

Industry & Trade Summary

Yarn

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PREFACE

In 1991 the United States International Trade Commission initiated its current *Industry and Trade Summary* series of informational reports on the thousands of products imported into and exported from the United States. Each summary addresses a different commodity/industry area and contains information on product uses, U.S. and foreign producers, and customs treatment. Also included is an analysis of the basic factors affecting trends in consumption, production, and trade of the commodity, as well as those bearing on the competitiveness of U.S. industries in domestic and foreign markets.¹

This report on yarn covers the period 1987 through 1991 and represents one of approximately 250 to 300 individual reports to be produced in this series during the first half of the 1990s. Listed below are the individual summary reports published to date on the chemical and textile sectors.

<i>USITC publication number</i>	<i>Publication date</i>	<i>Title</i>
Chemicals:		
2458	November 1991	Soaps, Detergents, and Surface-Active Agents
2509	May 1992	Inorganic Acids
2548	August 1992	Paints, Inks, and Related Items
2578	November 1992	Crude Petroleum
2588	December 1992	Major Primary Olefins
2590	February 1993	Polyethylene Resins in Primary Forms
2598	March 1993	Perfumes, Cosmetics, and Toiletries
Textiles and apparel:		
2543	August 1992	Nonwoven Fabrics
2580	December 1992	Gloves
2642	June 1993	Yarn

¹ The information and analysis provided in this report are for the purpose of this report only. Nothing in this report should be construed to indicate how the Commission would find in an investigation conducted under statutory authority covering the same or similar subject matter.

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INTRODUCTION

The U.S. yarn industry is among the largest in the world and has continued to be competitive with foreign suppliers in the U.S. market. Domestic producers supply 96 percent of the yarns sold in the United States (table 1).¹ U.S. producers have maintained their market share as the real value of the U.S. yarn market grew by over 65 percent during the last 20 years. Four factors contribute to U.S. competitiveness: (1) the United States is a major producer of raw materials used in yarn production, assuring the domestic industry an adequate supply of raw materials at competitive prices; (2) the size of the domestic market contributes to economies of scale and to high-capacity utilization, thus keeping costs relatively low; (3) capital investments have added to efficiencies; and (4) fabric producers tend to purchase yarn domestically as a means of controlling inventory costs.

The U.S. textile fabric industry, like those in most other countries, tends to purchase locally produced yarn, except for specialty yarn and spot purchases in the case of shortfalls. Therefore, U.S. yarn producers mainly supply the domestic market, and sell only a small portion of their total shipments overseas. However, U.S. yarn exports did receive a boost during 1987-91, largely because of the U.S.-Canada Free-Trade Agreement, spot purchases by China, and the depreciating dollar. Still, in 1991, exports accounted for less than 7 percent of U.S. yarn output.

U.S. yarn imports remained relatively low during 1987-91, accounting for roughly 4 percent of apparent consumption. About one-fourth of the yarn imports in 1991 were covered by restrictive quotas. These import quotas were concentrated largely on cotton and synthetic spun yarn, where imports are highly price-competitive with those produced domestically.

The yarn industry is made up of two major sectors: (1) spun yarn and (2) manmade-filament yarn. These two sectors make up roughly 83 percent of total U.S. yarn shipments. Sewing thread, other miscellaneous yarn, and yarn further processed by converters make up the remaining shipments. Because spun yarn and manmade-filament yarn account for such a large portion of the yarn industry, this summary will focus exclusively on these two sectors.

Spun yarn and manmade-filament yarn differ significantly in product characteristics, production methods, and industry structure. Spun yarn is produced from many noncontinuous, individual fibers twisted together, and has a fuzzy appearance and feel. Manmade-filament yarn is produced from one or more continuous lengths of fiber, which are loosely twisted together, and is more uniform in diameter. The

¹ The spun yarn sector includes only those producers that produce spun yarn for sale. Roughly two-thirds of the yarn spun in the United States is produced by integrated fabric mills that produce for their own consumption. Unless otherwise specified, the remainder of this report will cover only spun yarn that is produced by yarn spinners and put up for sale.

production of spun yarn begins with the preparation of staple fibers, usually 1 inch to 4 inches in length, that are spun into yarns. In contrast, the production of manmade-filament yarn involves the formation of the continuous filament fiber that forms the yarn. Spun yarn production technology ranges from hand spinning in cottage-type industries to "lights out" production involving virtually 100-percent automation. Manmade-filament yarn production is more uniformly automated across the sector, with even the simplest production involving large capital investment in plant and equipment. Furthermore, the spun yarn sector is an integral part of the textile industry, whereas the manmade-filament sector is just one of many end products produced by the chemical products industry.

Yarn is an intermediate product in the production of most textile and many nontextile products. As shown in figure 1, apparel is by far the largest end-use of yarn, accounting for 2.5 billion kilograms (kg) or roughly 44 percent of the yarn consumed in the United States.² Spun yarn accounted for two-thirds of the yarn consumed in the United States. Spun yarn dominates the apparel and home textiles markets, whereas manmade-filament yarn is more prominent in the floor coverings and industrial and other consumer-type products markets.

PRODUCTION PROCESSES

The production of spun yarn and manmade-filament yarn involves two very different manufacturing processes. These production processes are described below.

Spun Yarn

Spun yarn is produced from staple fibers, such as cotton, wool, and noncontinuous manmade fibers (e.g., polyester, nylon, and acrylic). These individual fibers are twisted together to form a continuous strand. Figure 2 illustrates the spun yarn production process.

In the first stages of spun yarn production, bales of staple fiber are opened and the fiber is passed through a series of machines that loosen the fiber and remove foreign matter.³ In the carding stage, fine wire teeth attached to revolving cylinders further clean the fiber. Fibers that are too short to be spun are removed and the remaining fibers are brought into parallel order. Combing is an optional step where all but the longest fibers are removed. "Combed" yarns are more uniform, smooth, and compact than uncombed or "carded" yarns.

In the drawing stage, fibers are further blended and are prepared for the roving process where they are grouped and drawn out to form a strand. In the spinning stage, the strand of fibers is further stretched and drawn to the ultimate diameter of the final yarn. During this operation a twist is inserted, causing the fibers to adhere to each other. The most common

² Based on total fiber consumption.

³ The initial processes of cleaning and removing short fibers, common to natural staple fiber preparation, are not always necessary in the case of manmade staple fibers.

Table 1

Yarn: U.S. shipments, exports of domestic merchandise, imports for consumption, and apparent U.S. consumption, 1987-91

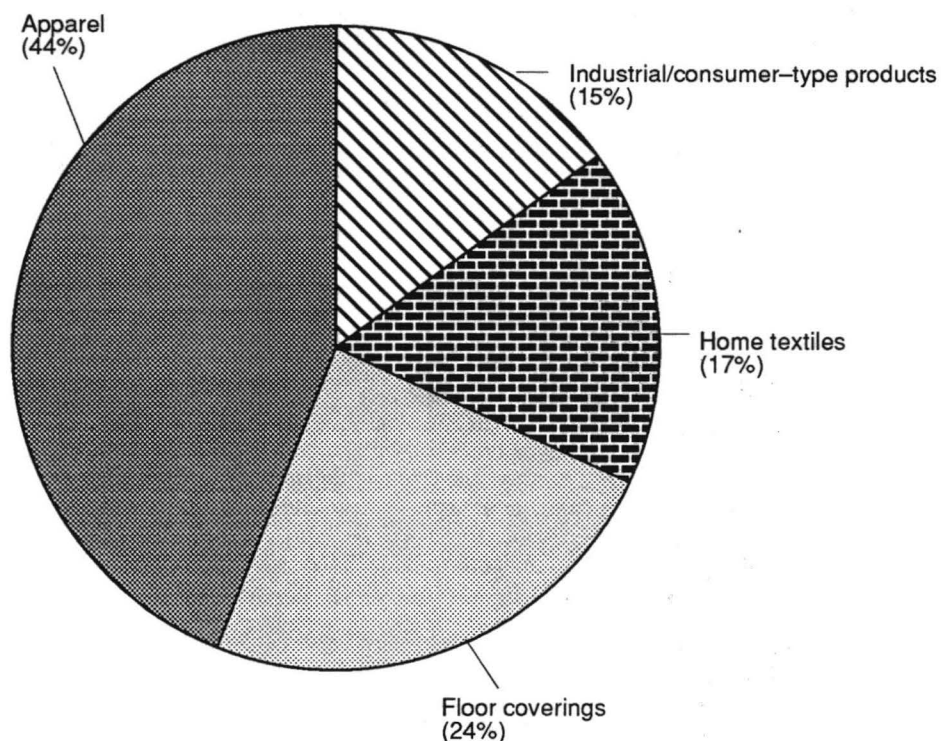
Year	U.S. shipments	U.S. exports	U.S. imports	Apparent U.S. consumption	Ratio of imports to consumption
	Million dollars				Percent
1987	16,184	804	640	16,020	4.0
1988	16,601	1,081	599	16,119	3.7
1989	17,076	966	683	16,793	4.1
1990	17,390	1,189	631	16,832	3.7
1991	18,090	1,205	766	17,651	4.3

Note.—Shipments were estimated from U.S. Bureau of the Census data for Standard Industrial Classification (SIC) 2281, 2282, 2284, 2823 (pt), and 2824 (pt).

Source: Compiled from official statistics of the U.S. Department of Commerce, except as noted.

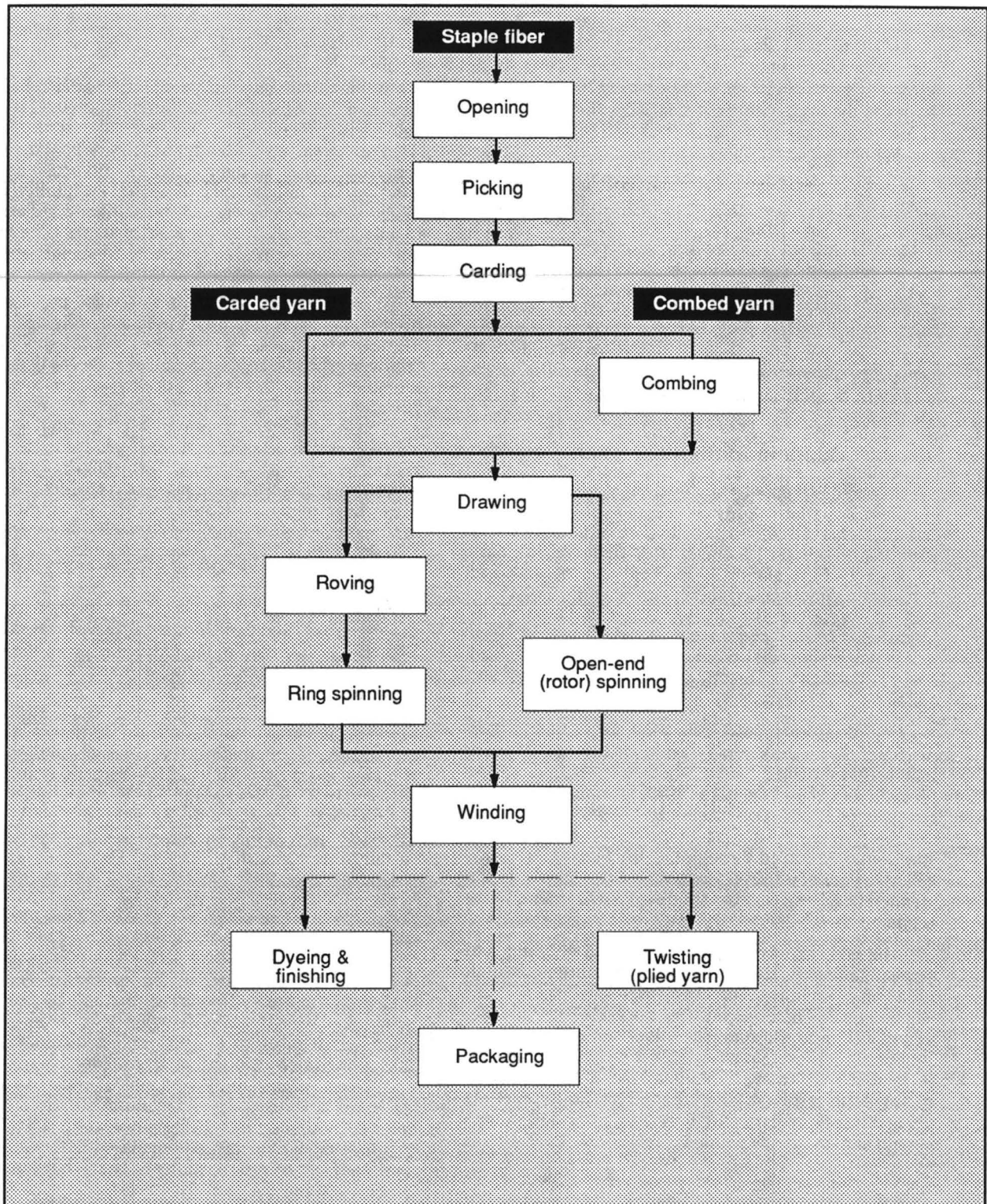
Figure 1

Yarn: U.S. consumption by end use, 1991



Source: Estimated from fiber consumption data from *Fiber Organon*, Sept. 1992.

Figure 2
Spun yarn production process



Source: U.S. International Trade Commission.

methods of spinning are ring spinning and open-end (rotor) spinning. In open-end spinning the roving stage is eliminated. Open-end spinning is up to five times as productive as ring spinning, running at speeds up to 120,000 rpm versus 25,000 rpm for ring spinning. The rotor system also provides for lower labor costs as it eliminates some of the steps necessary in ring spinning. However, the open-end rotor system is more limited to producing certain types and sizes of yarn than the ring-spinning system.

After the spinning process, the yarn is then wound onto a bobbin. Depending on the characteristics desired, the yarn may be further processed, which includes plying (twisting two or more yarns together), dyeing, and applying various finishes. Finished yarn is packaged in a variety of ways. Producers typically deliver yarn on pirns, cones, or tubes. Yarn generally needs to be rewound to suit particular downstream processes.⁴ Yarn may be further processed and packaged to customer specification by the yarn producer, the purchaser, or a commissioned converter.

Manmade-filament yarn

Manmade-filament yarn is composed of a bundle of continuous filament fibers that are held together by a certain degree of twist or, in the case of monofilament yarn, is composed of a single fiber filament. Roughly 95 percent of the manmade-filament yarn produced in the United States is synthetic (e.g., nylon, polyester, and polypropylene). Synthetic-filament yarn is produced from petrochemical derivatives. The remainder is artificial-filament yarn (e.g., rayon and acetate), which is manufactured from regenerated cellulose or wood pulp.⁵

Figure 3 illustrates the manmade-filament yarn production process. In contrast to spun yarn, manmade-filament yarn production includes the formation of the fiber. In the fiber-forming stage, solid raw material or polymer (i.e., plastics resins or cellulose) must be melted or dissolved into a liquid state and then forced through the tiny holes of a device called a spinneret. As the liquid emerges from the spinneret holes, it is solidified into continuous filaments.

The process of converting the liquid polymer into fiber filament is called "spinning" (not to be confused with the spinning process used in spun yarn production). There are three methods of spinning commonly used, depending on the type of fiber being produced: (1) wet spinning, (2) dry spinning, and (3) melt spinning. In wet spinning, the raw material is dissolved in a solvent, the liquid is forced through the spinneret and the emerging filaments are solidified in a chemical bath. In dry spinning, the raw material is also

⁴ For weaving purposes, for example, the filling (crosswise) yarn is wound on a quill that is inserted into a weaving shuttle, and the warp yarns are wound on a beam (a large spool about 5 feet long and 10 inches in diameter) from which they can then be drawn into a weaving loom.

⁵ Production of artificial-filament yarn in the United States peaked at 363 million kg in 1968. Since then, production has declined by 74 percent and many plants producing artificial-filament yarn have closed.

dissolved in a solvent, but the emerging filaments are solidified in warm air. Melt spinning involves melting the raw material for extrusion. The filaments are then hardened through cooling. Nylon, olefin, and polyester, by far the most prominent manmade-filament yarns, are produced by melt spinning.

While the filament is hardening or after it has been hardened, it is stretched. Stretching the filament reduces the diameter and causes the molecules to arrange themselves into a more orderly pattern. As the pattern of the molecular arrangement becomes more orderly, the strength increases and the ability of the filament to stretch without breaking decreases. The filament may then be wound and packaged as a monofilament yarn, or several filaments may be twisted together to form a multifilament yarn.

In many cases, the yarn is further processed by plying and packaged for subsequent mill operations. These procedures, which are collectively called "throwing," may be carried out by the mill that will ultimately use the yarn, or by a commissioned "throwster."⁶ Depending on the end use, manmade-filament yarn also may go through a process called texturizing. Texturizing produces a softer, bulkier yarn with increased warmth, comfort, and absorbency, and also imparts stretch to the yarn. Texturizing may be performed by the yarn producer, by the purchaser, or by a commissioned converter.

