

Chapter VI

International Sales of Information Technology Goods and Services

by Dennis G. Pastore*

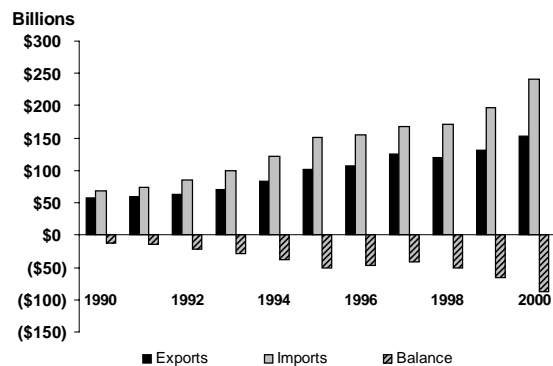
In the midst of a global economic slowdown, U.S. IT goods trade slowed substantially in 2001. With imports down \$28 billion and exports down \$19 billion through the third quarter, the annual deficit in IT goods may shrink for the first time in five years.

Deficits are a chronic feature of U.S. IT goods trade (Figure 6.1). Moreover, except for 2001 and a brief period in the mid-1990s, our position has steadily worsened. In 2000 (the last year for which we have annual data), the U.S. trade deficit in IT goods was a record \$88 billion (Figure 6.1). Deficits appeared in all major subcategories of goods trade except software and instruments. On the services side, 2000 data indicate a positive balance (\$6.4 billion), with net receipts for computer and information services and software royalties and license fees (\$8.0 billion) comfortably exceeding the nation's long-standing deficit in payments for telecommunications services.

Large and persistent IT trade deficits may seem to be clear evidence of competitive weakness and a telling refutation of the general perception that U.S. IT producers are leaders in the world market. In an increasingly integrated global economy, however, trade balances are incomplete and even misleading indicators of competitive success. Assessments of U.S. competitiveness must also take account of evolving patterns of global production and distribution.

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Figure 6.1
U.S. TRADE IN IT GOODS



Source: OBIA calculations based on Census data obtained from the Trade Policy Information System (TPIS), International Trade Administration (ITA), U.S. Department of Commerce.

In addition to analyzing U.S. trade in IT goods and services, this chapter examines two factors that help to explain the apparent inconsistency between IT trade deficits and the perceived competitive strength of U.S. producers: (i) the tendency of U.S. IT companies to rely on overseas affiliates rather than exports to service foreign clients; and (ii) global deployment of production by multinational companies resulting in large negative intra-firm trade balances for the United States. Among the chapter's most important findings are:

- In 1998 (the last year for which data on the operations of U.S. multinationals are avail-

able), foreign sales of goods and services by majority-owned overseas affiliates of U.S. IT companies exceeded \$202 billion—almost twice the value of comparable exports (\$113 billion) that year from the United States.¹

- The United States remains the world's largest exporter of IT goods, supplying 18 percent of the IT goods traded in world markets in 1999. Sales of goods produced abroad by foreign affiliates of U.S. companies to unaffiliated foreigners increase the global trade share of U.S. IT goods.
- In 2000, the U.S. deficit in IT goods trade between related parties (*i.e.*, U.S. parents and their foreign affiliates or foreign companies and their U.S. affiliates) totaled \$104 billion—more than the entire U.S. IT trade deficit in 2000.
- While globalizing production, however, U.S. companies have kept high value-added functions at home. Plants located in the United States still produce, on average, more than three-quarters of the combined value added of companies in the United States and their foreign affiliates in the computer and office equipment, household audio and video and communications equipment, and electronic components and accessories industries. U.S. workers employed in these industries earn on average more than twice as much as employees of U.S. foreign affiliates in the same industries.

U.S. IT trade deficits also reflect cyclical, macroeconomic trends. Rapid economic growth in the United States through mid-2000 and the rush by U.S. businesses to adopt the latest in IT hardware and software were potent forces drawing in imports. The economic slowdown since mid-2000 is having the opposite effect.

