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Internationalized Production in World Output

Robert E. Lipsey, Magnus Blomström, and
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3.1 Introduction

Internationalized production, that is, the operations of multinational firms outside their home countries, represents a separation between the geographical location of production and the ownership of production. It is an extension of the activities and influence of residents of a country outside the geographical borders of the country.

Much of the literature on multinationals is based on the idea that they possess firm-specific assets that are immobile among firms but mobile across geographical boundaries. To the extent that that is the case, the profitability of R&D and the incentive to invest in it or in other activities that contribute to the accumulation of firm-specific assets depends on the size of the worldwide market for the firm's output rather than on the size of the firm's home-country markets. A judgment about the quality of a firm's management or of the management of a country's firms in general would take into account firms' worldwide operations rather than only those in the firms' home countries.

In this paper, we compare the geographical view and the ownership view of production for a number of countries and try to assess the overall importance of

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the internationalized production that separates the two views. The geographical measure for a country reflects the capabilities of the combination of the geographically immobile factors of production located in the country with home and foreign firms' mobile factors. The ownership measure for a country reflects the capabilities of the mobile factors controlled by the country's firms, combined with various countries' immobile factors. We make the comparisons in two ways, from the home-country side and from the host-country side. The home-country view compares the production of a country as a geographical unit with the overseas, and in a few cases, the worldwide production of firms based in that country. The host-country view compares the production of the country as a geographical unit with that part of production controlled by foreign firms.

Although it is not our focus here, the ownership basis could also be used to compare groups of firms, such as Japanese-, U.S.-, and British-based multinationals, or large and small multinationals, or those based in developed countries with those based in developing countries. In each case, the output of the group of firms would reflect their command over geographically mobile assets. However, in a world where access to immobile assets, such as natural resources, is not available on a nondiscriminatory basis, a home country's immobile assets may contribute to the capabilities of firms based in a country.

A series of previous papers has compared export market shares and the composition of exports of countries with those of firms based in those countries (Kravis and Lipsey 1985, 1987, 1992; Blomström and Lipsey 1989a, 1989b, 1993; Blomström 1990; Lipsey, Blomström, and Kravis 1990; Lipsey 1995b). These export market share comparisons have several advantages over other measures. One is that production for export may be more footloose, less subject to host-government manipulation or control, and therefore more revealing about economic factors than shares in host-country markets. Another advantage of export market shares is that it is relatively easy to define the denominators of the share ratios. These might be total world exports, or developed-country exports, or exports of manufactured goods or particular products. Quite comprehensive trade data are collected and published by the United Nations, using classifications of commodities fairly comparable from one country to another.

On the other hand, export sales account for a minority of production, and a small minority for some countries' affiliates. They are uninformative about competition in services, many of which cannot be exported and must be produced where they are consumed. Even within manufacturing, usually classified as producing tradables, a concentration on export shares gives a high weight to those products that are most tradable and a low weight to less tradable goods. The effects of skills in advertising and marketing that enable American manufacturers of soft drinks and breakfast cereals to enter many markets would probably not be evident in export market shares.

Another problem with exports as a measure is that exports, unlike value

added, for example, can be duplicative. The same product can appear as parents' exports of components to an affiliate and in affiliate exports of a finished product. The same type of duplication characterizes the world trade data that are the denominators for export shares.

The obvious candidates for nonduplicative measures are value added and gross product originating in a country, a sector of the economy, an industry, or a set of firms. The denominators for such share measures are available for almost all countries for aggregates and major industry groups, although the quality of the data declines as one moves to narrower industry classifications. The numerators present worse problems, especially for measures of the shares of groups of firms spanning national borders. Very few countries report value added for their own multinationals' worldwide operations or for any operations outside home-country borders. However, on the inward side, a number of countries have coded their industrial censuses to distinguish establishments controlled by foreign firms, thus providing foreign firms' shares of geographically defined host-country production, by industry of establishment. For the United States, the first example of this type of establishment-based inward investment data was the results of the Bureau of Economic Analysis (BEA)–Census of Manufactures match for 1987 (U.S. Department of Commerce 1992c), although enterprise-based data go back to 1974. On the outward side, there have been several reports on value added by U.S. affiliates, but the first comprehensive estimates covering a substantial period, with industry and country detail, appeared in Mataloni and Goldberg (1994).

While gross output shares are informative about the control of production, they do not measure market shares. A firm or group of firms could have control over a market by supplying it through exports, or through control of downstream activities such as wholesaling or retailing, where the share in production would be much smaller than the share in final sales. Information on market shares is rarely available on any national or world basis for consumption in general, although there are some data for individual industries. It is possible, for example, to learn what portion of world sales of passenger automobiles is accounted for by American companies or Japanese companies around the world. The data on pharmaceutical sales collected by IMS could presumably be used to measure the degree of control of these markets by each company or group of companies. The share of each major producer in sales of transport aircraft is also known. What is not readily available is such data for all industries and data on the size of markets for groups of products, needed to calculate market shares.

The broadest summary of our conclusions is that the share of internationalized production (i.e., production by multinational firms outside their home countries) in world output was about 7 percent of world output in 1990 and had grown somewhat over the preceding two decades. However, there was a great variety of experience among individual countries. Most notable in the home-country histories has been the big decline in the share of U.S. interna-

tionalized production. That decline almost offset the increases in internationalized production in other countries. The host-country data show a mixed picture for the individual countries, with increasing importance of foreign-owned multinationals' production in some countries and decreasing importance in others.

Section 3.2 of this paper examines the internationalization of production from the home-country side. It compares the production of four countries—the United States, Japan, Germany, and Sweden—with the internationalized, and in some cases, the worldwide production of firms based in those countries. In section 3.3, internationalized production is examined through host-country reports on production by foreign-owned firms. Section 3.4 estimates the aggregate importance of internationalized production in world output, and section 3.5 summarizes our findings.

3.2 Production Viewed from the Home-Country Side

3.2.1 United States

Some hints of the role of U.S.-based multinationals in world output can be derived from data on the gross product of U.S. multinationals. Changes in the share of nonbank majority-owned affiliates of U.S. firms in world output outside the United States and in their importance relative to U.S. output are described in table 3.1. Nonbank American affiliates in foreign countries accounted for about 3 percent of output in the world outside the United States at what was probably their peak share, and that share fell by about a third between 1977 and 1993, after rising during the previous decade. The extent of internationalization of U.S.-owned production (the ratio of affiliate production overseas to output in the United States) jumped from less than 5 percent in 1966 to over 8 percent in 1977 before a long decline that brought the ratio back down to less than 6 percent in 1993.

Within the United States there was a similar decline in the importance of parent companies in total output. The share of U.S. nonbank parents in U.S. business output outside banking¹ fell from 32 percent in 1977 to 26 percent in 1989, and the share in total output fell from 25 to 20 percent (table 3.2). However, the decline in the U.S. multinational share within the United States came later than in the share outside and was not quite as sharp as the decline outside the United States. Among the three years for which data are available, 1982 was the peak. The parent share in U.S. multinational production remained close to three-quarters, rising somewhat from 1977 to 1982 and then falling to not far above the 1977 level in 1989.² Thus, the role of U.S. multinational firms in production was declining both at home and abroad, a little more rapidly abroad.

1. Business output excludes output produced in the government and household sectors.

2. Parent gross output estimates are available only for benchmark years beginning in 1977.

Table 3.1 U.S. and U.S. Affiliate^a Gross Product as a Percentage of U.S. and World GDP

Year	U.S. Affiliate Gross Product as a Percentage of			U.S. GDP as a Percentage of World GDP	
	U.S. GDP	World GDP Outside United States		Nominal ^b	In 1985 World Prices
		World GDP	United States		
1960	n.a.	n.a.	n.a.	36.5	26.9
1966	4.89	2.67	1.73	35.4	26.7
1970	6.88	2.46	1.81	26.3	24.0
1977	8.16	3.13	2.26	27.7	22.2
1982	7.10	2.80	2.01	28.3	20.6
1989	6.15	2.31	1.68	27.3	20.7
1990	6.49	2.29	1.69	26.1	20.4
1991	6.29	2.20	1.63	25.9	19.8
1992	6.09	2.11	1.56	25.6	19.8
1993	5.72	2.07	1.52	26.5	

Sources: Howenstine (1977, table 1), Mataloni and Goldberg (1994, table 6), Mataloni (1995, table 6), United Nations (1993), World Bank (1995), and Penn World Tables (5.6).

^aNonbank majority-owned foreign affiliates of nonbank U.S. parents.

^bConverted to U.S. dollars by current exchange rates.

Table 3.2 Gross Product of Nonbank U.S. Parents and Their Foreign Affiliates

Year	Gross Product (million U.S. \$)		U.S. Parent Share (%) in Gross Product of			U.S. Multinational Share (%) in World GDP
	Parents	Parents and Affiliates	U.S. Nonbank Business ^a	United States		
				U.S.	Multinationals	
1977	490,529	651,665	32.3	24.8	75.2	9.15
1982	796,017	1,019,734	33.0	25.3	78.1	9.16
1989	1,044,884	1,364,878	25.9	20.1	76.6	7.16

Sources: Mataloni and Goldberg (1994, tables 1 and 3) and World Bank (1995).

^aExcluding banks, government and government enterprises, private households, imputed rental income on housing, rental income of persons, business transfer payments, subsidies, and the statistical discrepancy.

A rough picture of the worldwide role of these firms shows a much larger share in world production for U.S. multinationals (parents and affiliates combined) than in production outside the United States for their affiliates alone. The U.S. multinational share was much greater in U.S. production than in foreign production, and U.S. production was still, in 1989, over a quarter of world output.

The trend in the share of the United States as a geographical area in world output is shown in table 3.1. The U.S. share declined substantially from 1960 and 1966 to 1970, but during the period for which we can compare the United States as a country with U.S. firms, starting in 1977, there was virtually no

Table 3.3 U.S. Parent Share of U.S. Business GDP,^a 1989

Industry	Percentage
All industries	26
Petroleum extraction and refining	8
Manufacturing ^b	61
Services	6
All other ^c	16

Source: Mataloni and Goldberg (1994, table 3).

^aExcluding production in the banking, government, and household sectors.

^bExcluding petroleum and coal product manufacturing.

^cIncluding agriculture, mining, except petroleum, construction, wholesale and retail trade, transportation and public utilities, and finance.

further change in the U.S. role. Thus, this history includes two very different periods for the United States and for U.S. firms. From the first half of the 1960s to the mid-1970s, the United States as a geographical entity had a declining share of world output, while U.S. firms' production outside the United States had a rising share of world output and a large rise relative to domestic U.S. output. After the mid-1970s, the United States as a country held on to a quite steady share of world production, while the U.S. multinational share of world output was falling, U.S. affiliate output was declining relative to geographical U.S. output and their own parents' domestic output, and the parents' share of domestic U.S. output was falling.

One reason why the share of U.S. multinationals in production outside the United States is so low is that much of the world's production takes place in sectors in which multinationals do not operate, such as government and households, or from which foreign firms are often barred or limited, such as transportation, communication, public utilities, and certain services. Even within the private business sector in the United States, the role of U.S. parents varies greatly across industries, as can be seen in table 3.3. Multinational home, or parent, operations account for a majority of U.S. production in the petroleum and manufacturing sectors, but for only a small part of production in the rest of the economy.

For the internationalized production of U.S. firms (production by affiliates in foreign countries) we can make comparisons to world totals by industry only for "industry" as contrasted with "services," the latter including agriculture and finance, and the former including mining; manufacturing; transportation, communication, and public utilities; construction; and wholesale and retail trade. This crude industrial origin breakdown is shown in table 3.4. The share of U.S. affiliates in service output outside the United States was negligible but stable, while the share in this very broadly defined "industry" category declined by almost 20 percent.

Table 3.4 Shares of Nonbank Majority-Owned Foreign Affiliates of U.S. Firms in "Industry" and "Services" Output, Outside the United States

Year	Affiliate Share (%) in Non-U.S. GDP	
	Industry ^a	Services ^b
1977	8.07	.16
1982	7.67	.16
1989	6.67	.17

Sources: Mataloni and Goldberg (1994, table 8) and United Nations (1993).

^aMining; manufacturing; transportation, communication, and public utilities; construction; and wholesale and retail trade.

^bAgriculture, finance (except banking), insurance and real estate, and other services.

3.2.2 Japan

The next largest home country for which some production-related indicators are available is Japan. However, the Ministry of International Trade and Industry (MITI) surveys of multinational firms provide data on sales, the value of production, and intermediate expenditures. It is therefore possible to estimate value added by subtracting intermediate expenditures from sales (which we use) or from the value of production.

A major problem with the MITI surveys is that the coverage rates are low, vary sharply over time, and differ substantially from variable to variable even within a single year, causing large fluctuations in reported value added. A rough attempt, explained in appendix A, is made here to adjust the data for changes in coverage. The adjusted estimates indicate more stable growth in the value added of both parents and affiliates and more stable shares for multinationals in corporate value added in Japan (table 3.5A). After the adjustment, the multinational parent share of total corporate value added in Japan shows a downward trend, from around 30 percent in the early 1980s to less than a quarter at the end of the decade. Ratios of affiliate value added to Japanese corporate value added fluctuated between 4 and 6.5 percent, with no clear trend, but there was a large increase in manufacturing affiliates and something of a decline in trade affiliates, a much larger group at the beginning of the 1980s.

Multinational shares of Japanese GDP are, of course, smaller than their shares of corporate value added, but the two series show similar trends (table 3.5B). While Japanese multinational value added has fallen relative to Japanese GDP, Japan's share of world GDP has risen so much that the Japanese multinational share of world GDP and the Japanese affiliate share of world GDP outside Japan have both increased greatly.

