

# Regional Patterns in the Location of Foreign-Owned U.S. Manufacturing Establishments

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**A** NEW DATA set on foreign-owned establishments supports an analysis of regional patterns of foreign direct investment in the United States (FDIUS) that uses comprehensive establishment data and is based on geographic areas that are defined on an economic basis rather than on a strictly political or administrative basis.<sup>1</sup> A key feature of the data set is the separate identification of newly built, or "greenfield," establishments. Greenfield establishments are of particular interest in the analysis of FDIUS because they indicate explicit locational choices by the foreign owners at the time of the investment.

Among the questions that can be addressed using the new data are the following: How do the regional patterns in the location of foreign-owned U.S. manufacturing establishments com-

pare with those of U.S.-owned manufacturing establishments? How do these patterns compare for greenfield establishments? How does the location of foreign-owned greenfield establishments compare with the location of existing establishments that are acquired by foreigners? To what extent does the location of foreign-owned greenfield establishments, and its relation to the location of prior investments, vary by country of owner?

This article describes the regional distribution of employment for foreign-owned U.S. manufacturing establishments, with a particular emphasis on greenfield investments in 1987-92. The geographic units used in the analysis are the 172 BEA economic areas, each of which consists of one or more economic nodes—centers of economic activity—and the surrounding counties that are economically related to the nodes (see the box "BEA Economic Areas").

Among the key findings from this analysis are the following:

- The regional distribution of employment for foreign-owned manufacturing establishments is broadly similar to that for U.S.-owned manufacturing establishments, but foreign-owned establishments tend to be more concentrated in the Southeast.
- Foreign-owned greenfield establishments are relatively concentrated in parts of New England and the Southeast, in coastal Texas and Louisiana, and in Missouri and western Illinois.
- The regional pattern of employment for foreign-owned greenfield establishments set up in 1987-92 differs somewhat from the

1. For convenience, the establishments of U.S. affiliates of foreign companies are referred to in this article as "foreign-owned establishments," even though the percentage of foreign ownership in a U.S. affiliate may be as low as 10 percent. (A U.S. affiliate is a U.S. business enterprise that is owned 10 percent or more, directly or indirectly, by a foreign person.) The data are not adjusted for percentage of foreign ownership; thus, the employment data include all the employees of the establishment, even though the foreign investor may own less than 100 percent of the affiliate to which the establishment belongs. However, most affiliates are majority owned (that is, they are owned more than 50 percent by direct investors); in 1992, majority-owned affiliates accounted for 86 percent of the manufacturing employment of all U.S. affiliates.

## BEA Economic Areas

The set of 172 BEA economic areas, as redefined in 1995, is used as the geographic basis for the analysis in this article (chart 8 and table 6). Since 1969, when the first set of BEA economic areas was established, BEA has used these multicounty areas to facilitate regional analyses. The economic areas were redefined in 1974, in 1977, and, most recently, in 1995 to incorporate updated information on county-level commuting patterns. The economic areas are designed so that they provide approximate delineations of the competing markets that an informed decision maker would consider in locating a plant.

Each economic area consists of one or more economic nodes—metropolitan areas or similar areas that serve as centers of economic activity—and the surrounding counties that are economically related to the nodes. As far as possible, each area includes both the place of work and the place of residence of its labor force, so the areas are often referred to as "self-contained labor markets." The economic areas that have multiple nodes have multiple labor markets that are not individually self-contained. The procedures used to define the areas are described in Kenneth P. Johnson, "Redefinition of the BEA Economic Areas," SURVEY OF CURRENT BUSINESS 75 (February 1995): 75-81.

The research reported in this article was conducted while the authors were research associates at the Center for Economic Studies, U.S. Bureau of the Census. The results of the research and the conclusions expressed do not necessarily indicate concurrence by the Bureau of the Census or the Center for Economic Studies.

pattern for foreign-owned establishments that were acquired during this period. For example, two of the top six BEA economic areas for greenfield establishments do not rank among the top 14 areas for acquired establishments.

- Foreign-owned greenfield establishments tend to be located in areas with high population levels, but the relationship is not as strong as it is for U.S.-owned greenfield establishments. Among the five major investing countries, the relation with population is strongest for British-owned establishments and weakest for Japanese-owned establishments.
- German-owned greenfield establishments tend to be located in areas where other German-owned establishments—both older plants and plants recently acquired from U.S. companies—are located.
- French- and German-owned greenfield establishments tend to be located in the eastern half of the United States, but British-owned greenfield establishments tend to be widely dispersed.
- Japanese-owned greenfield establishments tend to be concentrated on the west coast and along a corridor extending from Indiana to northern Georgia.

The findings presented in this article are the results of an initial examination of the new data set. Future research with the new data will refine and extend the analysis of how the characteristics of an area (such as education levels, wage rates, and local tax rates) and of the investment itself (such as size and industry) influence foreign investors' decisions about where to locate, particularly the tendency for establishments to cluster in certain areas. These topics have been a focus of other studies concerned with the regional aspects of FDIUS.<sup>2</sup> Compared with the data used in those studies, the new data set offers advantages because of its comprehensive coverage of foreign-owned establishments and because the data can be broken down into geographic areas defined on an economic basis.

2. See, for example, Cletus C. Coughlin, Joseph V. Terza, and Vachira Arromdee, "State Characteristics and the Location of Foreign Direct Investment within the United States," *The Review of Economics and Statistics* 73 (1991): 675-83; Douglas P. Woodward, "Locational Determinants of Japanese Manufacturing Start-ups in the United States," *Southern Economic Journal* 58 (1992): 690-708; Joseph Friedman, Daniel A. Gerlowski, and Jonathan Silberman, "What Attracts Foreign Multinational Corporations? Evidence from Branch Plant Location in the United States," *Journal of Regional Science* 32 (1992): 403-18; and Donald F. Smith, Jr. and Richard Florida, "Agglomeration and Industrial Location: An Econometric Analysis of Japanese-Affiliated Manufacturing Establishments in Automotive-Related Industries," *Journal of Urban Economics* 36 (1994): 23-41.

The new data set was constructed by the authors at the Census Bureau's Center for Economic Studies, a facility established to provide researchers with restricted access, for statistical purposes, to unpublished microdata collected in the Census Bureau's regular surveys and census programs. The authors have been granted access to this data set as research associates at the Center under arrangements that preserve the confidentiality of the data of individual companies (see the technical note at the end of this article).

Several data files were used to create the new data set. Some files were obtained from a joint project that linked the BEA enterprise, or company, data on foreign direct investment in the United States with the Bureau of the Census establishment, or plant, data for all U.S. companies; the data for establishments in all industries in 1987 and 1992 are from the economic censuses, and the data for manufacturing establishments in 1988-91 are from the annual survey of manufactures (ASM).<sup>3</sup> Several other Census Bureau microdata files from the economic censuses and other surveys were used in the construction of the data set.

The regional patterns examined in this article are for establishments in manufacturing. This sector is of particular interest because location decisions for manufacturing establishments are likely to be more closely related to geographic area characteristics that influence the cost and the availability of inputs and because manufacturing has an important role in the economies of many regions, particularly with respect to a region's labor markets and growth potential.<sup>4</sup> In addition,

3. The project was authorized by Congress under the Foreign Direct Investment and International Financial Data Improvements Act of 1990. The data for 1992 were published in U.S. Department of Commerce, Bureau of Economic Analysis and Bureau of the Census, *Foreign Direct Investment in the United States: Establishment Data for 1992* (Washington, DC: U.S. Government Printing Office, May 1997). The 1988-91 data were published in *Foreign Direct Investment in the United States: Establishment Data for Manufacturing*, in a volume for each year. The data for 1987 were published in *Foreign Direct Investment in the United States: Establishment Data for 1987* (Washington, DC: U.S. Government Printing Office, June 1992). The ASM data for the years after 1991 have not been linked because of resource constraints, but a link with the 1997 Economic Censuses data is planned.

Data on manufacturing obtained from the link project have been examined in two previous SURVEY articles: The first presented a profile of foreign-owned U.S. manufacturing establishments, including an overview of the State-by-industry distribution of the establishments' production; and the second examined differences by country of owner in foreign-owned establishments' operating characteristics, controlling for, among other factors, differences in location by State. See Ned G. Howenstine and William J. Zeile, "Characteristics of Foreign-Owned U.S. Manufacturing Establishments," SURVEY OF CURRENT BUSINESS 74 (January 1994): 34-59 and Ned G. Howenstine and Dale P. Shannon, "Differences in Foreign-Owned Establishments by Country of Owner," SURVEY 76 (March 1996): 43-60.

4. For a further discussion of the importance of manufacturing in regional economies, see G. Andrew Bernat, Jr., "Manufacturing Earnings in BEA Component Economic Areas," SURVEY 78 (November 1998): 55-64. This article analyzes how the characteristics of areas—such as industry mix, extent of new-industry clustering, education levels, and population levels—influence differences across the areas in manufacturing earnings per job.

manufacturing accounts for a large share of total FDIUS; in 1992, manufacturing establishments accounted for 40 percent of the employment of all foreign-owned establishments, almost double manufacturing's share in the employment of U.S.-owned establishments.

The foreign-owned greenfield establishments cover plants that were built in 1987-92, a period that includes several years—1987-90—when growth in FDIUS was particularly strong (during these years, manufacturing employment of foreign-owned businesses grew an average of 15 percent per year). In subsequent years through 1997, growth in FDIUS in manufacturing was relatively modest, and the geographic distribution at the State level changed little.<sup>5</sup> For this reason and because the underlying factors that influence the location of investments are unlikely to have changed significantly over time, most of the findings reported in this article probably also apply to the years since 1992.

Employment was chosen as the basis for the analysis both because of its usefulness as an indicator of economic activity and because of the widespread interest in the effect of FDIUS on levels of manufacturing employment. To place the findings in context, the employment patterns for foreign-owned establishments are compared with those for U.S.-owned establishments. The data

5. Data from BEA's FDIUS surveys indicate that, between 1992 and 1997, the manufacturing employment of foreign-owned businesses increased less than 2 percent, and the distribution of this employment across States changed only slightly. See Mahnaz Fahim-Nader and William J. Zeile, "Foreign Direct Investment in the United States: New Investment in 1997 and Affiliate Operations in 1996," SURVEY 78 (June 1998): 39-67.

for foreign-owned establishments only cover operating establishments, and they exclude small establishments for which the data were estimated rather than reported.