I. TRADE IN IT-MANUFACTURED GOODS

The \$88-billion overall deficit in U.S. IT goods trade in 2000, reflected deficits in all major segments of the IT goods market except instruments and software. Table 6.1 shows that the largest deficits in absolute terms were for components and accessories (\$32.5 billion), computer and office

¹Citations for this and other findings reported in this summary introduction are included in later sections of the chapter.

equipment (\$25.5 billion), and household audio and video equipment (\$24.1 billion). The main contributors to the overall (\$22 billion) increase in the deficit from 1999 to 2000, however, were telecommunications equipment, with a deficit increase of \$9.8 billion, and electronic components and accessories, with an increase of \$6.8 billion. Of the two surplus-generating IT goods categories, only instruments registered an increase. The surplus in software products declined 3.4 percent.

Closer inspection of the trade flows reveals a mixed pattern. The \$13 billion improvement in the U.S. balance from 1995 to 2000 on sales of semiconductors and related devices and parts – driven to a large extent by increasing surplus sales of “unmounted” chips and wafers – is almost the mirror image of a \$12.3 billion increase in the deficit on electronic components, *n.e.c.*, a category dominated by imports of *assembled* printed circuits.² The two measures taken together provide a ready-made example of the international division of labor that now characterizes the global IT industry. Leading technology producers retain control of capital and knowledge intensive operations while transferring the more labor intensive manufacturing and assembly overseas. The year 2000 also marked the second time in a row that U.S. imports of computers exceeded exports. As in 1999, the negative balance on portable computers, dominated by deficits with Taiwan (\$3.8 billion) and Mexico (\$1.6 billion), more than accounted for the overall imbalance in computers.

The deficit in communications equipment trade rose substantially in 2000, jumping to \$12.7 billion from \$2.9 billion in 1999. This increase reflected import growth of nearly 60 percent compared with 12 percent for exports. Imports of radiotelephones (predominantly cell phones) accounted for about half of the rise.

II. TRADE IN IT SERVICES

IT services trade falls in two major categories—computer-related services and telecommunications services. Between 1990 and 2000, the United States enjoyed growing surpluses in cross-border sales of computer-related services, including infor-

²This observation is based on analysis of commodity trade flows from 1996 through 2000 based on harmonized trade classification system. Data source: TPIS database, International Trade Administration, U.S. Department of Commerce.

TABLE 6.1: U.S. TRADE IN IT MANUFACTURED GOODS

(Billions of dollars)