While Japanese multinational affiliate value added grew less rapidly after 1986 than before, the stock of Japanese foreign direct investment (FDI) rose more rapidly. This divergence in trends may indicate that there was a deteriora-

Table 3.5A Japanese Multinationals' Value Added and Ratios to Corporate Value Added in Japan

Fiscal Year ^a	Parents			Affiliates		
	All Industries	Manufacturing	Trade	All Industries	Manufacturing	Trade
	<i>Adjusted Value Added^b (million U.S. \$)</i>					
1980	241,693	192,607	24,809	45,450	13,516	26,341
1983	293,608	225,400	29,433	57,547	14,187	34,264
1986	495,035	381,200	46,151	99,618	35,262	57,189
1987	n.a.	n.a.	n.a.	88,627	34,561	45,457
1988	542,116	438,504	45,432	95,734	43,791	44,018
1989	473,534	346,479	47,286	119,497	50,267	56,368
1990	601,583	451,925	56,059	151,879	68,886	68,889
1991	716,941	485,841	95,740	176,302	79,554	84,530
1992	661,076	537,301	56,542	180,918	88,760	82,786
	<i>Ratios of Adjusted Value Added to Corporate Value Added in Japan (%)</i>					
1980	31.11	58.43	11.02	5.85	4.10	11.70
1983	32.80	61.40	11.67	6.43	3.86	13.58
1986	29.53	60.54	9.53	5.94	5.60	11.81
1987	n.a.	n.a.	n.a.	4.09	4.21	7.23
1988	23.92	51.56	7.10	4.22	5.15	6.88
1989	23.70	44.64	8.93	5.98	6.48	10.65
1990	24.06	48.37	8.16	6.07	7.37	10.03
1991	24.96	47.15	11.85	6.14	7.72	10.46
1992	21.27	50.52	6.35	5.82	8.35	9.29

Source: Lipsey, Blomström, and Ramstetter (1995, tables A-3, A-4, and A-5).

^aFiscal years ending 31 March of the following calendar year.

^bSee appendix A for an explanation of how adjusted estimates are calculated.

tion in profitability of Japanese FDI, or that adjustment for the falloff in the coverage rates of the MITI surveys in recent years is not sufficient, or that the adjustment in 1986 (a year of particularly poor coverage) was too large.

3.2.3 Other Countries

For other home countries we have no information on affiliate production, and only for a few countries do we have data even on affiliate sales.

Since 1976, German affiliate sales have approximately doubled relative to German GDP and world GDP outside Germany, eventually reaching around 30 percent of German GDP and about 2 percent of world GDP outside Germany (table 3.6). However, sales are substantially larger than production. If the difference between sales and production is as large for Germany as for the United States, German firms' internationalized output may have reached 11 to 12 percent of German home output, up from 6 percent, and the German affiliate share of world production might have risen from about 0.4 percent to about 0.8 percent.

Table 3.5B Japanese Multinationals' Share of World GDP, World GDP Outside Japan, and Japanese GDP

Year	Parents and Affiliates Relative to World GDP	Affiliates Relative to World GDP Outside Japan	Parents and Affiliates Relative to Japanese GDP	Parents and Affiliates Relative to Corporate Value Added in Japan	Japanese GDP Relative to World GDP
<i>Multinational Shares Based on Adjusted Value Added (%)</i>					
1980	2.58	.45	27.11	36.97	9.53
1983	3.04	.55	29.60	39.23	10.26
1986	4.10	.80	29.95	35.48	13.68
1987	n.a.	.64	n.a.	n.a.	14.72
1988	3.50	.62	22.01	28.14	15.88
1989	3.11	.74	20.65	29.68	15.05
1990	3.56	.83	25.70	30.14	13.87
1991	4.06	.95	26.69	31.10	15.22
1992	3.61	.92	22.94	27.09	15.73

Sources: Table 3.5A and World Bank (1980, 1993, 1995).

Note: World GDP and Japanese GDP as estimated by the World Bank.

Table 3.6 Sales of German Foreign Affiliates

Year	Sales (billion U.S. \$)	Sales of German Affiliates as a Percentage of		
		German GDP	World GDP Outside Germany	World GDP
1976	68.71	15.4	1.16	1.08
1977	81.56	15.8	1.23	1.14
1982	172.83	26.4	1.65	1.55
1985	191.58	30.9	1.64	1.55
1989	373.40	31.6	2.08	1.96
1990	463.35	30.9	2.37	2.20
1991	477.85	27.8	2.37	2.19
1992	531.47	27.0	2.50	2.29
1993	535.29	28.1	2.49	2.27

Sources: Germany, Deutsche Bundesbank (1991) and earlier issues, Germany, Deutsche Bundesbank (1995, table 1) and earlier issues, Lipsey (1989), and World Bank (1980, 1993, 1995).

For Sweden we have data on sales for both parents and foreign affiliates, shown in table 3.7. There has been no clear trend in the world production share of Swedish multinationals as a whole during the period for which we have data since a large rise from 1970 to 1974. There was a very strong upward trend in the internationalized production share (the production share of Swedish affiliates), especially in the last few years, and a large shift in shares from parent sales to affiliate sales. The Swedish geographical output share shows little trend over the whole period.

Table 3.7 Sales of Swedish Parent Firms and Their Foreign Affiliates

Year	Sales (million U.S. \$)			Share (%) in					
	All Parents	Parents with Foreign Production Affiliates	Manufacturing Affiliates (Net Sales) ^f	World GDP of			Swedish GDP of		
				Sales of Multinationals with Foreign Production Affiliates	Affiliate Net Sales	Swedish GDP	Affiliate Net Sales	Parent Sales	Swedish Multinational Sales of Affiliate Net Sales ^e
1965	n.a.	n.a.	1,426	n.a.	.07	1.12	6.5	n.a.	n.a.
1970	(10,817) ^a	7,997	2,598	.35	.09	.85	10.1	31.00	24.52
1974	24,102	17,818	5,849	.45	.11	1.10	10.0	30.54	24.71
1978	(32,179) ^b	24,736	10,535	.41	.12	1.09	11.4	26.80	29.87
1986	46,959	39,220	22,097	.42	.15	.93	16.6	29.49	36.04
1990	n.a.	50,962	45,370	.46	.22	1.09	19.7	22.18	47.10

Sources: Swedenborg, Johansson-Grahn, and Kinwall (1988, tables 2.4, C.4A, and C.4B), Andersson, Fredriksson, and Svensson (1996), and World Bank (1980, 1993, 1995). Data are translated into U.S. dollars using exchange rates from International Monetary Fund (1995).

^aEstimated by assuming same ratio to sales of parents with only foreign production affiliates as in 1974.

^bEstimated by assuming same ratio to sales of parents with only foreign production affiliates as average of 1970 and 1978.

^cSales minus imports.

The four home countries for which we have some data on internationalized production or sales present quite different histories. Internationalized production by U.S. multinationals reached its peak relative to aggregate output outside the United States in the middle or late 1970s and now accounts for a smaller share than in 1966. It has also declined substantially relative to U.S. GDP since 1977. U.S. multinationals and U.S. multinational parents have declined in importance relative to world output and U.S. output, respectively, after a peak in the early 1980s. Within U.S. multinationals, affiliate output declined relative to parent output after 1977 but regained most of its share during the 1980s, with little overall change over a dozen years.

Internationalized production by Japanese multinationals, as far as can be gathered from the incomplete data available, has doubled relative to total world output outside Japan but remains much smaller than that of American firms. Relative to all Japanese corporate output, internationalized production has changed little, but internationalized production in manufacturing has roughly doubled in comparison to Japanese manufacturing output. Japanese multinational parents have lost ground within Japan, in manufacturing and in all industries, and Japanese multinationals have declined in importance relative to total corporate output and total Japanese GDP.

For Germany and Sweden we have information only on sales and for Germany only on sales from internationalized production. If output followed the trend of sales, German internationalized production has risen substantially since the mid-1970s. Swedish internationalized production, to judge by sales, has grown the fastest, tripling since 1965 and almost doubling since 1978 relative to world output.

Internationalized production has apparently increased, relative to world output, in three of the four countries. However, because of the much larger initial importance of U.S. internationalized production, the decline for U.S. firms has pretty well offset the increases in the three other countries over the past decade and a half.

3.3 Production Viewed from the Host-Country Side

A different view would be obtained by examining host-country reports on production owned by foreign firms. The great advantage of the host-country view is that the data for production by foreign-owned firms are usually from the same sources as, and comparable to, data for production in general and production by domestically owned firms.

Host-country data do present additional adding-up problems since they are usually calculated in each host-country's own currency. Our solution to that problem is to calculate foreign-owned production shares in each country's home currency and then apply these shares to measures of real GDP in each country such as those calculated by Summers and Heston (1991).

One advantage of home-country data is that outward direct investment is

more concentrated among countries than is inward investment, so that we could cover roughly half of internationalized production with data from only three countries. The drawback is that no other countries collect such data on their companies' activities overseas. While inward direct investment is much less concentrated, many more countries collect data on the activities of inward direct investors.

There are several comparisons we can make between foreign-owned and total production in a country. One is to compare foreign-owned production with GDP, as a measure of the importance of such production in a country's total output. Since GDP is the only denominator for which we have an appropriate translation to a common currency for aggregation across countries, we calculate these ratios of foreign-owned to total production for all countries.

Many sectors are essentially closed to production by foreign firms, including various types of governmental and household production. One can therefore also think of measuring foreign shares in "eligible" sectors, such as the business or corporate sector of each economy.

Since the importance of internationalized production varies greatly among sectors of the economy, it is also of interest to examine shares in individual sectors. In most countries, manufacturing is the only sector for which data are available. That and the petroleum sector are probably the most internationalized of all.

3.3.1 Developed Host Countries

United States

The trend within the United States, since 1974, has been that the share of production accounted for by foreign-owned firms has increased steadily, almost tripling over that period. By 1993, the foreign-owned firm share had reached 4.5 percent of total output and 6 percent of output in the nonbank business sector, excluding not only banks but also government and household production not open to foreign firms (table 3.8).

The foreign presence has always been much larger in petroleum and manufacturing than in other sectors of the U.S. economy. From less than 5 percent in 1974, the foreign-owned share grew to something in the neighborhood of 15 percent in 1993, a little faster growth than in other sectors. Foreign-owned manufacturing by itself tripled in importance relative to U.S. total and nonbank business output, reaching 3 percent of the latter in 1993.

The growth in the foreign firm share in U.S. output has taken place during a period after the rapid growth in the U.S. multinational share of world output described earlier. Thus, while U.S. domestic output was growing relative to U.S. multinational worldwide output, foreign firm U.S. output was growing faster than that of U.S.-owned firms.

Table 3.8 United States: Share of Foreign Firms in Output, 1974–93

Year	Share (%) in					
	Total GDP of		Nonbank Business GDP of		U.S. Manufacturing GDP	
	Total Foreign-Owned Output	Foreign-Owned Manufacturing Output	Total Foreign-Owned Output	Foreign-Owned Manufacturing Output	Excluding Petroleum and Coal Products	Including Petroleum and Coal Products and All Petroleum ^a
1974	1.64	.76	2.17	1.01	3.13	4.79
1977	1.78	.84	2.27	1.07	3.57	5.21
1978	1.92	.91	2.48	1.18	3.91	5.68
1979	2.23	1.06	2.89	1.38	4.59	6.65
1980	2.62	1.14	3.43	1.50	5.27	8.15
1981	3.26	1.55	4.18	1.99	7.22	10.48
1982	3.29	1.50	4.29	1.96	7.29	10.45
1983	3.27	1.54	4.33	2.04	7.57	10.44
1984	3.41	1.63	4.38	2.09	7.94	10.62
1985	3.34	1.55	4.31	2.00	7.85	10.51
1986	3.33	1.54	4.34	2.01	7.93	10.00
1987	3.48	1.66	4.54	2.17	8.60	10.73
1988	3.89	1.85	5.04	2.41	9.46	11.69
1989	4.25	2.08	5.56	2.72	10.87	13.28
1990	4.31	2.16	5.67	2.84	11.70	14.30
1991	4.50	2.20	5.96	2.91	12.20	14.59
1992	4.42	2.23	5.90	2.97	12.62	15.02
1993	4.58	2.26	6.10	3.02	12.84	15.18

Source: Lipsey, Blomström, and Ramstetter (1995, table B-1).

^aOf which more than three-quarters was in petroleum and coal products.

United Kingdom

The United Kingdom is a major recipient of direct investment and is one of the countries that has distinguished foreign-owned manufacturing enterprises in its Census of Production for a fairly long period. The share of foreign-owned firms in U.K. manufacturing production has hovered in the neighborhood of 20 percent since 1977, with the latest years' shares a little above the earliest ones, but without a clear trend (table 3.9). The lowest foreign share, 17 to 18 percent, was reached in 1986, and there was a substantial rise after that to 22 to 23 percent in 1990 and 1991.

Since manufacturing has been declining relative to other industries in the United Kingdom, the stable foreign share in manufacturing meant a decline in the share of foreign-owned manufacturing in the economy as a whole. That share fell by about a third from 1979 to 1986 and then recovered somewhat but never reached more than 80 percent of the share in 1977 and 1979. We do

Table 3.9 United Kingdom: Share of Foreign-Owned Manufacturing Enterprises in Manufacturing and Total Output

Year	Share (%) of Foreign-Owned Enterprises in		
	Manufacturing		
	Net Output	Gross Value Added at Factor Cost	Aggregate GDP ^a
1977	19.87	19.76	6.62
1979	21.29	21.41	6.79
1981	18.55	18.30	5.15
1983	18.97	18.61	5.05
1984	20.30	20.15	5.27
1985	18.84	18.67	4.85
1986	17.71	17.31	4.53
1987	19.05	18.79	4.81
1988	18.52	18.23	4.76
1989	21.48	21.06	5.53
1990	22.39	21.77	5.67
1991	22.54	21.71	5.32

Source: Lipsey, Blomström, and Ramstetter (1995, table B-2).

^aShare of net output of foreign-owned manufacturing firms.

not have data to tell whether information for all industries would show that same stability as in manufacturing or a declining share.