The remainder of this article consists of two sections. The first section briefly compares the regional patterns of employment for all foreign-owned and U.S.-owned manufacturing establishments in 1992. The second section compares the regional distribution of employment for foreign-owned greenfield establishments that were set up in 1987-92 with the distributions for U.S.-owned greenfield establishments, for foreign-owned establishments that were acquired from U.S. companies in 1988-92, and for foreign-owned establishments that were in place since at least 1982 and that were foreign-owned in both 1987 and 1992. Similar comparisons are made for the greenfield establishments of five major investing countries.

### Regional Distribution of Foreign-Owned Manufacturing Establishments

Measured by their employment reported in the 1992 Economic Census, activity by foreign-owned U.S. manufacturing establishments tends to be greatest in the high-population areas of the Northeast, the Great Lakes, and the west coast (chart 1). There is also considerable activity by these establishments in parts of the Southeast—particularly in a band that extends along the

Table 1.—Selected Comparative Rankings of the Top 20 Economic Areas for Foreign-Owned Establishments, 1992

Code	Name	All establishments		Greenfield establishments set up in 1987-92		Foreign-owned acquired establishments, 1988-92	Addendum: Ranking in terms of 1992 population
		Foreign-owned	U.S.-owned	Foreign-owned	U.S.-owned		
		(1)	(2)	(3)	(4)		
10	New York-Northern New Jersey-Long Island, NY-NJ-CT-PA-MA-VT .....	1	1	1	2	1	1
64	Chicago-Gary-Kenosha, IL-IN-WI .....	2	3	8	4	2	3
160	Los Angeles-Riverside-Orange County, CA-AZ .....	3	2	5	1	3	2
163	San Francisco-Oakland-San Jose, CA .....	4	6	4	3	5	4
12	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD .....	5	7	9	11	4	7
3	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT .....	6	4	2	5	6	6
71	Nashville, TN-KY .....	7	21	13	15	8	28
40	Atlanta, GA-AL-NC .....	8	11	3	9	15	13
55	Cleveland-Akron, OH-PA .....	9	9	15	10	7	12
127	Dallas-Fort Worth, TX-AR-OK .....	10	8	10	6	14	9
13	Washington-Baltimore, DC-MD-VA-WV-PA .....	11	14	16	21	10	5
41	Greenville-Spartanburg-Anderson, SC-NC .....	12	26	26	35	13	59
23	Charlotte-Gastonia-Rock Hill, NC-SC .....	13	18	20	24	9	37
57	Detroit-Ann Arbor-Flint, MI .....	14	5	14	7	19	8
51	Columbus, OH .....	15	35	48	36	11	25
131	Houston-Galveston-Brazoria, TX .....	16	19	6	13	22	10
96	St. Louis, MO-IL .....	17	17	12	26	20	16
19	Raleigh-Durham-Chapel Hill, NC .....	18	36	25	43	30	47
107	Minneapolis-St. Paul, MN-WI-IA .....	19	10	19	12	16	14
49	Cincinnati-Hamilton, OH-KY-IN .....	20	24	42	31	12	49

NOTE.—Rankings are by employment.

Piedmont area of the Carolinas to northern Georgia—and in eastern Texas.

Across the 172 economic areas, the distributions of employment for foreign- and U.S.-owned manufacturing establishments are very similar; as would be expected, both distributions are strongly associated with population levels.<sup>6</sup> This similarity is particularly pronounced at the upper end of the distribution: Five of the top six areas for foreign-owned manufacturing establishments are among the top six areas for U.S.-owned manufacturing establishments; these five areas also rank among the six most populous economic areas (table 1).

Despite this similarity, foreign-owned manufacturing establishments are relatively more concentrated than U.S.-owned manufacturing establishments in a number of areas, particularly in the Southeast. Four of the areas in the Southeast that rank among the top 20 areas for foreign-owned establishments—Nashville (EA 71), Greenville-Spartanburg-Anderson (EA 41), Charlotte-Gastonia-Rock Hill (EA 23), and Raleigh-Durham-Chapel Hill (EA 19)—are ranked much lower for U.S.-owned establishments; they also are ranked much lower in terms of population. In the Great Lakes region, Columbus (EA 51) ranks much higher for foreign-owned establishments than for U.S.-owned establishments, while the opposite is true of Detroit-Ann Arbor-Flint (EA 57). Some differences in the regional patterns for foreign- and U.S.-owned establishments may reflect differences in the industries in which the establishments operate.

The regional pattern of employment for foreign-owned manufacturing establishments in 1992 partly reflects the locations of the establishments that entered the foreign direct investment universe in 1987–92, a period that includes the investment surge of the late 1980's. Most of this investment took the form of acquisitions of U.S. companies and their plants. The distribution of employment across economic areas for all foreign-owned manufacturing establishments in 1992 is thus closely related to the distribution for foreign-owned manufacturing establishments that were acquired from U.S. companies. Each of the top six areas for acquired establishments also ranks among the top six areas for

all foreign-owned manufacturing establishments (table 1).

### Location of Foreign-Owned Greenfield Establishments

Although most foreign direct investment in U.S. manufacturing in recent years has taken the form of acquisitions, greenfield investments are of particular interest because they more clearly represent net additions to the economic bases of the communities where they are located. Greenfield investment also provides a superior indicator of the relative attractiveness of regions to foreign investors, because it involves a more explicit choice of location than does the takeover of establishments that had been set up by another company.

This section examines the regional patterns of employment for greenfield establishments in manufacturing that were set up by foreign direct investors in 1987–92. In the data set, there are about 1,750 of these establishments; they are present in 147 of the 172 economic areas (table 2). In comparison, there are about 4,000 foreign-owned manufacturing establishments that were acquired from U.S. companies in 1988–92; they are present in 166 economic areas.

The regional pattern of employment for foreign-owned greenfield establishments that were set up in 1987–92 differs somewhat from the pattern for foreign-owned establishments that were acquired in this period (and therefore from the pattern for all foreign-owned establishments). For example, two of the top six areas for greenfield establishments—Atlanta (EA 40) and Houston-Galveston-Brazoria (EA 131)—do not rank among the top 14 areas for acquired establishments (table 1, columns 3 and 5). In addition, the second-ranking area for greenfield establishments—Boston-Worcester-Lawrence-Lowell-Brockton (EA 3)—has a substantially lower ranking for acquired establishments, and the second-ranking area for acquired establishments—Chicago-Gary-Kenosha (EA 64)—has a substantially lower ranking for greenfield establishments.

Despite these differences, the overall geographic pattern for these greenfield establishments is broadly similar to that for the acquired establishments. Across the 147 economic areas that have foreign-owned greenfield establishments, the area share of employment for foreign-owned greenfield establishments is strongly correlated with that for foreign-owned acquired

6. The coefficient of correlation between the area share of employment for foreign-owned establishments and the area share of employment for U.S.-owned establishments is 0.95. Both shares are strongly correlated with the area share of total U.S. population; however, the correlation for U.S.-owned establishments (0.97) is slightly higher than that for foreign-owned establishments (0.92).

establishments (table 3). The area share for foreign-owned greenfield establishments is also strongly correlated with that for older foreign-owned establishments. These similarities reflect a common tendency for the greenfield, acquired, and older establishments of foreign direct investors to be located in areas with large populations.<sup>7</sup>

The overall geographic pattern for foreign-owned greenfield establishments is similarly related to that for U.S.-owned greenfield establishments: The correlation between the area shares of employment is strong, reflecting a

common relation to population size (table 3, column 3). However, the relation to population is somewhat stronger for the U.S.-owned establishments than for the foreign-owned establishments.<sup>8</sup> The top four economic areas for U.S.-owned greenfield establishments also rank among the four largest areas in terms of population. In contrast, the second-ranking area for foreign-owned greenfield establishments—Boston-Worcester-Lawrence-Lowell-Brockton (EA 3)—and the third-ranking area—Atlanta (EA 40)—each have substantially lower rankings in terms of population (table 1, columns 3, 4, and 6).

7. The coefficient of correlation between the area share of U.S. population and the area share of employment for foreign-owned greenfield establishments is 0.85 (table 3, column 6). Across the 147 areas, the coefficient of correlation between the share of population and the share of employment for foreign-owned acquired establishments is 0.89, and the coefficient of correlation between the share of population and the share of employment for older foreign-owned establishments is 0.85.

8. Across the 147 areas that have foreign-owned greenfield establishments, the coefficient of correlation between the area share of population and the area share of greenfield employment is 0.95 for U.S.-owned greenfield establishments, compared with 0.85 for foreign-owned greenfield establishments.

**Table 2.—Number and Employment of Foreign-Owned Operating Establishments and the Number of Economic Areas Containing Such Establishments, 1992**

	Universe <sup>1</sup>		New data set <sup>2</sup>							
	Number of establishments	Employment	All establishments		Of which:					
					Greenfield establishments set up in 1987–92		Acquired establishments, 1988–92		Older establishments <sup>3</sup>	
			Number of establishments	Number of economic areas	Number of establishments	Number of economic areas	Number of establishments	Number of economic areas	Number of establishments	Number of economic areas
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
<b>All foreign countries .....</b>	<b>10,952</b>	<b>1,787,610</b>	<b>8,980</b>	<b>170</b>	<b>1,749</b>	<b>147</b>	<b>4,024</b>	<b>166</b>	<b>2,098</b>	<b>156</b>
Canada .....	1,285	218,200	1,009	146	200	75	439	116	272	93
France .....	1,015	154,755	909	129	166	71	424	95	218	84
Germany .....	1,073	209,840	800	115	156	57	333	84	232	78
United Kingdom .....	2,847	378,539	2,587	156	519	109	1,071	137	562	119
Japan .....	1,543	323,080	1,037	121	252	69	537	98	138	55

1. Covers the universe of foreign-owned operating manufacturing establishments. Data originally appeared in *Foreign Direct Investment in the United States: Establishment Data for 1992*.