Exports							
Product Description	1990	1995	1996	1997	1998	1999	2000
All IT Goods	57.6	100.8	107.5	124.7	120.6	130.6	153.9
Computer and office equipment	24.0	35.5	39.0	42.9	39.7	39.8	45.7
Electronic computers	7.6	9.2	9.4	10.1	8.4	8.3	9.6
Computer storage devices	2.7	3.8	3.3	3.5	3.4	3.4	3.0
Computer peripheral equipment and parts	12.7	21.3	24.9	27.9	26.4	26.8	31.7
Calculating and accounting equipment and parts	0.5	0.5	0.6	0.7	0.7	0.7	0.8
Office machines and parts, nec	0.5	0.7	0.8	0.8	0.8	0.7	0.7
Electronic components and accessories	17.4	34.7	36.4	44.2	43.5	52.1	64.3
Electron tubes	0.6	1.5	1.7	2.3	2.5	2.4	2.6
Printed circuit boards	1.8	1.7	1.7	2.0	2.2	2.4	2.9
Semiconductors and related devices and parts	10.7	22.7	24.0	29.0	29.0	36.6	44.7
Electronic capacitors and resistors	0.7	1.5	1.8	2.1	2.0	2.3	3.3
Electronic coils, transformers, and connectors	1.2	2.0	2.2	2.7	2.6	2.8	3.8
Electronic components, nec	2.3	5.4	5.0	6.1	5.3	5.6	7.0
Household audio and video equipment	2.1	3.3	3.5	4.1	4.5	3.8	4.1
Communications equipment	5.2	12.6	13.0	16.0	16.0	17.3	19.4
Telephone and telegraph apparatus	2.4	5.8	6.6	7.3	7.9	9.1	11.8
Radio and TV communications equipment	2.8	6.8	6.4	8.6	8.2	8.2	7.7
Instruments	6.0	9.5	10.1	11.7	11.6	12.7	15.7
Magnetic and optical recording media	1.7	2.0	2.7	2.6	2.0	1.7	1.4
Prepackaged software	1.2	3.2	2.8	3.3	3.2	3.3	3.3
Imports							
Product Description	1990	1995	1996	1997	1998	1999	2000
All IT Goods	69.0	151.2	154.1	167.1	171.5	196.4	241.7
Computer and office equipment	16.7	43.2	50.0	58.1	57.4	63.6	71.2
Electronic computers	2.6	4.9	6.4	7.3	7.2	10.1	13.6
Computer storage devices	6.0	14.2	16.4	19.5	18.1	16.9	16.3
Computer peripheral equipment and parts	6.3	21.4	24.6	28.6	29.2	33.9	38.4
Calculating and accounting equipment and parts	1.0	1.2	1.3	1.4	1.5	1.4	1.6
Office machines and parts, nec	0.9	1.5	1.4	1.3	1.4	1.3	1.3
Electronic components and accessories	28.4	69.3	65.4	67.8	68.1	77.8	96.7
Electron tubes	0.8	1.4	1.2	1.1	1.0	0.9	0.8
Printed circuit boards	1.9	1.9	1.9	2.1	2.0	2.2	3.0
Semiconductors and related devices and parts	12.1	39.2	37.0	37.0	33.7	37.8	48.2
Electronic capacitors and resistors	0.8	1.8	1.6	1.9	1.9	2.3	3.8
Electronic coils, transformers, and connectors	1.7	3.0	3.0	3.4	3.3	3.7	4.9
Electronic components, nec	11.1	22.1	20.7	22.3	26.2	30.9	36.0
Household audio and video equipment	10.9	18.0	16.9	18.5	21.2	23.8	28.2
Communications equipment	8.5	12.5	13.1	13.2	14.5	20.2	32.1
Telephone and telegraph apparatus	4.1	5.9	6.3	7.2	7.8	9.7	15.1
Radio and TV communications equipment	4.4	6.6	6.8	6.1	6.7	10.5	17.0
Instruments	3.0	5.8	6.0	6.8	7.5	8.3	10.5
Magnetic and optical recording media	1.5	1.9	2.1	2.1	2.1	2.2	2.4
Prepackaged software	0.2	0.6	0.5	0.6	0.6	0.5	0.5
Balance (X-M)							
Product Description	1990	1995	1996	1997	1998	1999	2000
All IT Goods	-11.5	-50.4	-46.6	-42.5	-50.9	-65.9	-87.8
Computer and office equipment	7.3	-7.7	-11.1	-15.2	-17.7	-23.8	-25.5
Electronic computers	5.0	4.3	3.0	2.8	1.1	-1.8	-4.0
Computer storage devices	-3.3	-10.4	-13.1	-16.0	-14.7	-13.5	-13.3
Computer peripheral equipment and parts	6.4	-0.1	0.3	-0.7	-2.7	-7.1	-6.8
Calculating and accounting equipment and parts	-0.4	-0.7	-0.7	-0.7	-0.7	-0.8	-0.8
Office machines and parts, nec	-0.4	-0.8	-0.6	-0.5	-0.6	-0.6	-0.6
Electronic components and accessories	-11.0	-34.6	-29.0	-23.6	-24.7	-25.7	-32.5
Electron tubes	-0.1	0.2	0.5	1.1	1.5	1.5	1.8
Printed circuit boards	0.0	-0.2	-0.2	-0.1	0.1	0.2	-0.1
Semiconductors and related devices and parts	-1.4	-16.5	-13.0	-8.1	-4.8	-1.2	-3.5
Electronic capacitors and resistors	-0.1	-0.3	0.1	0.3	0.1	0.0	-0.5
Electronic coils, transformers, and connectors	-0.5	-1.0	-0.8	-0.7	-0.7	-0.9	-1.1
Electronic components, nec	-8.8	-16.7	-15.7	-16.2	-20.9	-25.3	-29.0
Household audio and video equipment	-8.8	-14.6	-13.4	-14.4	-16.7	-20.1	-24.1
Communications equipment	-3.3	0.1	-0.1	2.7	1.5	-2.9	-12.7
Telephone and telegraph apparatus	-1.7	-0.1	0.3	0.2	0.1	-0.6	-3.3
Radio and TV communications equipment	-1.5	0.2	-0.4	2.6	1.5	-2.3	-9.4
Instruments	3.0	3.7	4.0	4.9	4.1	4.4	5.2
Magnetic and optical recording media	0.2	0.1	0.6	0.5	-0.1	-0.5	-1.0
Prepackaged software	1.0	2.6	2.3	2.7	2.6	2.8	2.7