Canada

Canada, another important host country for multinationals, also provides long series of information on the operation of foreign firms. From the 1960s through the mid-1980s, foreign firms accounted for about a third of total sales in all industries and all nonfinancial industries, and more than half in manufacturing industries. The peak shares seem to have been reached around 1970, but there was little change until the late 1980s. The share of foreign-owned firms had dropped substantially by 1988, but it then increased slightly. Taken together, these figures suggest a declining importance of foreign-owned firm sales in Canada since the 1960s and 1970s.

The comparison of our crudely estimated value added in foreign-owned operations with total Canadian GDP gives a somewhat different picture. The share in total national output of foreign-owned production, in manufacturing and in all industries, reached a peak in the mid-1970s. Then it declined, to the point that over the whole period from 1967 to 1993 there was some decline in the foreign-owned share of total Canadian output (table 3.10).

Norway

By all the available measures, the foreign-owned share in Norway's output has declined over the past 15 years and particularly during the 1980s, after an

Table 3.10 Canada: Share of Foreign-Owned Firm Value Added in GDP

Year	Estimated Share (%) of Foreign-Owned Firm Value Added in Total GDP: Foreign-Owned Firms in		
	All Industries ^a	Nonfinancial Industries ^a	Manufacturing ^{b,c}
1967	16.5	16.1	14.1
1968	17.0	16.7	14.3
1969	16.6	16.3	14.1
1970	16.3	15.9	13.2
1972	16.6	16.3	13.6
1974	18.0	17.6	14.5
1978	n.a.	17.1	n.a.
1983	16.2	14.7	11.5
1988	15.6	13.9	11.1
1990	14.8	13.2	n.a.
1992	14.3	12.8	n.a.
1993	15.1	13.5	n.a.

Source: Lipsey, Blomström, and Ramstetter (1995, table B-3).

^aSales or operating revenue multiplied by 0.3, using approximation to ratios for U.S. majority-owned affiliates in Canada, which were as follows (%): 1977, 32.8; 1982, 31.5; 1989, 30.1; and 1991, 26.6 (from Mataloni and Goldberg 1994).

^bSales or operating revenue multiplied by 0.4, using approximation to 1972 Canadian ratios for foreign-owned manufacturing establishments, which were as follows (%): foreign-owned establishments, all activities, 38.6; and foreign-owned establishments, manufacturing activity, 41.7.

^cEnterprise basis. On an establishment basis the ratio for 1972 is 11.3, and that for 1991 is 10.5.

earlier increase (table 3.11). Within manufacturing there was a rise in the foreign share in 1973 and another large rise in 1979, followed by a sharp drop, by over a half, to the low point in 1985. Since then there has not been any strong trend.

The dates of the major changes in the foreign-owned share, coinciding with large increases in oil prices, suggest that relative price changes may have played a major role in these fluctuations. That could be the case if there was substantial foreign ownership in petroleum refining and large changes in refining margins or margins in other downstream petroleum-related output, since these would enter manufacturing value added.

Whatever the source of these fluctuations, they seem also to have been associated with corresponding fluctuations in the importance of the manufacturing sector in aggregate national output. That relationship is shown by the fact that the fluctuations in the foreign share of GDP were wider than those in the foreign share of manufacturing output. For example, when the foreign share of manufacturing output rose by a quarter from 1972 to 1974, the foreign share in GDP rose by a third. And when the foreign share in manufacturing fell by 54 percent from 1979 to 1986, the foreign share in GDP fell by 65 percent.

The trend in foreign ownership of Norwegian production seems quite clear. Foreign-owned production has been declining in importance both within man-

Table 3.11 Norway: Share of Foreign-Owned Manufacturing Establishments in Manufacturing and Total Output

	Manufacturing Value Added at Factor Prices: Foreign-Owned as a Percentage of		Manufacturing Value Added at Purchasers' Prices: Foreign- Owned as a Percentage of
	Total Manufacturing Value Added at Factor Prices (1)	Aggregate GDP (2)	Aggregate GDP ^a (3)
	<i>Foreign Ownership 50 Percent or More, Four Industries^b</i>		
1952	40.27		1.60
1957	36.62		1.38
1961	29.04		1.19
	<i>Foreign Ownership 50 Percent or More, All Manufacturing</i>		
1962	6.43		1.59
1962	6.35	1.51	
	<i>Foreign Ownership 20 Percent or More, All Manufacturing</i>		
1962	11.59		2.87
1962	11.79	2.80	
1972	14.69	3.10	2.91 ^c
1973	18.46	4.01	3.77 ^c
1977	17.23	3.43	3.08
1980	14.36	2.40	2.20
1982	13.29	1.93	1.82
1985	9.41	1.28	1.24
1986	11.27	1.60	1.54
1987	10.74	1.53	1.47 ^d
1989	13.58	1.87	1.80 ^d
1990	11.18	1.43	1.38 ^d

Source: Lipsey, Blomström, and Ramstetter (1995, table B-4).

^aEstimated by multiplying col. (2) by the ratio for all Norwegian manufacturing of value added at market prices to value added at factor prices (the ratio of col. [3] to col. [2] of Lipsey, Blomström, and Ramstetter 1995, table B-4).

^bElectrochemical; other chemical, except oil refining; basic metals, except iron and steel; and electrotechnical.

^cExtrapolated from 1975 by col. (2).

^dExtrapolated from 1986 by col. (2).

ufacturing and for the economy as a whole ever since the peak share reached in 1973 or 1974. In addition, there is evidence of a decline in the foreign share during the 1950s in the four industries for which foreign ownership data are available, industries that were growing relative to the average within the declining manufacturing sector.

Sweden

The trajectory of foreign ownership of Swedish industry appears to have been quite different from that for Norway, although the severe reduction in

Table 3.12 Sweden: Share of Foreign-Owned Firms in Manufacturing and Total Production

Year	Value Added in Foreign-Owned Production as a Share (%) of					
	Value Added in All Corresponding Enterprises				GDP:	
	Manufacturing Establishments in Enterprises with Foreign Ownership		Enterprises with Foreign Ownership		Manufacturing Establishments in Enterprises with Foreign Ownership	
	>50	≥20%	>50%	≥20%	>50%	≥20%
1971	6.2	n.a.	5.3	8.1	1.65	n.a.
1972	6.3	10.9	5.3	8.3	1.68	2.91
1973	6.4	10.7	5.9	9.7	1.80	3.00
1974	6.7	11.0	5.8	9.0	2.05	3.38
1975	6.4	10.2	5.3	7.8	1.84	2.93
1976	6.9	11.0	5.2	7.8	1.90	3.04
1977	7.0	11.7	5.4	8.5	1.84	3.09
1978	7.5	12.5	5.3	8.5	1.89	3.13
1979			6.1	9.5		
1986			13.5			
1990			17.0			

Source: Lipsey, Blomström, and Ramstetter (1995, tables B-5 and B-6).

availability of data after 1978 makes inferences rather uncertain. Most of the measures show little change in the share of foreign-owned enterprises in manufacturing or in total production from 1971 through 1976 or 1977, but if there was any change, it was toward an increase in foreign shares, especially after 1978 (table 3.12). After 1979 very little is available on value added, but the one series that does continue shows more than a doubling of the foreign share by 1986 and 1990. That impression is reinforced by the foreign shares in employment. The employment share of foreign-owned enterprises rose similarly (Lipsey, Blomström, and Ramstetter 1995, table B-6), a little faster in manufacturing than in all industries, but both confirming the impression of rapid growth in the foreign share of Swedish production during the 1980s.

Japan

The data on production by foreign firms in Japan suffer from many of the same defects as the data on Japan-based multinationals. In particular, they are based on voluntary surveys with low and fluctuating degrees of coverage. Response rates have varied between a high of 59 percent and a low of 31 percent but fell between 45 and 55 percent in 11 out of the 15 years for which coverage is known. The definition of foreign ownership has also changed over time: 25 percent equity ownership in 1977–81, 50 percent in 1982–91, and 33 percent in 1991–92.

While those changes of definition might not have a major effect on measures

of production in most host countries, minority-owned operations are of much greater importance in Japan than elsewhere. The 1991 change from 50 percent to 33 percent as the criterion for foreign control does not appear to have made a large difference, but the earlier increase from 25 percent to 50 percent may have been much more important.³

A way of estimating the effect of the strict criterion on estimated foreign ownership shares in Japan is to compare data for all U.S.-owned affiliates in Japan with data for majority-owned affiliates, both from U.S. outward investment surveys. Such a comparison is not possible for value added because those estimates cover only majority-owned affiliates. However, it is possible for a crude proxy for value added: the sum of employee and net income, both components of value added. The ratios of all affiliates to majority-owned affiliates for this proxy in three of the benchmark survey years are as follows (U.S. Department of Commerce 1981, 1985a, 1992b):

	1977	1982	1989
All industries	3.63	3.22	2.21
Manufacturing	2.95	3.86	2.61

In table 3.13 we present, first, estimates of foreign shares in corporate value added and in Japanese GDP according to the 50 percent foreign ownership criterion, the official one from 1982 through 1991. The 33 percent criterion introduced in 1991 added only about 4 percent to the foreign share in manufacturing and a little more than 10 percent to the overall foreign share, mainly because it added over 40 percent to the foreign share in trade.

The second part of the table gives two estimates of the foreign share by the 10 percent ownership criterion used in the U.S. data. The low estimate is based on the assumption that only U.S. firms held any minority interests above 10 percent in Japanese firms. The high estimate assumes that minority holdings by other countries bear the same relation to majority and 50 percent holdings as in U.S. investment.

The 10 percent criterion would put foreign shares higher, as far as we can judge: somewhere between 1.5 and 2.5 percent of GDP, according to the low estimate, and 2.5 to 3.5 percent, by the high estimate. The foreign share of corporate value added ranges from about 2 to over 3 percent in the low estimate and from almost 3 to around 6 percent in the high estimate, with fairly clear downward trends. Foreign shares are, and have mostly been, around 4 percent in manufacturing judged by the low estimate but 6 or 7 to over 10 percent according to the high estimate. Both, but particularly the high estimate, suggest a decline in the foreign share since the early or mid-1980s.

The data point to an important characteristic of value added as a production measure: its sensitivity to cyclical and exchange rate fluctuations. The fall in

3. For a discussion of some of the difficulties with Japanese data, see Weinstein (1997).

Table 3.13 **Japan: Share of Foreign-Owned Firms in Corporate Value Added and in GDP, by Various Ownership Criteria and Methods of Estimation**

Year	Foreign Share (%) of Corporate Value Added in Japan		Foreign Share (%) of Japanese GDP: All Industries			
	All Industries	Manufacturing				
<i>Foreign Ownership Criterion: 50 Percent or More</i>						
1977	1.75	2.91		1.10		
1978	1.62	2.91		1.00		
1979	1.35	2.39		0.90		
1980	1.37	2.38		0.93		
1981	1.53	2.83		1.06		
1982	1.53	2.83		1.05		
1983	1.90	3.88		1.35		
1984	1.54	3.07		1.09		
1985	1.11	2.27		0.80		
1986	1.66	3.69		1.22		
1987	1.51	3.33		1.19		
1988	1.53	3.27		1.25		
1989	1.51	3.14		1.20		
1990	1.35	2.78		1.13		
1991	1.34	2.83		1.14		
1992	1.16	2.61		0.97		
<i>Foreign Ownership Criterion: 10 Percent or More</i>						
	Low	High	Low	High	Low	High
1977	3.61	6.36	4.35	8.58	2.27	4.00
1978	3.40	5.75	4.59	9.13	2.09	3.54
1979	2.92	4.68	4.04	7.91	1.94	3.11
1980	2.82	4.62	4.15	8.34	1.93	3.16
1981	2.90	5.04	4.63	10.40	2.01	3.49
1982	2.89	4.91	4.84	10.92	1.99	3.38
1983	3.18	5.49	5.67	13.57	2.26	3.90
1984	2.67	4.02	4.76	9.40	1.88	2.83
1985	2.26	3.00	4.10	7.33	1.63	2.17
1986	2.64	3.99	5.27	10.18	1.94	2.93
1987	2.30	3.35	4.71	8.46	1.81	2.63
1988	2.28	3.38	4.61	8.74	1.85	2.75
1989	2.29	3.32	4.53	8.21	1.83	2.65
1990	2.08	3.01	4.16	7.57	1.73	2.51
1991	2.01	2.87	4.03	7.18	1.70	2.43
1992	1.67	2.32	3.63	6.16	1.40	1.93

Sources: Lipsey, Blomström, and Ramstetter (1995, table B-7) and appendix B of this paper.

Table 3.14 Australia: Share of Foreign-Owned and Foreign-Controlled Establishments in Mining, Manufacturing, and Total Output

Industry and Year	Foreign Share (%) of Sector Value Added and GDP			
	By Control		By Ownership	
	Sector	GDP	Sector	GDP
Mining				
1971-72	55.0	1.87		
1972-73	57.7	1.88		
1973-74	60.2	2.03		
1974-75	60.1	2.27	51.8	1.96
1976-77	59.0	2.29		
1981-82	57.9	2.36	51.2	2.09
1982-83	56.6	2.51	50.4	2.24
1984-85	51.5	2.39	44.7	2.08
Manufacturing				
1972-73	n.a.	n.a.	31.2	6.82
1982-83	34.6	5.87	32.9	5.57
1986-87	33.3	5.38	30.9	5.00

Source: Lipsey, Blomström, and Ramstetter (1995, tables B-8 and B-9).

foreign firm value added from 1983 to 1985 probably represents the effects of the sharp rise in the exchange value of the U.S. dollar, as U.S. affiliates, especially those in trade, cut margins to preserve their markets in Japan.

Although Japan's government restrictions on inward FDI, extremely restrictive until the early 1970s, were largely eliminated in 1980, foreign firms' shares of Japanese production are still relatively low, leading some (e.g., Encarnacion 1992) to suggest that private barriers to FDI have replaced public barriers. Others (e.g., Ramstetter and James 1993) argue that these trends are a result of general entry barriers (e.g., high land costs) and the low priority accorded the Japanese market by many Western multinationals in this period.

