Regional Exports of Manufactured Products

By Tim R. Smith

Exports have become an increasingly important base of economic activity for the United States and its various regions since the exchange value of the U.S. dollar began to decline in 1985. Unfortunately, little is known about the regional distribution of export activity or the characteristics of regional exports. Without this information, economists and other observers have been unable to measure precisely the regional impacts of the general revival in U.S. export-related industries.

Newly available state export data published by the Commerce Department give a clearer view of regional export activity. Yet this view suffers from some serious limitations. First, the state export data do not accurately reflect the production locations of exported goods. Second, the state of origin of almost one-fourth of total U.S. exports cannot be identified at all. And third, the published Commerce Department data do not include details about industrial mix or destinations of state exports.

This article supplements the published state export data with previously unpublished manufactured export data furnished by the Commerce Department to shed an important light on the industrial mix and destination of state exports.[1] By grouping the states into nine regions based on similar manufacturing activities and proximity to major ports, these data enable state and local policymakers and businesspeople to compare the exports from their respective regions and to understand which industries and countries most significantly affect exports from their regions.

The purpose of this article is to provide data that do not suffer as much from the shortcomings of the published Commerce Department state export data. The regional data reported in this article can be used to describe more accurately the characteristics of regional exports. The first section describes the major shortcomings of the published data and outlines the approach taken to make the data more meaningful to observers of regional export activity. The second section shows how the unpublished regional aggregations,

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despite some remaining limitations, give a new perspective on two important dimensions of regional exports. These dimensions, for which little information has previously been available, are industrial mix and destination.

Data and methodology

The widely publicized state rankings of 1987 exports are somewhat misleading.[2] The state-level export data are intended to identify the state "where the merchandise began its export journey." However, the reported state of origin is not always the state where the goods are manufactured or produced. The state of origin can also be the state where goods are consolidated by an intermediary for overseas shipment or the state where the port of embarkation is located. This article alleviates this problem by focusing only on manufactured exports and by grouping states into regions. The resulting information will provide observers of regional export activity a basis for a thorough comparison of regional manufactured exports.

The problem of identifying origin—the attribution error—is especially pronounced for agricultural and mined commodities. Small shipments of these commodities are often combined at storage facilities along their journey to the port. This practice of consolidation makes attributing exports to the state where the goods are produced very difficult. The state of origin for these goods is often reported by shippers as the state of consolidation or the port state instead of the state in which the goods are produced. For example, Louisiana, a major port for agricultural products, reports crop exports far exceeding those from top producing states such as Kansas. Much of the Kansas crop exports and those for other major crop-growing states are likely included in the Louisiana export total.

Manufactured export data furnished by the Commerce Department, but previously unpublished, are much less distorted by attribution error than the published total export data because agricultural and mined exports are excluded. Although agricultural and mined exports are a relatively small 9.3 percent of U.S. exports, the inclusion of these commodities skews the aggregate export values toward states with major ports and understates the total exports from agricultural and mining states. Moreover, because individual shipments of manufactured goods are easier to distinguish from one another than agricultural or mined products, they are less likely to suffer attribution errors caused by consolidation. Although the manufactured export data provide a narrower measure of exports, state and local policymakers have been particularly interested in manufactured exports, since these exports have benefited most from the depreciation of the U.S. dollar.

Some of the remaining attribution error in the state manufacturing data can be overcome by grouping states into multistate regions. Regional rankings reflect a more accurate account of goods produced for export because attribution errors are less serious between regions than between states. This is especially true for manufacturing because industrial plants often locate near ports to make it easier to receive imported materials and export finished goods. The location of manufacturing activity is less constrained than is the location of agriculture and mining by the location of natural resources.

This article considers export activity in nine regions of the United States (Figure 1). The regions were chosen by grouping states with similar kinds of manufacturing activity and, where possible, by grouping states according to proximity to major ports. The Plains and Rocky Mountain regions were intentionally not associated with Western states because doing so would seriously overstate the manufactured exports from these interior regions.

