

Characteristics of Foreign-Owned U.S. Manufacturing Establishments

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THIS ARTICLE examines the characteristics of foreign-owned U.S. manufacturing establishments on the basis of newly released data from a joint project of the Bureau of Economic Analysis (BEA) and the Bureau of the Census. The data greatly expand the establishment-level information available on the manufacturing operations of U.S. affiliates of foreign companies.¹ Because the establishment data provide more detailed and more precise information on the industrial composition of affiliates' operations than BEA's enterprise data (see the box on page 35), they can significantly enhance and extend the analysis of key questions about foreign direct investment in the United States (FDIUS), such as whether foreign-owned plants account for significant shares of total U.S. production in specific manufacturing industries and whether the wage rates and productivity of foreign-owned U.S. plants differ from those of U.S.-owned plants.

The new data on foreign-owned manufacturing establishments indicate the following:

- The average plant size, or scale, of foreign-owned establishments is much larger than that of U.S.-owned establishments, mostly reflecting the tendency for foreign-owned establishments to be larger than U.S.-owned establishments within specific industries. Less important is the tendency of foreign-owned establishments to be concentrated in industries with larger-than-average plant size.
- The capital intensity of foreign-owned establishments is higher than that of U.S.-

owned establishments, almost entirely reflecting foreign-owned establishments' relatively greater concentration in the industries that are the most capital intensive; the overall effect of within-industry differences is negligible. In many industries, the capital intensity of foreign-owned establishments differs from that of U.S.-owned establishments, but there is no systematic tendency for this difference to be in one direction or the other.

- The hourly wages paid to production workers are higher for foreign-owned establishments than for U.S.-owned establishments. Foreign-owned establishments tend to be in higher wage industries, and their production is more concentrated in large plants, which generally have higher wage rates than small plants. Foreign ownership per se does not appear to influence wage rates.
- The labor productivity of foreign-owned establishments is higher than that of U.S.-owned establishments, largely reflecting the tendency for foreign-owned establishments to be concentrated in industries in which

1. A U.S. affiliate is a U.S. business enterprise that is owned 10 percent or more, directly or indirectly, by a foreign person. "Person" is broadly defined to include any individual, corporation, branch, partnership, associated group, association, estate, trust, or other organization and any government (including any corporation, institution, or other entity or instrumentality of a government). The data are not adjusted for percentage of foreign ownership. Thus, for example, the employment data shown here include all employees at the manufacturing establishments of each U.S. affiliate, even though the foreign investor may own as little as 10 percent of the affiliate. However, most affiliates are majority owned; based on BEA data, U.S. affiliates that are majority owned (that is, affiliates that are owned more than 50 percent by direct investors) accounted for 85 percent of all manufacturing employment by U.S. affiliates.

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productivity is high. There are also within-industry differences in productivity, but they appear to be attributable largely to factors that have frequently been found to influence productivity—namely, plant size, capital intensity, and employee skill level—rather than to foreign ownership per se.

The new data on foreign-owned manufacturing establishments, which cover 1989 and 1990, were released last fall as part of an ongoing effort to augment and improve U.S. Government data on FDIUS. The data were obtained by linking BEA enterprise, or company, data on FDIUS with more detailed Census Bureau establishment, or plant, data for all U.S. companies.² For the linked establishments (hereafter referred to as “foreign-owned establishments”), data from the Census Bureau’s annual survey of manufactures (ASM) were then extracted.

2. A parallel project has linked BEA’s FDIUS data to Bureau of Labor Statistics (BLS) data on all U.S. businesses. The initial results of that link, released in 1992 by BLS, provided data for 1989 and 1990 on the number, employment, and payroll of foreign-owned establishments for both manufacturing and nonmanufacturing industries. In October 1993, BLS released information on the occupational structure of foreign-owned manufacturing establishments in 1989. Data from the two link projects differ, particularly at the most detailed industry levels, because of differences in coverage, classification, timing, and definitions. Both projects were authorized by Congress under the Foreign Direct Investment and International Financial Data Improvements Act of 1990.

The new data on foreign-owned manufacturing establishments cover most of the ASM items, including value added, shipments, employment, total employee compensation, employee benefits, hourly wage rates of production workers, cost of materials and energy used, inventories by stage of fabrication, and expenditures for new plant and equipment. Data are also included on the number of foreign-owned establishments. Totals for 1989 and 1990 for each of these items are shown in table 1. The data are also available by highly detailed industry, by State, and by country of investor. Summary data for 1990 appear in tables 2–13; data by detailed industry for 1990 covering selected items for foreign-owned and all U.S. establishments are shown in table 14, at the end of the article. (The box on page 51 provides information on the availability of the data in full detail for 1989 and 1990.)

The new ASM data update and extend the link project’s initial results, published in 1992, which were for 1987—a benchmark, or census, year for both BEA and the Census Bureau. The 1987 data covered both manufacturing and nonmanufacturing establishments, but presented fewer measures of their operations than are available from the new ASM-based series.³ Later this year,

3. For summary data for 1987, see “Foreign Direct Investment in the United States: Establishment Data for 1987,” SURVEY OF CURRENT BUSINESS

Establishment and Enterprise Data for U.S. Affiliates Compared

The establishment data presented in this article complement BEA’s enterprise data for U.S. affiliates. BEA’s enterprise data are needed for analyzing the overall significance of, and trends in, direct investment and for compiling the U.S. international transactions accounts, the international investment position of the United States, and the U.S. national income and product accounts. The data on positions and transactions between U.S. affiliates and their foreign parents used in compiling the national and international accounts exist only at the enterprise level. Analyses of some topics, such as profits and taxes, are meaningful only at that level. Furthermore, balance sheets and income statements containing the critical, nonduplicative financial and operating data needed for examining these topics exist only at the enterprise level.

The establishment data facilitate analysis of the activities and importance of foreign-owned U.S. companies in specific industries because they provide more detailed and more precise information on the industrial composition of U.S. affiliates’ operations than BEA’s enterprise data. Whereas BEA’s enterprise data classify each company, however diversified, in a single industry, the establishment data permit each plant or location of a company to be classified separately. Furthermore, the

level of industry classification can be much more detailed for individual establishments than is appropriate for consolidated enterprises, whose operations may span many narrowly defined industries. As a result, foreign-owned establishments can be classified into 459 manufacturing industries, whereas BEA’s foreign-owned enterprises can be classified into only 55 manufacturing industries.

The establishment data also provide more detailed State-by-industry data than are available from the enterprise data, and the ASM data introduced in this article include the first available State-level measures of manufacturing production (value added) by foreign-owned firms.

Finally, the establishment-level data for foreign-owned and U.S.-owned companies presented in this article are closely comparable because they are from the same source. In contrast, the enterprise-level data for foreign-owned U.S. companies collected by BEA are frequently not comparable, except at highly aggregated levels, with data for all U.S. companies collected by other Government agencies. Because the other agencies’ data are collected for different purposes, they often differ significantly in concept, definitions, consolidation, and industry classification from BEA’s data for foreign-owned companies.

BEA and the Census Bureau will publish ASM data for foreign-owned manufacturing establishments for 1991 and for 1988.

This article analyzes the operations of foreign-owned manufacturing establishments on the basis of the 1990 ASM data. Although the data are for the year 1990, most of the findings probably also apply to more recent years, because both the overall level and the industry and country composition of foreign direct investment in U.S. manufacturing have changed little since then.⁴

72 (October 1992): 44-78. For a slightly expanded version of that article, see Office of the Chief Economist, Economics and Statistics Administration, U.S. Department of Commerce, *Foreign Direct Investment in the United States: An Update* (Washington, DC: U.S. Government Printing Office, June 1993). The detailed 1987 data are available in a separate volume (see *inside back cover* for order information).

4. Although foreign direct investment in manufacturing grew rapidly between 1987 and 1990, data from BEA's enterprise surveys indicate that there was little growth in the industry in 1991 and 1992. According to BEA's annual survey of FDIUS, total manufacturing employment of U.S. affiliates in 1991 was almost the same as that in 1990, and changes in the composition of employment among subindustries of manufacturing and among investing countries were small. Moreover, data from BEA's latest survey of U.S. businesses acquired or established by foreign direct investors indicate that in 1992, new investment in manufacturing was at the lowest level in 8 years and was less than one-half that in 1991. In the May 1993 SURVEY, see "U.S. Affiliates

The remainder of this article consists of two sections and a technical note. The first section provides an overview of the operations of foreign-owned manufacturing establishments by industry, country, and State. The second compares the following key aspects of the operations of foreign-owned establishments with those of U.S.-owned establishments: Plant size, capital intensity, employee compensation, hourly wage rates of production workers, and labor productivity. The technical note describes the statistical decomposition method used in the article to separate industry-mix effects from within-industry differences and discusses how the estimation of data for foreign-owned establishments and the inclusion of residual industries, which cover establishments not elsewhere classified, affect the findings of the article.

Overview of Operations

In 1990, there were 11,900 foreign-owned manufacturing establishments in the United States. They employed 2 million workers and had shipments of \$418 billion. Their value added, an approximate measure of production, was \$177 billion, 13 percent of the value added by all U.S. manufacturing establishments (*table 2*).⁵

More than one-half of the value added by foreign-owned manufacturing establishments in 1990 was accounted for by four Standard Industrial Classification (SIC) two-digit industries: Chemicals and allied products (\$49 billion), food and kindred products (\$20 billion), electronic and other electric equipment (\$17 billion), and industrial machinery and equipment (\$14 billion). Production in the chemicals industry alone accounted for more than one-fourth of the value added by foreign-owned manufacturing establishments.

Among SIC two-digit industries, the share of total U.S. production accounted for by foreign-owned establishments was largest in chemicals (32 percent), followed by stone, clay, and glass products (25 percent) and primary metals (19 percent). The share was less than 5 percent in four industries: Apparel and other textile products, lumber and wood products, furniture and fixtures, and transportation equipment.

Table 1.—Data for Foreign-Owned Manufacturing Establishments, 1989 and 1990

[Millions of dollars, except as noted]

	1989	1990
Number of establishments	10,458	11,934
Value added by manufacture	161,929.2	177,360.7
Value of shipments	371,911.9	417,539.4
Employment and employee compensation:		
Total employment (number of employees)	1,815,311	2,004,235
Production workers (number)	1,082,983	1,188,140
Other workers (number)	732,328	816,095
Production worker hours (millions of hours)	2,203.2	2,411.7
Employee compensation, total	67,769.1	78,128.8
Payroll	55,562.5	63,495.9
Production worker wages	26,616.4	30,304.8
Other workers	28,946.1	33,191.1
Benefits	12,206.6	14,632.9
Legally required	4,751.2	5,591.4
Other	7,455.4	9,041.5
Production worker wages per hour (dollars)	12.08	12.57
Expenditures for new plant and equipment:		
Total	16,070.6	19,748.4
Buildings and other structures	2,799.6	3,246.5
Machinery and equipment	13,271.0	16,502.0
Materials:		
Cost of materials, total	211,706.8	241,548.4
Of which:		
Purchased fuels and electric energy	8,993.6	10,106.3
Fuels	3,697.4	4,238.1
Electric energy	5,296.1	5,868.2
Quantity of electric energy used (billion kWh)	121,950.3	135,204.9
Inventories:		
End of year, total	49,926.9	55,487.3
Finished products	20,151.9	23,167.3
Work-in-process	12,954.2	13,650.3
Materials, supplies, fuels, etc.	16,820.9	18,669.7
Beginning of year, total	47,212.3	53,768.3
Finished products	18,701.2	21,736.4
Work-in-process	12,424.6	13,635.7
Materials, supplies, fuels, etc.	16,077.4	18,396.2

kWh Kilowatthours

of Foreign Companies: Operations in 1991" and "U.S. Business Enterprises Acquired or Established by Foreign Direct Investors in 1992."

5. Value added measured by the Census Bureau's ASM differs from BEA's national income and product accounts measure of gross product because it includes purchased services but excludes indirect taxes and because it reflects inventory change valued at book value rather than at replacement cost.

Within a given two-digit industry, the shares for the component subindustries may vary considerably. In transportation equipment, for example, where foreign-owned establishments' share of value added was just under 5 percent, shares for SIC three-digit subindustries ranged from less than 1 percent for "guided missiles, space vehicles, and parts" to 12 percent for railroad equipment. The share for motor vehicles and equipment was 8 percent.

At the SIC four-digit level, foreign-owned establishments had operations in 429 of the 459 manufacturing industries. They accounted for less than 5 percent of total industry production in 149 industries and for more than 30 percent in 45 industries (table 3). Of the latter group, 13 industries were in chemicals, 6 in stone, clay, and glass products, and 6 in electronic and other electric equipment.

In nine industries, foreign-owned establishments accounted for more than one-half of total U.S. production. Their shares were highest in three chemicals industries: Inorganic pigments (71 percent), biological products except diagnostic (69 percent), and noncellulosic organic fibers (67 percent) (table 14). Among the industries outside chemicals, the share was highest in hydraulic cement (62 percent).

By country

In 1990, more than 80 percent of the employment, shipments, and value added by all foreign-

owned manufacturing establishments were accounted for by establishments with ultimate beneficial owners (UBO's) in seven countries: Canada, France, Germany, Japan, the Netherlands, Switzerland, and the United Kingdom (table 4).⁶ The establishments of these seven countries accounted for 86 percent of the value added by all foreign-owned manufacturing establishments and for 11 percent of the value added by all U.S. manufacturing establishments.

6. The UBO is that person, proceeding up a U.S. affiliate's ownership chain, beginning with and including the foreign parent, that is not owned more than 50 percent by another person. The foreign parent is the first foreign person in the affiliate's ownership chain. Unlike the foreign parent, the UBO of an affiliate may be located in the United States. The UBO of each U.S. affiliate is identified to ascertain the person that ultimately owns or controls and that, therefore, ultimately derives the benefits from owning or controlling the U.S. affiliate.

Table 3.—Distribution of Manufacturing Industries According to Foreign-Owned Establishments' Share of Value Added, 1990

Percentage of an industry's value added accounted for by foreign-owned establishments	Number of industries
0 ¹	30
Less than 5.0 ²	119
5.0-9.9	89
10.0-14.9	73
15.0-19.9	43
20.0-24.9	33
25.0-29.9	27
30.0-34.9	10
35.0-39.9	13
40.0-44.9	6
45.0-49.9	7
50.0 or more	9

1. Industries with no foreign-owned establishments.
 2. Includes three industries for which value added by foreign-owned establishments was negative in 1990.
 NOTE.—The distribution is across the 459 industries defined at the four-digit level of the Standard Industrial Classification.