Australia

Time series for foreign firms' shares in Australian output appear to be confined to mining and manufacturing, and even these cover only the period from the early 1970s to the mid-1980s. The mining sector is the one for which the longer span of years can be observed, and it is also the sector most dominated by foreign firms. Within that sector, the foreign share of production rose until the mid-1970s and then declined, the latest ratio, for 1984-85, being the lowest of the period (table 3.14). However, there was no real indication of a trend before that. The share of GDP originating in foreign-owned mining production did appear to have an upward trend, however, because the mining sector, though quite small, increased in importance during these years.

The foreign share in the much larger, but relatively shrinking, manufacturing

sector declined somewhat over the period for which we have data, but the share of foreign-owned manufacturing production in total output declined substantially. Thus, there is little doubt that the foreign share in Australian production as a whole declined, given that foreign production in these two major industries fell from about 9.5 percent to about 7.5 percent of GDP.

Of the seven developed host countries for which we have data from national sources on production by inward investors, only two, the United States and Sweden, have undergone substantial growth in foreign-owned shares in their production, mainly during the 1980s. The growth was particularly large in manufacturing for the United States, although the shares have not reached high levels compared with those in other countries. For Sweden, we do not have data by industry for the period of high growth in the foreign share.

The opposite trend, for manufacturing at least, characterized Norway and Canada. In Norway, the foreign share in manufacturing was cut substantially after rising in the 1970s, and the contribution of foreign-owned manufacturing to GDP fell far more steeply, as manufacturing declined in importance in the whole economy. In Canada, the foreign share of production, which reached a peak in the mid-1970s, fell substantially until 1988 and then recovered a bit by 1993, but the final shares were below the levels of the 1960s. Japan, the United Kingdom, and Australia are harder to characterize by any particular trends. Thus, among these seven countries, there is no strong consensus regarding the direction of changes in the importance of foreign-owned production. The strongest case for a trend is that of the United States, which absorbed an unprecedented share of the world's direct investment during the 1980s, but that may have been a temporary episode not likely to be repeated.

3.3.2 Developing Host Countries

Our data for developing countries are less complete. Table 3.15 presents the data we have assembled on foreign firm shares of value added in Asia's developing economies.⁴ Across countries these shares vary in a wide range, from very close to zero in India and in China's industrial sector for a number of years to well over 50 percent for some years in Malaysia and all years in Singapore. In the three countries for which data covering all industries are available for a reasonably long period of time (India, Malaysia, and Taiwan), there is a pronounced downward trend in Malaysia due in large part to declines of foreign shares in agriculture and mining (Ramstetter 1995, 123). There are no such strong trends in India and Taiwan, but in Taiwan foreign shares were, in the late 1980s, high relative to the past.⁵ In India and Korea, foreign firm shares

4. The data for China refer to gross value of output for industry, including intermediate expenditures. Figures on sales and the gross value of output, including intermediate expenditures, are provided in the appendix tables of Lipsey et al. (1995).

5. Ratios of foreign firm sales to Taiwanese total output indicate that high foreign shares continued into 1991 (see Lipsey et al. 1995, table C-8). The two value-added estimates for foreign firms in 1990 and 1991 are inconsistent and seem inconsistent with the sales data as well.

Table 3.15

Selected Asian Developing Economies: Share of Foreign Firms in Value Added

Year	All Industries						
	India	Korea	Malaysia	Taiwan		India	Ko
				1	2		
Ownership definition	b	b	a	b	b	b	
Output measure		c		g	c		
Industry coverage			e			d	
1968	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n
1969	n.a.	n.a.	63.5	n.a.	n.a.	n.a.	n
1970	n.a.	n.a.	60.2	n.a.	n.a.	n.a.	n
1971	n.a.	n.a.	56.6	n.a.	n.a.	n.a.	n
1972	n.a.	n.a.	54.2	n.a.	n.a.	n.a.	n
1973	n.a.	n.a.	55.5	n.a.	n.a.	n.a.	n
1974	n.a.	2.73	57.1	6.1	n.a.	n.a.	9
1975	1.75	3.83	50.0	6.4	n.a.	7.6	13
1976	1.95	4.66	46.2	6.5	n.a.	n.a.	16
1977	1.82	5.54	43.0	7.1	n.a.	n.a.	18
1978	1.86	5.32	41.0	8.0	n.a.	n.a.	17
1979	1.89	n.a.	40.3	8.4	10.4	7.0	n
1980	1.71	n.a.	39.4	6.7	8.9	7.0	n
1981	n.a.	n.a.	39.6	6.1	8.5	n.a.	n
1982	1.26	n.a.	37.4	5.7	6.6	5.2	n
1983	1.23	n.a.	36.9	6.8	6.3	5.1	n
1984	1.68	n.a.	34.0	8.8	11.3	5.8	10
1985	1.75	n.a.	31.4	5.7	7.8	6.1	11

1986	1.79	n.a.	31.3	7.1	6.9	6.4	12
1987	1.78	n.a.	32.9	8.0	7.8	6.3	n.
1988	n.a.	n.a.	32.0	11.4	10.5	n.a.	n.
1989	n.a.	n.a.	30.9	12.6	12.2	n.a.	n.
1990	n.a.	n.a.	30.1	14.0	7.8	n.a.	n.
1991	n.a.	n.a.	30.1	7.8	11.0	n.a.	n.
1992	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.

Year	Industry				Total	Indonesia
	China: Upper Limit	Guangdong		Hong Kong		
		Upper Limit	Actual			
Ownership definition				a	b	
Output measure	i	i	i			
Industry coverage						
1974	n.a.	n.a.	n.a.	n.a.	n.a.	r
1975	n.a.	n.a.	n.a.	n.a.	19	
1976	n.a.	n.a.	n.a.	n.a.	25	
1977	n.a.	n.a.	n.a.	n.a.	26	
1978	n.a.	n.a.	n.a.	n.a.	23	
1979	n.a.	n.a.	n.a.	n.a.	21	
1980	0.48	1.9	n.a.	n.a.	22	
1981	0.58	n.a.	n.a.	n.a.	22	
1982	0.68	n.a.	n.a.	n.a.	20	
1983	0.78	n.a.	n.a.	12.8	19	

(continued)

Table 3.15 (continued)

Year	Industry				Manufacturing				
	China: Upper Limit	Guangdong		Hong Kong	Indonesia		Singapore		Thailand
		Upper Limit	Actual		Total	Nonoil	1	2	
1984	1.01	n.a.	n.a.	13.0	14	19	63.1	67.9	n.a.
1985	1.21	4.6	n.a.	10.7	13	18	64.8	67.0	n.a.
1986	1.46	n.a.	n.a.	12.8	14	18	65.9	73.5	13.3
1987	2.02	n.a.	n.a.	13.5	15	18	72.4	74.0	n.a.
1988	2.72	n.a.	n.a.	14.3	14	17	71.7	72.4	n.a.
1989	3.44	n.a.	n.a.	14.6	16	19	73.6	74.4	n.a.
1990	4.38	24.3	8.34	16.2	15	19	72.7	74.2	14.8
1991	5.66	29.1	27.0	17.3	n.a.	n.a.	72.2	72.9	n.a.
1992	7.11	33.6	31.8	17.1	n.a.	n.a.	70.2	69.5	n.a.
1993	10.16	43.8	33.2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source: Lipsey, Blomström, and Ramstetter (1995, tables C-1 through C-11).

Notes: Ownership definition: (a) foreign firms defined as firms with 50 percent or higher foreign ownership shares and (b) foreign firms defined to include firms with minority foreign ownership shares.

Output measure: (c) value added estimated as total sales less expenditures for raw materials and parts; (g) estimates given by the original source equal to total income less expenditures for raw materials and parts, electricity, and other intermediate consumption; (i) gross value of output, including intermediate expenditures; (j) gross value added; (k) net value added; and (l) ratios to national accounts measures of value added.

Industry coverage: (d) foreign firm manufacturing data refer to the sum of textiles, chemicals, and engineering (metals and machinery) only; (e) data from surveys of limited companies; (f) data from industrial surveys; (h) data exclude paper and printing, precision machinery, and miscellaneous manufacturing; (m) data refer only to firms promoted by the Board of Investment—including nonpromoted foreign firms, the foreign share was 30.6 percent in 1990 (many nonpromoted firms had been promoted firms earlier).

were much larger in manufacturing than in all industries. Foreign shares in Malaysia and Taiwan generally followed a U-shaped pattern, being relatively high in the mid- to late 1970s, bottoming out in the early to mid-1980s, and rising again in the late 1980s and early 1990s.

For the remaining countries (China, Hong Kong, Indonesia, Singapore, and Thailand), data are available only for industry or manufacturing. A very strong upward trend is observable in China, though the figures here represent only an upper limit on foreign joint venture shares, and the data for Guangdong Province indicate that there are substantial differences between the upper limit and the actual share in some years. Nonetheless, there is no doubt that foreign shares in China have increased dramatically in recent years and have reached moderately high levels in Guangdong Province, mainly in firms owned by overseas Chinese.⁶ Upward trends are present in Hong Kong and Singapore, and a downward trend in Indonesia. In Thailand, shares of foreign firms promoted and surveyed by the Thai Board of Investment have not changed much over time, but it is also clear that these firms accounted for only about one-half of all foreign firm production in Thailand in 1990.

On balance, it appears that foreign firm shares of manufacturing production have increased somewhat in Asia's developing economies. The fact that Asian manufacturing has grown extremely rapidly in the past two decades, combined with constant or rising shares of foreign firms in these industries, means that the share of Asian manufacturing operations of foreign multinationals in world production has been increasing. Moreover, if one could account for the production of the growing number of Asian manufacturing multinationals in their home markets, the increase in the share of Asian multinationals in world production would likely be seen to be even more pronounced. As the Malaysian data indicate, internationalized production has long played an important role in Asian primary industries as well, though this role has become smaller in recent years in Malaysia.

We also have some information on the activities of multinationals in Latin America (table 3.16). In the two largest economies, Brazil and Mexico, as well as in Uruguay, foreign-owned firms play an important role in manufacturing production. In Brazil, foreign-owned production accounted for about 29 percent of manufacturing gross output in 1980, the only year for which data on all foreign affiliates are available. Little change has taken place in the share of U.S. affiliates (dominated by majority-owned affiliates), which accounted for approximately half of all foreign affiliate manufacturing output in Brazil in the beginning of the 1980s. If the growth of other foreign firms was like that of U.S. majority-owned foreign affiliates, there have been only small changes in the foreign manufacturing share in Brazil since the mid-1970s.

In Mexico, we find no significant change in the role of multinationals during

6. In 1992, 23 percent of the gross value of industrial production in Guangdong occurred in overseas Chinese firms (Lipsey et al. 1995, 41).

Table 3.16 Three Latin American Countries: Share of Foreign-Owned Production in Manufacturing Output

Year	Brazil		Mexico		Uruguay
	Total Foreign	U.S. MOFAs ^a	Total Foreign		
			A	B	
1970		n.a.	34	28.7	n.a.
1975		n.a.	31		n.a.
1977		10.5			9.2
1978		n.a.			n.a.
1980	28.5			27.2	18.0
1982		12.3			n.a.
1988		n.a.			8.5
1989		12.9			n.a.
1990		10.3			13.0
1991		9.2			13.0
					n.a.

Source: Lipsey, Blomström, and Ramstetter (1995, tables C-12 through C-14).

^aIn 1982, U.S. majority-owned foreign affiliates (MOFAs) accounted for 85 percent of manufacturing employment in all U.S. affiliates in Brazil and 60 percent in Mexico.

the 1970s, and if U.S. majority-owned foreign affiliates can represent all foreign affiliates in Mexico as we assumed they did in Brazil, the role of the multinationals remained unchanged in Mexican manufacturing in the 1980s. In 1970, 28.7 percent of Mexican manufacturing value added was produced by foreign-owned firms. In 1980, the last year for which figures for total foreign-owned production are available, that share was almost unchanged (27.2 percent). Looking only at U.S. majority-owned foreign affiliates in Mexican manufacturing, we see a downward trend until 1982, but then it shifted dramatically. Between 1982 and 1990, the share of these affiliates in Mexican manufacturing value added increased by 53 percent (from 8.5 to 13.0 percent). However, this seems to be a result of policy changes in Mexico after the debt crisis in 1982. Mexico abandoned its strict restrictions on FDI dating from the 1970s, which, among other things, prevented majority-ownership in new investments, and American firms seem to have responded to that change. In 1982, U.S. majority-owned foreign affiliates accounted for 60 (55) percent of the employment (sales) of all U.S. affiliates in Mexican manufacturing, and by 1990, this share had increased to 71 (66) percent.

The foreign share in Uruguay has also increased steadily since the 1970s. Almost 30 percent of the country's manufacturing output was produced by foreign firms in 1990. Given that Uruguay is a financial center for the Southern Cone, one would expect the foreign share of service industry production to be even higher.

In sum, it seems safe to guess that approximately 30 percent of our three Latin American countries' manufacturing output today is produced by foreign-

Table 3.17 Estimate of Internationalized Production from the Home-Country Side

Year	Affiliate (Internationalized) Output of Firms from Four Home Countries as a Percentage of World GDP ^a (1)	Share (%) of Four Home Countries in World Stock of Outward FDI ^b (2)	Share of Internationalized Output in World GDP ^c (3)
1960		49.6	
1970	2.5	(55)	4.5
1975		57.1	
1977	3.1	(57)	5.4
1980		56.5	
1982	3.2	(55)	5.8
1985		54.2	
1988	3.3	(53)	6.2
1990	3.4	51	6.7

^aRoughly estimated from country tables.

^bLipsey (1995b, table E-7). Figures in parentheses are straight-line interpolations, rounded to two significant digits.

^cIncluding four home countries. Calculated as (col. [1] ÷ col. [2]) × 100.

owned multinationals. The foreign share has been essentially unchanged in Mexico since 1970. It increased somewhat in Brazil during the 1970s but fell back again during the 1980s. In Uruguay, the trend has been upward since 1978, but the economy is small compared to the others. Thus, taking the three countries together, there has been little change in the foreign manufacturing share since the early or mid-1970s. During this period, these Latin American countries' manufacturing sectors have been growing more slowly than those of the Asian countries discussed above, but still faster than the world average. This suggests that the share of internationalized production in world output has been increasing somewhat for these developing countries as well.

