⁵⁴ Dick Nanto, "Japan's Industrial Groups: The Keiretsu," *CRS Report*, Nov. 5, 1990, p. 14.

⁵⁵ Quoted in Lawrence, op. cit., footnote 43, p. 311.

⁵⁶ See Gerlach, op. cit., footnote 18, especially pp. 92-93.

⁵⁷ Charles Smith, "Keiretsu: Reform Runs into Resistance," *Far Eastern Economic Review*, June 21, 1990, pp. 5&54.

⁵⁸ Lawrence, op. cit., footnote 43, p. 322. He notes, however, that both types of keiretsu appear to stifle imports significantly.

suppliers with production facilities here could exclude and harm U.S. parts suppliers.

The horizontal keiretsu in theory benefits all member companies by guaranteeing stable shareholding, information-sharing, access to financing, and cooperation in areas where the costs of development of a technology, for example, can be spread out among several members of a group. The keiretsu may provide some security in hard economic times. Members of the Sumitomo keiretsu, for example, helped bail out Mazda, its automaker, in the early 1970s: "The Sumitomo bank extended loans to Mazda; other keiretsu members agreed to employ Mazda employees temporarily until the company was out of trouble; and all members of the keiretsu purchased only Mazda cars."⁵⁹ In addition, Sumitomo bank helped arrange for Ford to purchase a 25 percent share in Mazda.⁶⁰ Some analysts have also suggested that horizontal keiretsu ties tend to reduce imports in relevant industries;⁶¹ one reason for this might be collusion among the major players in an oligopolistic market, which would result in exclusion of all newcomers, whether domestic or foreign.

The vertical groupings, however, principally benefit the central manufacturer, and often work against the interests of suppliers in the chain who depend on keiretsu business, but suffer from demands for continuous rationalization and/or price reductions. Distributors' freedom to sell other companies' products or compete on price with local rivals is also constrained, but they benefit through guaranteed high profit margins.

Despite the disadvantages of the keiretsu voiced by some suppliers, the flexibility of the Japanese system is impressive, especially in the production of automobiles, which combines thousands of components that can be produced by outside suppliers. The two extremes of almost total in-house production of components and almost total market procurement both appear inefficient, observes one U.S. analyst: "The American approach has been either to do it in-house (GM) or to buy a large fraction of parts in the marketplace (Chrysler). Neither approach seems to work as well as the group system of Japanese competitors such as Toyota."⁶² As a result GM, Ford, and Chrysler have begun to mod@ their sourcing and procurement strategies.

U.S. automakers are criticized for creating a system in which "costs have been shifted from higher to lower levels of the production system."⁶³ Ironically, this is one of the major factors in the Japanese producers' ability to weather the significant increases in the value of the yen since 1985. The system allows the manufacturers to employ highly skilled workers who perform very high value-added work, pushing the lower value work down to subcontractors, who are forced to cut prices to ease the pain of economic adjustment for the parent company.⁶⁴

Nippondenso, the world's largest auto-parts manufacturer, with 11 plants in North America, 4 in Europe, and 12 in Asia,⁶⁵ is an example of the growing complexity of the supplier relationship, especially as supplier companies grow into large corporations capable of exploiting scale econo-

⁵⁹ "The Mighty Keiretsu," *Industry Week*, Jan. 20, 1992, p. 53.

⁶⁰ Mark Mason, *American Multinationals and Japan: The Political Economy of Japanese Capital Controls, 1899-1980* (Cambridge, MA: Harvard University Press, 1992), pp. 239-40.

⁶¹ Lawrence, op. cit., footnote 43, p. 328.

⁶² James P. Womack, statement before the Joint Economic Committee, Dec. 10, 1991, P. 3.

⁶³ Ibid., p. 3.

⁶⁴ Yamamura, op. cit., footnote 37, p. 32.

⁶⁵ Louise Do Rosario, "Riding the Slipstream," *Far Eastern Economic Review*, Dec. 26, 1991, pp. 72-73.

mies themselves. Although Nippondenso is a member of the Toyota keiretsu, with the manufacturer holding nearly a quarter of its stock, it also produces components for Honda, Mazda, and Mitsubishi,⁶⁶ and has begun supplying parts to U.S. manufacturers. Yet it retains close ties with Toyota.

Keiretsu can aid companies in R&D and advanced manufacturing by coordinating “pre-competitive research in new technologies, and by easing access to capital for high-tech ventures that are extremely expensive to startup and have short production-life spans. An example of the latter is a semiconductor fabrication facility that may cost \$500 million and be at the leading edge of technology for only 4 years or less,”⁶⁷

Supplier relationships are the most obvious manifestation of keiretsu activity in the United States. Along with 11 Japanese auto manufacturing facilities in North America have come 66 steelworks, 20 rubber/tire facilities, and more than 270 auto parts suppliers.⁶⁸ Japanese firms initially defended this practice on the grounds that local producers were not immediately capable of meeting the demanding standards of Japanese production techniques.⁶⁹ There may also be elements of cultural preference in the choice: as one anonymous Japanese auto executive told a U.S. reporter, in selection of suppliers for his company’s transplants, “First choice is a keiretsu company, second is a Japanese supplier, third is

a local company.”⁷⁰ This pattern prompted the Federal Trade Commission to investigate Japanese transplant sourcing practices.⁷¹

Japanese keiretsu, whether horizontal or vertical, are probably more likely to offer U.S. firms limited amounts of business in contested areas than to welcome them as full members of the group. Nissan allowed 2 U.S. companies into its network of 192 primary suppliers,⁷² and Toyota has formed an organization of local suppliers called the ‘Bluegrass Automotive Manufacturers Association.’⁷³ But there are numerous examples of how Japanese firms favor familiar suppliers. For example, in 1988 less than 30 percent of the electronics content and 1 percent of the semiconductors of Japanese-branded televisions assembled in the United States came from U.S. suppliers. Similarly, less than 3 percent of the electronics content of VCRs assembled in the United States by Japanese firms came from U.S. suppliers.⁷⁴ Of products assembled in this country by Sony Corp., for example, only about 20 percent of the company’s \$8 billion worth of U.S. sales were manufactured domestically.⁷⁵

Rather than retaliation or protection, various analysts have urged a U.S. attempt to emulate the system in some way. Such emulation could take two forms: entry by U.S. firms into Japanese keiretsu, or the formation of U.S. keiretsu-like organizations. Other analysts suggest that U.S. companies can and should try to adopt certain

⁶⁶ Ibid., p. 72.

⁶⁷ Charles H. Ferguson, “Computers and the Coming of the U.S. Keiretsu,” *Harvard Business Review*, July-August 1990, p. 57.

⁶⁸ Kenney and Florida, op. cit., footnote 19, p. 25.

⁶⁹ Ibid., p. 28.

⁷⁰ Rapoport, op. cit., footnote 35, p. 80.

⁷¹ Bill Powell, “Japan: All in the Family,” *Newsweek*, June 10, 1991, p. 38.

⁷² Ibid.

⁷³ Kenney and Florida, op. cit., footnote 19, p. 32.

⁷⁴ John Eckhouse, “How U.S. Could Learn from Europe,” *San Francisco Chronicle*, Oct. 1, 1990, p. C1.

⁷⁵ Sheldon Weinig, Vice Chairman, Sony Engineering and Manufacturing of America, “Globalization’s Impact on Corporate Technological Competitiveness,” paper presented to the American Association for the Advancement of Science, AAAS 93, Boston, MA, Feb. 14, 1993, p. 4.

keiretsu practices. One, for example, calls for a network of U.S.-European linkups for development, production, and marketing—a straightforward bulwark against further Japanese expansion.⁷⁶

According to media reports, many U.S. firms have attempted to mimic Japanese-style corporate ties, ‘recasting their investment practices to form cooperative links both vertically, down their supply lines, and horizontally, with universities, research labs, and their peers.’⁷⁷ Less stringent enforcement of antitrust regulation by the Bush administration may have encouraged intra-industry collaboration, both bilateral and in consortia.⁷⁸ The Big Three automakers are collaborating on electric car technology, and IBM has begun tie-ups of varying levels of formality with Apple, Siemens, and other electronics firms.⁷⁹

It is important to make the distinction, though, between productive government-sponsored consortia and policy actions that stifle the positive aspects of vigorous competition. As one analyst observes: “The strength of Japanese industry in world competition involves the combination of extremely intense competition between firms in the same sector coupled with long-term shared destiny with financial organizations and firms in other sectors.”⁸⁰

DOMESTIC CONTENT OF JAPANESE-OWNED U.S. PRODUCTION

A major issue of contention in the debate over foreign, and particularly Japanese, investment is

the question of how much value a foreign-owned production facility adds to the local and national economy. One way of determining this is to evaluate how much of the product of such a facility is “domestic content,” and how much is imported. A foreign-owned assembly facility located in the United States might use local workers to do little more than assemble kits of components designed, engineered, and produced in the firm’s home country, thus avoiding political pressures associated with the trade deficit, while contributing little to the host nation. Alternatively, such a facility might be a stand-alone plant containing the entire production chain, from research and development to marketing staff.