Table 2.—Selected Data for Foreign-Owned Manufacturing Establishments, by Industry, 1990

SIC code	Industry	Foreign-owned establishments				Foreign-owned establishments as a percentage of all U.S. establishments		
		Number of establishments	Number of employees	Millions of dollars		Employment	Value added	Shipments
Value added	Shipments							
	Manufacturing	11,934	2,004,235	177,360.7	417,539.4	10.6	13.4	14.5
20	Food and kindred products	983	159,386	19,501.2	46,842.8	10.8	13.8	12.2
21	Tobacco products	5	H	(D)	(D)	(D)	(D)	(D)
22	Textile mill products	183	47,363	2,283.1	5,693.6	7.5	8.6	8.6
23	Apparel and other textile products	116	23,085	850.2	1,727.5	2.3	2.6	2.7
24	Lumber and wood products	184	17,043	842.5	2,304.0	2.5	2.9	3.1
25	Furniture and fixtures	83	J	(D)	(D)	(D)	(D)	(D)
26	Paper and allied products	328	48,644	4,709.2	11,395.2	7.7	7.9	8.7
27	Printing and publishing	834	103,983	10,408.8	16,499.9	6.8	10.1	10.5
28	Chemicals and allied products	1,520	242,392	48,835.7	87,678.9	28.4	31.9	30.4
29	Petroleum and coal products	319	25,638	4,106.8	46,372.6	22.9	15.1	26.9
30	Rubber and miscellaneous plastics products	658	120,951	8,757.9	17,790.6	13.9	17.6	17.5
31	Leather and leather products	29	6,362	287.3	608.1	5.4	6.3	6.2
32	Stone, clay, and glass products	1,421	105,578	8,450.2	16,407.5	20.7	24.8	25.9
33	Primary metal industries	402	119,087	10,297.6	31,902.9	16.7	19.3	21.8
34	Fabricated metal products	593	93,300	6,350.2	13,973.6	6.5	7.9	8.6
35	Industrial machinery and equipment	945	191,440	13,561.7	31,010.6	10.2	10.3	12.1
36	Electronic and other electric equipment	760	228,237	16,703.2	34,601.8	15.2	15.6	17.8
37	Transportation equipment	274	104,147	7,170.6	28,834.9	5.9	4.9	7.8
38	Instruments and related products	467	121,520	9,722.1	15,840.7	12.8	11.9	12.8
39	Miscellaneous manufacturing industries	128	26,087	1,929.3	3,553.2	6.8	9.6	9.6
	Administrative and auxiliary	1,702	200,064	n.a.	n.a.	15.9	n.a.	n.a.

D Suppressed to avoid disclosure of data of individual companies.
 n.a. Not available.

A—0 to 19; B—20 to 99; C—100 to 249; E—250 to 499; F—500 to 999; G—1,000 to 2,499; H—2,500 to 4,999; I—5,000 to 9,999; J—10,000 to 24,999; K—25,000 to 49,999; L—50,000 to 99,999; M—100,000 or more.
 NOTE.—Size ranges are given in employment cells that are suppressed. The size ranges are:
 SIC Standard Industrial Classification

Among establishments of individual investing countries, British-owned establishments accounted for the largest share of production by foreign-owned manufacturing establishments (23 percent), followed by Canadian-owned establishments (15 percent) and Japanese-owned establishments (13 percent). The share of total U.S. manufacturing production accounted for by British-owned establishments was 3 percent.

British-owned establishments also accounted for the largest share of production by foreign-owned establishments in 10 of the 20 SIC two-

digit manufacturing industries. Among these 10 industries, their share of total U.S. manufacturing production was largest in tobacco products, petroleum and coal products, food and kindred products, and instruments and related products (table 5).

Japanese-owned establishments accounted for the largest share of production by foreign-owned establishments in four industries: Primary metals, industrial machinery and equipment, electronic and other electric equipment, and transportation equipment. Their share of total U.S.

Table 4.—Selected Data for Foreign-Owned Manufacturing Establishments, by Country of UBO, 1990

Country	Number of establishments	Number of employees	Millions of dollars		Share of all-countries total (percent)			
			Value added	Value of shipments	Number of establishments	Number of employees	Value added	Value of shipments
All countries	11,934	2,004,235	177,360.7	417,539.4	100.0	100.0	100.0	100.0
Canada	1,538	269,362	26,869.2	58,983.3	12.9	13.4	15.1	14.1
Europe	8,007	1,297,424	115,466.1	251,039.0	67.1	64.7	65.1	60.1
Austria	27	5,035	417.1	816.2	.2	.3	.2	.2
Belgium	95	14,633	1,626.7	4,975.5	.8	.7	.9	1.2
Denmark	39	7,159	377.4	916.6	.3	.4	.2	.2
Finland	123	18,112	1,194.5	2,891.2	1.0	.9	.7	.7
France	1,217	178,324	15,390.3	36,168.0	10.2	8.9	8.7	8.7
Germany	1,045	229,007	20,442.5	40,568.9	8.8	11.4	11.5	9.7
Ireland	243	26,534	2,090.1	5,227.6	2.0	1.3	1.2	1.3
Italy	141	17,307	1,260.1	3,755.4	1.2	.9	.7	.9
Liechtenstein	9	917	50.9	120.7	.1	(*)	(*)	(*)
Luxembourg	25	5,003	307.2	664.3	.2	.2	.2	.2
Netherlands	618	123,424	11,648.1	34,800.9	5.2	6.2	6.6	8.3
Norway	53	5,771	463.9	933.8	.4	.3	.3	.2
Spain	20	399	26.5	65.7	.2	(*)	(*)	(*)
Sweden	347	73,818	4,969.9	10,760.5	2.9	3.7	2.8	2.6
Switzerland	697	133,934	14,829.4	27,440.4	5.8	6.7	8.4	6.6
United Kingdom	3,291	456,618	40,325.9	80,610.2	27.6	22.8	22.7	19.3
Other	17	1,429	45.5	323.0	.1	.1	(*)	.1
Latin America and Other Western Hemisphere	238	56,017	4,624.6	14,068.4	2.0	2.8	2.6	3.4
South and Central America	143	38,737	3,614.5	11,999.7	1.2	1.9	2.0	2.9
Brazil	9	358	22.9	77.3	.1	(*)	(*)	(*)
Mexico	64	J	(D)	(D)	.5	.5-1.2	(D)	(D)
Panama	35	J	(D)	(D)	.3	.5-1.2	(D)	(D)
Venezuela	31	6,684	1,123.1	7,532.0	.3	.3	.6	1.8
Other	4	174	15.5	27.4	0	(*)	(*)	(*)
Other Western Hemisphere	95	17,280	1,010.1	2,068.7	.8	.9	.6	.5
Africa	46	6,869	475.1	1,374.4	.4	.3	.3	.3
Middle East	67	I	(D)	(D)	.6	.2-5	(D)	(D)
Asia and Pacific	2,005	362,948	29,384.5	83,833.6	16.8	18.1	16.6	20.1
Australia	497	36,448	3,785.0	10,446.8	4.2	1.8	2.1	2.5
Hong Kong	3	C	(D)	(D)	(*)	(*)	(D)	(D)
Japan	1,356	291,415	22,814.6	65,760.0	11.4	14.5	12.9	15.7
Korea, Republic of	20	3,988	253.8	1,145.0	.2	.2	.1	.3
Malaysia	1	C	(D)	(D)	(*)	(*)	(D)	(D)
New Zealand	51	17,489	1,352.6	3,549.5	.4	.9	.8	.9
Philippines	13	H	(D)	(D)	.1	.1-2	(D)	(D)
Singapore	8	1,184	106.1	283.2	.1	.1	.1	.1
Taiwan	37	5,840	501.1	1,327.6	.3	.3	.3	.3
Other	19	G	(D)	(D)	.2	0-1	(D)	(D)
United States	33	H	(D)	(D)	.3	.2	(D)	(D)
Addenda:								
European Communities (12) ¹	6,735	L	(D)	(D)	56.4	2.5-5.0	(D)	(D)
OPEC ²	77	J	(D)	(D)	.6	.5-1.2	(D)	(D)

^D Suppressed to avoid disclosure of data of individual companies.

* Less than 0.05 percent.

1. The European Communities (12) comprises Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom.

2. OPEC is the Organization of Petroleum Exporting Countries. Through 1992, its members were Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, the United Arab Emirates, and Venezuela.

NOTES.—The columns for number of establishments and for number of employees cover both

operating establishments and administrative and auxiliary establishments; the other columns cover operating establishments only.

Size ranges are given in employment cells that are suppressed. The size ranges are: A—0 to 19; B—20 to 99; C—100 to 249; E—250 to 499; F—500 to 999; G—1,000 to 2,499; H—2,500 to 4,999; I—5,000 to 9,999; J—10,000 to 24,999; K—25,000 to 49,999; L—50,000 to 99,999; M—100,000 or more.

UBO Ultimate beneficial owner

manufacturing production was largest in primary metals and in electronic and other electric equipment.

Table 6 presents, for each of the seven major investing countries, ratios of the country's share of U.S. value added in each SIC two-digit industry to the country's share of value added in manufacturing as a whole. These ratios can be interpreted as indexes of relative intensity of investment by a country, taking into account both the size of the industry and the overall level of manufacturing production by the country's U.S. establishments.

Because these ratios allow for variations in both industry size and production levels, the ratios, unlike simple distributions of value added, can be compared across countries as well as among industries. A value greater than 1.0 indicates that production by the investing country's establishments was more intense in the given industry than in manufacturing as a whole. For example, Japanese-owned establishments accounted for 1.7 percent of total U.S. manufacturing production but for 3.5 percent of U.S. production in rubber products; thus, the value of the index for

Table 5.—Value Added in Manufacturing Industries by All U.S. Establishments and by Foreign-Owned Establishments of Major Investing Countries, 1990

SIC code	Industry	All U.S. establishments	Foreign-owned establishments by country of UBO								U.S.-owned establishments	
			All countries	Canada	France	Germany	Netherlands	Switzerland	United Kingdom	Japan		Other countries
Millions of dollars												
	Manufacturing	1,326,361.7	177,360.7	26,869.2	15,390.3	20,442.5	11,648.1	14,829.4	40,325.9	22,814.6	25,040.8	1,149,001.0
20	Food and kindred products	140,972.8	19,501.2	2,108.1	1,175.4	445.6	2,949.6	3,913.7	5,821.8	786.0	2,301.0	121,471.6
21	Tobacco products	22,561.3	(^D)	0	0	(^D)	0	0	(^D)	0	0	(^D)
22	Textile mill products	26,541.6	2,283.1	507.6	195.2	264.9	37.7	48.1	693.1	246.9	289.8	24,258.5
23	Apparel and other textile products	33,034.0	850.2	(^D)	(^D)	129.4	(^D)	0	186.8	(^D)	(^D)	32,183.8
24	Lumber and wood products	28,597.2	842.5	(^D)	18.0	62.0	(^D)	(^D)	281.2	76.1	(^D)	27,754.7
25	Furniture and fixtures	21,644.7	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)
26	Paper and allied products	59,823.3	4,709.2	749.8	129.7	119.1	(^D)	68.7	885.9	477.4	(^D)	55,114.1
27	Printing and publishing	103,179.0	10,408.8	3,143.4	465.6	1,248.1	(^D)	(^D)	2,856.1	386.4	1,670.8	92,770.2
28	Chemicals and allied products	153,032.4	48,835.7	(^D)	2,944.8	9,316.9	5,034.2	6,477.8	8,760.1	2,438.7	(^D)	104,196.7
29	Petroleum and coal products	27,214.1	4,106.8	1,032.1	(^D)	(^D)	(^D)	(^D)	1,952.4	(^D)	(^D)	23,107.3
30	Rubber and miscellaneous plastics products	49,889.0	8,757.9	996.1	2,153.6	1,124.9	465.5	117.8	1,731.5	1,722.4	446.1	41,131.1
31	Leather and leather products	4,586.6	287.3	(^D)	(^D)	0	(^D)	(^D)	(^D)	0	(^D)	4,299.3
32	Stone, clay, and glass products	34,140.2	8,450.2	154.5	2,256.9	610.6	174.1	515.2	1,747.3	774.7	2,216.8	25,690.0
33	Primary metal industries	53,366.6	10,297.6	1,522.7	1,342.3	655.5	62.9	378.2	956.9	3,874.2	1,505.0	43,069.0
34	Fabricated metal products	79,951.9	6,350.2	877.0	(^D)	685.9	(^D)	231.0	1,917.2	426.4	962.3	73,601.7
35	Industrial machinery and equipment	132,165.8	13,561.7	501.8	799.3	1,739.4	187.9	689.8	2,612.0	2,947.5	4,084.0	118,604.1
36	Electronic and other electric equipment	106,983.9	16,703.2	2,399.1	901.9	2,273.6	(^D)	714.8	2,549.6	4,333.1	(^D)	90,280.7
37	Transportation equipment	146,916.3	7,170.6	801.0	723.5	330.2	26.9	(^D)	1,131.1	3,183.2	(^D)	139,745.7
38	Instruments and related products	81,665.6	9,722.1	1,355.6	390.6	1,271.3	(^D)	1,068.3	3,314.9	780.1	(^D)	71,943.5
39	Miscellaneous manufacturing industries	20,095.6	1,929.3	64.6	279.6	(^D)	(^D)	(^D)	612.4	235.1	577.4	18,166.3
Percent of all U.S. establishments												
	Manufacturing	100.0	13.4	2.0	1.2	1.5	0.9	1.1	3.0	1.7	1.9	86.6
20	Food and kindred products	100.0	13.8	1.5	.8	.3	2.1	2.8	4.1	.6	1.6	86.2
21	Tobacco products	100.0	(^D)	0	0	(^D)	0	0	(^D)	0	0	(^D)
22	Textile mill products	100.0	8.6	1.9	.7	1.0	.1	.2	2.6	.9	1.1	91.4
23	Apparel and other textile products	100.0	2.6	(^D)	(^D)	.4	(^D)	0	.6	(^D)	(^D)	97.4
24	Lumber and wood products	100.0	2.9	(^D)	.1	.2	(^D)	(^D)	1.0	.3	(^D)	97.1
25	Furniture and fixtures	100.0	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)	(^D)
26	Paper and allied products	100.0	7.9	1.3	.2	.2	(^D)	.1	1.5	.8	(^D)	92.1
27	Printing and publishing	100.0	10.1	3.0	.5	1.2	(^D)	(^D)	2.8	.4	1.6	89.9
28	Chemicals and allied products	100.0	31.9	(^D)	1.9	6.1	3.3	4.2	5.7	1.6	(^D)	68.1
29	Petroleum and coal products	100.0	15.1	3.8	(^D)	(^D)	(^D)	(^D)	7.2	(^D)	(^D)	84.9
30	Rubber and miscellaneous plastics products	100.0	17.6	2.0	4.3	2.3	.9	.2	3.5	3.5	.9	82.4
31	Leather and leather products	100.0	6.3	(^D)	(^D)	0	(^D)	(^D)	(^D)	0	(^D)	93.7
32	Stone, clay, and glass products	100.0	24.8	.5	6.6	1.8	.5	1.5	5.1	2.3	6.5	75.2
33	Primary metal industries	100.0	19.3	2.9	2.5	1.2	.1	.7	1.8	7.3	2.8	80.7
34	Fabricated metal products	100.0	7.9	1.1	(^D)	.9	(^D)	.3	2.4	.5	1.2	92.1
35	Industrial machinery and equipment	100.0	10.3	.4	.6	1.3	.1	.5	2.0	2.2	3.1	89.7
36	Electronic and other electric equipment	100.0	15.6	2.2	.8	2.1	(^D)	.7	2.4	4.1	(^D)	84.4
37	Transportation equipment	100.0	4.9	.5	.5	.2	(^D)	(^D)	.8	2.2	(^D)	95.1
38	Instruments and related products	100.0	11.9	1.7	.5	1.6	(^D)	1.3	4.1	1.0	(^D)	88.1
39	Miscellaneous manufacturing industries	100.0	9.6	.3	1.4	(^D)	(^D)	(^D)	3.0	1.2	2.9	90.4
Addendum:												
Total number of industries in which the UBO country's establishments have the highest share of value added among investing countries												
				2	3	0	0	0	10	4	1	

* Less than 0.05 percent.