3.4 Measuring World Internationalized Production

3.4.1 From Home-Country Data

Home-country data on affiliate production were available for four countries—the United States, Japan, Germany, and Sweden. Judging from data on stocks of direct investment, it appears that these four countries have accounted for about half or more of all outward investment stocks since 1960. If we assume that shares of world internationalized production are proportionate to shares of outward investment stocks, we can estimate how much of aggregate world output is from internationalized production, as shown in table 3.17.

The share in world output of affiliates of multinationals from the four home countries reporting affiliate sales or output has changed little since 1977. However, these countries' share of the stock of total world outward direct investment has declined since then. Given our assumptions, we can roughly estimate that the share of internationalized, or affiliate, production has risen from about 4.5 percent to between 6.5 and 7 percent of world output since 1970.

Of course, the share of production accounted for by the multinationals from these countries, including parent (noninternationalized) as well as affiliate (internationalized) production, is much larger. In the United States, Japan, and Sweden, it was probably about 12 percent in 1980 and a little less at the end of the 1980s.

We have no information as to what part of the world's multinational production is represented by these three countries' firms. If we assumed, with no justification, that the parents account for the same share of world output as their affiliates do of the stock of FDI (48 percent in 1980 and 41 percent in 1990), we would estimate that multinationals accounted for about 25 percent of world output at the beginning of the 1980s and somewhat more at the end. That is almost certainly a maximum estimate because these countries probably account for more of internationalized (affiliate) production than of home production.

3.4.2 From Host-Country Data

We aggregate the internationalized output in the seven developed countries we cover by taking ratios of foreign-owned (internationalized) production to aggregate GDP in each country, calculated in national currencies at current prices, and applying these ratios to GDP in current-year international prices for each country. The results are shown in appendix tables 3C.1 and 3C.2 and summarized in table 3.18.

Foreign-owned production increased its share of total output in the group of countries surveyed by a little over a quarter from 1977 to 1991, judged by the middle estimate that assumes minority ownership in Japan only by U.S. multinationals. The increase was not continuous, to judge from the five countries with data for the most years (appendix table 3C.1), but the upward trend is clear.

The shares of internationalized production in these countries as a group ranged from about 3.5 to 4.5 percent. The share of foreign-owned production in Japan was far below the average for these countries. By the broadest measure, Japan does not stand out at the beginning of the period, but by the end it appears to have lower foreign shares in production than is typical.

Since most host countries report foreign-owned shares only in manufacturing, it is difficult to judge the implications of these numbers, which mix data for all industries in some countries with data only for manufacturing in other countries. The second part of each panel in table 3.18 is a more consistent version, limited to manufacturing output, where possible. For manufacturing

Table 3.18 Growth in Foreign-Owned Shares of Production in Seven Developed Host Countries, 1977-91

Industry	Percentage
<i>Growth in Foreign-Owned Shares in Host-Country Output</i>	
All industries ^a	
Assuming minority ownership in Japan only by U.S. multinationals	+27.7
Assuming minority ownership in Japan by all foreign multinationals	+21.1
Manufacturing ^b	
Assuming minority ownership in Japan only by U.S. multinationals	+15.5
Assuming minority ownership in Japan by all foreign multinationals	+13.7
<i>Growth in Foreign-Owned Host-Country Output as a Percentage of World Output</i>	
All industries ^a	
Assuming minority ownership in Japan only by U.S. multinationals	+21.6
Assuming minority ownership in Japan by all foreign multinationals	+15.3
Manufacturing ^b	
Assuming minority ownership in Japan only by U.S. multinationals	+10.0
Assuming minority ownership in Japan by all foreign multinationals	+ 8.3

Source: Appendix tables 3C.1 and 3C.2.

^aSeven countries, 1977-86; six countries, 1986-91.

^bSeven countries, 1977-86; six countries, 1986-90.

production there is not such a large upward trend. There was little change for the first decade or so and then a fairly continuous increase from 1985 to 1989 before another dip. However, the share in 1991 was substantially above those for the late 1970s (appendix table 3C.2).

The share of internationalized production in these countries in world output reflects its growth within the seven countries, but also the rate of growth of these seven countries relative to the world as a whole. The growth in shares of world output was between 16 and 27 percent, the broader measure producing the smaller increase. The increases in the shares of world output are smaller than those for shares in country output because these countries were growing less quickly than the world as a whole. The contrast is even stronger for shares of internationalized manufacturing production in these countries in aggregate world output. These grew by between 8 and 10 percent. There did seem to be some upward trend, especially in the last few years, but it was not a strong one.

The slower growth of these countries than of the world partly reflects the implicit weighting in these calculations, which is by the size of internationalized aggregate or manufacturing production. Even within the group of seven countries, that weighting tends to raise the importance of the slow-growing United States and lower that of the fast-growing Japan.

From these calculations, we can gather that there has been some long-term growth in the importance of internationalized production in the developed countries relative to their total output and to world output.

We have also aggregated the internationalized output in the nine developing countries we cover, using the same method as for developed countries. There

Table 3.19 Share of Foreign-Owned Total and Manufacturing Production in Nine Developing Countries in Their Real Output and in Real World Output

Year	Share (%) of Foreign-Owned Production in Real Output ^a of			Share (%) in Real World Output ^a of Foreign-Owned Production in		
	Seven Countries	Nine Countries A	Nine Countries B	Seven Countries	Nine Countries A	Nine Countries B
<i>Total Production</i>						
1975	1.79			0.22		
1977	2.17		3.38	0.26		0.59
1980 ^b	1.73		3.11	0.24		0.55
1983 ^c	1.83	2.99	3.03	0.27	0.46	0.56
1989 ^d	2.38	3.29	(3.33)	0.38	0.59	(0.72)
1990 ^d	2.79	3.41	(3.46)	0.46	0.64	(0.78)
<i>Manufacturing Production</i>						
1975	1.65			0.21		
1977 ^e	2.00		3.25	0.24		0.52
1980 ^b	1.60		3.01	0.22		0.53
1983 ^f	1.71	2.89	2.93	0.25	0.52	0.54
1989 ^d	2.04	3.01	(3.05)	0.33	0.58	(0.60)
1990 ^d	2.34	3.03	(3.07)	0.38	0.59	(0.61)

Sources: Text tables and Penn World Tables (5.6).

Note: Seven countries are China, India, Indonesia, Malaysia, Mexico, Singapore, and Taiwan. Nine countries A also include Brazil and Hong Kong. Nine countries B also include Brazil and Korea. Numbers in parentheses are extrapolated from 1983 by figures for nine countries A.

^aReal GDP in current international prices.

^bFor Malaysia, 1979, and for Korea, 1978.

^cFor Brazil and Mexico, 1982, and for Korea, 1978.

^dFor India, 1987.

^eFor India, average of 1975 and 1979.

^fFor Brazil, 1982 and for Korea, 1984.

appears to have been a fall in the share of internationalized production in the developing countries' own output from 1977 to 1983, following an earlier rise (table 3.19). Then there was large growth in the share after 1983. Relative to aggregate world output there was little change from 1977 to 1983, after an earlier increase, but a very large rise after that, suggesting growth of over 50 percent relative to world output up to 1990. The growth was probably even faster after that because foreign investment in China accelerated in the 1990s. The increase in foreign-owned production was much larger relative to world output than relative to these countries' own output because these countries were growing faster than the rest of the world.

Even more than for the developed host-country data, the data for foreign-owned production in developing countries are limited to the manufacturing sector. The same ratios, confined as far as possible, to the manufacturing sector, are shown in the second panel of table 3.19. The time pattern for manufactur-

ing alone relative to the countries' output is similar to that for the hybrid values in the first panel, with a rise to 1977, a decline to the early 1980s, and then another increase. However, there is no clear trend over the whole period. In contrast, the shares of world output do show an upward trend. The difference between the trends in shares of country output and in shares of world output results from the fact that the ratios are dominated by Asian countries that were growing much faster than the rest of the world.

If we add the foreign-owned manufacturing production in developed and developing host countries, we find that there was some rise over the period since 1977 in the share of world output, as indicated by column (1) of table 3.20.

These numbers understate the share of internationalized output in total output for two reasons. One is that they cover only manufacturing output, and the other is that they include only 16 host countries. To make up for the limitation to manufacturing we use estimates of the share of manufacturing in total internationalized output, as reported by five host countries (col. [2]).

Dividing the manufacturing output share measures of column (1) by these ratios, we estimate shares of world GDP for total internationalized output of the 16 host countries (col. [3]). Since these 16 host countries accounted for about 60 percent of all the inward stock of FDI (col. [4]), we can make an estimate of the share of internationalized production in the whole world by assuming that the share of world internationalized production of these 16 countries was equal to their share of the inward direct investment stock. The corresponding estimates for the share of internationalized production in the output of all host countries are in column (5).

This calculation from the host-country side implies a substantial growth in the share of internationalized production in world output, as does the calculation from the home-country side in column (6), but here almost all the growth is after 1985. The shares estimated from host-country data are smaller, but the growth is faster, over a third from 1977 to 1990 as compared with about a quarter in the estimates from home-country data.

3.5 Summary and Conclusions

The difference between a geographical and an ownership view of production is measured by the amount of internationalized production: that is, production in enterprises owned by nonresidents of the country where the production is located. That internationalized production is also one aspect of the much talked about "globalization" of production, for any one country and for the world as a whole.

The internationalization of production can be measured from two sides: that of the home country and that of the host country. Viewed from the home country, the question is, How much of production owned or controlled by home-country residents takes place outside the geographical boundaries of the home

Table 3.20 **Estimates of Internationalized Production from the Host-Country Side**

	Internationalized Manufacturing Output in 16 Host Countries as a Percentage of World GDP ^a (1)	Foreign-Owned (Internationalized) Manufacturing Output as a Percentage of Total Foreign-Owned Output: 5 Host Countries ^b (2)	Total Internationalized Output in 16 Host Countries as a Percentage of World GDP ^c (3)	Share (%) of 16 Host Countries in World Stock of Inward FDI ^d (4)	Share (%) of Internationalized Output in World GDP	
					Estimated from Host-Country Side ^e (5)	Estimated from Home-Country Side ^f (6)
1970						4.5
1977	1.55	65.4	2.37	(60.2)	3.9	5.4
1980	1.48	60.1	2.46	60.2	4.1	
1982						5.8
1985 ^g	1.49	57.7	2.58	62.0	4.2	
1988						6.2
1990	1.88	59.6	3.15	59.5	5.3	6.7

^aAppendix table 3C.2 for developed countries, and table 3.19 for developing countries. We use the conservative estimate from table 3C.2, assuming that only U.S. firms have minority ownership in Japan.

^bLipsey, Blomström, and Ramstetter (1995).

^c(Col. [1] ÷ col. [2]) × 100.

^dUnited Nations (1994, annex table 3).

^e(Col. [3] ÷ col. [4]) × 100.

^fTable 3.19.

^g1986 for developed countries, and 1983 for developing countries.

country? Viewed from the host country, the question is, How much of production located in the host country is owned or controlled by residents of other countries?" For the world as a whole, the two views, if measured perfectly, are identical.

Using host-country data, mostly limited to manufacturing, we estimated that the share of internationalized, or affiliate, output in world production increased from 4 percent in 1977 to over 5 percent in 1990, with most of the gain taking place in the late 1980s. The affiliate share of world production estimated from home-country data rose from 4.5 percent in 1970 to 5.4 percent in 1977 and to almost 7 percent in 1990. Since home-country data require fewer assumptions to move from the sample to a world total, we would be inclined to accept them as the best estimates and treat those from the host-country side as mainly a check on the orders of magnitude involved.

The general impression of a much greater importance of internationalized output stems from the contrast between shares of such production in goods industries, particularly manufacturing, and in services. Internationalized output by U.S. and Japanese firms was almost 6 percent of world output in "industry" in 1989, but less than 0.2 percent of the output of "services." "Industry" is defined here to include manufacturing, mining, transportation, communication, public utilities, construction, and trade, and it accounted for about 35 percent of world output in 1989, down from 41 percent in 1970. "Services" accounted for 58 percent, as compared with 49 percent in 1970. Since the United States and Japan account for about three-quarters of the outward direct investment stock of the four countries for which data are available (including also Germany and Sweden), we might guess that the four countries combined account for about 7.5 percent of world output of "industry." Since the four countries own about half of the world's outward investment stock, all internationalized production amounted to something in the neighborhood of 15 percent of world "industry" output.

In the "services" sector, which covers all except agriculture and industry, the internationalized share of production for these four countries' firms was negligible, somewhere between a quarter of 1 percent and a half, but closer to a quarter, with no strong trend.

Another reason for the impression of a much greater role of internationalized or globalization is that our calculations are not intended to describe the total output of multinationals, but only the part that is outside their home countries. Most output by multinationals takes place in their home countries. For example, U.S. multinational firms produced three-quarters of their output in the United States in 1977, and a little more than that fraction in 1989. Japanese multinationals produced 84 percent of their output at home in 1980, and almost 80 percent in 1992. A very rough calculation suggests that multinationals (parents and affiliates) accounted for about 22 percent of world output both at the beginning and at the end of the 1980s.

Given all the attention that globalization has received from scholars, international organizations, and the press, these numbers are a reminder of how large a proportion of economic activity is confined to single geographical locations and home-country ownership. Internationalization of production is clearly growing in importance, but the vast majority of production is still carried out by national producers within their own borders.

Appendix A

Adjusting the MITI Survey Data on Japanese Multinationals

Estimates for Japanese parents and their foreign affiliates are based on data obtained from the Ministry of International Trade and Industry's surveys of parents and affiliates, the only source that provides estimates of production-related activities of Japanese multinationals for more than one year. The coverage of these surveys is incomplete and varies from year to year as well as from variable to variable. This appendix explains the methods used in this paper to compensate for these variations in coverage.

