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MEASURING U.S. INTERNATIONAL GOODS AND SERVICES TRANSACTIONS

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ABSTRACT

In order to better capture the close relationship between firms' cross-border trading activities and the sales and purchasing activities of their foreign affiliates, this paper proposes supplementary accounting formats that classify cross-border and foreign affiliate activities on an ownership basis, in contrast to the residency approach followed in the balance-of-payments accounts. One format combines net cross-border sales by Americans to foreigners, net sales by foreign affiliates of U.S. firms to foreigners, and net sales of U.S. firms to U.S. affiliates of foreign firms to yield a figure that indicates net sales by Americans to foreigners. Another accounting format measures the value-added embodied in cross-border and foreign affiliate activities on an ownership basis. U.S. cross-border and foreign affiliate activities based on these two approaches are presented and analyzed for the period, 1987-1992. In addition, data by industry are presented in these formats.

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I. Introduction

One of the roles of economists concerned with organizing national and international economic data into meaningful accounting formats is to ask periodically whether existing sets of accounts adequately describe important economic trends and are as useful to public and private policymakers as possible. The Panel on Foreign Trade Statistics established under the auspices of the National Academy of Sciences (NAS) in 1989 (which Baldwin chaired) considered addressing this question to be an important part of its task. In particular, it focussed on whether existing ways of presenting data on firms' cross-border trading activities and the sales and purchasing activities of their foreign affiliates adequately captured the close relationship between these two types of international economic transactions.

The Panel concluded that the present system of economic accounting could be improved in this regard and recommended that cross-border sales (exports) and purchases (imports) of goods and services as well as net sales of foreign affiliates of U.S. firms (FAUSF) and net sales to U.S. affiliates of foreign firms (USAFF) be presented on an ownership basis to supplement the residency approach followed in the balance-of-payments accounts (Kester (ed.), 1992).[1] In the net sales calculations, the selling and purchasing activities of firms are measured as those undertaken by the firms' capital owners and employees, i.e., by the productive factors used directly to create value-added by the firm. Thus, net sales of foreign affiliates are defined as sales less purchases of intermediate goods

[1]It should be emphasized that the Panel did not propose that the existing framework for the balance of payments be changed but rather that additional information on international transactions be presented in supplementary accounting formats.

and services.[2] This suggested supplemental framework combines net cross-border sales of Americans to foreigners, net sales by foreign affiliates of U.S. firms to foreigners, and net sales of U.S. firms to U.S. affiliates of foreign firms to yield a figure that shows net sales of Americans to foreigners. The Panel report also estimated value-added on this basis, and we believe that measuring cross-border and foreign affiliate activities on a value-added basis is also a useful accounting format for representing international transactions. However, fundamentally, the usefulness of these as well as existing or other formats depends on the purpose for which the information is utilized.

The outline of the paper is as follows. Section II discusses the need for a supplementary framework and its benefits to both private and public officials. Section III considers various conceptual and practical issues involved in measuring cross-border and foreign affiliate activities on a net sales basis and also discusses some of the key relationships brought out in the tables measuring international transactions on an ownership basis over the period 1987-1991. Measurements of cross-border and direct investment activities on a value-added basis for this period are presented in Section IV, and important relationships based on this approach are discussed. Section V presents net sales figures on an industry basis and includes an analysis of the international structure and relative competitiveness of American industries that these figures reveal. Section VI concludes by contrasting the approach developed in the paper with other accounting formats for presenting data on cross-border

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[2]Consequently, the purchases from foreigners by affiliates of U.S. firms located abroad, for example, include the purchases by the firms of intermediate goods and services from foreign-owned firms located abroad but do not include the cost of foreign labor hired directly by the affiliates of U.S. firms.

transactions and the activities of foreign affiliates.

II. The Need for a Supplementary Framework

A key aspect of the increasing internationalization of economic activities is that firms have found they can profitably exploit their unique technological and managerial knowledge by establishing production units in foreign countries as well as by exporting to or importing from foreign firms or by permitting foreign firms to use their specialized knowledge. Thus, when supplying goods and services to foreign markets, business decisionmakers consider the alternatives of producing the goods and services domestically and exporting them or undertaking direct foreign investment and producing them in their facilities abroad. If they do choose to produce abroad, firms must also decide on the extent to which they will export components for further processing in their overseas facilities or purchase the needed intermediate inputs abroad. To compare the economic importance of these alternative means of serving foreign markets, it is necessary to have comparable data with respect to these different activities.

The current set of accounts documenting the international activities of U.S. and foreign firms does not provide such comparability. The balance of payments summarizes international transactions between residents of one country and residents of other countries. Total merchandise and service exports and imports of firms residing in the United States and in other countries are recorded, but no information is provided concerning whether the exports are shipped from U.S.-owned firms to FAUSF or USAFF to their foreign parents. Imports also are not distinguished on an ownership basis. Furthermore, since total exports include imported inputs, one is not able to compare properly the relative importance of value added through export activities with value added through affiliate activities or with total value added (GDP).

More importantly, the only measure of the level of activity of FAUSF or USAFF in the balance of payments is the income earned on U.S. direct investment abroad and on foreign direct investment in the United States. Comparing these income receipts and cross-border merchandise and services trade leads to an apple and oranges adding problem. The balance of payments framework measures the participation of U.S.-owned firms located in the United States in cross-border activities by their sales but measures their participation in direct investment activities abroad by the income earned on these direct investment activities. Since these exports and direct investment income are not comparable (one is a sales figure, while the other represents factor income), one does not get an adequate picture of the nature of firms' international activities from the balance of payments.

Economic data on sales and purchases of foreign affiliates of domestic firms and domestic affiliates of foreign firms are available for the United States and Japan but these are presented in other sets of accounts constructed by these governments.[3] The U.S. government, for example, annually publishes data on the operations of U.S. parent companies and their foreign affiliates and the operations of U.S. affiliates of foreign companies. These reports provide information on the cross-border trade between parent firms and their foreign affiliates as well as on the foreign sales and purchases of foreign affiliates. However, prior to the work of DeAnne Julius (1990, 1991) and an earlier study by Evelyn Lederer, Walter Lederer and Robert Sammons (1982), no effort apparently had been made to integrate information in both

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[3]Purchases by foreign affiliates of U.S. firms can only be estimated indirectly.

sets of accounts as a means of better understanding the nature of the increasing globalization of economic activities.

Not only are supplementary statistical summaries of cross-border and foreign-based transactions of firms needed to improve our understanding of the evolving international economy, but such accounting frameworks would be helpful to government officials in reaching policy decisions. As the various papers in this conference volume indicate, ownership as well as geography matters for economic behavior. For example, the domestic content of foreign-owned firms in the United States, though high, is substantially lower than that of domestic U.S.-owned firms. Similarly, plants owned by foreign multinational companies pay higher wages, are more capital intensive, are more technology intensive, and are more productive than the average U.S. plant. Moreover, the output of these firms is generally growing at a different (sometime faster, sometime slower) pace than domestically owned firms. National tax rules also affect the way in which foreign-owned firms report taxable income, price their products, and locate their production activities in a manner that differs from the behavior of domestic firms. Furthermore, foreign affiliates may respond differently to domestic monetary policies than domestically owned firms due to the likelihood of their better access to international capital markets. Since these various differences are important for a variety of macroeconomic and microeconomic policy decisions by governments, it is useful to have an accounting framework which facilitates the comparison and interpretation of the differences. However, quite aside from the various differences in economic behavior between domestically- owned and foreign-owned firms, it seems prudent on national security grounds to measure the cross-border and affiliate activities of U.S.-owned and foreign-owned firms on a comparable basis.

Expressing cross-border and affiliate activities in comparable terms can also be helpful to trade negotiators. Increasingly, it is the objective of governments not only to reduce the restrictive effects of traditional border measures but to reduce the discriminatory effects of various rules and regulations imposed by other governments that restrict the selling and buying activities of foreign affiliates within foreign markets. To determine the extent to which a country's negotiators have achieved both objectives, it is necessary to assess the liberalization achieved in both areas in a comparable manner, a goal that is not achieved by only utilizing the information available in the balance of payments. Furthermore, the proposed accounting frameworks are helpful in informing the ongoing debate on American competitiveness in the world economy. By providing data on the extent to which U.S. firms compete against foreign firms through sales and purchases from their foreign-based operations as well as through their cross-border sales and purchases, government officials can better inform the public on this issue.[4]

Of course, for most public policy and research issues, the relevant relationships are the level of domestic activity, regardless of whether it is undertaken by domestically-owned or foreign-owned firms, and the income accruing to U.S.-owned firms from their foreign investment activities rather than level of the activities of their foreign affiliates. The traditional residency approach followed in the balance-of-payments remains the appropriate accounting framework to utilize under these circumstances.

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[4]However, as Guy Stevens points out in his comments on this paper, no simple accounting measure can accurately measure the many different meanings of international competitiveness.

III. Measuring Cross-Border and Direct Investment Activities on a Net Sales Basis

(1) Some Conceptual Issues

The first issue that arises in estimating net sales of goods and services by Americans to foreigners is how to define U.S.-owned and foreign-owned firms. For balance of payments purposes, the Bureau of Economic Analysis (BEA) regards a business located abroad (in the United States) as representing U.S. (foreign) direct investment if one U.S. (foreign) person (in the legal sense that includes a firm) controls 10% or more of the voting securities of the business. Under such a practice, two or more countries can treat the same firm as a foreign affiliate. This will lead to double counting of total sales and purchases for the world, if an affiliate is assigned to each country. One way of avoiding this problem would be to allocate the sales and purchases of affiliates in proportion to the ownership interests of the different countries. Another would be to include only those affiliates that are majority-owned; that is, affiliates in which the combined ownership of those persons individually owning 10% or more of the voting stock from a particular country exceeds 50%. One could assign all sales and purchases of affiliates to countries with majority-ownership interests or only the proportions equal to the ownership interests.