^D Suppressed to avoid disclosure of data of individual companies.

UBO Ultimate beneficial owner

SIC Standard Industrial Classification

Japanese-owned establishments in rubber products was 2.0, indicating a relatively high intensity of investment in the industry.

In the table, France stands out because of the relatively high intensity of its investment in stone, clay, and glass products: In 1990, French-owned establishments' share of U.S. production in this industry was nearly six times as large as their share in total manufacturing. France also shows relatively intense investment in the rubber products industry, where French-owned establishments' share of production was nearly four times as large as their share in total manufacturing.

Japan shows relatively intense investment in the primary metals industry; Japanese-owned establishments' share of production in this industry was more than four times as large as that in total manufacturing. In contrast, their share of production in transportation equipment was only slightly higher than their share in total manufacturing.

Germany shows relatively intense investment in chemicals, as do Switzerland and the Netherlands. The establishments of each of these three countries had shares of production in chemicals that were nearly four times as large as their shares in total manufacturing.

By State

The States with the largest production by foreign-owned manufacturing establishments were California, Texas, New Jersey, North Carolina, Ohio,

and New York (table 7). These six States accounted for 41 percent of the total production by foreign-owned manufacturing establishments in the United States. By two-digit industry, California accounted for a particularly large share of the production in electronic and other electric equipment (23 percent), and New York accounted for a very large share in printing and publishing (26 percent) (table 8). Texas, New Jersey, and North Carolina together accounted for nearly 40 percent of the production by foreign-owned establishments in chemicals, and Ohio accounted for nearly 20 percent in transportation equipment.

Among two-digit industries, chemicals accounted for the largest share of production by foreign-owned manufacturing establishments in 20 States, and food products accounted for the largest share in 11 States. The chemicals industry accounted for more than one-half of foreign-owned production in five States: Delaware, West Virginia, New Jersey, Texas, and Virginia.

The States in which foreign-owned establishments accounted for the largest share of manufacturing production were Delaware (37 percent), West Virginia (36 percent), New Jersey (24 percent), Georgia (19 percent), South Carolina (19 percent), and North Carolina (19 percent). In several of these States, foreign-owned establishments accounted for very large shares of chemicals production—74 percent in Delaware, 56 percent in West Virginia, 47 percent in New Jersey, and 60 percent in North Carolina (table 9). In North Carolina, foreign-owned establishments also accounted for large shares of production

Table 6.—Index of Relative Intensity of Production in Manufacturing for All Foreign-Owned Establishments and for Establishments of Major Investing Countries, 1990

SIC code	Industry	All countries	Canada	France	Germany	Netherlands	Switzerland	United Kingdom	Japan	Other countries
	Manufacturing	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
20	Food and kindred products	1.034	.738	.719	.205	2.382	2.483	1.358	.324	.865
21	Tobacco products	(^P)	0	0	(^P)	0	0	(^P)	0	0
22	Textile mill products .....	.643	.944	.634	.648	.162	.162	.859	.541	.578
23	Apparel and other textile products .....	.192	(^P)	(^P)	.254	(^P)	0	.186	(^P)	(^P)
24	Lumber and wood products .....	.220	(^P)	.054	.141	(^P)	(^P)	.323	.155	(^P)
25	Furniture and fixtures	(^P)	(^P)	(^P)	(^P)	(^P)	(^P)	(^P)	(^P)	(^P)
26	Paper and allied products .....	.589	.619	.187	.129	(^P)	.103	.487	.464	(^P)
27	Printing and publishing .....	.754	1.504	.389	.785	(^P)	(^P)	.910	.218	.858
28	Chemicals and allied products	2.386	(^P)	1.658	3.950	3.746	3.786	1.883	.926	(^P)
29	Petroleum and coal products	1.129	1.872	(^P)	(^P)	(^P)	(^P)	2.360	(^P)	(^P)
30	Rubber and miscellaneous plastics products	1.313	.986	3.720	1.463	1.062	.211	1.142	2.007	.474
31	Leather and leather products .....	.468	(^P)	(^P)	0	(^P)	(^P)	(^P)	0	(^P)
32	Stone, clay, and glass products	1.851	.223	5.697	1.160	.581	1.350	1.683	1.319	3.439
33	Primary metal industries	1.443	1.408	2.168	.797	.134	.634	.590	4.220	1.494
34	Fabricated metal products .....	.594	.541	(^P)	.557	(^P)	.258	.789	.310	.638
35	Industrial machinery and equipment .....	.767	.187	.521	.854	.162	.467	.650	1.297	1.637
36	Electronic and other electric equipment	1.168	1.107	.727	1.379	(^P)	.598	.784	2.355	(^P)
37	Transportation equipment .....	.365	.269	.424	.146	(^P)	.021	(^P)	.253	1.260
38	Instruments and related products .....	.890	.819	.412	1.010	(^P)	(^P)	1.170	1.335	.555
39	Miscellaneous manufacturing industries .....	.718	.159	1.199	(^P)	(^P)	(^P)	1.002	.680	1.522

^P Suppressed to avoid disclosure of data of individual companies.

NOTE.—The index is the share of total U.S. value added in the given manufacturing industry accounted for by establishments of the given UBO country divided by the share of total U.S. value added in total manufacturing accounted for by establishments of the UBO country. This

index is similar in form to the export index of revealed comparative advantage introduced in Bela Balassa, "Trade Liberalization and 'Revealed' Comparative Advantage," *Manchester School* 33 (May 1965): 99-123.

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in both the electronics and the instruments industries (40 percent in each). In South Carolina, foreign-owned establishments accounted for more than 50 percent of the State's production in the rubber products industry.

Comparison of Foreign-Owned and U.S.-Owned Establishments

This section compares the operations of foreign-owned manufacturing establishments with those

of U.S.-owned ones in terms of plant size (or scale), capital intensity, compensation per employee, production-worker wage rates, and labor productivity.⁷ The section also examines whether differences between the hourly wage rates of production workers in foreign-owned and U.S.-owned establishments reflect differences in their

7. The analysis in this section is based on data for operating establishments only. Data for administrative and auxiliary establishments are not available by detailed industry for either foreign-owned or all U.S. establishments.

Table 7.—Selected Data for Foreign-Owned Manufacturing Establishments, by State, 1990

State	Foreign-owned establishments				Foreign-owned establishments as a percentage of all U.S. establishments		
	Number of establishments	Number of employees	Millions of dollars		Number of employees	Value added	Shipments
			Value added	Shipments			
Total	11,934	2,004,235	177,360.7	417,539.4	10.6	13.4	14.5
Alabama	185	33,678	3,019.5	6,661.1	9.2	14.1	13.7
Alaska	24	3,092	182.8	658.6	22.7	13.1	17.9
Arizona	115	10,998	747.2	2,002.9	6.1	6.3	8.8
Arkansas	106	17,881	1,225.5	3,262.6	8.2	9.8	10.7
California	1,361	205,024	18,533.9	42,051.9	9.7	12.4	14.3
Colorado	119	10,964	1,019.5	2,342.8	6.1	7.4	8.5
Connecticut	194	34,571	2,650.5	4,407.9	10.0	11.1	11.0
Delaware	69	30,386	1,658.0	4,339.9	46.2	36.7	33.6
District of Columbia	13	215	17.4	37.4	1.5	1.1	1.7
Florida	504	44,688	3,091.7	7,342.6	9.0	10.4	12.1
Georgia	491	70,347	6,926.8	13,730.2	12.5	19.2	16.3
Hawaii	30	2,087	275.7	1,218.0	10.1	17.7	29.0
Idaho	25	3,414	269.4	509.8	5.6	6.9	5.6
Illinois	649	110,468	8,684.1	25,260.4	11.0	12.3	16.1
Indiana	317	86,378	7,683.9	16,766.2	14.0	17.1	17.0
Iowa	106	22,359	1,863.0	3,631.8	9.7	9.6	7.9
Kansas	89	13,547	1,144.2	2,902.8	7.1	8.8	8.0
Kentucky	184	42,508	3,790.1	10,006.8	15.2	16.0	18.6
Louisiana	127	17,136	4,179.7	18,892.9	10.0	18.5	28.7
Maine	59	7,384	554.9	1,406.8	7.2	9.4	11.3
Maryland	196	27,941	2,232.4	4,859.0	13.2	14.2	15.8
Massachusetts	313	57,078	4,900.7	8,828.3	10.8	14.0	13.8
Michigan	396	70,914	5,300.0	14,368.9	7.8	8.2	9.4
Minnesota	174	31,983	1,813.5	4,009.6	8.1	7.0	7.3
Mississippi	110	13,706	1,109.5	2,582.0	5.9	8.7	8.5
Missouri	268	36,928	3,635.1	7,388.7	8.7	12.0	11.0
Montana	15	943	77.3	794.4	4.7	6.5	19.7
Nebraska	54	8,022	956.7	1,960.4	8.1	12.8	9.6
Nevada	27	1,501	123.6	244.7	5.9	8.4	8.4
New Hampshire	91	11,915	690.1	1,375.0	12.9	12.4	14.1
New Jersey	590	98,905	11,023.0	19,989.2	15.8	24.4	22.8
New Mexico	34	2,640	183.6	369.7	6.6	8.2	6.7
New York	650	104,499	9,528.6	18,845.2	9.1	11.1	12.2
North Carolina	483	110,447	10,682.9	21,147.8	13.3	18.5	18.2
North Dakota	7	F	(P)	(P)	(P)	(P)	(P)
Ohio	644	118,364	9,888.5	26,449.0	10.9	12.3	14.9
Oklahoma	103	15,842	1,339.5	4,256.8	9.5	11.3	15.2
Oregon	119	15,269	1,071.7	3,313.9	7.1	8.1	10.7
Pennsylvania	667	119,688	9,511.1	20,216.7	11.9	14.8	14.8
Rhode Island	51	6,628	390.4	909.7	6.6	7.6	9.3
South Carolina	229	59,626	3,996.1	9,724.6	16.2	19.0	20.8
South Dakota	21	2,947	141.6	338.2	9.9	8.7	7.5
Tennessee	308	72,779	5,252.6	14,102.1	14.4	17.4	20.9
Texas	783	101,890	12,849.7	35,184.0	10.8	15.4	16.7
Utah	51	7,049	588.7	1,302.2	6.9	9.6	9.3
Vermont	26	3,657	224.7	490.1	8.3	7.0	8.8
Virginia	242	47,873	4,555.3	8,465.5	11.3	14.0	13.9
Washington	197	22,979	1,867.1	5,454.6	6.3	7.5	8.1
West Virginia	61	18,047	2,291.7	4,489.5	22.0	36.1	34.7
Wisconsin	249	46,016	3,551.0	8,520.9	8.4	9.6	10.3
Wyoming	8	C	(P)	(P)	(P)	(P)	(P)

P Suppressed to avoid disclosure of data of individual companies.

Size ranges are given in employment cells that are suppressed. The size ranges are: A—0 to 19; B—20 to 99; C—100 to 249; E—250 to 499; F—500 to 999; G—1,000 to 2,499; H—2,500 to 4,999; I—5,000 to 9,999; J—10,000 to 24,999; K—25,000 to 49,999; L—50,000 to 99,999; M—100,000 or more.

NOTES.—The columns for number of establishments and for number of employees cover both operating establishments and administrative and auxiliary establishments; the other columns cover operating establishments only.

Table 8.—Value Added by Foreign-Owned Manufacturing Establishments, State by Selected Industry, 1990

[Millions of dollars]

