

ANNUAL DEFICITS CONTINUE FOR U.S. TRADE IN ADVANCED TECHNOLOGY PRODUCTS

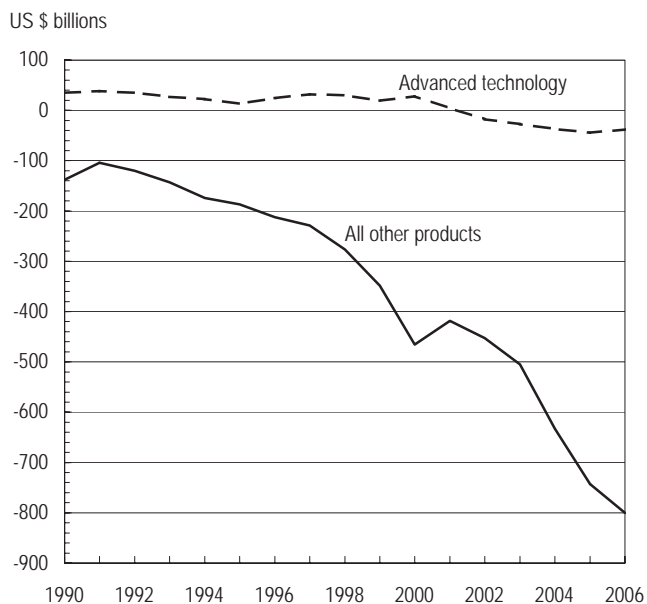
by Lawrence M. Rausch and Derek Hill

During much of the 1990s, U.S. trade in advanced technology products produced consistent trade surpluses for the United States and stood in stark contrast to the steadily growing annual trade deficits from U.S. trade in general merchandise (figure 1). But beginning in 2001 and coinciding with the end of the dot-com boom, the trade balance for U.S. technology products began to erode.¹ By 2002, U.S. imports of advanced technology products exceeded exports, resulting in the first U.S. trade deficit in this market segment. The technology product trade deficit has continued each year since then, standing at \$38.3 billion in 2006 after reaching a high of \$44.4 billion in 2005 (figure 1 and table 1). The deficits in this market segment reflect the growing imbalance of U.S. trade with Asia and especially with China. In most other parts of the world, U.S. trade in technology products generally produces surpluses or relatively balanced trade (table 2).

The U.S. Census Bureau developed the advanced technology product classification system to track exports and imports that embody new or leading-edge technologies. The system categorizes trade into 10 major technology areas: biotechnology, life science technologies, optoelectronics, information and communications, electronics, flexible manufacturing, advanced materials,

aerospace, weapons, and nuclear technology (see Definitions). To be included in a category, a product must contain a significant amount of one of the leading-edge technologies, and the technology must account for a significant portion of the product's value. In this report,

FIGURE 1. U.S. merchandise trade balance, by product type: 1990–2006



NOTES: Technology products from special tabulations. All other product trade = total merchandise trade minus trade in advanced technology products.

SOURCE: U.S. Census Bureau, Foreign Trade Division, special tabulations (2007); and data on total product trade, <http://www.fedstats.gov>. Accessed April, 2007, and http://www.bea.gov/agency/uguide1.htm#_1_19, Accessed July 2007.

¹ The U.S. dollar rose against other major currencies in the late 1990s and continued to rise until early 2002. The sharp rise in the U.S. dollar was a contributing factor in the broad-based decline in exports by U.S. manufacturers during 2000–03. The U.S. export decline was also affected by slower rates of growth in gross domestic product experienced by some U.S. trading partners during that time, including the European Union and Japan.



TABLE 1. U.S. trade in advanced technology products, by technology: 2000–06
(US \$ millions)