Determining the level of domestic content, however, can be tricky. One reason is that different parts of the U.S. Government define a North American product differently. For the purposes of levying import duties under the Canadian Free Trade Agreement (CFTA) or the North American Free Trade Agreement (NAFTA), the U.S. Customs Service (USCS) defines a domestic product differently than the Environmental Protection Agency (EPA) does when it evaluates gasoline mileage of automakers’ domestic and imported fleets under the Corporate Average Fuel Economy (CAFE) standards.⁸¹ Actual domestic content, on a components basis, could be less than 50 percent, even when for EPA purposes it reaches a 75 percent level.⁸²

There are problems associated with domestic content requirements, on both technical and

⁷⁶ Ferguson, *op. cit.*, footnote 67, p. 68.

⁷⁷ Kevin Kelly and Otis Port, “Learning from Japan,” *BusinessWeek*, Jan. 27, 1992, p. 52.

⁷⁸ *Ibid.*, p. 52.

⁷⁹ *Ibid.*, p. 55.

⁸⁰ Womack, *op. cit.*, footnote 62.

⁸¹ Under the CFTA, USCS does not allow the practice of “roll-up” of domestic content when evaluating assemblies of numerous components. (Samuel Banks, Assistant Commissioner for Commercial Operations, U.S. Customs Service, press briefing, Mar. 2, 1992).

⁸² For a detailed discussion of how roll-up can allow very small actual levels of domestic components and assembly to qualify much larger imported content as domestic content see U.S. International Trade Commission, “Rules of Origin Issues Related to NAFTA and the North American Automotive Industry,” USITC Publication 2460, November 1991.

political grounds. On the technical side, it can be difficult to assess the actual amount of value added to a given industrial product, since this requires looking at each step of the industrial process, assessing whether the producer is correctly justifying each material and labor component and accurately representing its source.

In some formulations, such as the CFTA rules, elements such as depreciation on capital equipment or debt interest can account for significant amounts of the “domestic content” a producer calculates. For example, the largest domestic-content item claimed by Honda in 1990 for engines produced at its Anna, Ohio, plant was depreciation on machinery, much of which was imported from Japan.⁸³ One U.S. official associated with a 1989-90 Customs Service audit of Honda estimated that the real value added domestically to the cars assembled by Honda in North America was probably no more than 25 to 30 percent of the total value of the final product.⁸⁴ (See box 4-A.) An analysis conducted by the University of Michigan, however, found a 1989 Honda automobile produced in Marysville, Ohio, to have 62 percent North American content, and 38 percent import content, including parts of foreign (Japanese) origin purchased from suppliers located in North America.⁸⁵ A General Accounting Office (GAO) analysis, meanwhile, found Japanese auto transplants had 50.5 percent domestic content on average in 1989, compared to 38 percent in 1988. A significant part of this

increase was accounted for by increased purchases of parts from domestic suppliers.⁸⁶

Evaluation of domestic content is further muddled by the presence of foreign-owned suppliers. In the Honda audit, the USCS evaluated parts purchased from the U.S. subsidiary of a Japanese firm as U.S. products.⁸⁷ Critics claim that this may be misleading; according to one U.S. official: “It is easy to set up a sham ‘domestic supplier’ who is actually the subsidiary of a Japanese company doing minimal assembly on a Japanese-designed component.”⁸⁸

An additional problem in determining domestic content is the practice of ‘roll-up,’ in which, for example, a part that is made of 51 percent domestic inputs (including labor) and 49 percent foreign inputs is counted as 100 percent domestic product at the next stage of assembly. By **skillfully** manipulating this process, according to a U.S. Customs Service official, it would be possible to qualify a product with a very high percentage of foreign content as North-American made.⁸⁹ (See box 4-A.)

On the political side, domestic content requirements can have complex ramifications. Most obviously, they are a barrier that conflicts with the free trade approach the United States has traditionally espoused. While many exceptions to the principle of free trade can be found in practice, domestic content requirements are one of the clearest examples of a government-imposed market distortion.

⁸³ Paul Magnusson and James B. Treece, “Honda: Is It an American Car?” *Business Week*, Nov. 18, 1991, p. 106.

⁸⁴ OTA interview, Oct. 21, 1992.

⁸⁵ University of Michigan Transportation Research Institute, *The US-Japan Automotive Bilateral 1994 Trade Deficit* (Ann Arbor, MI: UMTRI, h&y 1991), p. 67.

⁸⁶ U.S. Congress, General Accounting Office, *Foreign Investment: Japanese-Affiliated Automakers' 1989 US Production' s Impact on Jobs*, GAO/NSIAD-91-52 (Washington, DC: October 1990), p. 3.

⁸⁷ Keith Bradsher, “Honda’s Nationality Proves Troublesome for Free-Trade Pact,” *The New York Times*, Oct. 9, 1992, p. A1.

⁸⁸ J. Michael Farren, Under Secretary of Commerce for International Affairs, quoted in David E. Singer, “Is ‘Local Content’ the Smartest Way to Judge Imports?” *The New York Times*, Mar. 8, 1992, section 4, p. 3.

⁸⁹ Banks, *op. cit.*, footnote 81. Banks indicated that this practice of roll-up accounting of domestic content in order for products to be classified as North American would not be allowed, p. 15.

Box 4-A-Honda: The Sourcing Behavior of a Leading Japanese Transplant

Honda was the first Japanese automobile company to produce vehicles in the United States. Claiming that Honda's U.S. affiliate should be treated like a U.S. automaker, one executive argued, "Whether a company is beneficial to the United States is not a function of the capital that created the Company."¹ **The company should be judged on the basis of the contribution it makes to the U.S. economy. On that basis, the time when Honda's contribution to the U.S. economy and technology base is fully equal to that of the leading U.S. firms remains on the horizon.**

The Big Three-GM, Ford, and Chrysler-conduct the bulk of their R&D in the United States, where they also design and engineer most of the vehicles they manufacture and sell in the United States, Mexico, and Canada. Most of their supplier base is located within the United States, and much of the rest within the NAFTA region. They report their average domestic content on a component basis for vehicles sold in the United States at 88 percent. U.S. automakers who compete with Honda estimate that the average local content of all **Japanese transplant** assemblers would be about 50 percent.²

Honda like other Japanese transplant assemblers, retains its key competencies in its Japanese operations. Research, development engineering, design, and the bulk of their assembly capacity and supplier base remain centered in Japan. Typically, high value-added activities are the last to be moved abroad.

The vehicles that Honda assembles here have an excellent reputation. Its assembly facility is judged to be productive and its workforce well-trained and well-compensated. Although wages **and benefits in Honda's** assembly operations are comparable to the Big 3, actual costs are lower due to the much younger average age of the workforce. By locating in Ohio, Honda and its keiretsu-related suppliers located in the U.S. **avoid many of** the social costs associated with workers being displaced from the Big 3 and their traditional supplier base.³

Most experts believe that Honda has made more progress in domestic sourcing for its U.S. **operations than the other transplant assembly operations. Honda has an estimated EPA domestic content** (which allows roll-up) for vehicles assembled in the United States of about 70 percent. One published study estimated that its actual domestic content, including assembly, was 62 percent.⁴

¹ Charles M. Thomas, "Honda Considers Itself American Despite Heritage" *Automotive News*, Jan. 18, 1993, p. 33.

² Statement of Ronald R. Boltz, Vice President, Product Strategy and Regulatory Affairs, Chrysler Corporation, Before the Joint Economic committee, Dec. 10, 1991, chart 13; Personal communication, Dean Harlow, General Motors Corp., June 1, 1993.

³ For a discussion of the worker-age advantages the transplants enjoy, see: Candace Howes, testimony before the Joint Economic Committee hearing on The Future Of U.S. Manufacturing: Auto Assemblers and Suppliers, Dec. 10, 1991 p. 12.; and Candace Howes, "The Benefits of Youth: The Role of Japanese Fringe Benefit Policies in the Restructuring of the U.S. Motor Vehicle industry," *International Contributions to Labour Studies*, vol. 1, 1991, pp. 113-132.

⁴ Sean P. McAlinden, David J. Andrea, Michael S. Flynn and Brett C. Smith, *The U.S. Japan Automotive Bilateral 1994 Trade Deficit*, Report Number UMTRI 91-20 (Ann Arbor, MI: Transportation Research Institute, May 1991). Honda disputes these figures. Also see, Paul Magnusson, James B. Treece, and William C. Symonds, "Honda: is It An American Car?" *Business Week*, Nov. 18, 1991, pp. 105-112.