The procedure followed here is to treat only majority-owned affiliates as U.S.-owned or foreign-owned firms and assign all the sales and purchases to either the United States or foreigners, depending on who has the majority-ownership interest. Unfortunately, while data on the sales and purchases of goods and services are available for majority-owned FAUSF, the data on majority-owned USAFF, although collected, are not published. In the tables included in the paper, figures on these affiliates cover firms in which the ownership interest is only 10% or more.[5] Another problem in identifying U.S.-owned and foreign-owned firms is that some FAUSF may belong to U.S. firms who are themselves USAFF, and some USAFF may belong to foreign firms who are themselves FAUSF. Unfortunately, the data for identifying such firms and properly classifying them as foreign-owned and domestically-owned firms are not available. Still another issue in estimating net sales of Americans to foreigners is the lack of data on sales and purchases of U.S. citizens living abroad and households of foreign citizens living in the United States. Because of this problem, it is necessary to classify households on a country-of-residence basis, as in the balance of payments statistics. That is, the household of a private foreign citizen in the United States (not employed by a foreign government) is combined with households of U.S. citizens living in the United States and the U.S. government and regarded as an American unit. Similarly, the household of a private U.S. citizen living abroad (not employed by the U.S. government) is combined with households of foreign citizens living abroad and foreign governments and regarded as a foreign unit.

The focus is on identifying the selling and purchasing activities of FAUSF and USAFF. Thus, the term, "Americans," as used here, consists of U.S.-owned firms in the United States and abroad, households of U.S. and private foreign citizens residing in the United States (U.S.-resident households), and U.S. government units. Similarly, the term, "foreigners," consists of foreign-owned firms in the United States and abroad, households of foreign and U.S. citizens residing abroad (foreign-resident households), and foreign

[5]An exception is services data from DiLullo and Whichard (1990) and Sondheimer and Bargas (1992, 1993, 1994) which cover majority-owned USAFF.

governments.

In comparing the net sales of Americans to foreigners over time, it is, of course, necessary to deflate the value figures by appropriate price indices. Cross-border sales should be deflated by U.S. export and import price series, while the appropriate deflator for net sales to USAFF is an index of U.S. producer prices. Net sales of FAUSF should be deflated by a weighted average of foreign producer prices, where the weights reflect the relative importance of the sales of FAUSF across the countries.[6]

(2) Estimates of Net Sales of Americans to Foreigners

Estimates of the net balance of sales by Americans to foreigners for 1987-1992 are presented in Table 1. The net sales figure is the sum of three parts: (1) cross-border sales to and purchases from foreigners by Americans; (2) sales to and purchases from foreigners by FAUSF; (3) sales to and purchases from USAFF by Americans. Net sales of these three components are also shown in Figure 1 for 1991. (Data for 1991 rather than 1992 are shown, since the figures for the latter year are preliminary.) In this figure, the usual geographical breakdown between the United States and foreign countries is depicted as shaded rectangles on the right and left-hand sides of the figure. The part of the figure above the solid line cutting across the two rectangles indicates American-owned firms both within the United States and located abroad and households and governmental units in the United States, while

[6]A problem of growing importance with regard to measuring cross border trade is that many goods and services now pass across borders with no transactions taking place. Consequently, cross-border flows are increasingly imputations, akin to those for the services of owner-occupied housing. Moreover, for many internationally traded goods and services, there are no markets comparable to the rental market for homes from which to draw prices in imputing the value of trade.

the portion below this line indicates foreign-owned firms located in the United States and in their own countries and households and governments abroad.

Part I of Table I indicates cross-border sales (exports) to and purchases (imports) from foreigners only. Cross-border sales to foreigners are obtained by subtracting from total exports of goods and services both U.S. exports to FAUSF and U.S. exports shipped by USAFF.[7] Since the first export figure represents sales by U.S.-owned firms and U.S. private residents to U.S.-owned firms located abroad and the second represents sales of foreign-owned firms to foreigners abroad, both must be excluded in estimating the sales by U.S.-owned domestic firms and U.S. private residents in the United States to foreigners abroad. In 1987 exports of U.S. firms to their foreign affiliates equaled 25 percent of total exports, while exports of U.S. affiliates of foreign firms amounted to another 15 percent. In 1991 these figures were 23 percent and 18 percent, respectively. The estimate of cross-border sales (exports) to foreigners by Americans in 1991 is $344,725 million (the following figures are all for 1991).

The $344,725 million figure is only an approximate estimate for several reasons.[8] For example, since exports by USAFF to FAUSF are included in both U.S. exports to FAUSF and in U.S. exports shipped by USAFF, this amount is subtracted twice from total exports of

[7]These subtractions exclude both intra-firm exports and exports to FAUSF by non-affiliated U.S.- owned firms and by USAFF to non-affiliated foreigners. The BEA surveys on U.S. investment abroad collect the data needed to divide exports into these different categories, if such a breakdown is desired.

[8]For a detailed discussion of the differences between the estimate of net sales by Americans to foreigners and the conceptually correct measure, see National Research Council (1992, Appendix A).

goods and services. Also, data on U.S. exports of services to FAUSF, which should be subtracted from total exports of services, are not available except for the sales of some services by U.S. parent companies to their foreign affiliates. These divergences between the desired and actual figure are not likely to be large, however.

Cross-border purchases (imports) of goods and services from foreigners are estimated in a manner similar to cross-border sales. U.S.imports from FAUSF and U.S. imports shipped to USAFF are both subtracted from total imports of goods and services in order to obtain just the trade between Americans and foreigners.[9] In 1987 U.S. imports from FAUSF amounted to 15% of total imports, while imports shipped to USAFF were equal to 29% of total imports. By 1991 the first ratio has risen to 17% and the second to 31%. As before, the $320,364 million estimate of purchases by Americans from foreigners for 1991 is only approximate because of the double subtraction of U.S. imports from FAUSF going to USAFF and the absence of data on services imports shipped to USAFF, except for some services by USAFF from their foreign parent companies.

A more serious problem concerns the subtraction of merchandise imports going not just to USAFF where the ownership interest is 50% or more, but to USAFF with an ownership interest of 10% or more. This causes the import figure of $320,364 million to be too small compared to the export figure and thus the estimate of the surplus in net cross-border sales, namely, $24,361 million, to be too large. This net cross-border sales figure is shown in Figure 1 next to the large arrows between the two shaded rectangles.

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[9]The same point about intra-firm and arms-length transactions made in footnote 7 also applies here.

Estimates of the sales and purchases by FAUSF are presented in Part II of Table 1. To obtain net sales of these firms to foreigners, it is necessary to subtract both sales among themselves and sales to the United States from their total sales. This yields sales to foreigners of $898,046 million. This figure also is only an approximation of the desired number, since it improperly excludes the sales of FAUSF to USAFF. But, again, this exclusion is likely to be comparatively small.

No direct data are available on the purchases of intermediate goods and services by FAUSF, let alone their purchases of these goods and services from foreigners. A rough estimate of purchases of goods from foreigners by FAUSF is obtained by subtracting employee compensation, depreciation, depletion, and other charges, production royalty payments, purchases from other FAUSF, and U.S. exports shipped to FAUSF from the cost of goods sold. Purchases of services from foreigners are estimated by applying the ratio of total purchases of USAFF by the finance, insurance, and services sectors to the total sales of these sectors, namely, 0.78 (as calculated from Lowe, 1990), to the total sales of services by FAUSF to yield a total purchases estimate. A part of imports of services from the United States and purchases from other FAUSF are then subtracted from the total purchases figure to the estimate of local purchases of services from foreigners. Adding this to the sum for goods yields a total of $559,050 for local purchases for goods and services by FAUSF. Since these calculations only approximate the purchases of intermediate goods and services, the figure of net sales to foreigners by FAUSF ($338,996 million) must be interpreted carefully.

The above figures for the sales of FAUSF to foreigners and purchases of these firms from foreigners in 1991 are depicted in the right-hand shaded portion of Figure 1 as arrows across the solid wide line separating U.S.-owned and foreign firms, with the net sales figure shown above the large two-way arrow.

Part III of Table 1 presents the estimates of net sales by Americans to USAFF. Again, the data on U.S. sales of goods and services to USAFF or, in other words, local purchases of intermediate goods and services by USAFF are not available directly. The estimate of U.S. sales of goods to USAFF is obtained by a procedure similar to the one used in estimating local purchases by FAUSF, except that there are no data on production royalty payments and purchases from other USAFF. U.S. sales of services to USAFF are also estimated in a manner similar to local purchases of services by FAUSF. The sum of U.S. sales of goods and services is $735,018 million. U.S. purchases of goods and services from USAFF, or, in other words, sales to Americans by USAFF are estimated by subtracting U.S. exports shipped by USAFF from total sales by USAFF. The 1991 estimate of this figure is $1,038,783. Data on sales among USAFF are not available. Thus, the estimate of net U.S. sales of goods and services to USAFF is -$303,765 million. This net figure as well as the sales and purchases estimates are shown in the shaded portion of the left-hand rectangle in Figure 1 by arrows between U.S. owned firms and USAFF.

By summing up the three components, we obtain an estimate of net sales of goods and services by Americans to foreigners in 1991 of $59,592 million (Part IV of the Table and right-hand side of Figure 1). The conventional cross-border trade balance in 1991 was -$27,920, as shown at the bottom of Figure 1. The estimates of net sales to by Americans to foreigners for 1987, 1988, 1989, 1990 and 1992 are $-71,902, -$26,058 million, -$5,697 million, $12,796, and $48,362 million, respectively. These net sales figures have not been deflated but, instead, are expressed in current dollars.