Category	2000	2001	2002	2003	2004	2005	2006
Exports							
All technologies	223,415.4	200,106.8	178,627.3	179,786.5	201,454.0	215,605.7	252,569.3
Biotechnologies	1,728.8	1,615.0	2,130.5	2,862.8	3,743.2	4,592.5	5,163.1
Life sciences	11,950.6	12,839.6	11,858.6	13,002.0	14,515.9	16,493.8	18,756.1
Optoelectronics	4,113.0	3,402.7	2,430.6	2,467.0	3,506.4	4,636.8	5,063.6
Information and communications	76,132.0	65,180.4	51,998.4	51,499.7	57,402.5	61,885.1	66,842.3
Electronics	56,884.0	45,358.4	42,762.8	46,597.2	48,564.4	47,543.8	53,415.3
Flexible manufacturing	14,295.1	9,451.4	8,562.5	8,319.6	13,044.3	11,854.1	14,664.8
Advanced materials	2,651.2	2,309.6	1,088.9	1,036.5	1,137.2	1,154.9	1,401.1
Aerospace	52,747.5	56,916.7	53,255.2	49,432.9	54,377.3	62,737.6	81,216.6
Weapons	1,528.8	1,522.7	1,557.7	1,451.8	1,852.1	1,551.7	2,012.9
Nuclear technology	1,266.0	1,430.3	1,671.2	1,488.9	1,503.1	1,032.1	1,634.9
Computer software	118.4	80.0	1,310.9	1,628.1	1,807.6	2,123.2	2,398.5
Imports							
All technologies	195,660.3	195,265.2	196,100.1	207,196.2	238,478.3	259,968.7	290,848.0
Biotechnologies	1,136.0	1,294.4	1,871.9	2,183.9	1,967.4	4,218.8	4,872.6
Life sciences	16,210.5	20,113.0	25,950.3	30,936.9	32,799.0	30,390.3	33,736.6
Optoelectronics	5,822.9	5,607.5	5,436.6	5,254.9	7,795.0	12,173.5	19,575.0
Information and communications	91,038.7	94,435.0	99,985.1	109,133.3	131,549.3	146,083.2	160,015.6
Electronics	41,651.5	30,882.6	26,649.5	25,135.2	27,454.0	26,594.4	28,009.1
Flexible manufacturing	8,684.9	7,473.4	6,562.2	6,262.8	7,587.2	8,897.2	10,289.6
Advanced materials	2,707.4	2,435.9	1,484.9	1,510.5	1,794.4	1,803.8	2,170.8
Aerospace	25,733.1	30,511.0	25,212.9	22,773.1	23,832.8	25,531.4	27,584.3
Weapons	413.2	383.1	407.0	461.4	539.7	648.2	748.7
Nuclear technology	1,436.1	1,405.7	1,758.9	2,589.0	2,169.9	2,522.6	3,024.4
Computer software	826.0	723.6	780.8	955.2	989.7	1,105.3	821.2
Balance							
All technologies	27,755.1	4,841.6	-17,472.8	-27,409.7	-37,024.3	-44,363.0	-38,278.8
Biotechnologies	592.8	320.6	258.6	678.9	1,775.8	373.7	290.5
Life sciences	-4,259.9	-7,273.4	-14,091.7	-17,934.9	-18,283.1	-13,896.4	-14,980.5
Optoelectronics	-1,709.9	-2,204.8	-3,006.0	-2,787.9	-4,288.6	-7,536.7	-14,511.4
Information and communications	-14,906.7	-29,254.6	-47,986.7	-57,633.6	-74,146.8	-84,198.1	-93,173.3
Electronics	15,232.5	14,475.8	16,113.3	21,462.0	21,110.4	20,949.4	25,406.2
Flexible manufacturing	5,610.2	1,978.0	2,000.3	2,056.8	5,457.1	2,956.9	4,375.2
Advanced materials	-56.2	-126.3	-396.0	-474.0	-657.2	-648.8	-769.7
Aerospace	27,014.4	26,405.7	28,042.3	26,659.8	30,544.5	37,206.3	53,632.3
Weapons	1,115.6	1,139.6	1,150.7	990.4	1,312.4	903.5	1,264.2
Nuclear technology	-170.1	24.6	-87.7	-1,100.1	-666.8	-1,490.5	-1,389.5
Computer software	-707.6	-643.6	530.1	672.9	817.9	1,017.9	1,577.4

SOURCE: U.S. Census Bureau, Foreign Trade Division, special tabulations (March 2007).

computer software is examined separately, creating an 11th technology area. In official statistics published by the U.S. Department of Commerce, computer software is included in the information and communications technology area.

Technologies Generating a Trade Surplus

Throughout most of the 1990s, U.S. exports of advanced technology products exceeded imports in 9 of the 11 technology areas. Trade in aerospace products con-

sistently produced the largest surpluses for the United States during this time, followed by electronics.²

Since then, the number of technology areas in which U.S. exports of advanced technology products generally exceeded imports has slipped from nine areas

² Data for 1990s provided by U.S. Census Bureau, Foreign Trade Division. Also see appendix tables 6-3, 6-4, and 6-5, *Science and Engineering Indicators 2002* for detailed data on U.S. trade in advanced technology products, by technology area, 1990–99.

TABLE 2. U.S. trade balance in advanced technology products, by trade partner: 2000–06
(US \$ millions)