State	Total	Selected industries													
		Food and kindred products	Textile mill products	Paper and allied products	Printing and publishing	Chemicals and allied products	Petroleum and coal products	Rubber and miscellaneous plastics products	Stone, clay, and glass products	Primary metal industries	Fabricated metal products	Industrial machinery and equipment	Electronic and other electric equipment	Transportation equipment	Instruments and related products
SIC code		20	22	26	27	28	29	30	32	33	34	35	36	37	38
Total	177,360.7	19,501.2	2,283.1	4,709.2	10,408.8	48,835.7	4,106.8	8,757.9	8,450.2	10,297.6	6,350.2	13,561.7	16,703.2	7,170.6	9,722.1
Alabama	3,019.5	(P)	103.1	348.4	18.6	896.6	(P)	634.0	183.4	(P)	(P)	96.1	248.3	(P)	(P)
Alaska	182.8	(P)	0	(P)	0	(P)	0	0	0	0	(P)	0	0	0	0
Arizona	747.2	43.2	0	0	(P)	20.6	0	52.7	159.0	147.6	68.1	107.2	(P)	(P)	(P)
Arkansas	1,225.5	170.1	0	36.1	(P)	81.8	(P)	(P)	48.7	56.7	149.7	214.8	214.5	54.6	(P)
California	18,533.9	2,471.0	(P)	344.6	936.4	3,430.1	(P)	376.5	1,008.0	475.7	608.6	1,880.0	3,920.9	880.1	1,936.5
Colorado	1,019.5	210.3	0	(P)	140.5	107.8	(P)	(P)	85.1	(P)	(P)	100.6	64.1	0	57.1
Connecticut	2,650.5	163.2	32.3	15.8	141.4	973.5	10.6	18.8	80.2	207.4	122.7	206.6	102.0	(P)	248.0
Delaware	1,658.0	(P)	0	0	0	1,316.3	(P)	(P)	(P)	(P)	(P)	(P)	0	0	(P)
District of Columbia	17.4	0	0	0	(P)	0	0	(P)	(P)	0	0	0	0	0	0
Florida	3,091.7	645.4	0	(P)	164.5	225.5	(P)	72.0	400.2	84.3	78.8	300.4	497.4	147.3	128.7
Georgia	6,926.8	550.3	(P)	355.5	144.0	1,026.2	(P)	145.6	407.3	208.1	111.8	241.2	823.1	10.1	262.7
Hawaii	275.7	(P)	0	(P)	(P)	(P)	(P)	(P)	(P)	(P)	0	0	0	(P)	0
Idaho	269.4	125.4	0	0	(P)	6.3	0	0	(P)	0	0	(P)	(P)	0	0
Illinois	8,684.1	1,435.7	0	220.8	801.2	1,660.1	149.7	645.5	327.5	572.8	310.4	880.2	790.5	(P)	489.1
Indiana	7,683.9	1,025.4	(P)	(P)	330.3	893.5	3.6	534.8	(P)	1,758.2	335.8	780.9	634.5	224.8	654.7
Iowa	1,863.0	360.3	0	42.2	125.9	209.7	(P)	371.9	76.0	(P)	(P)	254.0	(P)	(P)	(P)
Kansas	1,144.2	195.6	0	(P)	172.6	128.3	(P)	(P)	124.6	(P)	13.3	87.9	(P)	(P)	(P)
Kentucky	3,790.1	527.9	(P)	(P)	95.3	739.1	(P)	(P)	168.8	814.6	146.0	189.1	85.4	(P)	0
Louisiana	4,179.7	261.2	(P)	(P)	(P)	1,855.7	(P)	10.7	38.3	0	(P)	(P)	(P)	(P)	0
Maine	554.9	95.8	0	265.6	(P)	(P)	(P)	43.7	(P)	(P)	12.2	23.8	(P)	(P)	0
Maryland	2,232.4	460.3	(P)	(P)	220.0	570.2	(P)	89.6	183.1	(P)	44.8	99.1	195.4	(P)	117.8
Massachusetts	4,900.7	218.3	111.9	141.1	501.6	446.5	(P)	151.1	(P)	201.0	276.5	827.5	530.2	78.0	504.8
Michigan	5,300.0	550.5	0	83.6	255.7	837.1	(P)	261.8	231.1	690.9	368.9	649.1	292.1	713.5	206.9
Minnesota	1,813.5	421.1	(P)	(P)	179.1	91.5	(P)	86.7	70.7	(P)	(P)	213.7	266.1	(P)	101.2
Mississippi	1,109.5	39.4	0	(P)	(P)	363.7	(P)	115.4	95.7	35.0	133.4	(P)	(P)	(P)	42.7
Missouri	3,635.1	900.9	(P)	102.5	81.9	1,108.7	(P)	63.3	187.3	307.2	200.8	161.3	149.5	(P)	129.6
Montana	77.3	(P)	0	0	0	(P)	(P)	(P)	(P)	(P)	(P)	0	0	0	0
Nebraska	956.7	363.8	0	0	(P)	401.1	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)	(P)
Nevada	123.6	43.3	0	(P)	0	(P)	0	(P)	32.6	19.5	0	0	0	0	(P)
New Hampshire	690.1	35.7	(P)	40.1	46.7	(P)	(P)	96.7	27.9	(P)	(P)	209.8	64.5	0	76.9
New Jersey	11,023.0	1,156.4	(P)	177.1	419.8	6,726.3	76.6	209.6	232.3	255.2	178.3	340.5	357.5	33.8	787.7
New Mexico	183.6	(P)	0	0	(P)	(P)	(P)	18.4	0	0	0	(P)	0	0	(P)
New York	9,528.6	1,069.9	52.9	182.0	2,707.7	1,813.4	(P)	495.7	293.1	373.8	332.1	595.3	798.2	136.2	441.2
North Carolina	10,682.9	290.1	489.5	141.4	160.2	4,886.5	(P)	562.4	295.7	160.9	235.7	525.6	1,894.0	191.3	528.2
North Dakota	(P)	(P)	0	0	(P)	0	0	0	0	0	0	0	0	(P)	0
Ohio	9,888.5	1,148.6	(P)	229.1	395.3	1,609.1	(P)	541.0	479.2	1,035.5	491.1	617.0	619.0	1,338.6	535.4
Oklahoma	1,339.5	89.0	0	(P)	47.6	195.5	(P)	430.0	123.6	(P)	102.3	87.4	(P)	(P)	61.1
Oregon	1,071.7	169.8	(P)	(P)	(P)	117.5	(P)	10.7	36.4	84.7	(P)	203.6	168.7	(P)	(P)
Pennsylvania	9,511.1	1,065.3	95.7	388.4	794.3	1,505.4	(P)	214.4	511.8	526.7	510.7	971.0	765.4	628.4	868.5
Rhode Island	390.4	(P)	(P)	0	45.5	(P)	(P)	38.4	(P)	(P)	15.9	21.7	46.8	0	83.5
South Carolina	3,996.1	273.7	328.7	(P)	37.5	1,017.6	(P)	771.1	174.3	(P)	85.8	558.6	389.1	(P)	(P)
South Dakota	141.6	73.7	0	0	(P)	(P)	0	(P)	(P)	0	(P)	32.1	(P)	0	0
Tennessee	5,252.6	228.0	155.0	88.5	144.3	1,585.5	(P)	375.2	227.7	213.6	267.4	551.9	392.7	564.2	188.2
Texas	12,849.7	509.1	0	40.0	303.0	7,594.0	458.5	315.0	625.4	505.3	330.6	477.2	1,114.6	84.3	381.9
Utah	588.7	25.1	(P)	0	(P)	20.2	0	0	24.1	(P)	(P)	(P)	32.6	(P)	(P)
Vermont	224.7	(P)	0	(P)	(P)	38.8	0	(P)	(P)	(P)	0	30.4	(P)	(P)	0
Virginia	4,555.3	281.1	(P)	(P)	173.0	2,361.0	0	304.8	192.5	(P)	33.0	295.8	282.2	201.0	80.3
Washington	1,867.1	406.1	(P)	250.1	31.9	134.3	(P)	47.6	153.7	71.3	(P)	23.8	177.2	(P)	(P)
West Virginia	2,291.7	0	0	(P)	(P)	1,435.2	(P)	(P)	84.9	485.6	109.8	(P)	(P)	(P)	(P)
Wisconsin	3,551.0	1,038.2	(P)	379.1	262.0	243.5	0	165.5	(P)	136.3	166.4	579.0	236.1	0	221.6
Wyoming	(P)	(P)	0	0	0	(P)	0	0	(P)	0	0	0	0	0	0

(P) Suppressed to avoid disclosure of data of individual companies.

NOTE.—Administrative and auxiliary establishments are excluded.

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Table 9.—Value Added by Foreign-Owned Manufacturing Establishments as a Percentage of That by All U.S. Manufacturing Establishments, State by Selected Industry, 1990

State	Total	Selected industries													
		Food and kindred products	Textile mill products	Paper and allied products	Printing and publishing	Chemicals and allied products	Petroleum and coal products	Rubber and miscellaneous plastics products	Stone, clay, and glass products	Primary metal industries	Fabricated metal products	Industrial machinery and equipment	Electronic and other electric equipment	Transportation equipment	Instruments and related products
		20	22	26	27	28	29	30	32	33	34	35	36	37	38
Total	13.4	13.8	8.6	7.9	10.1	31.9	15.1	17.6	24.8	19.3	7.9	10.3	15.6	4.9	11.9
Alabama	14.1	(D)	6.5	11.0	2.7	43.6	(D)	52.5	39.4	(D)	(D)	7.2	26.1	(D)	(D)
Alaska	13.1	(D)	0	(D)	0	(D)	0	0	0	0	(D)	0	0	0	0
Arizona	6.3	5.9	0	0	(D)	3.9	0	23.5	45.3	22.1	19.0	13.3	(D)	(D)	(D)
Arkansas	9.8	7.0	0	2.2	(D)	11.3	(D)	(D)	20.8	13.0	14.3	23.2	21.1	10.2	(D)
California	12.4	13.5	(D)	11.5	7.9	49.8	(D)	8.2	27.2	23.5	7.9	10.1	21.6	3.8	12.9
Colorado	7.4	8.1	0	(D)	9.5	41.4	(D)	(D)	23.0	(D)	(D)	6.3	7.0	0	2.4
Connecticut	11.1	18.5	14.6	1.4	8.8	41.7	(D)	3.6	25.3	26.4	5.2	7.3	5.8	(D)	11.8
Delaware	36.7	(D)	0	0	0	74.4	(D)	(D)	(D)	(D)	(D)	(D)	0	0	(D)
District of Columbia	1.1	0	0	0	(D)	0	n.a.	(D)	(D)	0	0	0	0	0	0
Florida	10.4	14.6	0	(D)	4.8	8	(D)	8.0	35.2	31.5	5.8	19.6	11.1	6.3	4.4
Georgia	19.2	12.3	(D)	10.1	8.2	34.9	(D)	13.0	37.4	17.4	10.9	16.0	32.8	0.2	41.1
Hawaii	17.7	(D)	0	(D)	(D)	(D)	(D)	(D)	(D)	(D)	0	0	0	(D)	0
Idaho	6.9	13.4	0	0	(D)	1.2	0	0	0	0	0	(D)	(D)	0	0
Illinois	12.3	14.2	0	8.3	11.0	20.4	15.2	18.3	25.0	17.2	5.1	8.4	11.4	(D)	20.1
Indiana	17.1	28.7	(D)	(D)	16.2	13.5	0.6	22.9	(D)	28.3	10.9	19.7	19.7	3.5	36.8
Iowa	9.6	7.2	0	10.5	10.0	10.5	(D)	43.7	21.4	(D)	(D)	6.4	(D)	(D)	(D)
Kansas	8.8	9.5	0	(D)	9.4	9.1	(D)	(D)	30.9	(D)	3.7	6.7	(D)	(D)	(D)
Kentucky	16.0	27.8	(D)	(D)	6.4	29.2	(D)	(D)	28.7	57.8	13.6	8.4	4.8	(D)	0
Louisiana	18.5	14.7	(D)	(D)	(D)	19.8	(D)	5.1	17.4	0	(D)	(D)	(D)	(D)	0
Maine	9.4	25.9	0	14.8	(D)	(D)	(D)	18.6	(D)	(D)	6.2	10.5	(D)	(D)	0
Maryland	14.2	19.9	(D)	(D)	12.1	28.3	(D)	20.1	45.1	(D)	7.1	10.6	27.3	(D)	5.5
Massachusetts	14.0	13.0	15.2	9.9	13.6	29.4	(D)	9.9	(D)	22.5	12.5	16.0	10.5	4.6	8.7
Michigan	8.2	10.6	0	4.8	8.9	17.5	(D)	9.4	17.8	24.7	5.8	8.4	22.1	3.3	15.2
Minnesota	7.0	11.4	(D)	(D)	6.3	9.0	(D)	10.6	8.0	(D)	(D)	4.8	15.0	(D)	4.8
Mississippi	8.7	3.5	0	(D)	(D)	35.6	(D)	18.1	30.6	9.6	20.6	(D)	(D)	(D)	44.7
Missouri	12.0	19.3	(D)	9.5	3.6	25.5	(D)	7.8	25.1	36.1	9.0	9.9	8.2	(D)	18.1
Montana	6.5	(D)	0	0	0	(D)	(D)	(D)	(D)	(D)	(D)	0	0	0	0
Nebraska	12.8	13.6	0	0	(D)	72.3	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)
Nevada	8.4	27.9	0	(D)	0	(D)	0	(D)	24.4	22.3	0	0	0	0	(D)
New Hampshire	12.4	9.7	(D)	10.6	8.4	(D)	(D)	27.2	20.5	(D)	(D)	24.3	10.2	0	8.3
New Jersey	24.4	25.2	(D)	11.5	9.4	46.7	10.4	12.6	19.2	23.8	7.7	13.2	12.5	4.6	22.3
New Mexico	8.2	(D)	0	0	(D)	(D)	(D)	(D)	16.0	0	0	(D)	(D)	0	(D)
New York	11.1	17.5	7.0	8.1	16.3	24.5	(D)	25.7	19.3	20.7	9.6	7.5	10.6	2.8	3.1
North Carolina	18.5	8.8	6.6	6.7	11.6	59.2	(D)	23.8	21.0	22.5	14.1	11.6	41.1	14.9	45.7
North Dakota	(D)	(D)	0	0	(D)	0	0	0	0	0	0	0	0	(D)	0
Ohio	12.3	16.4	(D)	10.0	9.4	21.6	(D)	12.6	16.1	14.5	5.8	6.4	10.5	9.2	28.5
Oklahoma	11.3	9.6	0	(D)	7.7	42.7	(D)	37.2	18.3	(D)	10.3	4.4	(D)	(D)	10.7
Oregon	8.1	9.3	(D)	(D)	(D)	37.5	(D)	3.7	14.9	10.0	(D)	15.9	20.2	(D)	(D)
Pennsylvania	14.8	14.1	11.2	12.2	13.5	21.0	(D)	9.9	18.0	9.4	9.9	16.4	15.8	16.8	30.6
Rhode Island	7.6	(D)	(D)	0	13.4	(D)	(D)	16.6	(D)	(D)	2.5	8.1	11.3	0	15.0
South Carolina	19.0	31.2	9.1	(D)	7.1	22.3	(D)	52.0	23.7	(D)	8.8	27.0	32.6	(D)	(D)
South Dakota	8.7	17.6	0	0	(D)	(D)	0	(D)	(D)	0	(D)	10.7	(D)	0	0
Tennessee	17.4	6.0	18.3	5.4	7.5	31.0	(D)	22.4	27.4	17.8	15.2	22.6	21.7	29.3	26.2
Texas	15.4	6.2	0	1.8	7.5	36.9	5.3	11.2	30.4	23.6	8.8	7.4	14.4	1.4	9.0
Utah	9.6	4.2	(D)	0	(D)	9.1	0	0	14.9	(D)	(D)	(D)	10.5	(D)	(D)
Vermont	7.0	(D)	0	(D)	(D)	(D)	0	(D)	(D)	(D)	0	15.4	(D)	(D)	0
Virginia	14.0	10.0	(D)	(D)	8.0	54.3	0	23.3	28.0	(D)	3.5	20.3	17.3	6.6	4.8
Washington	7.5	18.2	(D)	13.6	3.0	8.8	(D)	12.3	29.2	6.1	(D)	1.7	31.1	(D)	(D)
West Virginia	36.1	0	0	(D)	(D)	55.9	(D)	(D)	19.1	42.1	30.7	(D)	(D)	0	(D)
Wisconsin	9.6	21.3	(D)	7.8	10.5	15.1	0	12.5	(D)	11.3	5.3	8.0	8.0	(D)	11.4
Wyoming	(D)	(D)	n.a.	n.a.	0	(D)	0	(D)	(D)	0	0	0	0	0	0

(D) Suppressed to avoid disclosure of data of individual companies.
n.a. Not applicable.

NOTE.—Administrative and auxiliary establishments are excluded.
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plant scale and capital intensity or whether they can be attributed to foreign ownership per se. Finally, it examines whether differences between the productivity of foreign-owned and U.S.-owned establishments reflect differences in their plant scale, capital intensity, or employee skill levels or whether they can be attributed to foreign ownership per se.

Plant scale

For total manufacturing, average plant scale (measured as value added per establishment) of foreign-owned establishments was much larger than that of U.S.-owned establishments—\$17.3 million, compared with \$3.2 million, or a difference of \$14.1 million.⁸ A statistical decomposition of the difference indicated that 60 percent of it was attributable to a tendency in some industries for the plant scale of foreign-owned establishments to be larger than that of U.S.-owned establishments, while only 27 percent was attributable to a tendency for foreign-owned establishments to be concentrated in industries with above-average plant scale.⁹ (The method used to decompose the difference in plant scale is described in the technical note.)