U.S. INDUSTRY PROFILE

Yarn production is classified under two major groups in the Standard Industrial Classification (SIC) system, as illustrated in table 2. Spun yarn, thread, and yarn further processed by finishers/converters are classified as textile mill products, whereas manmade-filament yarn is classified as a chemical product. Because spun yarn and manmade-filament yarn account for over 80 percent of total industry shipments, data for SIC 2281 - Yarn Spinning Mills, SIC 2823 - Cellulosic Manmade Fibers, and SIC 2824 - Manmade Organic Fibers, Except Cellulosic are generally used in this summary as indicative of trends in the overall industry.⁷

Spun Yarn

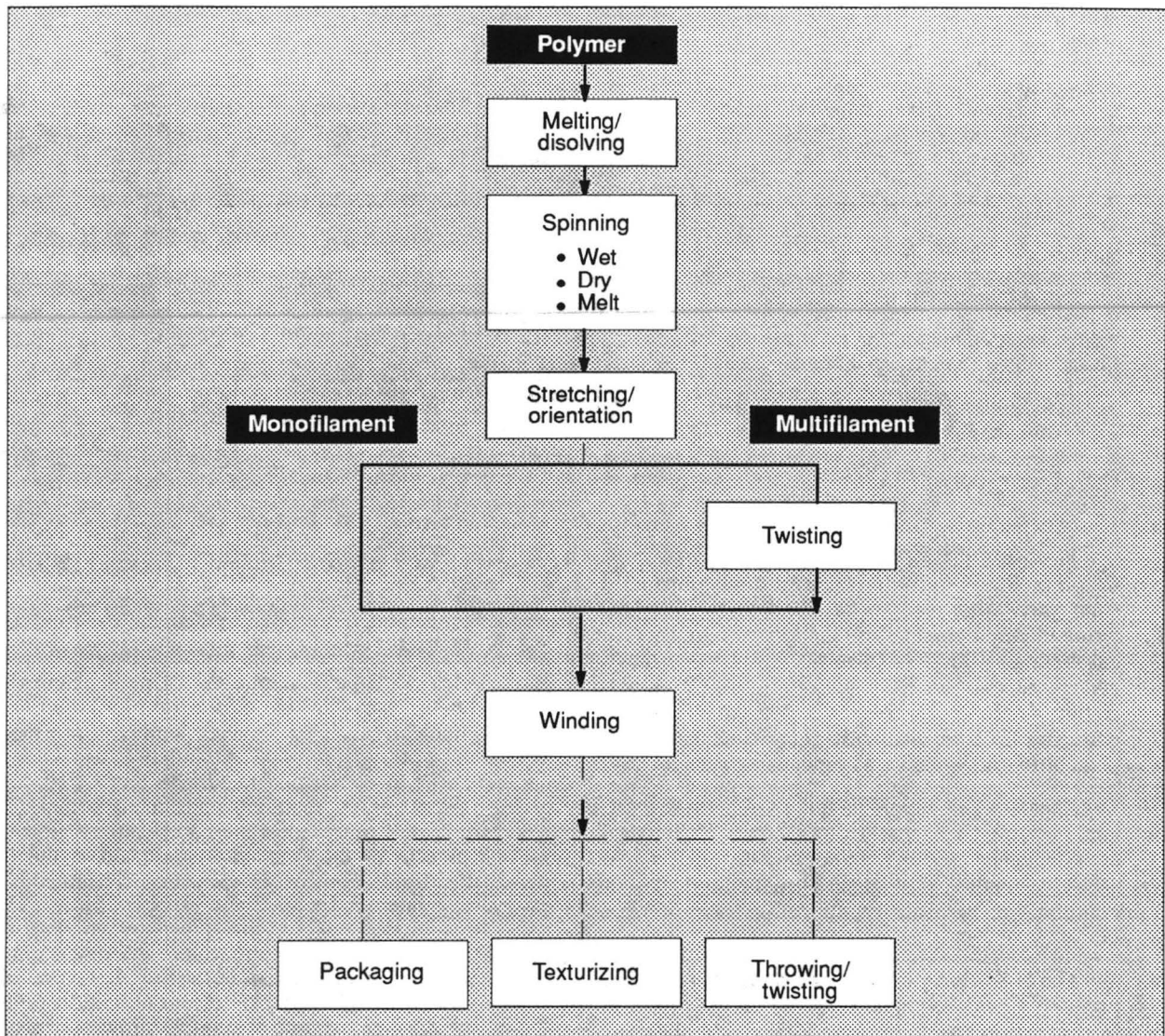
Industry Structure

Since the early 1970s, the spun yarn sector has undergone major restructuring, marked by the fallout of weaker, usually smaller, spun yarn producers. An increased number of mergers and acquisitions in the late 1980s also resulted in a drop in the number of companies. Surviving companies sharpened their competitive edge by installing more efficient machinery and by increasing automation. Largely as a result of plant closures and increased automation, both the number of establishments and the number of employees fell by over 20 percent between 1972-91 (table 3).

⁶ "Throwing" usually applies to the preparation of relatively light weight yarns, whereas "twisting" pertains to the preparation of heavier yarns.

⁷ Artificial and synthetic fibers and filament yarn are also referred to as "cellulosic" and "noncellulosic," respectively.

Figure 3
Manmade-filament yarn production process



Source: U.S. International Trade Commission.

Table 2
Standard Industrial Classification (SIC) headings for yarn production

Textile mill products:

- SIC 2281 - Yarn Spinning Mills
- SIC 2282 - Yarn Texturizing, Throwing, Twisting, and Winding Mills
- SIC 2284 - Thread Mills
- SIC 2231 (pt) - Broadwoven Fabric Mills, Wool (Including Dyeing and Finishing)
- SIC 2269 (pt) - Finishers of Textiles, Not Elsewhere Classified
- SIC 2299 (pt) - Textile Goods, Not Elsewhere Classified

Chemicals and allied products:

- SIC 2823 (pt) - Cellulosic Manmade Fibers
- SIC 2824 (pt) - Manmade Organic Fibers, Except Cellulosic

Source: Executive Office of the President, Office of Management and Budget, *Standard Industrial Classification Manual-1987* (Washington, DC: GPO).

Table 3
The structure of the U.S. spun yarn sector (SIC 2281), specified years 1972 to 1991

Item	1972	1977	1982	1987
Number of companies	356	344	279	242
Number of establishments	525	532	450	414
Number of employees (1,000)	105.0	96.3	81.9	86.0
Number of production workers (1,000)	98.0	88.9	73.6	77.7
Value of shipments (million dollars)	2,469.7	4,059.8	4,512.9	7,501.8
Value of shipments (million dollars) ¹	2,469.7	2,574.0	2,220.3	3,698.3
Capacity utilization (fourth quarter)	(2)	87	68	84
	1988	1989	1990	1991
Number of establishments	401	410	408	421
Number of employees (1,000)	86.0	84.2	81.0	79.3
Number of production workers (1,000)	77.9	75.9	72.6	70.9
Value of shipments (million dollars)	7,278.9	7,327.2	7,259.2	7,265.4
Value of shipments (million dollars) ¹	3,483.7	3,534.3	3,467.7	3,446.6
Capacity utilization (fourth quarter)	93	85	75	(2)

¹ Constant 1972 dollars as deflated by the Producer Price Index for SIC 2281.

² Not available.

Source: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics, except as noted.

Three-fourths of the spun yarn mills are in North Carolina, South Carolina, Georgia, and Alabama. U.S. spun yarn mills tend to be small to medium-size in terms of employment, with the largest number of mills employing 100-249 people. However, sales are concentrated in mills employing 250-499 employees (figure 4). In 1987, the sector was made up of 242 companies, of which the 50 largest accounted for 80 percent of the value of shipments.

Capacity utilization in the spun yarn sector was generally higher in the last half of the 1980s, peaking at 93 percent in 1988. However, the soft market in 1990 resulted in stagnant production and, as a consequence, a capacity utilization rate of only 75 percent that year.

The U.S. spun yarn industry is mostly comprised of privately held companies. The level of foreign investment in the sector is moderate, although several of the larger U.S. producers are wholly-owned subsidiaries of foreign companies (table 4). In recent years, several Japanese yarn producers have invested heavily in the United States, constructing modern facilities with state-of-the-art spinning equipment. Japanese investment has been encouraged largely by an increasing need to be closer to the U.S. market in order to provide better service to the U.S. customer. The appreciation of the yen against the dollar, which has made imports from Japan more expensive in the United States, has also stimulated Japanese investment. Currently, none of the large U.S. spun yarn companies has any production in other countries.

Major Factors of Production

The main cost components in the production of spun yarn are (1) raw materials; (2) capital equipment; and (3) labor. Raw material accounts for the largest share of costs incurred in the production of spun yarn.

Data for a 100-percent cotton yarn are provided in figure 5.

Raw materials

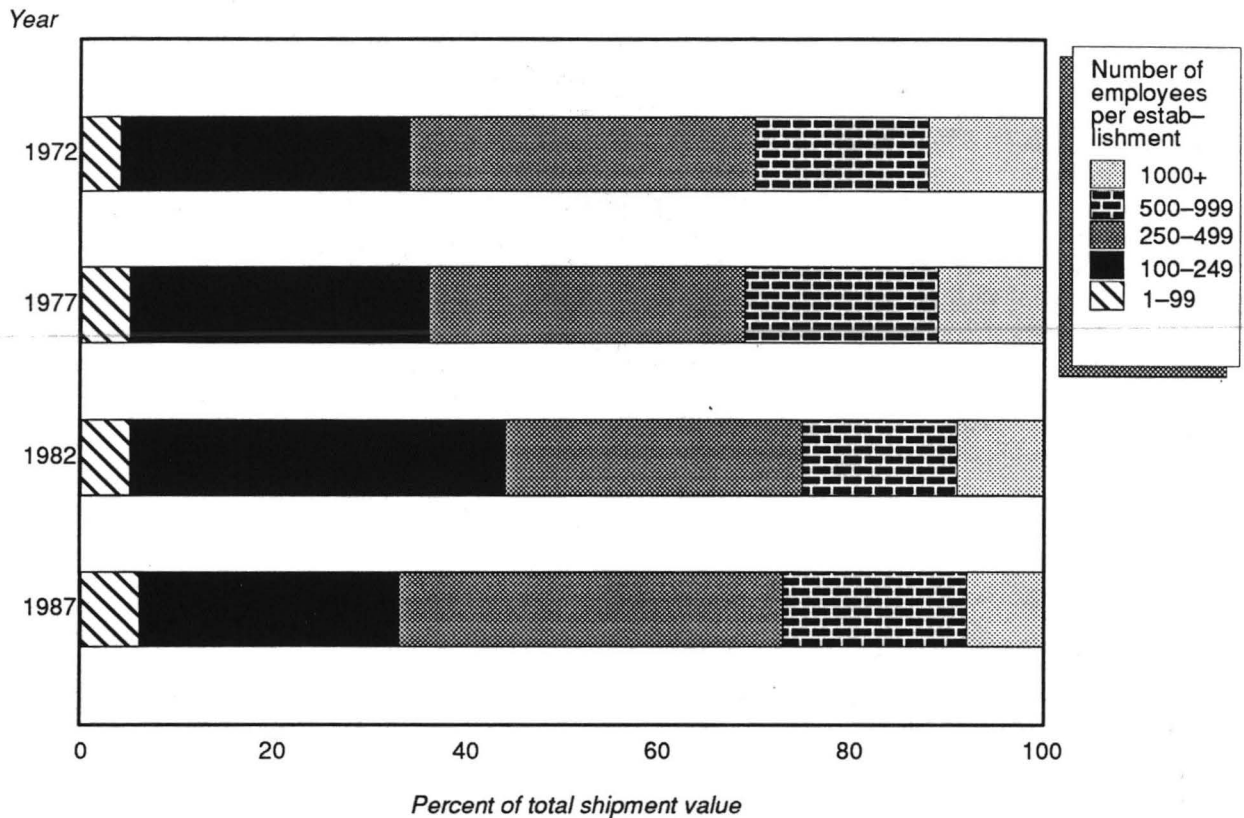
To a large extent, the United States' cost competitiveness in the production of spun yarn is facilitated by its large domestic supply of raw materials at competitive prices. The United States is a major producer of cotton and manmade-staple fibers, which are the major raw materials consumed by the U.S. spun yarn sector. Manmade-staple and cotton yarn makeup 95 percent of the spun yarn produced in the United States (figure 6). Most of the cotton consumed by U.S. yarn spinners is supplied domestically. Since 1939, the United States has set limits on the volume of raw cotton that can be imported into the domestic market. This import quota system requires U.S. textile mills to rely almost exclusively on domestic cotton producers as their primary source of supply. A raw-cotton subsidy was established in 1990 to compensate spun yarn producers who buy U.S. cotton at prices higher than those abroad.⁸

The United States is the world's largest manmade-fiber producer. Ninety-five percent of the manmade-staple fiber consumed in the United States is supplied by the domestic industry. A large portion of wool, on the other hand, is bought on the international

⁸ A study by the U.S. Department of Agriculture found the U.S. price for raw cotton to be competitive with that of alternative imports when transportation and marketing costs were considered. U.S. Department of Agriculture, Economic Research Service, "Marketing Foreign Raw Cotton to U.S. Mills-Prospects and Costs," *Cotton and Wool Situation and Outlook Report*, May 1991, pp. 29-32. However, the American Textile Manufacturers Institute estimated that in the first quarter of 1991 U.S. mills had to pay 14 percent, or \$143 million, more for U.S.-grown raw cotton than their foreign competitors. Joanna Ramey, "Revised Cotton Subsidy Divides Mill Executives," *Daily News Record*, Aug. 28, 1991, p. 9.

Figure 4

Spun yarn: U.S. market share by establishment size (SIC 2281), specified years 1972 to 1987



Note.—These data represent establishment size and not firm size. A firm may own more than one establishment.

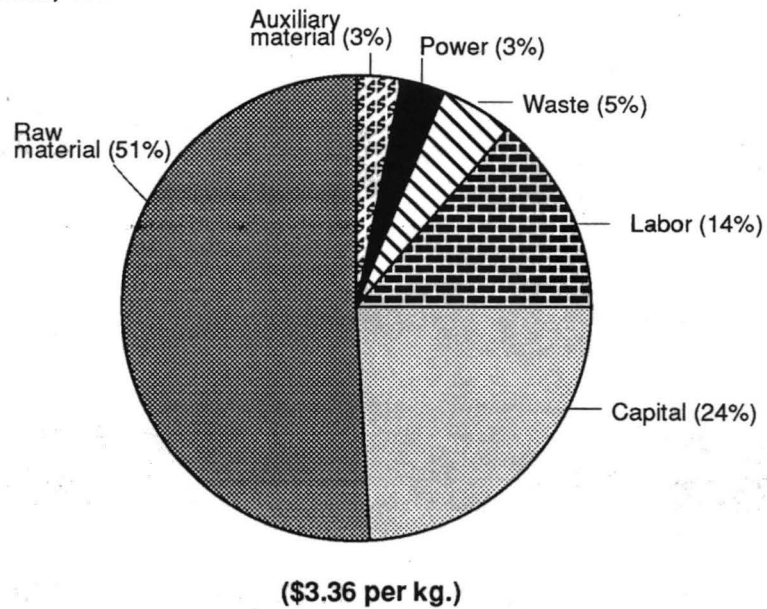
Source: *Census of Manufactures*, 1972; 1977; 1982; and 1987.

Table 4
Major U.S. spun yarn producers and their foreign affiliations

U.S. firm	Parent firm	Producer affiliations
Coats & Clark Inc.	Coats Viyellan PLC (U.K.)	<ul style="list-style-type: none"> • subsidiaries throughout Europe, and the Americas
Dominion Yarn Corp.	Dominion Textile Inc. (Canada)	<ul style="list-style-type: none"> • subsidiaries throughout Europe, and the Americas
TNS Mills, Inc.	Tsuzuki Spinning Co., Ltd. (Japan)	

Source: Compiled by the staff of the U.S. International Trade Commission from Moody's Investors Service, *Moody's Industrial Manual* (New York: Moody's, 1992).