Country/economy	2000	2001	2002	2003	2004	2005	2006
Total	27,755.1	4,841.6	-17,472.8	-27,409.7	-37,024.3	-44,363.0	-38,278.7
NAFTA partners	7,447.9	1,617.3	-35.9	-44.8	959.0	-198.9	-3,571.1
Canada	5,308.0	4,115.5	3,651.0	4,305.1	6,594.3	7,229.3	8,654.3
Mexico	2,139.9	-2,498.2	-3,686.9	-4,349.9	-5,635.3	-7,428.2	-12,225.4
Asia, selected	-25,735.6	-29,022.3	-35,594.1	-41,424.6	-59,308.5	-70,491.0	-73,475.9
China	-1,104.6	-1,404.6	-8,233.5	-16,942.3	-31,049.2	-41,472.6	-49,327.0
India	913.3	951.2	1,056.0	1,075.4	1,186.6	1,598.1	2,557.9
Indonesia	-889.3	-1,183.2	-1,066.8	-867.9	-902.6	-832.6	-656.2
Japan	-12,699.5	-9,354.6	-6,895.1	-5,440.9	-5,713.4	-6,814.0	-6,300.3
Malaysia	-5,550.7	-8,000.8	-7,915.6	-8,578.1	-10,649.3	-15,605.1	-16,584.0
Philippines	-1,807.0	-973.3	-877.7	934.3	1,026.9	721.7	1,159.2
Singapore	-2,183.1	-388.1	-1,903.1	-1,977.1	-646.2	77.2	2,349.8
South Korea	-220.8	-3,828.4	-4,228.7	-4,843.4	-7,636.4	-2,574.1	408.1
Taiwan	-2,128.4	-4,783.3	-4,207.2	-3,818.7	-2,858.2	-2,270.4	-3,740.5
Thailand	-65.5	-57.2	-1,322.4	-965.9	-2,066.7	-3,319.2	-3,342.9
Europe, selected	24,418.1	12,611.5	668.4	-888.4	3,838.1	2,415.7	3,841.4
Austria	310.4	274.2	265.5	20.8	33.1	45.9	48.8
Belgium	1,148.4	577.8	362.8	668.5	340.4	1,216.6	510.8
Czech Republic	257.6	158.0	113.4	-19.1	-3.2	31.6	48.5
Denmark	59.9	61.2	30.5	-110.0	156.4	-315.1	-273.7
Federal Republic of Germany	3,603.4	2,840.3	1,266.9	1,298.9	-255.3	-356.1	1,561.9
Finland	452.4	139.1	-44.4	-185.9	63.5	53.1	176.6
France	-222.0	-1,757.0	-1,108.9	-2,533.7	329.1	756.3	215.4
Greece	581.0	598.7	531.6	436.8	1,049.8	268.3	507.2
Hungary	-1,094.9	-641.5	-849.6	-827.5	-603.4	-1,011.4	-780.3
Ireland	-2,729.0	-5,346.1	-10,409.9	-11,288.1	-9,697.8	-9,847.0	-10,200.0
Italy	1,556.7	1,069.7	1,231.4	1,412.5	930.7	370.1	558.6
Netherlands	7,904.0	6,290.5	5,498.7	6,370.3	6,961.1	7,415.1	7,272.8
Norway	330.3	218.5	143.3	128.0	7.5	170.6	173.5
Poland	215.3	177.1	138.6	142.9	150.7	238.3	506.1
Portugal	316.3	329.8	-82.9	-232.7	-176.4	-124.0	33.3
Slovakia	43.5	19.9	15.1	20.5	16.6	33.3	339.7
Slovenia	28.5	20.5	24.3	14.7	7.8	33.1	26.1
Spain	2,021.4	1,216.3	700.7	713.4	905.2	1,170.3	932.2
Sweden	1,058.6	272.6	-297.3	-138.2	-416.5	-826.9	188.4
Switzerland	410.3	-128.8	-278.8	-767.1	-623.0	-1,274.8	-1,285.9
United Kingdom	8,166.0	6,220.7	3,417.4	3,986.6	4,661.8	4,368.4	3,281.4
Latin America, selected	7,286.2	5,358.0	2,809.2	2,364.0	3,933.6	5,953.7	10,256.1
Argentina	1,384.6	1,000.8	205.4	432.0	588.6	851.6	941.9
Brazil	3,863.3	2,776.1	986.2	595.1	1,542.9	2,548.0	5,270.4
Chile	924.9	855.7	595.6	581.8	609.4	1,060.8	1,767.1
Costa Rica	42.3	-240.5	156.9	80.2	19.3	80.8	311.3
Peru	317.7	276.8	287.1	300.7	321.8	358.3	518.9
Venezuela	753.4	689.1	578.0	374.2	851.6	1,054.2	1,446.5
Other, selected	5,324.5	4,178.0	5,560.7	3,962.4	3,824.8	4,045.4	5,818.4
Australia	3,353.0	2,615.1	4,329.3	3,671.9	2,928.6	2,904.0	3,616.8
Israel	194.3	374.5	-74.2	-162.2	493.0	383.3	134.5
Russia	-600.4	-621.2	-401.2	-685.2	-509.9	-497.1	-440.5
South Africa	881.1	908.6	542.1	610.3	506.1	604.0	674.0
Turkey	1,496.5	901.0	1,164.7	527.6	407.0	651.2	1,833.6
All other countries	9,014.0	10,099.1	9,118.9	8,621.7	9,728.7	13,912.1	18,852.4

SOURCE: U.S. Census Bureau, Foreign Trade Division, special tabulations (March 2007).

showing a trade surplus during the 1990s to five or six since 2000 (table 1).³ Aerospace products continue to produce the largest surpluses. Surpluses in aerospace trade narrowed in the mid-1990s as competition from Europe's Airbus Industrie challenged U.S. companies' preeminence at home and in foreign markets. In 2005, U.S. trade in aerospace products generated a net inflow of \$37.2 billion that rose to \$53.6 billion in 2006 (table 1 and figure 2).

U.S. trade classified as electronics products (e.g., electronic components including integrated circuits, circuit boards, capacitors, and resistors) is the only other technology area that has generated large surpluses in recent years. However, unlike the U.S. trade surplus in aerospace products where exports were higher in 2006 than in 2000, the larger surplus in the electronics technology area resulted mainly from a greater drop in U.S. imports than exports between 2000 and 2006. In 2000, U.S. trade in electronics products generated a net inflow of \$15.2 billion that increased to \$16.1 billion in 2002, \$21 billion in 2003, 2004, and 2005, and to \$25 billion in 2006. Trade activity in biotechnologies, computer software, flexible manufacturing (e.g., industrial automation products, robotics), and weapon technologies generated small surpluses over the past few years.

Technologies Generating a Trade Deficit

Throughout most of the 1990s, trade deficits were recorded in 2 of the 11 technology areas: information and communications and optoelectronics. Rapidly rising imports of life science technologies during the late 1990s produced the first U.S. trade deficit in that third technology area in 1999.⁴ After 2000, U.S. imports have exceeded exports in 5 of the 11 technology areas, with the largest trade deficits continuing to be in the information and communications technology area (table 1). In 2006, U.S. trade in information and communications resulted in a net outflow of \$93.2 billion; in life science technologies, the net outflow was \$15.0 billion; and in optoelectronics, it was \$14.5 billion (figure 2). Small deficits resulted from trade in both nuclear technologies (\$1.4 billion) and advanced materials (\$0.8 billion).

³ Ibid.

⁴ Data for 1990s provided by U.S. Census Bureau, Foreign Trade Division. Also see appendix tables 6-3, 6-4, and 6-5, *Science and Engineering Indicators 2002* for detailed data on U.S. trade in advanced technology products, by technology area, 1990-99.

Top Customers by Technology Area

Asia, Europe, and North America together purchase over 80% of all U.S. exports of advanced technology products. In 2006, Asia was the destination for about 40%, Europe about 26%, and Canada and Mexico together about 17% (table 3).