The importance of the within-industry differences can be seen by examining the distribution of industries on the basis of the relative plant scale of foreign-owned and U.S.-owned establishments. As the following tabulation indicates, the average plant scale of foreign-owned establishments was more than 10 percent larger than that of U.S.-owned establishments in 277 of the 312 industries with 6 or more foreign-owned establishments (hereafter referred to as “the 312 industries”). In 98 of these 277 industries, plant scale of foreign-owned establishments was more than four times as large. Moreover, there were only 20 industries in which the average plant scale of foreign-owned establishments was more

than 10 percent smaller than that of U.S.-owned establishments.¹⁰

Plant scale of foreign-owned establishments relative to that of U.S.-owned establishments	Number of industries
All industries	312
At least 30 percent smaller	8
Between 10 and 30 percent smaller	12
Within 10 percent smaller or larger	15
Between 10 and 30 percent larger	12
At least 30 percent larger	265

Plant scale of foreign-owned establishments may be larger, on average, than that of U.S.-owned establishments at least partly because the income and other benefits that normally accrue to large plants may be sought out to offset the inherent disadvantages foreign investors tend to face when investing in the United States and when subsequently operating their U.S. businesses. Foreign investors may be unfamiliar with the language and the general business environment in the United States, and their investments must, at least to some extent, be managed from a distance. Many of the added costs a foreign investor incurs when making a new U.S. investment and subsequently operating a business here tend to be fixed, and foreign investors may tend to concentrate their investments in relatively large establishments as a means of spreading these costs over a larger volume of output. In some cases, such a strategy may also benefit foreign direct investors by simplifying the organizational structure, reducing the number of units that must be managed, and lowering the number of local business environments to which they must become acclimated.

Most industries with direct investment have both large foreign-owned and large U.S.-owned plants. However, in many of these industries, there are substantial numbers of small U.S.-owned plants but relatively few small foreign-owned plants. This pattern can be seen in “motor vehicles and car bodies” manufacturing (SIC 3711), which includes both car and truck manufacturing. In 1990, the average plant scale of foreign-owned establishments in the industry was over 60 percent larger than that of U.S.-owned establishments. Of the 406 plants in the industry, 385 were U.S. owned and 21 were foreign owned. Both groups had a number of large plants: 52 of the U.S.-owned plants and 11

8. Because the number of manufacturing establishments is not shown in the Census Bureau's ASM publications, average plant scale for U.S.-owned establishments was computed using the total value added from the ASM and the number of U.S. manufacturing establishments shown in the Census Bureau's *County Business Patterns, 1990: United States* (Washington DC: U.S. Government Printing Office, 1992). Because the *County Business Patterns* and ASM data are closely comparable, use of *County Business Patterns* establishment counts is unlikely to have significantly affected the findings of the article.

9. The remaining difference was attributable to the interaction of the within-industry differences and industry-mix effects.

In industries with only a few foreign-owned establishments, value added per establishment and the other measures for foreign-owned establishments discussed in this section may be so affected by the special circumstances of individual establishments that they are not representative of foreign-owned establishments generally. Because of this possibility, the decomposition was limited to the 312 four-digit industries with at least 6 foreign-owned establishments. For these industries, value added per establishment was \$17.3 million for foreign-owned establishments and \$3.6 million for U.S.-owned establishments, a difference of \$13.7 million.

10. Across the 312 industries, the mean difference between the foreign-owned and U.S.-owned plant scale measures was \$11.0 million. Unlike the differences cited in the text and in footnote 9, which were computed using a method that gave heavier weight to the larger industries, this figure was computed without regard to industry size; a statistical test indicated that it was statistically significant at the 1-percent confidence level.

of the foreign-owned plants had at least 1,000 employees. However, there were many small U.S.-owned plants but few small foreign-owned plants in the industry: Over three-fourths of the U.S.-owned plants, but less than one-fifth of the foreign-owned plants, had fewer than 100 employees.

Capital intensity

For total manufacturing, capital intensity (indirectly measured as the non-employee-compensation share of value added) was higher for foreign-owned establishments than for U.S.-owned establishments—61 percent, compared with 55 percent.¹¹ Virtually all of this difference was attributable to industry-mix effects; within-industry differences were negligible.¹²

Although the capital intensity of foreign-owned establishments was not systematically higher or lower than that of U.S.-owned establishments within specific industries,¹³ in a large number of industries, as the following tabulation indicates, the capital intensity of foreign-owned establishments differed substantially from that of U.S.-owned establishments. On the one hand, the capital intensity of foreign-owned establishments was more than 10 percent higher than that of U.S.-owned establishments in 98 of the 312 industries. On the other hand, it was more than 10 percent lower in 85 industries.

Capital intensity of foreign-owned establishments relative to that of U.S.-owned establishments	Number of industries
All industries	312
At least 30 percent lower	26
Between 10 and 30 percent lower	59
Within 10 percent lower or higher	129
Between 10 and 30 percent higher	67
At least 30 percent higher	31

Compensation per employee

For total manufacturing, compensation per employee of foreign-owned establishments was \$5,300 higher than that of U.S.-owned establishments—\$38,300, compared with \$33,000. About 60 percent of this difference was attributable

to industry-mix effects, and 30 percent to within-industry differences.¹⁴

Although industry-mix effects dominate, within-industry differences are nonetheless significant. The positive contribution of these differences can be seen from the following tabulation. It shows that compensation per employee of foreign-owned establishments was more than 10 percent higher than that of U.S.-owned establishments in 131 of the 312 industries, whereas it was more than 10 percent lower in only 28 industries.¹⁵

Compensation per employee of foreign-owned establishments relative to that of U.S.-owned establishments	Number of industries
All industries	312
At least 30 percent lower	3
Between 10 and 30 percent lower	25
Within 10 percent lower or higher	153
Between 10 and 30 percent higher	107
At least 30 percent higher	24

Compensation per employee may have been higher for foreign-owned establishments than for other establishments in the same industry because the occupational mix was weighted more heavily toward relatively high-skilled occupations, perhaps reflecting the use of different technologies.¹⁶ In addition, foreign-owned establishments may have paid higher wage rates at a given skill level than U.S.-owned establishments because, for example, they have a greater tendency to be located in high-wage areas.

14. The remaining difference was attributable to the interaction of the within-industry differences and industry-mix effects. The decomposition was based on data for the 312 industries. For these industries, the difference in compensation per employee was \$4,600, somewhat smaller than the difference for manufacturing as a whole.

In "FDIUS: Establishment Data for 1987," differences between foreign-owned and U.S.-owned establishments were examined using payroll per employee, which is a somewhat narrower measure than total employee compensation. (Payroll excludes employee benefits, whereas total employee compensation includes them.) Data on total employee compensation were not available from the 1987 link data.

Within-industry differences were somewhat less important in explaining the overall difference in compensation per employee in the 1990 data than in explaining the overall difference in payroll per employee in the 1987 data. This result appears to largely reflect a narrowing of within-industry differences in payroll per employee between 1987 and 1990. In light of the 1990 data, within-industry differences in benefits per employee appear to be larger than within-industry differences in payroll per employee.

15. Across the 312 industries, the mean difference between foreign-owned and U.S.-owned establishments' compensation per employee was \$2,500. A statistical test indicated that this difference was significant at the 1-percent confidence level.

16. As noted in footnote 2, BLS has released information on the occupational structure of foreign-owned manufacturing establishments for 1989. Based on this information, BLS concluded that while the distribution of occupations in foreign-owned manufacturing establishments in the United States was little different from that in all U.S. manufacturing establishments at the overall manufacturing level, there were major differences in the distribution of occupations within individual industries, at least at the SIC two-digit level.

11. The data needed to measure capital intensity directly are not available.

12. This statement is based on a decomposition similar to that used for plant scale (see technical note). The decomposition was based on data for the 312 industries. For these industries, the capital intensity measures for both foreign-owned and U.S.-owned establishments were almost the same as the corresponding measures for manufacturing as a whole.

13. Across the 312 industries, the mean difference between the foreign-owned and U.S.-owned capital-intensity measures was negligible.

Table 10.—Relative Plant Scale and Capital Intensity: Averages for Industries Grouped by the Wage Rates of Foreign-Owned Establishments Relative to Those of U.S.-Owned Establishments, 1990

Range of relative wage rates (percent) ¹	Number of industries	Percent	
		Relative plant scale ²	Relative capital intensity ³
All industries	312	376	102
At least 30 percent lower	2	118	147
Between 10 and 30 percent lower	41	226	95
Within 10 percent lower or higher	156	336	102
Between 10 and 30 percent higher	88	448	104
At least 30 percent higher	25	634	103
Addendum: Coefficient of correlation between the measure in the column and the relative wage rate ratio for the 312 industries .....		.336*	.0348

*Statistically significant at the 1-percent confidence level.

1. Relative wage rates are foreign-owned establishments' wage rates divided by U.S.-owned establishments' wage rates times 100.

2. Relative plant scale is foreign-owned establishments' value added per establishment divided by the corresponding measure for U.S.-owned establishments times 100. This column shows the unweighted averages of the relative scale measure for industries in the groups defined by the relative wage rates shown in the stub.

3. Relative capital intensity is foreign-owned establishments' non-employee-compensation share of value added divided by the corresponding measure for U.S.-owned establishments times 100. This column shows the unweighted averages of the relative capital intensity measure for industries in the groups defined by the relative wage rates shown in the stub.

Production-worker wage rates

In examining differences in employee compensation between foreign-owned and U.S.-owned establishments, differences in occupational mix can be partly controlled for by comparing the wages of production workers only. Restricting the comparison in this way eliminates variations in the ratio of production workers to other workers as a source of differences in rates of pay; in addition, production workers probably constitute a more homogeneous group than other workers, who may represent a wide variety of occupational groups (for example, sales and clerical as well as professional and managerial employees).

For total manufacturing, the average hourly wage rate (excluding benefits) of production workers was \$12.57 for foreign-owned establishments and \$11.04 for U.S.-owned establishments, a difference of \$1.53. About 70 percent of this difference was attributable to industry-

Table 11.—Production Worker Hourly Wage Rates for Foreign-Owned and U.S.-Owned Establishments, Selected Industries in Which Wage Rates of Foreign-Owned Establishments Were Relatively Low or High, 1990

SIC code	Industry	Wages per hour (dollars)		Relative wage rate (percent) ¹	Addendum: Relative plant scale (percent) ²
		Foreign-owned establishments	U.S.-owned establishments		
Industries in which foreign-owned establishments had relatively low hourly wage rates:					
3647	Vehicular lighting equipment	10.38	15.85	65	109
3694	Engine electrical equipment	8.30	11.86	70	127
3721	Aircraft	12.07	17.17	70	26
2711	Newspapers	8.93	12.52	71	96
3714	Motor vehicle parts and accessories	11.60	16.14	72	148
3624	Carbon and graphite products	10.53	14.27	74	113
3592	Carburetors, pistons, rings, valves	11.56	14.83	78	170
2431	Millwork	7.96	9.92	80	385
3711	Motor vehicles and car bodies	16.74	20.84	80	161
3661	Telephone and telegraph apparatus	12.07	14.93	81	297
3663	Radio and television communications equipment	9.94	12.10	82	175
2095	Roasted coffee	10.76	13.01	83	162
2631	Paperboard mills	14.03	16.88	83	76
2296	Tire cord and fabrics	8.43	10.12	83	39
3255	Clay refractories	10.70	12.77	84	225
3531	Construction machinery	12.88	15.26	84	219
3951	Pens and mechanical pencils	8.32	9.86	84	222
Industries in which foreign-owned establishments had relatively high hourly wage rates:					
3532	Mining machinery	13.05	10.39	126	360
2064	Candy and other confectionery products	12.00	9.54	126	357
3251	Brick and structural clay tile	10.40	8.22	127	165
3082	Unsupported plastics profile shapes	11.87	9.36	127	439
2851	Paints and allied products	14.35	11.27	127	416
3398	Metal heat treating	13.73	10.75	128	431
2045	Prepared flour mixes and doughs	13.48	10.55	128	503
2836	Biological products except diagnostic	10.21	7.98	128	1,026
2325	Men's and boys' trousers and slacks	8.27	6.39	130	120
3651	Household audio and video equipment	10.40	7.97	130	1,474
2833	Medicinals and botanicals	21.43	16.41	131	98
3087	Custom compound purchased resins	12.24	9.31	131	187
2085	Distilled and blended liquors	15.89	11.92	133	187
3295	Minerals, ground or treated	13.59	10.16	134	324
3965	Fasteners, buttons, needles, and pins	9.63	7.15	135	831
2816	Inorganic pigments	17.01	12.54	136	703
3291	Abrasive products	14.84	10.70	139	817
3645	Residential lighting fixtures	10.49	7.51	140	606
3596	Scales and balances, except laboratory	11.25	7.87	143	686
3088	Plastics plumbing fixtures	13.10	7.53	174	1,032

1. Hourly wage rate for foreign-owned establishments divided by hourly wage rate for U.S.-owned establishments times 100.

2. Value added per establishment for foreign-owned establishments divided by value added per establishment for U.S.-owned establishments times 100.

NOTE.—The list of industries in this table excludes industries for which the data for foreign-owned establishments are suppressed. It also excludes residual industries, which cover establishments not elsewhere classified.

SIC Standard Industrial Classification

mix effects, and 20 percent was attributable to within-industry differences.¹⁷

Although industry-mix effects dominate, the first two columns of table 10 show that within-industry differences are nonetheless significant. Hourly wages of production workers were more than 10 percent higher in foreign-owned establishments than in U.S.-owned establishments in 113 of the 312 industries, whereas they were at least 10 percent lower in only 43 industries.¹⁸

Data for selected industries in which the wage rates of foreign-owned establishments differed substantially from those of U.S.-owned establishments are shown in table 11. Five of the industries in which wage rates of foreign-owned establishments were substantially lower than those of U.S.-owned establishments are motor-vehicle related: Vehicular lighting equipment; engine electrical equipment; motor vehicle parts and accessories; carburetors, pistons, rings, and valves; and motor vehicles and car bodies. The lower wage rates in these industries may have resulted because many of the foreign-owned establishments were established recently—within the last decade—and thus have a workforce with less accumulated job tenure than is typical of U.S.-owned establishments. They may also reflect lower rates of unionization among foreign-owned establishments and differences in plant location.

Plant scale.—The within-industry differences in wage rates partly reflect differences in plant scale. Across the 312 industries, the ratio of the wage rates of foreign-owned establishments to those of U.S.-owned establishments is significantly correlated with the ratio of their average plant scales. In table 10, the relative plant-scale ratio for foreign- and U.S.-owned establishments increases steadily as the ratio of their wage rates increases: The average ratio is 118 percent for the 2 industries in which the wage rates are at least 30 percent lower for foreign-owned establishments than for U.S.-owned establishments, and it is 634 percent for the 25 industries in which the wage rates are at least 30 percent higher for foreign-owned establishments. This pattern is consistent with other research that shows that

production-worker wages tend to be higher at larger plants.¹⁹

This pattern is further illustrated in table 11. Average plant scale of foreign-owned establishments was more than three times higher than that of U.S.-owned establishments in 15 of the 20 industries in which wage rates of foreign-owned establishments were substantially higher than those of U.S.-owned establishments. In contrast, it was more than three times that of U.S.-owned establishments in only 1 of the 17 industries in which wage rates of foreign-owned establishments were substantially lower than those of U.S.-owned establishments; in 4 of the 17 industries, average plant scale of foreign-owned establishments was smaller than that of U.S.-owned establishments.

Capital intensity.—Differences between the hourly wage rates of foreign-owned and U.S.-owned establishments were not associated with differences in their capital intensity. In table 10, no discernible relationship between the relative wage and capital-intensity measures is evident. Furthermore, a statistical test indicated that the relative wage and capital-intensity measures were not significantly correlated.