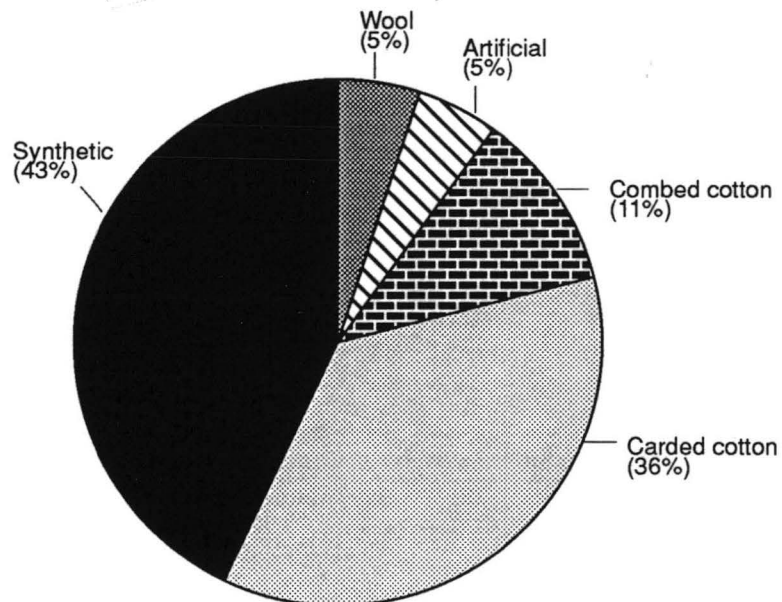
Figure 5
Total U.S. spun yarn costs, 1991



Note.—Costs based on a Ne 20 (Nm 33/30 tex) 100-percent cotton carded yarn. Capital includes depreciation and interest.

Source: International Textile Manufacturers Federation, 1991 *International Production Cost Comparison Spinning/Weaving* (Zurich, Aug. 1991).

Figure 6
Spun yarn: Market share by yarn type, 1991



Source: U.S. Bureau of the Census, 1991 *Annual Survey of Manufactures-Value of Product Shipments*, Nov. 1992.

market, as the domestic supply of wool is not of the quantity or type necessary to fill all domestic needs. There are no quantitative restrictions on imports of either wool or manmade-staple fibers.

Capital

To maintain its competitiveness with foreign suppliers and meet the needs of its customers, the U.S. spun yarn sector significantly increased its capital expenditures in the late-80s. Total capital expenditures increased from \$201 million in 1986 to \$340 million in 1987, reaching a peak of \$513 million in 1988 (figure 7). However, expenditures fell during 1989 to 1991 largely because of the soft market for yarn and the resulting over-capacity in the sector.

During 1987 to 1991, the spun yarn industry concentrated on replacing old equipment with faster, more automated equipment. As the new machines installed during that period were several times more efficient than those replaced, the number of ring-spinning spindles installed fell by 28 percent from 13.4 million in 1987 to 9.7 million in 1991. The number of open-end rotors increased by 51 percent to 786 thousand during that same period. To some extent, however, spindles were replaced by higher speed, more automated open-end rotors. Between 1987 and 1991 a total of 758 thousand new spindles and 435 thousand open-end rotors was shipped in the United States.⁹ In addition, increased investment in computerization and automation have provided for reduced labor costs, as well as increased product quality.

Spun yarn mills rely heavily on machinery and equipment manufacturers for new production technology. Much of this technology is developed in Germany, Switzerland, Japan, and Italy, which together account for over half of the world yarn-spinning machinery and equipment exports.

Labor

As a result of increased production efficiency, labor productivity has risen significantly. Between 1972 and 1991 the real value added per production worker hour increased by 146 percent (table 5). Increased computerization and automation in the production process have broadened the skill requirements of the work force; however, spun yarn production remains by and large an entry-level industry for lower skilled persons. The average hourly wage for production workers in the yarn spinning sector was \$7.97 in 1991 compared with \$11.18 for all manufacturing.

⁹ International Textile Manufacturers Federation, *International Textile Machinery Shipment Statistics*, (Zurich, Apr. 1988, 1989, 1990, 1991, and 1992).

Manmade-Filament Yarn

Industry Structure

The U.S. manmade-filament yarn sector is the largest in the world. As with U.S. yarn production overall, this sector is highly competitive because of economies of scale in production, access to a large viable domestic market, and access to an ample supply of raw materials. However, the sector's responsiveness to market changes, and its innovation in the creation of new types of yarn and improvements in existing yarn properties, have also enabled it to remain competitive in more recent years.

New product development is a major part of research and development (R&D) in the growing field of manmade fibers. The U.S. manmade-fiber industry is recognized as a leader in world manmade-fiber development. In 1991, DuPont Fibers spent \$299 million or almost 5 percent of its sales on R&D.¹⁰ Fiber development ranges from highly technical fibers used in the aerospace industry to high-volume commodity-type yarns used by the floor-covering industry. A recent major development, which is expected to be a large growth market for the sector, is microfibers.¹¹ Because R&D costs are high, many firms license technology rather than develop it themselves.¹²

In 1991, manmade-filament yarn production capacity was 2.5 billion kg (figure 8). As in the spun yarn sector, capacity utilization in manmade-filament yarn was generally higher in the late-1980s. The sharp decline in production in 1982 correlated with the general recession at that time, and the fall in capacity utilization in the early 1990s was largely a result of a soft market (table 6).

The U.S. manmade-filament yarn sector consists of a relatively small number of large companies mainly in South Carolina and North Carolina. The sector is highly concentrated. In 1987, there were 53 companies producing manmade fibers (including manmade-filament yarn), of which the 20 largest accounted for 98 percent of the value of shipments. A large portion of the producing establishments employed over 1,000 people.

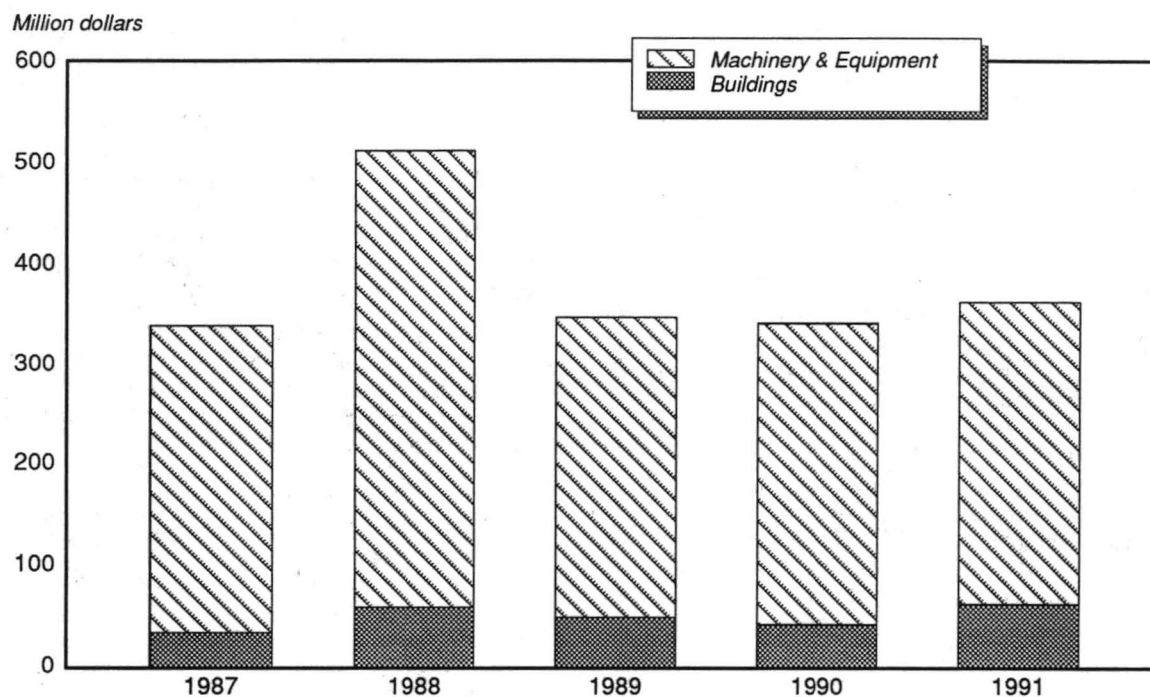
During 1972-91, employment in the U.S. manmade-fiber sector fell by over 40 percent, largely as a result of improved labor productivity and increased automation in the production process. During the same period, the real value of manmade-filament yarn shipments more than doubled.

¹⁰ E.I. du Pont de Nemours & Co., *Annual Report*, 1991 (1992).

¹¹ Microfibers include manmade-staple fiber and filament that are finer than silk, which is nature's finest fiber.

¹² To some extent, large manmade fiber companies in the United States and other Organization for Economic Cooperation and Development (OECD) countries have been sheltered from domestic and foreign competition by patent protection and by the large entry barriers that result from economies of scale in research and development.

Figure 7
Capital expenditures by spun yarn mills (SIC 2281), 1987-91



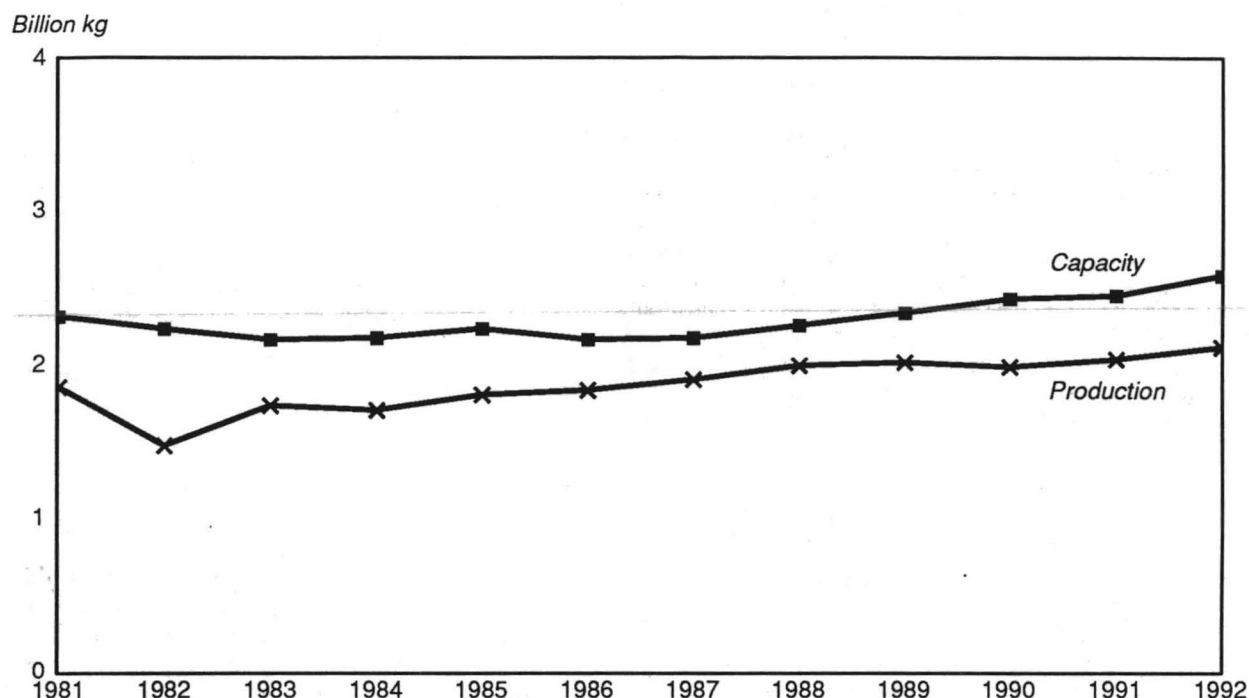
Source: *Annual Survey of Manufactures*, 1987; 1988; 1989; 1990; and 1991.

Table 5
U.S. employment data for yarn-spinning mills (SIC 2281), specified years 1972 to 1991

Year	Production workers as percent of total employment	Value added per production worker hour
	Percent	1972 dollars
1991	89	10.29
1990	90	9.17
1989	90	9.15
1988	90	8.48
1987	90	8.76
1982	90	5.96
1977	92	5.36
1972	93	4.19

Source: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics.

Figure 8
Manmade-filament yarn capacity and production, 1981-92



Source: *Fiber Organon*, Jan. 1993.

Table 6
The structure of the U.S. manmade-filament yarn sector (SICs 2823 and 2824), specified years 1972 to 1991

Item	1972	1977	1982	1987
Number of companies ¹	48	42	49	53
Number of establishments ¹	79	76	79	79
Number of employees (1,000) ¹	95.3	89.9	74.4	56.2
Number of production workers (1,000) ¹	72.8	67.3	53.9	42.3
Value of shipments (million dollars) ²	42,390.1	4,089.8	5,679.9	6,376.9
Value of shipments (million dollars) ^{2 3}	42,390.0	2,852.2	2,617.5	4,352.0
Capacity utilization ⁵	83	74	67	88
	1988	1989	1990	1991
Number of establishments ⁶	84	86	92	85
Number of employees (1,000) ¹	56.0	58.1	57.8	57.4
Number of production workers (1,000) ¹	42.3	43.9	43.3	42.7
Value of shipments (million dollars) ²	7,085.6	7,694.6	7,840.0	8,048.6
Value of shipments (million dollars) ^{2 3}	4,635.1	4,935.6	4,633.1	4,999.1
Capacity utilization ⁵	88	86	82	83

¹ Includes all manmade-fiber producers classified under SICs 2823 and 2824.

² Data for manmade-filament yarn only. Estimated by the staff of the U.S. International Trade Commission.

³ Constant 1972 dollars as deflated by the Producer Price Index for the relevant SICs.

⁴ Does not include producer textured manmade-filament yarn.

⁵ Capacity utilization rates for synthetic-filament yarn only. *Fiber Organon*.

⁶ Establishment data from Fiber Economics Bureau, Inc.

Source: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics, except as noted.

Consequently, a larger share of shipments originated from plants employing fewer workers in 1987 than in 1972 (figure 9).

Several of the major U.S. manmade-filament yarn producers are fully integrated petroleum and chemical companies that conduct petroleum exploration, refine petroleum, and produce intermediate raw materials for their downstream fiber production (table 7). Other major producers are large chemical companies that produce intermediate raw materials with purchased petrochemicals. Except for a few cases, in which some industrial fabrics and carpet backing are produced, U.S. manmade-filament yarn producers generally are not integrated into downstream production of textile products. However, the major companies that produce U.S. manmade-filament yarn also have divisions that manufacture a wide range of products such as resins, plastics, detergent ingredients and phosphates, rubber and process chemicals, specialty chemicals, and pharmaceuticals.

Several of the large U.S. manmade-filament yarn producers are multinational firms or subsidiaries of multinational firms (table 8). Traditionally, U.S. investment in foreign manmade-filament yarn production facilities has been concentrated in other Organization for Economic Cooperation and Development (OECD) countries. Although there was some divestment from Europe in the early 1980s, renewed interest in that region has developed in connection with the single EC market. U.S. investment in developing countries has traditionally focused on Latin America, especially in Brazil and Mexico. Most recently, U.S. investors have shown increasing interest in the Far East. For the most part, U.S. foreign investment has involved wholly owned subsidiaries. Investment restrictions and export performance requirements in many countries have lead U.S. companies to license new technology rather than to establish new subsidiaries.

Major Factors of Production

The manmade-filament yarn sector is highly capital-intensive in comparison with the spun yarn sector. In 1987, the average gross book value of capital of a manmade-filament yarn establishment was \$106.8 million compared with \$6.7 million for a spun yarn establishment. In that same year, wages accounted for only 8 percent of the total value of manmade-filament shipments compared with 14 percent of the total value of spun yarn shipments. Materials, however, accounted for the largest portion of production costs in both sectors.

Raw materials

Raw materials for the production of synthetic-filament yarn are petroleum derivatives and virtually all of the U.S. demand for these materials is supplied by the U.S. petroleum industry. Synthetic organic chemicals comprise the major portion of these raw materials (figure 10). These chemicals are used

primarily by manufacturers who have upstream chemical production. Plastics resins are generally purchased by the smaller manufacturers who do not have integrated operations. The prices of synthetic organic chemicals and plastic resins are influenced by the price of oil. Petrochemical prices are sensitive to the market demand for its numerous downstream uses, including various chemical products and automotive fuel.

Capital

The real value of capital expenditures by manmade fiber producers remained fairly flat between the late 70s and the mid-80s. However, as illustrated in figure 11, capital spending increased steadily between 1987 and 1991. In 1991, manmade fiber producers spent \$915 million on new machinery and buildings.

Labor

The manmade-filament yarn sector traditionally has required workers with higher technical skills than those employed in the spun yarn sector. As a result, average wages for production workers in the former sector tend to be higher than those in the spun yarn sector. In 1991, the average hourly wage of production workers in manmade-filament yarn plants was \$14.17 or 78 percent higher than that in spun yarn mills. However, the value added per production worker for manmade fibers was more than five times that for yarn spinning. Increased efficiency in the manmade-filament yarn sector lead to a decrease in the labor element and, as a result, the real value added per production worker hour more than tripled between 1972 and 1991 (table 9).

