

Imports and domestic employment: identifying affected industries

For its trade monitoring program, the Bureau has developed measures of import penetration; initial data suggest about one-fourth of manufacturing groups might be sensitive to rising imports

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Concern about the performance of U.S. industries in domestic and international markets has led to increasing interest in the development of indicators of the domestic market share accounted for by imports. Accordingly, the Bureau of Labor Statistics has begun constructing measures which, when applied in conjunction with other information, could be used to identify domestic industries that might be experiencing adverse employment effects or other adjustment problems because of changing international trade patterns. Analysis of the geographic concentration of domestic production and employment for these sectors could help Federal agencies target assistance programs for workers, communities, and industries.

This article considers the problems of constructing indicators of import market share at the 4-digit Standard Industrial Classification (SIC) level,¹ and discusses some of the main features and trends of the BLS trade monitoring statistics. Data examined so far show that, be-

tween 1972 and 1979, the import share of the domestic market for manufactured goods rose moderately. However, among the 318 manufacturing groups studied separately, 72 were found to be "import-sensitive"—that is, having experienced either a sustained high level or a substantial increase in import share of U.S. sales during 1972–79. Employment declines over this period were reported in 38 of the 79 domestic industries which produce products similar to those in "import-sensitive" groups; more than half of these 38 industries were involved in the manufacture of textile, apparel, and leather goods products. The limitations of these measures are examined in the appendix.

Background

Under section 282 of the Trade Act of 1974 (19 USC 2393), the Bureau of Labor Statistics and the Bureau of the Census were given the responsibility of monitoring changes in U.S. imports and related domestic production and employment. The context for this monitoring program was the expanded trade adjustment assistance program established under Title II of the act. The trade monitoring system was intended to inform the Congress and administrators of adjustment assistance programs of those industries and localities in which adjustment

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problems were likely to occur as a result of the expansion of international trade.

The Bureau of the Census and the Bureau of Labor Statistics (BLS) jointly carry out the monitoring. The Census Bureau develops and publishes trade and domestic production data, while BLS has chief responsibility for the development and publication of related employment data, the development of the trade monitoring system, and the establishment of a reporting program on the results.

In connection with its broad responsibility, BLS plans, subject to availability of resources,² to:

- Establish a reliable base of detailed merchandise import, product-based output, and industry employment data on a consistent classification system.
- Set up a timely system for reporting and summarizing the data.
- Provide objective interpretations of the findings.

Currently, the Bureau produces quarterly and annual tabulations on SIC-based merchandise imports and industry employment. Import penetration ratios, that is, the ratio of imports to the sum of domestic product shipments and imports, are computed annually for manufacturing commodity groups.

Concepts

A variety of measures can be developed to assess the United States' relative trade performance, both on an aggregate basis and by industrial sector. Depending upon the ultimate application, certain definitions of these measures may be preferred over others. Of special interest for the examination of potential employment adjustment problems are indicators of the share of the domestic market accounted for by foreign imports and the share of total sales which is accounted for by U.S. exports.

Ideally, a measure of import penetration should compare domestic consumption of a product with imports of the product at a specified market point of distribution; however, no product-specific measure of consumption exists. The best available substitute is domestic demand, often termed "apparent consumption," which is usually defined as U.S. sales (shipments) less net exports (exports minus imports).³ Furthermore, while final sales (retail for consumers) of imports over final U.S. sales from all sources would be the most appropriate measure of the proportion of the domestic market served by imports (that is, import penetration), such data are not reported separately in Federal statistics.

Similar problems arise in the development of measures of export performance. Final sales of U.S. exports (excluding transportation and insurance costs to the point of exportation) over U.S. total final sales would be the best measure of the proportion of domestic eco-

nomics activity accounted for by the exports; unfortunately, data on export sales by U.S. manufacturing establishments are limited.⁴

Import penetration and export proportion measures presented in this article show the market shares of a final commodity which are accounted for by imports and exports, respectively. They do not, however, account for intermediate products used in domestic production. For example, they exclude imported or domestically produced components of end-products which are consumed here or abroad. An analysis of intermediate goods would have to be based on an econometric model or an input-output table.

Taking into account the data limitations which are discussed in greater detail in the appendix and the desire to develop measures for broad industrial trade monitoring, currently available series on U.S. imports and exports, reclassified to the equivalent producer industry, are related to industrial product-based shipments. Four ratios which relate domestic shipments to international merchandise trade may be considered:⁵

$$(a) M / (M + S - X)$$

$$(b) M / (M + S)$$

$$(c) X / S$$

$$(d) X / (M + S)$$

where

M	=	U.S. imports
X	=	U.S. exports
S	=	U.S. product shipments
S - X	=	consumption of domestically produced goods
M + S - X	=	apparent consumption
M + S	=	new supply

Measure (a), the ratio of imports to apparent consumption, is commonly used to assess the import penetration of a domestic market, showing the share of a market which is served by imports. One shortcoming of this market share-based measure from an employment point of view is that it fails to capture the offsetting nature of the domestic industry's involvement in export markets. Measure (b) makes allowances for this factor, representing the ratio of imports to new supply. New supply is defined as imports plus U.S. product shipments. The latter include domestically produced goods which are exported for foreign consumption as well as those which are consumed here. Such a supply-based measure takes into account (and is influenced by) not only domestic demand but also foreign demand for U.S. goods. Increased output in response to increases in either domestic or foreign demand for the product will

usually result in increased domestic employment levels. Therefore, from an employment point of view, measure (b) might be preferred to (a), because it takes into account the foreign demand for U.S. goods. If exports do not play a significant role in the consumption of an industry's output, then ratios (a) and (b) will be nearly the same. However, if exports are important, ratio (b) will be smaller than (a).

Measure (c), the ratio of exports to U.S. shipments, is a commonly used export performance measure. It reflects the proportion of total domestic output which is exported, but fails to capture the influence of imports in U.S. markets. Measure (d), the ratio of exports to new supply, accounts for the influence of imports and possible displacement effects which they might have. From an employment standpoint, any domestic employment displacement due to imports would be conjectural—that is, it is not clear that the same goods could or would be produced domestically if imports were not available.⁶ Therefore, measure (c) might be preferred to (d), because it would directly reflect the actual importance of exports in domestic activities. Ratio (d) will be smaller than (c) if imports are significant; correspondingly, the less significant imports are in new supply, the closer the two measures will be.

Ratio (d) does have a feature which might commend its use in conjunction with measure (b), namely a common denominator. Hence, the difference between measures (d) and (b) could be viewed as a trade gap or balance measure for a sector relative to the size of the sector.

All of the above ratios could be based on either dollar value or a unit of quantity, if a consistent measure of the latter is available. (Perhaps the best evaluation of these ratios from an employment standpoint would be with weighted aggregates of U.S. unit labor requirements.) Measures based on quantity assume that there is a homogeneous and meaningful unit as well as product specification for the classification. For certain well-defined products, such as new automobiles and textile goods, quantity-based measures might be constructed, but the appropriate level of commodity aggregation is often difficult to determine. Furthermore, quantity-based measures often fail to capture quality differences within a product group.

In constructing product-based measures at the aggregate industrial level, value-based measures, while they have some limitations,⁷ are generally more useful, because homogeneous units of quantity either are not available or are not very meaningful for purposes of comparison. About two-thirds of the manufacturing 4-digit SIC-based import commodity groups do not have a homogeneous unit of quantity.

Quality differentials are frequently reflected in value data through prices, which may serve as implicit

weights when aggregating commodity groups. Ideally, the value of imports should be adjusted for price changes, as well as for importer markups, customs duties, subsidies, and costs of transportation and insurance to the market point of distribution. A transaction-based price index would account for any changes in product specification, quality, and conditions of sale. Unfortunately, at the present time, there are no adequate and consistent deflators for SIC-based imports or exports. In general, domestic prices of imported goods include, in addition to the import price, the domestic value added (unloading, inland transit, further manufacture, handling, markups, and so forth) and applicable duties. Because all these costs can vary independently of import prices, domestic price trends are considered to be poor proxies for import price trends.⁸ In addition, the use of calculated import unit-value measures as price indexes for import commodity groups can be misleading, because of variations in product specification and quality within the product category.