As the table shows, in 1987 the net sales to foreigners by FAUSF were about 16% greater than export sales by Americans to foreigners. However, this margin gradually declined between 1987 and 1991 so that by the latter year, net sales to foreigners by FAUSF were 2% less than exports by Americans to foreigners. Cross-border purchases by Americans from foreigners in 1987 were about 13% greater than net purchases by Americans from USAFF. In 1991 this margin was 5%.

IV. Measuring Cross-Border and Direct Investment Activities on a Value Added Basis

Although the volume of firms' sales is widely used to compare the relative importance of their different economic activities, a comparison more closely related to national accounting procedures is based on the value added by the primary productive factors involved in these economic activities. By rearranging the data presented in Table 1, the value added by FAUSF and by USAFF can easily be estimated. These estimates are presented in Table 2 and also shown in Figure 2. The value added by FAUSF ($328,184 million in 1991, for example) is calculated by subtracting from sales of goods and services by FAUSF the sum of local purchases abroad by FAUSF, imported goods and services by FAUSF, and purchases from other locally-located FAUSF.[10] The value added of USAFF ($222,011 million in 1991)

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[10]Inventory changes should be included in the calculation of value added by FAUSF but information on these changes is not available. However, this information is available for USAFF in 1987 and is taken into account in estimating value added by these firms.

In the absence of any change in the size of inventories, value added by FAUSF exceeds (falls short of) net sales of FAUSF to foreigners by the amount by which intermediate goods and services imported from the United States by FAUSF falls short of (exceeds) sales of goods and services to the United States by FAUSF.

is derived in the same manner.[11]

To help understand the economic significance of affiliates, ratios of value added by FAUSF to value added by all U.S.-owned firms (the latter being defined as U.S. GDP minus value-added by USAFF plus value added by FAUSF) are also presented in Table 2 as well as ratios of value added by USAFF to the GDP of the United States. The former ratios indicate that in 1991 5.6% of the value-adding activities of U.S.-owned firms were performed by their foreign affiliates, whereas 3.9% of the country's GDP was contributed by USAFF.

Another relationship brought out in the table is the lower ratio of value added to total sales for USAFF (19% in 1991) than for FAUSF (27% in 1991). This asymmetry could be due to several factors. One may simply be that foreign firms in the United States choose to produce products with a low value-added component. However, another may be the existence of low profits for USAFF (see Lipsey, 1992). Profits for these firms may be low because foreign firms are forced to move their production sites to the United States by the threat of formal or informal American protectionism, even if these operations are not very profitable. Or, the relatively recent rapid increase in foreign direct investment in the United States may simply mean that many production plants of USAFF are in their initial stages of activity and have not been able to earn significant profits thus far. Other possibilities are the existence of pervasive transfer pricing practices to avoid U.S. taxation and the greater concentration of USAFF compared to FAUSF in trading activities as opposed to manufacturing.

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[11]In the absence of any change in inventories, value added by USAFF will exceed (fall short of) net sales of USAFF to Americans by the amount by which imports of intermediate goods and services falls short of (exceeds) sales of goods and services by USAFF to foreigners.

Since value added is a more fundamental measure of economic activity than net sales, an alternative approach for measuring the international activities of a country's firms is to measure both cross-border and affiliate activities on a value-added basis.[12] This approach involves combining the value added abroad by FAUSF ($328,184 in 1991) and the U.S. value added by U.S.-owned firms embodied in their cross-border sales (exports) to obtain a measure of the international activities of American firms. The export figure can be calculated by subtracting exports of USAFF from total cross-border exports and then subtracting out the import component in the remaining exports. (One would also have to estimate the U.S. affiliate component in these exports to avoid double-counting.) Unfortunately, good data on the use of imports as intermediate inputs do not exist, but a rough estimate can be made by utilizing information in the U.S. input-output table. A special unpublished BEA study (Planting, 1990) of the use of imports as intermediate goods indicates that the share of imported inputs in U.S. exports in 1977 was about 6 percent. Using this import ratio, the estimate of the U.S. value added in exporting by U.S.-owned firms is $448,452 million for 1991, as reported in Table 2. Thus, the estimated value added by U.S.-owned firms through their export and foreign affiliate activities is $776,636 for 1991.

In calculating the foreign value added component in the exports of foreign-owned firms of goods and services to the United States, input-output tables of these countries should be used to net out the imported input component in these exports. Unfortunately, the lack of such tables for many countries makes it impossible to adequately measure the imported input

[12] As Lois Stekler (1992) has pointed out, except for net changes in inventories, net sales of Americans to foreigners are equal to the trade balance plus the value added by FAUSF minus the value added by USAFF.

component in the exports of foreign countries to the United States. The 6 percent share of imported inputs in U.S. exports is probably smaller than the figure for most other countries because of the large size of the United States. However, for the lack of an adequate estimate for foreign countries, the U.S. figure is used to obtain an estimate of the net value added abroad through the exports of foreign-owned firms to the United States. This net value-added figure is $475,864 million in 1991. Combining this with the 1991 value added by USAFF ($222,011 million) yields a figure of $697,875 for the 1991 total value added by foreign-owned firms in exporting to the United States and in undertaking affiliate activities in this country.

The value-added approach can be also used in focusing on transactions between Americans and foreigners, as under the net sales approach. The value added by FAUSF can be divided into the value-added component in the goods and services sold by FAUSF to foreigners and in the goods and services sold by these firms to Americans by assuming that the value-added share in the sales to the United States by FAUSF is the same as in its total sales. The 1991 breakdown of value added on this basis yields figures of $242,827 million and $85,357 million, respectively. Similarly, the U.S. value added component in the exports of U.S.-owned domestic firms can be divided into the value-added component of their exports to FAUSF and in their exports to foreigners by assuming the same fraction of imported inputs in these exports. In 1991 the value added components in these two types of exports were $124,411 million and $324,042 million, respectively.

The breakdown of value added in the goods and services sold by USAFF both to Americans and to foreigners as well as the value added in goods and services imported both by Americans and by USAFF from foreign-owned firms located abroad can be estimated in a similar fashion. For 1991, the estimates for the first breakdown are $201,785 million and $20,226 million, respectively, and for the second $301,142 million and $174,722 million, respectively. The value added component in the net sales of Americans to foreigners is the sum of the value added components in the net cross-border trade (exports less imports) between Americans and foreigners ($22,900 million for 1991), in the net sales of FAUSF to foreigners ($242,827 million in 1991), and in the net sales of Americans to USAFF (-$201,785 million in 1991) or $63,942 million in 1991. As indicated in Table 1, under the net sales approach the net sales figure for 1991 is $59,592.

The value added approach indicates that in 1991 the economic activity (as measured by value added) embodied in the goods and services purchased by foreigners located abroad and produced by U.S.-owned firms in the United States ($324,042 million) exceeded the value-added embodied in goods and services purchased by foreigners located abroad and produced by U.S. firms abroad ($242,827 million) by 33%. With regard to purchases by American from foreigners, the value-added approach indicates that the value-added embodied in goods and services produced by foreign firms abroad ($301,142 million) exceeded the value-added in goods and services produced by foreign firms in the United States ($201,785 million) by 49%.

The value-added data can also be arranged to show the contribution of foreign affiliates and domestic firms engaged in international trade to a nation's output and the income of its citizens. The value added in exporting by domestic U.S.-owned firms plus the value added by USAFF ($448,452 million plus $222,011 million or a total of $670,463 million in 1991) measure the contribution of these activities to the gross domestic product of the United States. Similarly, the importing and foreign affiliate activities of Americans contributed $804,048 million to the gross domestic product of foreign countries. Furthermore, combining the portion of the value added by FAUSF that represents the net receipts of the U.S. owners of these affiliates ($50,820 million in 1991 [see Landefeld *et al.* (1993), Table 4], the value added by USAFF less the net receipts of the foreign owners of these firms ($222,011 million minus -$1,450 million or $223,461 in 1991 (op. cit.), and the value added in the United States by the export activities of U.S.-owned firms ($448,452 million in 1991) yields the income earned by Americans in these international activities, namely, $722,733 million in 1991. These relationships bring out the point that exporting activities by American firms are still twice as important as a source of income for American than the activities of USAFF and that the income earned by Americans from FAUSF is only about 11% of the income earned through exporting.

The sum of the income earned by foreigners from the activities of foreign affiliates of U.S.-owned firms ($277,364 million in 1991), from the earnings of U.S. affiliates of foreign firms (-$1,450 million in 1991), and from exporting to the United States ($475,864 million in 1991) amounted to $751,778 in 1991. Thus, although international activities between the United States and foreign firms contributed 20% more to the GDP of foreign countries than to the GDP of the United States in 1991, the division of the total value added from these activities into income shares yields a figure for foreigners only 4% higher than the income earned by Americans.

One argument often made in support of using only the balance of payments accounts to depict international economic transactions is that this accounting framework is integrated with the broader national accounts. The current account balance (exports minus imports) taken from the balance of payments (with minor adjustments) is added to the expenditures on goods and services by consumers, business and the government, i.e., C+I+G, to yield GDP. Exports minus imports (rather than just exports) are added to the other three components because these expenditures are measured inclusive of imports. In other words, in calculating GDP, the current account balance is used mainly to correct the other three expenditure components. The only items in the balance of payments that are direct measures of domestic or national product are the net receipts of FAUSF and of USAFF. In contrast, calculating trading and direct investment activities in value-added terms measures both types of international transactions in terms of standard national account concepts. By separating value added by firms engaged in international transactions on a nationality and geography basis, the value added approach supplements the traditional national accounts framework under which the GDP accounts divide aggregate production activities on the basis of geography and the GNP accounts allocate value added by primary factors on the basis of nationality. The value-added approach can easily be presented in a form that yields the current account balance needed for estimating aggregate domestic and national product. Consequently, this advantage of the balance of payments approach could be incorporated into the value-added accounting framework.