In a U.S. Customs Service audit of Honda cars produced in Canada in 1989-90, conducted under the terms of the Canadian Free Trade Agreement, the use of domestic components to roll up imported components was not allowed.⁵ The Customs Service concluded that domestic content was 38 to 48 percent, not the 50 percent being claimed.⁶ They also found that the single largest item of local content for the Anna Ohio, engine plant as defined for customs purposes, and counted as domestic content, consisted of depreciation on facilities and equipment sourced from Japanese suppliers.⁷ This would suggest that Honda's investments have had a relatively small positive effect on the local manufacturing equipment supplier and tool and die industries.

Qualifying new suppliers is both time consuming and expensive,⁸ and economies of scale and capacity utilization are **critical** to profitability in auto production. These factors have led Honda and its suppliers to source less of their vehicles' content from the U.S. manufacturing sector than do the Big Three. One would expect technology transfer to the U.S. supplier base to be gradual, and this appears to have been the case, although there is considerable anecdotal evidence that certain facilities have benefited greatly. Honda now produces more than half the cars it sells here in this country, which gives it the incentive to continue to shift technical and design functions to the United States as long as production volumes warrant such a shift.⁹ Currently, however, just over 20 percent of the company's production is done in this country,¹⁰ indicating that its key competencies are still, logically, in its home base. For the foreseeable future, Honda and its keiretsu suppliers can be expected to conduct less research and development and source fewer components in the United States or North America than the Big Three.

⁵ This discussion is based on a briefing provided by the U.S. Customs Service to OTA in October 1992. If roll-up had been allowed under the terms of the CFTA, the Honda cars probably would have qualified as North American products. Also see John Daly, "A Collision Course," *Maclean's*, July 1, 1991, pp. 84-5.; and William C. Symonds, Paul Magnusson, and John Pearson, "Gunfight at the Customs Corral," *Business Week*, Mar. 2, 1992, p. 54.

⁶ Honda North America inc., Comments on OTAdraft, July 2, 1993, p. 8.

⁷ Magnusson, Treece, and Symonds, Op. cit., footnote 4, p. 106

⁸ A recent study conducted by a U.S. consulting firm for the Japan Auto Manufacturers Association describes the difficulties that an auto part supplier would face in being qualified by any major automaker, U.S. or Japanese. The study suggests that resistance on the part of the Japanese transplants to purchase parts from domestic suppliers, while significant during the early 1980s, has decreased "substantially." Boston Consulting Group, "Context of U.S.-Japan Automotive Issues and Competitiveness of Automobile-Part Suppliers" (Tokyo: Boston Consulting Group, March 1993), p. 19.

⁹ Honda North America inc., op. cit., footnote 6, P. 11.

¹⁰ Honda's U.S. production in 1992 was 475,718 (Dean Harlow, op. cit., footnote 2). Total global production of the company in 1991 was 1,975,000 vehicles. (Automotive News, "Top 12 Global Vehicle Producers—4 Years," 1992 Market Data Book, May 27, 1992, p. 3.)

¹¹ Honda Motor, Japan's third-largest automaker, heads a vertical keiretsu estimated at over 300 subsidiaries and affiliates. Dodwell Marketing Consultants, *Industrial Groupings in Japan, 1988-9* (Tokyo: Dodwell Marketing Consultants, 1988), p. 259.

In addition, domestic content requirements may affect the competitiveness of U.S.-based MNEs. Corporations with manufacturing and sourcing operations in several countries take advantage of shifting supply and demand and resource availability to minimize production and shipping costs. Although many U.S. producers in major industries tend to have higher average levels of domestic content than foreign-based competitors, OTA interviews suggest that they might still resent government-imposed restrictions that could limit their freedom to source globally.

In response to criticism that they are not adding significant value to the production process in the United States, many U.S. affiliates of foreign-based MNEs contend that it is unfair to compare a new investment with a complete industrial operation producing in its home country. Transferring production abroad can be a gradual process, with the value added increasing as overseas employees gain in skills and sophistication, and establish a local supplier base.

All the major Japanese automakers and many of their Japanese suppliers have established styling, engineering, and design facilities in this country, some as integral parts of manufacturing affiliates and some as separate operations.⁹⁰ Most of the automakers claim that significant portions of recent models of automobiles built here (e.g., the 1992 Nissan Stanza and the 1992 Toyota Camry),⁹² were styled, designed and/or engineered here, although basic research may have

been conducted in Japan. At Honda's Marysville, Ohio, plant, the first Japanese transplant in this country, the design and engineering not only of cars but of robots, machine tools, and other production equipment was reportedly being performed domestically in 1988, the sixth year of the plant's operation.⁹³

The subject of domestic content—which typically includes labor costs and other related expenses of car production—has become a legal issue between the U.S. Government and Japanese automakers in two contexts. The first case concerns Honda Civics manufactured in Canada and imported to the United States duty-free under the terms of the U.S.-Canada Free Trade Agreement. The USCS has determined that about 90,000 1989 and 1990 model year Civics do not qualify as North American-produced vehicles, and has imposed an additional \$17 million duty on Honda.⁹⁴ The USCS and Honda differ over the amount of value added in the machining of the engine block of the cars in question; Honda claims the USCS decision stems from political motivations. One Honda executive stated that the Honda case “has been aimed at hitting Japanese enterprises” in the United States.⁹⁵

The NAFTA currently requires 50 percent North American content to qualify for preferential treatment under the agreement; that threshold is to rise gradually to 62.5 percent by 2002.⁹⁶ A customs official knowledgeable about the audit suggested that Honda, after revising its produc-

W Kenney and Florida, op. cit., footnote 19, p. 46-47.

⁹¹ Richard Rescigno, “Yen for the Fast Lane: Japanese Auto Makers Step on the Gas,” *Barron's*, Feb. 12, 1990, p. 16.

⁹² Gary S. Vasilish “Competing With the World From Kentucky,” *Production*, December 1991, p. 61.

⁹³ Robert R. Rehder, “Japanese Transplants: A New Model for Detroit,” *Business Horizons*, January-February 1988, p. 53.

⁹⁴ “Japanese Automakers Respond to Local Content Issue—Ripples Caused by Civic Case,” *Asahi Shimbun*, Apr. 20, 1992 (morning edition), p. 7, from FBIS.

⁹⁵ Nobuyuki Oishi, “Managed Trade Gaining Favor with Carmakers,” *Nikkei Weekly*, Mar. 3, 1992, p. 1.

⁹⁶ Keith Bradsher, “Nationality of Autos Big Trade Issue,” *The New York Times*, Oct. 9, 1992, p. D2.

⁹⁷ OTA interview, Oct. 21, 1992.

tion and sourcing procedures, may qualify under the NAFTA standard.⁹⁷ (See box 4-A.)

In relation to cars produced by Japanese affiliates in the United States, another domestic content issue has to do with the CAFE level of some Japanese automakers' products. The EPA sets minimum CAFE levels for automakers' foreign and domestically made cars. Since the EPA sets the minimum domestic content of a U.S. car at 75 percent, an automaker can determine which cars to produce in the U.S. and which to import, in order to keep its domestic CAFE level down.⁹⁸ This can be as simple a matter as changing the sourcing of a few high value-added components, an issue relevant to U.S. automakers as well. In one case, for example, Ford reportedly switched from a domestic to a foreign supplier for certain components of one particular low-mileage car model in order to transfer it from its domestic fleet to its imported fleet.⁹⁹

JAPANESE INVESTMENT IN SMALL U.S. HIGH-TECH FIRMS

Since the late 1980s, there has been widespread speculation in Congress and the media that Japanese firms were investing in small, innovative U.S. high-tech companies in order to obtain technology at relatively low cost. Some analysts have described a Japanese strategy to gain the edge in an area where the United States still clearly dominates: state-of-the-art technology in

R&D-intensive industries such as computers, semiconductors, and biotechnology. The computer industry trade press, in particular, has taken the position that the Japanese are even funding U.S. innovation.¹⁰⁰ It is often argued that difficulty in obtaining start-up capital forces companies to trade their cutting-edge technology for Japanese money or both.

Although data are inconsistent on the subject, OTA research suggests that of all U.S. high-tech start-ups, perhaps as few as 5 percent have received Japanese financing. For example, in 1989, a peak year for Japanese investment in the United States,¹⁰¹ there were 1,500 high-tech start-ups in this country.¹⁰² Yet in that year the most comprehensive source of data on Japanese mergers and acquisitions in the United States reported only 46 Japanese investments in or acquisitions of U.S. firms in the areas of computer equipment, telecommunications, and electric and electric components.¹⁰³ Although not conclusive, these figures indicate the relative scale of these phenomena. The Japanese were not financing the development of advanced technology in Silicon Valley.