2. See the technical note.

3. Older establishments are establishments that existed in 1982 and were owned by the same foreign country in 1987 and 1992.

**Table 3.—Correlations Between the Location of Foreign-Owned Greenfield Establishments and the Location of Other Groups of Establishments**

	Number of economic areas <sup>1</sup>	Coefficient of correlation between economic area shares of U.S. employment in foreign-owned greenfield establishments and economic area shares of employment in: <sup>2</sup>				Addendum: Coefficient of correlation with economic area share of total U.S. population
		Greenfield establishments set up in 1987–92:		Foreign-owned acquired establishments, 1988–92	Older foreign-owned establishments	
		Owned by other foreign countries	Owned by U.S. companies			
		(1)	(2)	(3)	(4)	
<b>All foreign countries .....</b>	<b>147</b>	<b>0.84</b>	<b>0.81</b>	<b>0.82</b>	<b>0.85</b>	
Canada .....	75	.37	.39	.57	.16	.39
France .....	70	.72	.60	.56	.32	.60
Germany .....	57	.61	.62	.73	.66	.75
United Kingdom .....	109	.80	.76	.79	.67	.81
Japan .....	69	.28	.34	.27	.38	.29

1. The number of economic areas that have greenfield establishments owned by the country(ies) listed in the stub; for a given row, the correlations are across these economic areas.

2. For example, the coefficient of correlation shown in column 2 for Canada (0.37) measures, for the 75 economic areas that have Canadian-owned greenfield establishments, the strength of the relationship between the location of these establishments and the location of establishments

owned by all other foreign countries' investors. The coefficient is computed based on the economic areas' shares of total employment for each group of establishments.

NOTE.—A coefficient of correlation between two variables may take a value between -1 and 1; absolute values closer to 1 indicate a strong linear relationship, and the sign indicates whether the relationship is direct or inverse.

Relative to all greenfield establishments, the employment of foreign-owned greenfield establishments is concentrated in a number of specific areas. These areas are highlighted in chart 2, which segments the economic areas by a location quotient that measures the relative concentration of foreign-owned establishments in the employment of all greenfield establishments: In areas with a high location quotient (more than 1.5), the foreign-owned establishments' share of the area's greenfield employment is more than 50 percent higher than the foreign-owned establishments' share for the United States. The chart shows that foreign-owned greenfield establishments are relatively concentrated in several clusters of contiguous areas in the eastern half of the United States—particularly in parts of New England and the Southeast, in coastal Texas and Louisiana, and in Missouri and western Illinois. Within the Southeast, foreign-owned greenfield establishments are relatively concentrated in portions of Kentucky, Tennessee, Georgia, Virginia, and the Carolinas. Among the major population centers, these establishments are more concen-

trated in the Boston and Houston areas and less concentrated in the Los Angeles area.

**Comparisons by country of ownership**

Among the five major investing countries—Canada, France, Germany, the United Kingdom, and Japan—the regional patterns of employment in foreign-owned greenfield establishments vary substantially.<sup>9</sup> For each investing country, at least two of the country's top five areas are not among the top five areas for the other four countries; for two countries, four of the top five areas are not among the top five areas for the other four countries (table 4). In contrast, the economic area rankings for the countries' acquired establishments tend to be more similar (table 5).

The regional patterns for Canadian- and Japanese-owned greenfield establishments are the most distinctive: For each of these countries, the pattern is only weakly correlated with the pattern

9. These five investing countries accounted for more than 70 percent of the employment of all foreign-owned operating establishments in manufacturing in 1992 (table 2).

**Table 4.—Comparative Rankings of the Top 20 Economic Areas for Foreign-Owned Greenfield Establishments by Country of Ownership, 1992**

Code	Name	Employment ranking among all economic areas					Addendum: Ranking in terms of 1992 population	
		All foreign-owned establishments	Canadian-owned establishments	French-owned establishments	German-owned establishments	British-owned establishments		Japanese-owned establishments
10	New York-Northern New Jersey-Long Island, NY-NJ-CT-PA-MA-VT ....	1	A	A	A	A	B	1
3	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT .....	2	C	A	B	A	C	6
40	Atlanta, GA-AL-NC .....	3	A	A	B	C	A	13
163	San Francisco-Oakland-San Jose, CA .....	4	.....	.....	.....	C	A	4
160	Los Angeles-Riverside-Orange County, CA-AZ .....	5	C	B	C	A	B	2
131	Houston-Galveston-Brazoria, TX .....	6	.....	C	.....	A	C	10
47	Lexington, KY-TN-VA-WV .....	7	.....	.....	.....	C	A	33
64	Chicago-Gary-Kenosha, IL-IN-WI .....	8	.....	C	B	A	C	3
12	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD .....	9	C	.....	A	B	.....	7
127	Dallas-Fort Worth, TX-AR-OK .....	10	C	C	C	B	C	9
67	Indianapolis, IN-IL .....	11	C	.....	.....	C	A	20
96	St. Louis, MO-IL .....	12	A	B	A	.....	.....	16
71	Nashville, TN-KY .....	13	.....	.....	.....	C	A	28
57	Detroit-Ann Arbor-Flint, MI .....	14	B	.....	.....	.....	C	8
55	Cleveland-Akron, OH-PA .....	15	B	B	.....	B	.....	12
13	Washington-Baltimore, DC-MD-VA-WV-PA .....	16	.....	.....	A	B	.....	5
63	Milwaukee-Racine, WI .....	17	B	.....	B	.....	.....	26
167	Portland-Salem, OR-WA .....	18	C	.....	.....	.....	B	23
107	Minneapolis-St. Paul, MN-WI-IA .....	19	.....	C	C	.....	.....	14
23	Charlotte-Gastonia-Rock Hill, NC-SC .....	20	.....	.....	C	.....	.....	37
Addenda:								
All other economic areas that rank among the top 10 for at least one of the five major investing countries:								
73	Memphis, TN-AR-MS-KY .....	21	A	.....	.....	C	.....	34
99	Kansas City, MO-KS .....	22	B	C	.....	.....	C	24
18	Greensboro-Winston-Salem-High Point, NC-VA .....	23	C	A	.....	C	.....	40
161	San Diego, CA .....	24	.....	C	.....	.....	B	21
19	Raleigh-Durham-Chapel Hill, NC .....	25	.....	.....	C	B	.....	47
141	Denver-Boulder-Greeley, CO-KS-NE .....	28	.....	B	.....	.....	.....	17
30	Orlando, FL .....	31	.....	.....	A	.....	.....	19
70	Louisville, KY-IN .....	32	.....	.....	B	.....	.....	50
122	Wichita, KS-OK .....	37	A	C	.....	.....	.....	60
171	Anchorage, AK .....	41	.....	.....	.....	.....	B	92
24	Columbia, SC .....	46	.....	A	.....	.....	.....	70
60	Appleton-Oshkosh-Neenah, WI .....	65	.....	B	.....	.....	.....	124
4	Burlington, VT-NY .....	66	B	.....	.....	.....	.....	94

A Ranking within the top 5 for the given investing country.  
 B Ranking from 6 to 10 for the given investing country.  
 C Ranking from 11 to 20 for the given investing country.

for all the other investing countries (table 3, column 2). This distinctiveness partly reflects a relative tendency for Canadian and Japanese direct investors to locate greenfield establishments in less populous areas (table 3, column 6).

In terms of their concentration relative to all greenfield establishments, Canadian-, Japanese-, and German-owned establishments exhibit area clustering, but the patterns for French- and British-owned establishments are less pronounced (charts 3-7).

*Canada.*—Canadian-owned greenfield establishments tend not to be located in the same areas as older Canadian-owned establishments, but they do tend to be located in the same areas as Canadian-owned establishments that were acquired from U.S. companies in 1988-92 (table 3).

Relative to all greenfield establishments, the employment of Canadian-owned greenfield establishments is concentrated in a number of areas near the Canadian border and in a central band that spans the Mississippi River and a number of States in the Plains region (chart 3). Three of the areas in this central band—St. Louis (EA 96),

Memphis (EA 73), and Wichita (EA 122)—rank among the top five areas for Canadian-owned greenfield establishments (table 4). The employment of these establishments in this band is diversified across a number of industries.

*France.*—The regional pattern of employment for French-owned greenfield establishments is closely associated with the pattern for other foreign-owned greenfield establishments, but not with the pattern for older French-owned establishments (table 3).

French-owned greenfield establishments tend to be located in the eastern portion of the United States. The top five areas for French-owned greenfield establishments are all located in States on the east coast (table 4). Relative to all greenfield establishments, French-owned greenfield establishments are concentrated in a number of economic areas along the east coast and in the Plains region (chart 4).