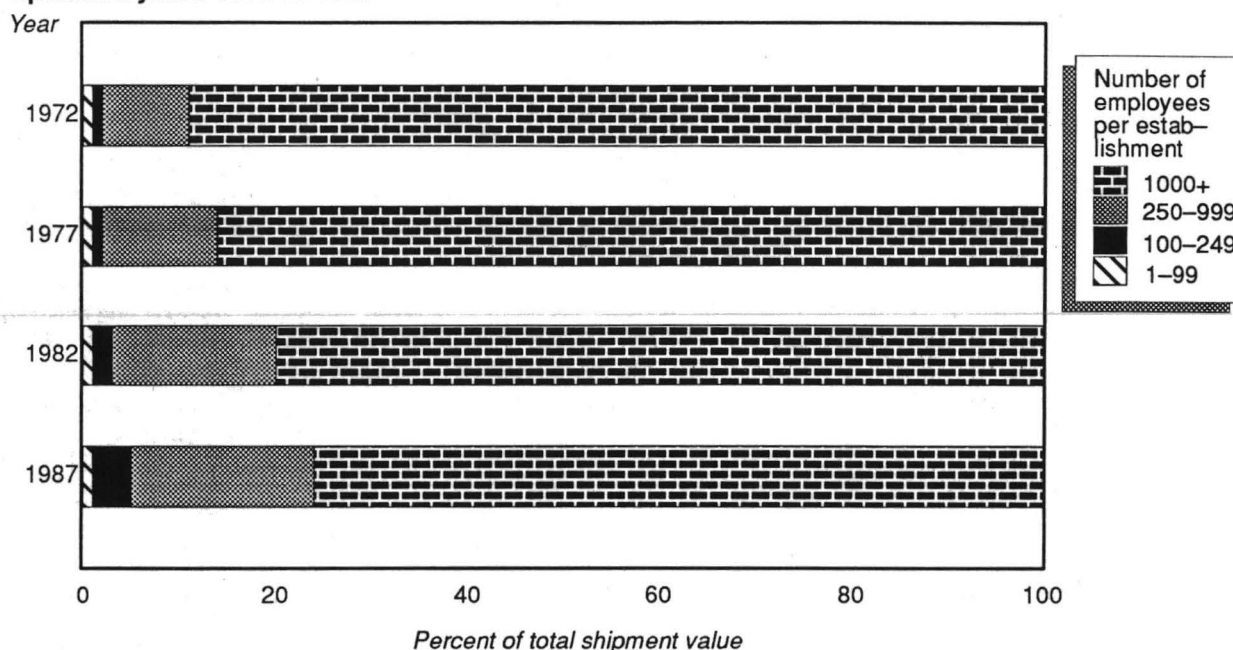
Consumer Characteristics and Factors Affecting Demand

Consumer Characteristics

For the most part, yarn is an intermediate product in the production of textile products, such as apparel, and nontextile products, such as automobile tires. Some yarn is sold as end products, such as craft and handwork yarn. The primary consumers of yarn and major end uses are listed in table 10. The U.S. consumer base is large and is dispersed throughout the United States. In the U.S. textile industry alone, there are roughly 3,500 mills (weaving, machine knitting, and floor covering mills) with shipments valued at roughly \$40 billion. A large portion of these mills are in the South near yarn producers.

The primary customer for spun yarn is the knitting mill industry (figure 12). Knitting mills purchase a high percentage of their yarn because they tend to be small, nonintegrated, style-oriented entities that generally require a greater variety of yarns. Weaving mills, on the other hand, purchase only a small portion of their spun yarn. The majority of the woven fabric producers are large, vertically integrated textile mills

Figure 9
Manmade-filament yarn: Distribution of U.S. shipments by establishment size (SIC 2824),
specified years 1972 to 1987



Note.—These data represent establishment size and not firm size. A firm may own more than one establishment. Includes manmade-filament producers in addition to other manmade fiber producers in SIC 2824.
Source: *Census of Manufactures*, 1972; 1977; 1982; and 1987.

that produce their own yarn.¹³ Knitting mills purchase roughly 70 percent of their total spun yarn usage, floor covering producers purchase 30 percent, and woven fabric producers purchase 10 percent.¹⁴

Weaving and floor covering mills are the largest consumers of manmade-filament yarn (figure 13). The floor covering industry purchases about two-thirds of its total manmade-filament yarn usage, whereas the weaving and knitting mills purchase virtually all of their usage. Manmade-filament yarn is sold directly to manufacturers of downstream products and to yarn converters who texturize the yarn for resale.

Factors Affecting Demand

The demand for yarn is largely a derived demand that is driven by major end-use markets: apparel, home

textiles (e.g., sheets, towels, and curtains), floor coverings, and industrial and other consumer-type goods. The factors affecting demand for these end-use markets are varied.

Apparel and home textiles tend to be low-ticket, nondurable items. The demand for these items is largely affected by the availability of disposable income and by changes in fashion and consumer taste. For the most part, the apparel and home textiles markets are mature and saturated. The demand for yarn used in these markets also is particularly affected by imports of fabric, apparel, and home textiles. While yarn imports result in direct displacement of domestic sales yarn production, imported fabrics, apparel, and home textile products made with foreign yarns are a form of indirect competition to the extent that they displace domestic sales yarn.^{15 16}

¹³ Although integrated firms rarely purchase spun yarn, they may purchase yarn that they either do not produce, or do not produce in sufficient quantity. With the exception of a few firms, which have separate sales yarn divisions, these integrated textile manufacturers virtually never sell yarn. However, they may sell some yarn when weak fabric business results in over production of yarn.

¹⁴ In recent years an increasing number of carpet manufacturers and knitters have integrated backwards into spun yarn production, for example Shaw Industries, Inc., the largest U.S. carpet producer, and Sara Lee Knit Products.

¹⁵ However, to the extent that lower priced imports increase U.S. demand for apparel and other textile products, the displacement is not on a one-for-one basis.

¹⁶ The proposed phaseout of the Multifiber Arrangement (MFA) may result in an increase in fabric and apparel imports, which, in turn, could reduce demand for domestically produced apparel. For further discussion of the MFA, see the section entitled "Nontariff Measures".

Table 7
Leading U.S. manmade-filament yarn firms

Firm	Vertical integration	Horizontal integration
Allied-Signal Inc., Engineered Materials sector, Fibers Division	39% interest in Union Texas Petroleum Holdings, Inc. (oil and gas exploration and processing and petrochemical manufacturer.	Fluorine products, plastics, performance materials.
Amoco Fabrics and Fibers Co	Fully integrated petroleum and chemical company, downstream production of industrial fabrics and carpet backing.	Films, resins, plastic packaging materials, petrochemicals, etc.
BASF	No.	Agricultural chemicals, consumer products, dyestuffs and finishing products, chemicals, raw materials and energy.
DuPont Fibers	Fully integrated petroleum operation conducted through Conoco.	Agricultural chemicals, industrial and specialty chemicals, pharmaceuticals, films, resins, adhesives, paints and coatings films, resins, plastic packaging materials, petrochemicals, etc.
Hoechst Celanese Corp	Some fiber intermediate production.	Acetate cigarette filter tow; specialty and bulk chemicals; prescription drugs; agricultural chemicals, engineering plastics, dyes and pigments, film.
Monsanto Chemical Company, Fibers and Engineered Products Division	No.	Agricultural products; chemical products; pharmaceuticals; food products; and industrial process control equipment; nonwoven fabrics.
Phillips Fiber Corp	Fully integrated oil and Fully integrated oil and	Plastics and petrochemicals.

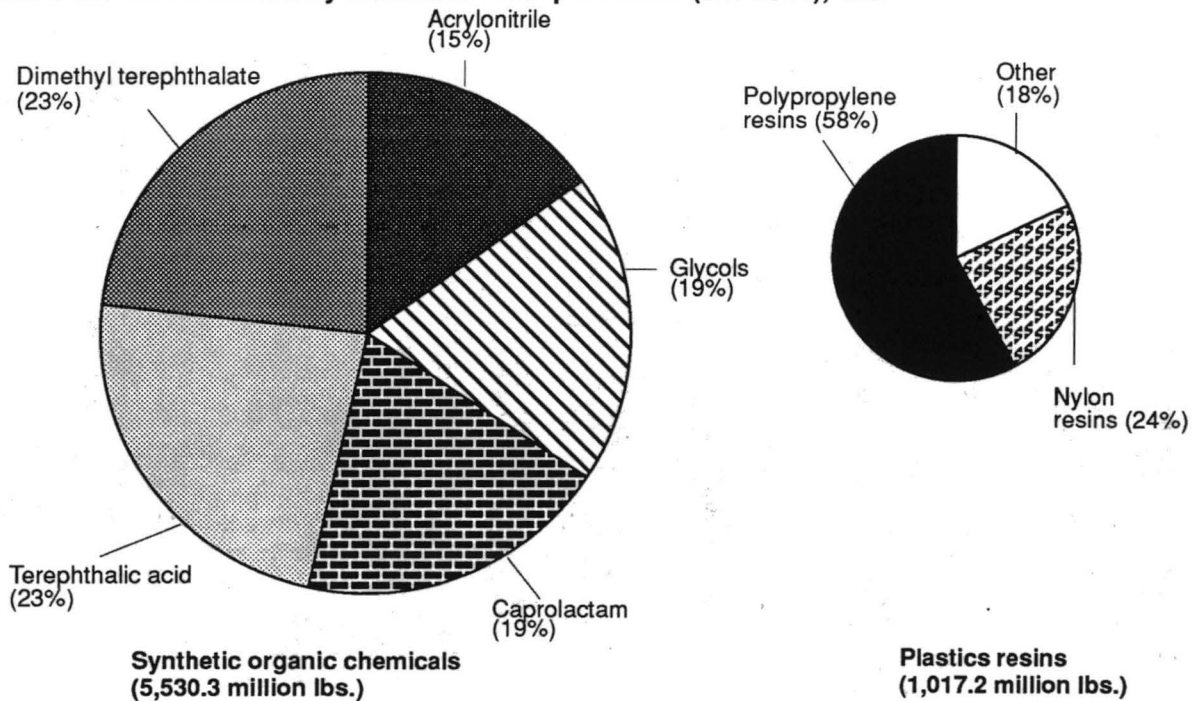
Source: Compiled by the staff of the U.S. International Trade Commission from Moody's Investors Service, *Moody's Industrial Manual* (New York: Moody's, 1992); Standard and Poor's Corp., *S&P's Corporation Records* (New York: Standard & Poor's, 1992); Allied Signal, Inc., *Change, Progress, New Horizons: 1991 Annual Report* (1992); Amoco Corp., *Amoco Corporation Annual Report 1991* (1992); BASF Corp., *BASF* (1991); E.I. du Pont de Nemours and Co., *Annual Report 1991* (1992); Hoechst Celanese Corp., *Annual Report 1991* (1992); and Monsanto Co., *1992 Annual Report* (1993).

Table 8
Major U.S. manmade-filament yarn producers and their foreign affiliations

Firm	Parent firm	Producer affiliations and percentage of capital ownership
Amoco Fabrics & Fibers Company	Amoco Corporation Amoco Chemical Co. (U.S.A.)	<ul style="list-style-type: none"> • Amoco Chemicals Pty. Ltd., 100% (Australia) • Propex do Brasil Produtos Sineticos Ltda., 100% (Brazil) • Amoco Fabrics & Fibers Ltd., 100% (Canada) • Amoco Deutschland G.m.b.H., 100% (West Germany) • Amoco Fabrics Ltd., 100%, (U.K.) • Amoco Fabrics & Fibers Co., 100% (USA)
BASF Corporation Fibers Division	BASF Aktiengesellschaft (Germany)	<ul style="list-style-type: none"> • BASF Corporation Fibers Division, division of BASF Corporation 100% (U.S.A.) • BASF Canada Inc. is a subsidiary of BASF Corporation 100% (U.S.A.).
DuPont Fibers	E.I. Du Pont De Nemours & Company (Inc.) (U.S.A.)	<ul style="list-style-type: none"> • Ducilo 82%; Bunge & Born 18% (Argentina) • Du Pont do Brasil, 100% (Brazil) • Du Pont Canada 75%; public 25% (Canada) • Du Pont de Nemours (Deutschland) 100% (Germany) • Toray-Dupont 50%; Toray Industries 50% (Japan) • Du Pont Fibres 100% (Luxembourg) • Nylon de Mexico 40%; Alfa-Group 51%; public 9% (Mexico) • Du Pont de Nemours (Nederland) 100% (Netherlands) • Du Pont 50%; Sabanci Group 50% (Turkey) • Du Pont (U.K.) 100% (U.K.) • Fibers Department 100% Polymer Products Department 100% (U.S.A.)
Hoechst Celanese Corp.	Hoechst AG (Germany)	<ul style="list-style-type: none"> • Austria Faserverke; Hoechst Austria 51%; Lenzing 49% (Austria) • Hoechst Celanese 100% (Belgium) • Hoechst Do Brasil Quimica e Farmaceutica S.A. 100% (Brazil) • Celanese Canada Inc. 56%; public 44% (Canada) • Nantong Cellulose Fibers Co. Ltd. (China) • Hoechst A.G. 100% Zehlendorf 97%; others 3% (Germany) • Celanese Mexicana, S.A. 51%; public 49% (Mexico) • Hoechst Fibras S.A. 100% Hoechst Portuguesa S.A.R.L. 100% (Portugal) • Hoechst South Africa 100% (South Africa) • Hoechst Fibre Industries 100% (U.K.) • Hoechst Celanese Corporation 100% (U.S.A.)

Source: Compiled by the staff of the U.S. International Trade Commission from Fiber Organon; Moody's Investors Service, *Moody's Industrial Manual* (New York: Moody's, 1992); Amoco Corp., *Amoco Corporation Annual Report 1991* (1992); BASF Corp., *BASF* (1991); E.I. du Pont de Nemours and Co., *Annual Report 1991* (1992); and Hoechst Celanese Corp., *Annual Report 1991* (1992).

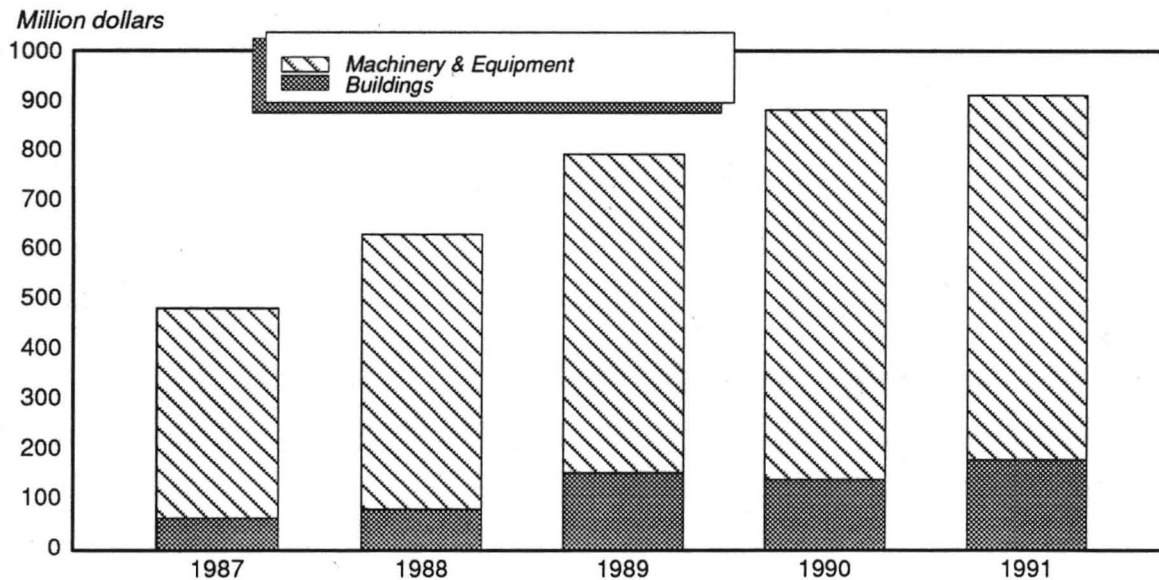
Figure 10
Raw material consumed by manmade-fiber producers (SIC 2824), 1987



Note.—Data include raw materials consumed by manmade-filament producers in addition to other fiber producers under SIC 2824.

Source: 1987 Census of Manufactures.

Figure 11
Capital expenditures by manmade-fiber producers (SICs 2823 and 2824), 1987-91



Note.—Includes all manmade-fiber producers under SICs 2823 and 2824.

Source: Annual Survey of Manufactures, 1987; 1988; 1989; 1990; and 1991.

Table 9
U.S. employment data for manmade-filament yarn,¹ specified years 1972 to 1991

Year	Production workers as percent of total employment	Value added per production worker hour
	Percent	1972 dollars
1991	75	53.18
1990	75	48.26
1989	76	53.99
1988	76	50.81
1987	75	48.39
1982	72	19.21
1977	74	18.54
1972	75	17.48

¹ Includes manmade-filament yarn producers in addition to other manmade-fiber producers in SIC 2824—
 Manmade Organic Fibers, Except Cellulosic.