However, within more specific industry segments, even small numbers of acquisitions could afford Japanese firms significant control of key technologies. A telling example is in the photo-mask industry, in which there are effectively no U.S. merchant mask makers without Japanese

⁹⁸ Chappell, op. cit., footnote 20.

⁹⁹ Alex Taylor, "Do You Know Where Your Car Was Made?," *Fortune*, June 17, 1991, p. 52.

¹⁰⁰ Valerie Rice, "Losing the High-Tech Lead," *Infoworld*, Sept. 23, 1991, p. 40. Other representative headlines in national magazines and newspapers included: "American Technology at Fire-Sale Prices," *Forbes*, Jan. 22, 1990, pp. 60-64; "A Shopping Spree in the US: Japan Still Has a Voracious Appetite for Technology Invented Overseas," *Business Week*, June 15, 1990, pp. 86-87; and "Is the U.S. Selling Its High-Tech Soul to Japan?" *Business Week*, June 26, 1989, pp. 117-118.

¹⁰¹ Emily Thornton, "How Japan Got Burned in the USA," *Fortune*, June 15, 1992, p. 115; 1989 marks the beginning of the downturn, according to the Japan Economic Institute, *JEI Report No. 46A*, Dec. 13, 1991, p. 3.

¹⁰² C. Gordon Bell, *High-Tech Ventures; The Guide for Entrepreneurial Success* (New York, NY: Addison-Wesley, 1991), p. 4.

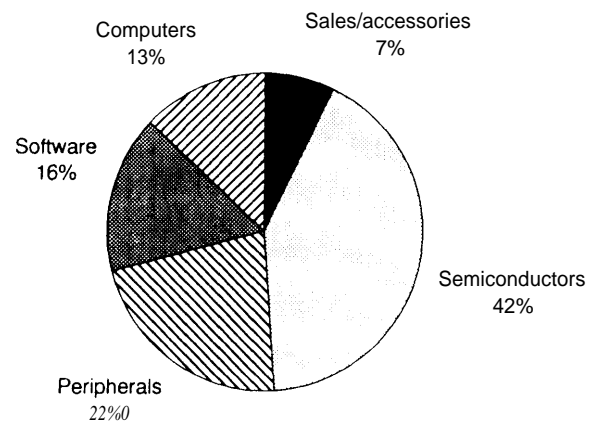
¹⁰³ *Japan M&A Reporter*, Ulmer Brothers Research Institute, Jan. 1990, p. 7. Another widely cited database reported Japanese investments in 399 of the 608 foreign investment deals found in U.S. high-tech industries in 1988-92. ("High Technology Acquisitions," compiled by Linda M. Spencer, Economic Strategy Institute, Washington DC.) OTA used the ESI database as one of its initial sources to identify Japanese acquisitions.

affiliations. Figure 4-1 shows that, according to a widely cited source, of 141 deals reported from 1987 to 1991 the highest percentage of Japanese acquisitions in computer-related industries (42 percent) were in the semiconductor and semiconductor manufacturing areas.

Since 1992, equity investments by Japanese firms have declined along with Japanese investment in the United States in general,¹⁰⁴ but industry observers suggest that the formation of nonequity strategic alliances between Japanese and U.S. firms remains steady.¹⁰⁵ This could indicate a number of things, including a thrifter approach to technology acquisition, a stage of equilibrium as major firms pause to evaluate their acquisitions and how best to use them,¹⁰⁶ or a shift toward technology partnerships with larger U.S. firms, as in recently announced alliances among Intel and Sharp, Toshiba and IBM, and Fujitsu and AMD.¹⁰⁷

Another form of Japanese investment into small high-tech firms, difficult to measure but potentially significant, is the funding of start-ups and young firms through local or Japanese-directed venture capital funds. Industry sources estimate that Japanese investors have provided roughly half of foreign investment in U.S.-based venture capital funds. International investors may have provided as much as 23 percent of the capital raised by the U.S. venture capital industry in certain years.¹⁰⁸ Some venture funding relationships, especially within the context of funds specializing in a particular technology area, allow

Figure 4-1-Japanese Acquisitions in the U.S. Computer-Related Industries, 1987-1991



SOURCE: "Japanese Acquisitions in the U.S. Computer and Related Industries, 1987-1 Q 1991," Ulmer Bros. Research Institute, July 1991, p. 1, table A.

investors access to the firm's products and researchers, which could amount to an inexpensive and discreet window on developing technology. Several industry sources described Japanese corporate investments as typically aimed at obtaining access to emerging technology.

Although industry sources suggest to OTA that Japanese companies have been a significant source of venture capital to young firms in various technology areas, without more authoritative data it is impossible to evaluate this trend. Such an approach, however, would be consistent with the direct equity investments examined in OTA's Silicon Valley interviews and other research.

¹⁰⁴ "Japanese Acquisitions Keep Slowing," *Japan M&A Reporter*, Ulmer Bros., Inc., July/August 1992, pp. 1-3; Michael R. Sesit, "Japanese Are Shying Away From Investments in U.S.," *Asian Wall Street Journal*, Feb. 1, 1993, p. 26. Some analysts put the end of the Japanese investment boom even earlier; see Susan MacKnight, "Japan's Expanding U.S. Manufacturing Presence: 1990 Update," *JEI Report*, No. 46A, Japan Economic Institute, Dec. 13, 1991, pp. 1-5.

¹⁰⁵ Junko Matsubara, "Company _@," *Dataquest Perspective*, May 25, 1992, p. 17.

¹⁰⁶ Japan Economic Institute, *JEI Report*, No. 46A, p. 3.

¹⁰⁷ "Cost Explosion Fuels Continued Rush by Chip Companies To Find Partners," *Asian Wall Street Journal Weekly*, July 20, 1992, p. 8.

¹⁰⁸ The average annual foreign share of total capital committed from 1980 to 1991 was slightly over 12 percent. *venture Economics*, fig. 2.0, "Capital Commitments by Limited Partners to Institutionally-Funded Independent Private Venture Capital Funds," *1991 Yearbook* (New York, NY: Venture Economics, Inc., 1991), p. 7A.

The recent decline of Japanese investments also demonstrates another salient point about Japanese corporate behavior: there is a strong follow-the-leader tendency. Many of the executives interviewed by OTA believed the investment in their companies was at least partly motivated by a perceived need by the Japanese firm to match the investments of its Japanese rivals.

Interviews with companies¹⁰⁹ and other research suggests that the basic reason small high-tech U.S. firms obtain Japanese (or other foreign) funding is because the money is not available from domestic sources. Although virtually all the industry sources interviewed agreed that technology acquisition was a principal goal of most of the investments by Japanese firms in small U.S. high-tech start-ups, the relationships tended to include more aspects than a simple cash infusion in exchange for technology. Although the total number of high-tech start-ups that have received Japanese funding is relatively small, the phenomenon should be viewed as a significant means of technology absorption, consistent with support of U.S. university research and other technology-absorbing activities described in this report.¹¹⁰

| Sources of Investment

Seed money and initial venture funding in the computer industry comes primarily from venture capital firms, or, less frequently, from larger firms in the industry. These investors are concerned with making a profit on their investment. Industry interviews indicate that large Japanese companies that invest in small U.S. high-tech firms typically do not primarily seek a risk-adjusted financial return on their investment, but are more interested either in obtaining technology, marketing rights, or access to the U.S. market. If this is the case, then the question of whether a given high-tech start-up can succeed with a certain product may be irrelevant; what matters most to the (Japanese) investor is whether it can obtain what it seeks.

Industry representatives clearly indicated to OTA that there is a lack of incentive for U.S. venture capital investors to develop a long-term perspective and to provide resources beyond a limited time scale. Indeed, many of the interviewees described a similar scenario: high-technology firms generally run out of financial resources at a stage when they are on the verge of making technological and commercial breakthroughs. It is then, when U.S. start-ups are most vulnerable, that Japanese corporations may prove to be the only viable source of capital--often, although not always, making contractual demands that involve

¹⁰⁹ OTA interviewed 18 firms in 5 technology areas: computers and computer equipment, semiconductors, semiconductor manufacturing equipment, advanced materials, and biotechnology. These five --were chosen as industries that meet generally agreed-on characteristics of "high technology": a high proportion of costs goes into research and development; the technology is generally regarded as critical to an industrialized nation's technology base; and the technology is constantly developing.

The firms were chosen from lists of Japanese investments in U.S. high-tech firms compiled by the Department of Commerce, the Japan Economic Institute (a private research organization funded by the Japanese Government), and the Economic Strategy Institute, a private policy research organization, as well as from articles in general interest, business, and trade periodicals. Firms were selected from the lists based on their location, their principal area of business, and their size (less than 500 employees, the threshold used by the Small Business Innovation Research (SBIR) program).