*Germany.*—German-owned greenfield establishments tend to be located in areas where

*Text continues on page 24.*

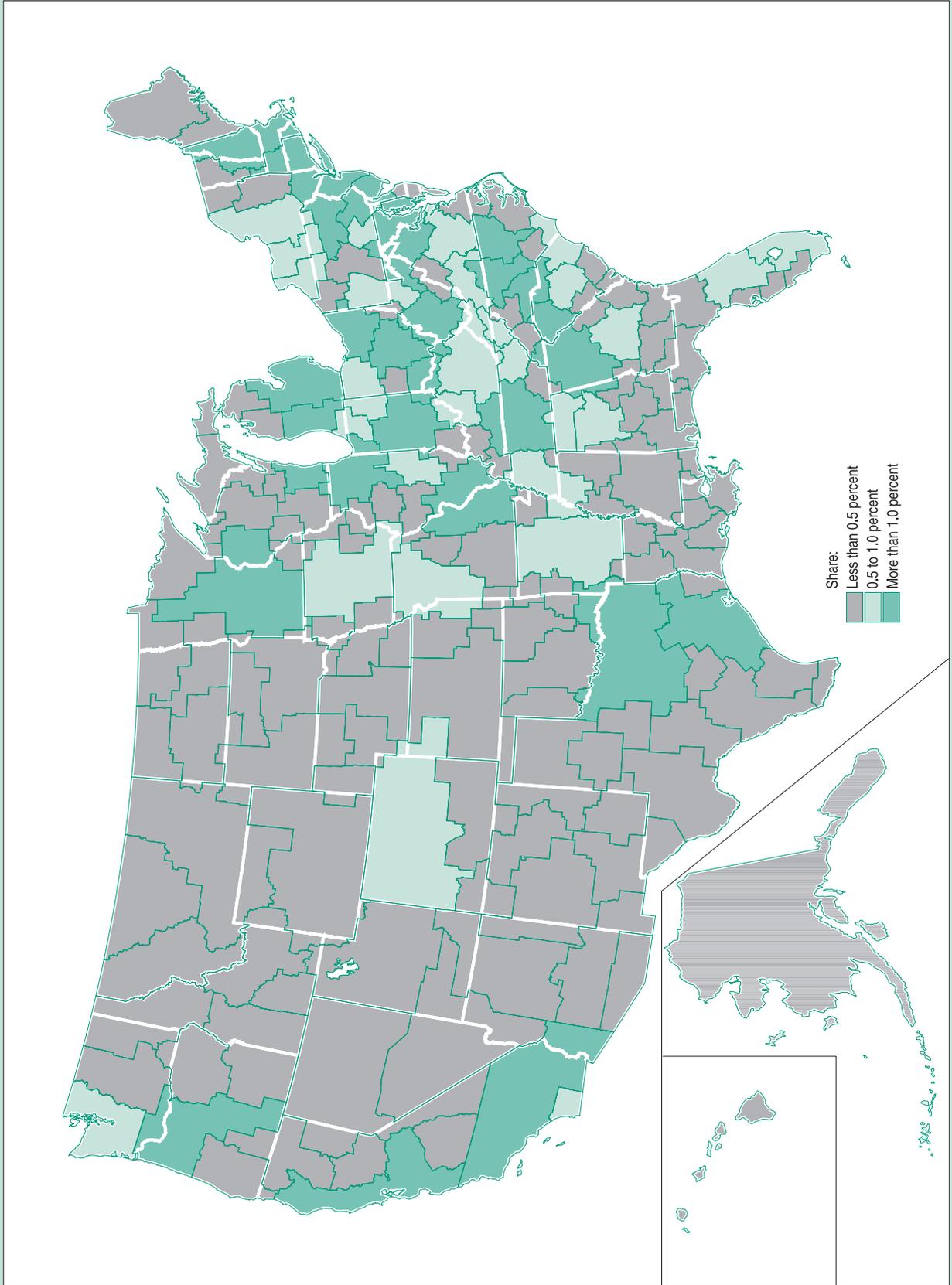
**Table 5.—Comparative Rankings of the Top 20 Economic Areas for Foreign-Owned Acquired Establishments by Country of Ownership, 1992**

Code	Name	Employment ranking among all economic areas						Addendum: Ranking in terms of 1992 population
		All foreign-owned establishments	Canadian-owned establishments	French-owned establishments	German-owned establishments	British-owned establishments	Japanese-owned establishments	
10	New York-Northern New Jersey-Long Island, NY-NJ-CT-PA-MA-VT ....	1	A	A	A	A	A	1
64	Chicago-Gary-Kenosha, IL-IN-WI .....	2	C	A	B	A	A	3
160	Los Angeles-Riverside-Orange County, CA-AZ .....	3	A	B	A	A	A	2
12	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD .....	4	.....	C	C	A	.....	7
163	San Francisco-Oakland-San Jose, CA .....	5	C	.....	B	B	A	4
3	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT .....	6	B	C	A	A	C	6
55	Cleveland-Akron, OH-PA .....	7	C	B	C	C	B	12
71	Nashville, TN-KY .....	8	.....	.....	.....	B	B	28
23	Charlotte-Gastonia-Rock Hill, NC-SC .....	9	.....	.....	A	C	C	37
13	Washington-Baltimore, DC-MD-VA-WV-PA .....	10	B	.....	.....	B	.....	5
51	Columbus, OH .....	11	.....	C	.....	B	B	25
49	Cincinnati-Hamilton, OH-KY-IN .....	12	C	.....	C	C	A	29
41	Greenville-Spartanburg-Anderson, SC-NC .....	13	.....	.....	A	.....	B	59
127	Dallas-Fort Worth, TX-AR-OK .....	14	B	B	.....	C	.....	9
40	Atlanta, GA-AL-NC .....	15	B	C	.....	C	.....	13
107	Minneapolis-St. Paul, MN-WI-IA .....	16	.....	C	B	C	.....	14
67	Indianapolis, IN-IL .....	17	C	A	.....	.....	C	20
62	Grand Rapids-Muskegon-Holland, MI .....	18	.....	.....	B	B	C	36
57	Detroit-Ann Arbor-Flint, MI .....	19	C	.....	C	C	.....	8
96	St. Louis, MO-IL .....	20	B	C	.....	.....	.....	16
Addenda:								
All other economic areas that rank among the top 10 for at least one of the five major investing countries:								
7	Rochester, NY-PA .....	23	A	.....	.....	C	.....	45
66	Fort Wayne, IN .....	24	.....	A	.....	.....	.....	84
17	Roanoke, VA-NC-WV .....	27	.....	.....	B	.....	.....	75
48	Charleston, WV-KY-OH .....	31	.....	.....	.....	.....	B	55
78	Birmingham, AL .....	32	.....	A	.....	.....	.....	46
125	Oklahoma City, OK .....	35	.....	B	.....	.....	C	43
39	Columbus, GA-AL .....	60	.....	B	.....	.....	.....	114
122	Wichita, KS-OK .....	64	A	.....	.....	.....	.....	60
33	Sarasota-Bradenton, FL .....	65	A	.....	.....	.....	.....	87

A Ranking within the top 5 for the given investing country.  
 B Ranking from 6 to 10 for the given investing country.  
 C Ranking from 11 to 20 for the given investing country.

CHART 1

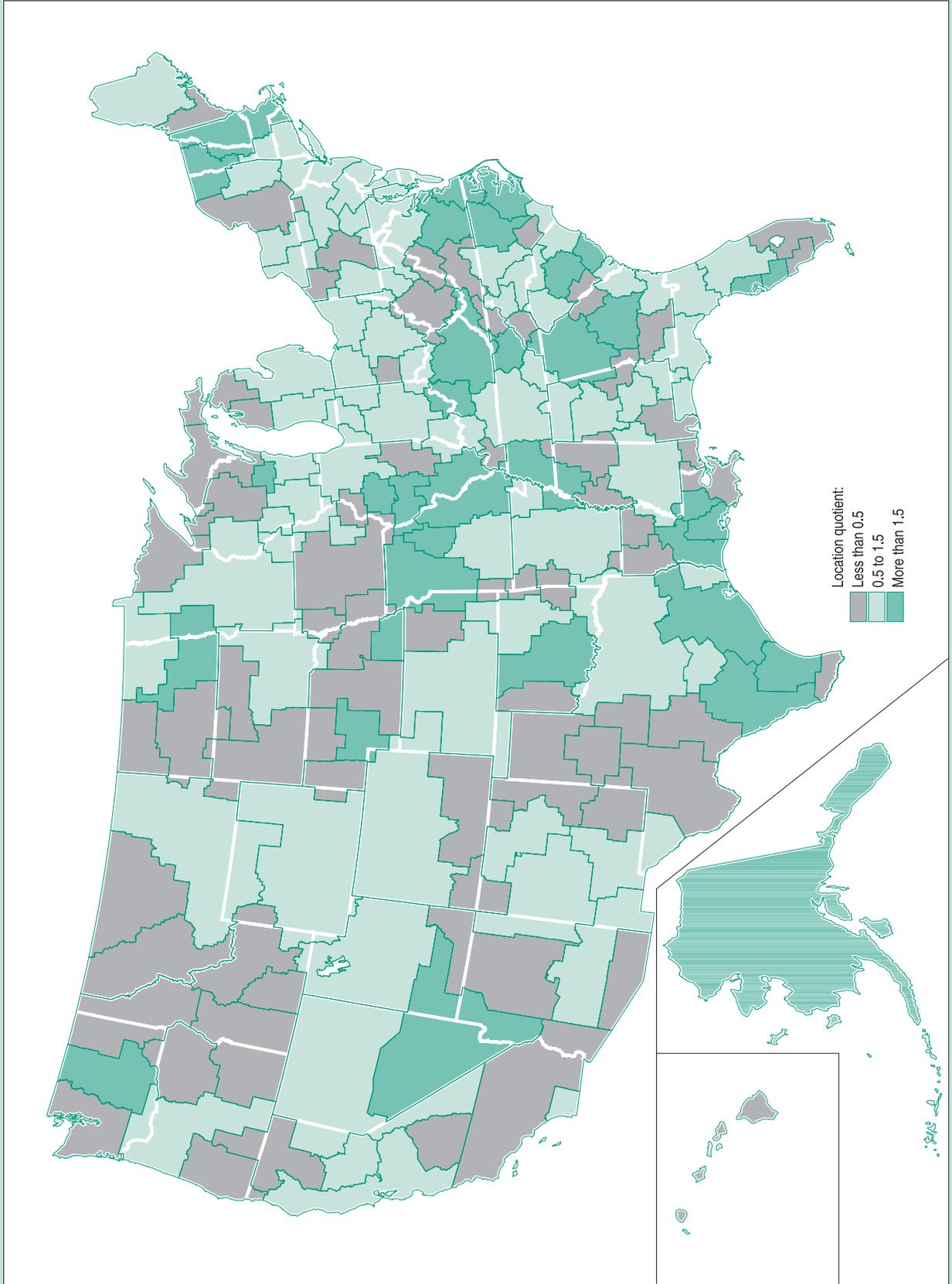
All Foreign-Owned Manufacturing Establishments, Share of Employment by Economic Area, 1992



Note.—Economic area boundaries are shown in green. The share for an economic area is calculated as the employment of all foreign-owned manufacturing establishments in the area divided by the employment of all foreign-owned manufacturing establishments in the Nation.