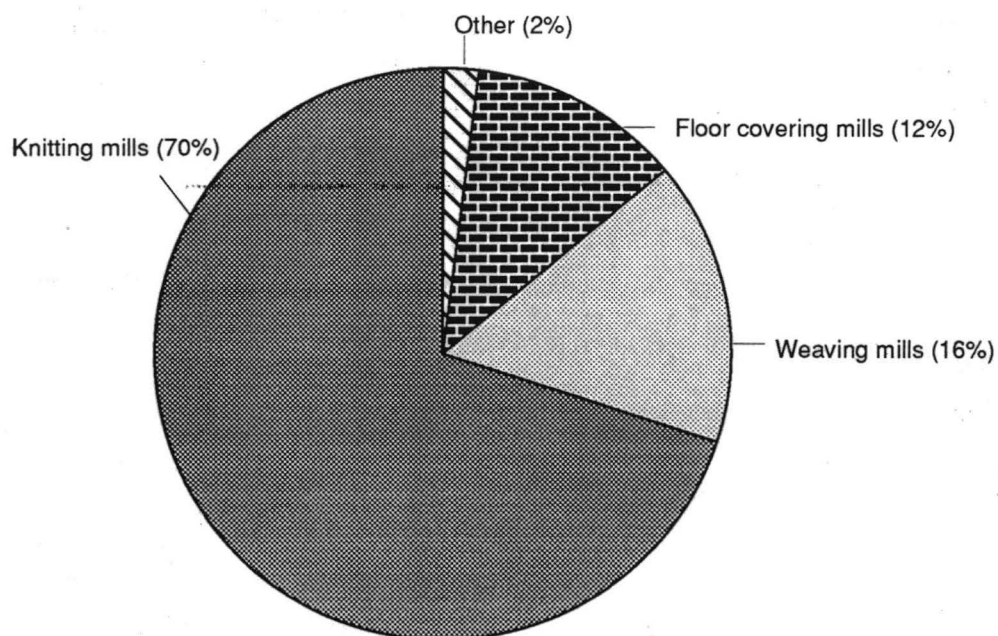
Source: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics.

Table 10
Yarn: Primary consumers and end uses

Primary Consumers	End Uses
Weaving mills	<ul style="list-style-type: none"> • broadwoven and narrow woven fabrics for apparel, home textiles, and industrial products.
Knitting mills	<ul style="list-style-type: none"> • knit fabric for apparel, home textiles, and industrial products. • knit apparel (e.g., hosiery and sweaters).
Floor covering mills	<ul style="list-style-type: none"> • carpets and rugs.
Reinforced rubber products manufacturers (manmade filament yarn)	<ul style="list-style-type: none"> • tires, hoses, and belting.
Other industrial and consumer- type products manufacturers	<ul style="list-style-type: none"> • coated and protective fabrics, filtration, industrial webbing, and bags and bagging.
Retailers	<ul style="list-style-type: none"> • fishing line, sewing thread, and craft yarn.

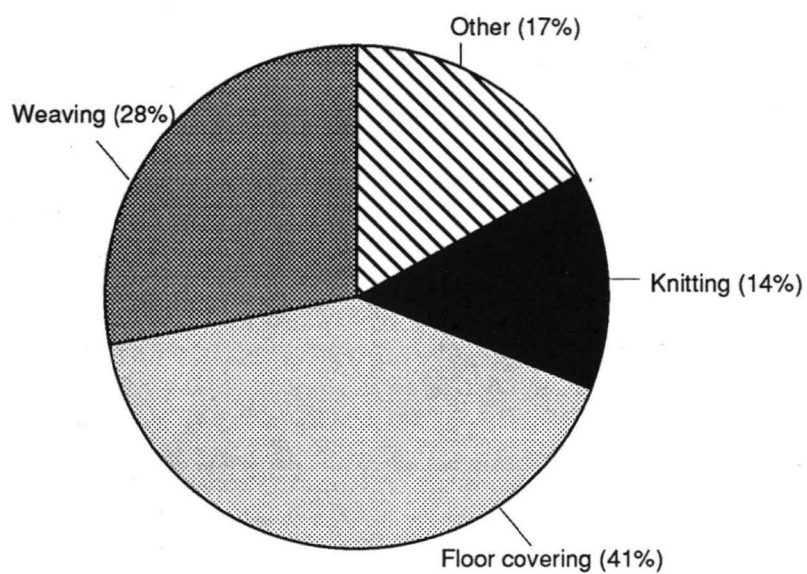
Source: Compiled by the staff of the U.S. International Trade Commission.

Figure 12
Consumption of U.S. spun yarn put up for sale, by primary markets, 1991



Source: U.S. Bureau of the Census, *Spun Yarn Production*, Oct. 1992.

Figure 13
Consumption of U.S. manmade-filament yarn by primary markets, 1991



Source: *Fiber Organon*, June 1992.

The floor covering market is largely affected by residential and commercial construction activity, as well as the demand for replacement flooring in existing homes and offices. The level of construction activity is also sensitive to fluctuations in the state of the economy. Carpet imports are relatively insignificant.

Industrial end-use markets for yarn are particularly affected by activity in the automobile industry due to the large number of textile components used in automobiles and the size of this market. The automobile market is particularly sensitive to fluctuations in the general state of the economy. Auto imports have also affected domestic demand for yarn. Sales volume of technical products, such as those for medical uses, civil engineering, and the aerospace industry tend to be more stable and less affected by general economic activity. Demand for yarn in the industrial/specialty markets is expected to grow as more and more new uses are found for textiles in these areas.

Demand for particular types of yarn is dependent on the specific properties required by the end use. Figure 14 illustrates that spun yarn accounts for over 80 percent of the apparel and the home textiles markets, and that manmade-filament yarn accounts for over half of the floor covering market and over two-thirds of the industrial and other consumer-type product market. Market share is also divided by type of fiber. For example, nylon is especially popular in carpeting, whereas blends of polyester and cotton are widely used in apparel. Substitutability between different types of yarn is limited largely by their technical properties and by consumer tastes and preferences. Price also has a significant effect on substitutability of yarn for apparel and home textiles, for which blends may be adjusted and still maintain acceptable characteristics.

FOREIGN INDUSTRY PROFILE

Spun Yarn

Approximately 22 billion kg of spun yarn were produced worldwide in 1991, up 23 percent from about 18 billion kg in 1980. China, by far the largest spun-yarn-producing country, produced roughly 5 billion kg or about 23 percent of the world total (figure 15). The United States was the second-largest producer at 3 billion kg. A major portion of the overall growth in world production of spun yarn was accounted for by China, which increased its production by 2 billion kg between 1980 and 1991. Spun yarn production in Japan and the European Community (EC), on the other hand, fell slightly during that period.

In 1991, China was the largest producer of cotton yarn, followed by the former U.S.S.R., the United States, and India. These countries, along with Pakistan and Brazil, are also the world's largest cotton-growing countries. The United States is by far the world's largest manmade-staple yarn producing country. Major wool yarn producers include the EC (mainly Italy), the former U.S.S.R., and China. Since 1980, world production of wool yarn has shifted from the EC

towards Asia, especially China. The United States is a relatively small producer of wool yarn.

Figure 16 illustrates the installed spinning capacities of the major spun yarn producing countries. The number of machines, however, does not necessarily correlate with an individual country's actual production. For example, China has almost 3 times as many ring spinning spindles as the United States, however, China only produces 66 percent more yarn than the United States. Through advances in spinning technology, developed countries such as the United States have been able to reduce the number of machines by replacing them with faster, more efficient equipment. In the United States, many spindles have been replaced with faster, more efficient open-end rotors.

The higher portion of rotors to spindles in the developed countries tends to correlate with the higher labor costs in those countries. In the developing countries, such as China and India where labor costs are lower, older, less-efficient machinery is mostly used. Japan, however, has a relatively low ratio of rotors to spindles because of its emphasis on finer yarn counts. The former U.S.S.R. has traditionally accounted for the largest number of rotors, largely because of the prominence of open-end rotor technology in Eastern Europe and because of the type of yarn produced.

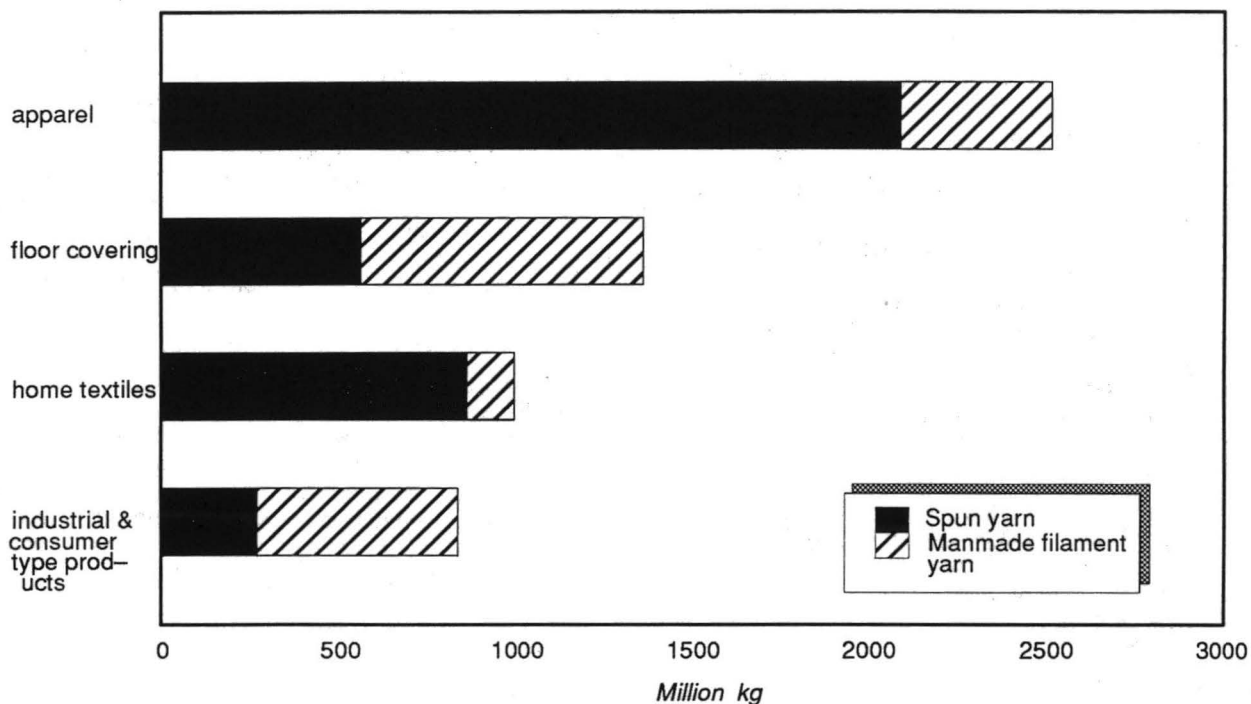
Over the past decade, there has been a shift of world spun yarn production capacity from the developed countries toward the developing countries. Most of the regional increase in production capacity has occurred in Asia. Growth of spun yarn capacity in many countries such as China and India has been facilitated by strong demand for their exports of downstream textile goods. Between 1982 and 1991, India received 7.6 million short-staple spindles or roughly 26 percent of total world deliveries.¹⁷ Other fast growing Asian producers include Pakistan, Indonesia, and Thailand.

Much of the growth in developing countries' spinning capacities has been facilitated by investments from more advanced producers. Japan, and more recently, Taiwan, Korea, and Hong Kong have invested in yarn-spinning subsidiaries in other less developed Asian countries. Motivations for these investments include (1) developing low-cost production bases to supply demand at home, (2) establishing export production bases in countries whose textile shipments to major world markets are less restricted by quotas, (3) finding outlets for outdated but still productive equipment, and (4) earning income from management and know-how that is particularly relevant to production in developing countries.

Table 11 shows a breakdown of the comparative unit cost of producing cotton yarn in six major yarn-producing countries, including the United States. Raw materials and labor are the two primary inputs determining the relative levels of costs among

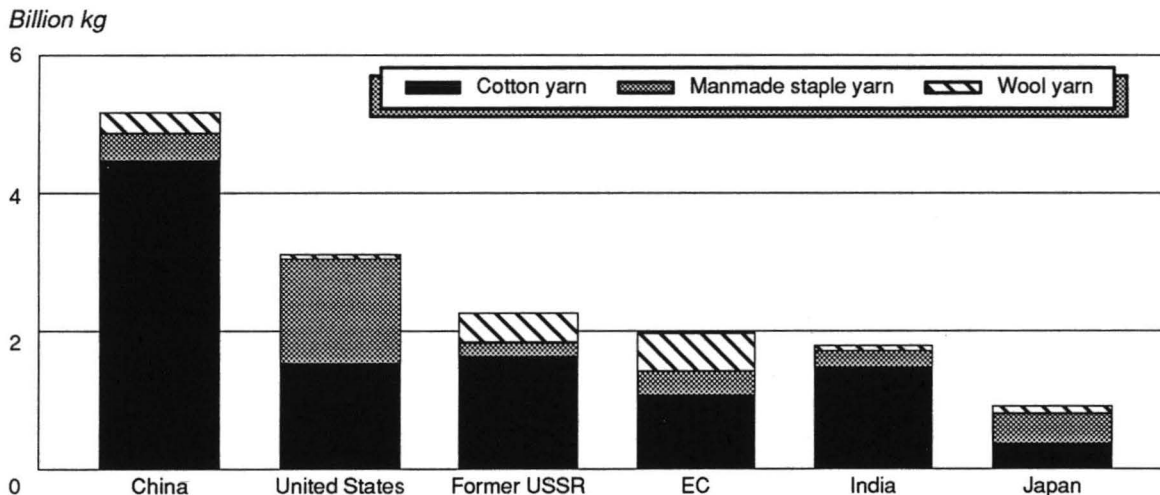
¹⁷ International Textile Manufacturers Federation, *International Textile Machinery Shipment Statistics*, (Zurich, Apr. 1992).

Figure 14
Yarn: U.S. consumption by end use, 1991



Source: Estimated from U.S. fiber consumption data from *Fiber Organon*, Sept. 1992.

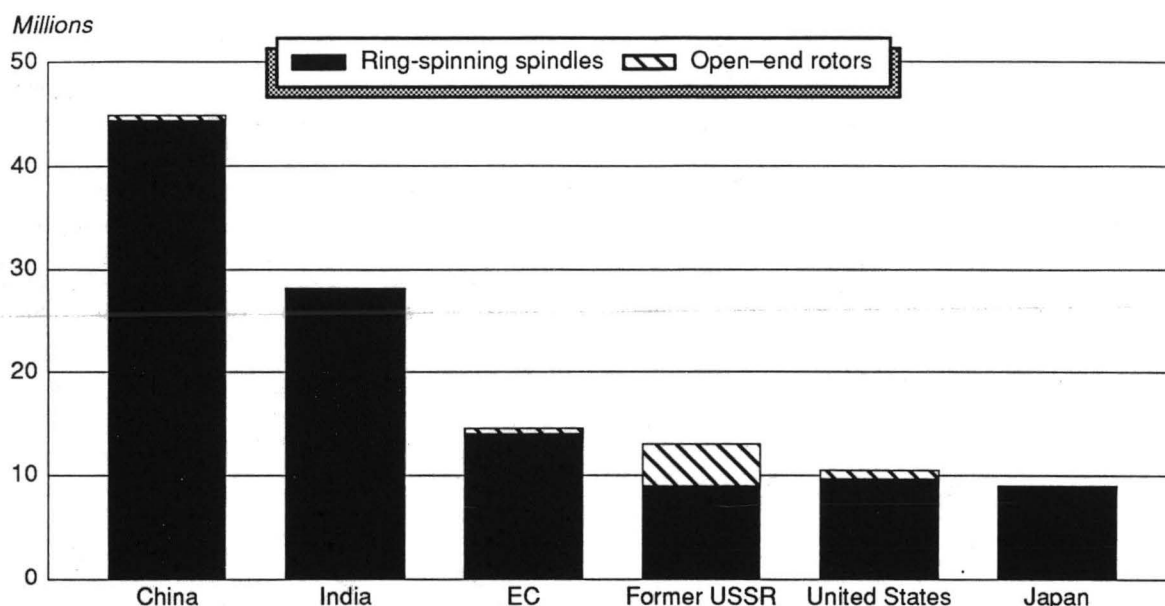
Figure 15
Major spun yarn-producing countries, 1991



Note.—Production data for Taiwan are estimated by USITC staff.

Source: U.S. production data from U.S. Bureau of the Census, *1992 Current Industrial Reports: Yarn Production*. Japanese data from The Research and Statistics Department of MITI. Other country data estimated by the USITC staff from United Nations, *Industrial Statistics Yearbook 1990*, New York: 1991; Coordination Committee for the Textile Industries in the EEC, *Comitextil*, Bulletin 93/1-2; International Textile Manufacturers Federation, *Country Statements 1991*; and International Cotton Advisory Committee, *Cotton: World Statistics*, April 1992.

Figure 16
1991 installed yarn spinning capacities



Note—In 1991 Japan's installed yarn spinning capacity included 148 thousand open-end rotors and India's included 69.9 thousand rotors.