In addition to minimizing the attribution error,

FIGURE 1
U.S. export regions

this article includes two additional features that make the data easier to interpret. First, the article reports only the shares of regional manufactured exports for individual industries or destination countries instead of exact dollar values, because these values are understated due to the large proportion of manufactured exports with unknown origin. Expressing regional exports as shares instead of levels allows qualitative comparisons to be made across regions, assuming exports with unknown origin have the same geographical distribution as exports with known origin.[3]

The second way that the article makes the data easier to interpret is by scaling the broadest measure of regional manufacturing exports to the size of the regions. The 1987 values of manufactured exports and total personal income for each region are shown in Table 1. Personal income is included in this table to provide a benchmark of overall economic activity in the regions and to standardize the comparison of manufactured exports across regions. Therefore, one way to interpret the last column in Table 1 is the proportion of a region's total economic activity (measured by personal income) accounted for by export of manufactured goods (measured by the value of shipments).

Characteristics of regional manufactured exports

Regional exports of manufactured goods can be understood more clearly with the information about important export industries in each region and the destinations of exports from each region provided in Tables 2-5. Despite limitations in identifying the exact origins of exported products, the regional export data provide useful information about the relative importance of individual

TABLE 1

Value of manufactured exports and personal income by region, 1987

	1987 value of manufactured exports ($ billions)	Regional share of manufactured exports (percent)	1987 personal income ($ billions)	Regional share of personal income (percent)	Ratio of manufactured exports to personal income (× 100)
Great Lakes (Illinois, Indiana, Michigan, Ohio, Wisconsin)	32.28	14.95	637.45	16.92	5.06
Mid-Atlantic (Dist. of Columbia, Delaware, Maryland, New Jersey, New York, Pennsylvania)	24.89	11.53	764.30	20.28	3.26
New England (Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont)	11.45	5.30	238.64	6.33	4.80
Plains (Iowa, Kansas, Minnesota, Missouri, North Dakota, Nebraska, South Dakota)	8.38	3.88	260.85	6.92	3.21
Rocky Mountain (Colorado, Idaho, Montana, Utah, Wyoming)	2.66	1.23	98.53	2.62	2.70
South Atlantic (Florida, Georgia, North Carolina, South Carolina, Virginia, West Virginia)	20.00	9.27	521.26	13.83	3.84
South Central (Alabama, Arkansas, Kentucky, Louisiana, Mississippi, Tennessee)	10.30	4.77	261.90	6.95	3.93
Southwest (Arizona, New Mexico, Oklahoma, Texas)	21.39	9.91	340.13	9.03	6.29
West (Alaska, California, Hawaii, Nevada, Oregon, Washington)	38.11	17.66	645.06	17.12	5.91
Unknown origin	46.40	21.50	—	—	—
Total	215.86	100.00	3,768.12	100.00	5.73

Source: Compiled from "State of Export Series" provided on magnetic tape by the Foreign Trade Division, Bureau of the Census, U.S. Department of Commerce. Personal income data from *Survey of Current Business*, U.S. Department of Commerce, Bureau of Economic Analysis, Vol. 68, No. 8, August 1988.

export industries and the destinations of regional manufactured exports.

Industrial mix

Data in Table 2 illustrate how the industrial makeup of export activity differs across regions. Selected industry shares of 1987 manufactured exports for the U.S. and nine regions are shown in the table. The industries are grouped into two broad categories: durables and nondurables. The shares listed for each region in the table show the percent of total manufactured exports from that region accounted for by a given industry.

Durables industries account for more exports than nondurables industries in most regions. In fact, exports of durable goods account for over two-thirds of total U.S. manufactured exports. Regionally, durables range in importance from 86 percent of manufactured exports in New England to 34.7 percent in the South Central region.

Some individual industries are clearly more important exporters than others. The three most important durables industries for both the nation and most regions are nonelectrical machinery, electrical machinery, and transportation equipment. The biggest category of nondurables exports for the nation and most regions is chemicals.

Although Table 2 demonstrates the variation in the industrial characteristics of each region's manufactured exports, it does not show which regions dominate in the export of each particular product. For example, the effects of regional specialization in some industries, such as lumber and wood in the West and textiles in the South Atlantic, are overwhelmed in Table 2 by the dominance of nonelectrical machinery, electrical machinery, and transportation equipment. Lumber and wood products account for only 5.9 percent of manufactured exports from the West, and textiles account for only 3.8 percent of manufactured exports from the South Atlantic region.