The fact that all the firms interviewed are in California, is indicative of the geographic distribution of high-tech start-ups in the United States. Commerce Department studies, as well as interviews with industry sources in Silicon Valley, Boston's Route 128, and North Carolina's Research Triangle Park--three areas commonly cited as high-tech centers in the United States--indicate that a significant majority of small start-ups that have received Japanese funding are in California, mostly in the Silicon Valley area, which extends from San Francisco to San Jose.

¹¹⁰ Because of issues unique to the industry, technology transfer in the biotechnology industry is quite different from other high-tech areas, and presents somewhat different policy concerns. It is discussed below.

the transfer of technology patent rights, and often production, to Japan.

The firms interviewed frequently complained that U.S. venture capitalists' horizons are too short, and that they need more patient capital than is available from U.S. investors. Venture capitalists, according to industry sources, typically seek a return on their investment within 3 years. This does not mean, of course, that the venture capitalists are short-sighted. Having experience with the market and the Silicon Valley environment, such investors are in fact likely to judge a company's prospects more accurately than its founders. Even if a company has good technology, the business climate or other factors such as poor management can cause it to fail. The market is extremely competitive and moves very quickly.

Timing of financing is key to what a Japanese investor can obtain from a business relationship. One company executive observed that it is often more difficult for a company to get "bridge financing" after several rounds of venture capital than to attract the initial seed money. The late entrant Japanese investor may thus be able to get significant technology/marketing rights if the target firm is in sufficiently dire straits.

Many company officials suggested that large U.S. firms' reluctance to invest in small domestic start-ups has important consequences for the nation's technology base, and claimed that they would prefer to deal with U.S. firms rather than with foreign investors. But in many cases, these large corporations either demonstrate little interest in the development capacity of start-ups, or are "too interested" and want to acquire them. The large firms are therefore generally not inclined to make equity investments, and when they do, tend to adopt a more "adversarial" posture than their Japanese counterparts. This further encourages small U.S. firms to seek Japanese investment partners.

Representatives of several large U.S.-based technology firms told OTA that their firms were

interested in obtaining technology from U.S. start-ups, but that they received many more queries from such firms than they could fire. Clearly, this issue is a matter of point of view; the question of whether large U.S. companies are taking full advantage of the technology resources of the start-up community cannot be answered without more empirical research.

Virtually all the industry sources OTA interviewed agreed that technology acquisition was a principal goal of most of the Japanese investments in small U.S. high-tech start-ups. In only a few of the firms interviewed did the U.S. executives believe that the Japanese investor was interested even partially in return on their investment. Most assumed that the firm considered the investment the price of the technology/market access. Other industry sources confirmed this view.

When the U.S. firms had a unique technology, they often appeared to have a much greater control over the terms of Japanese investment. Executives of several companies believed they had successfully limited their investors' access to technology, control over the location of manufacturing process, or sales rights. Nevertheless, this might change should additional investment capital be required.

Marketing rights, as opposed to simply a presence in or access to the U.S. market, appear to be a close second to technology acquisition as a motive for investment by large Japanese firms. High technology, and in particular information technology, has become a global market; a firm can no longer be successful if it sells only in its own domestic market. Further, in industries such as semiconductor equipment, both R&D and marketing (including service) are so expensive that a firm must be present in all significant markets in order to compete. With such noncommodity products, manufacturing economies of scale are small, so while a small company can

compete in terms of manufacturing, it must still market its products.

Industry sources also noted that the status' of being associated with a high-tech company or with a glamorous Silicon Valley name was often an attraction for Japanese investors: Canon's \$100 million investment in Steve Jobs' Next Computer Corp. may be an example of this. In the same vein, several companies described examples of equity purchased at a very generous valuation, with little apparent financial return as of yet.

Japanese companies' ideology of technology acquisition resonates with the history of Japanese industrial development since the Meiji Restoration (1868), which has included a strong strand of government-encouraged technology absorption from the West. Since World War II in particular, government agencies such as MITI have structured policies to stimulate the influx of technology, such as requirements that foreign companies investing in Japan make technology licenses available to domestic firms.¹¹¹ (See ch. 3.)

| Types of Relationships

In addition to straightforward cash for equity exchanges between Japanese investors and U.S. firms, relationships often include marketing agreements, joint ventures, funding for R&D, codevelopment projects, supplier relationships, and personnel exchange. These aspects of the relationship are not always clearly in the Japanese investor's favor; although technology transfer from Japan to the United States is generally minimal, Japanese investors can sometimes extend certain kinds of technical support to the U.S. firms. More importantly, several companies reported that their Japanese investors had intro-

duced them to Japanese customers, or provided access to low-cost capital from Japanese banks. In one case, a Japanese bank made capital available to the U.S. firm at 1 1/2 percent below the U.S. prime rate.¹¹²

Cases where the U.S. company supplies a component to its Japanese investor appear to have the most immediate chance for productive interaction, since any benefits to the U.S. firm's technology result in a direct benefit to the investor. This does not mean that the U.S. supplier, however, is protected against losing its customer later if the Japanese firm gains enough know-how to produce the components itself. Similarly, the extent to which the connection with a Japanese investor opens markets in Japan could vary. In the case of one semiconductor manufacturer, for example, there seemed to be little market-opening until the 1986 Semiconductor Trade Agreement (STA) forced Japanese firms to make an effort to source in the United States. Ironically, one executive suggested, its Japanese investor could conceivably count purchases of chips from its own fabrication facility as U.S. imports for purposes of fulfilling the STA quota.¹¹³

Amicable relationships do not automatically preclude the Japanese firms from obtaining technology that they could potentially use to compete with their U.S. partners. In the case of several companies, the terms of the deals—often evolving through repeated requests from the U.S. partner for money—allow the Japanese firm at some point to use the U.S. firm's own technology to compete with it. One company president admitted that this was a strategic error that could have significant negative consequences for his firm.

¹¹¹See Johnson, *op. cit.*, footnote 11; and Marie Anchordoguy, *Computers Inc.: Japan's Challenge to IBM* (Cambridge, MA: Harvard East Asian Monographs, 1989).

¹¹²OTA interview, July 1992.

¹¹³H. suggested that this might take place by shipping the chips to the United States and then reimporting them, or even by conducting a paper transfer without moving the product at all. (OTA interview, July 1992.)

It would be inaccurate to conclude, of course, that Japanese firms are always astute, strategic investors. OTA interviews—including some with representatives of the Japanese investors themselves—revealed instances of inept Japanese investment decisions and unsuccessful attempts at integration of U.S. affiliates, as well as of mutual exchange of information. The benefits to a Japanese investor in terms of technology transfer and generation of profits depend on the circumstances.

Predatory investment behavior is most apparent in cases where Japanese corporations invest in U.S. firms with related technologies. In many cases, however, a firm from a sunset industry such as steel is looking to diversify, to give itself a “high-tech” image, or simply to make a profitable equity investment. Or the investment might be from a trading company whose only interest is in marketing a finished product in Japanese or third-country markets. In such investment relationships, the effect on the development of the independent U.S. firm is believed to be generally neutral at worst, at best highly beneficial.

With the exception of the biotechnology industry, OTA teams found that the Japanese sunset industry firm accounted for the majority of investments in U.S. start-ups from 1988-1992, and often seemed as interested in learning about a new technology area on a relatively basic level as in obtaining state-of-the-art technology. As one scholar put it, “the chances of Kubota exploiting an area of U.S. technology area lot less than of NEC doing it.”¹¹⁴

In contrast, predatory investment strategies are designed eventually to own the U.S. firm outright, or simply to absorb the technology and/or manufacturing rights of the start-up’s product, or more likely to be associated with investors from the same sector with closely allied products. Such investors can benefit through directly integrating

the technology that the U.S. firm is developing into their own production process. Respondents in interviews repeatedly voiced their support for legislative measures designed to limit technology transfer in these cases, citing European and Japanese practices that constrain the free flow of technology.

I Japanese Investment in Biotechnology

Because of country-specific regulatory regimes, technology transfer in the biotechnology pharmaceutical industry is fundamentally different from other high-tech areas, and presents somewhat different policy concerns. Since the costs of getting a drug or medical product approved in a particular country can be astronomical, involving extensive clinical testing and documentation, and knowledge of the specific national regulatory system is essential, it is standard practice for companies to license products across borders. In the case of small start-ups, which not only need large amounts of cash to keep their research and approval applications going but also generally lack sales forces abroad, the logic of licensing products to pharmaceutical companies in other countries prior to regulatory approval is even more obvious.