CHART 2

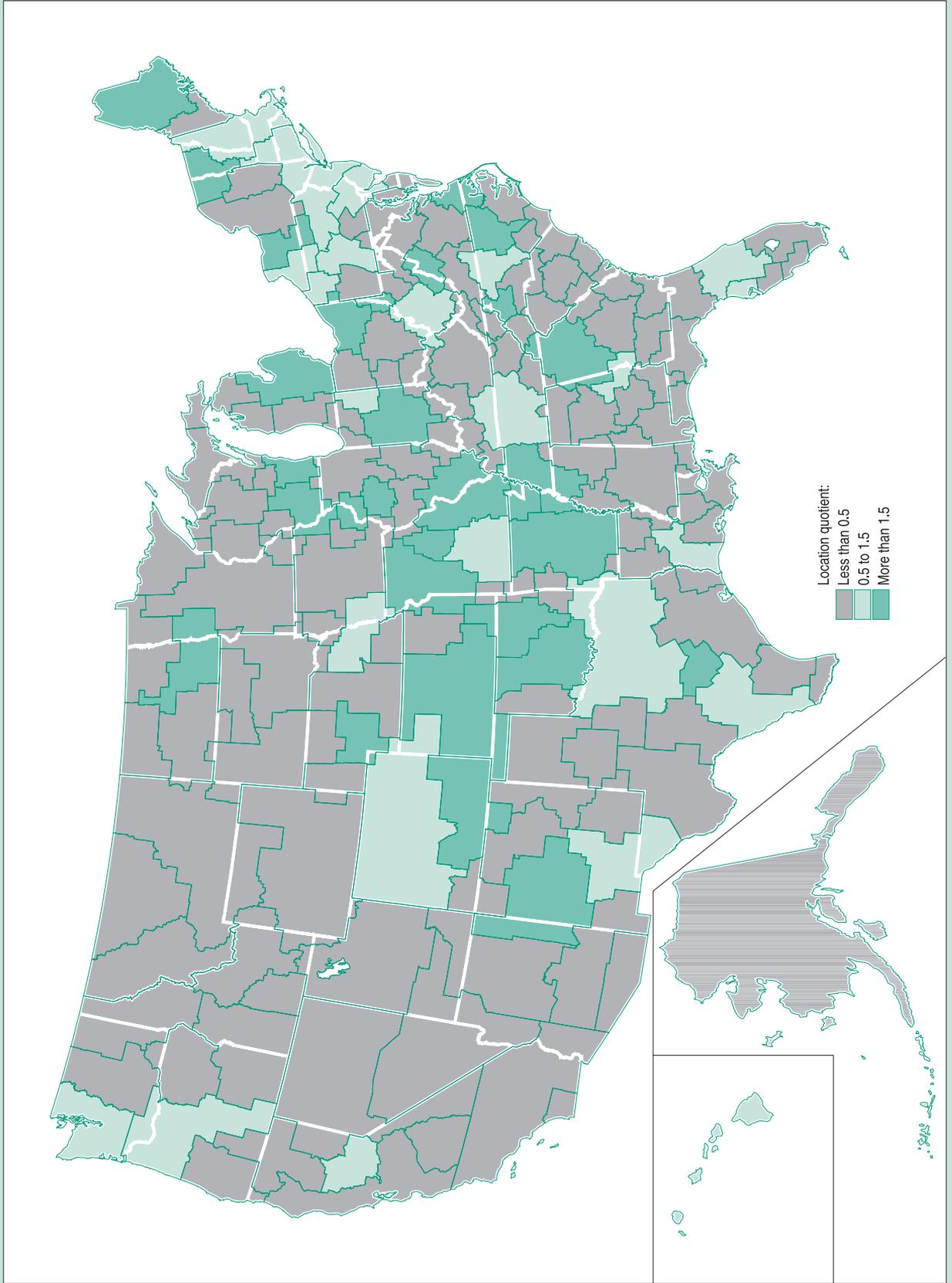
Foreign-Owned Greenfield Manufacturing Establishments, Relative Concentration of Employment by Economic Area, 1992



Note.—Economic area boundaries are shown in green. The location quotient for an economic area is calculated as foreign-owned establishments' share of employment in the area's greenfield manufacturing establishments divided by foreign-owned establishments' share of employment in the Nation's greenfield manufacturing establishments.

**CHART 3**

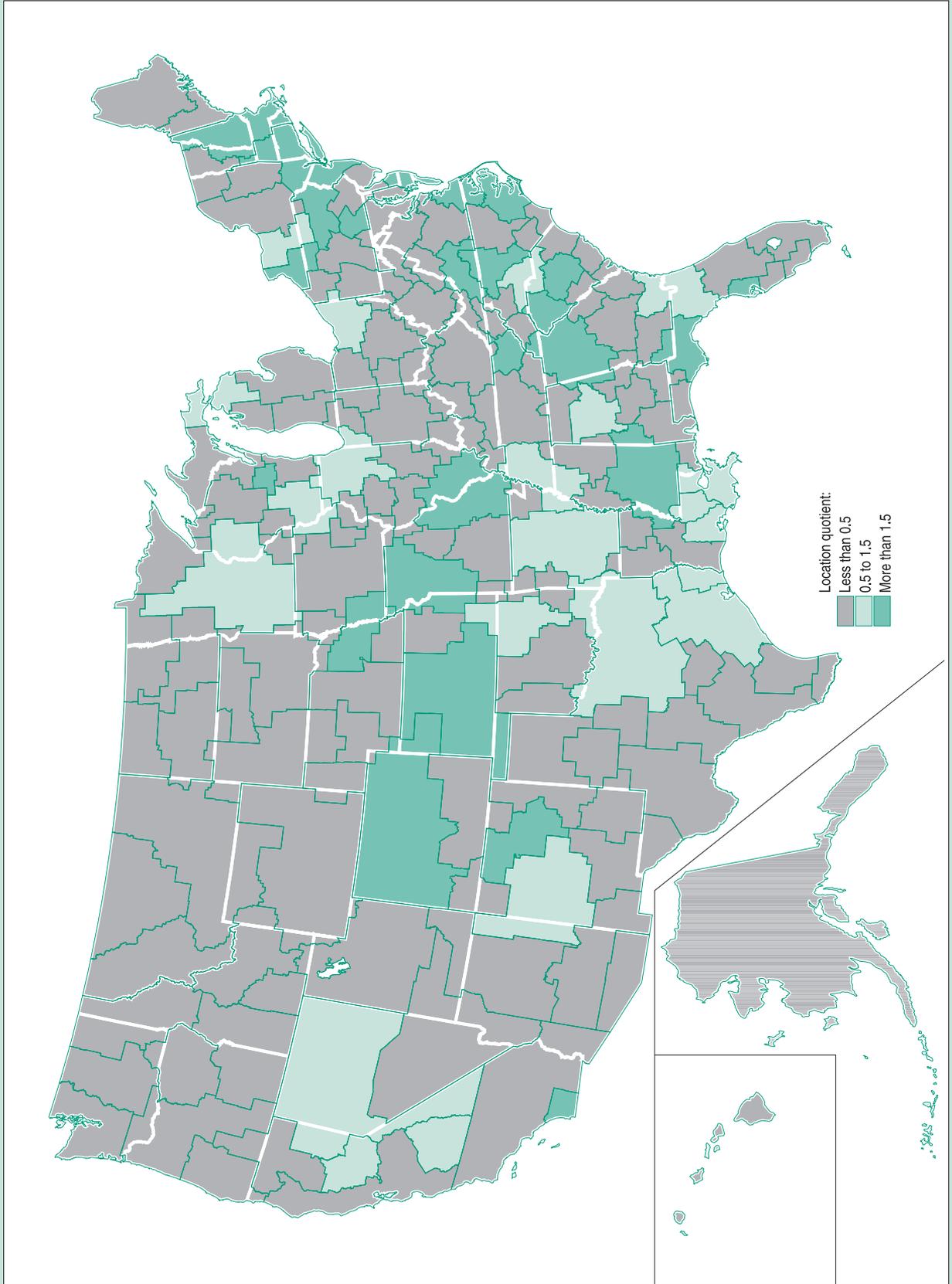
**Canadian-Owned Greenfield Manufacturing Establishments, Relative Concentration of Employment by Economic Area, 1992**



Note.—Economic area boundaries are shown in green. The location quotient for an economic area is calculated as Canadian-owned establishments' share of employment in the area's greenfield manufacturing establishments divided by Canadian-owned establishments' share of employment in the Nation's greenfield manufacturing establishments.