V. A Sectoral Approach

(1) Sectoral net sales

Net-sales balances by nationality can be measured for individual industrial sectors as well as for the entire economy. These net sales figures provide a rough idea of the relative international performance of American and foreign firms by industry. If technological know-how and managerial ability are major determinants of firms' competitiveness in international markets, these data may be more appropriate for analyzing international activities by nationalities than cross-border trade balances alone.

Nationality-adjusted sales for individual sectors are calculated by subtracting U.S. exports shipped by USAFF, U.S. exports to FAUSF, sales to the United States by FAUSF, and sales to other FAUSF by FAUSF from the sum of U.S. cross-border exports and sales by FAUSF. Nationality-adjusted purchases are estimated by subtracting U.S. imports from FAUSF, U.S.imports shipped to USAFF, U.S. exports shipped by USAFF and sales to other USAFF by USAFF from the sum of U.S. cross-border imports and sales of USAFF. Data on sales among USAFF or between FAUSF and USAFF are unfortunately not available.

A major difficulty in estimating nationality-adjusted net sales balances by industry arises in trying to estimate purchases of FAUSF and USAFF. Sectoral intermediate input purchases by industry origin are not available. One possible way to estimate such purchases would be to use input-output tables and assume identical input-output structures for U.S.-owned firms in the United States, FAUSF, and USAFF. Instead, it is assumed here that each industry purchases intermediate inputs only from its own industry. Such an assumption greatly simplifies the derivation of nationality-adjusted net sales by sector: nationality-adjusted net sales are simply cross-border net sales (net exports) plus value added by FAUSF minus value added by USAFF.

Another problem is that the value added estimates for FAUSF are classified by industry, while those for USAFF are disaggregated on an establishment basis. As Lipsey (1993) points out, this could generate biases in the estimation procedure. In addition, the U.S. cross-border exports and imports only include merchandise trade, while value added by FAUSF and USAFF contains both merchandise and service transactions. However, this , is unlikely to cause serious measurement errors, since the machinery industry (except electrical) is the only manufacturing sector that has large service sales (about 10% out of total sales).

Table 3 shows both net cross-border sales (net exports) and estimated nationality-adjusted net cross-border plus affiliate sales for individual manufacturing sectors from 1988 through 1991. The ratios of net cross-border sales to total sales in the United States and nationality-adjusted net cross-border sales to total sales of U.S.-owned firms are also presented as indicators of firms' "revealed" international competitiveness. To discuss comparative advantage across industries, it would be necessary to adjust the net export data for macroeconomic trade balances by using some method such as the one in Bowen and Sveikauskas (1992). Table 3, however, presents unadjusted figures only.

Despite significant problems with the estimation process, the figures provide a number of useful insights into the competitiveness issue of U.S. industries. For the total manufacturing sector, the ratios of nationality-adjusted net cross-border and affiliate sales are larger than the ratios for cross-border trade alone from 1989 through 1991.[13] This suggests that U.S. industries have a greater "revealed"comparative advantage than indicated by the

[13]Nationality-adjusted net sales in 1988 are much smaller than those in other years due to the small estimated value added earned by FAUSF. In 1988, the sales of FAUSF are smaller than usual, while the purchases are larger.

cross-border trade balance alone.[14] Industries where the total ratios are larger than those for trade alone include industrial machinery and transportation equipment. Thus, considering only cross-border import penetration for these industries may be misleading in appraising their international competitiveness. Industries where the combined ratio is lower than the trade ratio are, stone, clay and glass, and primary metal products. In particular, cross-border net exports indicate that the chemical industry is a leading export industry of the United States, while nationality-adjusted total net sales are negative.

(2) Sectoral significance of FAUSF and USAFF

Ratios of value added by FAUSF and USAFF relative to value added for the U.S. economy as a whole are given in Table 2. Since the activities of FAUSF and USAFF are concentrated in the manufacturing industries and the wholesale trade sector, the impact of multinational enterprises on those sectors is generally more significant than at the macroeconomic level.

Table 4 indicates for the various manufacturing sectors the shares of sales of FAUSF to total sales of U.S.-owned firms and the shares of sales by USAFF to total sales of firms in the United States from 1988 through 1991.[15] In addition, comparable shares in employment terms are shown in the table. Note that the data for USAFF and the firms in the United

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[14]Lipsey and Kravis (1986) agree with the view that taking the activities of FAUSF into consideration improves the evaluation of international competitiveness of U.S. firms.

[15]Lipsey (1992) examines the shares of USAFF in all U.S. firms in terms of assets, employment, and plant and equipment expenditures.

States are on an establishment basis, while those for FAUSF are on an industry basis.[16] Also note that the data for USAFF are again for affiliates in which the foreign ownership interest is 10% or more. The sales, value added and employment shares of FAUSF to U.S.-owned firms in the total manufacturing sector in 1991 are 22%, 14% and 17%, respectively. Considering the size of the whole U.S. manufacturing sector, the magnitude of the activities of FAUSF is surprisingly large. The sales, value added and employment shares of USAFF to firms in the United States in total manufacturing are also significant, namely, 15%, 14% and 11%, respectively, for 1991. Thus, more than 10% of manufacturing activity in the United States is accounted for by foreign companies.

It is in the chemicals, petroleum and coal, industrial machinery, electronics and electrical equipment, and transportation equipment sectors where the sales, value added and employment shares for FAUSF are particularly high. The presence of USAFF is large in chemicals, petroleum and coal, rubber and plastics, stone, clay, and glass, primary metal, and electronics and electrical equipment. The chemical industry looks special in that its shares are very large for both FAUSF and USAFF.

VI. Conclusions

This paper has argued that the increasing internationalization of firms' economic activities has brought about the need for supplementary accounting formats to document these activities better. In particular, because of the close relationship between firms' international

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[16]The definition of value added in the establishment data is also slightly different than the one used here, although it does not seem to cause large estimation errors. See the detailed note in *Foreign Direct Investment in the United States: Establishment Data for Manufacturing,* published by the U.S. Department of Commerce.

trade and international investment decisions, the paper argues for sets of accounts that provide data on both the cross-border trading activities of firms and the selling and purchasing activities of their foreign affiliates. Fortunately, much of the data required for constructing such accounts already exists, although certain relationships must be investigated more carefully before the figures in the accounts presented here can be regarded as more than rough estimates.[17]

In addition to the NAS Panel, others have also called for new accounting formats that tie together cross-border and foreign affiliate activities better than existing frameworks (see Julius (1990, 1991) and Landefeld *et al.* (1993)). One difference between the net sales and value-added approaches developed here and the formats suggested by other investigators is that the former approaches focus on the firm as the unit of interest. They provide information on the net sales and value added by FAUSF and USAFF rather than just on that portion of net sales or value added attributable to the U.S. or foreign ownership stake in these firms. This procedure makes the measurement of the activities of these firms comparable to the manner in which the cross-border activities of domestic U.S.-owned firms and foreign-owned firms located abroad are reported, namely, by their sales or value added.

One criticism of this procedure is that "it does not align a country's sales with the use of only those factors of production that are either entirely located in (as with GDP) or owned by (as with GNP) residents of the country." (see Landefeld *et al.*, pp. 54-55). In contrast, it is maintained by these critics, "standard measures of exports and imports of goods, services and

[17]In particular, there is a need for sales and purchases data for FAUSF and USAFF on the same basis in terms of the degree of domestic ownership and for better estimates of the share of imported inputs in exports.

income do align a country's sales with factor location or ownership, . . ." (op. cit., p. 56). The example cited by the authors in making their point is that net sales or value added by FAUSF include both payments that accrue to the U.S. owners of these firms and that accrue to foreign workers and any foreign owners of the firms. Combining these two types of income may, it is alleged (op. cit., p. 54), "give misleading signals if used to gauge the effect of changes in foreign affiliate' sales on domestic income and employment."

It is difficult to understand why anyone would incorrectly infer that the entire amount of any increase in value added by FAUSF would accrue to American workers or investors, particularly when, as in Table 2, the value added figures are also divided in a manner showing how much is part of U.S. national income. However, what the approaches set forth in this paper do, which the balance of payments and other suggested approaches do not, is to show firms' cross-border and foreign activities on a comparable basis. Exporting results in income accruing to both U.S. workers and U.S. capitalists. Providing, as the traditional accounting does, only data on the extra income earned by U.S. investors when the net sales of FAUSF increase may, in fact, more mislead policymakers and others about the implications of this sales increase for domestic income and employment than the approaches suggested here. Furthermore, as emphasized previously, reporting the net sales or value added of affiliates of U.S.-owned firms together with the exports of these firms from their domestic facilities enables public officials and researchers to measure the economic importance in the world economy of the export and overseas activities of these firms on a comparable basis.

It is also not clear just what Landefeld *et al.* mean when they maintain that standard measures of exports and imports do align a country's sales with factor location or ownership.

The value of exports, as reported in the balance of payments, include imported inputs that represent foreign value-added and income. Furthermore, they include exports by U.S. affiliates of foreign firms, part of which represents income earned by the foreign owners of these firms. Thus, the value of a country's exports includes components of domestic and foreign value added as well as income accruing to domestic and foreign factors of production.