Another way to view regional exports is to consider the proportions of each category of manufactured exports emanating from each region, as shown in Table 3. Each row in Table 3 divides 1987 manufactured export activity across the nine regions. The resulting regional distribution points to regions that are important to the export of particular goods. For example, the West is the most important exporter of lumber and wood products, and the South Atlantic region is the most important exporter of textiles.

Some clear patterns show up in Table 3. Durables exports originate mainly in three regions—the Great Lakes, Mid-Atlantic, and West—which account for over half of the U.S. exports of durable goods. Nondurables exports come predominantly from the "Sun Belt" regions—South Atlantic, South Central, and Southwest. These three regions together account for over 42 percent of nondurables exports.

Destinations

Knowledge of destinations of regional exports helps in understanding the participation of regions in the ongoing expansion of U.S. exports. Since the U.S. dollar has not depreciated by the same amount against all currencies in recent years, regions that export mainly to Europe or Japan will be affected differently than regions that export to other countries. For example, growth in exports to Canada has not been boosted as much from dollar depreciation as growth in exports to Europe or Japan, because the dollar has depreciated more against such currencies as the mark, the pound, and the yen than against the Canadian dollar.

The shares of manufactured exports from each region shipped to the nation's top 10 export destinations in 1987 are shown in Table 4. The countries listed in the table receive different proportions of exports from each region. While these

TABLE 2

Selected industry shares of regional manufactured exports, 1987

(percent of regional total)

Industry	Great Lakes	Mid-Atlantic	New England	Plains	Rocky Mountain	South Atlantic	South Central	South-west	West	Unknown	United States
DURABLES	81.7	75.5	86.0	74.6	76.0	46.7	34.7	57.6	81.3	56.1	67.4
Lumber, wood	0.5	0.7	0.9	0.6	0.6	0.8	1.5	0.3	5.9	1.8	1.8
Nonelectrical machinery	23.2	18.3	41.3	32.1	28.3	18.2	11.7	19.2	20.2	13.2	19.9
Electrical machinery	8.5	15.0	13.6	9.2	23.7	9.1	6.1	21.3	18.4	6.6	12.3
Transportation equipment	35.3	15.4	12.8	20.5	2.2	9.7	9.3	8.1	25.4	22.4	20.0
Instruments and related products	3.0	10.7	11.1	5.8	12.6	2.8	1.5	2.8	6.1	2.8	5.0
Other durables	11.2	15.4	6.3	6.4	8.6	6.1	4.6	5.9	5.3	9.3	8.4
NONDURABLES	16.6	22.3	12.1	24.1	22.6	51.5	64.3	41.6	17.5	29.8	28.4
Food	1.9	1.6	1.5	12.1	7.6	3.6	18.7	4.8	6.3	9.1	5.9
Tobacco	0.0	0.2	0.0	0.0	0.0	10.8	0.3	0.0	0.0	0.2	1.1
Chemicals	9.9	12.0	3.9	5.9	8.5	20.8	28.6	26.5	3.6	10.5	12.2
Textiles	0.1	0.9	0.7	0.1	0.1	3.8	0.8	0.8	0.1	1.1	0.9
Other nondurables	4.7	7.6	6.0	6.0	6.4	12.5	15.9	9.5	7.5	8.9	8.3
UNCLASSIFIED	1.8	2.3	1.9	1.3	1.4	1.8	1.0	0.8	1.2	14.1	4.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Compiled from "State of Export Series" provided on magnetic tape by the Foreign Trade Division, Bureau of the Census, U.S. Department of Commerce.