For this reason, the relationships between Japanese and other foreign investors and U.S. biotechnology start-ups seem to follow a simpler pattern, presenting unique challenges and threats to the U.S. technology base. Although further study would be valuable, there was little indication from the OTA interviews that Japanese pharmaceutical companies behaved much differently than other foreign or U.S. firms. The unique phenomenon, rather, is the existence of the U.S. biotechnology start-up environment, which draws on the availability of venture capital and the strength of U.S. research institutions, as well as

¹¹⁴ Michael Borrus, University of California, Berkeley, personal Communication Sept. 9, 1992.

extensive government funding, primarily through the National Institutes of Health (NIH).

Efforts to nurture biotechnology in Japan have not had the impressive success that many other targeting ventures have, although the Japanese Government has declared biotechnology a 'strategic' industry.¹¹⁵ Japanese companies are improving at biotechnology, but are still clearly behind U.S. (and some European) companies' technology in most aspects of the business. A major possible explanation for this is in the activities of NIH, which has conducted or sponsored a broad variety of research initiatives in biotechnology. The bulk of the outside research NIH has sponsored has been at U.S. universities. OTA was told in nearly every interview that the Japanese university system has not produced the quality or quantity of biotechnology research or researchers that the U.S. university system has. This suggests that one reason for the scientific success of U.S. biotechnology companies is publicly funded research from which foreign companies are now beginning to profit.

OTA found no instance in which a U.S. biotechnology company received substantial technical assistance from either their Japanese investors or their Japanese contacts. Most of the Japanese investors are far larger than the U.S. firms, and when they seek a U.S. firm to assist with clinical trials and FDA approvals, they typically choose more established U.S. firms that are better equipped to perform those duties.

The biotechnology industry is young, with its oldest firms little more than a decade old. It fits the model of high-technology industry in that it requires advanced scientific and technological knowledge, and it has lofty barriers to entry. The success of a firm depends heavily on its human

capital, and there is a great deal of personnel movement among firms. R&D costs are extremely high, with the added burden of clinical trials and FDA approvals. The industry is made up of many small firms working in radically new areas of technology, all competing for funding. They offer payoff as much as 5 to 10 years down the road, with the strong possibility that returns on investment might disappear at any step in the process.

The youth of the industry also means that the stock market, an important source of capital, turns on small events. Not many products invented or produced with biotechnology have been proposed for FDA approval; the regulatory fate of the few that have been submitted has significantly influenced the stock prices of biotech firms. Approval of one experimental drug, for example, caused a boom in biotechnology stocks, while another drug's failure to obtain approval caused a sharp decline in the market.¹¹⁶ This volatility, in turn, affects the ability of new firms to issue initial public offerings.

OTA interviews gleaned little quantitative evidence on the extent of foreign investment in the industry, but it appears to be common. There are several reasons for foreign, especially Japanese, interest in the industry. First, alliances with foreign companies are standard practice in the pharmaceutical and medical-devices business because of the difficulties of dealing with the heavy regulation of these products in the various nations that account for the biggest markets-the United States, Japan, and the member states of the European Community (EC). Even big companies typically form partnerships with foreign companies to get their drugs through clinical trials and regulatory processes overseas. For many small

¹¹⁵ Kevin W.O'Connor, "Biotechnology: An International Survey," *Biotechnology Development: Expanding the Capacity to Produce Food*, United Nations Department of Economic and Social Development Advanced Technology Assessment System, Issue 9, winter 1992, p. 133.

¹¹⁶ OTA interview, August 1992; Gina Kolata, "Halted at the Market's Door: How A \$1 Billion Drug Failed," *The New York Times*, Feb. 12, 1993, p. A1.

companies, investment from a Japanese company represents the best opportunity to expand the market for their products to Japan or other East Asian nations. The necessity of having a Japanese investor to sell in Japan is especially great since Japan's regulatory process is particularly stringent and requires that clinical trials be done on Japanese nationals.

The primary reason the biotechnology companies interviewed wanted Japanese investment, however, was not only to expand their eventual markets (most of them had only one or two products on the market, some had none), but to obtain funding for further research and clinical development in the United States. Corporate investors were deemed preferable to venture capitalists, being more likely to be patient and provide capital on better terms. Venture capitalists' only hope of getting a return on investment lies in the company succeeding financially; if the company fails, they get nothing. The other, strategic type of investor would seek different types of benefits, such as learning about technology, getting marketing rights or licenses, and establishing relationships with firms for possible future benefits. In short, strategic investors have many more ways of obtaining a good return on investment than appreciation of their stake in the company. As a consequence, they are reportedly willing to accept a smaller equity stake for a given investment than are venture capitalists.

It appears likely that without foreign capital, fewer small biotech start-ups would make it to market with an approved product. At the same time, venture capital, although valuable, is not a substitute for strategic investment. This implies not that there is a failure in the venture capital market, but that venture capital cannot provide the amount of capital that many technology-intensive start-ups need. Strategic investors, then, can play a vital role in nurturing companies and technologies.

The strategic investors are clearly getting technology. Japanese companies that have invested in small biotech firms all have been trying to learn about biotechnology. Although there have been few instances of Japanese firms sending their scientists to do long-term research at the U.S. firms, Japanese investors all have been expected to do clinical trials in Japan, which could provide a thorough grounding in many of the technologies. The licenses that many of these investors are getting through or in addition to their investments also transfer technology, since in many instances the licenses are for process as well as product patents.

Japanese investment in U.S. biotechnology firms may present a greater threat to the U.S. industry than similar investment in information technology, since the Japanese firms have more to learn in the biotechnology area. The question to be answered here regards the linearity of the development of biotechnology products; that is, would one key technology acquisition then provide a step for a Japanese company on which to base future product development? A successful drug can make a small company's fortune, but the major international pharmaceutical companies tend to produce products in many different therapeutic and diagnostic areas. Typically, the companies OTA visited did have a base technology on which a product family was produced, but a deeper examination of the biotechnology industry might produce further insights as to how this would position a company for future growth.

JAPANESE MNEs AND U.S. UNIVERSITY RESEARCH

During the late 1980s, Congress and the media gave increased attention to the transfer of U.S. technology to foreign MNEs that might have resulted from their relationships with U.S. universities and research institutions. As the number of such relationships-particularly those involving Japanese firms-grew, congressional and media

attention correspondingly focused on the fear that we were “selling our science.”¹¹⁷ Some analysts argued that foreign corporations had achieved excessive access to advanced research that had been funded by U.S. taxpayers.

In recent years inquiries by members of Congress have resulted in several studies by GAO, in congressional hearings, and in investigations by the NIH.¹¹⁸ Although reliable figures are not available, OTA estimates that the share of all U.S. university research funded by Japanese or other foreign-based firms remains small. It is, nevertheless, possible that a foreign company could strategically sponsor research or license university-developed technology to obtain significant returns. If that technology was originally funded with government support, there might be reason for U.S. taxpayers to be concerned. Furthermore, since the Government is a significant consumer of health care through Medicare, Medicaid, and military/veterans' insurance programs, it has an interest in how government-sponsored medical research ultimately benefits consumers.¹¹⁹ Con-

cern about the issue, then, is not unreasonable, and the U.S. Government would do well to expect universities to cooperate fully in keeping the American public informed about these concerns.¹²⁰

Major research institutions maintain consistent standards for such corporate funding to retain academic freedom to publish, and to safeguard the institutions' financial interests. As standard practice, all the top-tier research institutions that OTA interviewed retain patents and other ownership rights to any research performed by university investigators. Universities report that the law regulating such relationships, the Bayh-Dole amendment (see below), is effective and relatively easy to comply with, and that corporate sponsors of research or firms that seek to license university-developed technology are unlikely to request exceptions to these standards.¹²¹

The discussion of corporate-university relationships that follows is primarily intended to respond to congressional concerns. The relationships, especially those involving Japanese firms,

¹¹⁷ Martin and Susan J. Tolchin, *Selling Our Security: The Erosion of America's Assets* (New York, NY: Alfred A. Knopf, 1992), p. 217.

¹¹⁸ Three studies include: U.S. Congress, House Committee on Government Operations, Subcommittee on Human Resources and Intergovernmental Relations, *Is Science For Sale? Conflicts of Interest vs. the Public Interest*, June 13, 1989; U.S. Congress, House Committee on Science, Space and Technology, Subcommittee on International Scientific Cooperation *International Technology Transfer: Who is Minding the Store?* July 19, 1989; U.S. Congress General Accounting Office, *Engineering Research Centers: NSF Program Management and Industry Sponsorship*, GAO/RCED-88-177 (Gaithersburg, MD: 1988); U.S. Congress General Accounting Office, *R&D Funding: Foreign Sponsorship of US University Research* GAO/RCED-88-89BR (Gaithersburg, MD: U.S. Congress Government Printing Office, 1988); U.S. Congress General Accounting Office, *University Research: Controlling Inappropriate Access to Federally Funded Research Results*, GAO/RCED-92-104 (Gaithersburg, MD: 1992).