What is more important than the differences among the various proposals, however, is the fact that there seems to be a growing interest in developing new accounting formats that supplement the information gained about the international economy from balance-of-payments accounts. Hopefully, at conferences such as this one, those who have both an interest and expertise in the subject can agree on what formats would be most helpful.

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Figure 1
Estimation of Aggregate Net Sales of Goods and Services by Americans to Foreigners, 1991
(in millions of dollars)

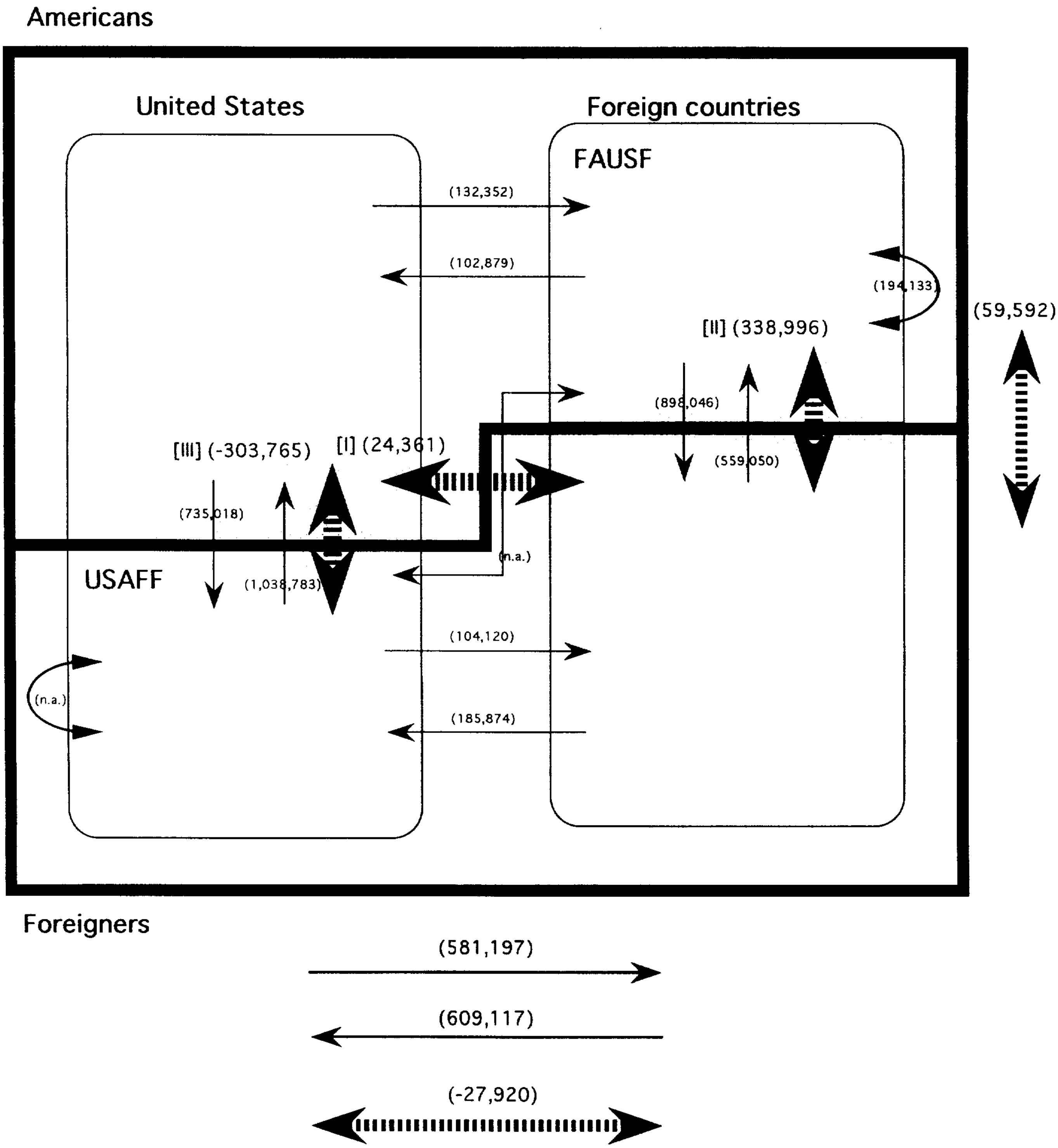

Figure 2
Estimation of Value Added in Goods and Services Sold by FAUSF and USAFF and Exports of U.S.-Owned and Foreign-Owned Firms, 1991
(in millions of dollars)

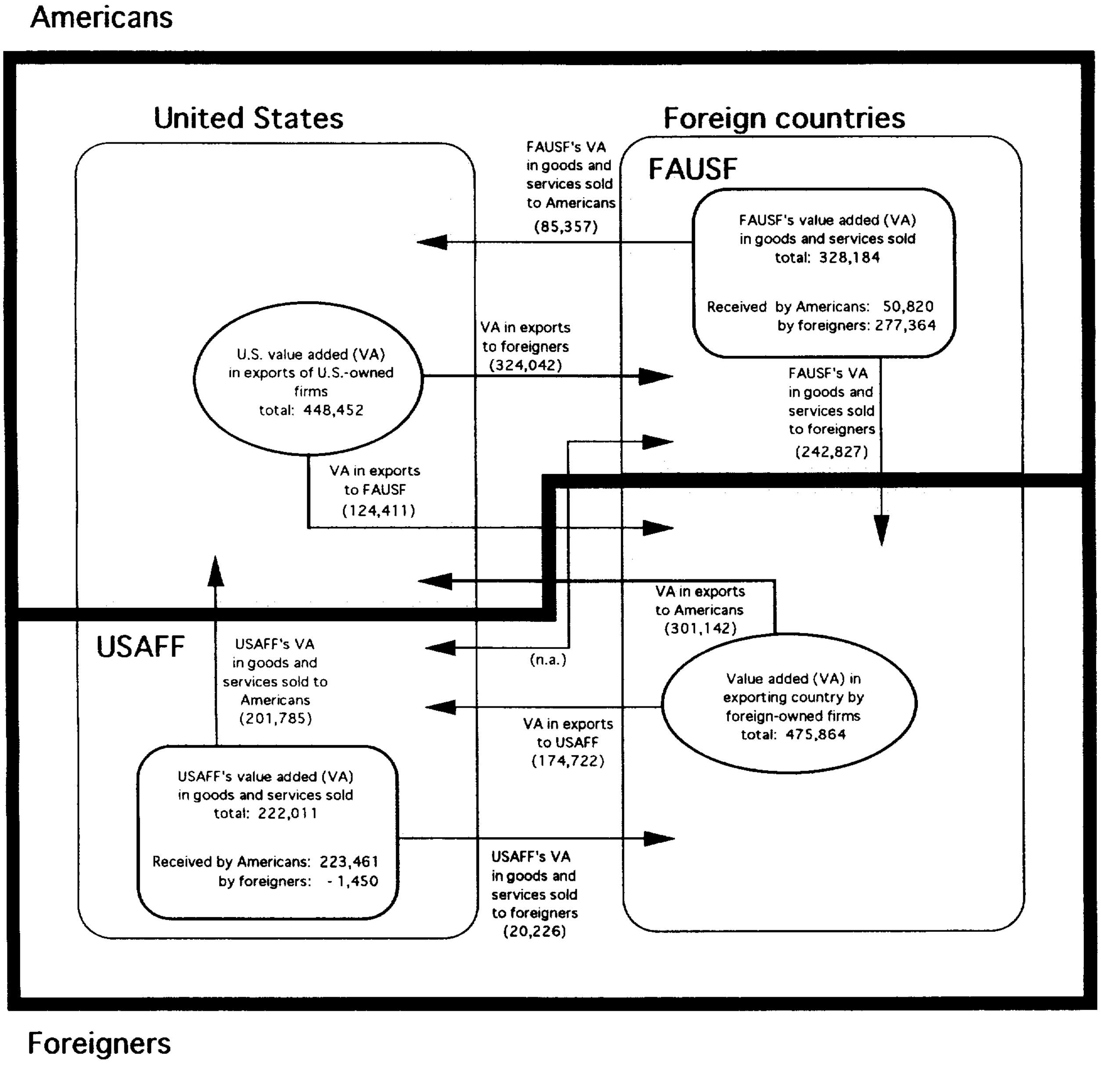

Table 1 Net Sales of Goods and Services by Americans and Foreigners, 1987-1992
(in millions of dollars)