In general, value-based measures will differ from those calculated on a quantity basis. For example, value-based import penetration ratios will be smaller than those which are quantity based in those cases where imports consist predominantly of items with lower unit values than similar domestic products (for example, nonrubber footwear and brassieres). The effect of using current-dollar trade and shipment values in place of real (deflated) values in the calculation of the market share measures depends upon the stability of the ratio of import or export prices to domestic prices. In many cases, we would expect domestic and world commodity prices to exhibit similar trends in the absence of domestic price controls or government subsidies. Therefore, it would be expected that import penetration ratios based on current-dollar values would show more stability with regard to inflation than either of their component value-based series on imports or shipments.

Table 1. Two-digit SIC-based share of manufacturing total imports, shipments, and employment, by import penetration level, 1972 and 1979

[In percent]

Import penetration level in 1972 or 1979	Share of manufacturing total							
	Two-digit SIC groups		Import value		Shipments value		Industry employment	
	1972	1979	1972	1979	1972	1979	1972	1979
All SIC groups	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Under 1 percent	10.0	5.0	0.6	(¹)	4.3	0.5	6.1	0.3
1 and under 2 percent	—	5.0	—	0.4	—	3.4	—	5.9
2 and under 5 percent	30.0	30.0	20.9	18.4	38.0	35.7	31.8	31.6
5 and under 10 percent	45.0	20.0	49.7	23.4	42.0	24.7	48.9	19.9
10 and under 20 percent	15.0	30.0	28.9	52.1	15.6	34.0	13.2	39.0
20 and under 50 percent	—	10.0	—	5.6	—	1.7	—	3.3
50 percent and over	—	—	—	—	—	—	—	—

¹ Less than 0.05 percent.

Note: Due to rounding, sums of individual items may not equal 100.

Data

The shipments data for the market-share measures are from the Census Bureau's *Annual Survey of Manufactures*. The value of product shipments is a sampling estimate of the current-dollar value of all products sold, transferred to other plants of the same company, or shipped on consignment, whether for domestic consumption or for export. It represents net sales value (f.o.b. plant), and excludes discounts and allowances, freight charges, and excise taxes. In a few cases, domestic production values, rather than shipment values, are used. Products bought and resold without further manufacture are excluded. The value of shipments for a 4-digit class of products used in the measures is on a wherever-made basis—that is, total shipments of the primary products of the industry, which include sales of the same products made by firms classified in other industries. (See the appendix for further discussion.)

The import and export data are from the Census Bureau's foreign trade statistics.⁹ The import value is current U.S. dollar customs value (usually foreign port value) of imports for consumption and excludes any customs duty, freight, or handling charges. The export value is current U.S. dollar free alongside ship (f.a.s.) value (U.S. port value) of exports of domestic merchandise and includes any markups and freight or handling charges incurred to the port of exportation.

Trends in penetration measures

As part of the current trade monitoring program, BLS tracks 347 4-digit SIC-based manufacturing import groups (as well as 63 agricultural and mineral groups) each quarter for significant increases in the current-dollar value of imports for consumption. In addition, industry employment is analyzed quarterly for significant declines.

While these procedures are useful in highlighting short-term movements in those commodity groups and industries which are experiencing a sudden increase in imports and a decline in current industry employment, it is instructive to consider the structure and composition of import penetration, as well as the long-term trends in industry employment, for those commodity groups for which either import penetration has increased substantially in the recent past or the level of penetration has remained relatively high.

Structure and composition. Chart 1 presents an overview of the structure of import penetration and export proportion in 2-digit SIC-based U.S. manufacturing major groups for the years 1972 and 1979 (latest available). In both years, the all-manufacturing levels of both import penetration and export proportion were in the 5.0- to 9.9-percent range; between those years, import penetra-

tion rose more moderately than export proportion. During the period 1972-79, the leather, miscellaneous manufactures, and apparel major groups experienced the largest increases in import penetration, while the textiles group registered a slight decline. During the same period, the tobacco, instruments, electrical and nonelectrical machinery, and miscellaneous manufactures major groups showed the largest increases in export proportion, while the petroleum refining group experienced a modest decrease.

At the aggregate level, imports appear to contribute significantly (above 10 percent in 1979) to the available new supply of apparel, lumber, leather, primary metals, electrical machinery, transportation equipment, instruments, and miscellaneous manufactures, but have a negligible role in tobacco and printing and publishing. In four of the major groups in which imports contribute significantly to new supply (transportation equipment, electrical machinery, instruments, and miscellaneous manufactures), U.S. exports also play an important role. Other major groups in which a significant proportion of output is exported include tobacco, chemicals, and nonelectrical machinery.

Table 1 presents the percentage distribution of total manufactures import value, product-based shipments, and industry employment by import penetration level in 1972 and 1979, on a 2-digit SIC basis. In both years, 12 of the 20 major manufacturing groups had a level of import penetration of 5 percent or more. In 1972, the corresponding imports accounted for 79 percent of the value of all manufactured imports; by 1979, their imports accounted for about 83 percent of the total.

In 1972, approximately 29 percent of the import value was accounted for by product groups with penetration levels of 10 percent or more, but by 1979, this share had grown to nearly 58 percent. During this period, both the industry employment and product shipments share-of-manufacturing total for the groups with

Table 2. Four-digit SIC-based share of manufacturing total imports and shipments, by import penetration level, 1972 and 1979

(In percent)

Import penetration level in 1972 or 1979	Import penetration level for all SIC groups in range		Share of manufacturing total					
			Four-digit SIC groups		Import value		Shipments value	
	1972	1979	1972	1979	1972	1979	1972	1979
All SIC groups	6.1	7.9	100.0	100.0	100.0	100.0	100.0	100.0
Under 1 percent	0.3	0.4	21.7	18.2	1.1	0.9	22.9	18.3
1 and under 2 percent	1.2	1.3	12.0	8.8	1.8	1.2	9.3	7.9
2 and under 5 percent	3.4	3.6	26.4	19.8	16.6	8.2	30.8	19.1
5 and under 10 percent	7.7	7.1	18.2	22.3	28.2	28.3	22.2	31.8
10 and under 20 percent	13.9	14.7	11.3	16.0	30.2	37.2	12.2	18.7
20 and under 50 percent	28.4	28.0	8.5	12.3	15.3	17.3	2.5	4.8
50 percent and over	57.1	61.9	1.9	2.5	6.8	6.9	0.3	0.4

NOTE: Due to rounding, sums of individual items may not equal 100.

Chart 1. Imports as a percent of new supply and exports as a percent of product shipments by major manufacturing group, 1972 and 1979