Effect of foreign-ownership.—Differences between the hourly wage rates of foreign-owned and U.S.-owned establishments do not appear to be the result of foreign ownership per se. A regression that controlled for the effects of plant scale and capital intensity on wage rates and that incorporated a variable for foreign ownership indicated that there is no statistically significant relationship between foreign ownership and wage rates.²⁰

19. See, for example, Steve J. Davis and John Haltiwanger, "Wage Dispersion Between and Within U.S. Manufacturing Plants, 1963–1986," *Brookings Papers on Economic Activity*, Special Issue (1991): 115–80.

20. A linear regression equation was estimated in which there were 624 observations (consisting of separate observations for foreign-owned and U.S.-owned establishments for each of the 312 industries). This estimation yielded the following:

$$W = 10.42 + 0.07SC + 0.59CI - 0.09FDMY$$

$$(11.35) \quad (0.90) \quad (-0.43)$$

$$R^2 = 0.21,$$

$$F = 54.7$$

where W is hourly wages, SC is plant scale, CI is capital intensity, and $FDMY$ is a dummy variable for foreign ownership. The t -statistics for the independent variables, which appear in parentheses, indicate that the coefficient of the scale variable was significant at the 1-percent confidence level and that the coefficients of both the capital intensity variable and the foreign-ownership dummy variable were insignificant.

17. The remaining difference was attributable to the interaction of the within-industry differences and industry-mix effects. The decomposition was based on data for the 312 industries. For these industries, the hourly wage rate for foreign-owned establishments was \$1.26 higher than that for U.S.-owned establishments—\$12.69, compared with \$11.43.

18. Across the 312 industries, the mean difference between foreign-owned and U.S.-owned establishments' hourly wage rates was \$0.63. A statistical test indicated that this difference was significant at the 1-percent confidence level.

Labor productivity

For total manufacturing, labor productivity (measured as value added per production-worker hour) of foreign-owned establishments was significantly higher than that of U.S.-owned establishments—\$74 per hour, compared with \$52 per hour.²¹ About 70 percent of the difference was attributable to industry-mix effects, and 20 percent to within-industry differences.²²

Examination of the distribution of industries on the basis of the relative productivity of foreign- and U.S.-owned establishments confirms that, although industry-mix effects dominate, within-industry differences are nonetheless im-

portant. In a significant number of industries, the productivity of foreign-owned establishments was higher than that of U.S.-owned establishments: It was more than 10 percent higher in 153 of the 312 industries (table 12). In considerably fewer industries, the productivity of foreign-owned establishments was relatively low: It was at least 10 percent lower in only 70 industries.²³ In 89 industries, foreign-owned establishments' productivity was roughly equal to (within 10 percent of) that of U.S.-owned establishments.

Studies of productivity frequently indicate that plant scale, capital intensity, and employee skill level strongly influence productivity. The following discussion examines the extent to which these conventional factors explain the differences between the productivity of foreign-owned and U.S.-owned establishments.

Plant scale.—Differences between the productivity of foreign-owned and U.S.-owned establishments were highly correlated across industries with differences in plant scale (table 12). This pattern can be seen by comparing the industries in which foreign-owned establishments' productivity was relatively low with the industries in which it was relatively high. In the 18 "lower productivity" industries, the average plant scale of foreign-owned establishments was only about 36 percent larger than that of U.S.-owned establishments. In contrast, in the 92 "higher productivity" industries, the average plant scale of foreign-owned establishments was more than six times that of U.S.-owned establishments.

This pattern is further illustrated in table 13, which shows selected lower and higher productivity industries. In 7 of the 11 lower productivity industries, the average plant scale of foreign-owned establishments was smaller than that of U.S.-owned establishments. In contrast, in all but 2 of the 23 higher productivity industries, the average plant scale of foreign-owned establishments was at least twice as large as that of U.S.-owned establishments.

Capital intensity.—As discussed earlier, even though the capital intensity of foreign-owned establishments was not systematically higher or lower than that of U.S.-owned establishments within individual industries, the differences in the capital intensity of the two groups of establishments were sizable in a large number

21. Productivity can be measured in a variety of ways; the measure used here—value added per production-worker hour—is a commonly used measure of labor productivity and can be easily calculated from the data. Studies of productivity sometimes use total output (shipments plus inventory change) instead of value added in the numerator. However, when total output is used as a measure of production, the inputs to which output is related typically include not only labor employed within the establishment but also capital and the inputs that the establishment purchases from others (for example, materials or business services); data on some of these inputs are not available from the ASM. Furthermore, in attempting to determine whether foreign-owned establishments differ from U.S.-owned establishments, value added may be the preferred measure because it reflects only the production by the establishments themselves, whereas total output reflects, in addition to the establishments' own production, the value of inputs purchased from others.

22. The remaining difference was attributable to the interaction of the industry-mix effects and within-industry differences. The decomposition was performed for the 312 industries. For these industries, value added per production-worker hour was \$75 for foreign-owned establishments and \$55 for U.S.-owned establishments.

Table 12.—Relative Plant Scale, Capital Intensity, and Employee Skill Level: Averages for Industries Grouped by the Productivity of Foreign-Owned Establishments Relative to That of U.S.-Owned Establishments, 1990

Range of relative productivity (percent) ¹	Number of industries	Percent		
		Relative plant scale ²	Relative capital intensity ³	Relative employee skill level ⁴
All industries	312	376	102	109
At least 30 percent lower	18	136	58	103
Between 10 and 30 percent lower	52	208	85	98
Within 10 percent lower or higher	89	288	96	106
Between 10 and 30 percent higher	61	373	108	111
At least 30 percent higher	92	604	121	118
Addendum:				
Coefficient of correlation between the measure in the column and the relative productivity ratio for the 312 industries .....		.50*	.64*	.39*

* Statistically significant at the 1-percent confidence level.

1. Relative productivity is foreign-owned establishments' value added per production worker hour divided by the corresponding measure for U.S.-owned establishments times 100.

2. Relative plant scale is foreign-owned establishments' value added per establishment divided by the corresponding measure for U.S.-owned establishments times 100. This column shows the unweighted averages of the relative scale measure for industries in the groups defined by the relative productivity measure shown in the stub.

3. Relative capital intensity is foreign-owned establishments' non-employee-compensation share of value added divided by the corresponding measure for U.S.-owned establishments times 100. This column shows the unweighted averages of the relative capital intensity measure for industries in the groups defined by the relative productivity measure shown in the stub.

4. Relative employee skill level is foreign-owned establishments' compensation per employee divided by the corresponding measure for U.S.-owned establishments times 100. This column shows the unweighted averages of the relative employee skill level measure for industries in the groups defined by the relative productivity measure shown in the stub.

23. Across the 312 industries, the mean difference between the foreign-owned and U.S.-owned productivity measures was \$8.19 per hour. A statistical test indicated that this difference was significant at the 1-percent confidence level.

of industries. As table 12 indicates, these differences are highly correlated with differences in productivity. Like the case of plant scale, as the productivity of foreign-owned establishments increases in relation to that of U.S.-owned establishments, the relative capital intensity of foreign-owned establishments also increases. The correlation between capital intensity and productivity reflects the tendency for additional capital to allow increased production when combined with a given amount of labor.

The correlation between differences in productivity and differences in capital intensity of foreign-owned and U.S.-owned establishments is particularly evident when the capital intensities of the two groups of establishments in lower and higher productivity industries are compared. In the lower productivity industries, the average capital intensity of foreign-owned establishments was only 58 percent of that of U.S.-owned

establishments. In contrast, in the higher productivity industries, the average capital intensity of foreign-owned establishments exceeded that of U.S.-owned establishments by 21 percent. The data shown in table 13 for selected lower and higher productivity industries further illustrate this pattern. In all of the lower productivity industries, foreign-owned establishments were less capital intensive than U.S.-owned establishments, whereas in all but one of the higher productivity industries, foreign-owned establishments were more capital intensive.

Employee skill level.—Differences in productivity of foreign-owned and U.S.-owned establishments were correlated with differences in the skill level of their employees (measured as compensation per employee); however, the correlation was not as high as the correlation for plant scale and

Table 13.—Productivity, Plant Scale, Capital Intensity, and Employee Skill Level of Foreign-Owned and U.S.-Owned Establishments, Selected Industries in Which the Productivity of Foreign-Owned Establishments Was Relatively Low or High, 1990

SIC code	Industry	Foreign-owned establishments				U.S.-owned establishments				Foreign-owned establishments relative to U.S.-owned establishments (percent)			
		Productivity (dollars) ¹	Plant scale (millions of dollars) ²	Capital intensity (percent) ³	Employee skill level (dollars) ⁴	Productivity (dollars) ¹	Plant scale (millions of dollars) ²	Capital intensity (percent) ³	Employee skill level (dollars) ⁴	Productivity	Plant scale	Capital intensity	Employee skill level
Industries in which foreign-owned establishments had relatively low productivity:													
2296	Tire cord and fabrics	20.1	13.4	28	23,786	66.2	34.3	73	28,535	30	39	38	83
3721	Aircraft	30.8	30.5	12	43,176	76.8	115.6	31	48,834	40	26	41	88
3844	X-ray apparatus and tubes	56.3	15.6	36	45,010	119.8	18.7	67	44,245	47	83	53	102
2911	Petroleum refining	123.8	61.0	67	56,727	248.2	69.5	85	55,053	50	88	79	103
3295	Minerals, ground or treated	37.8	6.6	28	49,584	75.0	2.0	75	26,492	50	324	37	187
2833	Medicinals and botanicals	105.6	10.4	61	48,543	200.4	10.6	81	46,583	53	98	76	104
3724	Aircraft engines and engine parts	43.7	10.9	33	41,474	82.7	27.9	50	47,121	53	39	66	88
3692	Primary batteries, dry and wet	28.8	7.2	31	26,222	51.4	9.8	61	30,728	56	73	52	85
3711	Motor vehicles and car bodies	62.0	151.6	52	47,037	104.3	94.3	66	60,373	59	161	80	78
3643	Current-carrying wiring devices	29.1	10.8	31	30,621	43.7	6.2	53	28,840	67	173	60	106
3524	Lawn and garden equipment	43.8	48.6	65	24,195	63.7	9.7	67	29,451	69	502	96	82
Industries in which foreign-owned establishments had relatively high productivity:													
3555	Printing trades machinery	92.2	23.8	68	34,815	59.5	3.3	36	41,234	155	722	188	84
2033	Canned fruits and vegetables	82.7	35.5	79	27,591	52.3	9.1	70	26,491	158	389	113	104
3291	Abrasive products	85.0	28.0	58	48,695	53.1	3.4	54	34,351	160	817	107	142
3563	Air and gas compressors	104.0	17.0	55	45,572	62.9	7.3	44	39,642	165	234	125	115
2096	Potato chips and similar snacks	114.0	32.1	76	36,432	66.0	8.0	69	26,683	173	400	110	137
3594	Fluid power pumps and motors	86.9	15.1	56	40,044	49.4	5.6	37	39,663	176	269	149	101
3567	Industrial furnaces and ovens	66.8	4.4	46	39,474	37.0	2.4	30	32,519	180	181	153	121
2035	Pickles, sauces, and salad dressings	163.0	35.7	86	35,742	89.7	7.4	79	28,091	182	483	109	127
2041	Flour and other grain mill products	107.6	17.8	76	42,475	57.5	3.0	62	35,627	187	585	123	119
2834	Pharmaceutical preparations	417.4	153.6	78	54,215	220.7	33.7	80	43,629	189	456	98	124
3873	Watches, clocks, watchcases, and parts	75.5	17.6	69	30,140	38.9	2.8	55	28,879	194	625	125	104
3398	Metal heat treating	74.4	7.8	54	40,478	38.0	1.8	46	33,270	196	431	118	122
2034	Dehydrated fruits, vegetables, soups	84.1	33.5	78	30,788	42.0	6.2	59	27,299	200	542	132	113
2241	Narrow fabric mills	42.0	12.9	68	25,025	20.9	2.3	42	21,377	201	562	161	117
2836	Biological products except diagnostic	129.2	23.3	66	37,209	64.3	2.3	55	36,677	201	1,026	120	101
2032	Canned specialties	161.2	30.5	86	31,089	80.1	15.7	77	30,766	201	194	112	101
2045	Prepared flour mixes and doughs	144.0	37.0	84	36,583	68.5	7.4	68	31,615	210	503	123	116
2731	Book publishing	689.4	34.4	80	36,563	291.4	3.8	73	37,424	237	912	110	98
3088	Plastics plumbing fixtures	88.6	22.8	73	35,482	35.1	2.2	52	23,809	252	1,032	140	149
3821	Laboratory apparatus and furniture	134.0	25.6	55	45,506	52.8	3.7	43	34,375	254	692	128	132
3743	Railroad equipment	112.6	25.1	62	37,331	41.4	9.2	34	39,208	272	274	182	95
2816	Inorganic pigments	257.2	54.8	84	49,606	93.9	7.8	71	39,586	274	703	119	125
2411	Logging	87.1	8.0	80	33,712	31.5	.3	51	24,895	276	2,352	156	135

1. Value added per production worker hour.
 2. Value added per establishment.
 3. Non-employee-compensation share of value added.
 4. Compensation per employee.

of U.S.-owned establishments and that (1) had at least six foreign-owned establishments, (2) were not suppressed for foreign-owned establishments, and (3) were not residual industries (see "Technical Note" in the article). The industries with relatively high productivity for foreign-owned establishments shown in this table are the industries in which the productivity of foreign-owned establishments was a least 50 percent higher than that of U.S.-owned establishments and that (1) had at least six foreign-owned establishments, (2) were not suppressed for foreign-owned establishments, and (3) were not residual industries (see "Technical Note").

for capital intensity.²⁴ In the lower productivity industries, the employee skill level of foreign-owned and U.S.-owned establishments was about the same, whereas in the higher productivity industries, the employee skill level of foreign-owned establishments was 18 percent higher than that of U.S.-owned establishments. Table 13 further illustrates the relationship between productivity and employee skill level. In 10 of the 11 lower productivity industries, the employee skill level of foreign-owned establishments was roughly equal to, or lower than, that of U.S.-owned establishments. In contrast, in 15 of the 23 higher productivity industries, the employee skill level of foreign-owned establishments was substantially higher than that of U.S.-owned establishments.

Combined effects.—The prior discussion showed that, when taken separately, differences in the plant scale, capital intensity, and employee skill level of foreign-owned and U.S.-owned establishments are each associated with differences in productivity. To determine whether a particular factor still independently contributes to the differences in productivity once the influence of each of the other factors is taken into account, the measures of relative plant scale, capital intensity, and employee skill level were included as independent variables in a multiple regression equation in which the relative productivity measure was the dependent variable. In addition to testing for the independent contribution of each of the three factors, the regression also provides an indication of their combined importance. The results confirmed that, even after allowing for the influence of the other measures, the relative plant scale, capital intensity, and employee skill level measures were each significantly correlated with the differences in productivity.²⁵ Furthermore, over 60 percent of the variation in the relative

productivity measure could be accounted for by the combined variation in these three factors.

Effect of foreign ownership.—One additional statistical check was made to test directly whether foreign ownership per se was associated with higher productivity levels. This check involved estimating a multiple regression equation that controlled for the effects on productivity levels of plant scale, capital intensity, and employee skill level and that included a variable for foreign ownership. The test indicated that there was no correlation between productivity and foreign ownership per se.²⁶ Thus, any influence of foreign ownership on productivity appears to be mainly indirect: The plant scale, capital intensity, and employee skill level of foreign-owned establishments differ from those of U.S.-owned establishments, and it is largely because of these differences that the productivity for foreign-owned establishments is higher.