Transaction	Amount 1987	1988	1989	1990	1991	1992
I. Cross-border sales to and purchases from foreigners by Americans						
Exports to foreigners						
+ U.S. exports of merchandise and services	348,024	430,216	488,955	537,605	581,197	619,848
- U.S. exports to FAUSF	87,647	106,036	117,218	122,631	132,352	139,587
- U.S. exports shipped by USAFF	51,843	73,520	92,024	99,185	104,120	108,166
Total	208,534	250,660	279,713	315,789	344,725	372,095
Imports from foreigners						
+ U.S. imports of merchandise and services	500,005	545,040	579,300	615,986	609,117	659,575
- U.S. imports from FAUSF	75,986	86,053	94,703	100,721	102,879	110,939
- U.S. imports shipped to USAFF	146,985	159,400	176,607	188,687	185,874	189,849
Total	277,034	299,587	307,990	326,578	320,364	358,787
Net cross-border sales by Americans to foreigners	-68,500	-48,927	-28,277	-10,789	24,361	13,308
II. Sales to and purchases from foreigners by FAUSF						
Sales by FAUSF						
+ Sales by FAUSF	815,541	927,886	999,506	1,184,823	1,213,719	1,266,717
- Sales among FAUSF	125,107	144,401	150,392	186,427	194,133	215,797
- Sales to the United States by FAUSF	88,923	101,444	111,106	120,437	121,540	126,378
Total	601,511	682,041	738,008	877,959	898,046	924,542
Purchases abroad from foreigners by FAUSF	358,715	395,973	431,885	541,755	559,050	575,265
Net sales to foreigners by FAUSF	242,796	286,068	306,123	336,204	338,996	349,277
III. U.S. sales to and purchases from USAFF						
U.S. sales to USAFF	425,915	523,318	646,596	727,988	735,018	757,244
U.S. purchases from USAFF						
+ Sales by USAFF	723,956	860,037	1,022,163	1,139,792	1,142,903	1,181,633
- Sales among USAFF	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
- U.S. exports shipped by USAFF	51,843	73,520	92,024	99,185	104,120	108,166
Total	672,113	786,517	930,139	1,040,607	1,038,783	1,073,467
Net sales to USAFF	-246,198	-263,199	-283,543	-312,619	-303,765	-316,223
IV. Net sales by Americans to foreigners	-71,902	-26,058	-5,697	12,796	59,592	46,362
Reference:						
Cross-border merchandise trade balance	-159,557	-126,959	-115,249	-109,033	-73,802	-96,138
Cross-border trade balance of merchandise and services	-151,981	-114,824	-90,345	-78,381	-27,920	-39,727

FAUSF: foreign affiliates of U.S. firms abroad
USAFF: U.S. affiliates of foreing firms in the United States

Attachment to Table 1: Estimation procedure and data sources

General notes
1. Cross-border trade data are on a calendar year basis while data on FAUSF and USAFF are on a financial year basis.
2. Data on FAUSF are for majority-owned nonbank affiliates while data on USAFF are for nonbank affiliates with an ownership of 10% or more, except for data from DiLullo and Whichard (1990) and Sondheimer and Bargas (1992, 1993, 1994).

Estimation of each item
(Figures in parentheses are for 1987, 88, 89, 90, 91, and 92 respectively.)

U.S. exports of merchandise and services --- U.S merchandise exports (250,208; 320,230; 362,116; 389,303; 416,937; 440,138) and U.S. services exports (97,816; 109,986; 126,839; 148,302; 164,260; 179,710) are from Murad (1993, Table 1, p. 71).

U.S. exports to FAUSF --- U.S. exports of goods to FAUSF (74,907; 90,780; 97,488; 100,232; 108,839; 114,139) are from FAUSF87, 88 (Table 51), 89, 90, 91, 92 (Table III.H.2). U.S. exports of services to FAUSF are not directly available; royalties and licence fees (7,400; 8,893; 10,613; 12,867; 13,819; 15,226) and other private services (5,340; 6,363; 9,117; 9,532; 9,694; 10,222) received by U.S. parent companies from their foreign affiliates, obtained from Sondheimer and Bargas (1992, Tables 4.2, 4.3, 6.1, and 6.2; for 1987, 88 data), Sondheimer and Bargas (1993, Tables 4.1, and 6.1; for 1989 data), and Sondheimer and Bargas (1994, Tables 4.1, 4.2, 4.3, 6.1, and 6.2; for 1990, 91, 92 data) are used.

U.S. exports shipped by USAFF --- U.S. exports of goods shipped by USAFF (48,091; 69,541; 86,316; 92,308; 96,933; 100,615) are from USAFF87, 88, 89, 90, 91, 92 (Table G-1). U.S. exports of services shipped by USAFF (3,752; 3,979; 5,708; 6,877; 7,187; 7,551) are from DiLullo and Whichard (1990, Table 11; for 1987, 88 data), Sondheimer and Bargas (1992, Table 10; for 1989 data), Sondheimer and Bargas (1993, Table 10; for 1990 data), and Sondheimer and Bargas (1994, Table 10; for 1991, 92 data).

U.S. imports of merchandise and services --- U.S merchandise imports (409,765; 447,189; 477,365; 498,336; 490,739; 536,276) and U.S. services imports (90,240; 97,851; 101,935; 117,650; 118,378; 123,299) are from Murad (1993, Table 1, p. 71).

U.S. imports from FAUSF --- U.S. merchandise imports from FAUSF (65,542; 75,578; 84,298; 88,641; 90,512; 98,850) and U.S. services imports (10,444; 10,475; 10,405; 12,080; 12,367; 12,089) are from FAUSF87, 88 (Table 51 and 42), 89, 90, 91, 92 (Table III.H.2 and III.F.18).

U.S. imports shipped to USAFF --- U.S. merchandise imports to USAFF (143,537; 155,533; 171,847; 182,936; 178,702; 182,152) are from USAFF87, 88, 89, 90, 91, 92 (Table G-1). U.S. services imports are not directly available; royalties and licence fees (1,141; 1,285; 1,632; 1,967; 2,830; 3,069) and other private services (2,307; 2,582; 3,128; 3,784; 4,342; 4,628) paid by USAFF to their foreign parents, obtained from Sondheimer and Bargas (1992, for 1987, 88 data; Tables 4.2, 4.3, 6.1, and 6.2), Sondheimer and Bargas (1993, for 1989 data; Tables 4.1, and 6.1), and Sondheimer and Bargas (1994, for 1990, 91, 92 data; Tables 4.1, 4.2, 4.3, 6.1, and 6.2) are used.

Sales by FAUSF --- Sales of goods by FAUSF (718,086; 816,597; 889,875; 1,051,484; 1,069,729; 1,113,043) and sales of services by FAUSF (97,455; 111,289; 109,631; 133,339; 143,990; 153,674) are from FAUSF87, 88 (Tables 40 and 42), 89, 90, 91, 92 (Tables III.F.14 and 18).

Sales among FAUSF --- Sales of goods by FAUSF to other foreign affiliates (110,606; 128,425; 137,587; 173,671; 181,112; 200,761) and sales of services by FAUSF to other foreign affiliates (14,501; 15,976; 12,805; 12,756; 13,021; 15,036) are from FAUSF87, 88 (Tables 40 and 42), 89, 90, 91, 92 (Tables III.F.14 and 18).

Sales to the United States by FAUSF --- Sales of goods by FAUSF to the United States (78,479; 90,969; 100,701; 108,357; 109,173; 114,289) and sales of services by FAUSF to the United States (10,444; 10,475; 10,405; 12,080; 12,367; 12,089) are from FAUSF87, 88 (Tables 40 and 42), 89, 90, 91, 92 (Tables III.F.14 and 18).

Purchases abroad from foreigners by FAUSF --- Purchases of goods abroad from foreigners by FAUSF (309,941; 340,400; 378,908; 472,906; 483,272; 495,883) are estimated as follows: subtract, from cost of goods sold (629,137; 705,845; 779,024; 934,474; 970,398; 1,021,043: FAUSF87 (Table 28), 88 (Table 33) [See below for calculation of 1989, 90, 91, 92 figures]), employee compensation (105,452; 117,418; 132,565; 151,051; 160,082; 169,623: FAUSF87, 88 (Table 49), 89 (Table III.G.2), 90, 91, 92 (Table III.G.7)), depreciation, depletion, [and like charges] (24,847; 26,245; 29,191; 33,190; 33,542; 37,095: FAUSF87 (Table 28), 88 (Table 33), 89 (Table III.D.2), 90, 91, 92 (Table III.E.2)), production royalty payments (3,384; 2,677; 3,285; 3,424; 3,551; 3,542: FAUSF87 (Table 28), 88 (Table 33), 89 (Table III.J.2), 90, 91, 92 (Table III.E.2)), purchases from other FAUSF (equal to sales among FAUSF: 110,606; 128,425; 137,587; 173,671; 181,112; 200,761: see above for data sources), and U.S. exports shipped to FAUSF (74,907; 90,780; 97,488; 100,232; 108,839; 114,139: see above for data sources).

For 1989, 90, 91, and 92, first sum up "cost of goods sold and selling, general, and administrative expenses" (913,308; 1,080,482; 1,126,092; 1,183,876: FAUSF89, 90, 91, 92 (Table III.E.2)) and "other costs and expenses" (41,317; 64,634; 63,046; 67,322: FAUSF89, 90, 91, 92 (Table III.E.2)) and multiply it by the 1988 ratio of "cost of goods sold" (705,845; FAUSF88) to the sum of "cost of goods sold" and "other costs and expenses" (705,845 + 159,106; FAUSF88) to obtain cost of goods sold in 1989, 90, and 91 (779, 024; 934,474; 970,398; 1,021,043). Then follow the same procedure as for 1987 and 88.

Purchases of services abroad from foreigners by FAUSF (48,774; 55,573; 52,977; 68,849; 75,778; 79,382) are estimated as follows: major sectors for service sales are finance, insurance, and services. Thus, estimate purchases/sales ratio of 0.78 from the sales and purchases data of these sectors of USAFF from Table 6 of Lowe (1990). Then multiply total sales of services by FAUSF (97,455; 111,289; 109,631; 133,339; 143,990; 153,674: see above for data sources) by 0.78 to obtain total purchases of services (76,015; 86,805; 85,512; 104,004; 112,312; 119,866). Subtract U.S. exports of services to FAUSF (7,400 + 5,340; 8,893 + 6,363; 10,613 + 9,117; 12,867 + 9,532; 13,819 + 9,694; 15,226 + 10,222: see above for data sources) and sales of services by FAUSF to other foreign affiliates (14,501; 15,976; 12,805; 12,756; 13,021; 15,036: see above for data sources) from total purchases of services (76,015; 86,805; 85,512; 104,004; 112,312; 119,866).