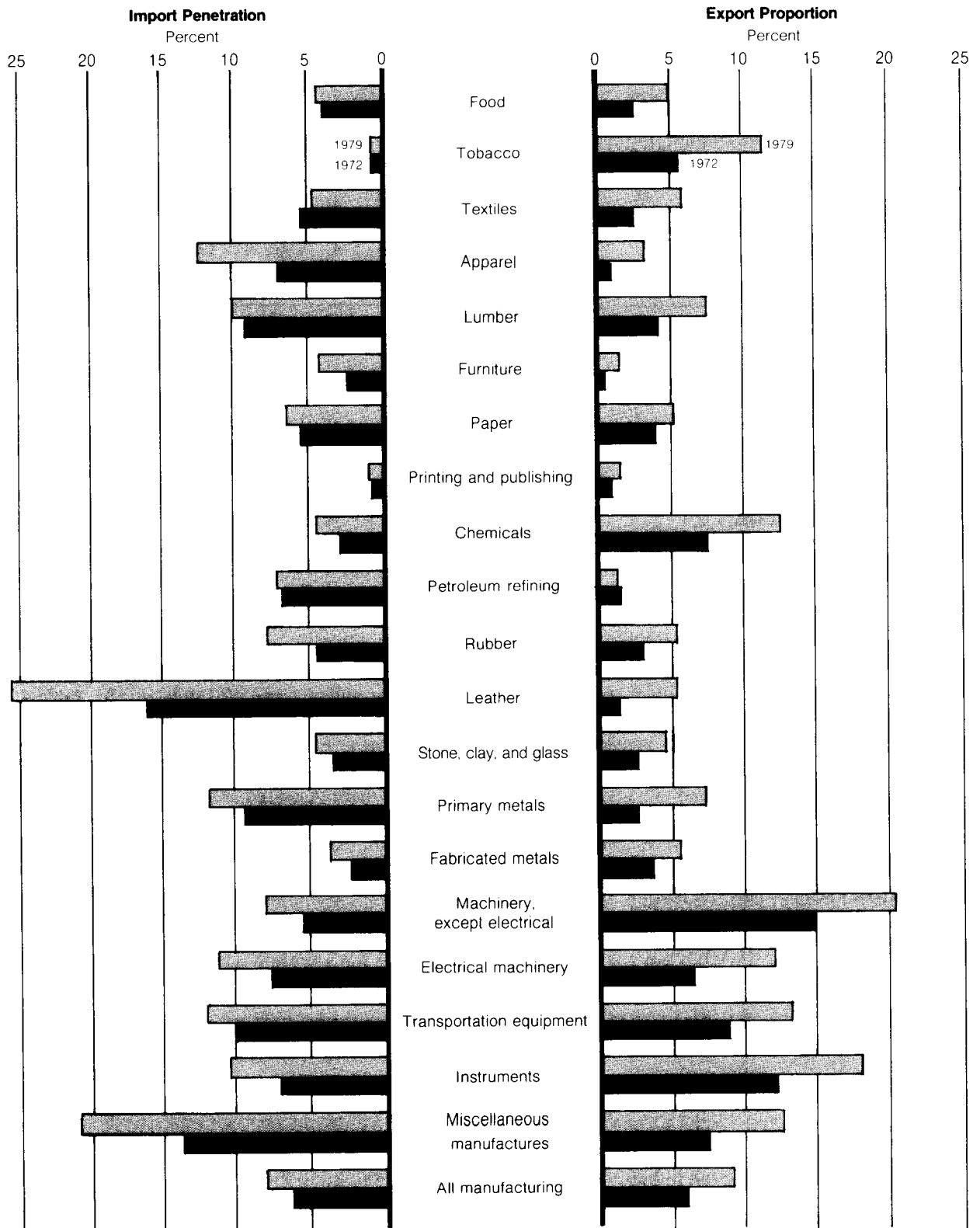


Table 3. Distribution of 4-digit SIC-based manufacturing import commodity groups and value of imports, by import penetration level, 1972 and 1979

[Cumulative frequency in percent]

Import penetration level in 1972 or 1979	Four-digit SIC-based import manufacturing commodity groups				Value of imports for consumption			
	1972		1979		1972		1979	
	Number	Cumulative frequency	Number	Cumulative frequency	Millions of dollars	Cumulative frequency	Millions of dollars	Cumulative frequency
All SIC groups	318	—	318	—	\$45,219.3	—	\$136,598.4	—
Under 1 percent	69	21.7	58	18.2	478.2	1.1	1,184.0	0.9
1 and under 2 percent	38	33.7	28	27.0	809.9	2.9	1,622.7	2.1
2 and under 5 percent	84	60.1	63	46.9	7,527.5	19.5	11,238.9	10.3
5 and under 10 percent	58	78.3	71	69.2	12,751.2	47.7	38,651.2	38.6
10 and under 20 percent	36	89.6	51	85.2	13,655.0	77.9	50,872.2	75.8
20 and under 50 percent	27	98.1	39	97.5	6,936.8	93.2	23,564.6	93.1
50 percent and over	6	100.0	8	100.0	3,060.7	100.0	9,464.8	100.0

Note: Due to rounding, sum of individual items may not equal total.

penetration levels of 5 percent or more remained relatively unchanged, in the 58- to 66-percent range. Despite the probability of extensive duplication in the value of product shipments at the 2-digit SIC level, the shipments value share-of-manufacturing total for groups with 1979 penetration levels of 5 percent or more was about 60 percent, whether measured on a final product, industry, or value-added basis.

Table 2 shows the percentage distribution of total manufactures import value and product-based shipments by import penetration level in 1972 and 1979 on a more detailed 4-digit SIC basis. Tables 3 and 4 present some additional information on the 1972 and 1979 distribution of 4-digit SIC-based manufacturing commodity groups by import value and import penetration level.

In 1972, 40 percent of the 318 4-digit product groups had levels of import penetration of 5 percent or more; these product groups accounted for 81 percent of the value of manufactures imports and 37 percent of the value of manufactures product shipments. By 1979, 53 percent of the groups had a penetration level of 5 percent or more and accounted for 90 percent of the value of manufactures imports and 56 percent of manufactures product shipments. While the number of groups, import value, and shipments value share-of-manufacturing totals for 4-digit groups with import penetration

levels between 2.0 and 19.9 percent remained fairly stable between 1972 and 1979, the share distribution within this penetration range reflected a general upward trend because of the growing importance of imports in new supply. For example, during this period, the share-of-manufacturing total of those 4-digit groups with import penetration levels between 10.0 and 19.9 percent increased 4.7 percentage points to 16.0 percent, while the share of groups with import penetration levels between 2.0 and 4.9 percent decreased 6.6 points to 19.8 percent.

In 1972, slightly more than one-fourth (86 out of 318) of the 4-digit manufacturing commodity groups had levels of import penetration less than 10 percent and import values under \$10 million. (See table 4.) By 1979, the number was only one-ninth of the total number of groups. Between 1972 and 1979, the number of 4-digit commodity groups with import values of \$500 million or more increased about 350 percent, from 13 to 58.

To permit examination of the composition of changes within the major manufacturing groups over time, table 5 summarizes the distribution of 4-digit manufacturing commodity groups within each 2-digit major manufacturing group, by 1972 and 1979 import penetration level. Perusal of this table reveals that the 2-digit major

Table 4. Four-digit SIC-based manufacturing commodity groups, by value of imports and import penetration level, 1972 and 1979

[Number of 4-digit SIC groups]

Value of imports for consumption in 1972 or 1979	1972				1979			
	Number of SIC groups	Import penetration level			Number of SIC groups	Import penetration level		
		Under 10 percent	10 and under 20 percent	20 percent and over		Under 10 percent	10 and under 20 percent	20 percent and over
Total, all commodity groups	318	249	36	33	318	220	51	47
Under \$10 million	86	86	—	—	35	35	—	—
\$10 million and under \$50 million	91	77	8	6	79	74	4	1
\$50 million and under \$500 million	128	82	24	22	146	88	32	26
\$500 million and over	13	4	4	5	58	23	15	20

Table 5. Distribution of 4-digit SIC-based manufacturing commodity groups, by import penetration level and 2-digit parent SIC, 1972 and 1979

[Number of 4-digit SIC-based groups]

SIC Code	Commodity group	Number of SIC groups	Imports as a percent of new supply						
			Under 1 percent	1 and under 2 percent	2 and under 5 percent	5 and under 10 percent	10 and under 20 percent	20 and under 50 percent	50 percent and over
			1972						
	Total, manufactured commodities	318	69	38	84	158	36	27	6
20	Food and kindred products	39	18	6	19	1	1	4	—
21	Tobacco manufactures	3	1	—	1	1	—	—	—
22	Textile mill products	20	4	2	5	14	1	3	1
23	Apparel and related products	21	2	1	8	14	4	2	—
24	Lumber and wood products	10	3	1	2	11	1	2	—
25	Furniture and fixtures	1	—	—	1	—	—	—	—
26	Paper and allied products	9	4	2	1	1	1	1	—
27	Printing and publishing	8	16	—	1	1	—	—	—
28	Chemicals and allied products	26	7	5	19	3	1	1	—
29	Petroleum refining	3	2	—	—	1	—	—	—
30	Rubber and miscellaneous plastic products	6	—	1	12	2	—	1	—
31	Leather and leather products	11	—	—	2	—	16	3	—
32	Stone, clay, and glass products	23	5	4	13	6	1	3	1
33	Primary metal products	15	3	1	3	13	3	1	1
34	Fabricated metal products	20	7	2	13	7	1	—	—
35	Machinery, except electrical	38	2	5	16	11	2	2	—
36	Electrical machinery	27	2	3	11	16	3	1	1
37	Transportation equipment	11	2	2	1	4	1	1	1
38	Instruments, optical goods, clocks	10	—	2	3	1	3	1	—
39	Miscellaneous manufactured commodities	17	1	1	3	2	17	2	1
			1979						
	Total, manufactured commodities	318	58	28	63	171	51	39	8
20	Food and kindred products	39	17	7	16	4	1	4	—
21	Tobacco manufactures	3	1	—	1	1	—	—	—
22	Textile mill products	20	4	2	14	4	1	4	1
23	Apparel and related products	21	1	1	2	5	17	4	1
24	Lumber and wood products	10	3	—	1	3	1	2	—
25	Furniture and fixtures	1	—	—	1	—	—	—	—
26	Paper and allied products	9	3	2	2	1	1	1	—
27	Printing and publishing	8	5	1	2	—	—	—	—
28	Chemicals and allied products	26	6	6	17	2	4	1	—
29	Petroleum refining	3	—	1	1	1	—	—	—
30	Rubber and miscellaneous plastics products	6	—	—	2	1	1	1	1
31	Leather and leather products	11	—	—	1	—	3	16	1
32	Stone, clay, and glass products	23	4	2	15	6	2	3	1
33	Primary metal products	15	1	1	4	5	1	2	1
34	Fabricated metal products	20	6	1	14	4	5	—	—
35	Machinery, except electrical	38	2	3	7	14	10	2	—
36	Electrical machinery	27	2	1	5	12	13	4	—
37	Transportation equipment	11	2	—	2	5	1	2	1
38	Instruments, optical goods, clocks	10	—	—	4	1	13	—	—
39	Miscellaneous manufactured commodities	17	1	—	2	2	7	14	1

¹ Level of import penetration for the 2-digit SIC-based group in 1972 or 1979.

group import penetration level, while representative for the group as a whole, does not reflect the level of penetration for each 4-digit group within the major group. In addition, the 4-digit industry size, importance (based on shipments value or employment), and propensity to import or export varies greatly within some 2-digit major groups.