The coverage problems can be most clearly seen by comparing the MITI surveys with generally more comprehensive surveys by a private publishing company, Toyo Keizai (table 3A.1). The number of parents identified by MITI is usually slightly larger than the number surveyed by Toyo Keizai, but because reply rates were low, the number of replying parents is far lower. Moreover, the number of firms reporting even such a basic indicator as sales is smaller than the number of replies for several years. Since we wish to calculate value added, the fact that the number of firms reporting intermediate expenditures is smaller in many years than the number reporting sales is a concern.

For affiliates, reply rates are generally much higher than for parents, but here again the number of firms reporting sales is often lower than the number of replying firms, and the number of firms reporting intermediate expenditures is still smaller in most years (table 3A.1, note c). Moreover, although the number of affiliates to which MITI has sent out questionnaires and the number of affiliates included in the Toyo Keizai surveys were roughly equal in 1988, in subsequent years the number of affiliates to which MITI sent out questionnaires increased much more slowly than the number of affiliates in the Toyo Keizai surveys. Thus, by 1992, the number of affiliates in the Toyo Keizai surveys was 31 percent larger than the number of affiliates receiving MITI questionnaires and 2.3 times as large as the number of affiliates reporting sales to MITI. The Toyo Keizai estimates of affiliate employment are far larger than MITI estimates in the years for which comparisons are possible. One reason the Toyo Keizai estimates are higher is that they apparently cover a large num-

Table 3A.1 Japan: Comparison of MITI and Toyo Keizai Surveys

Fiscal Year ^a	Parent Samples (number of firms)					Affiliate Samples (number of firms)				Affiliate Employment (thousands)	
	MITI Surveys ^b				Toyo Keizai Survey Replies ^d	MITI Surveys ^c			Toyo Keizai Survey Replies ^d	MITI Surveys ^c	Toyo Keizai Surveys ^d
	Sent Out (1)	Replies (2)	Sales (3)	Intermediate Expenditures (4)		Sent Out (6)	Replies (7)	Sales (8)			
1980	3,247	1,401	1,256	1,180	n.a.	n.a.	3,853	3,288	6,270	739	n.a.
1983	3,331	1,271	1,161	1,153	n.a.	n.a.	4,383	3,705	7,351	709	n.a.
1984	3,301	1,617	1,488	n.a.	n.a.	n.a.	4,962	4,962	7,684	926	n.a.
1985	3,385	1,413	1,293	n.a.	n.a.	n.a.	5,343	5,343	8,187	1,057	n.a.
1986	3,425	1,144	1,031	832	n.a.	7,112	4,579	4,519	8,146	962	n.a.
1987	3,708	1,718	1,511	n.a.	2,329	8,367	6,647	6,647	8,933	1,168	1,544
1988	3,525	1,771	1,606	1,441	3,165	9,576	7,544	7,544	9,859	1,326	1,672
1989	3,331	1,563	1,360	1,359	3,191	8,804	6,362	6,362	11,484	1,157	1,941
1990	3,529	1,776	1,616	1,553	3,284	10,210	7,986	7,986	12,522	1,550	n.a.
1991	3,368	1,789	1,630	1,325	3,331	10,835	8,505	7,620	13,522	1,621	2,277
1992	3,378	1,594	1,439	1,296	3,290	10,844	7,108	6,243	14,238	1,404	2,416

Sources: MITI (various years-a-c) and Toyo Keizai (various years-a-e).

^aFiscal years ending 31 March of the following calendar year. MITI estimates refer to the end of the fiscal year. Toyo Keizai estimates refer to the same calendar year (June–July for 1983–89, December for 1990–91, and October for 1992); figure for 1980 estimated as number of firms in June 1981 minus firms established from 1980 forward.

^bData refer to parent firms owning at least 10 percent of a foreign affiliate.

^cData refer to directly owned affiliates with 10 percent or larger Japanese ownership shares and indirectly owned affiliates that are majority owned by directly owned affiliates. Data for 1982 and 1984–85 exclude indirectly owned affiliates—indirectly owned affiliates accounted for 7 percent of the number of replying affiliates and 3 percent of affiliate employment in 1980; 9 and 5 percent, respectively, in 1983; and 8 and 4 percent, respectively, in 1986. Sample sizes for intermediate expenditures are not calculable for affiliates but, as in the case of parents, are thought to be much smaller than for sales in some years. For example, for directly owned affiliates in 1983, the sales sample was 3,368 but the intermediate expenditure sample was only 2,704.

^dSince 1990 Toyo Keizai surveys have covered affiliates with Japanese ownership shares of 10 percent or more; before 1990 the cutoff is unclear.

ber of smaller affiliates that may be excluded from the MITI surveys.⁷ The relatively stable growth rates of affiliate employment implied by the Toyo Keizai surveys are much more believable than the wild gyrations implied by the MITI surveys.

Unfortunately, the Toyo Keizai publications do not attempt to compile sales (the only production-related indicator included in these surveys). We can compare the MITI data with U.S. BEA data on Japanese affiliates operating in the United States, from surveys that are legally mandatory and adjusted to compensate for known variations in coverage. This comparison covers 22 to 27 percent of the number of Japanese affiliates abroad reporting sales and 40 to 55 percent of affiliate sales in 1983–92 (tables 3A.1, 3A.2, and 3A.4).

For sales, the variable for which coverage is among the best in the MITI surveys, MITI estimates were larger than BEA totals in 1983–84 and 1986–88, and BEA estimates were larger in other years (table 3A.2). For most years, the differences between the two estimates were under 10 percent, the exceptions being 1987 and 1990–92, with the MITI estimate being much lower in 1992. BEA numbers of affiliates were smaller than MITI's sales samples in 1983 and 1986–88, but the BEA numbers grew much faster thereafter. BEA estimates of Japanese affiliate employment were generally far larger than corresponding MITI estimates. Thus, it appears that estimates of sales are much closer in the two sources than estimates of the number of affiliates or affiliate employment.

MITI estimates of value added in Japanese affiliates in the United States are much larger than corresponding U.S. estimates of gross product originating in them, implying that MITI estimates of intermediate purchases are much lower. Moreover, although ratios of value added to sales calculated from U.S. data are relatively stable, rising slowly from 6 percent in 1980 to 13 percent in 1992, corresponding ratios calculated from MITI data varied from 15 percent to 58 percent. MITI's recently initiated business structure surveys indicate that corresponding ratios for majority-owned affiliates worldwide in 1991 (the only year available as yet) were close to the low end of the MITI estimates but slightly higher than U.S. estimates, 20 percent in all industries, 35 percent in manufacturing, and 15 percent in trade (MITI 1994). Thus, if the coverage of affiliates in the United States is representative of the MITI multinational survey coverage in general, estimates of sales appear to have been reasonably reliable in the 1980s, but poor coverage appears to have had a particularly adverse effect on more recent sales estimates, on estimates of intermediate purchases, and therefore on calculated value added.

Adjustments to the MITI estimates of sales and value added, presented in tables 3A.3 and 3A.4, attempt to compensate for (1) fluctuations in coverage over time and (2) the particularly low and variable coverage of intermediate expenditures. The first step involves adjusting the sales series to compensate

7. E.g., in 1992, average affiliate employment reported to MITI was 220 (MITI, various years-a), while the figures in appendix table 3A.1 indicate an average of 170 employees per affiliate in the Toyo Keizai sample.

Table 3A.2 Japan: Sales and Value Added of Japanese Affiliates in the United States

Year	Sales (billion yen)			Value Added (billion yen)			Value Added/Sales			No. of Affiliates, All Industries ^a	
	All Industries	Manufacturing	Trade	All Industries	Manufacturing	Trade	All Industries	Manufacturing	Trade		
					<i>MITI Surveys^b</i>						
1983	27,414	2,358	24,700	8,872	1,168	7,424	0.32	0.50	0.30	833	
1984	36,781	5,660	30,136	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
1985	25,199	3,862	20,654	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	
1986	25,969	4,845	20,600	15,060	2,989	11,691	0.58	0.62	0.57	1,107	
1987	27,278	5,600	21,000	5,731	1,597	3,926	0.21	0.29	0.19	1,717	
1988	31,222	7,249	22,659	4,657	2,020	2,362	0.15	0.28	0.10	1,957	
1989	41,491	11,706	28,672	7,109	3,282	3,448	0.17	0.28	0.12	1,720	
1990	40,071	11,196	27,459	10,516	4,539	5,024	0.26	0.41	0.18	2,070	
1991	37,654	10,072	26,342	16,810	5,965	10,025	0.45	0.59	0.38	1,935	
1992	31,576	9,313	20,474	15,540	5,518	8,828	0.49	0.59	0.43	1,602	
					<i>U.S. BEA Surveys^c</i>						
1980	17,822	844	15,918	1,050	n.a.	n.a.	0.06	n.a.	n.a.	709	
1983	25,318	1,526	22,502	1,866	n.a.	n.a.	0.07	n.a.	n.a.	799	
1984	34,280	2,485	29,920	2,938	n.a.	n.a.	0.09	n.a.	n.a.	833	
1985	27,198	1,994	23,781	2,422	n.a.	n.a.	0.09	n.a.	n.a.	870	
1986	24,462	1,754	21,620	2,014	n.a.	n.a.	0.08	n.a.	n.a.	953	
1987	23,604	1,958	19,160	2,212	550	1,068	0.09	0.28	0.06	1,159	
1988	30,891	3,603	23,752	3,223	1,031	1,199	0.10	0.29	0.05	1,378	
1989	42,903	6,722	30,585	4,966	1,698	1,701	0.12	0.25	0.06	1,817	
1990	45,114	8,656	31,504	5,001	2,127	1,531	0.11	0.25	0.05	2,233	
1991	42,989	8,630	28,952	5,325	2,002	2,208	0.12	0.23	0.08	2,472	
1992	41,769	8,517	27,971	5,382	2,104	2,349	0.13	0.25	0.08	3,124	

Sources: MITI (various years-a, various years-b), Lowe (1990), U.S. Department of Commerce (1985b, 1990, 1992a, 1994, various years), and Zeile (1994).

^aFor MITI multinational firm surveys, number of firms reporting sales.

^bFor definitional notes, see table 3A.1.

^cData refer to nonbank affiliates with 10 percent or more foreign ownership and their largest ultimate beneficial owners in Japan. Value-added data refer to gross product estimates by the source. Original U.S. dollar figures converted to Japanese yen using exchange rates in the MITI multinational firm surveys.

Table 3A.3

Japan: Sales and Value Added Estimates for Japanese Parents

Year	Sales (billion yen)			Value Added ^a (billion yen)		
	All Industries	Manufacturing	Trade	All Industries	Manufacturing	Trade
				<i>Unadjusted</i>		
1980	184,591	79,864	94,551	42,898	37,116	4,213
1983	219,431	91,489	111,945	62,678	51,422	5,669
1984	321,584	172,747	121,143	n.a.	n.a.	n.a.
1985	272,219	114,664	126,028	n.a.	n.a.	n.a.
1986	217,855	91,544	104,722	70,778	57,098	5,785
1987	267,807	119,331	120,473	n.a.	n.a.	n.a.
1988	304,582	138,219	128,843	75,266	58,627	5,786
1989	315,548	125,004	159,502	56,922	46,803	4,958
1990	364,494	154,233	160,167	87,828	62,488	9,527
1991	363,258	151,615	158,758	152,800	79,611	34,965
1992	327,024	144,363	143,852	90,908	79,087	6,721
				<i>Adjusted^b</i>		
1980	227,620	98,480	116,591	51,154	40,765	5,251
1983	279,407	116,495	142,542	65,768	50,490	6,593
1984	336,296	180,650	126,685	n.a.	n.a.	n.a.
1985	317,390	133,692	146,940	n.a.	n.a.	n.a.
1986	298,872	125,587	143,666	72,696	55,979	6,777
1987	301,680	134,424	135,711	n.a.	n.a.	n.a.
1988	317,155	143,925	134,161	72,210	58,409	6,052
1989	349,072	138,284	176,448	74,818	54,744	7,471
1990	376,041	159,119	165,241	85,154	63,970	7,935
1991	363,273	151,622	158,765	95,317	64,593	12,729
1992	352,708	155,701	155,150	82,482	67,039	7,055

Source: See tables 3A.1 and 3A.2.

Note: See table 3A.1 for definitional details.

^aValue added estimated as sales less intermediate expenditures. For 1988 and 1990–91, intermediate expenditure imports and IR = ratio of imports to intermediate expenditures. Due to apparent differences in sample sizes across years, errors in the value-added calculations not present for other years.

^bSee appendix A text for details on the calculation of adjusted values.

Table 3A.4 Japan: Sales and Value Added Estimates for Japanese Affiliates

Year	Sales (billion yen)			Value Added (billion yen)			Value Added/Sales		
	All Industries	Manufacturing	Trade	All Industries	Manufacturing	Trade	All Industries	Manufacturing	Trade
<i>Unadjusted^a</i>									
1980	37,940	6,510	30,979	11,136	3,205	7,706	0.29	0.49	0.25
1983	49,914	7,218	41,345	17,157	3,953	12,179	0.34	0.55	0.29
1984	68,933	13,442	52,564	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1985	50,953	9,949	38,151	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1986	48,166	11,362	35,510	27,478	7,483	19,118	0.57	0.66	0.54
1987	54,809	13,060	39,877	12,673	3,747	7,963	0.23	0.29	0.20
1988	68,427	17,621	48,128	10,440	5,082	4,644	0.15	0.29	0.10
1989	93,178	22,267	66,044	16,038	6,856	7,957	0.17	0.31	0.12
1990	99,806	26,195	69,149	25,926	11,233	11,586	0.26	0.43	0.17
1991	88,737	25,365	58,337	40,887	14,984	22,851	0.46	0.59	0.39
1992	79,007	25,114	48,785	39,347	15,185	21,166	0.50	0.60	0.43
<i>Adjusted^b</i>									
1980	44,834	7,693	36,608	9,619	2,861	5,575	0.21	0.37	0.15
1983	57,392	8,300	47,539	12,891	3,178	7,675	0.22	0.38	0.16
1984	72,350	14,108	55,169	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1985	54,173	10,578	40,562	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1986	54,190	12,783	39,951	14,629	5,178	8,398	0.27	0.41	0.21
1987	55,408	13,203	40,313	11,198	4,367	5,743	0.20	0.33	0.14
1988	68,422	17,620	48,124	12,752	5,833	5,863	0.19	0.33	0.12
1989	99,224	23,712	70,330	18,881	7,942	8,906	0.19	0.33	0.13
1990	103,452	27,152	71,675	21,498	9,751	9,751	0.21	0.36	0.14
1991	94,510	27,015	62,132	23,439	10,577	11,238	0.25	0.39	0.18
1992	88,363	28,087	54,561	22,573	11,075	10,329	0.26	0.39	0.19

Source: See tables 3A.1 and 3A.2.