TABLE 3

Regional shares of manufactured exports by industry, 1987

(percent of total exports by each industry)

Industry	Great Lakes	Mid-Atlantic	New England	Plains	Rocky Mountain	South Atlantic	South Central	Southwest	West	Unknown	Total
DURABLES	18.1	12.9	6.8	4.3	1.4	6.4	2.5	8.5	21.3	17.9	100.0
Lumber, wood	4.0	4.5	2.5	1.3	0.4	4.0	3.8	1.4	56.8	21.5	100.0
Furniture	18.4	8.4	2.3	2.3	0.6	13.7	3.4	9.8	10.8	30.2	100.0
Stone, clay, glass	29.4	16.3	4.1	2.8	1.1	10.7	4.9	5.5	6.6	18.6	100.0
Primary metals	10.8	24.4	2.8	2.4	2.2	5.3	2.6	8.0	13.7	27.8	100.0
Fabricated metals	30.9	12.2	4.6	3.4	0.7	7.6	2.1	7.3	9.5	21.7	100.0
Nonelectrical machinery	17.4	10.6	11.0	6.3	1.8	8.5	2.8	9.6	17.9	14.2	100.0
Electrical machinery	10.4	14.1	5.9	2.9	2.4	6.9	2.4	17.2	26.5	11.5	100.0
Transportation equipment	26.4	8.9	3.4	4.0	0.1	4.5	2.2	4.0	22.4	24.1	100.0
Instruments	8.9	25.0	11.9	4.6	3.2	5.2	1.5	5.7	21.9	12.2	100.0
Miscellaneous	9.1	36.7	5.6	3.0	0.6	4.4	2.2	3.8	12.2	22.4	100.0
NONDURABLES	8.7	9.1	2.3	3.3	1.0	16.8	10.8	14.6	10.9	22.6	100.0
Food	4.8	3.1	1.3	8.0	1.6	5.7	15.2	8.1	18.9	33.3	100.0
Tobacco	0.2	1.6	0.0	0.0	0.0	93.6	1.3	0.0	0.1	3.2	100.0
Textiles	2.1	11.5	4.2	0.6	0.2	38.9	4.2	8.6	2.7	26.9	100.0
Apparel	4.0	17.5	2.1	1.4	0.7	28.9	5.2	12.2	6.8	21.4	100.0
Paper	4.7	5.6	4.7	1.7	1.6	23.9	11.4	5.1	17.1	24.3	100.0
Printing and publishing	19.9	24.5	5.0	6.7	0.8	3.9	4.9	2.0	8.9	23.5	100.0
Chemicals	12.1	11.3	1.7	1.9	0.9	15.8	11.2	21.5	5.2	18.5	100.0
Petroleum	4.4	4.1	0.2	0.6	0.4	0.7	13.3	24.9	26.6	24.8	100.0
Rubber and plastics	16.1	15.9	5.2	5.4	0.9	14.4	5.7	9.2	9.2	18.1	100.0
Leather	7.9	20.9	14.9	6.4	0.5	4.6	1.5	6.5	7.2	29.5	100.0
UNCLASSIFIED	6.3	6.1	2.3	1.2	0.4	3.8	1.1	1.9	5.0	71.7	100.0
ALL INDUSTRIES	15.0	11.5	5.3	3.9	1.2	9.3	4.8	9.9	17.7	21.5	100.0

Source: Compiled from "State of Export Series" provided on magnetic tape by the Foreign Trade Division, Bureau of the Census, U.S. Department of Commerce.

TABLE 4

Destinations of regional manufactured exports, 1987
(percent of regional total)

	Great Lakes	Mid-Atlantic	New England	Plains	Rocky Mountain	South Atlantic	South Central	Southwest	West	Unknown	United States
Canada	49.2	23.3	19.0	33.4	17.8	13.1	19.0	9.5	9.3	28.3	23.4
Japan	6.5	8.1	11.6	11.6	19.7	8.2	7.7	6.3	20.6	8.5	10.4
Mexico	5.3	3.2	1.8	3.4	3.8	2.2	4.0	27.5	5.1	3.5	6.2
Great Britain	4.8	6.7	12.3	7.5	8.0	5.5	4.4	4.6	8.2	3.8	6.0
Germany	4.3	6.3	6.9	5.4	8.4	3.6	4.3	3.0	6.4	3.9	4.9
France	4.2	4.4	4.7	3.8	3.6	3.0	3.8	2.8	3.0	2.0	3.3
Netherlands	1.9	2.8	4.7	2.9	1.8	2.4	8.2	3.9	3.0	2.9	3.1
Korea	1.5	2.1	2.1	3.5	3.6	1.4	3.1	3.2	4.1	3.8	2.9
Taiwan	1.4	3.1	2.1	1.4	2.2	1.7	1.9	3.2	3.7	3.4	2.7
Belgium/ Luxembourg	1.9	3.0	1.9	1.7	1.6	7.6	4.1	2.5	1.3	1.3	2.5
Total	81.0	63.0	67.1	74.6	70.5	48.7	60.5	66.5	64.7	61.4	65.3