For example, in 1979, 53 percent of all 4-digit manufacturing commodity groups had a level of import penetration of 5 percent or more. Sixty percent—12 of 20—of the 2-digit major groups had overall levels of import penetration of 5 percent or more. Two of these 12 major groups (paper and petroleum refining) had fewer than 50 percent of their constituent 4-digit groups with penetration at or above the 5-percent level. Conversely, in one 2-digit major group (stone, clay, and glass) with a penetration level less than 5 percent, more

than 50 percent of component 4-digit groups experienced penetration levels of 5 percent or more.

Long-term trends. The following tabulation compares the 1972–79 average annual increases in import penetration with the average levels of penetration for all 4-digit SIC-based manufacturing groups:

	Total groups	Average annual change	
		Under 1 percentage point	1 percentage point or more
Total groups	318	274	44
Average level:			
Under 15 percent	266	246	20
15 percent or more	52	28	24

As indicated, 44 of the 318 4-digit manufacturing commodity groups had a 1972-79 average annual increase in import penetration of 1 percentage point or more. (See table 6.) Twenty of the 44 groups had a 1972-79 average level of import penetration of less than 15 percent. During this same period, 5 of the 44 groups experienced a rate of growth in export proportion which equaled or exceeded that of import penetration. Fifty-two of the 318 manufacturing commodity groups had a 1972-79 average level of import penetration of 15 percent or more. (See table 7.) In 28 of these 52 groups, import penetration either declined or had a 1972-79 average annual increase of less than 1 percentage point. Of the 52 groups, 15 exported at least 10 percent of

their shipments, on average, during this period, indicating a high degree of trade activity in both imports and exports.

If we consider those groups for which either (1) the 1972-79 average annual increase was 1 percentage point or more, or (2) the 1972-79 average level of import penetration was 15 percent or more, we obtain a total of 72 import groups which have recently experienced either a sustained high level of import penetration or substantial increase in import penetration. For brevity, we shall refer to these 72 import groups as "import-sensitive" groups.¹⁰

Industry employment related to the "import-sensitive" groups is presented in table 8. In many cases, the

Table 6. Four-digit SIC-based manufacturing commodity groups with average annual increases in import penetration of 1 percentage point or more, 1972-79

SIC-based code	Commodity group	Imports as a percent of new supply					Average annual percentage point change, 1972-79
		1972 level	Range, 1972-79		1979 level	Average, 1972-79	
			Low	High			
3021	Footwear, rubber or plastic	33.9	33.9	71.7	69.2	52.5	5.0
2279	Floor coverings, nes, of textile or vegetable materials	30.9	30.9	57.2	57.2	42.1	3.8
2385	Rainwear	20.2	20.2	44.9	40.6	33.4	2.9
3149(part)	Leather ski boots and other leather athletic footwear	31.6	31.6	62.2	51.2	46.7	2.8
3263	Earthenware tableware	51.2	49.2	70.0	70.0	56.7	2.7
3873	Watches, clocks, clockwork operated devices, and parts	21.1	21.1	39.9	39.9	30.0	2.7
2066(part); 2099(part)	Chocolate and cocoa products	11.0	11.0	31.6	29.2	19.1	2.6
3171	Women's handbags and purses	20.6	20.6	38.5	38.5	29.1	2.6
2386	Leather wearing apparel, nes	34.6	33.9	57.7	50.4	43.7	2.3
3911; 3915(part)	Jewelry and cigarette lighters of precious metals	4.2	4.2	20.5	20.5	9.9	2.3
3144; 3149(part)	Women's footwear, except athletic	18.9	18.9	33.5	33.5	24.9	2.1
2271	Floor coverings, textile materials, pile inserted	11.3	11.3	28.0	24.3	19.3	1.9
2342	Corsets and allied garments	5.3	5.3	18.8	18.8	12.1	1.9
3339; 3341(part)	Smelter and refined nonferrous metals, nes	50.0	42.7	62.6	62.6	51.2	1.8
3541	Metal-cutting machine tools, and parts, nes	7.7	7.7	19.5	19.5	12.5	1.7
3553	Woodworking machinery, and parts, nes	7.9	7.9	19.7	19.7	12.9	1.7
3674; 3629(part)	Semiconductors, rectifiers, and rectifying apparatus	11.5	11.5	23.2	23.2	19.1	1.7
2371	Fur wearing apparel, and fur articles, nes	3.7	3.7	15.1	15.1	8.9	1.6
3313	Electrometallurgical products	19.7	19.7	36.3	31.1	29.7	1.6
3944	Games, toys, and children's vehicles, except dolls	11.2	11.1	22.2	22.2	14.6	1.6
2381; 2259	Gloves, except sports, leather, or fur gloves	13.8	12.7	24.1	24.1	17.4	1.5
3131	Leather cut to shapes for footwear, leather shoelaces	2.2	2.2	12.9	12.9	6.8	1.5
2321; 2322; 2331(part); 2361(part); 2253(part); 2254(part)	Male shirts, nightwear, and underwear; and female and infants' knit shirts	10.7	10.7	20.6	20.6	14.6	1.4
3676	Resistors for electronic applications	6.2	6.2	16.3	16.3	10.8	1.4
3161	Luggage of leather, textile materials, plastics	15.4	12.6	25.0	24.4	18.5	1.3
3253	Ceramic floor and wall tile	22.9	16.7	32.2	32.2	25.2	1.3
3333; 3341(part)	Smelter and refined zinc	28.5	28.5	43.2	37.4	37.4	1.3
3151	Gloves, leather	22.3	18.3	31.0	31.0	23.0	1.2
3851	Ophthalmic goods and parts, nes	12.4	12.4	20.5	20.5	16.6	1.2
3942	Dolls and stuffed toy animals	21.8	17.5	30.1	30.1	22.7	1.2
2121	Cigars and cheroots	2.3	2.3	9.7	9.7	5.8	1.1
2331(part); 2335; 2361(part)	Women's, girls', and infants' dresses, blouses, and shirts, except knit shirts	4.2	4.1	12.0	12.0	6.9	1.1
2387(part)	Leather apparel belts, with or without buckles	4.8	4.8	12.3	12.3	7.9	1.1
2429	Wood shingles, cooperage stock, and excelsior	26.6	19.3	34.2	34.1	28.2	1.1
2492	Wood particleboard, whether or not face finished	0.6	0.3	8.5	8.5	3.4	1.1
3547	Metal rolling mills, and parts, nes	4.0	3.4	11.4	11.4	5.5	1.1
3675; 3629(part)	Electrical capacitors, fixed or variable	9.6	9.6	17.2	17.2	14.0	1.1
2311; 2329(part)	Men's or boys' suits and coats, except raincoats	6.1	6.1	13.1	13.1	9.8	1.0
2337; 2363	Women's, girls', and infants' coats, suits, and skirts	6.6	6.1	13.7	13.7	9.0	1.0
3269	Ceramic articles, nes	33.7	33.7	45.7	40.6	38.9	1.0
3554	Pulp and paper machinery, and parts, nes	12.6	10.1	19.7	19.7	14.2	1.0
3651	Radio and television receiving sets, phonographs, and audio equipment, nes	34.9	33.3	44.3	42.1	38.7	1.0
3961	Costume jewelry and novelties, except precious metal	10.4	10.4	17.8	17.8	13.6	1.0
3964	Needles, pins, zippers, and similar notions	9.1	9.1	16.3	16.3	12.5	1.0

¹ The 1972-79 average annual percentage point change in export proportion for this group is equal to or exceeds the 1972-79 average annual percentage point change in import

penetration.
nes = not elsewhere specified.

industry employment series are not that well matched to the import groups. The industry coverage may be broader or narrower than that implied by the import product group; some industry employment series are related to more than one import group. Given these and

other limitations which are discussed in the appendix, the employment coverage of the "import-sensitive" groups presented in table 8 should be considered only as approximate.