Sources:

OBIA tabulations based on Census data from the Trade Policy Information System (TPIS) database, International Trade Administration, U.S. Department of Commerce.

Data on software trade from Bureau of Economic Analysis, Balance of Payments Division.

mation services and royalty income from software sales (Figure 6.2). Imports (purchases of services from overseas) over the period grew at 32 percent per year, while exports (receipts for U.S. services provided to overseas customers) grew at 21 percent. Though imports grew more rapidly than exports, the value of exports of computer-related services in 2000 (\$8.8 billion) was still almost six times the value of imports. Receipts from royalties and license fees accounted for close to half (44 percent) of computer services exports.³

In contrast, deficits in telecommunications services trade are a fixture in the U.S. IT service sector, averaging more than \$3 billion a year between 1990 and 2000. A number of factors contribute to the imbalance, including the relatively higher incomes in the United States and the wide array of cultural and business ties that exist between U.S. and foreign residents. In recent years, however, several developments worked to lower international rates and, along with them, the U.S. deficit. One of these was the FCC Benchmarks Order, which requires U.S. carriers to negotiate more cost-based settlement rates with foreign carriers for terminating calls from the United States. Another was the WTO Agreement on Basic Telecommunications, which accelerated the global trend of opening domestic telecommunications markets to competition. The WTO agreement obligated signatories to reduce their settlement rates by predetermined amounts each year over a five-year period beginning in 1997. Table 6.2 shows U.S. trade involving the major IT services between 1990 and 2000.

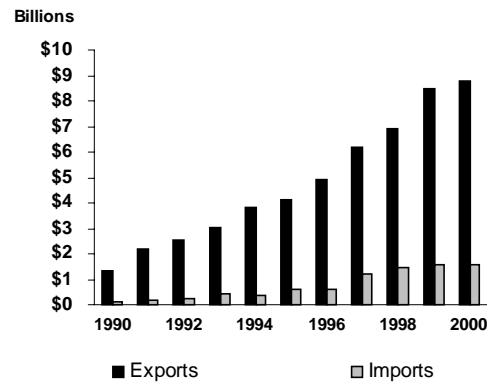
III. TRADE EFFECTS OF THE GLOBALIZATION OF PRODUCTION AND DISTRIBUTION OF IT GOODS AND SERVICES

Driven perhaps by the desire to increase foreign sales or to raise the level of support provided to overseas clients or by pressure to reduce costs, U.S. IT companies have established a significant operational presence abroad. The global deployment of production and distribution has strengthened U.S. companies in a highly competitive sector of the world economy.