The sum of local purchases of goods abroad by FAUSF (309,941; 340,400; 378,908; 472,906; 483,272; 495,883) and those of services (48,774; 55,573; 52,977; 68,849; 75,778; 79,382) is local purchases abroad by FAUSF (358,715; 395,973; 431,885; 541,755; 559,050; 575,265).

U.S. sales to USAFF --- U.S. sales of goods to USAFF or local purchases of goods by USAFF (356,963; 434,310; 533,167; 604,544; 602,465; 622,597) are estimated as follows: subtract, from cost of goods sold (616,310; 733,908; 877,203; 984,080; 993,949; 1,024,825: USAFF87 (Table E-1) [See below for 1988-91].), employee compensation (96,009; 119,588; 144,158; 163,592; 175,969; 181,709: USAFF87, 88, 89, 90, 91, 92 (Table F-1)), depletion and depreciation (19,801; 24,477; 28,031; 33,008; 36,813; 38,367: USAFF87, 88, 89, 90, 91, 92 (Table D-8)), and U.S. merchandise imports shipped to USAFF (143,537; 155,533; 171,847; 182,936; 178,702; 182,152: see above for data sources).

For 1988-91, first, multiply "cost of goods sold and selling, general, and administrative expenses" (859,963; 1,027,871; 1,153,105; 1,164,669; 1,200,.848: USAFF88, 89, 90, 91, 92 (Table E-1)) by the 1987 ratio of "cost of goods sold" (616,310: USAFF87 (Table E-1)) to the sum of "cost of goods sold" and "selling, general, and administrative expenses" (616,310 + 105,857: USAFF87 (Table E-1)) to obtain cost of goods sold in 1988-91 (733,908; 877,203; 984,080; 993,949; 1,024,825). Then follow the same procedure as for 1987.

U.S. sales of services to USAFF or local purchases of services by USAFF (68,952; 89,008; 113,429; 123,444; 132,553; 134,647) are estimated as follows: major sectors for service sales are finance, insurance, and services. Thus, use again the estimate of purchases/sales ratio of 0.78 calculated above. Multiply total sales of services by USAFF (92,820; 119,071; 151,524; 165,634; 179,135; 182,492: USAFF87, 88, 89, 90, 91, 92 (Table E-12)) by 0.78 to obtain total purchases of services (72,400; 92,875; 118,189; 129,195; 139,725; 142,344). Subtract U.S. imports of services shipped to USAFF (1,141 + 2,307; 1,285 + 2,582; 1,632 + 3,128; 1,967 + 3,784; 2,830 + 4,342; 3,069 + 4,628: see above for data sources) from total purchases of services (72,400; 92,875; 118,189; 129,195; 139,725; 142,344).

The sum of U.S. sales of goods to USAFF (356,963; 434,310; 533,167; 604,544, 602,465; 622,597) and those of services (68,952; 89,008; 113,429; 123,444; 132,553; 134,647) is U.S. sales to USAFF (425,915; 523,318; 646,596; 727,988; 735,018; 757,244).

Sales by USAFF --- Sales of goods by USAFF (631,136; 740,966; 870,639; 974,158; 963,768; 999,141) and sales of services by USAFF (92,820; 119,071; 151,524; 165,634; 179,135; 182,492) are from USAFF87, 88, 89, 90, 91, 92 (Table E-12)."

Sales among USAFF --- Not available.

Cross-border merchandise trade balance --- From Murad (1993, p. 71).

Cross-border trade balance of merchandise and services --- From Murad (1993, p. 71)."

Table 2 Value Added by FAUSF and USAFF, 1987-1992
(in millions of dollars)

Transaction	Amount 1987	1988	1989	1990	1991	1992
I. Value Added by FAUSF						
+ Sales by FAUSF	815,541	927,886	999,506	1,184,823	1,213,719	1,266,717
- Purchases abroad from foreigners by FAUSF	358,715	395,973	431,885	541,755	559,050	575,265
- U.S. goods and services imported by FAUSF	87,647	106,036	117,218	122,631	132,352	139,587
- Purchases from other FAUSF	125,107	144,401	150,392	186,427	194,133	215,797
Total	244,072	281,476	300,011	334,010	328,184	336,068
In goods and services sold to:						
Americans	64,054	74,578	78,491	86,507	85,357	90,781
Foreigners	180,018	206,898	221,520	247,503	242,827	245,287
Received by:						
Americans	n.a.	n.a.	n.a.	n.a.	50,820	n.a.
Foreigners	n.a.	n.a.	n.a.	n.a.	277,364	n.a.
Value added / sales ratio (%)	29.93	30.34	30.02	28.19	27.04	26.53
II. U.S. value added in exports of U.S.-owned firms	278,410	335,294	373,115	412,115	448,452	480,981
In exports to FAUSF	82,388	99,674	110,185	115,273	124,411	131,212
In exports to foreigners	196,022	235,620	262,930	296,842	324,042	349,769
III. Value added by USAFF						
+ Sales by USAFF	723,956	860,037	1,022,163	1,139,792	1,142,903	1,181,633
- Purchases within the United States by USAFF	425,915	523,318	646,596	727,988	735,018	757,244
- Imported goods and services by USAFF	146,985	159,400	176,607	188,687	185,874	189,849
- Purchases from other USAFF	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
+ Inventory changes by USAFF	4,671	n.a.	n.a.	n.a.	n.a.	n.a.
Total	155,727	177,319	198,960	223,117	222,011	234,540
In goods and services sold to:						
Americans	144,575	162,161	181,048	203,701	201,785	213,070
Foreigners	11,152	15,158	17,912	19,416	20,226	21,470
Received by:						
Americans	n.a.	n.a.	n.a.	n.a.	223,461	n.a.
Foreigners	n.a.	n.a.	n.a.	n.a.	-1,450	n.a.
Value added / sales ratio (%)	21.51	20.62	19.46	19.58	19.43	19.85
IV. Value added in exporting country by foreign-owned firms	398,578	431,448	455,521	484,349	475,864	515,718
In exports to Americans	260,412	281,612	289,511	306,983	301,142	337,260
In exports to USAFF	138,166	149,836	166,011	177,366	174,722	178,458
Reference:						
Gross domestic product of the United States	4,539,900	4,900,400	5,250,800	5,546,100	5,724,800	6,020,200
Ratio of value added of FAUSF to that of U.S.-owned firms (%)	5.27	5.62	5.61	5.90	5.63	5.49
Ratio of value added of USAFF to U.S. GDP (%)	3.43	3.62	3.79	4.02	3.88	3.90

Figures in II and IV are estimated by using the share of imported inputs in exports (6%).
See the text in the detail.

Data sources:
Inventory changes by USAFF: Lowe 1990, Table 6, p. 51.
Gross domestic product of the United States: ERP95, Table B-1, p. 274.
See Table 1 for the other figures.

	1987	1988	1989	1990	1991	1992
cf. "Gross product" of FAUSF	n.a.	n.a.	319,994	356,033	356,069	n.a.
Source: Survey of Current Business, Feb. 1994, pp. 42-63.						
cf. "Gross product" of USAFF	157,869	191,728	226,031	241,182	n.a.	n.a.
Source: Survey of Current Business, Nov. 1992, pp. 47-54.						

Table 3 Cross-Border and Nationality-Adjusted Sales by Manufacturing Sector
(Millions of dollars, %)

	Cross-border net sales (net exports)				Nationality-adjusted net sales			
SIC code	1988	1989	1990	1991	1988	1989	1990	1991
Manufacturing total	-147,002	-132,163	-100,833	-69,246	-312,073	-81,733	-89,922	-68,153
20 Food and kindred products	-3,989	-3,613	-3,750	-1,754	-18,178	-9,550	-7,887	-4,311
21 Tobacco products	2,918	3,646	5,045	4,588	3,758	5,736	7,534	7,600
22+23 Textile products and apparel	-23,986	-26,446	-26,293	-26,305	-24,079	-27,094	-27,310	-27,658
24+25 Lumber and furniture	-5,570	-5,257	-4,505	-3,596	-5,369	-4,999	-4,091	-3,302
26 Paper and allied products	-4,831	-4,649	-3,896	-2,338	-5,022	-2,361	-482	-316
27 Printing and publishing	268	1,085	1,535	1,921	-6,192	-6,988	-7,469	-7,135
28 Chemicals and allied products	7,463	10,601	10,569	11,650	-28,453	-1,896	-2,454	-1,626
29 Petroleum and coal products	-10,169	-10,850	-12,318	-8,046	-67,246	36,771	-8,263	-3,764
30 Rubber and plastics products	1,326	596	2,283	4,281	2,648	-1,121	-446	1,443
32 Stone, clay, and glass products	-7,397	-7,084	-5,844	-5,364	-9,837	-14,717	-10,454	-9,865
33 Primary metal industries	-16,868	-14,203	-11,888	-8,217	-24,213	-21,163	-20,544	-16,612
34 Fabricated metal products	-5,711	-4,868	-3,488	-2,817	-2,514	-5,314	-3,758	-4,283
35 Industrial machinery and equipment	-2,158	-2,155	4,357	10,087	-16,870	18,407	29,654	31,026
36 Electronic and other electric equipment	-23,775	-21,889	-16,088	-14,847	-29,323	-25,607	-18,269	-19,032
37 Transportation equipment	-33,998	-29,156	-19,676	-11,414	-41,262	-3,143	5,661	11,993
38 Instruments and related products	744	2,765	3,224	3,617	-16,483	1,980	2,968	3,201
31+39 Other manufacturing industries	-21,268	-20,685	-20,099	-20,689	-21,385	-21,745	-20,880	-21,344