Fifty-one industry employment series in table 8 relate

Table 7. Four-digit SIC-based manufacturing commodity groups with average levels of import penetration of 15 percent or more, 1972-79

SIC-based code	Commodity group	Imports as a percent of new supply					Average annual percentage point change, 1972-79
		1972 level	Range, 1972-79		1979 level	Average, 1972-79	
			Low	High			
3915(part)	Jewelers' findings and materials, and lapidary work	68.9	68.9	75.6	72.3	72.4	0.5
3263	Earthenware tableware	51.2	49.2	70.0	70.0	56.7	2.7
3751	Motorcycles, bicycles, and parts, nes	65.1	49.8	65.1	52.4	55.6	-1.8
2299	Textile mill products, nes	59.0	39.6	63.7	46.2	54.0	1.8
3021	Footwear, rubber or plastic	33.9	33.9	71.7	69.2	52.5	5.0
3339:							
3341(part)	Smelter and refined nonferrous metals, nes	50.0	42.7	62.6	62.6	51.2	1.8
3636	Sewing machines, and parts, nes	50.9	41.3	50.9	41.3	46.9	-1.4
3149(part)	Leather ski boots and other leather athletic footwear	31.6	31.6	62.2	51.2	46.7	2.8
3962	Artificial trees, flowers, dried plants, and grasses	41.9	37.2	54.2	45.8	45.9	0.6
2386	Leather wearing apparel, nes	34.6	33.9	57.7	50.4	43.7	2.3
2279	Floor coverings, nes, of textile or vegetable materials	30.9	30.9	57.2	57.2	42.1	3.8
3262	China tableware	41.0	36.8	44.5	41.0	40.6	0.0
3574(part)	Calculating and accounting machines, excluding parts	40.1	33.6	46.1	40.6	40.4	0.1
3269	Ceramic articles, nes	33.7	33.7	45.7	40.6	38.9	1.0
3651	Radio and television receiving sets, phonographs, and audio equipment, nes	34.9	33.3	44.3	42.1	38.7	1.0
3333:							
3341(part)	Smelter and refined zinc	28.5	28.5	43.2	37.4	37.4	1.3
2385	Rainwear	20.2	20.2	44.9	40.6	33.4	2.9
2611	Pulp mill products	30.4	30.3	32.3	32.3	31.4	0.3
3552	Textile machinery, and parts, nes	36.6	26.1	37.3	33.2	31.3	-0.5
2435	Hardwood plywood and veneer	31.3	27.9	33.1	33.1	31.0	0.3
3873	Watches, clocks, clockwork operated devices, and parts	21.1	21.1	39.9	39.9	30.0	2.7
3313	Electrometallurgical products	19.7	19.7	36.3	31.1	29.7	1.6
2292	Lace goods, nes	21.7	21.7	35.1	27.7	29.6	0.9
3171	Women's handbags and purses	20.6	20.6	38.5	38.5	29.1	2.6
2429	Wood shingles, cooperage stock, and excelsior	26.6	19.3	34.2	34.1	28.2	1.1
2298	Cordage	21.5	20.4	40.3	23.4	25.5	0.3
2085	Distilled, rectified, and blended liquors, except brandy	24.9	24.3	26.4	24.3	25.3	-0.1
3253	Ceramic floor and wall tile	22.9	16.7	32.2	32.2	25.2	1.3
3144:							
3149(part)	Women's footwear, except athletic	18.9	18.9	33.5	33.5	24.9	2.1
2084	Wines, brandy, and brandy spirits	21.3	18.5	28.9	26.2	23.2	0.7
3151	Gloves, leather	22.3	18.3	31.0	31.0	23.0	1.2
3942	Dolls and stuffed toy animals	21.8	17.5	30.1	30.1	22.7	1.2
2091	Canned and cured fish and seafoods	24.8	20.7	25.4	21.0	22.3	-0.5
2833	Medicinals and botanicals	22.0	20.2	24.6	21.7	21.7	0.0
2061-3	Cane or beet sugar, syrup, and molasses, beet pulp	22.5	16.1	24.3	18.5	21.5	-0.6
2271	Floor coverings, textile materials, pile inserted	11.3	11.3	28.0	24.3	19.3	1.9
2066(part):							
2099(part)	Chocolate and cocoa products	11.0	11.0	31.6	29.2	19.1	2.6
3674:							
3629(part)	Semiconductors, rectifiers, and rectifying apparatus	11.5	11.5	23.2	23.2	19.1	1.7
3914	Silverware, plated ware, and stainless steel ware	14.9	14.9	21.6	17.4	18.7	0.4
3161	Luggage of leather, textile materials, plastics	15.4	12.6	25.0	24.4	18.5	1.3
3699(part):							
3629(part)	Electrical articles and electrical parts of articles	17.5	14.9	20.3	20.3	18.3	0.4
2381, 2259	Gloves, except sports, leather, or fur gloves	13.8	12.7	24.1	24.1	17.4	1.5
2369, 2339:							
2329(part):							
2387(part):							
2253(part)	Outerwear, nes, of textile materials	16.3	14.0	20.8	20.0	17.3	0.5
3143:							
3149(part)	Men's footwear, except athletic	14.7	14.7	20.4	20.4	17.2	0.8
3572	Typewriters and parts, nes	16.3	14.8	19.5	18.5	17.1	0.3
3832	Optical instruments and lenses, and parts, nes	17.1	14.3	19.5	15.9	17.1	-0.2
3851	Ophthalmic goods and parts, nes	12.4	12.4	20.5	20.5	16.6	1.2
3949	Sporting and athletic goods and parts, nes	13.0	12.8	19.1	18.6	16.2	0.8
3711, 3, 6:							
3799(part)	Motor vehicles and passenger car, truck, and bus bodies	13.6	13.4	18.3	18.3	16.0	0.7
3811(part)	Surveying and drafting instruments; balances, nes; measuring equipment, nes	12.5	12.5	22.0	19.0	15.5	0.9
3172	Flat goods of leather and other materials	14.0	10.7	20.1	20.1	15.4	0.9
2421	Lumber and other sawmill and planing mill products, except dimension hardwood	16.3	11.2	17.5	16.9	15.1	0.1

¹ The 1972-79 average level of export proportion for this group exceeds 10 percent. nes = not elsewhere specified.

NOTE: This table includes all 4-digit SIC-based manufacturing commodity groups with imports accounting for 20 percent or more of new supply in 1979, with the exception of the following groups, which all had a 1972-79 average level of import penetration less than 15

percent: SIC 2321-2, 2253(part), 2254 (part), 2331(part), 2361(part) - Male shirts, nightwear, and underwear, and female and infants' knit shirts (20.6 percent); SIC 3911, 3915(part) - Jewelry, of precious metal or stones (20.5 percent); and SIC 3944 - Games, toys, and children's vehicles (22.2 percent).