Source: International Textile Manufacturers Federation, *International Textile Machinery Shipment Statistics*, (Zurich, Apr. 1993).

Table 11
Total yarn costs, 1991

Item	Brazil	Germany ¹	India	Japan	Korea	USA
Dollars per kg						
Waste	0.17	0.16	0.13	0.19	0.19	0.16
Labor	0.13	0.35	0.08	0.54	0.10	0.48
Power	0.13	0.23	0.15	0.24	0.13	0.11
Auxiliary material	0.13	0.09	0.11	0.09	0.09	0.08
Capital (depreciation and interest)	1.08	0.57	0.94	0.80	0.59	0.81
Raw material (cotton)	1.79	2.05	1.40	1.94	1.97	1.72
Total yarn costs	3.43	3.45	2.81	3.80	3.07	3.36
Percent of total cost						
Waste	5	5	5	5	6	5
Labor	4	10	3	14	4	14
Power	4	7	5	6	4	3
Auxiliary material	4	3	4	3	3	3
Capital (depreciation and interest)	31	16	33	21	19	24
Raw material (cotton)	52	59	50	51	64	51
Total yarn costs	100	100	100	100	100	100

¹ A major portion of Germany's carded cotton yarn is spun on open-end rotor machines, whereas ring spinning is still the dominant technology in the other countries for this type of yarn.

Note.—Based on a 100-percent carded cotton yarn.

Source: International Textile Manufacturers Federation, *1991 International Production Cost Comparison Spinning/Weaving* (Zurich, Aug. 1991).

countries.¹⁸ The extent to which yarn producers have access to competitively priced raw materials has a significant effect on total production costs. The significance of raw material costs can be seen by comparing production costs of both Germany and Korea, which must import cotton, to those of the United States, which predominantly uses domestic cotton. In 1991, Germany's yarn-manufacturing costs, excluding cotton costs, were 15 percent lower than those of the United States. Korea's costs were 33 percent lower than U.S. costs, when cotton costs were excluded.

Table 12 illustrates the disparity of labor costs among some of the major spun yarn producing countries. Labor costs in the developed countries averaged \$10 to \$17 per hour compared to those in China and Indonesia that averaged \$0.30 per hour. In order to remain competitive in the global market, the United States, EC, and Japan have incorporated faster, labor-saving equipment. Low-labor-cost countries such as China and India have been able to remain competitive, especially in standard products, using relatively old, less efficient equipment. Furthermore, sharp increases in labor costs in Japan, Taiwan, and Korea have encouraged these countries to move capacity to lower labor-cost countries such as Thailand and Indonesia.

World exports of spun yarn are small compared with world spun yarn production because most yarn is used in the local production of textile goods. The United States exports slightly over 1 percent of its total spun yarn production volume. China exports less than 5 percent, and Korea exports about 8 percent. In 1990, Pakistan was the largest exporter of spun yarn, exporting 436 million kg or 51 percent of its cotton yarn production. China was the second-largest, exporting roughly 200 million kg.

China

China's large domestic supply of raw materials has facilitated the development of its large spun yarn sector. China is currently the world's leading producer of cotton, silk and ramie, the fourth-largest producer of wool, and a major producer of flax and a number of specialty fibers such as cashmere. However, rapid expansion of the Chinese textile industry in recent years has resulted in raw material shortages in China. Hard currency for raw material imports has also been limited.

More than two-thirds of China's spun yarn output comes from government-owned facilities and the remainder is produced mainly by collectives. In recent years there has been significant expansion of production capacity in the industry. Most of this growth is believed to involve small, semi-private

¹⁸ For each of the countries shown, raw materials accounted for about 50 to 70 percent of total costs. In 1990 a sharp increase in world cotton prices added about 10 cents per pound to total costs.

spinners using reactivated machinery, which had been scrapped by state mills.¹⁹ The result has been over-production and growing inventories of low-quality products.

Cotton yarn is an important export commodity for China, although exports account for less than 5 percent of production. In recent years, export volume has dropped largely because of the Chinese Government's efforts to encourage the export of finished goods that have a higher value added and because of quality and delivery problems.²⁰ In an effort to regulate spun yarn production and to raise general quality standards, the Chinese Government placed a 5-year ban on the installation of any new spindles.²¹ Spinning capacity at the end of 1990 was believed to be in the range of 38 million spindles, almost 12 million above the limit set by the Chinese Government.

EC

France, Germany,²² and Italy account for roughly 60 percent of the spun yarn produced in the EC. Over the past decade the EC spun yarn sector has undergone major restructuring, with reductions in production capacity and employment. In 1989 the EC produced about 2.5 billion kg of spun yarn, a decrease of more than 7 percent from the 1980 level. In recent years the EC spun yarn sector has experienced high yarn stocks, increasing imports, and falling exports. At the end of the first quarter in 1991, the European index for yarn orders stood at 78 percent (1987=100), its lowest recorded level for more than 4 years.²³ Growing stocks of spun yarn in the EC have caused strong downward pressure on prices, which have led to considerable financial losses, especially for producers of commodity-type yarn. Unfavorable exchange rates in 1990 were the primary reason for falling exports and increasing imports.

Unlike the other major spun-yarn-producing countries, the EC is highly dependent on imported raw materials. Although the EC has a large domestic supply of manmade-staple fiber, much of the cotton and wool must be imported. This reliance on imported raw materials has greatly affected the EC's price competitiveness in spun yarn production.

¹⁹ Peer Munkholt, "The Textile Industry in China," *Textile Outlook International* (The Economist Intelligence Unit: London, July 1990), p. 40.

²⁰ In 1989, U.S. and Japanese companies reportedly filed 46 claims for compensation against exports of Chinese cotton yarns and fabrics. *USA Textile/Apparel Newsletter*, Prent Thomas Textile Consulting, June 15, 1991.

²¹ "Chinese Halt Investment in New Spinning Equipment," *Textile Month*, July 1991, p. 7.

²² Few enterprises in the former German Democratic Republic (GDR) are expected to be able to compete in the unified German market without significant investment in upgrading and modernizing plants and equipment. In the former GDR, cotton yarn and fabric production was reduced by 80 percent in 1990 compared with 1989.

²³ "Worldwide Yarn Stocks Piling Up," *Textile Month*, Aug. 1991, p. 11.

Table 12
Labor cost comparisons in spinning and weaving, spring 1980 and summer/autumn 1991
(\$US/hour)

Country	Spring 1980	Summer/Autumn 1991	Percent change, 1991 from 1980
Italy	\$9.1	\$17.3	90
West Germany	10.2	17.0	67
Japan	4.4	16.4	277
Canada	6.3	14.0	124
France	7.9	12.6	59
United States	6.4	10.3	62
UK	5.8	10.2	77
Taiwan	1.3	5.0	297
South Korea	0.8	3.6	362
Hong Kong	1.9	3.4	78
Mexico	3.1	2.8	-10
Brazil	(¹)	1.5	(¹)
Thailand	0.3	0.9	173
India	0.6	0.6	0
Pakistan	0.3	0.4	18
China	(¹)	0.3	(¹)
Indonesia	(¹)	0.3	(¹)

¹ Not available.

Source: Werner International Inc., *Spinning and Weaving Labour Cost Comparisons Summer/Autumn 1991; and Spring 1980*, (New York, 1992).

India

About 85 percent of India's spun yarn production is cotton yarn. In 1991, India produced 1.5 billion kg of cotton yarn, an increase of 28 percent over its 1981 production level. The number of spindles in India grew from 21 million in 1980 to 28.2 million in 1991, and the number of open-end rotors increased from 490 to 69,900.²⁴

Improved yarn quality and strong demand for cotton yarn in international markets resulted in sharp increases in India's exports of cotton yarn in the mid-1980s. India's exports of cotton yarn peaked in 1987, totaling 86 million kg. In 1990 the Government of India restricted cotton yarn exports to 60 million kg in order to ensure that the requirements of the domestic handloom sector could be met. In September 1991 the Government of India suspended cotton yarn exports.²⁵ This suspension likely had and will have negative effects on customer confidence regarding India's ability to regularly supply cotton yarn.

Japan

Manmade-staple yarn accounts for the largest portion of Japan's spun yarn production. This is largely due to Japan's access to domestic manmade-fiber supplies. Cotton and wool for yarn spinning must be imported.

The Japanese spun yarn sector went through major restructuring during the 1980s. Production capacity was reduced and emphasis was placed on the manufacture of high-value-added yarn and small lots of specialized yarn. Rising labor costs also induced

producers to increase automation, including the establishment of highly automated "lights-out" operations. Integrated production systems from yarn spinning to apparel making also have been emphasized.

Japanese spun yarn producers also shifted production to low-cost Asian countries, such as Thailand and Indonesia. Production facilities in these countries were targeted mainly as low-cost production sources of commodity-type yarns for the Japanese market. Access to these lower labor cost sources enabled the Japanese industry to compete more effectively with its counterparts in Korea and Taiwan.

During the 1980s, the Japanese industry also expanded its spun-yarn production capacity in the United States, partly because the appreciation of the yen against the dollar made U.S. imports of yarn from Japan more expensive. Also, the Japanese industry's presence in the United States enables it to respond more quickly to changing demand patterns in the U.S. market and to provide more customized service to U.S. customers. The Japanese industry's yarn production in the United States is geared primarily toward supplying the U.S. market.

The Former U.S.S.R.

The spun yarn sector in the former U.S.S.R. has been aided by its access to large domestic supplies of raw materials. The former U.S.S.R. is ranked as the world's third-largest producer of textile fibers. It is the largest producer of flax, the second-largest producer of raw wool, the third-largest producer of cotton, and a large producer of manmade fibers.

In 1989, the former U.S.S.R. produced 2.4 billion kg of spun yarn, making it the fourth largest producer in the world. Between 1980 and 1989, spun yarn production in the former U.S.S.R. increased by only 6

²⁴ International Textile Manufacturers Federation, *International Textile Machinery Shipment Statistics*, (Zurich, Apr. 1993).

²⁵ U.S. Department of State Telegram, Sept. 1991, Bombay, message reference No. 05095.

percent. Cotton yarn accounts for roughly three-quarters of its total spun yarn production, and wool yarn for about 19 percent. The former U.S.S.R., is the second-largest producer of cotton yarn after China and the second-largest producer of wool yarn after the EC. Exports of the former U.S.S.R. to markets outside of Eastern Europe are small, amounting to less than 1 percent of total production.

The former U.S.S.R. has a fairly modern spun yarn sector. It accounts for over half of the open-end rotors installed worldwide, almost six times the number of open-end rotors installed in the United States.²⁶

Manmade-Filament Yarn Sector

The world manmade-fiber industry (including filament yarn production) is dominated by a small number of OECD-based multinational chemical companies.²⁷ The 10 largest companies alone account for about 40 percent of total worldwide capacity, although their share has declined in the past decade as production capacity has increased outside of the United States, the EC, and Japan.²⁸

In 1991, world production of manmade-filament yarn totaled roughly 8 billion kg. The United States, the largest producer, accounted for 18 percent of total world production (figure 17). The EC, Taiwan, and Japan accounted for 13, 12, and 10 percent, respectively. Rapid growth of synthetic-fiber/filament yarn capacities in OECD countries in the early-1970s led to severe over-capacity. As a result, cutbacks in capacity occurred during that period, mainly in Western Europe²⁹ and Japan.³⁰ Since the mid-1970s, the industries in the United States, the EC, and Japan have essentially maintained existing production volumes. Since 1980, most of the growth in manmade-filament yarn production has taken place in Asia, especially in Taiwan, Korea, and China (figure 18).

World capacity of manmade filament yarn is projected to increase by about 11 percent from 10 billion kg in 1991 to 11.1 billion kg in 1993. China, Korea, and Taiwan are expected to account for 37

percent of this new capacity and the United States for 17 percent. Capacity is expected to increase by less than 1 percent in Japan, and to fall slightly in the EC.³¹

EC

Since the restructuring of the EC manmade-filament yarn sector in the 1970s, production in the EC has remained fairly stable. Restructuring included substantial capacity reductions, coupled with large reductions in labor and other costs. In addition, the EC industry became more specialized in products that were less threatened by commodity-type imports.

In recent years, the relationship between capacity and demand has been reasonably balanced. However, plans for new investments in the sector may lead to increased capacity surplus in the near future. In Ireland, the polyester-filament yarn capacity is increasing with the U.S. firm Unifi expanding its production capacity, and new production plants being set up by a U.S.-Indonesian group. A joint venture was recently established between a French textiles group and a Japanese synthetic fibers manufacturer to produce polyester-filament yarn in France. Also in France, the U.S. company, Allied Signal, plans to set up a plant to produce polyester-filament yarn for technical applications.³²

In 1991, the EC exported about 68 percent of its manmade-filament yarn production.³³ However, only 20 percent of these exports went to countries outside of the EC. Major non-EC markets included Eastern Europe, the United States, and Africa. In 1991, EC exports of textile manmade-filament yarn to the United States fell, largely due to the downturn in the U.S. textiles industry, while exports of manmade-filament yarns for technical uses remained stable. The weakness of the dollar against European currencies has also accounted for some of the decrease in EC exports to the United States.

Japan

In the mid-1980s, Japan's highly export-oriented manmade-fiber/filament yarn industry shifted its orientation to the home market. This shift was largely the result of increased Japanese demand for yarn and the strong yen relative to the dollar, which reduced the cost competitiveness of Japanese exports to the United States and to countries whose currencies were pegged to the dollar. In addition, a significant portion of Japanese manmade-fiber/filament yarn production was relocated to other Asian-Pacific countries. Production in these countries was established mainly to supply the Japanese market with commodity-type fiber/filament yarn. At the same time, the Japanese domestic industry diversified into new nontextile applications such as optical fibers, and placed more emphasis on textile products with higher value added.

²⁶ International Textile Manufacturers Federation, *International Textile Machinery Shipment Statistics*, (Zurich, Apr. 1992).

²⁷ Barriers to entry in manmade-fiber production including economies of scale, large capital costs, large expenditures on R&D and marketing of new products, and patent protection have tended to limit the number of manmade-fiber producers.

²⁸ Robin Anson and Paul Simpson, *World Textile Trade and Production Trends* (The Economist Intelligence Unit: London, 1988), Special report No. 1108, p. 39.

²⁹ Since 1977 the EC Commission has enforced a "Code on Aid to the Synthetic Fibers Industry," which restricts public financial support that would result in the installation of new capacity or the maintenance of existing capacity in the synthetic fibers industry. The Code was recently extended for the period January 1, 1993 to December 31, 1994. U.S. Department of State Telegram, Apr. 1993, Brussels, message reference No. 04292.

³⁰ In Japan, MITI (Ministry of Trade and Industry) launched a program to scale down domestic polyester and nylon filament yarn capacity in the late 1970s. To prevent the threat of over-capacity reoccurring, legislation

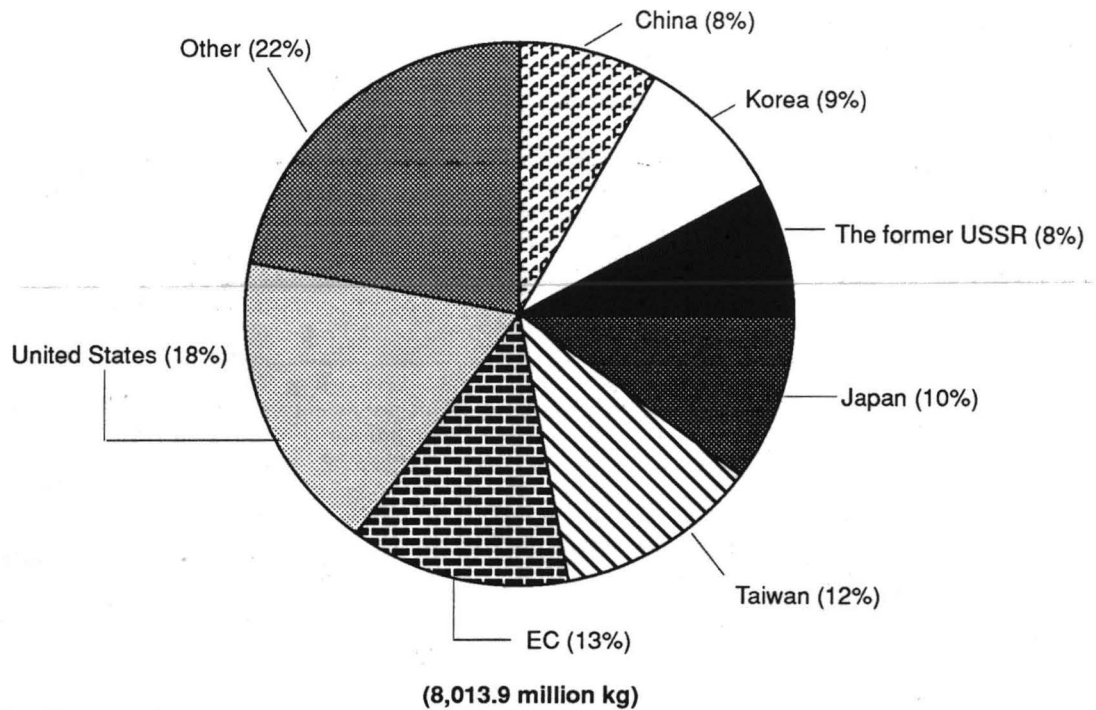
³¹ *Continued*—was introduced in 1983 that prevented the installation of new equipment until 1986.