Source: Compiled from "State of Export Series" provided on magnetic tape by the Foreign Trade Division, Bureau of the Census, U.S. Department of Commerce.

10 countries together receive about two-thirds of total U.S. manufactured exports, the amounts they receive vary regionally from 48.7 percent of South Atlantic manufactured exports to 81 percent of Great Lakes manufactured exports.

Understanding where countries buy their manufactured goods in the United States is also important, because it could guide economic development policies directed at boosting regional export activity. State and local policymakers are interested in the relative participation of their region in the total U.S. exports to a given country. Economic development efforts aimed at regional export activity could be enhanced by targeting those export destinations in which a region already has a strong foothold relative to other regions.

While the largest exporting regions have significant shares of export activity with several countries, some important bilateral relationships for regions are evident in the table. Table 5 compares the shares of each region in the 1987 manufactured exports to each of the nation's 10 most important export destinations. Regional export relationships appear to be determined largely by proximity. The Great Lakes region accounts for the largest share of manufactured exports to Canada. Japan receives most of its U.S. manufactured goods from the West, and Mexico receives most of its U.S. products from the Southwest.

Conclusions

Despite the difficulty in identifying the production location of some exported products, manufactured export data provide information about the industrial mix and destinations of regional exports that has not been available before. The data also

TABLE 5

Regional distribution of manufactured exports to selected trading partners, 1987
(percent of total exports to each country)

	Great Lakes	Mid-Atlantic	New England	Plains	Rocky Mountain	South Atlantic	South Central	South-west	West	Unknown	Total
Canada	31.5	11.5	4.3	5.6	0.9	5.2	3.9	4.0	7.1	26.0	100.0
Japan	9.3	8.9	5.9	4.3	2.3	7.3	3.5	6.0	34.9	17.6	100.0
Mexico	12.9	5.9	1.5	2.1	0.8	3.3	3.1	43.9	14.6	12.0	100.0
Great Britain	12.1	12.9	10.9	4.9	1.7	8.5	3.5	7.6	24.4	13.6	100.0
Germany	13.3	15.0	7.6	4.3	2.1	6.9	4.2	6.2	23.2	17.2	100.0
France	19.3	15.6	7.6	4.5	1.4	8.6	5.6	8.5	16.3	12.9	100.0
Netherlands	9.0	10.1	7.9	3.6	0.7	7.1	12.5	12.2	17.0	20.0	100.0
Korea	7.9	8.2	3.9	4.7	1.6	4.5	5.2	11.0	25.1	28.0	100.0
Taiwan	7.6	13.3	4.1	1.9	1.0	5.7	3.4	11.8	24.3	27.0	100.0
Belgium/ Luxembourg	11.4	14.0	4.0	2.7	0.8	28.3	7.9	10.0	9.5	11.4	100.0

Source: Compiled from "State of Export Series" provided on magnetic tape by the Foreign Trade Division, Bureau of the Census, U.S. Department of Commerce.

suggest the base from which anticipated changes in patterns of regional exports can be measured. Some regions, such as the Great Lakes and the West, export a large dollar volume of a wide variety of goods to many trading partners. Other regions, such as the Plains and Rocky Mountains, participate much less in export activity. The export data allow state and local policymakers and businesspeople to analyze the characteristics of individual regions in more detail and compare the relative participation of their regions in nationwide manufactured exports.

[1] The information presented in this article is based on quarterly export data by state of origin provided on magnetic tape by the Foreign Trade Division of the Bureau of the Census, U.S. Department of Commerce, from shippers' export documents. The first year these data were available was 1987.