Table 8. Employment in domestic industries which produce products similar to those in import-sensitive¹ product groups, 1972, 1979, and 1981

SIC code	Industry	Annual average employment (in thousands)			Annual average growth rate (in percent)		SIC code	Industry	Annual average employment (in thousands)			Annual average growth rate (in percent)	
		1972	1979	1981	1972-79	1972-81			1972	1979	1981	1972-79	1972-81
Food and kindred products													
2061-3	Cane and beet sugar	37.1	30.7	31.7	-2.7	-1.7	3149 ³	Footwear, except rubber, nec ²	32.3	23.5	23.0	-4.4	-3.7
2066,7	Chocolate and cocoa products; chewing gum ²	20.7	20.5	19.7	-0.1	-0.5	3161	Luggage	17.3	17.7	15.0	0.3	-1.6
2084	Wines, brandy, and brandy spirits ²	10.5	13.2	14.4	3.3	3.6	3171	Women's handbags and purses ²	19.9	18.5	17.5	-1.0	-1.4
2085	Distilled liquors, except brandy ²	22.8	19.0	17.4	-2.6	-3.0	3172	Personal leather goods, nec ²	13.0	14.3	12.6	1.4	-0.3
2091	Canned and cured seafoods ²	19.9	20.1	18.4	0.1	-0.9	3151,3199	Other leather products, nec ²	14.0	14.5	13.6	0.5	-0.3
Stone, clay, and glass products													
							3253,9	Other structural clay products ²	18.8	15.6	13.2	-2.6	-3.9
							3262,3 ³	Vitreous china and earthenware food utensils ²	10.4	9.7	9.4	-1.0	-1.1
2121	Cigars ²	14.7	8.0	7.0	-8.3	-7.9	3269	Pottery products, nec ²	12.0	14.6	12.5	2.8	0.5
Textile mill products													
2253 ³	Knit outerwear mills	77.6	70.5	71.5	-1.4	-0.9	3269	Pottery products, nec ²	12.0	14.6	12.5	2.8	0.5
2254	Knit underwear mills	34.4	32.0	30.2	-1.0	-1.4	3313	Electrometallurgical products ²	15.1	15.0	13.1	-0.1	-1.6
2258,9	Knit fabric and knitting mills, nec ²	28.6	25.7	21.5	-1.5	-3.1	3332,3	Primary lead and zinc ²	9.1	9.5	7.7	0.6	-1.8
2271,2,9 ³	Floor covering mills	62.2	60.5	52.6	-0.4	-1.8	3339	Primary nonferrous metals, nec ²	8.2	10.7	11.8	3.9	4.1
2291-4,7,9 ³	Other textile goods ²	36.3	36.8	35.6	0.2	-0.2	3341 ³	Secondary nonferrous metals ²	17.7	24.8	23.7	4.9	3.3
2298	CORDAGE AND TWINE ²	10.9	10.3	9.1	-0.8	-2.0							
Apparel and other textile products													
2311	Men's and boys' suits and coats	112.8	81.2	76.5	-4.6	-4.2	3541	Machine tools, metal cutting types	58.4	77.4	79.5	4.1	3.5
2321	Men's and boys' shirts and nightwear	118.0	102.8	97.4	-2.0	-2.1	3547	Rolling mill machinery ²	11.8	11.6	10.1	-0.2	-1.7
2322	Men's and boys' underwear ²	20.2	16.2	14.4	-3.1	-3.7	3552	Textile machinery	35.5	26.9	26.2	-3.9	-3.3
2329 ³	Men's and boys' clothing, nec ²	57.3	59.5	58.4	0.5	0.2	3553	Woodworking machinery ²	10.8	13.6	11.7	3.3	0.9
2331 ³	Women's and misses' blouses and waists	46.0	64.0	62.4	4.8	3.4	3554	Paper industries machinery ²	14.8	18.9	19.6	3.6	3.2
2335	Women's and misses' dresses	197.4	156.5	137.1	-3.3	-4.0	3572	Typewriters ⁵					
2337	Women's and misses' suits and coats	73.4	64.8	61.4	-1.8	-2.0	3574	Calculating and accounting machines ⁵	45.2	36.2	38.3	-3.1	-1.8
2339	Women's and misses' outerwear, nec	105.5	149.4	147.1	5.1	3.8							
2342	Brassieres and allied garments	31.3	18.7	18.3	-7.1	-5.8	3629 ³	Electrical industrial apparatus, nec ²	11.4	14.5	12.2	3.5	0.8
2361 ³	Children's dresses and blouses	34.0	27.5	27.2	-3.0	-2.4	3635,6,9	Other household appliances ²	35.1	36.9	31.8	0.7	-1.1
2363	Children's coats and suits ²	9.7	7.4	6.4	-3.8	-4.5	3651	Radio and tv receiving sets	114.5	87.5	82.2	-3.8	-3.6
2369	Children's outerwear ²	29.8	30.8	30.2	0.5	0.1	3674	Semiconductors and related devices	115.2	201.1	224.6	8.3	7.7
2371	Fur goods ⁴	5.7	4.4	4.0	-3.6	-3.9	3675	Electronic capacitors ²	19.2	26.8	27.0	4.9	3.9
2381	Fabric dress and work gloves ²	14.0	14.5	11.1	0.5	-2.5	3676,8	Electronic resistors and connectors ²	10.5	22.1	19.3	11.2	7.0
2385	Waterproof outer garments ²	17.8	12.2	11.8	-5.3	-4.5	3699	Other miscellaneous electrical equipment ²	14.0	14.7	14.0	0.7	0.0
2386,7,9 ³	Apparel and accessories, nec ²	21.5	20.1	24.3	-1.0	1.4							
Lumber and wood products													
2421	Sawmills and planing mills, general	182.0	196.4	171.5	1.1	-0.7	3711	Motor vehicles and car bodies	415.2	463.0	352.4	1.6	-1.8
2429	Special product sawmills, nec ²	6.1	6.5	4.9	0.9	-2.4	3713	Truck and bus bodies	46.1	46.1	37.1	0.0	-2.4
2435	Hardwood veneer and plywood	30.9	27.9	24.8	-1.4	-2.4	3751	Motorcycles, bicycles, and parts ²	18.2	19.5	16.8	1.0	-0.9
2492,9	Particleboard and wood products, nec ²	65.0	70.8	67.7	1.2	0.5							
Paper and allied products													
2611	Pulp mills ²	13.7	16.1	17.2	2.3	2.6	3811	Engineering and scientific instruments	64.5	72.4	78.5	1.7	2.2
							3832	Optical instruments and lenses	17.6	31.6	33.4	8.7	7.4
							3851	Ophthalmic goods	37.1	45.1	40.7	2.8	1.0
							3873	Watches, clocks, and watchcases	29.6	27.7	20.1	-0.9	-4.2
Chemicals and allied products													
2833	Medicinals and botanicals ²	14.8	17.2	18.6	2.2	2.6							
Rubber and miscellaneous plastics products													
3021	Rubber and plastic footwear	28.7	22.7	22.2	-3.3	-2.8	3911	Jewelry, precious metal	33.9	40.0	37.3	2.4	1.1
							3914	Silverware and plated ware ²	11.2	11.9	11.7	0.9	0.5
							3915 ³	Jewelers' materials and lapidary work ²	7.2	8.9	7.8	3.1	0.9
							3942,4 ³	Dolls, games, toys, and children's vehicles	69.7	59.7	59.7	-2.2	-1.7
Leather and leather products													
3131	Boot and shoe cut stock and findings ²	13.4	11.7	11.2	-1.9	-2.0	3949	Sporting and athletic goods	56.7	61.5	57.7	1.2	0.2
3143	Men's footwear, except athletic	63.8	57.9	57.2	-1.4	-1.2	3961	Costume jewelry	27.3	31.1	24.0	1.9	-1.4
3144	Women's footwear, except athletic	86.6	59.3	52.9	-5.3	-5.3	3962,3	Artificial flowers and buttons ²	11.0	8.6	8.5	-3.5	-2.8
							3964	Needles, pins, and fasteners ²	21.7	18.6	13.9	-2.2	-4.8

¹ Import commodity groups for which either (1) the 1972-79 average annual increase in import penetration was 1 percentage point or more, or (2) the 1972-79 average level of import penetration was 15 percent or more.

² Unpublished establishment survey data. Employment data are of good quality, but have not been published due to an inadequate sample for publication of non-employment data types.

³ Industry employment series is related to more than one import-sensitive product group.

⁴ Unpublished establishment survey data. Employment data are of low quality and have not been published due to an inadequate sample for publication of any data types.

⁵ Unpublished establishment survey data. Employment data represent a combination of unpublished confidential series to avoid disclosure of any individual industry estimates.

nec = not elsewhere classified.

NOTE: There are a few industry employment series which have not been included because either data are not available for 1972 or industry coverage of the employment series is too broad to be matched with the import-sensitive product group.

SOURCE: Bureau of Labor Statistics, Payroll Employment Program, Establishment Survey, March 1981 benchmark.

to the 44 import commodity groups in table 6 with 1972-79 average annual increases in import penetration of 1 percentage point or more; 28 industry employment series relate to the 28 import groups in table 7 that had 1972-79 average annual increases in import penetration of less than 1 percentage point, but an average level of import penetration of 15 percent or more.

Of the 79 employment series in table 8, 38 show a declining 1972-79 average annual rate of change; 51 show a declining rate for the period 1972-81. (The larger number of declines for the 1972-81 period may be due to the downturn in the business cycle during 1980.) Twenty-two of the 38 industries with 1972-79 employment declines and 27 of the 51 with 1972-81 employment declines are in the textile, apparel, and leather goods groups. During the period 1972-79, total manufacturing employment grew at an average annual rate of 1.4 percent; for the period 1972-81, the growth rate was 0.6 percent. Further analysis would be required to determine whether imports were the major factor in the long-term employment decline in these 38 (or 51) industries. However, the foregoing does illustrate how analysis of import penetration and change in industry employment might be used as a screening tool to focus on potential import problems which an industry might be facing.