CHART 4

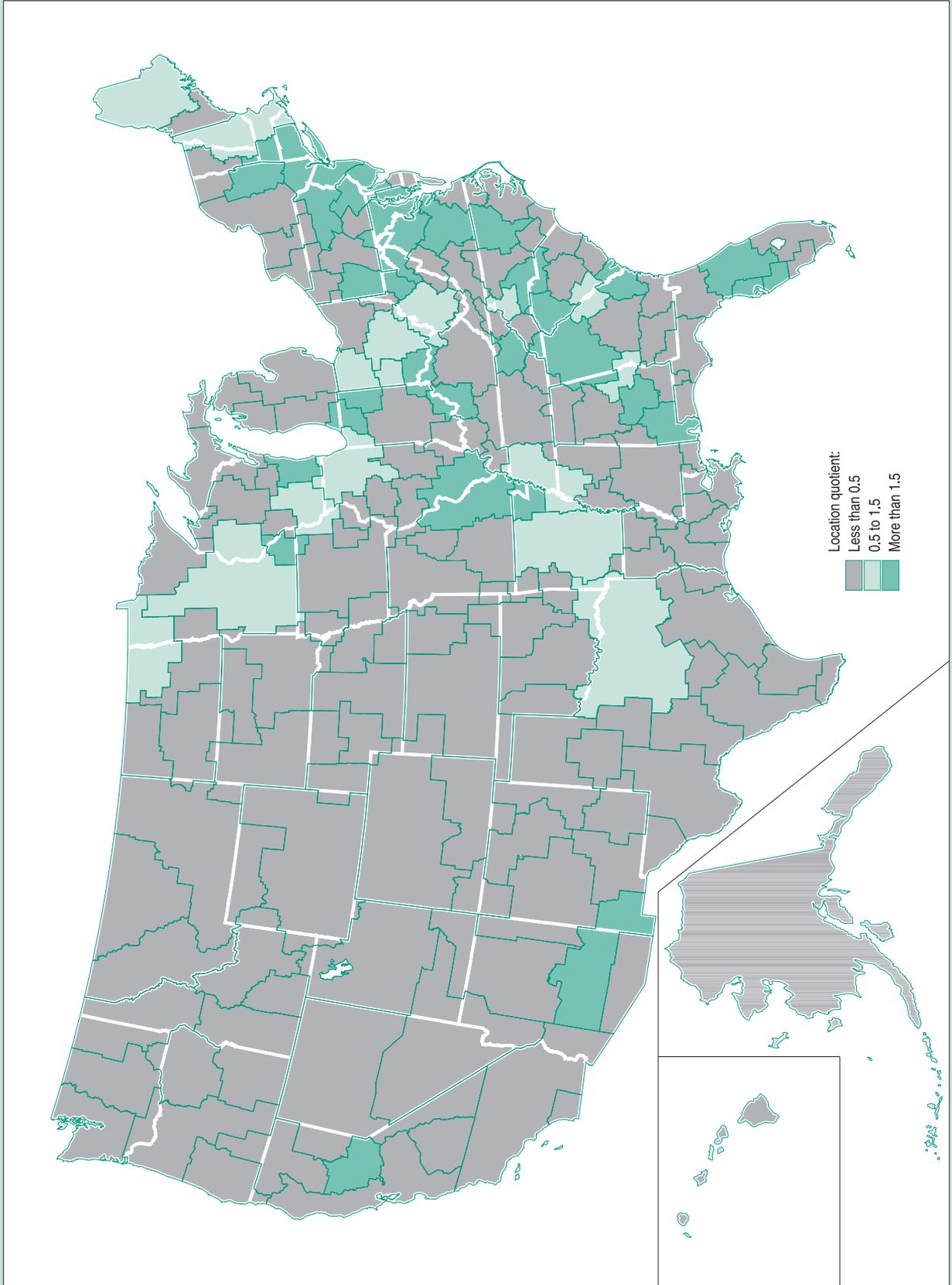
French-Owned Greenfield Manufacturing Establishments, Relative Concentration of Employment by Economic Area, 1992



Note.—Economic area boundaries are shown in green. The location quotient for an economic area is calculated as French-owned establishments' share of employment in the area's greenfield manufacturing establishments divided by French-owned establishments' share of employment in the Nation's greenfield manufacturing establishments.

CHART 5

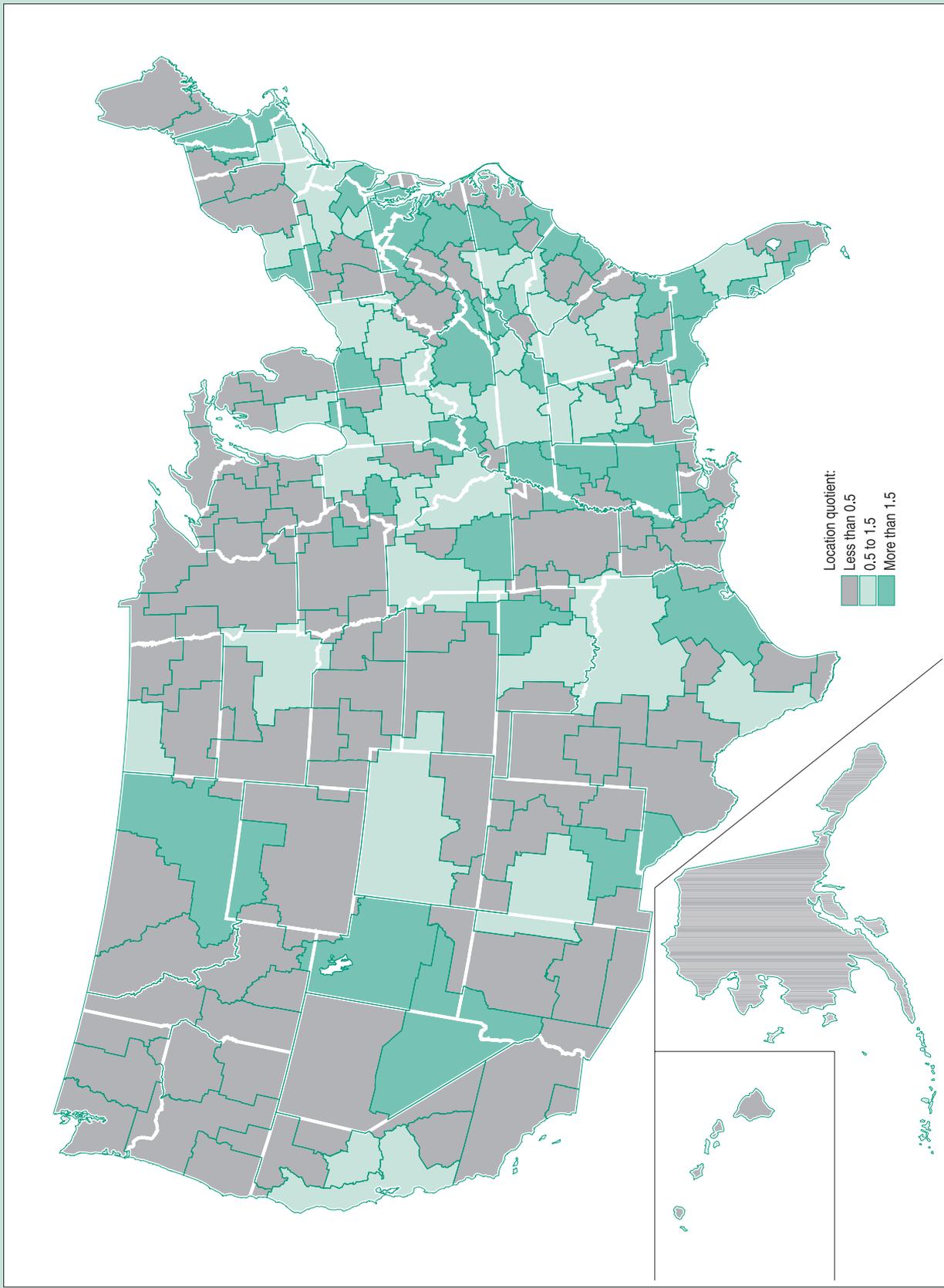
German-Owned Greenfield Manufacturing Establishments, Relative Concentration of Employment by Economic Area, 1992



Note.—Economic area boundaries are shown in green. The location quotient for an economic area is calculated as German-owned establishments' share of employment in the area's greenfield manufacturing establishments divided by German-owned establishments' share of employment in the Nation's greenfield manufacturing establishments.

CHART 6

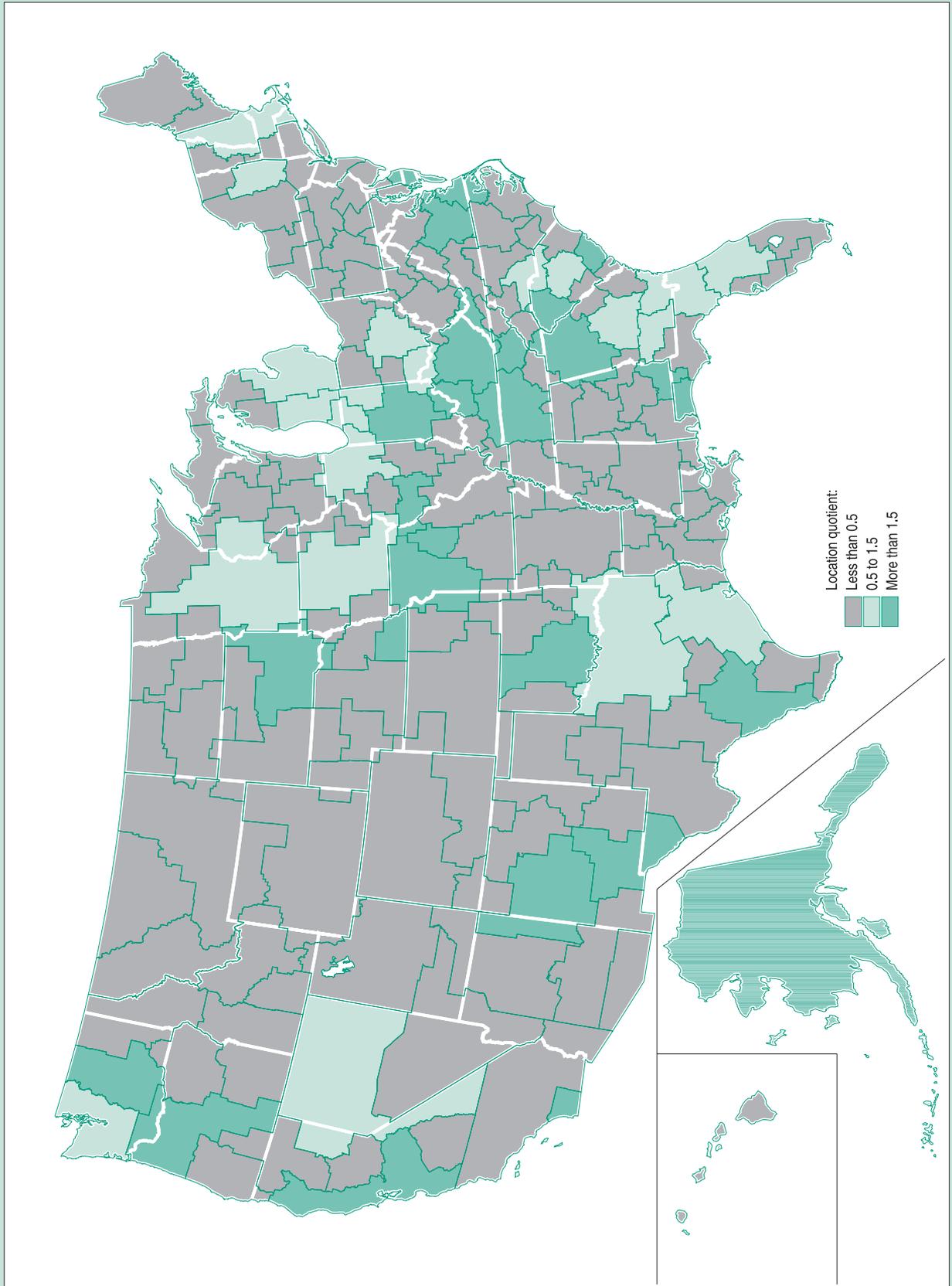
British-Owned Greenfield Manufacturing Establishments, Relative Concentration of Employment by Economic Area, 1992



Note.—Economic area boundaries are shown in green. The location quotient for an economic area is calculated as British-owned establishments' share of employment in the area's greenfield manufacturing establishments divided by British-owned establishments' share of employment in the Nation's greenfield manufacturing establishments.