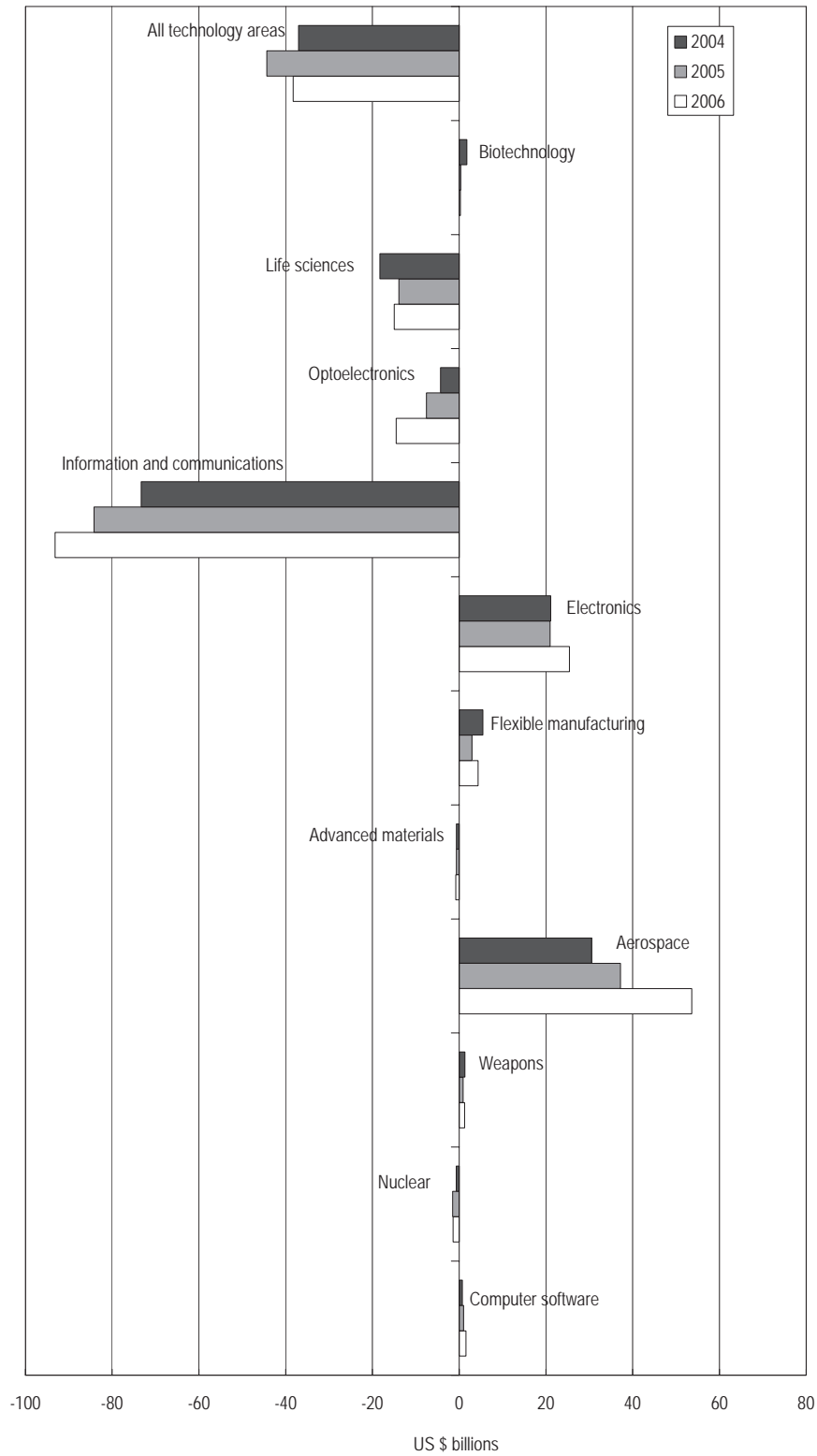
China, Canada, and Japan are largest country customers across a broad range of U.S. technology products, with China accounting for about 10% of all U.S. exports of advanced technology products in 2006, Canada for about 9%, and Japan about 8% (table 3). While not the largest U.S. customer for U.S. exports, Japan is an important customer across the broadest range of technology areas. In 2006, Japan ranked among the top three customers in 7 of 11 technology areas, China in 5, and Mexico in 4 (figure 3).

Asia is a major export market for the United States with Asian economies representing two of the top three U.S. customers in 7 of the 11 technology areas examined. In addition to the broad array of technology products sold to Japan, the latest data show Taiwan among the top three customers in optoelectronics, flexible manufacturing, and nuclear technologies, and China is among the top three customers in aerospace, advanced materials, computer software, electronics, and in information and communications, and South Korea is among the top three in flexible manufacturing technologies and weapons, and Malaysia is an important export market in electronics technologies.

European countries are also important consumers of U.S. technology products, particularly Germany, the United Kingdom, France, Belgium, and the Netherlands. The European market is particularly important in two technology areas: biotechnology and aerospace. The Netherlands, Belgium, and the United Kingdom are the top customers for U.S. biotechnology products, together consuming more than half of all U.S. exports within this technology area. France is one of the leading consumers of U.S. aerospace technology products (8.5% of U.S. exports in this technology area) as is the United Kingdom (6.3%).⁵

⁵ The United Kingdom was the fifth largest country customer in 2006.