Foreign sales of majority-owned foreign affiliates of U.S. IT companies in the five industries for which data are reported (*i.e.*, computer and office equip-

³Does not include royalties and license fees received from foreign affiliates

Figure 6.2
U.S. TRADE
IN COMPUTER-RELATED SERVICES¹



services, data base and other information services, and receipts of software royalties and license fees.
Source: OBIA calculations based on data from U.S. Department of Commerce, Bureau of Economic Analysis, "U.S. International Services: Cross-Border Trade in 2000 and Sales through Affiliates in 1999," Survey of Current Business 81 (November 2001) and data provided by BEA, Balance of Payments Division.

ment, electronic components and accessories, household audio and video and communications equipment, computer and data processing services, and communications services)⁴ substantially exceed U.S. exports of comparable goods and services (Figure 6.3).⁵ In 1998 (the most recent year for which data are available)⁶, estimated sales by foreign affiliates of U.S. firms in these industries totaled about \$202 billion—almost twice the value of comparable IT goods and services exported by all U.S. companies that year (\$113 billion).⁷ Foreign affiliates of U.S. firms in the computer and office equipment industry accounted for more than half of these sales.

To reduce costs, U.S. firms reportedly have transferred production of many lower value-added, commoditized components and parts to foreign af-

⁴ Defined as sales to unaffiliated foreigners of goods and services by majority-owned foreign affiliates of U.S. IT companies net of the apportioned value of U.S. exports going to these affiliates. Source: U.S. Department of Commerce, Bureau of Economic Analysis, U.S. Direct Investment Abroad: Operations of U.S. Parent Companies and Their Foreign Affiliates, Preliminary 1998 Estimates (Washington, D.C.: U.S. Department of Commerce, 2000), Tables III.F 9 and II.T 1.

⁵ In this regard, the IT sector is no different from other U.S. industries with a global presence. See also Joseph Quinlan and Marc Chandler, "The U.S. Trade Deficit: A Dangerous Obsession," Foreign Affairs, Vol. 80, No. 3 (May/June 2001), 87-97.

⁶ Data from the 1999 survey are expected to be published in the spring of 2002.

⁷ The \$113 billion figure does not include the value of U.S. exports of IT instruments (measuring and controlling devices), magnetic and optical recording media, prepackaged software, or receipts from overseas clients of software royalties and license fees.

TABLE 6.2: U.S. TRADE IN IT SERVICES

(Billions of dollars)