	Cross-border net sales / Total sales of firms in the U.S.				Nationality-adjusted net sales / total sales of U.S.-owned firms			
SIC code	1988	1989	1990	1991	1988	1989	1990	1991
Manufacturing total	-5.48	-4.75	-3.51	-2.45	-10.76	-2.73	-2.88	-2.21
20 Food and kindred products	-1.13	-0.94	-0.98	-0.45	-5.00	-2.44	-1.98	-1.06
21 Tobacco products	12.24	14.13	16.86	14.32	12.71	15.85	17.90	16.60
22+23 Textile products and apparel	-18.48	-21.91	-20.17	-20.07	-18.57	-22.60	-21.14	-21.48
24+25 Lumber and furniture	-5.01	-4.55	-3.88	-3.25	-4.81	-4.30	-3.50	-2.95
26 Paper and allied products	-3.94	-3.54	-2.96	-1.81	-3.95	-1.70	-0.34	-0.23
27 Printing and publishing	0.19	0.72	0.98	1.23	-4.53	-5.05	-5.15	-4.91
28 Chemicals and allied products	2.87	3.81	3.67	3.99	-10.01	-0.64	-0.80	-0.51
29 Petroleum and coal products	-7.74	-7.55	-7.14	-5.09	-42.50	20.32	-3.96	-1.87
30 Rubber and plastics products	1.41	0.67	2.25	4.25	2.71	-1.25	-0.44	1.45
32 Stone, clay, and glass products	-11.73	-11.13	-9.21	-9.00	-17.09	-27.29	-18.62	-18.50
33 Primary metal industries	-11.31	-9.29	-8.14	-6.19	-18.36	-16.44	-17.07	-15.32
34 Fabricated metal products	-3.60	-3.20	-2.14	-1.79	-1.55	-3.44	-2.26	-2.71
35 Industrial machinery and equipment	-0.89	-0.85	1.70	4.14	-5.50	5.70	8.73	9.54
36 Electronic and other electric equipment	-12.72	-11.36	-8.26	-7.50	-15.11	-12.88	-8.87	-9.22
37 Transportation equipment	-9.60	-7.97	-5.35	-3.14	-9.27	-0.69	1.22	2.62
38 Instruments and related products	0.65	2.33	2.60	2.84	-13.38	1.57	2.23	2.34
31+39 Other manufacturing industries	-47.76	-45.27	-42.68	-44.71	-47.59	-47.84	-43.57	-45.18

Nationality-adjusted net sales = cross-border net exports + value added by FAUSF - value added by USAFF .
We are assuming that purchases by an industry are all from own industry since by-origin purchases data are not available.

Data Sources: FAUSF88 (Tables 33, 40, 42, 49), 89 (Tables III.D 2, E 2, F 3, 14, 18, G 2, J 2), 90, 91 (Tables III.E 2, F 3, 14, 18, G 7), UN90, 92, USEST88, 89, 90, 91 (Table 1.1).

Table 4 Sales, Value Added, and Employment Shares of FAUSF and USAFF (%)

(a) Sales

SIC code		Share of FAUSF to U.S.-owned firms (%)				Share of USAFF to firms in the U.S. (%)			
		1988	1989	1990	1991	1988	1989	1990	1991
	Manufacturing total	17.95	19.44	21.25	22.04	11.31	13.36	14.53	14.97
20	Food and kindred products	13.42	12.91	15.36	16.66	10.44	11.17	12.20	12.29
21	Tobacco products	19.37	28.70	28.89	30.04	0.00	0.00	0.00	0.00
22+23	Textile products and apparel	3.21	4.28	4.82	4.14	3.29	4.94	5.69	5.79
24+25	Lumber and furniture	1.71	2.26	2.89	3.20	1.46	1.63	1.99	2.09
26	Paper and allied products	11.49	12.69	15.34	14.99	8.16	7.84	8.67	9.03
27	Printing and publishing	2.27	2.77	3.08	3.38	7.08	10.18	10.51	10.36
28	Chemicals and allied products	31.43	32.17	35.01	35.93	24.97	28.24	30.42	30.70
29	Petroleum and coal products	36.52	40.58	39.56	41.90	23.57	25.18	26.87	26.07
30	Rubber and plastics products	16.73	17.43	17.35	16.92	13.53	16.34	17.55	17.73
32	Stone, clay, and glass products	10.72	8.13	16.17	15.70	18.50	22.16	25.85	24.59
33	Primary metal industries	4.77	4.43	5.13	5.44	15.77	19.58	21.84	22.82
34	Fabricated metal products	9.51	9.93	10.36	10.27	7.70	8.64	8.57	9.76
35	Industrial machinery and equipment	27.34	30.88	33.64	34.65	8.46	11.93	12.10	12.69
36	Electronic and other electric equipment	17.41	19.96	22.16	23.02	14.27	17.41	17.76	19.71
37	Transportation equipment	24.55	25.02	26.73	27.82	5.16	6.35	7.84	9.09
38	Instruments and related products	16.45	17.34	18.85	19.05	10.09	11.78	12.80	12.76
31+39	Other manufacturing industries	8.61	8.13	10.41	11.10	7.79	8.62	8.84	9.24

(b) Value added

SIC code		Share of FAUSF to U.S.-owned firms (%)				Share of USAFF to firms in the U.S. (%)			
		1988	1989	1990	1991	1988	1989	1990	1991
	Manufacturing total	-3.03	15.63	14.08	14.04	10.44	12.38	13.37	13.97
20	Food and kindred products	0.71	9.45	11.23	12.55	11.65	13.52	13.83	14.08
21	Tobacco products	4.67	9.95	9.94	10.95	0.00	0.00	0.00	0.00
22+23	Textile products and apparel	2.87	3.12	3.61	3.43	3.02	4.17	5.26	5.60
24+25	Lumber and furniture	1.80	1.99	2.48	2.29	1.40	1.50	1.68	1.69
26	Paper and allied products	7.35	10.54	12.85	11.29	7.66	7.19	7.87	8.22
27	Printing and publishing	-0.53	1.39	1.49	1.54	6.37	9.53	10.09	10.13
28	Chemicals and allied products	-0.98	23.53	25.58	25.85	25.32	30.08	31.91	32.21
29	Petroleum and coal products	163.73	71.27	26.10	30.35	19.84	18.74	15.09	17.94
30	Rubber and plastics products	15.65	11.25	12.78	12.89	13.26	14.44	17.55	17.80
32	Stone, clay, and glass products	11.81	-0.13	13.01	11.37	18.10	22.05	24.75	23.90
33	Primary metal industries	-0.22	3.29	3.67	3.61	12.81	15.41	19.30	20.97
34	Fabricated metal products	10.26	7.30	7.63	7.58	6.67	7.81	7.94	9.35
35	Industrial machinery and equipment	-4.03	21.98	24.68	24.12	7.80	10.04	10.26	11.33
36	Electronic and other electric equipment	7.28	12.54	13.86	14.11	12.25	15.60	15.61	17.48
37	Transportation equipment	-1.89	17.67	18.87	18.02	3.27	3.74	4.88	5.40
38	Instruments and related products	-16.87	10.02	11.63	11.40	9.59	10.92	11.90	11.85
31+39	Other manufacturing industries	7.60	4.42	6.00	6.38	8.06	8.60	8.98	8.90

(c) Employment

SIC code		Share of FAUSF to U.S.-owned firms (%)				Share of USAFF to firms in the U.S. (%)			
		1988	1989	1990	1991	1988	1989	1990	1991
	Manufacturing total	15.25	16.29	16.95	17.28	8.06	9.53	10.64	11.10
20	Food and kindred products	18.46	18.99	20.01	20.83	8.44	10.09	10.84	10.63
21	Tobacco products	44.19	48.44	51.88	52.95	0.00	0.00	0.00	0.00
22+23	Textile products and apparel	3.95	4.82	5.02	5.41	2.50	3.40	4.33	4.43
24+25	Lumber and furniture	1.48	3.04	3.82	3.74	1.08	1.21	1.44	1.51
26	Paper and allied products	15.67	18.08	19.57	18.66	7.57	7.47	7.74	7.98
27	Printing and publishing	2.07	2.25	1.97	2.00	5.08	6.22	6.76	6.76
28	Chemicals and allied products	42.68	42.81	44.50	44.94	22.58	25.27	28.41	27.49
29	Petroleum and coal products	53.73	54.14	40.37	38.86	18.83	20.69	22.91	22.51
30	Rubber and plastics products	15.29	14.93	15.59	14.90	10.22	11.32	13.90	14.09
32	Stone, clay, and glass products	12.44	13.31	13.71	13.56	15.47	18.44	20.74	20.16
33	Primary metal industries	5.19	5.08	6.78	6.69	11.16	13.44	16.73	17.83
34	Fabricated metal products	9.28	9.53	9.50	9.29	5.33	6.17	6.49	7.49
35	Industrial machinery and equipment	19.43	22.77	23.36	23.08	7.57	9.96	10.20	10.86
36	Electronic and other electric equipment	24.40	25.64	28.21	28.90	12.21	14.96	15.24	16.49
37	Transportation equipment	24.44	25.69	26.36	27.93	3.60	4.40	5.87	6.54
38	Instruments and related products	14.67	15.73	16.81	17.44	9.86	11.16	12.81	12.50
31+39	Other manufacturing industries	8.43	8.55	10.13	10.11	5.87	6.62	6.44	6.81

Data sources: FAUSF88 (Tables 33, 40, 42, 47, 49), FAUSF89 (Tables III. D 2, E 2, F 3, 14, 18, G 2, G 7, J 2),
FAUSF90, 91 (Tables III.E 2, F 3, 14, 18, G 4, 7), USEST88, 89, 90, 91 (Table 1.1).

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