In February 1993, an amendment to NIH's funding bill was introduced to limit advance access to U.S. government-funded research by foreign corporations. The amendment was withdrawn, but further hearings on the subject are reportedly planned. (*Congressional Record*, Feb. 17, 1993, S1701.) In the spring of 1993, the National Institutes of Health were conducting a survey of more than 100 major U.S. research institutions, all of which receive federal funding, to examine their relationships with foreign corporations. The NIH has not yet announced when it will release findings of its survey.

¹¹⁹ See U.S. Congress, Office of Technology Assessment, *Pharmaceutical R&D: Costs, Risks, and Rewards*, OTA-H-522 (Washington, DC: U.S. Government Printing Office, February 1993).

¹²⁰ The primary vehicle for technology transfer remains, as it has been, students who take their knowledge and research skills to a private company. While the number of foreign graduate students in U.S. science and engineering programs is significant, rising from 20 percent of all science, engineering, and health-field graduate students in 1983 to 31 percent in 1991 (National Science Foundation, *Foreign Participation in U.S. Academic and Engineering: 1991* (NSF 93-302), cited in "In Print," *Science and Government Report* (Washington DC: Science and Government Report, Inc., July 1, 1993, p. 8), that mode of technology transfer is not the focus of this study.

¹²¹ Susan W. University of Florida, speech at National Institutes of Health/Pharmaceutical Manufacturers of America Technology Transfer Conference, Washington DC, May 5, 1993.

are of interest as an example of how foreign firms may tap into the U.S. technology base, and how Japanese firms in particular have been able to take advantage of such resources.

It is important to note that in general, reciprocity would be difficult to obtain in regard to these issues. Observers agree that advanced research in the sciences is far more likely to be done within company laboratories in Japan than in university facilities. Research conducted in Japanese universities does not compare in quality or scope with the work done at academic institutions in the United States; thus neither U.S. firms nor U.S. graduate students are lining up for access to Japanese university research laboratories.

| Extent of Corporate Funding of U.S. Academic Research

Academic research comprises a large component of the total U.S. research effort. Academic institutions conducted about \$17.2 billion in basic and applied research in 1991,¹²² increasing from a 12-percent share of total U.S. research spending in 1985 to a 15-percent share in 1991. During the 1980s, academic R&D expenditures rose at an even faster pace than total U.S. spending, increasing more than 180 percent from 1980 to 1991, while total national spending increased about 140 percent.¹²³ The top 100 educational institutions

accounted for about 70 percent, or nearly \$12 billion. From 1980 to 1990, industry's share of total funding of academic R&D rose from 4 to 7 percent, or about \$1.16 billion.¹²⁴

Estimates of how much money foreign corporations spend at U.S. universities vary widely. Many analysts believe that foreign and especially Japanese funding of U.S. universities escalated rapidly in the late 1980s, but this was an increase on a very low base, and remains low in comparison with total funding from domestic firms. In 1986, the National Science Foundation (NSF) polled 1,270 Japanese enterprises, and found that a total of 56 firms had funded a total of about \$3.6 million in U.S. academic research in 1983, that 71 had funded a total of \$5 million worth in 1984, and that 98 had funded a total of \$9 million worth in 1985. In a more complete study, conducted in 1988, GAO put total foreign corporate funding of academic R&D at \$27.6 million for fiscal year 1986, or about one-third of 1 percent of the total R&D expenditures of the 107 universities reporting foreign funds (27 reported no foreign funds).¹²⁵ This represented about 5 percent of total industry funding of academic R&D.¹²⁶

Meanwhile, foreign governments and other nonbusiness sources spent another \$46.8 million at U.S. universities, with one-third of that total going to an international ocean-drilling program

¹²² National Science Foundation, op. cit., footnote 120, p. 306, table 4-2. This did not include about \$5 billion, or \$3.5 billion in constant 1982 dollars, at federally funded research and development center (FFRDCs), which conduct R&D almost exclusively for use by the Federal Government. One problem in estimating these numbers is defining a "university" or "academic institution." The NSF prefers a broad definition, including university-affiliated research centers, experimental stations, and medical centers as well as traditional departments. National Science Foundation Division of Science Resources Studies, *The Science and Technology Resources of Japan: A Comparison with the United States*, NSF 88-318 (Washington DC: 1988), p. 23.

¹²³ Ibid.

¹²⁴ National Science Foundation, Division of Science Resources Studies, *Academic Science and Engineering: R&D Expenditures, Fiscal Year 1990*, NSF 92-321, detailed statistical tables (Washington DC: 1992), table B-1, p. 19.

¹²⁵ These numbers tend to minimize the extent of foreign funding, however, as they ignore industrial liaison program (ILP) membership fees and endowments and gifts for research programs, GAO did not attempt to estimate how much money university ILPs received from foreign sources, although it stated that the amount of support was "not extensive" (GAO, *R&D Funding*, op. cit., footnote 118, p. 18). Foreign sources (not just corporations) accounted for \$27.3 million in gifts and endowments for research programs in FY 1986 (Ibid., p. 21).

¹²⁶ Ibid., p. 8.

¹²⁷ Ibid., p. 8.

at Texas A&M University.¹²⁷ MIT received \$5.3 million, or 2 percent, of its research budget from ties with foreign corporations; Japan accounted for roughly half of that. The GAO found 13 foreign corporation-university agreements worth \$500,000 or more.¹²⁸ These arrangements, which varied in length from 3 to 20 years, provided \$127 million to the universities over time.¹²⁹ Finally, GAO found that most foreign corporate funding was not in areas identified by the Department of Commerce as critical technologies for future U.S. economic growth.¹³⁰

OTA's research suggests that a conservative estimate of Japanese corporate funding of U.S. university research (including endowments to research programs) would be about \$50 million per year, with total foreign corporate funding at about \$75 million. That would make the foreign corporate contribution to university research about two-thirds of 1 percent of the top 100 universities' research spending, with Japanese corporations by far the main foreign corporate funders of U.S. university research.

| Legislative Grounding of Corporate-University Relationships

America's universities have long served as the country's primary centers of basic research activity. U.S. universities' role in promoting national economic competitiveness has been largely "pre-competitive"—building the country's human capital and knowledge base, rather than producing marketable products. The Federal Government has thus funded research at U.S. universities primarily as part of a national commitment to basic science, rather than as an attempt to achieve specific goals. With the major exception of defense-related research, the United States has not conditioned its research funding of universi-

ties on the generation of concrete results or a certain return on investment. It has generally supported the peer review process for Federal grants to ensure standards of scientific merit as defined by the research community.

However, in the 1970s, amid deepening concerns about the trajectory of the U.S. economy, Congress began to examine ways to encourage a more active university role in promoting the country's well-being. One of the outcomes of this debate, which continues vigorously, was a focus on Federal patent policy. Congress was concerned that U.S. patent rules had allowed foreign firms to gain ground on domestic ones in global markets. At the time, the Federal Government claimed title to all wholly or partially federally funded patents developed by universities. Since the government did not actively promote licensing of those patents to the private sector, and since it did not grant exclusive licenses, Congress feared that much commercializable research was not reaching the U.S. private sector. The result was PL 96-517, the University and Small Business Patent Policy Act (also known as the Bayh-Dole Act). Under the Bayh-Dole Act, the universities and other research performers could receive title to patents resulting from federally funded research. Thus they could now profit from granting exclusive or nonexclusive licenses to federally funded innovations.

For U.S. universities, a majority of whose research funding came from the Federal Government, the act promised to be a major financial windfall. Not only would they collect licensing fees on their innovations, but they would also be able to use the licensing "carrot" to convince corporations to fund projects already partially underwritten by the Federal Government. For U.S. corporations, it promised to be an innovation

¹²⁸ *Ibid.*, p. 5.

¹²⁹ *Ibid.*, p. 36.

¹³⁰ *Ibid.*, pp. 10-11

windfall, giving them a clear advantage over competitors from foreign countries, whose university research could not compare with America's in quantity or quality.

From both these points of view, Bayh-Dole appears to have been a qualified success thus far. Universities are always pleased to receive corporate funding, especially as Federal research funds decrease or fail to keep pace with rising costs. University officials and researchers have told OTA that they prefer on the whole to work with domestic firms, both for reasons of patriotism and practicality. Indeed, because of linguistic and cultural understanding, they found U.S. firms more convenient than foreign sponsors, and wished U.S. corporations were more aggressive in sponsoring research and licensing university-developed technologies.