Usefulness of the measures

A review of some of the major methodological and measurement problems in relating trade data to domestic output and industry employment is presented in the appendix. Given these problems, the absolute values of the measures of import penetration and export proportion are of limited use, for example, in inter-industry comparisons. However, they are valid for the study of direction and magnitude of change over time, if all oth-

er relevant factors remain unaltered (for example, no structural or reporting changes).

Changes in import penetration are usually more important than levels when examining for possible employment displacement in a particular industry. However, it should be noted that a rapid rise in import penetration is not necessarily undesirable, because it might reflect a greater product specialization within an industry. This might involve higher levels of both imports and exports, reflecting greater net competitiveness. For this reason, measures of import penetration should be examined in conjunction with measures of export proportion as well as other indicators.

The BLS measures of import penetration have been developed on a 4-digit SIC basis because domestic employment measures are available only on that basis. However, by confining import penetration measures to the 4-digit SIC level, which often represents combinations of broad product groups, we may overlook some potential adjustment problems if these groups contain a mixture of very competitive and less competitive products.

AS MORE COMPLETE DATA become available, it may be possible to further refine and improve the quality of the measures which BLS has developed for use in its trade monitoring program. However, the interpretation of import penetration measures may be affected by factors in addition to the data limitations indicated above. For example, the stage of the business cycle, as reflected in U.S. and world demand, will help determine the level and composition of both imports and exports. Shifts in consumer demand due to changing tastes or product substitution, strikes, the weather, and new government regulations are other exogenous factors. Long-term secular changes in capital investment, technology, and labor force characteristics also are influential. □

FOOTNOTES

¹Commodity classification is based upon the *Standard Industrial Classification Manual: 1972* (Washington, U.S. Government Printing Office), and its 1977 Supplement. See the appendix for a more detailed description of the methods used to classify imports, exports, and domestic output.

²While BLS has received no appropriation for its role, it has devoted some resources from other programs to trade monitoring. The Census Bureau has received some limited funding for its role which has resulted in improved comparability between reported domestic production, import, and export commodity data, as well as more timely and detailed reporting of domestic production data.

³An alternative measure might be based upon a production or output basis, that is, imports relative to shipments less net inventories and net exports. In most cases, inventory change data are not generally available for adjusting product shipments data. If this measure were based over several years, the year-to-year fluctuations in inventories over the business cycle probably would not create severe distortions and would likely parallel analysis based on a domestic demand or apparent consumption basis.

⁴See, "Origin of Exports of Manufacturing Establishments," in *1976 Annual Survey of Manufactures, M76-AS-8* (Bureau of the Census, 1978).

⁵A fifth measure, the ratio of imports to U.S. product shipments, M/S , is not discussed here. This ratio is equivalent to the ratio of the relative shares of new supply of imports-to-shipments, that is, $[M/(M+S)]/[S/(M+S)]$. Algebraically, it can be derived from ratio (b) as follows: let $M/(M+S) = B$, then $M/S = B/(1-B)$. Note that B may take on any value between 0 and 1; (M/S) is nonnegative but not necessarily bounded from above.

⁶A solution to this problem would involve distinguishing "directly competitive" imports (primarily finished manufactures) from "supporting" imports such as raw materials (for example, petroleum, lumber, certain mineral and agricultural products, and semi-finished manufactures), and analyzing the supply and product availability of domestically produced substitutes. Substitution of domestic goods for foreign goods and resources will depend on both consumer tastes and industry technology. On the consumer side, income and price (cross) elasticities of demand, and on the producer side, capacity utilization,

productivity, and the possibility of resource bottlenecks, will influence the adjustment (both in the short run and the long run) to replacement of imported commodities with domestically produced goods.

⁷ The value-based measures presented in this article should be considered as approximations intended for broad industrial monitoring. Further adjustments would need to be made for a detailed analysis of a specific sector. These might include adjustments in import value to make it more equivalent to a domestic valuation, and attempting to account for different cost and wage structures among countries, the changing composition of the product basket, point of sale, and timing of sale.

⁸ BLS produces U.S. import and export price indexes which are based on the nomenclature of the Standard International Trade Classification (SITC) System of the United Nations, 1974 Revision. Monthly net transaction price data are collected by BLS for approximately 14,500 products from more than 6,000 companies (importers and exporters). The product areas surveyed for the import price in-

dexes account for about 96 percent of the value of U.S. imports and cover all imported commodities, excluding chemicals. The product areas surveyed for the export price indexes account for approximately 64 percent of the value of all U.S. exports and include machinery and transportation equipment, and selected categories of chemicals, intermediate products, crude materials, and food.

⁹ Import data are BLS SIC-based aggregations of Census Bureau IM-145 monthly import tapes. Export data are from the Census Bureau's EA-675, U.S. Exports of Domestic and Foreign Merchandise, SIC Division by SIC-Based 2-Digit, 3-Digit, and 4-Digit Product Code.

¹⁰ It should not be concluded that the remaining 246 groups are insensitive to import changes. The choice of average annual increase of 1 percentage point and average level of 15 percent for the period is completely arbitrary and made only for the purpose of reducing the number of groups considered for analysis. The selection criteria could be adjusted according to any desired level of discrimination.

APPENDIX: Data limitations

There are several conceptual and measurement difficulties in comparing domestic output and employment data to commodity trade data. These problems vary with the product or industry considered, the definition of the industrial market, and the scope of the measure. Because each of the factors enumerated below affects comparability among trade and domestic data to some degree, the BLS measures of import penetration and any related employment coverage for import groups should be viewed only as approximations.

Market mismatches. For the analysis of trade-related employment effects, it would seem reasonable to consider the output at the industrial level (4-digit SIC), because workers usually are mobile between establishments which produce similar products. However, for any meaningful analysis, there must be a defined market with distinct products, the definition depending, in part, upon the degree of vertical integration within the industry. In the above article, markets were defined at the industry level (4-digit SIC), but the pertinent market could be broader in some cases (for example, steel—SIC 331) or narrower (as for canned mushrooms, SIC 20333, within canned vegetables, SIC 2033). This is an important caveat, because the degree of import penetration calculated will vary with the definition of the 'industry' (2-, 3-, or 4-digit) or product category (5- or 7-digit) used.

Commodity versus industry base. Data on U.S. manufacturers' shipments are available on two bases: 1) industry shipments—total shipments of firms classified in a given industry, which include other secondary products, and 2) product-class shipments—total shipments of the primary products of the industry, which include sales of the same products made by firms classified in other industries. Because international trade classifications are commodity-based, it was decided to match imports and exports to domestic sales of a commodity on a product-class basis.

A product class is a group of individual products of an industry. It is designated by a 5-digit code, the first four digits indicating the SIC (industry), and the fifth, the specific group of products. In some cases, a 5-digit product class is, by definition, limited to products of a particular manufacturing process (for example, ferrous wire made in wiredrawing plants, SIC 33151, as distinguished from ferrous wire not produced by wiredrawers, SIC 34961). Accordingly, the output of all 5-digit classes with similar end products must be combined before comparisons are made with import levels, because the import

classifications do not make these differentiations.

Because employment data are available only on an industry basis, we must consider the commodity-to-industry mismatch when relating product-based measures of import penetration or export proportion to industry employment. Two available measures are useful in evaluating this problem. The first is the specialization ratio, defined as primary product output within the industry divided by total industry output (primary and secondary). The second measure, the coverage ratio, is the primary product output produced within an industry divided by total output of the primary product by all industries. If these two measures are fairly constant over time, then the industry-to-commodity mismatch should not present a major problem when changes in commodity-based import penetration or export proportion are compared with changes in industry-based measures, such as employment.

Data duplication. In computing measures of import penetration at the 4-digit SIC level, domestic product-based output must be aggregated and matched to imports. Aggregation of 5-digit product-class shipments to a 4-digit level will result in duplication to the extent that these commodities are used as materials in other commodities produced within the industry considered. (There are no similar problems of duplication in the import data, because only final products are recorded.) Most domestic output classes covering contract and commission work have been excluded to minimize duplication in the valuation of output. However, in lieu of an appropriate general measure of duplication, such as the percentage of output currently accounted for by intraindustry sales, it can only be noted that, if there is substantial duplication in the measurement of domestic output, the corresponding measure of import penetration will be understated.