³² *Fiber Organon*, June 1992.

³³ "Economic Downturn Hits Worldwide Sales," *Textile Month*, June 1991, pp. 36-37.

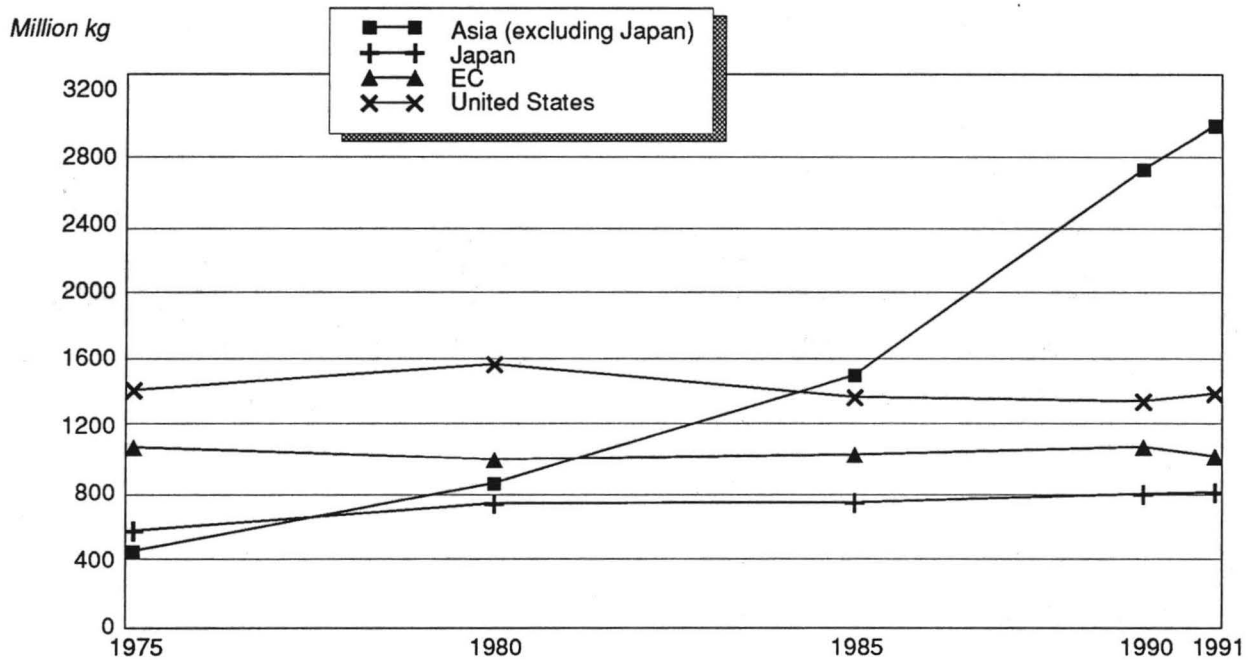
³⁴ *Fiber Organon*, Jan. 1992.

Figure 17
World manmade-filament yarn production, 1991



Source: *Fiber Organon*, June 1992.

Figure 18
World manmade-filament production, specified years 1975 to 1991



Source: *Textile Organon*, June 1980; *Fiber Organon*, June 1985; 1987; and 1992.

Japanese production of manmade-filament yarn increased by almost 15 percent, from 708 million kg in 1987 to 811 million kg in 1991.³⁴ About 14 percent of Japan's production of manmade-filament yarn was exported in 1991.³⁵ In 1990, Japan exported \$2.4 billion of manmade-filament yarn, of which 44 percent went to Southeast Asia, 20 percent went to Western Europe, and 12 percent to North America.³⁶

Unlike the major manmade-fiber/filament yarn producers in the United States, those in Japan have strong financial and technical links with downstream textile and apparel producers. The Japanese Chemical Fiber Association estimates that about half of textile production capacity is controlled by firms that have a direct link to the major manmade fiber/filament yarn producers.³⁷

Taiwan and Korea

The Taiwanese and Korean textile industries are major suppliers of manmade-filament yarn and fabric to developing countries such as China, Thailand, the Philippines, Indonesia, and Singapore. In 1991 Taiwan exported 40 percent of its manmade-filament yarn production.³⁸ Although Korea only exported 14 percent of its manmade-filament yarn production in that same year,³⁹ more than half of its total production was exported in the form of fabric.⁴⁰

Recent increases in production capacity of manmade-filament yarn in both Korea and Taiwan have been fueled by growing demand from the domestic manmade-filament fabric producers and those in other Asian countries.⁴¹ In 1991, Taiwan and Korea were the top two world producers of polyester-filament yarn, at 2.4 million kg/day and 1.7 million kg/day, respectively. Between 1991 and 1994, polyester-filament yarn production capacities in Taiwan and Korea are projected to increase by 68 percent to 4 million kg/day and 26 percent to 2.2 million kg/day, respectively. During that same period, Taiwan is also projected to increase its nylon-filament yarn production capacity by 34 percent to 1.1 million kg/day, superceding Japan, at 0.9 million kg/day, as the largest producer in Asia.⁴²

Investment in machinery and equipment in both Taiwan and Korea's manmade-filament yarn industries has been heavy, optimizing scales of production and lowering labor, energy, and material costs. Both countries have been highly competitive producers even though they have had to import most of their raw materials. However, as Taiwan and Korea have become major producers of manmade-fiber/filament yarn, up-

stream petrochemical production has begun to be located in these countries. ICI (UK) recently opened a 350,000 ton/year pure terephthalic acid (PTA) plant in Taiwan. After the United States, Taiwan is the world's second largest consumer of PTA—a major raw material in the production of polyester fiber/filament yarn.⁴³

China

The Chinese manmade-filament yarn sector has experienced rapid growth in the past decade. In 1980, China produced only 43 million kg of synthetic manmade-filament yarn; by 1991 it produced 564 million kg. At the same time, China cut its production of artificial manmade-filament yarn to less than a third of its 1980 levels, to 49 million kg in 1991.⁴⁴ In 1990, the Chinese manmade-fiber/filament yarn sector produced at 87 percent of its capacity, compared with 82 percent in the United States and 77 percent in Europe. China plans to increase synthetic manmade-filament yarn capacity to 745 million kg by the end of 1993, up 10 percent from 680 million kg in 1992.⁴⁵

Because China is a relatively new synthetic manmade-fiber/filament yarn producer, its production facilities are fairly modern. China also has the potential to become self-sufficient in raw materials (i.e., petrochemicals). However, consistency of production quality remains a problem. Although, the quality in major plants generally meets international standards, there are relatively large differences in product quality, depending on the region and the manufacturing process.⁴⁶ China's exports of manmade-filament yarn is negligible, partly because of quality problems, but also because of the large demand for filament yarn in China for downstream fabric production.

The Former U.S.S.R.

The former U.S.S.R. has a long history in the manmade-fiber/filament yarn sector. Unlike the other major producers, a large portion of the manmade-filament yarn production in the former U.S.S.R. is artificial manmade-filament yarn. In 1991, this filament yarn accounted for 52 percent of total manmade-filament yarn production in the former U.S.S.R., compared with 7 percent in the United States in that year.⁴⁷ Furthermore, production of artificial manmade-filament yarn in the former U.S.S.R. has remained steady while production in the United States, China, and Western Europe has declined. The former U.S.S.R. is the world's largest producer of artificial manmade-filament yarn, producing 229 million kg or 28 percent of the world total. Nevertheless, the former U.S.S.R. exports a negligible amount of artificial or synthetic manmade-filament yarn.

³⁴ *Fiber Organon*, June 1992.

³⁵ *Fiber Organon*, Jan. 1993.

³⁶ Japanese Ministry of Finance.

³⁷ Robin Anson and Paul Simpson, *World Textile Trade and Production Trends* (The Economist Intelligence Unit: London, 1988), Special report No. 1108, p. 169.

³⁸ *Fiber Organon*, Jan. 1993.

³⁹ *Ibid.*

⁴⁰ *Korean Textile Industry*, JTN, June 1991, pp. 92 and 93.

⁴¹ In 1990, the number of fabric looms installed in Korea rose by 32 percent. *Ibid.*, p. 94.

⁴² "Rapid expansion in Synthetic Fiber Facilities," *JTN*, Feb. 1993, p. 16.

⁴³ "Fibres Majors invest in New Asia-Pacific Plants," *Asia-Pacific Chemicals*, Feb. 1993, p. 30.

⁴⁴ *Fiber Organon*, June 1992.

⁴⁵ *Ibid.*

⁴⁶ Peer Munkholt, "The Textile Industry in China," *Textile Outlook International*, July 1990, p. 38.

⁴⁷ *Fiber Organon*, June 1992.

U.S. TRADE MEASURES

Tariff Measures

Yarn is covered in chapters 50-56 of the Harmonized Tariff Schedule (HTS), according to fiber type. Within these chapters, yarn is further differentiated by size or thickness, the amount of twist, whether it has been dyed or finished, and if it is put up for retail sale or not. In the HTS, a formula is used to assign a yarn-number (nm) to indicate yarn size; the higher the number the finer the yarn.⁴⁸ Twist, an important factor in determining yarn strength, is measured in turns per inch. Yarn is also differentiated as to whether it is (1) single ply, (2) plied yarn, made by twisting one or more single ply yarns together, or (3) cable yarn, made by twisting two or more plied yarns together.

U.S. column 1-general rates of duty for yarn, effective January 1, 1992, range as follows:

Item	Rate of duty (percent ad valorem)
silk	5%
wool	0-9%
cotton	5-12%
manmade filament	3.1-13%
manmade staple	11-15%

A more detailed listing of duty rates is given in table B-1 of appendix B. U.S. yarn imports are eligible for preferential rates under the United States-Israel Free-Trade Implementation Act of 1985 and for duty-free treatment under the United States-Canada Free-Trade Agreement.⁴⁹ Only a few types of yarn are eligible for duty-free treatment under the Generalized System of Preferences, the Caribbean Basin Economic Recovery Act, or the Andean Trade Preference Act—silk yarn, yarn of vegetable fibers other than cotton, and some specialty yarn. Cotton fiber that has been carded or combed, an intermediate step in the yarn production process, is also eligible for duty-free treatment.

Nontariff Measures

A major portion of U.S. yarn imports are subject to restraint through quotas negotiated under the Arrangement Regarding International Trade in Textiles, commonly known as the Multifiber Arrangement (MFA). Created under the aegis of the General Agreement on Tariffs and Trade (GATT), the MFA allows signatories to place quantitative limits, or quotas, on imports of textiles and apparel.⁵⁰ MFA

⁴⁸ To determine yarn number, the meters of yarn per kilogram is divided by 1000 and the quotient multiplied by the number of plies in the yarn.

⁴⁹ See appendix A for a description of U.S. tariff and trade agreement terms.

⁵⁰ The MFA covers products of cotton, wool, manmade fibers, and since August 1986, silk blends, linen, and ramie.

quotas include specific limits (SLs), designated consultation levels (DCLs),⁵¹ and minimum consultation levels (MCLs). Quotas can be established through negotiation of bilateral agreements.⁵² In the absence of mutually agreeable limits, quotas can be imposed unilaterally by the importing countries for up to 2 years, provided that the limits are not below actual import levels during 12 of the previous 14 months preceding the date of the request for negotiations. Conclusion of the GATT Uruguay Round along lines proposed in the "Dunkel draft" would call for the phaseout of the MFA over a 10-year period.

To administer the U.S. textile and apparel trade agreements program under the MFA, imports of textiles and apparel are grouped into three-digit category numbers according to product and fiber content (e.g., cotton carded yarn). Quota levels have also been established for broader groups of products, such as yarn, fabric, apparel, or home furnishings. Imports of yarn are classified under the following categories:

200 -	Cotton and/or manmade fiber yarn put up for retail sale, and sewing thread
201 -	Cotton and/or manmade fiber specialty yarns
300 -	Carded cotton yarn
301 -	Combed cotton yarn
400 -	Wool yarn
600 -	Textured filament yarn
603 -	Yarn 85 percent or more of artificial staple fiber
604 -	Yarn 85 percent or more of synthetic staple fiber
604-A -	Acrylic spun yarn
604-O -	Other than acrylic spun yarn
606 -	Non-textured manmade filament yarn
607 -	Other manmade staple yarn
607-P -	Polyester/cotton yarn
607-O -	Other than polyester/cotton yarn
800 -	Silk blends/non-cotton vegetable fiber yarn

During 1991, the United States had bilateral agreements containing quotas on yarn from 19 foreign suppliers. Negotiated quota limits were concentrated in categories 200, 300, 301, 604, and 607. The portion of U.S. yarn imports subject to quota ranged from 53 percent in category 200 to 81 percent in category 300.

About one-fourth of total yarn imports were restricted by binding quotas during 1991. Table 13 shows foreign suppliers whose yarn imports were

⁵¹ DCLs—a more flexible import control—are usually somewhat above existing trade levels and once reached cannot be exceeded unless the United States agrees to further shipments. They normally apply to categories in which trade is not as great as those for which specific limits are set.

⁵² U.S. authority to enter into agreements or establish quotas with MFA and non-MFA signatories is provided under sec. 204 of the Agricultural Act of 1956.

Table 13
Yarn: 1991 binding quotas and fill rates, by countries¹

Country	MFA category	Quota ^{2 3} (kilograms)	Fill rate ⁴ (percent)
Brazil	300/301	4,213,820	85.1
China	200	591,449	98.4
Egypt	300/301	7,012,120	84.2
Hong Kong	200	294,050	98.8
Indonesia	604	131,200	100.0
Korea	200	410,367	91.6
	201	1,488,240	87.9
	604	254,527	82.7
Malaysia	200	188,974	86.7
	604	878,830	78.4
Mexico	604-A	2,298,505	95.4
Singapore	200	351,996	99.7
	604	843,758	98.0
Taiwan	200	626,140	96.7
	301	1,281,438	90.9
Thailand	200	847,500	99.8
	300	3,210,000	98.2
	301-O	642,000	96.5
	301-P	3,210,000	96.2
	607	2,000,000	93.8

¹ Quota utilization rate of 75 percent or higher during the agreement year.

² Quota year extends from January 1, 1991 to December 31, 1991, with the exception of Indonesia's quota year which extends from July 1, 1990 to June 30, 1991.

³ SL, with the exception of a DCL for category 200 for Singapore.

⁴ Percent of quota filled as of May 19, 1992.

Source: Compiled from official statistics of the U.S. Department of Commerce.

restricted by binding quotas⁵³ during the 1991 quota period. Of the countries listed in table 13, Mexico, Thailand, Brazil, Egypt, and Korea were among the top 10 largest foreign suppliers of yarn to the United States in 1991, by volume.

U.S. Government Trade-Related Investigations

On June 10, 1992, the USITC made an affirmative final determination that the domestic industry was materially injured by imports of high-tenacity rayon-filament yarn from Germany that were sold in the United States at less than fair value (USITC investigation No. 731-TA-530). As a result of the USITC's determination, under section 735(b) of the Tariff Act of 1930, the U.S. Department of Commerce issued an antidumping order and imposed antidumping duties on the subject imports from Germany.

⁵³ Quota utilization rate was 75 percent or higher during the agreement year.

FOREIGN TRADE MEASURES

Table 14 shows tariff rates assessed by major trading partners on major categories of yarn imports. U.S. tariffs are relatively low in comparison to those of major U.S. trading partners, although the EC tariff rates are slightly lower. In general, U.S. exports of yarn do not appear to have been hindered by nontariff measures.

U.S. MARKET

Consumption

U.S. yarn consumption increased by an average of only 2.5 percent annually between 1987 and 1991 (figure 19). This trend reflected the sluggish market for downstream goods due to the general economic recession. The import-to-consumption ratio during 1987-91 remained relatively low, ranging between 3.7 and 4.3 percent.