Representatives of corporations, on the other hand, expressed more skepticism about the value of such research. They typically felt that immediate returns on such investments are unlikely, and that any technology coming out of a university lab is likely to be far from commercialization. Corporate interviewees often said that the cost of licensing a technology from a university was likely to amount to only a fraction of the cost of commercializing such research. Rather, they suggested, their biggest benefits from relationships with universities are likely to be in recruitment opportunities and in keeping in touch with the advanced work conducted in university research facilities.¹³¹

| Types of Corporate-University Relationships

Foreign corporate tie-ups with U.S. universities take many different forms, none of them

unique to foreign companies. The most significant include:

- sponsored research at universities,
- licensing university-controlled patents,
- membership in university industrial liaison programs (ILPs),
- corporate philanthropy, and
- location of facilities in university-related research parks.

This discussion will focus on the first three of these, which have been the subject of most congressional concern and media scrutiny.

| Sponsored Research and Technology Licensing

Sponsored research involves the most intimate interaction and therefore the largest amount of potential knowledge transfer between universities and foreign firms. This is especially true when, as is typical, research tie-ups offer the possibility of a technology licensing arrangement at the end of the project. Corporations cannot dictate the specific nature of a project or direct the progress of research; they can only opt to support a research project that an investigator proposes. Major research universities, such as MIT, Harvard, and Princeton, will not negotiate conditions of sponsored research relating to ownership of intellectual property or restrictions on what results of the research may be published, although some may agree to give sponsoring corporations access to results and article manuscripts a certain number of days, typically 30, before publication.

Some university officials suggested that smaller or less well-established universities may be willing to accept more direction on the nature of research, or even to perform what one university scientist described as "product-testing," but no

¹³¹ OTA interviewed officers of university technology licensing offices, offices of sponsored research, and industrial liaison programs as well as marchers from MIT, Princeton, Harvard (including Massachusetts General Hospital, a teaching hospital of the Harvard Medical School), the University of California at Irvine, and the Scripps Research Institute.

interviewee would cite specific institutions where these compromises might take place. It is likely, however, that the larger and more prestigious research institutions have less incentive to accede to corporate pressures to withhold publication or to cater to specific corporate research purposes.

Contract research is usually limited to a precise objective, and the firm often has the right to an exclusive license to research results. In this category, the firm may or may not participate in the performance of the research, but it usually has rights to observe the research in progress, which may be partially based on proprietary information provided by the company. Sponsored research and contract research can culminate in a license, either exclusive or nonexclusive, for a university-held patent. If the original sponsor chooses not to license a particular invention or technology, the research institution may also license third parties not originally involved.

Industry-university research centers and consortia involve firms paying an annual fee to observe and help direct the center or consortium's research projects, which are generally at a pre-competitive stage. They may also pay an additional fee for projects in which they are actively involved. Patentable research results are often licensed on a nonexclusive basis to any and all members of the consortium. One unique facet of industry-university consortia is that they can span several disciplines, bringing together not only employees from different firms but also university researchers from different departments. The MIT Media Lab, which has been cited as receiving a large amount of support from Japanese corporations, is perhaps the premier example of the university-industry research consortium.¹³²

While some European companies are active in the Media Lab, the much larger Japanese presence often amounts to a fifth of the Lab's funding.¹³³ The director of the Media Lab, noting the sensitivity of such disclosures, has suggested that the Lab should reduce its fundraising efforts from Japanese corporate sources to avoid unfavorable domestic opinion.¹³⁴

| Industrial Liaison Programs

Foreign corporate membership in university-sponsored ILPs has drawn considerable media and congressional attention in recent years, but typically offers companies a less intimate relationship with university researchers than sponsored research projects. These programs, which blossomed in the 1980s and are now quite common at major research universities, generally charge a fee (rarely more than \$100,000) in exchange for providing "facilitated access" to research in fields of interest to the corporate member. In practice, facilitated access usually means invitations to conferences and subscriptions to publications summarizing the activities of university researchers, the possibility of reviewing papers and research results before official publication dates, and special incentives to faculty to cooperate with ILP members.

Liaison programs take two basic forms: general-purpose (university-wide) liaison programs and focused liaison programs that specialize in a particular technology area or academic field. Liaison programs offer more limited access to university research than research consortia or research centers. A 1992 GAO survey of 35 important research universities found that of the 30 offering ILPs, 24 had foreign members, with

¹³²In 1992, the lab performed contract research with such Japanese corporations as NHK, Nintendo, Toshiba, Yamaha, NEC, Hitachi, Sony, Sony Industrial Products, Hitachi, Mitsubishi Electric, Seiko Epson, and Toshiba in different specialized consortia, and had received major building gifts and endowments from Asahi Broadcasting Corporation, Asahi Shimbun Publishing Company, Fukutake Publishing, Hitachi, Matsushita, MCA, NEC, Nintendo, Sony, and Toshiba.

¹³³MIT Media Lab, Press release, 1992; Stewart Brand, *The Media Lab: Inventing the Future at MIT* (New York, NY: Viking, 1987).

¹³⁴Brand, *ibid.*, p. 167.

499 foreign companies participating.¹³⁵ At MIT's program, by far the largest of these, Japanese firms accounted for more than a fifth of the corporate membership.¹³⁶

MIT officials suggested, however, and U.S. corporate members of MIT's ILP confirmed, that while membership in a liaison program may be more beneficial to a foreign firm than to a domestic one, it may not afford the foreign firm privileged access. The reason for this apparent anomaly is that liaison programs provide entree into networks of scientists and researchers with which U.S. firms are already likely to be familiar. It may well be of more benefit for a Japanese firm to be updated on current research activities at MIT than a domestic firm whose scientists may have come from that university and have more opportunity to obtain information informally.

| Corporate Philanthropy

Not surprisingly, corporate gifts are the preferred form of sponsorship from the universities' point of view, since they typically have the fewest strings attached. If a corporation wishes to learn about research activities at a university, philanthropy is not the most cost-effective means of achieving its goal, compared to sponsorship of research or even membership in an ILP. Overall, corporations gave \$2.17 billion to higher education in the academic year 1989-90, up 11.5 percent from the previous year.¹³⁷ Although the total amount of foreign corporate giving is unclear, of the approximately \$260 million listed as "large corporate gifts" for 1990, about \$46 million (18 percent) came from foreign corpora-

tions. Japanese gifts accounted for about \$18 million, or about 7 percent of the total.¹³⁸

The benefits corporate donors receive for their gifts vary, ranging from "mix and mingle opportunities" with faculty (and other corporate donors) to low-cost executive training programs that business schools tailor to the corporation's needs, among other modest benefits. Endowing a chair for a researcher at a university of the rank of MIT or Harvard typically costs about \$1.5 million, for which a corporation may receive research reports or copies of papers published by the holder of the chair, but rarely any closer access to university research. Japanese firms may view philanthropy as a gesture of goodwill that could indirectly induce the university to view the firm in a positive light if opportunities to expand the relationship were to arise.

| University-Related Research Parks

The popularity of university-related research parks has increased rapidly since 1983. As of 1992, there were 128 such parks in the United States, 80 percent of which had been established since 1983. In addition, a large number of new parks were planned.¹³⁹ Research parks are real estate development projects undertaken by a university, usually in cooperation with a private developer. They also often include "business incubators" for start-up companies; these start-ups may closely involve university faculty in their operations. The key difference between university-related and private industrial parks is that companies can draw on the resources of facilities, researchers, and libraries available at the participating universities. The university gets revenue

¹³⁵ GAO, 1992, op. cit., footnote 118, p. 17.

¹³⁶ Massachusetts Institute of Technology, "The International Relationships of MIT in a Technologically Competitive World; Report by the Faculty Study Group on the International Relations of MIT" (Cambridge, MA: Massachusetts Institute of Technology, 1991), p. 5.

¹³⁷ AAFRC Trust for Philanthropy, "Giving USA 1991 (Washington, DC: AAFRC, 1991), p. 111.

¹³⁸ Ibid., pp. 97-99.

¹³⁹ American Association of University-Related Research Parks, "Research Park Statistics" (Tempe, AZ: AAURRP, 1991), p. 3.

and the possibility of performing joint research with industry. Industry gets access to university libraries and other resources (which often include an office for technology transfer to research park occupants), plus the Unquantifiable advantage of being situated in a highly intellectual, cutting-edge environment.

Foreign firms have usually been welcome in research parks. Although figures are not available on the percentage of foreign corporate occupancy at research parks, there is certainly a sizable presence. A spokesman for the Association of University-Related Research Parks noted that there are:

... no nationalistic policies at research parks. They probably like international companies to

locate there. If you're the type of company doing the activities parks allow, it doesn't matter where you're from.¹⁴⁰

Foreign investment in university-related research parks is welcomed by municipal and State governments, because it provides them with high-skill, high-wage, high-tech employment, together with potential spillover effects from research. Although companies may see various advantages in locating close to universities, the real benefit may lie more in image and atmosphere than in direct technology transfer.

¹⁴⁰ Chris Boetcher, President, American Association of University-Related Research Parks, personal communication, July 1992.