[2] Total exports by state of origin for 1987 are published in *Highlights of U.S. Export and Import Trade,* U.S. Department of Commerce, Bureau of the Census, December 1987. See also *Business America,* March 28, 1988, p. 8, and *U.S. News and World Report,* June 13, 1988, p. 71.

[3] All tables include a column for manufactured exports with unknown region of origin. The tables, therefore, show the industrial composition and the destinations for these manufactured exports with unknown origin.

Manufactured exports from the Tenth Federal Reserve District

The Tenth Federal Reserve District states—Colorado, Kansas, Missouri, Nebraska, New Mexico, Oklahoma, and Wyoming—overlap three of the regions considered in this article. The Tenth District states comprise parts of the Plains, Rocky Mountain, and Southwest regions. Due to the importance of agricultural exports in these states, the manufactured export data underestimate the overall importance of exports from the district.

The industrial composition of 1987 manufactured exports from Tenth District states is shown in Table B1. The shares of durable and nondurable goods in total manufactured exports from these states roughly equal the U.S. shares. Durable goods account for about 70 percent of manufactured exports from district states, and nondurable goods account for about 28 percent.

The most important categories of durables exports from district states are nonelectrical machinery, electrical machinery, and transportation equipment. The share of transportation equipment exports in district manufactured exports is over five percentage points above the national average, reflecting the importance of automobile and aircraft manufacturing in Tenth District states. District shares of electrical and nonelectrical machinery are closer to average.

The most important nondurables exports in district states are food products and chemicals. The share of food in district manufactured exports is more than twice the U.S. average. The share of chemicals exports in the district states is only slightly below the U.S. average.

The primary destinations of manufactured exports from the Tenth District states are shown in Table B2. Canada is the most important destination of manufactured exports from the district. It receives an above-average share of the district's

TABLE B1

Industry shares of manufactured exports from Tenth District states, 1987

(percent of total)

Industry	Tenth District states	United States
DURABLES	70.52	67.42
Lumber, wood	0.44	1.84
Furniture	0.23	0.26
Stone, clay, glass	0.90	0.97
Primary metals	1.35	2.82
Fabricated metals	2.39	2.93
Nonelectrical machinery	21.44	19.91
Electrical machinery	10.46	12.29
Transportation equipment	25.11	19.98
Instruments	7.76	4.95
Miscellaneous	0.44	1.46
NONDURABLES	28.25	28.35
Food	12.19	5.86
Tobacco	0.00	1.07
Textiles	0.12	0.91
Apparel	0.23	0.72
Paper	0.61	2.65
Printing and publishing	0.99	0.72
Chemicals	10.78	12.21
Petroleum	0.79	2.12
Rubber and plastics	1.89	1.74
Leather	0.65	0.34
UNCLASSIFIED	1.23	4.23
TOTAL	100.0	100.0

Source: Compiled from "State of Export Series" provided on magnetic tape by the Foreign Trade Division, Bureau of the Census, U.S. Department of Commerce.

TABLE B2

Destinations of manufactured exports from Tenth District states, 1987

(percent of total)

	Tenth District states	United States
Canada	28.28	23.36
Japan	12.17	10.43
Mexico	4.10	6.20
Great Britain	8.28	5.96
Germany	5.44	4.87
France	3.69	3.28
Netherlands	1.65	3.14
Korea	3.88	2.90
Taiwan	1.76	2.72
Belgium/Luxembourg	1.95	2.48
Total	71.20	65.34

Source: Compiled from "State of Export Series" provided on magnetic tape by the Foreign Trade Division, Bureau of the Census, U.S. Department of Commerce.

manufactured exports. Japan is the second most important destination of goods shipped from the district, also receiving an above-average share of district manufactured exports.

In summary, although manufactured exports are relatively less important to Tenth District states than to states in Great Lakes or coastal regions, the overall industrial makeup of these exports is similar to the makeup of U.S. manufactured exports. Notable exceptions are the larger district shares of transportation equipment and food exports. And the proportion of manufactured exports from Tenth District states shipped to Canada and Japan, the two most important export destinations for district states, is larger than average.