Comparability of commodity classes. The available trade data are not ideal for the calculation of import penetration ratios or export proportions. Limitations include problems of valuation, timing, coverage, and comparability with classifications for domestic output.

Perhaps the most critical problem is the incongruity among classifications used for reporting domestic production, U.S. imports, and U.S. exports. Reported domestic production (as well as employment) is based on the classification of domestic economic activity of establishments according to the *Standard Industrial Classification (SIC) Manual*, 1972 edition. U.S. imports are reported on the basis of more than 10,000 legal tariff

commodity classifications, designed for the collection of duties, in the *Tariff Schedules of the United States Annotated* (TSUSA). Finally, U.S. exports are reported on the basis of the Commerce Department's more than 4,000 Statistical Classifications of U.S. Exports (Schedule B).

The three classification structures (SIC, TSUSA, Schedule B) were designed for different uses. The SIC nomenclature is organized by stage of processing (for example, raw materials, manufactured products, services, and so forth). The origin of production is the establishment primarily responsible for output. In some cases, the method of manufacture or process, or market use, is important for industry classification. On the other hand, the trade classifications are commodity based; that is, they define objective commodity characteristics, material content, operating characteristics, and so forth, which may cross industry lines. In the case of imports, these commodity characteristics are important for the determination of any applicable duty.

For the purpose of relating imports (exports) to output, individual TSUSA (Schedule B) commodity numbers are assigned to a 5-digit SIC-based product class. In cases where the TSUSA (Schedule B) numbers include items which should be classified under two or more SIC-based output codes, an assignment is made to that code under which the principal content of the TSUSA (Schedule B) number appears to belong, if such an assignment will not significantly overcount the SIC classification to which the TSUSA (Schedule B) number is assigned or undercount the other SIC classifications to which it partially belongs. Where it appears that distortions will result from the assignment of an entire TSUSA (Schedule B) number to a single SIC-based output code, the principal SIC-based output classes are combined to form a more comprehensive SIC-based import (export) code, and the pertinent TSUSA (Schedule B) data are assigned to the combination. For the 1972 edition of the SIC, and its 1977 Supplement, there are 452 4-digit SIC-based manufacturing output codes and 347 (409) 4-digit SIC-based manufacturing import (export) codes. As one can see, the concordance between domestic output and either SIC-based imports or exports (and for that matter, even between SIC-based imports and exports) is not perfect.

Under Section 608 of the Trade Act of 1974, the Departments of Commerce and Treasury, along with the International Trade Commission, are working to improve the different classifications used for reporting domestic production, imports, and exports. Since the signing of the Act, significant improvements have been made. A completely new Schedule B classification for exports, structured after the TSUSA numbering scheme for imports, was introduced in 1978. In addition, new and more detailed TSUSA classifications are introduced each year, which in many cases permit better associations with domestic output classifications. But while these improvements in comparability are critical for relating trade to domestic economic activity, they present substantial problems for time-series analysis, because the improvements are often achieved at the cost of breaks in individual classification series. For example, only 318 of the 347 4-digit SIC-based import classifications currently available can be matched to output on a consistent basis for the years 1972-79.

In some cases, it is inappropriate (or impossible) to calculate a measure of import penetration, because comparable import data are not available for certain domestic output classifications (for example, morticians' goods, screw machine products, and so forth). In most cases this is not because these items are not imported, but because the different classification structures used for imports (TSUSA) and output (SIC) do not distinguish product characteristics on the same basis. In some

cases, the tariff classifications are not defined precisely enough to permit association of import data with 5-digit detailed domestic output classifications. However, where it is likely that the domestic product class is subsumed in imports at the 4-digit level, it is included in the calculation of the import penetration measure. (For example, products like canned baby foods, SIC 20321, are assumed to be included in the broader import grouping for canned and preserved fruits and vegetables.)

The value of manufactures shipments at the 4-digit commodity level often includes a small amount which is not distributed among the individual 5-digit product classes. When SIC-based import groupings represent combinations of product classes from different 4-digit groups, a share of the undistributed output for the 4-digit output class is allocated to each output product class according to the 5-digit product-class share of the 4-digit total. Because this allocation is an approximation, the value of shipments for the 4-digit import commodity group might be slightly misstated.

Valuation. Differences in the method and point of valuation of imports and exports present major problems in comparisons with domestic output. Output shipments values are sample estimates, subject to error, and usually relate to the point of production. They include interplant transfers and are gross output measures (value added plus cost of materials).

In the above analysis, exports were valued at the point of exportation—seaport, borderpoint, or airport. The export value represents the selling price, or cost if not sold, and includes expenditures for freight, insurance, and other charges to the export point. In addition, the exporter's trade margin above cost boosts the export value in relation to producers' values. Information on the magnitude of this incremental margin is not available on a commodity-by-commodity basis. And, because export values pertain only to direct exports, and not to commodities which are incorporated into other, more finished products and exported in finished form, the relation of exports to shipments for intermediate products (such as steel shapes) is considerably understated.

Beginning in 1974, the Census Bureau began reporting imports on an f.a.s. basis (transaction value, f.o.b. port of exportation) and on a c.i.f. basis (value of the import at the first port of entry), in addition to the previously reported customs value. The customs value, which is used in this article, has been the basic valuation for duty-collection purposes since the inception of the tariff schedules. It usually represents the value in the foreign country and excludes duties, insurance, and other charges. Until recently, customs values did not necessarily represent transaction values. Certain products were valued for customs purposes on the basis of their American Selling Price (ASP), which in most cases was above the actual transaction value. However, under the Customs Valuation Code of the Trade Agreements Act of 1979, the ASP valuation practice is to be phased out and replaced with a transaction-based valuation. As a result, beginning with the compilation of 1982 trade statistics, the Census Bureau is substituting the transaction-based customs value for the f.a.s. value, and discontinuing the compilation of f.a.s. import values.

Of the three alternative import valuations, customs value, f.a.s., and c.i.f., the last would be preferred, because it would reflect the purchase price, freight, insurance, and other charges (except overland charges from Mexico or Canada). To obtain a landed value, customs duties assessed should also be added. This landed value would be the most appropriate measure to use in comparisons with domestic output. Because customs value was used in the above analysis, the import values under-

state the landed U.S. market value. However, the Census Bureau has tabulated SIC-based import penetration measures for 1974 using all three valuation bases, finding that in most cases there are no major differences, while in some there might be differences of as much as 2 percentage points.

Both imports and exports exclude low-valued shipments and mail entry items. To the extent these items are important in a product category, the valuation will be understated.

With few exceptions (for example, used tractors, cars, and tires), used or rebuilt commodities are classified in the same import or export group as new merchandise. Import penetration measures will be overstated to the extent that used or rebuilt products are significant in trade, because domestic shipments data usually do not include such commodities.

Differences in labor requirements for imported commodities present a major problem in value comparisons with domestic output when inferences are made about the employment associated with a particular commodity group. A commodity

group should be defined with sufficient product detail to ensure homogeneity with regard to labor requirements. But in the foregoing analysis, imports are not differentiated by supplying country, a primary determinate of labor input and costs. Products are assumed to be homogeneous within world industrial sectors, and are distinguished only between those which are imported and those which are produced domestically. Imports are compared with like or similar domestically produced commodities on a dollar-for-dollar basis. While this method is probably more valid for the analysis of the balance of payments, it has severe limitations if such a one-to-one correspondence between output and imports is inferred. Different wage and cost structures in each country will affect current dollar value comparability between domestically produced and imported goods. Furthermore, any estimate of the U.S. labor requirements necessary to produce output equivalent to the imported amount would be affected by differences in the valuation of imports and output.

Productivity and people

A number of economic factors have created a new awareness of the human factor in the productivity equation: inflation, the high cost of money, slow economic growth, high energy costs, and increased foreign competition have all served to broaden our perspective. Although in the past top management has tended to downgrade or minimize the importance of the human factor, there is a new awareness of its significance today. A national opinion survey of leadership in the United States in 1979 revealed that government leaders considered improved employee relations to be one of the principal avenues of productivity improvement. Increasing awareness by the chief executive officers in American industry of this source of productivity will also focus corporate attention on more innovative programs within the workplace.

—JEROME M. ROSOW, ED.

Productivity: Prospects for Growth

(New York, Van Nostrand Reinhold Co.,
1981), p. 256.