CHART 7

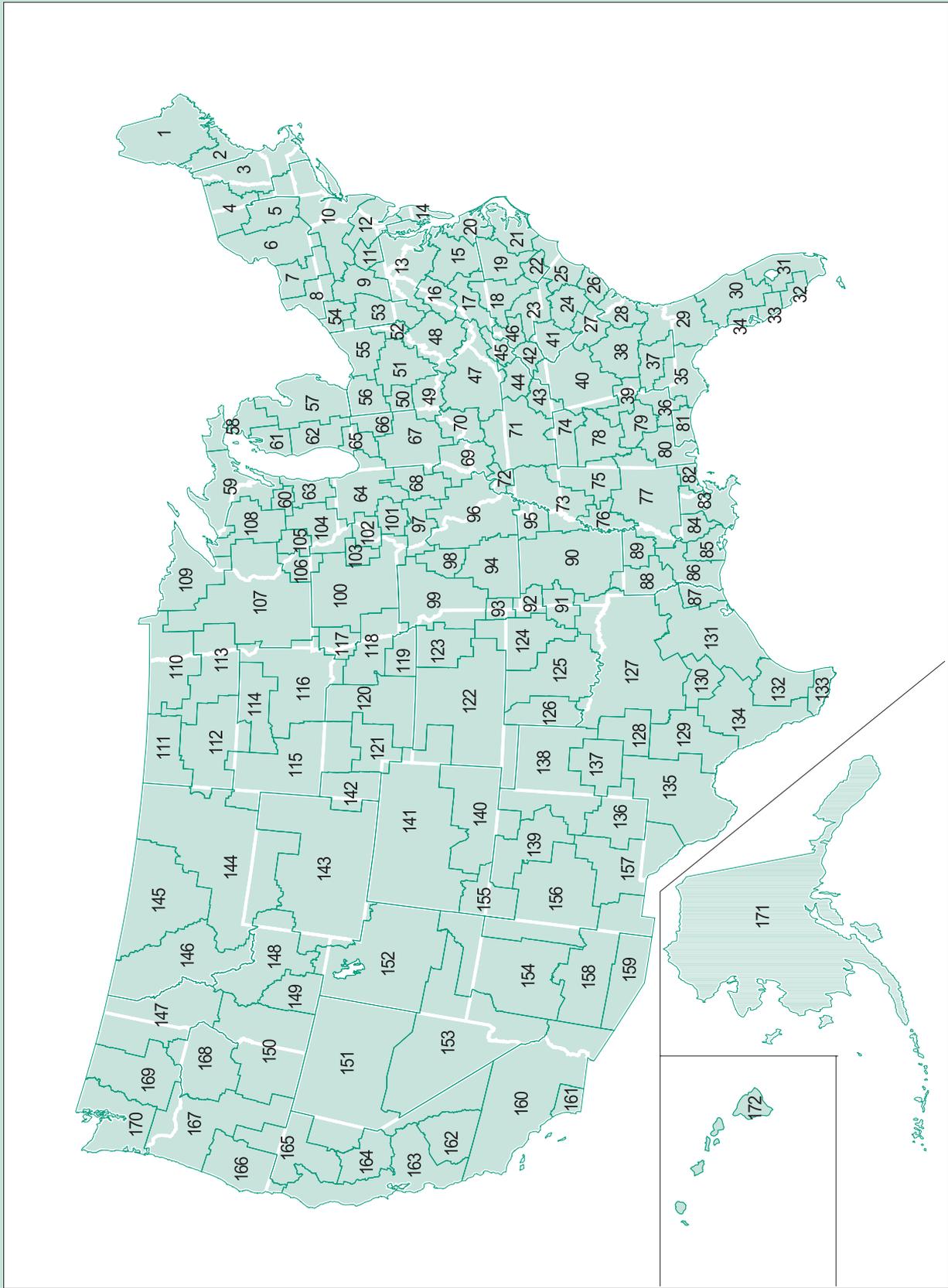
Japanese-Owned Greenfield Manufacturing Establishments, Relative Concentration of Employment by Economic Area, 1992



Note.—Economic area boundaries are shown in green. The location quotient for an economic area is calculated as Japanese-owned establishments' share of employment in the area's greenfield manufacturing establishments divided by Japanese-owned establishments' share of employment in the Nation's greenfield manufacturing establishments.

CHART 8

BEA Economic Areas and Their Codes



Note.—Economic area boundaries are shown in green. For the names of the economic areas, see table 6. U.S. Department of Commerce, Bureau of Economic Analysis

Table 6.—Codes and Names for BEA Economic Areas

Code	Name	Code	Name
001	Bangor, ME	088	Shreveport-Bossier City, LA-AR
002	Portland, ME	089	Monroe, LA
003	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH-RI-VT	090	Little Rock-North Little Rock, AR
004	Burlington, VT-NY	091	Fort Smith, AR-OK
005	Albany-Schenectady-Troy, NY	092	Fayetteville-Springdale-Rogers, AR-MO-OK
006	Syracuse, NY-PA	093	Joplin, MO-KS-OK
007	Rochester, NY-PA	094	Springfield, MO
008	Buffalo-Niagara Falls, NY-PA	095	Jonesboro, AR-MO
009	State College, PA	096	St. Louis, MO-IL
010	New York-Northern New Jersey-Long Island, NY-NJ-CT-PA-MA-VT	097	Springfield, IL-MO
011	Harrisburg-Lebanon-Carlisle, PA	098	Columbia, MO
012	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD	099	Kansas City, MO-KS
013	Washington-Baltimore, DC-MD-VA-WV-PA	100	Des Moines, IA-IL-MO
014	Salisbury, MD-DE-VA		
015	Richmond-Petersburg, VA	101	Peoria-Pekin, IL
016	Staunton, VA-WV	102	Davenport-Moline-Rock Island, IA-IL
017	Roanoke, VA-NC-WV	103	Cedar Rapids, IA
018	Greensboro-Winston-Salem-High Point, NC-VA	104	Madison, WI-IL-IA
019	Raleigh-Durham-Chapel Hill, NC	105	La Crosse, WI-MN
020	Norfolk-Virginia Beach-Newport News, VA-NC	106	Rochester, MN-IA-WI
		107	Minneapolis-St. Paul, MN-WI-IA
021	Greenville, NC	108	Wausau, WI
022	Fayetteville, NC	109	Duluth-Superior, MN-WI
023	Charlotte-Gastonia-Rock Hill, NC-SC	110	Grand Forks, ND-MN
024	Columbia, SC	111	Minot, ND
025	Wilmington, NC-SC	112	Bismarck, ND-MT-SD
026	Charleston-North Charleston, SC	113	Fargo-Moorhead, ND-MN
027	Augusta-Aiken, GA-SC	114	Aberdeen, SD
028	Savannah, GA-SC	115	Rapid City, SD-MT-NE-ND
029	Jacksonville, FL-GA	116	Sioux Falls, SD-IA-MN-NE
030	Orlando, FL	117	Sioux City, IA-NE-SD
031	Miami-Fort Lauderdale, FL	118	Omaha, NE-IA-MO
032	Fort Myers-Cape Coral, FL	119	Lincoln, NE
033	Sarasota-Bradenton, FL	120	Grand Island, NE
034	Tampa-St. Petersburg-Clearwater, FL		
035	Tallahassee, FL-GA	121	North Platte, NE-CO
036	Dothan, AL-FL-GA	122	Wichita, KS-OK
037	Albany, GA	123	Topeka, KS
038	Macon, GA	124	Tulsa, OK-KS
039	Columbus, GA-AL	125	Oklahoma City, OK
040	Atlanta, GA-AL-NC	126	Western Oklahoma, OK
		127	Dallas-Fort Worth, TX-AR-OK
041	Greenville-Spartanburg-Anderson, SC-NC	128	Abilene, TX
042	Asheville, NC	129	San Angelo, TX
043	Chattanooga, TN-GA	130	Austin-San Marcos, TX
044	Knoxville, TN	131	Houston-Galveston-Brazoria, TX
045	Johnson City-Kingsport-Bristol, TN-VA	132	Corpus Christi, TX
046	Hickory-Morganton, NC-TN	133	McAllen-Edinburg-Mission, TX
047	Lexington, KY-TN-VA-WV	134	San Antonio, TX
048	Charleston, WV-KY-OH	135	Odessa-Midland, TX
049	Cincinnati-Hamilton, OH-KY-IN	136	Hobbs, NM-TX
050	Dayton-Springfield, OH	137	Lubbock, TX
051	Columbus, OH	138	Amarillo, TX-NM
052	Wheeling, WV-OH	139	Santa Fe, NM
053	Pittsburgh, PA-WV	140	Pueblo, CO-NM
054	Erie, PA		
055	Cleveland-Akron, OH-PA	141	Denver-Boulder-Greeley, CO-KS-NE
056	Toledo, OH	142	Scottsbluff, NE-WY
057	Detroit-Ann Arbor-Flint, MI	143	Casper, WY-ID-UT
058	Northern Michigan, MI	144	Billings, MT-WY
059	Green Bay, WI-MI	145	Great Falls, MT
060	Appleton-Oshkosh-Neenah, WI	146	Missoula, MT
		147	Spokane, WA-ID
061	Traverse City, MI	148	Idaho Falls, ID-WY
062	Grand Rapids-Muskegon-Holland, MI	149	Twin Falls, ID
063	Milwaukee-Racine, WI	150	Boise City, ID-OR
064	Chicago-Gary-Kenosha, IL-IN-WI	151	Reno, NV-CA
065	Elkhart-Goshen, IN-MI	152	Salt Lake City-Ogden, UT-ID
066	Fort Wayne, IN	153	Las Vegas, NV-AZ-UT
067	Indianapolis, IN-IL	154	Flagstaff, AZ-UT
068	Champaign-Urbana, IL	155	Farmington, NM-CO
069	Evansville-Henderson, IN-KY-IL	156	Albuquerque, NM-AZ
070	Louisville, KY-IN	157	El Paso, TX-NM
071	Nashville, TN-KY	158	Phoenix-Mesa, AZ-NM
072	Paducah, KY-IL	159	Tucson, AZ
073	Memphis, TN-AR-MS-KY	160	Los Angeles-Riverside-Orange County, CA-AZ
074	Huntsville, AL-TN		
075	Tupelo, MS-AL-TN	161	San Diego, CA
076	Greenville, MS	162	Fresno, CA
077	Jackson, MS-AL-LA	163	San Francisco-Oakland-San Jose, CA
078	Birmingham, AL	164	Sacramento-Yolo, CA
079	Montgomery, AL	165	Redding, CA-OR
080	Mobile, AL	166	Eugene-Springfield, OR-CA
		167	Portland-Salem, OR-WA
081	Pensacola, FL	168	Pendleton, OR-WA
082	Biloxi-Gulfport-Pascagoula, MS	169	Richland-Kennewick-Pasco, WA
083	New Orleans, LA-MS	170	Seattle-Tacoma-Bremerton, WA
084	Baton Rouge, LA-MS	171	Anchorage, AK
085	Lafayette, LA	172	Honolulu, HI
086	Lake Charles, LA		
087	Beaumont-Port Arthur, TX		