FIGURE 2. U.S. trade balance by technology area: 2004–06



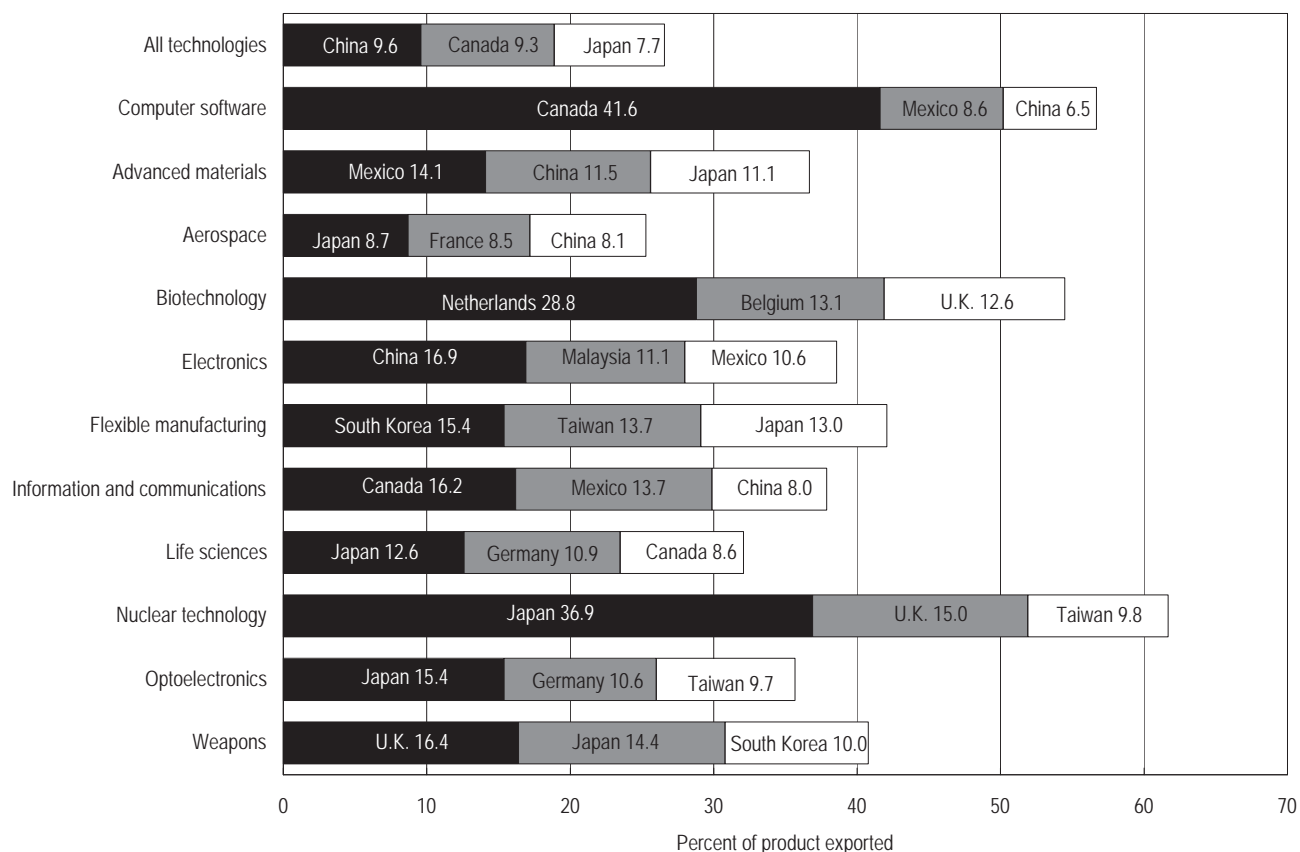
SOURCE: U.S. Census Bureau, Foreign Trade Division, special tabulations (March 2007).

TABLE 3. U.S. exports of advanced technology products: 2000–06
(US \$ millions)