Technical Note

This note describes the statistical decomposition method used in the article and discusses how the findings of the article are affected by the estimation of data for foreign-owned establishments and by the inclusion in the SIC of residual industries, which cover establishments not elsewhere classified.

Statistical decomposition

The differences between foreign-owned and U.S.-owned establishments in average plant scale, capital intensity, compensation per employee, wages per production-worker hour, and productivity were decomposed statistically into industry-mix,

26. A linear regression was estimated in which there were 624 observations (there were separate observations for foreign-owned and U.S.-owned establishments for each of the 312 industries). This estimation yielded the following:

$$PR = -133.81 + .19SC + 219.10CI + .0024ES - .15FDMY$$

(1.83) (19.95) (10.99) (-.04)

$$R^2 = .54,$$

$$F = 188.41$$

where *PR*, *SC*, *CI*, and *ES* are the measures of productivity, plant scale, capital intensity, and employee skill level, respectively, and *FDMY* is a dummy variable for foreign ownership. The *t*-statistics for the independent variables, which are shown in parentheses, indicate that the coefficients of both the capital intensity and employee skill level variables were significant at the 1-percent confidence level, that the coefficient of the scale variable was significant at the 10-percent confidence level, and that the coefficient of the foreign-ownership dummy was insignificant. To rule out the possibility that the regression results were influenced by errors in the measurement of capital intensity through the use of a proxy variable, tests controlling for this potential errors-in-variables problem using "instrumental variables" were conducted; the results of the tests suggested that such errors probably were not a problem.

24. The compensation-per-employee measure of employee skill level (sometimes termed "human capital intensity") reflects both occupational structure and the accumulation of skills within occupations.

25. Using the 312 industries as the observations, the estimation yielded the following:

$$RPR = -.89 + .02RSC + .01RCI + .01RES$$

(4.90) (15.67) (9.10)

$$R^2 = .61,$$

$$F = 163.7$$

where *RPR*, *RSC*, *RCI*, and *RES* are the measures of relative productivity, plant scale, capital intensity, and employee skill level, respectively. The *t*-statistics for the independent variables, which appear in parentheses, indicate that the coefficients for all of the variables were statistically significant at the 1-percent confidence level. The coefficients of correlation between the independent variables were as follows: Plant scale and capital intensity, 0.32; plant scale and employee skill level, 0.33; capital intensity and employee skill level, 0.04.

within-industry, and interaction effects. The decomposition for a given measure begins with expressing the measure as a weighted average of values for individual industries. For plant scale, for example, average plant scale (value added per establishment) may be expressed as a weighted average of the average plant scales in individual industries, with the weight for any given industry being the industry's share in the total number of establishments. Thus, the average plant scale for U.S.-owned establishments can be expressed as

$$p = \sum_{i=1}^{312} s_i p_i,$$

and the average plant scale of foreign-owned establishments can be expressed as

$$p^a = \sum_{i=1}^{312} s_i^a p_i^a,$$

where p is average plant scale (value added per establishment) for the 312 industries (see footnote 9), p_i is plant scale for industry i , and s_i is the share of the i th industry in the total number of establishments for the 312 industries. (Variables with the superscript a denote data for foreign-owned establishments, and variables without a superscript denote data for U.S.-owned establishments.) The difference between average plant scales of the two groups of establishments can then be decomposed algebraically as

$$p^a - p = \sum_{i=1}^{312} p_i (s_i^a - s_i) + \sum_{i=1}^{312} s_i (p_i^a - p_i) + \sum_{i=1}^{312} (p_i^a - p_i) (s_i^a - s_i).$$

The first term on the right side of the equation measures the effects of differences in industry mix; it is the difference in plant scale that would have resulted if, in each industry, plant scale were the same for foreign-owned establishments as for U.S.-owned establishments but if the differences in the distribution of the establishments by industry were as observed. The second term on the right side measures the effects of within-industry differences in plant scale; it is the difference in plant scale that would have resulted if foreign-owned establishments had the same distribution by industry as U.S.-owned establishments but if the differences in plant scale that existed in each industry were as observed. The third term reflects the interaction between these two effects.

A decomposition similar to this one was carried out for each of the other measures discussed in the article.

Estimation of nonsample establishments

Data were estimated for foreign-owned establishments that were not selected for the 1990 ASM, which covered only a sample of all manufacturing establishments. For manufacturing as a whole, 17 percent of the shipments of foreign-owned establishments was estimated in 1990. Data for the nonsample foreign-owned establishments were estimated using industry-average relationships between employment and payroll, on the one hand, and the other items covered by the ASM, on the other. (Employment and payroll for all foreign-owned establishments were obtained from the Census Bureau's Standard Statistical Establishment List.) Because industry-average relationships were used as the basis for estimation, actual differences between foreign-owned and U.S.-owned establishments may not be the same as those observed in the data; in particular, both the total and the within-industry differences may be larger. To check this possibility, the productivity of foreign-owned and U.S.-owned establishments was compared using data only for those foreign-owned establishments that were reported in the ASM. This comparison indicated that both the total productivity difference and the within-industry difference are larger when only these data are used than when both the reported and estimated data are used. However, the significance of this result is difficult to assess because the foreign-owned establishments included in the ASM sample were much larger, on average, than the nonsample establishments, and, as discussed

Data Availability

This article presents summary data for foreign-owned U.S. manufacturing establishments. Publications presenting more detailed data for 1989 and 1990 are available from the Superintendent of Documents (see inside back cover for order information). The data are also available on diskettes at a cost of \$20 each. For the 1989 data, specify BEA Accession Number 50-93-40-789, and for the 1990 data, Accession Number 50-93-40-790. Send your order, along with a check or money order payable to "Bureau of Economic Analysis," to Public Information Office Order Desk, BE-53, Bureau of Economic Analysis, U.S. Department of Commerce, Washington, DC 20230. To place an order using MasterCard or VISA, call (202) 606-9827. For further information about the link project, call (202) 606-9893.

in the previous section, productivity tends to be higher in larger establishments.

Residual industries

The SIC includes some three- and four-digit industries that cover establishments not elsewhere classified. (An SIC code with the digit "9" appearing as the third or fourth digit usually designates such an industry.) These residual industries usually do not consist of homogeneous activity groups. For example, SIC 3699 ("Electrical machinery, equipment, and supplies, not elsewhere classified") includes, among other things, establishments that manufacture electric Christmas tree lights and establishments that manufacture particle accelerators. Because of this heterogeneity, the activities of foreign-owned and U.S.-owned establishments that are classified in such industries may differ significantly. These differences could, in turn, cause the within-industry differences that were observed in the data to be larger than if comparisons had been based only on industries in which activities were

more homogeneous. To determine whether this was the case, the residual industries were excluded from the data, and the comparisons of the hourly wage rate and the productivity of foreign-owned and U.S.-owned establishments were repeated. Two different checks were made: In the first, only the 15 three-digit residual industries were excluded; in the second, both the three- and four-digit residual industries (a total of 53 industries) were excluded. In both the hourly wage rate and the productivity comparisons, excluding the residual industries had little effect on the results. Specifically, both the overall differences between foreign-owned and U.S.-owned establishments and the relative importance of the industry-mix effects and within-industry differences were nearly the same as those reported in the article. In addition, the distributions of foreign-owned and U.S.-owned establishments in terms of relative hourly wage rates and productivity were little changed from those discussed in the article.


Table 14 follows. 

Table 14.—Employment, Value Added by Manufacture, and Value of Shipments of Foreign-Owned and All U.S. Establishments, by Detailed Industry, 1990—Continued

SIC code	Industry	Foreign-owned establishments			All U.S. establishments			Foreign-owned establishments as a percentage of all U.S. establishments		
		Number of employees	Thousands of dollars		Number of employees ¹	Thousands of dollars		Employment	Value added by manufacture	Value of shipments
			Value added by manufacture	Value of shipments		Value added by manufacture ¹	Value of shipments ²			
2221	Broadwoven fabric mills, manmade fiber and silk	10,405	538,937	1,076,324	85,300	3,619,300	8,577,900	12.2	14.9	12.5
223	Broadwoven fabric mills, wool	357	23,336	41,728	15,700	674,600	1,798,300	2.3	3.5	2.3
2231	Broadwoven fabric mills, wool	357	23,336	41,728	15,700	674,600	1,798,300	2.3	3.5	2.3
224	Narrow fabric mills	983	77,334	107,476	17,000	671,400	1,259,700	5.8	11.5	8.5
2241	Narrow fabric mills	983	77,334	107,476	17,000	671,400	1,259,700	5.8	11.5	8.5
225	Knitting mills	8,331	290,206	701,556	197,900	6,791,100	14,596,500	4.2	4.3	4.8
2251	Women's hosiery, except socks	E	(D)	(D)	23,400	911,200	1,620,700	(D)	(D)	(D)
2252	Hosiery, nec	G	(D)	(D)	38,600	1,062,000	2,277,900	(D)	(D)	(D)
2253	Knit outerwear mills	1,378	35,918	67,356	63,600	1,783,200	3,456,400	2.2	2.0	1.9
2254	Knit underwear mills	G	(D)	(D)	15,400	596,500	1,105,000	(D)	(D)	(D)
2257	Wet knit fabric mills	842	32,153	102,668	30,700	1,370,000	3,588,700	2.7	2.3	2.9
2258	Lace and warp knit fabric mills	G	(D)	(D)	22,300	931,600	2,298,300	(D)	(D)	(D)
2259	Knitting mills, nec	0	0	0	3,900	136,500	249,300	0	0	0
226	Textile finishing, except wool	H	(D)	(D)	49,400	2,365,700	6,303,800	(D)	(D)	(D)
2261	Finishing plants, cotton	1,341	59,665	113,369	14,900	812,300	1,594,800	9.0	7.3	7.1
2262	Finishing plants, manmade	E	(D)	(D)	22,300	1,109,700	3,400,900	(D)	(D)	(D)
2269	Finishing plants, nec	1,489	74,144	189,153	12,200	4,109,700	13,081,100	12.2	16.7	14.5
227	Carpets and rugs	3,310	179,830	661,636	51,800	2,917,300	10,038,400	6.4	6.2	6.6
2273	Carpets and rugs	3,310	179,830	661,636	51,800	2,917,300	10,038,400	6.4	6.2	6.6
228	Yarn and thread mills	10,800	394,793	996,732	100,700	3,753,100	10,574,600	10.7	10.5	9.4
2281	Yarn spinning mills	6,693	246,816	619,148	75,000	2,654,500	7,259,200	8.9	9.3	8.5
2282	Throwing and winding mills	F	(D)	(D)	18,500	769,300	2,521,000	(D)	(D)	(D)
2284	Thread mills	H	(D)	(D)	7,100	329,300	794,500	(D)	(D)	(D)
229	Miscellaneous textile goods	7,828	520,049	1,524,095	52,200	3,292,000	7,477,800	15.0	15.8	20.4
2295	Coated fabrics, not rubberized	E	(D)	(D)	8,900	578,600	1,361,800	(D)	(D)	(D)
2296	Tire cord and fabrics	2,849	94,050	443,174	5,100	334,300	981,600	55.9	28.1	45.1
2297	Nonwoven fabrics	2,329	214,792	669,364	16,900	1,306,900	2,851,000	13.8	16.4	23.5
2298	Cordage and twine	G	(D)	(D)	7,000	248,800	636,900	(D)	(D)	(D)
2299	Textile goods, nec	1,199	118,688	203,167	14,400	823,400	1,646,500	8.3	14.4	12.3
23	Apparel and other textile products	23,085	850,240	1,727,481	992,900	33,034,000	64,413,600	2.3	2.6	2.7
231	Men's and boys' suits and coats	4,262	148,603	234,577	48,400	1,500,800	2,622,400	8.8	9.9	8.9
2311	Men's and boys' suits and coats	4,262	148,603	234,577	48,400	1,500,800	2,622,400	8.8	9.9	8.9
232	Men's and boys' furnishings	7,982	264,990	548,727	258,800	8,051,400	14,872,900	3.1	3.3	3.7
2321	Men's and boys' shirts	H	(D)	(D)	69,700	2,197,700	4,242,600	(D)	(D)	(D)
2322	Men's and boys' underwear and nightwear	G	(D)	(D)	15,300	381,700	724,900	(D)	(D)	(D)
2323	Men's and boys' neckwear	B	(D)	(D)	7,400	268,500	499,900	(D)	(D)	(D)
2325	Men's and boys' trousers and slacks	1,813	67,229	163,467	81,700	3,016,700	5,657,300	2.2	2.2	2.9
2326	Men's and boys' work clothing	C	(D)	(D)	31,500	846,300	1,461,700	(D)	(D)	(D)
2329	Men's and boys' clothing, nec	F	(D)	(D)	53,300	1,340,600	2,286,600	(D)	(D)	(D)
233	Women's and misses' outerwear	1,950	60,636	111,089	318,200	10,192,400	19,338,700	.6	.6	.6
2331	Women's and misses' blouses and shirts	C	(D)	(D)	64,400	1,954,900	3,733,000	(D)	(D)	(D)
2335	Women's, junior's, and misses' dresses	F	(D)	(D)	106,400	3,346,800	5,914,500	(D)	(D)	(D)
2337	Women's and misses' suits and coats	1,004	36,450	77,062	45,900	1,979,000	4,162,800	2.2	1.8	1.9
2339	Women's and misses' outerwear, nec	C	(D)	(D)	101,500	5,281,400	5,528,400	(D)	(D)	(D)
234	Women's and children's undergarments	G	(D)	(D)	60,300	1,859,000	3,424,300	(D)	(D)	(D)
2341	Women's and children's underwear	G	(D)	(D)	48,700	1,298,400	2,337,400	(D)	(D)	(D)
2342	Bras, girdles, and allied garments	E	(D)	(D)	11,600	560,600	1,086,900	(D)	(D)	(D)
235	Hats, caps, and millinery	0	0	0	16,500	424,300	736,600	0	0	0
2353	Hats, caps, and millinery	0	0	0	16,500	424,300	736,600	0	0	0
236	Girls' and children's outerwear	F	(D)	(D)	60,800	2,045,700	3,697,800	(D)	(D)	(D)
2361	Girls' and children's dresses and blouses	E	(D)	(D)	29,000	903,800	1,724,500	(D)	(D)	(D)
2369	Girls' and children's outerwear, nec	C	(D)	(D)	31,900	1,141,900	1,973,200	(D)	(D)	(D)
237	Fur goods	0	0	0	2,200	103,600	378,700	0	0	0
2371	Fur goods	0	0	0	2,200	103,600	378,700	0	0	0
238	Miscellaneous apparel and accessories	C	(D)	(D)	38,300	1,237,900	2,256,400	(D)	(D)	(D)
2381	Fabric dress and work gloves	C	(D)	(D)	5,200	212,400	340,800	(D)	(D)	(D)
2384	Robes and dressing gowns	0	0	0	3,900	119,700	306,300	0	0	0
2385	Waterproof outerwear	0	0	0	4,500	113,000	219,300	0	0	0
2386	Leather and sheep-lined clothing	0	0	0	2,200	73,000	166,600	0	0	0
2387	Apparel belts	0	0	0	11,100	386,100	673,400	0	0	0
2389	Apparel and accessories, nec	0	0	0	11,500	333,800	550,100	0	0	0
239	Miscellaneous fabricated textile products	6,515	273,047	620,649	189,300	7,618,900	17,085,900	3.4	3.6	3.6
2391	Curtains and draperies	F	(D)	(D)	23,400	685,400	1,499,200	(D)	(D)	(D)
2392	Housefurnishings, nec	2,638	86,198	214,278	44,800	1,967,300	4,871,900	5.9	4.4	4.4
2393	Textile bags	360	12,369	29,131	5,700	230,000	513,000	6.3	5.4	5.7
2394	Canvas and related products	C	(D)	(D)	17,300	531,100	1,134,900	(D)	(D)	(D)
2395	Pleating and stitching	0	0	0	14,200	388,100	742,700	0	0	0
2396	Automotive and apparel trimmings	F	(D)	(D)	47,100	2,267,400	5,104,800	(D)	(D)	(D)
2397	Schiffli machine embroideries	C	(D)	(D)	5,900	172,900	309,200	(D)	(D)	(D)
2399	Fabricated textile products, nec	1,586	110,416	206,322	31,100	1,376,600	2,910,300	5.1	8.0	7.1
24	Lumber and wood products	17,043	842,486	2,304,003	682,900	28,597,200	74,287,200	2.5	2.9	3.1
241	Logging	721	119,353	382,586	83,400	4,313,200	12,229,000	.9	2.8	3.1
2411	Logging	721	119,353	382,586	83,400	4,313,200	12,229,000	.9	2.8	3.1
242	Sawmills and planing mills	2,706	143,504	431,743	170,800	7,174,500	19,934,900	1.6	2.0	2.2
2421	Sawmills and planing mills, general	2,071	122,196	378,485	138,900	6,184,300	17,923,000	1.5	2.0	2.1
2426	Hardwood dimension and flooring mills	F	(D)	(D)	29,300	908,800	1,800,500	(D)	(D)	(D)
2429	Special product sawmills, nec	B	(D)	(D)	2,500	81,500	211,300	(D)	(D)	(D)
243	Millwork, plywood and structural members	7,930	339,789	777,564	229,400	9,577,600	23,245,200	3.5	3.5	3.3
2431	Millwork	3,909	168,644	375,646	90,500	3,851,600	9,524,700	4.3	4.4	3.9
2434	Wood kitchen cabinets	G	(D)	(D)	62,800	2,540,100	4,610,000	(D)	(D)	(D)
2435	Hardwood veneer and plywood	1,328	59,420	135,003	18,700	706,600	2,051,700	7.1	8.4	6.6
2436	Softwood veneer and plywood	C	(D)	(D)	35,600	1,669,200	5,030,400	(D)	(D)	(D)
2439	Structural wood members, nec	F	(D)	(D)	21,800	810,100	2,028,400	(D)	(D)	(D)
244	Wood containers	C	(D)	(D)	41,500	1,189,200	2,850,000	(D)	(D)	(D)
2441	Nailed wood boxes and shooks	0	0	0	6,000	191,600	431,300	0	0	0
2448	Wood pallets and skids	C	(D)	(D)	28,300	802,000	1,948,600	(D)	(D)	(D)
2449	Wood containers, nec	0	0	0	7,200	195,600	470,200	0	0	0
245	Wood buildings and mobile homes	G	(D)	(D)	61,400	2,364,800	6,471,000	(D)	(D)	(D)
2451	Mobile homes	B	(D)	(D)	38,800	1,501,600	4,202,500	(D)	(D)	(D)
2452	Prefabricated wood buildings	1,359	48,762	116,306	22,600	863,200	2,268,500	6.0	5.6	5.1
249	Miscellaneous wood products	4,118	178,693	570,338	96,400	3,977,800	9,557,000	4.3	4.5	6.0
2491	Wood preserving	F	(D)	(D)	13,000	696,500	2,642,700	(D)	(D)	(D)
2493	Reconstituted wood products	1,598	95,998	247,272	22,300	1,285,000	3,042,600	7.2	7.5	8.1
2499	Wood products, nec	G	(D)	(D)	61,100	1,996,300	3,871,800	(D)	(D)	(D)
25	Furniture and fixtures	J	(D)	(D)	499,200	21,644,700	41,682,000	(D)	(D)	(D)