NOTE.—Codes are assigned, beginning with 001 in northern Maine, continuing south to Florida, then north to the Great Lakes, and continuing in a serpentine pattern to the West Coast. The name of each economic area includes each State that contains counties in that economic area.

*Text continues from page 14.*

there are other German-owned establishments—both establishments that were acquired from U.S. companies in 1988–92 and older establishments that were already German-owned in 1987 (table 3). They also tend to be located in areas with high population levels.

German-owned greenfield establishments are mainly located in the eastern portion of the United States: None of the top 10 economic areas is west of Missouri (table 4). Relative to all greenfield establishments, they are concentrated on the east coast from New York to Virginia and along the Piedmont area of the Carolinas to northern Georgia (chart 5). Along this corridor, German-owned greenfield establishments are dispersed among a large number of manufacturing industries.

*United Kingdom.*—Among the five investing countries, the geographic pattern of employment for British-owned greenfield establishments stands out as being the most closely related to that of U.S.-owned greenfield establishments (table 3, column 3). The geographic pattern for British-owned greenfield establishments is also similar to that for greenfield establishments of other investing countries (table 3, column 2 and chart 6).

British-owned greenfield establishments also tend to be located in the same areas as older British-owned establishments and as British-owned acquired establishments. Four of the top five areas for British-owned greenfield establishments also rank among the top five areas for British-owned acquired establishments (tables 4 and 5).

The location of British-owned greenfield establishments is strongly correlated with population (table 3, column 6). Eight of the top ten areas for British-owned greenfield establishments rank among the 10 most populous economic areas in the United States (table 4).

*Japan.*—Japanese-owned greenfield establishments tend not to be located in the same areas as other foreign-owned greenfield establishments (table 3, column 2). Only one of the top five economic areas for Japanese-owned greenfield establishments—Atlanta—ranks among the top 10 economic areas for greenfield establishments of the other four major investing countries (table 4). In contrast, three of the top five economic areas for Japanese-owned acquired establishments—

the top three areas in terms of population—rank among the top five economic areas for at least three of the other four major investing countries (table 5). There is little relation between the locations of Japanese-owned greenfield establishments and those of Japanese-owned establishments that were acquired from U.S. companies (table 3, column 4).

Unlike the greenfield establishments of the other investing countries, Japanese-owned greenfield establishments are relatively concentrated in the Far West, which is more proximate to Japan (chart 7). Five of the top ten economic areas for Japanese-owned greenfield establishments are on the west coast (table 4). Japanese-owned greenfield establishments are also relatively concentrated along a corridor that extends from Indiana to northern Georgia and that includes four of the top five economic areas for Japanese-owned greenfield establishments. Much of the employment of Japanese-owned greenfield establishments in the corridor is related to motor vehicle production, and much of the employment in the Far West is in the electronics industry.

## Technical Note

### New Data Set on Foreign-Owned U.S. Manufacturing Establishments

The data set used in this article was created to facilitate the analysis of the activities of foreign-owned establishments. It contains data for 8,980 foreign-owned operating establishments in manufacturing; these establishments account for 86 percent of the employment and 82 percent of the

**Table 7.—Number and Employment of Foreign-Owned and All U.S. Operating Establishments in Manufacturing, 1992**

Line		Number of establishments	Employment
1	All U.S. establishments .....	370,912	16,948,900
2	U.S.-owned establishments .....	359,960	15,161,290
3	Foreign-owned establishments (universe) ....	10,952	1,787,610
	<i>Of which:</i>		
4	New data set for foreign-owned establishments .....	8,980	1,541,265
5	Greenfield establishments set up in 1987–92 <sup>1</sup> .....	1,749	146,531
6	Acquired establishments, 1988–92 <sup>1</sup> ....	4,024	697,724
7	Older establishments <sup>1</sup> .....	2,089	531,253
8	Other establishments <sup>1</sup> .....	1,118	165,757
			Percent
9	<b>Addenda:</b> Foreign-owned establishments as a percentage of all U.S. establishments (line 3/line 1) .....	3	11
10	Establishments in the new data set as a percentage of foreign-owned establishments (line 4/line 3) .....	82	86

1. See the text on the next page for the definitions of these items.

number of all such establishments (table 7). One of the key features of the data set is that it identifies foreign-owned greenfield establishments and establishments acquired by foreigners.

The new data set was created from several data files. As noted in the text, some files were obtained from a joint project that linked BEA and Census Bureau data. In addition, several Census Bureau microdata files from various surveys were used. These files include the census of manufactures for 1982, 1987, and 1992 and the Standard Statistical Establishment List covering U.S. business enterprises and their establishments in the United States for 1986 and 1988–91. BEA gained access to these files through the Census Bureau's Center for Economic Studies (CES), a facility established to provide researchers with restricted access, for statistical purposes, to unpublished microdata collected in the Census Bureau's regular surveys and census programs. This access benefits both the research community and the Census Bureau. Access is provided under arrangements that preserve the confidentiality of the data of individual companies.<sup>10</sup>

In the new data set, foreign-owned greenfield establishments are defined as establishments that first appeared in the Census Bureau's data files in 1987–92 and that were foreign-owned both in the year they first appeared and in 1992. Foreign-owned acquired establishments are defined as establishments that were acquired from U.S. owners in 1988–92.<sup>11</sup> "Older foreign-owned establishments" are defined as establishments that existed in 1982 and for which the country of owner was the same in 1987 and 1992. "Other establishments" are establishments that were set up in 1983–86—so that their initial ownership status (that is, whether foreign or U.S. owned) could not be determined—or establishments for which the country of foreign owner in 1992 differed from that in 1987.

For comparison, U.S.-owned greenfield establishments were also identified. These establishments are defined as establishments that first appeared in the data files in 1987–92 and that were U.S.-owned both in the year they first appeared and in 1992.

This study covers operating establishments; administrative and auxiliary establishments are excluded because the factors that are most important in determining their locations probably differ from those that determine the locations of operating establishments. For example, the cost and availability of inputs to production are likely to be significant factors in locating an operating establishment but would not necessarily affect the location of an administrative and auxiliary establishment. In addition, the information available to classify and analyze the activities of these establishments is less detailed than that for operating establishments.

This study also excludes establishments for which identification information was missing, small establishments that were exempt from reporting in the census of manufactures, and establishments whose reports were received too late to be included in the census of manufactures publication.<sup>12</sup>

The employment data used for this study are from the 1992 Census of Manufactures. The number of employees for each establishment is the average number of full-time and part-time production workers on the payroll for the four pay periods including the 12th of March, May, August, and November and the number of other full-time and part-time employees on the payroll for the pay period including the 12th of March. 

10. Information about the CES facility is available from the Census Bureau's Web site at <[www.census.gov/cecon/www/ces.html](http://www.census.gov/cecon/www/ces.html)>. CES ensures confidentiality by requiring that files be accessed for approved research projects at a secure Census Bureau facility, by limiting access to researchers who have special sworn status, and by reviewing all research output to ensure that information on individual survey respondents is not disclosed.

11. This set does not include foreign-owned establishments that were acquired from U.S. owners in 1987, because information on whether the establishments were U.S. or foreign owned in 1986 is not available.

12. Small establishments are not required to report in the census of manufactures in order to reduce reporting burden and to economize on Census Bureau resources. The published statistics for all U.S. manufacturing establishments and for foreign-owned manufacturing establishments from the census of manufactures cover the universe of establishments because data for the exempt establishments and data for the establishments that did not report in time were estimated. For establishments that required estimation, selected data items, including employment and payroll, are obtained from administrative records of the Internal Revenue Service, and the data items that are not available from these records are estimated using industry-average relationships. For further information, see *1992 Census of Manufactures, General Summary* (Washington, DC: U.S. Government Printing Office, October 1996).