^aSee table 3A.1 for definitional notes regarding the multinational firm surveys. Note also that data for 1984 and 1985 exclude indirectly owned affiliates that accounted for 7 percent of all affiliate sales in 1983 and 8 percent in 1986.

^bFor details on calculation of adjusted figures see appendix A text.

for changes in coverage from year to year. To estimate the marginal effect of changes in coverage rates, worldwide affiliate sales and parent sales were estimated as functions of sales by affiliates in the United States taken from BEA data and the applicable coverage rate. The idea here is to use the strong correlations between parent sales, affiliate sales, and sales of affiliates in the United States to remove trend effects independent of variance in reply rates, and then measure the effect of changing reply rates. The resulting ordinary least squares regressions for 1980 and 1983–92 are as follows:

$$SP_t = -29736 + 4.1794 (SAU_t) + 442766 (NPS_t / NP_t),$$

(0.69) (5.60) (3.34)

$$\text{Adj. } R^2 = 0.920, \text{ DW} = 0.83,$$

$$SA_t = -19945 + 2.1625 (SAU_t) + 28653 (NAS_t / NA_t),$$

(2.07) (15.7) (2.19)

$$\text{Adj. } R^2 = 0.961, \text{ DW} = 1.10,$$

where NA is number of affiliates in the Toyo Keizai surveys, NAS is number of affiliates reporting sales to MITI, NP is number of parents sent MITI questionnaires, NPS is number of parents reporting sales, SA is worldwide affiliate sales, SAU is BEA estimates of sales of Japanese affiliates in the United States, SP is parent sales, and t is a subscript indicating year t . Figures in parentheses are t -statistics. Durbin-Watson (DW) statistics are uncomfortably low, especially in the parent equation, where first-order autocorrelation is definitely indicated, but the small samples involved make it difficult to correct this problem with any degree of confidence, and these estimates are used as is.

Aggregate adjusted sales (SAADJ and SPADJ for affiliates and parents, respectively) are then calculated as the sum of reported sales and the product of the coefficient on the reply rate from the above equations and the difference between the maximum observed reply rate and the actual reply rate:

$$SAADJ_t = SA_t + (0.765 - NAS_t / NA_t)(442,766),$$

$$SPADJ_t = SP_t + (0.484 - NPS_t / NP_t)(28,653).$$

The use of the maximum observed reply rate as opposed to one (implying 100 percent coverage) reflects a primary concern with compensating for variations in coverage rates rather than for the levels of coverage rates. To obtain estimates for the manufacturing and trade sectors (sector being indicated by subscript i), sectoral shares from reported sales data are multiplied by adjusted sales estimates:

$$SAADJ_{it} = (SAADJ_t)(SA_{it} / SA_t),$$

$$SPADJ_{it} = (SPADJ_t)(SP_{it} / SP_t).$$

The second step is to calculate value added from the adjusted sales figures. Since the levels and volatility of ratios of value added to sales in the MITI data seem clearly unrealistic, adjusted value-added estimates are derived by first adjusting the ratios of value added to sales downward somewhat and reducing their volatility, and then multiplying these adjusted ratios by the corresponding adjusted sales estimates. Because the average of MITI estimates for the years 1988–90 is relatively low and closer to other corresponding estimates, this average is taken as a base, and adjusted ratios of value added to sales are calculated as an 80–20 weighted average of this base and reported ratios. The resulting calculations are as follows:

$$\begin{aligned} \text{VSADJ}_{it} &= 0.8(\text{VSB}_i) + 0.2(\text{VS}_{it}), \\ \text{VADJ}_{it} &= (\text{VSAADJ}_{it})(\text{SPADJ}_{it}), \end{aligned}$$

where VSB is the base (average 1988–90) ratio of value added to sales (for affiliates, 0.19 in all industries, 0.34 in manufacturing, and 0.13 in trade; for parents, 0.22 in all industries, 0.40 in manufacturing, and 0.05 in trade), VADJ is adjusted value added, VS is the reported ratio of value added to sales, and VSADJ is the adjusted ratio of value added to sales.

The resulting adjusted estimates for sales and value added are thought to be more realistic than the unadjusted figures in that fluctuations due to changes in the coverage of MITI surveys are somewhat compensated for. The resulting adjusted figures are correspondingly subject to far less variation than the unadjusted values.

Finally, there is also a problem encountered when trying to calculate multinational shares of Japanese value added or sales (or total output including intermediate expenditures) at the sector level. If one calculates the ratio of parent sales to total output on a national accounts basis for the trade sector, the resulting ratios are 1.68 to 2.25 (tables 3A.3 and 3A.5). If one uses the Ministry of Finance's corporation statistics to calculate parent shares of sales, these ratios fall to the 0.29–0.40 range. In other words, either differences between the definition of total sales and total output (i.e., inventory changes) or differences in accounting by establishments (national accounts data) or enterprises (corporation and multinational firm statistics) are extremely large. Due to the control of a large number of nontrade establishments by large trading firms in Japan, the latter is probably by far the larger factor. This makes the use of the corporation statistics preferable for sectoral-level analysis, but use of these data may lead to overestimation of multinational shares because estimates of value added based on corporation statistics are below national accounts estimates of GDP.

Table 3A.5

Japan: Sales or Total Output and Value Added

Year	Sales or Total Output (billion yen)			Value Added (billion yen)		
	All Industries	Manufacturing	Trade	All Industries	Manufacturing	Trade
<i>All Corporations in Japan^a</i>						
1980	662,415	229,489	313,737	164,405	69,773	47,667
1983	766,836	260,240	360,230	200,482	82,230	56,508
1984	811,901	283,075	378,607	211,635	89,955	60,201
1985	857,031	295,821	392,407	231,619	95,000	62,497
1986	860,670	272,667	404,049	246,152	92,463	71,117
1987	953,937	300,878	448,820	273,814	103,733	79,388
1988	1,035,465	326,172	471,390	301,925	113,274	85,200
1989	1,093,531	345,425	484,382	315,698	122,623	83,630
1990	1,200,607	375,069	529,832	353,891	132,240	97,218
1991	1,256,101	387,860	550,597	381,881	137,005	107,446
1992	1,230,330	368,516	535,788	387,752	132,702	111,163
<i>National Accounts Estimates (Establishments)^b</i>						
1980	544,284	242,496	55,396	239,951	70,232	36,792
1983	614,674	264,895	61,900	279,169	81,416	41,774
1984	647,176	279,496	64,698	300,429	89,245	41,977
1985	674,321	287,810	65,896	320,258	94,673	42,836
1986	675,725	275,271	67,189	334,450	96,262	43,567
1987	696,821	274,715	70,158	349,516	99,297	45,540
1988	746,587	296,560	74,306	373,137	106,649	48,010
1989	810,513	322,246	78,391	398,238	114,455	50,377
1990	877,125	348,072	84,913	426,559	123,443	54,501
1991	924,561	366,078	90,286	451,873	131,336	57,830
1992	926,688	351,620	92,326	461,334	129,570	59,273

Sources: Japan, Economic Planning Agency (various years) and Japan, Ministry of Finance (various years).

^aData refer to fiscal years ending 31 March of following calendar year. Data in "sales or total output" columns refer to total output, including intermediate products at cost of sales plus labor costs.

^bData refer to calendar years. Data in "sales or total output" columns refer to total output, including intermediate products at market prices.

Appendix B

Table 3B.1 Estimating Foreign-Owned Production in Japan, Including Minority-Owned Firms

Year	Exchange Rate ^a (yen per U.S.\$) (1)	Value Added in Foreign Majority-Owned Firms ^b (billion yen) (2)	U.S.-Owned Affiliates in Japan					Ratio: Total to Majority Owned (3)/(4) (8)	Gross I of Ma Ow (billion (9)
			Sum of Employee Compensation and Net Income						
			U.S. Dollars (million)		Yen (billion)				
			Total ^c (3)	Majority Owned ^c (4)	Total (5)	Majority Owned (6)	Minority Owned (7)		
1977	268.51	2,045	5,523	1,522	1,483	409	1,074	3.629	3,
1978	210.44	2,041					(1,108)	(3.547)	
1979	219.14	1,988					(1,141)	(3.464)	
1980	226.74	2,245					(1,175)	(3.382)	
1981	220.54	2,725					(1,209)	(3.300)	
1982	249.08	2,843	7,236	2,249	1,802	560	1,242	3.217	4,
1983	237.51	3,812	8,300	2,876	1,971	683	1,288	2.886	
1984	237.52	3,262	8,467	3,247	2,011	771	1,240	2.608	
1985	238.54	2,572	9,476	3,511	2,260	838	1,423	2.699	
1986	168.52	4,075	13,478	5,597	2,271	943	1,328	2.408	
1987	144.64	4,136	15,487	6,991	2,240	1,011	1,229	2.215	
1988	128.15	4,627	18,830	8,532	2,413	1,093	1,320	2.207	
1989	137.96	4,757	19,949	9,042	2,752	1,247	1,505	2.206	14,

(continued)

Table 3B.1 (continued)

Year	Exchange Rate ^a (yen per U.S.\$) (1)	Value Added in Foreign Majority-Owned Firms ^b (billion yen) (2)	U.S.-Owned Affiliates in Japan					Ratio: Total to Majority Owned (3)/(4) (8)	Gross P of Maj Own (billion (9)	
			Sum of Employee Compensation and Net Income							
			U.S. Dollars (million)		Yen (billion)					
			Total ^c (3)	Majority Owned ^d (4)	Total (5)	Majority Owned (6)	Minority Owned (7)			
1990	144.79	4,778	20,506	9,209	2,969	1,333	1,636	2.227	14,	
1991	134.71	5,131	22,707	10,629	3,059	1,432	1,627	2.136	16,	
1992	126.65	4,497	21,673	10,851	2,745	1,374	1,371	1.997	15,	
1993	111.20		24,396	12,688	2,713	1,411	1,302	1.923	17,	

Note: Numbers in parentheses were interpolated on a straight line.

^aInternational Monetary Fund (1995).

^bLipsey, Blomström, and Ramstetter (1995, table B-7).

^cU.S. Department of Commerce (1981, 1985a, 1992b) and corresponding annual volumes.

^dMataloni and Goldberg (1994) and Mataloni (1995).

^eAssuming the same ratio of total to majority-owned in all countries as in United States.

^fAssuming only U.S. firms had minority holdings.

Table 3B.2

Estimating Foreign-Owned Manufacturing Production in Japan, Including Minority

Year	Exchange Rate* (yen per U.S.\$) (1)	Value Added in Foreign Majority-Owned Firms ^b (billion yen) (2)	U.S.-Owned Manufacturing Affiliates in Japan						Ratio: Total to Majority Owned (3)/(4) (8)	Gross P of Ma Own (billion (9)
			Sum of Employee Compensation and Net Income							
			U.S. Dollars (million)		Yen (billion)					
			Total ^c (3)	Majority Owned ^c (4)	Total (5)	Majority Owned (6)	Minority Owned (7)			
1977	268.51	1,548	2,810	952	755	256	499	2.952	1,4	
1978	210.44	1,604					(594)	(3.134)		
1979	219.14	1,548					(689)	(3.316)		
1980	226.74	1,663					(784)	(3.499)		
1981	220.54	2,178					(879)	(3.681)		
1982	249.08	2,183	5,277	1,366	1,314	340	974	3.863	2,1	
1983	237.51	3,188	5,513	1,575	1,309	374	935	3.500		
1984	237.52	2,762	6,087	1,988	1,446	472	974	3.062		
1985	238.54	2,159	6,819	2,113	1,627	504	1,123	3.227		
1986	168.52	3,414	8,851	3,210	1,492	541	951	2.757		
1987	144.64	3,455	10,728	4,226	1,552	611	941	2.539		
1988	128.15	3,701	12,575	4,701	1,611	602	1,009	2.675		

(continued)

Table 3B.2 (continued)

Year	Exchange Rate ^a (yen per U.S.\$) (1)	Value Added in Foreign Majority-Owned Firms ^b (billion yen) (2)	U.S.-Owned Manufacturing Affiliates in Japan					Ratio: Total to Majority Owned (3)/(4) (8)	Gross P of Ma Own (billion (9)	
			Sum of Employee Compensation and Net Income			Majority Owned ^c (4)	Yen (billion)			
			U.S. Dollars (million)		Total (5)		Majority Owned (6)			Minority Owned (7)
			Total ^e (3)	Majority Owned ^c (4)						
1989	137.96	3,852	13,450	5,147	1,856	710	1,146	2.613	7,6	
1990	144.79	3,674	13,867	5,090	2,008	737	1,271	2.724	7,3	
1991	134.71	3,882	14,384	5,680	1,938	765	1,173	2.532	7,9	
1992	126.65	3,463	13,418	5,686	1,699	720	979	2.360	7,8	
1993	111.20		14,896	6,597	1,656	734	922	2.258	8,9	

Note: Numbers in parentheses were interpolated on a straight line.

^aInternational Monetary Fund (1995).

^bLipsey, Blomström, and Ramstetter (1995, table B-7).

^cU.S. Department of Commerce (1981, 1985a, 1992b) and corresponding annual volumes.