Country/economy	2000	2001	2002	2003	2004	2005	2006
Total	223,415.4	200,106.8	178,627.3	179,786.5	201,454.0	215,605.7	252,569.3
NAFTA partners	40,673.3	35,341.8	30,004.9	31,632.4	36,947.0	39,597.7	42,265.2
Canada	25,601.5	21,417.5	17,420.3	18,027.7	20,438.5	23,035.4	23,603.4
Mexico	15,071.8	13,924.3	12,584.6	13,604.7	16,508.5	16,562.3	18,661.8
Asia, selected	85,884.1	75,389.0	72,184.4	74,121.5	81,035.2	84,225.5	101,102.6
China	11,225.9	13,016.7	13,053.0	13,431.6	15,771.9	18,815.2	24,166.6
India	1,056.4	1,150.9	1,254.8	1,328.4	1,505.1	2,054.1	3,251.1
Indonesia	255.6	215.9	198.2	208.1	220.7	270.9	260.4
Japan	22,116.8	18,525.0	16,849.3	16,945.1	18,163.5	17,776.7	19,539.0
Malaysia	7,226.2	6,051.1	7,234.8	7,806.3	7,554.7	7,053.8	8,520.8
Philippines	5,537.3	4,934.6	4,965.5	5,851.5	4,836.0	4,416.2	4,906.0
Singapore	8,862.5	9,693.3	8,139.4	8,430.7	10,158.4	9,336.0	12,153.7
South Korea	13,485.5	9,927.6	9,598.7	9,569.5	10,341.4	11,403.4	14,108.0
Taiwan	12,645.1	9,032.5	9,171.5	8,225.9	9,952.2	10,004.5	10,330.0
Thailand	3,472.8	2,841.4	1,719.2	2,324.4	2,531.3	3,094.7	3,867.0
Europe, selected	67,618.4	61,206.1	50,613.5	50,394.4	57,044.6	58,817.9	65,337.6
Austria	624.4	563.8	708.9	423.6	532.0	628.0	704.8
Belgium	2,122.0	1,945.4	1,659.0	1,655.4	1,860.3	2,315.8	2,491.6
Czech Republic	354.9	321.7	333.9	268.6	336.5	435.4	471.0
Denmark	516.0	555.5	524.1	492.4	912.4	562.9	616.2
Federal Republic of Germany	12,407.9	12,376.9	9,341.8	9,306.8	9,340.1	10,679.2	12,966.1
Finland	725.4	602.4	595.2	422.0	477.5	558.1	545.5
France	9,221.6	8,677.0	8,508.6	6,672.3	9,165.7	9,242.9	10,049.9
Greece	593.2	606.2	548.9	456.8	1,066.4	303.2	536.3
Hungary	145.7	244.9	235.5	460.5	644.2	381.8	397.3
Ireland	3,901.4	3,578.3	2,823.3	3,285.8	3,735.2	4,199.8	4,025.3
Italy	3,136.3	2,744.1	3,131.3	3,147.0	2,902.8	2,571.5	2,721.3
Netherlands	9,547.4	7,805.1	7,261.5	8,413.3	9,152.1	9,650.7	10,102.6
Norway	587.6	551.4	457.1	407.6	379.8	515.6	617.3
Poland	264.0	215.3	179.8	189.0	224.7	332.5	817.9
Portugal	350.2	583.5	229.3	195.2	366.5	544.7	836.3
Slovakia	46.0	24.1	21.8	29.2	25.6	46.7	352.7
Slovenia	33.9	25.5	39.7	36.2	33.0	49.5	46.9
Spain	2,252.5	1,471.9	1,069.1	1,465.3	1,605.9	1,722.5	1,526.1
Sweden	2,284.6	1,399.4	1,212.8	1,205.6	1,048.0	1,063.5	1,455.7
Switzerland	1,810.0	1,436.8	1,141.7	1,028.1	1,162.6	1,373.8	1,376.5
United Kingdom	16,693.4	15,476.9	10,590.2	10,833.7	12,073.3	11,639.8	12,680.3
Latin America, selected	9,629.7	9,031.9	6,716.7	6,272.2	7,875.8	9,703.7	13,197.5
Argentina	1,395.3	1,015.2	223.5	441.7	605.7	865.8	958.1
Brazil	5,793.0	5,703.3	3,947.5	3,281.0	4,352.3	5,146.8	7,000.1
Chile	926.9	858.3	600.0	585.1	615.5	1,064.9	1,775.5
Costa Rica	437.8	485.4	1,075.4	1,286.7	1,124.0	1,208.9	1,487.7
Peru	318.4	279.1	289.4	301.7	323.8	359.4	520.0
Venezuela	758.3	690.6	580.9	376.0	854.5	1,057.9	1,456.1
Other, selected	9,430.7	7,976.2	8,984.7	7,518.0	7,579.7	7,991.3	10,401.4
Australia	3,743.0	3,043.0	4,711.2	4,046.1	3,345.0	3,437.1	4,226.7
Israel	2,738.2	2,603.8	2,025.8	1,851.5	2,773.8	2,684.8	2,949.1
Russia	445.0	390.4	430.3	367.5	411.2	447.7	532.2
South Africa	908.8	931.2	570.0	642.1	535.7	634.6	700.1
Turkey	1,595.7	1,007.8	1,247.4	610.8	514.0	787.1	1,993.3
All other countries	10,179.2	11,161.8	10,123.1	9,848.0	10,971.7	15,269.6	20,265.0

SOURCE: U.S. Census Bureau, Foreign Trade Division, special tabulations (March 2007).

FIGURE 3. Three largest export markets for U.S. technology products: 2006



SOURCE: U.S. Census Bureau, Foreign Trade Division, special tabulations (2007).

Top Suppliers by Technology Area

The United States is not only an important exporter of technologies to the world but also a major consumer of imported technologies. The leading economies in Asia, Europe, and North America are important suppliers to the U.S. market in each of the 11 technology areas examined (figure 4 and table 4). Together, they supply over 95% of all U.S. imports of advanced technology products. In 2006, Asia supplied 60%, Europe over 20%, and North America over 15%.