Exports (Receipts)								
Description	1990	1994	1995	1996	1997	1998	1999	2000
IT Services Exports					11.7	13.8	13.6	14.0
To Unaffiliated Parties	4.0	6.7	7.4	8.2	10.1	12.5	12.2	12.6
Telecommunications services	2.7	2.9	3.2	3.3	3.9	5.6	3.7	3.8
Computer-related services	1.3	3.8	4.1	4.9	6.2	6.9	8.5	8.8
Software royalties and license fees	(1)	1.5	1.7	2.1	2.7	3.2	3.7	3.9
Computer and data processing services	1.0	1.3	1.3	1.6	2.0	1.9	2.7	2.5
Data base and other information services	0.3	1.0	1.1	1.2	1.5	1.8	2.1	2.4
To Affiliated Parties⁽²⁾					1.6	1.3	1.4	1.4
Computer and information services ⁽³⁾								
U.S. parents to foreign affiliates					1.4	1.3	1.3	1.4
U.S. affiliates to foreign parent group					0.2	(*)	0.1	(*)
Imports (Payments)								
Description	1990	1994	1995	1996	1997	1998	1999	2000
IT Services Imports					10.4	10.1	9.0	7.6
From Unaffiliated Parties	5.7	7.3	7.9	8.9	9.6	9.2	8.2	6.9
Telecommunications services	5.6	6.9	7.3	8.3	8.3	7.7	6.6	5.4
Computer-related services	0.1	0.4	0.6	0.6	1.2	1.5	1.6	1.6
Software royalties and license fees	(1)	0.2	0.3	0.2	0.5	0.5	0.5	0.5
Computer and data processing services	0.0	0.1	0.1	0.3	0.6	0.8	0.9	0.8
Data base and other information services	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2
From Affiliated Parties⁽²⁾					0.8	0.9	0.8	0.7
Computer and information services ⁽³⁾								
U.S. parents from foreign affiliates					0.5	0.6	0.6	0.6
U.S. affiliates from foreign parent group					0.3	0.3	0.2	0.1
Balance (X-M)								
Description	1990	1994	1995	1996	1997	1998	1999	2000
IT Services Trade Balance					1.3	3.7	4.6	6.4
Between Unaffiliated Parties	-1.6	-0.6	-0.5	-0.7	0.5	3.3	4.0	5.7
Telecommunications services	-2.8	-4.1	-4.1	-5.0	-4.4	-2.1	-2.9	-1.5
Computer-related services	1.2	3.4	3.6	4.3	4.9	5.4	6.9	7.2
Software royalties and license fees	(1)	1.3	1.4	2.0	2.2	2.7	3.2	3.3
Computer and data processing services	1.0	1.2	1.2	1.3	1.4	1.1	1.8	1.6
Data base and other information services	0.2	0.9	0.9	1.0	1.4	1.6	1.9	2.2
Between Affiliated Parties⁽²⁾					0.8	0.4	0.6	0.7
Computer and information services ⁽³⁾								
U.S. parents from foreign affiliates					0.9	0.7	0.7	0.8
U.S. affiliates from foreign parent group					-0.1	-0.3	-0.1	-0.1

¹Less than \$50 million. Treated as zero when used in calculations.²Included in computer and data processing prior to 1992.³Trade between affiliated parties reported on an industry basis. For accounting purposes, BEA considers all intrafirm payments for telecommunications services as transactions between unaffiliated parties. BEA does not separately identify intrafirm payments involving software royalties and license fees. However, unpublished data indicate that net payments to U.S. companies are substantial and could add a few billion dollars a year to the trade surplus.⁴Includes both computer and data processing services and data base and other information services.

Sources:

U.S. Department of Commerce, Bureau of Economic Analysis, "U.S. International Services: Cross-Border Trade in 2000 and Sales through Affiliates in 1999," Survey of Current Business 81 (November 2001).

Unpublished data on software royalties from 1994 through 1996 obtained from BEA, Balance of Payments Division.

filiales, while focusing in the United States on more profitable higher-end manufacturing activities and on the provision of computer and information services. Census Bureau estimates of industry-level value-added support this contention. Between 1995 and 1998, American manufacturing workers

in the computer and office equipment, household audio and video and communications equipment, and electronic components and accessories (IT3) industries generated more than three-quarters of the combined value-added produced at IT3 firms located in the United States and at majority-owned

**TABLE 6.3: U.S. IT GOODS TRADE BETWEEN RELATED PARTIES
2000**

(Billions of dollars)

Product Description	Exports		Imports		Balance (X-M)	
	To Related Parties	Other ¹	From Related Parties	Other ¹	Between Related Parties	Other ¹
Total²	150.6		241.1		-90.6	
All IT	56.5	94.1	160.4	80.8	-103.9	13.3
Computer and office equipment	17.9	27.8	47.9	23.3	-30.0	4.5
Household audio, video and communication eq	6.8	16.7	42.4	18.0	-35.5	-1.3
Electronic components and accessories	25.5	38.7	62.2	34.5	-36.7	4.2
Other IT goods (excluding software)	6.3	10.8	7.9	5.0	-1.6	5.9

¹Consists of trade between unrelated parties or parties who fail to specify whether a relationship exists.