^dMataloni and Goldberg (1994) and Mataloni (1995).

^eAssuming the same ratio of total to majority-owned in all countries as in United States.

^fAssuming only U.S. firms had minority holdings.

Appendix C

Table 3C.1 Share of Foreign-Owned Production in Seven Developed Countries in Their Real Output and Minority Ownership in Japan

Year ^a	Omitting Minority Ownership in Japan			Assuming Minority Ownership in Japan Only by U.S. Multinationals		
	Seven Countries	Six Countries	Five Countries	Seven Countries	Six Countries	Five Countries
	<i>Share (%) of Foreign-Owned Production in Real Output^b</i>					
1977	3.28	3.10	3.12	3.50	3.33	3.35
1979	(3.59) ^c	3.39	3.42	(3.79) ^c	3.60	3.63
1980	(3.74) ^d		3.56	(3.93) ^d		3.76
1981			3.77			3.97
1982			3.67			3.88
1985			3.65			3.83
1986	3.76	3.64	3.65	3.91	3.80	3.81
1989		4.24	4.24		4.38	4.38
1990	(4.34) ^e	4.20	4.21	(4.47) ^e	4.35	4.35
1991	(4.34) ^e	4.21	4.21	(4.47) ^e	4.35	4.35
	<i>Share (%) of Foreign-Owned Manufacturing Production in Real Output^b</i>					
1977	2.47	2.34	2.35	2.55	2.42	2.43
1979		2.47	2.48		2.57	2.58

(continued)

Table 3C.1

(continued)

Year ^a	Omitting Minority Ownership in Japan			Assuming Minority Ownership in Japan Only by U.S. Multinationals		
	Seven Countries	Six Countries	Five Countries	Seven Countries	Six Countries	Five Countries
1980	(2.49) ^c	2.35	2.37	(2.60) ^c	2.46	2.47
1981	(2.58) ^d		2.45	(2.70) ^d		2.57
1982			2.31			2.44
1985			2.33			2.45
1986	2.46	2.38	2.36	2.55	2.47	2.46
1989			2.85			2.95
1990	(2.94) ^e	2.83	2.81	(3.03) ^e	2.93	2.92
1991	(2.87) ^e		2.75	(2.95) ^e		2.84

Sources: Text tables, appendix B, and Penn World Tables (5.6).

Note: Seven countries are Australia, Japan, Norway, Sweden, the United Kingdom, the United States, and Canada. Excludes Australia and Sweden.

^aIn 1977, average of 1974 and 1979 for Canada. In 1978, U.K. figure for 1977. In 1979, figure for Sweden from 1978. In 1981, figure for Sweden from 1986. In 1987, figure for Sweden from 1986. In 1988, figure for Norway from 1987. In 1991, figures for Norway from 1986.

^bReal GDP in current international prices.

^cExtrapolated from 1977 by figures for six countries.

^dExtrapolated from 1979 by figures for five countries.

^eExtrapolated from 1986 by figures for five countries.

**Table 3C.2 Share of Foreign-Owned Production in Seven Developed Countries in World Output
Minority Ownership in Japan**

Year ^a	Omitting Minority Ownership in Japan			Assuming Minority Ownership Only by U.S. Multinationals		
	Seven Countries	Six Countries	Five Countries	Seven Countries	Six Countries	Five Countries
	<i>Share (%) in World Output^b of Foreign-Owned Production</i>					
1977	1.22	1.12	1.11	1.31	1.21	1.19
1979	(1.33) ^c	1.22	1.21	(1.41) ^c	1.30	1.29
1980			1.22			1.29
1981			1.30			1.37
1982			1.25			1.32
1985			1.26			1.32
1986	1.38	1.29	1.27	1.43	1.35	1.33
1989		1.50	1.48		1.55	1.53
1990	(1.57) ^d	1.48	1.45	(1.62) ^d	1.53	1.50
1991	(1.55) ^d	1.45	1.43	(1.59) ^d	1.50	1.48
	<i>Share (%) in World Output^b of Foreign-Owned Manufacturing Production</i>					
1977	0.93	0.85	0.84	0.96	0.88	0.87
1979		0.89	0.88		0.93	0.92
1980	(0.90) ^c	0.82	0.81	(0.93) ^c	0.86	0.85
1981			0.85			0.89
1982			0.79			0.83
1985			0.80			0.84

(continued)

Table 3C.2 (continued)

Year ^a	Omitting Minority Ownership in Japan			Assuming Minority Ownership Only by U.S. Multinationals			Assuming Minority Ownership by Foreign Multinationals in Same Proportion to Majority Ownership as for United States		
	Seven Countries	Six Countries	Five Countries	Seven Countries	Six Countries	Five Countries	Seven Countries	Six Countries	Five Countries
1986	0.90	0.84	0.82	0.93	0.88	0.86	1.04	0.98	0.96
1989			0.99			1.03			1.12
1990	(1.06) ^d	0.99	0.97	(1.10) ^d	1.03	1.01	(1.18) ^d	1.12	1.09
1991	(1.02) ^d		0.93	(1.05) ^d		0.96	(1.13) ^d		1.04

Sources: Text tables, appendix B, and Penn World Tables (5.6).

Note: Seven countries are Australia, Japan, Norway, Sweden, the United Kingdom, the United States, and Canada. Six countries exclude Australia. Five countries exclude Australia and Sweden.

^aIn 1977, average of 1974 and 1979 for Canada. In 1978, U.K. figure for 1977. In 1979, figure for Sweden from 1978. In 1980, U.K. figure for 1979. In 1982, U.K. figure for 1981. In 1987, figure for Sweden from 1986. In 1988, figure for Norway from 1987. In 1991, figures for both Norway and Sweden from 1990.

^bReal GDP in current international prices.

^cExtrapolated from 1977 by figures for six countries.

^dExtrapolated from 1979 by figures for five countries.

^eExtrapolated from 1986 by figures for five countries.

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Comment Raymond J. Mataloni, Jr.

This paper by Blomström, Lipsey, and Ramstetter examines the changing role of multinational companies (MNCs) in the world economy using time-series estimates of their production of goods and services (MNC gross product). The first half of the paper examines MNC production from the home-country perspective by measuring production shares for home-country-based MNCs; these include parent company shares of home-country GDP, foreign affiliate shares of foreign-host-country GDP, and whole MNC shares of gross world product. The second half examines MNC production from the host-country perspective, calculating the foreign-country-based MNC share of host-country GDP. The research is significant in both its scope and methods; the authors have compiled an extensive collection of data on MNC production in terms of both the number of countries and the number of years covered, and they use a variety of ratios to uncover meaningful trends.

My comments will deal primarily with the share of world production accounted for by home-country MNCs, first because it is the broadest measure,

but more important because it deals with a central theme of this conference: How do you measure the competitiveness of a nation's companies in an increasingly integrated global economy? This share should reflect the "competitiveness" of home-country MNCs, in the sense that it reflects the quality of their geographically mobile corporate assets (such as management, production techniques, and designs); however, because all world markets are not equally accessible for a given country's firms, the share will also be influenced by barriers to direct investment and the additional costs to foreign versus domestic production. This ownership-based measure of a nation's companies' standing in the global economy differs from the other ownership-based measure presented at this conference (the Baldwin and Kimura framework) because it encompasses MNC production for all customers—home-country and foreign alike.

The paper presents the home-country MNC share of world production for two countries (the United States and Japan) because they are the only ones for which all of the necessary data are available. (No other countries are known to produce estimates of parent company production.) Over the period examined—roughly speaking, the 1980s—there were markedly different changes in this share for the two groups of MNCs. The share of world production accounted for by Japanese MNCs increased from 1.5 to 4.1 percent while that accounted for by U.S. MNCs *declined* from 8.7 to 6.7 percent. Although it is quite possible that these divergent changes partly reflect changes in the relative competitiveness of Japanese and U.S. MNCs, there are other factors that may have contributed. The bulk of my comments will deal with those other factors and I hope, in doing so, will offer possible future improvements to this measure.

The first factor, other than changes in competitiveness, is the convention of introducing all existing domestic operations to the parent company universe once a company undertakes its first foreign direct investment. When a large domestic company suddenly becomes a multinational by establishing as little as one foreign affiliate, it usually causes a sizable increase in the aggregate parent company data and only a minor (if not negligible) increase in the aggregate foreign affiliate data. For example, suppose that a large U.S. company such as General Motors were a purely domestic manufacturer and that it had U.S. production valued at \$50 billion. If GM suddenly became a U.S. parent by establishing a Canadian affiliate with production valued at \$100 million, U.S. MNC gross product would be increased by \$50.1 billion, of which only \$100 million (or well under 1 percent) reflected an actual expansion of production. Thus large changes can occur in aggregate MNC production data that have little to do with actual expansion—or heightened competitiveness—of given MNCs.

It is likely that the "new parent company" effect had a much greater impact on the Japanese MNC data than on the U.S. MNC data. The 1980s was a period of great expansion in Japanese direct investment abroad and was accompanied by a rise in the number of Japanese parent companies. During 1980–88, the number of Japanese parent companies showed a net increase of 210 companies

(up 12 percent). By comparison, the U.S. parent company universe was much more stable, showing a net increase of only 71 companies (up 3 percent) during 1982–89. Perhaps consequently, Japanese parent companies accounted for the bulk (92 percent) of the growth in the share of world production accounted for by Japanese MNCs. In fact, had the Japanese parent share of worldwide GDP remained unchanged, while the Japanese foreign affiliate share increased as it did, the share of world production accounted for by Japanese MNCs would have only increased marginally (from 1.5 to 1.7 percent). To the extent that the rise in Japanese parent company production reflected additions to the parent company universe rather than expansion by existing parent companies, the rise in the Japanese MNC share of world production is unrelated to heightened competitiveness of given Japanese MNCs.

The phenomenon of new MNCs causing large increases in the parent company data, by bringing well-established domestic operations into the MNC universe, can cause analytical problems that cannot readily be controlled, or adjusted, for by data users. Any solution (if one exists) must come from the data producers.

Exchange rate changes are the second factor, other than rising competitiveness, that may have significantly boosted the Japanese MNC share of world production (measured in U.S. dollars) during the 1980s. The home-country MNC shares of world production were calculated in U.S. dollars. During the period for which the Japanese shares were calculated—1980 to 1988—the Japanese yen appreciated 62 percent relative to the U.S. dollar. Because the yen's appreciation was significantly greater against the dollar than against other foreign currencies, it boosted the dollar value of both Japanese parent production (translated from yen to dollars) and Japanese foreign affiliate production (translated from foreign currency to yen to dollars). Because Japanese parents accounted for 93 percent of Japanese MNC production worldwide in 1988, the exchange rate effect on the dollar value of their production alone would have increased the dollar value of Japanese MNC production by roughly 58 percent (93 percent of 62 percent).

During the roughly comparable period for which the U.S. shares were calculated—1982 to 1989—the dollar depreciated about 20 percent against other currencies, on average, which boosted the dollar value of U.S. foreign affiliate production. However, because foreign affiliates accounted for only 23 percent of U.S. MNC production worldwide in 1989, the exchange rate changes increased the dollar value of U.S. MNC production by only 5 percent, roughly (23 percent of 20 percent).

There are perhaps two ways that the comparison of Japanese and U.S. MNC shares of world production can be made more reflective of actual changes in the underlying competitiveness of those companies. First, to exclude the effects of exchange rate changes, the shares could be computed in base-period exchange rates. Researchers in the International Investment Division of the Bureau of Economic Analysis (BEA) may eventually be able to produce such estimates for U.S. MNCs. We are currently studying the effects of exchange

rate (and price) changes on U.S. MNC gross product and evaluating the utility of developing alternative measures that exclude the effects of these changes. Second, it may be possible to exclude the effects of new parent companies entering the MNC universe. The most restrictive solution would be to exclude parent companies from the analysis and to compare the foreign affiliate production shares of world GDP excluding the home country. Another possible solution would be to produce a subset of data for "well established" MNCs and to restrict the analysis to this group. (Obviously, this could be done only with the cooperation of the statistical agencies that produce the data.) Neither of these "solutions" is perfect in that something is lost for whatever is gained; in the first case, the parent company perspective is lost, and in the second, the meaningful effects of new MNCs on the foreign affiliate data are lost.

In addition to the statistical issues just mentioned, there may also be a conceptual limitation to the MNC world production shares. Despite growing openness in the world economy, MNCs retain a competitive advantage at home. They can be shielded from cross-border foreign competition through tariff or nontariff barriers and from local foreign competition through explicit barriers to foreign direct investment or less tangible barriers such as language and cultural differences or restrictive market structures (such as the Japanese *keiretsu* system). These advantages could have a major effect on the MNC world production shares because an overwhelming share of global MNC production occurs in the home country (77 percent for U.S. MNCs in 1989 and 93 percent for Japanese MNCs in 1988). Therefore, when examining the world production shares for any two countries' MNCs, it is important to consider the relative openness of their domestic markets.

I would like to end by noting steps that BEA has taken to maintain and I hope expand its MNC gross product estimates in order to facilitate this type of research. Since the release, in the February 1994 *Survey of Current Business*, of the U.S. MNC gross product estimates used in this paper, the bureau has released revised 1991 estimates of gross product by majority-owned foreign affiliates in the June 1994 *Survey*, as well as revised 1992 and preliminary 1993 estimates in the June 1995 *Survey*. In addition, annual estimates of U.S. parent company, and thus worldwide U.S. MNC, gross product may soon be available. Those estimates are currently available only in benchmark survey years (the last of which covered 1989) because the necessary data items are not collected in the annual surveys. The bureau has proposed adding the necessary data items to its annual surveys following the 1994 benchmark survey. If these changes are approved, U.S. parent, foreign affiliate, and worldwide U.S. MNC gross product will be available annually from 1994 forward. Worldwide U.S. MNC gross product estimates are an important addition to the statistical information on MNCs that can enhance our understanding of direct investment, the operations of multinational companies, and the relevance of geography-based and ownership-based measures of international transactions.