See footnotes at end of table.

Table 14.—Employment, Value Added by Manufacture, and Value of Shipments of Foreign-Owned and All U.S. Establishments, by Detailed Industry, 1990—Continued

SIC code	Industry	Foreign-owned establishments			All U.S. establishments			Foreign-owned establishments as a percentage of all U.S. establishments		
		Number of employees	Thousands of dollars		Number of employees ¹	Thousands of dollars		Employment	Value added by manufacture	Value of shipments
			Value added by manufacture	Value of shipments		Value added by manufacture ¹	Value of shipments ²			
3713	Truck and bus bodies	G	(D)	(D)	37,200	1,809,300	4,382,200	(D)	(D)	(D)
3714	Motor vehicle parts and accessories	39,230	2,123,952	6,563,321	388,700	26,871,400	64,875,400	10.1	7.9	10.1
3715	Truck trailers	C	(D)	(D)	24,800	869,000	3,122,000	(D)	(D)	(D)
3716	Motor homes	0	0	0	14,100	594,500	2,167,200	0	0	0
372	Aircraft and parts	18,928	985,449	2,223,467	615,700	44,903,200	94,640,200	3.1	2.2	2.3
3721	Aircraft	4,945	243,878	746,741	289,300	20,235,400	51,369,600	1.7	1.2	1.5
3724	Aircraft engines and engine parts	3,013	186,076	397,010	129,000	12,059,100	22,812,800	2.3	1.5	1.7
3728	Aircraft parts and equipment, nec	10,970	555,495	1,079,716	197,500	12,608,700	20,457,900	5.6	4.4	5.3
373	Ship and boat building and repairing	5,993	292,752	590,271	175,200	8,554,700	15,853,700	3.4	3.4	3.7
3731	Ship building and repairing	G	(D)	(D)	121,200	6,362,800	10,855,700	(D)	(D)	(D)
3732	Boat building and repairing	H	(D)	(D)	54,100	2,191,800	4,998,000	(D)	(D)	(D)
374	Railroad equipment	2,312	225,809	339,421	29,500	1,839,200	4,693,600	7.8	12.3	7.2
3743	Railroad equipment	2,312	225,809	339,421	29,500	1,839,200	4,693,600	7.8	12.3	7.2
375	Motorcycles, bicycles, and parts	F	(D)	(D)	9,400	570,800	1,475,800	(D)	(D)	(D)
3751	Motorcycles, bicycles, and parts	F	(D)	(D)	9,400	570,800	1,475,800	(D)	(D)	(D)
376	Guided missiles, space vehicles, parts	G	(D)	(D)	200,300	19,284,300	30,554,100	(D)	(D)	(D)
3761	Guided missiles and space vehicles	0	0	0	156,200	15,782,500	25,082,600	0	0	0
3764	Space propulsion units and parts	0	0	0	29,700	2,412,000	3,755,800	0	0	0
3769	Space vehicle equipment, nec	G	(D)	(D)	14,400	1,089,700	1,715,600	(D)	(D)	(D)
379	Miscellaneous transportation equipment	G	(D)	(D)	39,100	2,115,600	5,745,500	(D)	(D)	(D)
3792	Travel trailers and campers	0	0	0	13,800	622,800	1,657,500	0	0	0
3795	Tanks and tank components	0	0	0	9,300	694,500	1,846,500	0	0	0
3799	Transportation equipment, nec	G	(D)	(D)	16,000	798,300	2,241,500	(D)	(D)	(D)
38	Instruments and related products	121,520	9,722,110	15,840,686	948,600	81,665,600	123,776,700	12.8	11.9	12.8
381	Search and navigation equipment	19,160	1,433,915	2,094,047	313,600	24,931,900	36,733,500	6.1	5.8	5.7
3812	Search and navigation equipment	19,160	1,433,915	2,094,047	313,600	24,931,900	36,733,500	6.1	5.8	5.7
382	Measuring and controlling devices	53,500	3,679,493	6,037,558	283,600	19,629,200	31,455,800	18.9	18.7	19.2
3821	Laboratory apparatus and furniture	3,290	333,003	506,393	17,800	1,209,700	1,916,700	18.5	27.5	26.4
3822	Environmental controls	7,702	404,098	669,225	26,100	1,461,600	2,396,000	29.5	27.6	27.9
3823	Process control instruments	13,410	791,866	1,379,551	54,700	3,764,700	5,924,000	24.5	21.0	23.3
3824	Fluid meters and counting devices	3,130	260,544	440,090	10,400	976,700	1,665,900	30.1	26.7	26.4
3825	Instruments to measure electricity	10,806	744,956	1,125,640	78,400	5,352,400	8,389,700	13.8	13.9	13.4
3826	Analytical instruments	5,648	491,886	822,932	37,800	3,018,700	4,906,100	14.9	16.3	16.8
3827	Optical instruments and lenses	3,027	160,220	299,938	22,000	1,326,700	2,217,700	13.8	12.1	13.5
3829	Measuring and controlling devices, nec	6,487	492,920	793,789	36,300	2,518,700	4,039,700	17.9	19.6	19.7
384	Medical instruments and supplies	29,530	2,573,803	4,262,668	234,700	20,286,300	30,934,200	12.6	12.7	13.8
3841	Surgical and medical instruments	11,597	1,027,510	1,554,613	88,900	7,077,500	10,261,600	13.0	14.5	15.2
3842	Surgical appliances and supplies	7,931	697,442	1,174,739	86,600	7,163,100	11,127,600	9.2	9.7	10.6
3843	Dental equipment and supplies	1,078	77,419	135,006	12,900	890,100	1,364,700	8.4	8.7	9.9
3844	X-ray apparatus and tubes	2,895	202,729	495,358	12,600	1,495,800	2,576,500	23.0	13.6	19.2
3845	Electromedical equipment	6,029	568,703	902,952	33,600	3,659,800	5,603,800	17.9	15.5	16.1
385	Ophthalmic goods	7,861	480,831	633,762	28,000	1,625,600	2,274,700	28.1	29.6	27.9
3851	Ophthalmic goods	7,861	480,831	633,762	28,000	1,625,600	2,274,700	28.1	29.6	27.9
386	Photographic equipment and supplies	9,455	1,360,864	2,400,481	79,300	14,527,200	21,018,200	11.9	9.4	11.4
3861	Photographic equipment and supplies	9,455	1,360,864	2,400,481	79,300	14,527,200	21,018,200	11.9	9.4	11.4
387	Watches, clocks, watchcases, and parts	2,014	193,204	412,170	9,400	665,400	1,360,200	21.4	29.0	30.3
3873	Watches, clocks, watchcases, and parts	2,014	193,204	412,170	9,400	665,400	1,360,200	21.4	29.0	30.3
39	Miscellaneous manufacturing industries	26,087	1,929,276	3,553,235	386,300	20,095,600	37,205,200	6.8	9.6	9.6
391	Jewelry, silverware, and plated ware	1,138	54,025	109,874	49,100	2,590,700	5,754,200	2.3	2.1	1.9
3911	Jewelry, precious metal	E	(D)	(D)	35,600	1,869,400	4,180,100	(D)	(D)	(D)
3914	Silverware and plated ware	B	(D)	(D)	7,300	462,300	751,900	(D)	(D)	(D)
3915	Jewelers' materials and lapidary work	F	(D)	(D)	6,200	259,000	822,200	(D)	(D)	(D)
393	Musical instruments	1,545	79,949	130,485	11,700	547,700	872,900	13.2	14.6	14.9
3931	Musical instruments	1,545	79,949	130,485	11,700	547,700	872,900	13.2	14.6	14.9
394	Toys and sporting goods	10,644	899,270	1,659,072	98,600	5,919,600	11,043,600	10.8	15.2	15.0
3942	Dolls and stuffed toys	E	(D)	(D)	4,900	244,100	380,400	(D)	(D)	(D)
3944	Games, toys, and children's vehicles	H	(D)	(D)	27,900	1,911,800	3,622,900	(D)	(D)	(D)
3949	Sporting and athletic goods, nec	5,842	465,662	883,445	65,800	3,763,600	7,040,200	8.9	12.4	12.5
395	Pens, pencils, office, and art supplies	3,397	219,327	484,349	29,900	1,780,000	3,310,100	11.4	12.3	14.6
3951	Pens and mechanical pencils	1,584	98,523	238,000	9,600	682,400	1,205,800	16.5	14.4	19.8
3952	Lead pencils and art goods	G	(D)	(D)	5,300	407,200	745,900	(D)	(D)	(D)
3953	Marking devices	0	0	0	7,700	295,200	485,600	0	0	0
3955	Carbon paper and inked ribbons	E	(D)	(D)	7,300	395,200	872,700	(D)	(D)	(D)
396	Costume jewelry and notions	2,636	144,693	251,301	28,200	1,363,500	2,222,900	9.3	10.6	11.3
3961	Costume jewelry	0	0	0	19,200	892,400	1,415,700	0	0	0
3965	Fasteners, buttons, needles, and pins	2,636	144,693	251,301	9,000	471,100	807,200	29.3	30.7	31.1
399	Miscellaneous manufactures	6,727	532,012	918,154	168,800	7,894,100	14,001,600	4.0	6.7	6.6
3991	Brooms and brushes	E	(D)	(D)	14,000	731,000	1,221,800	(D)	(D)	(D)
3993	Signs and advertising specialties	G	(D)	(D)	69,500	2,613,800	4,826,500	(D)	(D)	(D)
3995	Burial caskets	0	0	0	10,200	579,800	1,093,500	0	0	0
3996	Hard surface floor coverings, nec	F	(D)	(D)	7,100	793,200	1,377,300	(D)	(D)	(D)
3999	Manufacturing industries, nec	4,248	360,031	560,730	68,000	3,176,200	5,482,400	6.2	11.3	10.2
	Administrative and auxiliary	200,064	n.a.	n.a.	1,260,900	n.a.	n.a.	15.9	n.a.	n.a.

^D Suppressed to avoid disclosure of data of individual companies.

n.a. Not available.

1. The data shown in this column are rounded to the nearest 100 employees because they are rounded in this manner in the Census Bureau's 1990 Annual Survey of Manufactures: Statistics for Industry Groups and Industries, from which they were taken.

2. The data shown in this column are rounded to the nearest \$100,000 because they are rounded in this manner in the Census Bureau's 1990 Annual Survey of Manufactures: Statistics for Industry Groups and Industries, from

which they were taken.

3. On this line, the columns for number of employees cover both operating establishments and administrative and auxiliary establishments; the other columns cover operating establishments only.

NOTE.—Size ranges are given in employment cells that are suppressed. The size ranges are: A—0 to 19; B—20 to 99; C—100 to 249; E—250 to 499; F—500 to 999; G—1,000 to 2,499; H—2,500 to 4,999; I—5,000 to 9,999; J—10,000 to 24,999; K—25,000 to 49,999; L—50,000 to 99,999; M—100,000 or more.

SIC Standard Industrial Classification