²Total does not reflect trade in software. Values may differ from those in Table 5.1 because of rounding.

Source:

OBIA tabulations derived from data provided by the Foreign Trade Division, U.S. Census Bureau, U.S. Department of Commerce.

**TABLE 6.4: WORLD TRADE IN IT GOODS¹
1996 AND 1999**

(Billions of dollars)

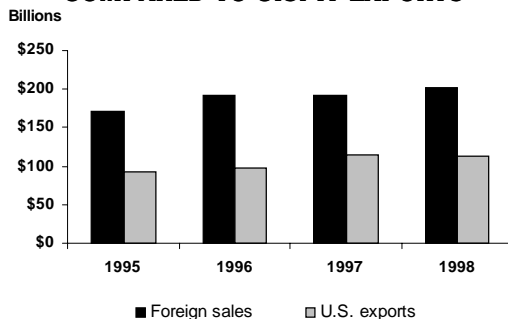
Country of Origin	Exports		Rate of Growth	Share of World Exports	Rank	
	1996	1999	1996-1999	1999	1999	1996
Total	769	970	8.1%			
United States	146	170	5.3%	18%	1	1
Japan	115	121	1.9%	13%	2	2
Taiwan	15	60	57.6%	6%	3	11
Germany	53	58	2.8%	6%	4	3
Malaysia	39	52	10.0%	5%	5	6
United Kingdom	40	49	7.1%	5%	6	5
Singapore	48	48	-0.1%	5%	7	4
Korea	32	46	12.6%	5%	8	7
Mexico	18	32	21.4%	3%	9	10
France	26	29	4.7%	3%	10	8
Netherlands	22	29	9.4%	3%	11	9
Philippines	11	23	29.1%	2%	12	16
Ireland	11	19	20.3%	2%	13	15
Thailand	14	19	9.0%	2%	14	13
Canada	15	18	5.9%	2%	15	12
Hong Kong	13	15	3.7%	2%	16	14
Hungary	2	7	59.3%	1%	17	17
Rest of World	150	177	5.6%	18%		

¹Harmonized trade system (HTS) categories grouped to reflect 1987 SIC-based IT goods trade, not including software. Imports (c.i.f.), reported by trading partners used as the measure of a country's exports. Calculated totals are estimates of the value of IT goods based on the first six digits of 10-digit HTS commodity codes for IT goods. The resulting inclusion of some non-IT goods and the different sources and valuation of the reported data cause the value of IT trade for the United States (and most likely for other countries as well) to be overstated.

Source:

OBIA tabulations based on United Nations trade data obtained from the TPIS database, ITA, U.S. Department of Commerce.

Figure 6.3
FOREIGN SALES¹ OF MAJORITY-OWNED
FOREIGN AFFILIATES OF U.S. IT COMPANIES
COMPARED TO U.S. IT EXPORTS²



¹Sales of goods and services to unaffiliated foreign parties by foreign affiliates of U.S. companies in IT3, computer and data processing services, and telecommunications services industries net of the apportioned value of affiliate purchases of goods from the United States. Values withheld to avoid disclosure were estimated for purposes of aggregation.

²U.S. exports of IT3 products and receipts for exports of computer-related services (excluding software royalties and licensing fees) and telecommunications services. Exports do not include receipts from intrafirm sales of computer-related services.

Sources: OBIA calculations based on data derived from U.S. Department of Commerce, Bureau of Economic Analysis (BEA), U.S. Direct Investment Abroad: Operations of U.S. Parent Companies and Their Foreign Affiliates, Revised 1995, 1996, and 1997 Estimates and Preliminary 1998 Estimates (Washington, D.C.: U.S. Department of Commerce: 1998-2000); Census trade data in TPIS, ITA, U.S. Department of Commerce; and U.S. Department of Commerce, Bureau of Economic Analysis, "U.S. International Services: Cross-Border Trade in 2000 and Sales through Affiliates in 1999," Survey of Current Business 81 (November 2001).

foreign IT3 affiliates of U.S. companies. An OBIA estimate places the total value added by these firms in 1998 at about \$172 billion.⁸

Reflecting their higher per capita value-added, U.S. domestic workers in IT3 industries are better paid than their U.S. foreign affiliate counterparts.