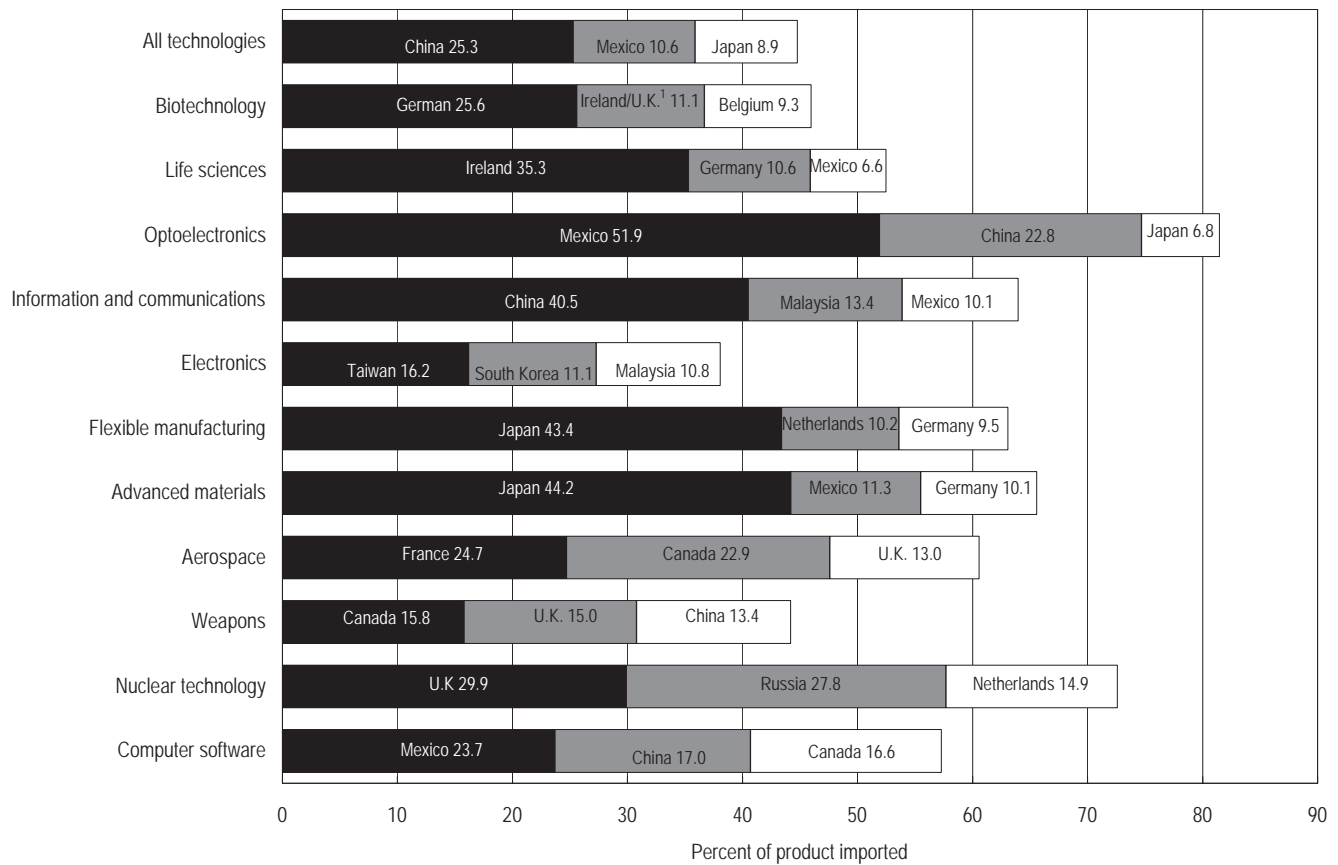
In 2003, China replaced Japan to become the largest supplier of technology products to the United States. In 2006, China was the source for 25% of U.S. imports (figure 4). Japan was a distant third, the source for 9% of U.S. technology imports, as was Malaysia. Taiwan and South Korea are other major Asian suppliers. In the electronics technology area, the top three suppliers are all in Asia (figure 4).

Among the European countries Ireland, Germany, the United Kingdom, France, and the Netherlands are major suppliers of technology products to the United States, especially in biotechnologies, life sciences, aerospace, flexible manufacturing, and nuclear technologies. Ireland was the leading European supplier of technology products overall and among the top suppliers of biotechnology and life science products to the United States in 2006, as the source for 11% and 35% of U.S. imports in these two categories. Additional European countries have also become important sources for technology products, although they tend to specialize more. Belgium supplied 9% of U.S. biotechnology imports, and France supplied 25% of U.S. aerospace imports in 2006.

Summary

The comparative advantage long held by U.S. producers in international trade of advanced technology

FIGURE 4. Top three foreign suppliers of technology products to United States: 2006



¹ Ireland and United Kingdom each supplied 11.1% of U.S. biotechnology imports.

SOURCE: U.S. Census Bureau, Foreign Trade Division, special tabulations.

products has been replaced by successive years of uninterrupted annual trading deficits beginning in 2002. Trade deficits with Asia, especially with China, Malaysia, and Japan, overwhelm U.S. surpluses and relatively balanced trade with other parts of the world.

In 2006, the United States continued to export considerably more than it imported in two technology areas, aerospace and electronics. But large trading deficits in information and communication technologies, life science technologies, and optoelectronics led to yet another negative year for U.S. trade in advanced technology products.

Definitions

The U.S. Census Bureau classifies product exports and imports that embody new or leading-edge technologies into 10 major technology areas:

Biotechnology—the medical and industrial application of advanced genetic research to the creation of drugs, hormones, and other therapeutic items for both agricultural and human uses.

Life science technologies—the application of nonbiological scientific advances to medicine. For example, advances such as nuclear magnetic resonance imaging, echocardiography, and novel chemistry, coupled with new drug manufacturing techniques, have led to new products that help control or eradicate disease.

Optoelectronics—the development of electronics and electronic components that emit or detect light, including optical scanners, optical disk players, solar cells, photo-sensitive semiconductors, and laser printers.

Information and communications—the development of products that process increasing amounts of informa-

TABLE 4. U.S. imports of advanced technology products: 2000–06
(US \$ millions)