⁸OBIA estimates are based on data on value added obtained from the Annual Survey of Manufacturing (1999), Table 2, and USDIA Operations (1998), Table III G.4. We arrive at this figure by combining NAICS-based estimates of value added from the Census Bureau's Annual Survey of Manufacturing (for companies located in the United States) and SIC-based estimates from BEA of the gross product of majority-owned foreign affiliates. The measure is an approximation because the two concepts, while similar, are not identical. Value added is derived from a measure of total inputs that includes the cost of purchased services. BEA does not include the value of purchased services in its input measure when calculating gross product. While the method for calculating affiliate gross product is conceptually similar to the one used by BEA in its gross domestic product by industry data series, the industry-level estimates are only available at the two-digit SIC level, which makes them inadequate for our purposes here. A comparison of the ASM estimate of value added for all manufacturing industries in 1998 (\$1,956 billion after adjusting the published NAICS-based \$1,899 billion figure to reflect SIC-based accounting conventions) with the corresponding BEA estimate of gross product by (SIC) industry for all manufacturing industries (\$1,432 billion) shows that the value added measure was about 27 percent higher than the corresponding gross product estimate. Reducing the value added by U.S.-based firms accordingly lowers the average U.S. share for the period 1995-1998 from 82 to 77 percent.

Average annual compensation per U.S. domestic worker in the IT3 industries was \$51,787 in 1998 versus \$24,727 for employees of majority U.S.-owned foreign affiliates.⁹

As a result of the globalization of production, internal transfers between accounting units of a single firm may become international transactions affecting national trade balances. A case in point: shipments of goods between firms producing in the United States and related companies located on foreign soil have a large negative impact on America's IT trade balance. Census data for the year 2000 show that two-thirds (\$160 billion) of U.S. imports of IT goods and a little over a third (\$57 billion) of U.S. IT exports involved shipments between related parties—i.e., U.S. parents and their foreign affiliates or foreign parents and their U.S. affiliates (Table 6.3).¹⁰ The resulting U.S. deficit in related party IT goods trade (\$104 billion) in 2000 more than accounted for the nation's total IT trade deficit.

Finally, despite large and increasing deficits in U.S. IT trade and intense competition from producers in foreign countries, the United States remains the world's largest exporter of IT goods (Table 6.4). According to U.N. trade data,¹¹ companies located in the United States supplied about \$170 billion, or 18 percent, of all IT goods traded in 1999. Exports to third countries of goods produced by foreign IT affiliates of U.S. companies (\$88 billion in 1998) increase the contribution of U.S. companies to world trade in IT goods.¹²

⁹OBIA estimates are based on data on compensation of employees obtained from Annual Survey of Manufacturing (1999), Table 3, and USDIA Operations (1998), Table III H.7.

¹⁰Tabulations are based on data provided by the Foreign Trade Division, Bureau of the Census, U.S. Department of Commerce.

¹¹United Nations trade data were obtained from the Trade Policy Information System (TPIS), International Trade Administration, U.S. Department of Commerce. Imports, c.i.f., were used as the measure of world trade.

¹²Exports of goods by majority-owned foreign IT3 affiliates of U.S. companies (i.e., non-local foreign sales of majority-owned foreign affiliates net of the apportioned value of goods they imported from the United States). See USDIA Operations (1998), Tables III F.14 and II T.1. The industry-based foreign affiliate trade figures from BEA are not strictly comparable to the product-based UN trade numbers, but they provide a rough basis for gauging the relative magnitudes of the flows involved.