Country/economy	2000	2001	2002	2003	2004	2005	2006
Total	195,660.3	195,265.2	196,100.1	207,196.2	238,478.3	259,968.7	290,848.0
NAFTA partners	33,225.4	33,724.5	30,040.8	31,677.2	35,988.0	39,796.6	45,836.3
Canada	20,293.5	17,302.0	13,769.3	13,722.6	13,844.2	15,806.1	14,949.1
Mexico	12,931.9	16,422.5	16,271.5	17,954.6	22,143.8	23,990.5	30,887.2
Asia, selected	111,619.7	104,411.3	107,778.5	115,546.1	140,343.7	154,716.5	174,578.5
China	12,330.5	14,421.3	21,286.5	30,373.9	46,821.1	60,287.8	73,493.6
India	143.1	199.7	198.8	253.0	318.5	456.0	693.2
Indonesia	1,144.9	1,399.1	1,265.0	1,076.0	1,123.3	1,103.5	916.6
Japan	34,816.3	27,879.6	23,744.4	22,386.0	23,876.9	24,590.7	25,839.3
Malaysia	12,776.9	14,051.9	15,150.4	16,384.4	18,204.0	22,658.9	25,104.8
Philippines	7,344.3	5,907.9	5,843.2	4,917.2	3,809.1	3,694.5	3,746.8
Singapore	11,045.6	10,081.4	10,042.5	10,407.8	10,804.6	9,258.8	9,803.9
South Korea	13,706.3	13,756.0	13,827.4	14,412.9	17,977.8	13,977.5	13,699.9
Taiwan	14,773.5	13,815.8	13,378.7	12,044.6	12,810.4	12,274.9	14,070.5
Thailand	3,538.3	2,898.6	3,041.6	3,290.3	4,598.0	6,413.9	7,209.9
Europe, selected	43,200.3	48,594.6	49,945.1	51,282.8	53,206.5	56,402.2	61,496.2
Austria	314.0	289.6	443.4	402.8	498.9	582.1	656.0
Belgium	973.6	1,367.6	1,296.2	986.9	1,519.9	1,099.2	1,980.8
Czech Republic	97.3	163.7	220.5	287.7	339.7	403.8	422.5
Denmark	456.1	494.3	493.6	602.4	756.0	878.0	889.9
Federal Republic of Germany	8,804.5	9,536.6	8,074.9	8,007.9	9,595.4	11,035.3	11,404.2
Finland	273.0	463.3	639.6	607.9	414.0	505.0	368.9
France	9,443.6	10,434.0	9,617.5	9,206.0	8,836.6	8,486.6	9,834.5
Greece	12.2	7.5	17.3	20.0	16.6	34.9	29.1
Hungary	1,240.6	886.4	1,085.1	1,288.0	1,247.6	1,393.2	1,177.6
Ireland	6,630.4	8,924.4	13,233.2	14,573.9	13,433.0	14,046.8	14,225.3
Italy	1,579.6	1,674.4	1,899.9	1,734.5	1,972.1	2,201.4	2,162.7
Netherlands	1,643.4	1,514.6	1,762.8	2,043.0	2,191.0	2,235.6	2,829.8
Norway	257.3	332.9	313.8	279.6	372.3	345.0	443.8
Poland	48.7	38.2	41.2	46.1	74.0	94.2	311.8
Portugal	33.9	253.7	312.2	427.9	542.9	668.7	803.0
Slovakia	2.5	4.2	6.7	8.7	9.0	13.4	13.0
Slovenia	5.4	5.0	15.4	21.5	25.2	16.4	20.8
Spain	231.1	255.6	368.4	751.9	700.7	552.2	593.9
Sweden	1,226.0	1,126.8	1,510.1	1,343.8	1,464.5	1,890.4	1,267.3
Switzerland	1,399.7	1,565.6	1,420.5	1,795.2	1,785.6	2,648.6	2,662.4
United Kingdom	8,527.4	9,256.2	7,172.8	6,847.1	7,411.5	7,271.4	9,398.9
Latin America, selected	2,343.5	3,673.9	3,907.5	3,908.2	3,942.2	3,750.0	2,941.4
Argentina	10.7	14.4	18.1	9.7	17.1	14.2	16.2
Brazil	1,929.7	2,927.2	2,961.3	2,685.9	2,809.4	2,598.8	1,729.7
Chile	2.0	2.6	4.4	3.3	6.1	4.1	8.4
Costa Rica	395.5	725.9	918.5	1,206.5	1,104.7	1,128.1	1,176.4
Peru	0.7	2.3	2.3	1.0	2.0	1.1	1.1
Venezuela	4.9	1.5	2.9	1.8	2.9	3.7	9.6
Other, selected	4,106.2	3,798.2	3,424.0	3,555.6	3,754.9	3,945.9	4,583.0
Australia	390.0	427.9	381.9	374.2	416.4	533.1	609.9
Israel	2,543.9	2,229.3	2,100.0	2,013.7	2,280.8	2,301.5	2,814.6
Russia	1,045.4	1,011.6	831.5	1,052.7	921.1	944.8	972.7
South Africa	27.7	22.6	27.9	31.8	29.6	30.6	26.1
Turkey	99.2	106.8	82.7	83.2	107.0	135.9	159.7
All other countries	1,165.2	1,062.7	1,004.2	1,226.3	1,243.0	1,357.5	1,412.6

SOURCE: U.S. Census Bureau, Foreign Trade Division, special tabulations (March 2007).

tion in shorter periods of time, including fax machines, telephone switching apparatus, radar apparatus, communications satellites, central processing units, and peripheral units such as disk drives, control units, modems, and computer software.

Electronics—the development of electronic components (other than optoelectronic components), including integrated circuits, multilayer printed circuit boards, and surface-mounted components, such as capacitors and resistors, that improve performance and capacity and, in many cases, reduce product size.

Flexible manufacturing—the development of products for industrial automation, including robots, numerically controlled machine tools, and automated guided vehicles, that permit greater flexibility in the manufacturing process and reduce human intervention.

Advanced materials—the development of materials, including semiconductor materials, optical fiber cable, and videodisks, that enhance the application of other advanced technologies.

Aerospace—the development of aircraft technologies, such as most new military and civil airplanes, helicopters, spacecraft (communication satellites excepted), turbojet aircraft engines, flight simulators, and automatic pilots.

Weapons—the development of technologies with military applications, including guided missiles, bombs, torpedoes, mines, missile and rocket launchers, and some firearms.

Nuclear technology—the development of nuclear production apparatus (other than nuclear medical equipment), including nuclear reactors and parts, isotopic separation equipment, and fuel cartridges (nuclear medical apparatus is included in life sciences rather than this category).

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