Table 14
Yarn: Tariff rates, by major trade partners

(Percent ad valorem)

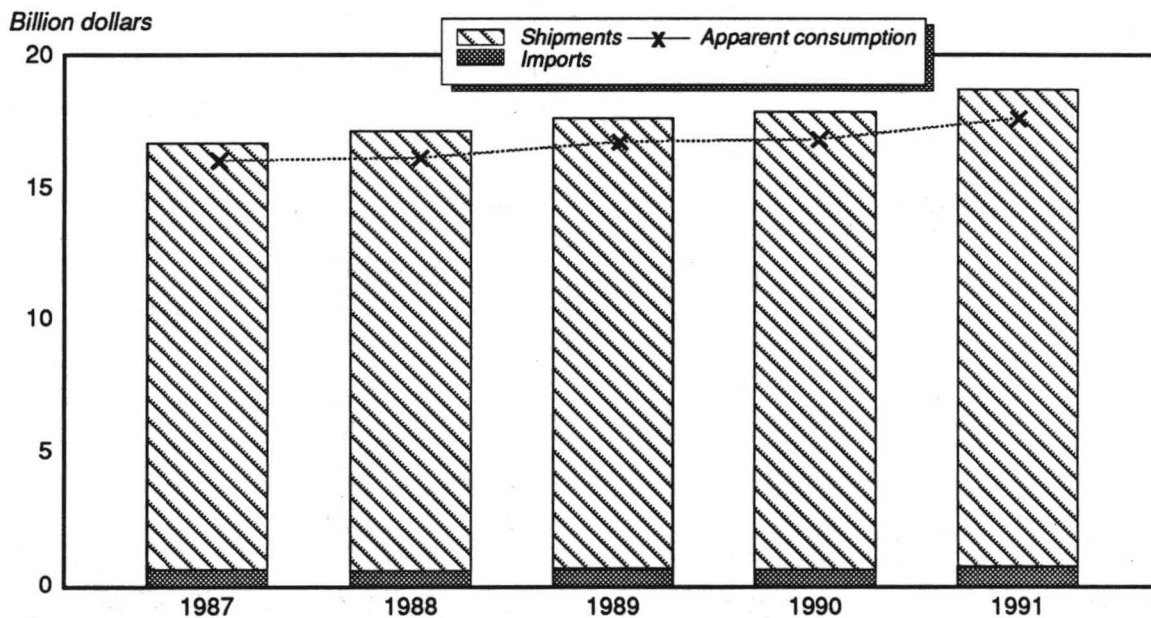
Yarn	EC	Canada ¹	Australia	Mexico	Japan	Korea	China
Silk	2.9-6.2	0	2	15	15	30	70-100
Wool	3.2-6.5	3.3-7.5	15	15	10-15	30	50-80
Cotton	4-9	0-7.5	15	15	15	30	30-50
Manmade filament	3.8-9.5	26.9-7.0	15-30	5-15	15-25	30	25-90
Manmade staple	9	5.9-8.7	15	5-15	15-25	30	50-90

¹ Duty as of January 1, 1992. Duty rates in this column are those negotiated under the United States-Canada Free-Trade Agreement. Under the FTA, which took effect on January 1, 1989, duties are being reduced in 10 annual stages until they become free in 1998.

² Canadian duty on most of the manmade-filament yarns include an additional charge of 7.7 cents per kg.

Source: *The International Customs Journal (Douanes)*, for the EC; Australia; Mexico; Japan; Korea; and China; *Customs Tariff (Canada)*.

Figure 19
Yarn: U.S. imports, producers' shipments, and apparent consumption, 1987-91



Note.—Apparent consumption equals producers' shipments plus imports minus exports. Shipments were estimated from U.S. Bureau of the Census data for SICs 2281, 2282, 2284, 2823 (pt), and 2824 (pt).

Source: Compiled from official statistics of the U.S. Department of Commerce except as noted.

Imports

U.S. yarn imports are concentrated among relatively few suppliers. The top 10 suppliers account for approximately 70 percent of total import volume (table 15). In recent years, imports have become increasingly concentrated among fewer suppliers, largely as a result of increased imports from Canada, by far the largest supplier. During 1987-91, imports from Canada increased, in part, because of duty reductions that became effective in 1989. In volume, Mexico was the second-largest single-country supplier in 1991. Canada and Mexico are major suppliers to the United States chiefly because of their geographic proximity to the U.S. market and because of U.S. industry affiliations in these countries.

The volume of yarn imported during 1987-91 fluctuated, reaching a high of 177 million kg in 1989 and a low of 149 million kg in 1990. In terms of value, imports grew by almost 20 percent during this period to \$766 million. This increase in value can mostly be attributed to a change in product mix. In 1992, imports increased by 17 percent to 203 million kg or \$873 million. This import growth was largely accounted for by increased imports of spun and manmade-filament yarn from Canada, manmade-filament yarn from the EC, and spun yarn from the Association of Southeast Asian Nations (ASEAN).

Spun yarn accounted for \$281 million or approximately 37 percent of total U.S. yarn imports in 1991. In value, imports of spun yarn fell on average 7 percent annually from \$372 million in 1987. Cotton

Table 15
Yarn: U.S. imports for consumption, by principal sources, 1987-91

Source	1987	1988	1989	1990	1991
Quantity (1,000 kilograms)					
Canada	(1)	(1)	23,576	25,682	38,992
Germany	(1)	(1)	18,630	16,795	16,662
Japan	(1)	(1)	7,313	7,158	8,759
United Kingdom	(1)	(1)	12,103	11,702	13,857
Mexico	(1)	(1)	18,121	13,923	17,304
France	(1)	(1)	6,769	7,382	5,223
Thailand	(1)	(1)	12,105	7,912	10,018
Brazil	(1)	(1)	8,431	5,222	7,209
Italy	(1)	(1)	6,894	3,505	1,485
Netherlands	(1)	(1)	2,389	3,096	2,768
All other	(1)	(1)	60,752	46,225	51,309
Total	176,159	151,479	177,084	148,601	173,586
Value (1,000 dollars)					
Canada	(1)	(1)	74,499	82,210	140,576
Germany	(1)	(1)	79,628	83,867	85,392
Japan	(1)	(1)	55,507	56,325	72,725
United Kingdom	(1)	(1)	62,711	62,626	72,315
Mexico	(1)	(1)	54,413	44,975	60,136
France	(1)	(1)	46,812	52,399	43,593
Thailand	(1)	(1)	38,465	24,476	32,634
Brazil	(1)	(1)	28,570	19,038	24,155
Italy	(1)	(1)	33,425	23,516	22,964
Netherlands	(1)	(1)	11,931	16,654	20,972
All other	(1)	(1)	197,258	164,858	190,210
Total	639,990	598,992	683,221	630,944	765,671
Unit value (dollars per kilogram)					
Canada	(1)	(1)	3.16	3.20	3.61
Germany	(1)	(1)	4.27	4.99	5.12
Japan	(1)	(1)	7.59	7.87	8.30
United Kingdom	(1)	(1)	5.18	5.35	5.22
Mexico	(1)	(1)	3.00	3.23	3.48
France	(1)	(1)	6.92	7.10	8.35
Thailand	(1)	(1)	3.18	3.09	3.26
Brazil	(1)	(1)	3.39	3.65	3.35
Italy	(1)	(1)	4.85	6.71	15.47
Netherlands	(1)	(1)	4.99	5.38	7.58
All other	(1)	(1)	3.25	3.57	3.71
Average	3.63	3.95	3.86	4.25	4.41

¹ Country-level detail is provided only for years in which there are actual trade data under the Harmonized Tariff Schedule of the United States (HTS).

Note.—Because of rounding, figures may not add to totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

yarn (containing at least 14 percent of cotton by weight) makes up the major portion of spun yarn imports by volume. Major suppliers of cotton yarn include Thailand, Brazil, Egypt, Mexico, and the CBERA countries, which accounted for roughly 70 percent of the volume of total 1991 cotton yarn imports.⁵⁴ Major suppliers of manmade staple yarns include Mexico⁵⁵, Canada, Austria⁵⁶, and the EC.

⁵⁴ In 1991, Brazil, Egypt, and Thailand had utilized between 84-97 percent of their U.S. quota for cotton yarns.

⁵⁵ Mexico utilized 95 percent of its U.S. quota on acrylic spun yarn in 1991.

⁵⁶ Austrian shipments of artificial staple yarn increased by 309 percent over 1990 to 2.2 million kg in 1991.

These countries accounted for 60 percent of the volume of manmade-staple yarn imports in 1991.

Manmade-filament yarn accounted for about 55 percent of the total value of yarn imported in 1991. Imports of manmade-filament yarn increased from \$229 million in 1987 to \$420 million in 1991, an average annual increase of 16 percent. Canada, the largest single-country supplier, along with Japan, the EC, and Mexico, accounted for about 78 percent of the value of manmade-filament yarn imports in 1991.

FOREIGN MARKETS

Foreign Market Profile

The major foreign markets for U.S. yarn exports include Canada, the EC, Japan, Korea, Mexico, China, and Australia. Canada and Mexico are strong markets for the United States because of their geographic proximity and because of U.S. industry ties in these countries. In recent years, exports to Canada have accelerated largely due to the reduction of duties under the free-trade agreement. Similarly, it is likely that exports to Mexico would also increase under a proposed North American Free-Trade Agreement among the United States, Canada, and Mexico.⁵⁷

Although Japan is a major market for the United States, its major foreign suppliers include Korea and Taiwan. In recent years Japan has also diversified its yarn production to other low-cost Asian countries in order to supply its domestic needs with lower priced imported yarns. China has most recently become a major market for the United States. Much of China's demand stems largely from its need for quality yarns to produce fabric for its apparel-exporting operations. However, China's lack of hard currency has limited its ability to purchase foreign yarn.

U.S. Exports

U.S. yarn exports increased in volume by roughly 19 percent annually between 1987 and 1991 (table 16). The value of exports, however, increased at a slower rate during this period because the United States exported a higher volume of lower-unit-value goods. Canada accounted for the largest share of U.S. exports in 1991, at 19 percent. Along with that of Canada, another notable increase in U.S. exports was that to China, which more than doubled between 1989 and 1991.

In 1992, however, the volume of yarn exports fell by 20 percent to 237 million kg from 298 million kg. By value, exports fell by only 11 percent to \$1,071 million from \$1,205 million. Decreased exports in 1992 largely reflected smaller U.S. shipments to China and the EC.

Spun yarn accounted for \$348 million or 29 percent of total U.S. yarn exports in 1991. Major foreign markets included Canada, with a 16-percent share, China with 14 percent, and the EC, with 18 percent. Exports to Canada showed strong growth between 1989 and 1991, increasing by 30 percent annually. However, exports to China showed the most dramatic increase, growing from an estimated \$1 million in 1987 to \$47 million in 1991. The EC market peaked at \$81 million in 1990 before falling to \$62 million in 1991.

⁵⁷ U.S. International Trade Commission, *Potential Impact on the U.S. Economy and Selected Industries of the North American Free-Trade Agreement* (Investigation No. 333-337), USITC Publication 2596, January 1993.

U.S. exports of manmade-filament yarn accounted for \$751 million, or 62 percent of total U.S. yarn exports in 1991. Canada, the largest single-country market, accounted for 20 percent of these exports by value. Other major foreign markets included Japan, Mexico, Korea, Australia, and the EC.

Although U.S. yarn exports increased during 1987-91, less than 7 percent of total U.S. shipments were exported in 1991. In 1987, exports accounted for 5 percent of total shipments. Fluctuations in export levels are caused largely by changes in the exchange rates and domestic market conditions. Exports tend to increase when exchange rates are favorable because U.S. products become more price competitive in foreign markets. Exports also tend to increase when the domestic market is slow. In order to maintain certain production levels, U.S. producers rely more on sales in the international market. In 1990, the soft market and favorable exchange rate was largely responsible for strong U.S. exports to some foreign markets, especially the EC. Export levels are also affected by spot purchases to make up for shortfalls or to buy specialty products.

U.S. TRADE BALANCE

The United States maintained a trade surplus in yarn during 1987-91 (table 17). Throughout this period, manmade-filament yarn accounted for most of this surplus. Spun yarn, on the other hand, ran a trade deficit before attaining a trade surplus in 1990 and 1991. Throughout 1987-91, the United States ran a trade deficit in spun yarn with the EC and the ASEAN, although the deficit with the former dropped significantly during 1987-91.

Due to the significant increase in imports and the fall in exports, the U.S. trade surplus in yarns fell to \$198 million in 1992. Trade deficits in spun yarn with the EC and the ASEAN grew significantly in 1992. The United States also recorded a \$3 million trade deficit in manmade-filament yarn with the EC.

In all the major producing countries, yarn is produced primarily for the domestic textile industry. Even though many developing countries are able to offer lower prices on commodity yarn than those offered by the United States, most of the major world producers only export small quantities of yarn relative to their production for domestic markets. Most countries export textile products that are further advanced in processing than the yarn stage. In addition, yarn exports are most often shipped to nearby markets where transportation costs are low or to markets where the exported product is of a different type or quality than that produced in the importing country.

Table 16

Yarn: U.S. exports of domestic merchandise, by principal markets, 1987-91

Source	1987	1988	1989	1990	1991
Quantity (1,000 kilograms)					
Canada	(1)	(1)	32,885	42,934	48,091
Belgium	(1)	(1)	19,998	23,738	20,134
United Kingdom	(1)	(1)	13,266	21,213	20,705
Japan	(1)	(1)	14,229	12,132	14,388
Korea	(1)	(1)	6,450	7,745	8,320
Mexico	(1)	(1)	10,903	8,959	11,881
China	(1)	(1)	11,346	11,199	24,466
Australia	(1)	(1)	12,926	15,223	9,963
Taiwan	(1)	(1)	5,071	12,083	11,234
Germany	(1)	(1)	5,933	7,702	6,686
All other	(1)	(1)	91,382	123,524	121,973
Total	148,862	189,759	244,386	286,452	297,840
Value (1,000 dollars)					
Canada	(1)	(1)	150,880	203,963	224,417
Belgium	(1)	(1)	98,549	110,853	91,941
United Kingdom	(1)	(1)	52,456	77,826	73,695
Japan	(1)	(1)	76,753	71,595	70,728
Korea	(1)	(1)	48,077	58,038	70,319
Mexico	(1)	(1)	48,287	50,510	64,776
China	(1)	(1)	25,658	23,679	52,341
Australia	(1)	(1)	61,192	65,144	50,393
Taiwan	(1)	(1)	18,926	28,194	33,254
Germany	(1)	(1)	28,975	37,089	29,587
All other	(1)	(1)	356,165	461,655	443,923
Total	804,152	1,081,171	965,918	1,188,545	1,205,377
Unit value (dollars per kilogram)					
Canada	(1)	(1)	4.59	4.75	4.67
Belgium	(1)	(1)	4.93	4.67	4.57
United Kingdom	(1)	(1)	3.95	3.67	3.56
Japan	(1)	(1)	5.39	5.90	4.92
Korea	(1)	(1)	7.45	7.49	8.45
Mexico	(1)	(1)	4.43	5.64	5.45
China	(1)	(1)	2.26	2.11	2.14
Australia	(1)	(1)	4.73	4.28	5.06
Taiwan	(1)	(1)	3.73	2.33	2.96
Germany	(1)	(1)	4.88	4.82	4.43
All other	(1)	(1)	3.90	3.74	3.64
Average	5.40	5.70	4.30	4.15	4.05

¹ Country-level detail is provided only for years in which there are actual trade data under the new Schedule B (based on the Harmonized Tariff Schedule of the United States).

Note.—Because of rounding, figures may not add to totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 17

Yarn: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected countries and country groups, 1987-91¹

(Million dollars)

Item	1987	1988	1989	1990	1991
U.S. exports of domestic merchandise:					
Canada	(2)	(2)	151	204	224
United Kingdom	(2)	(2)	52	78	74
Japan	(2)	(2)	77	72	71
Mexico	(2)	(2)	48	51	65
Germany	(2)	(2)	29	37	30
Belgium	(2)	(2)	99	111	92
Korea	(2)	(2)	48	58	70
France	(2)	(2)	18	21	22
China	(2)	(2)	26	24	52
Australia	(2)	(2)	61	65	50
All other	(2)	(2)	357	469	455
Total	804	1,081	966	1,189	1,205
EC-12	(2)	(2)	263	340	304
OPEC	(2)	(2)	67	78	72
ASEAN	(2)	(2)	45	52	43
CBERA	(2)	(2)	36	59	62
Eastern Europe	(2)	(2)	6	7	8
U.S. imports for consumption:					
Canada	(2)	(2)	74	82	141
United Kingdom	(2)	(2)	63	63	72
Japan	(2)	(2)	56	56	73
Mexico	(2)	(2)	54	45	60
Germany	(2)	(2)	80	84	85
Belgium	(2)	(2)	16	15	8
Korea	(2)	(2)	15	17	21
France	(2)	(2)	47	52	44
China	(2)	(2)	17	7	7
Australia	(2)	(2)	2	(3)	3
All other	(2)	(2)	259	209	252
Total	640	599	683	631	766
EC-12	(2)	(2)	261	261	262
OPEC	(2)	(2)	3	3	2
ASEAN	(2)	(2)	51	34	44
CBERA	(2)	(2)	20	23	21
Eastern Europe	(2)	(2)	7	6	4
U.S. merchandise trade balance:					
Canada	(2)	(2)	77	122	83
United Kingdom	(2)	(2)	-11	15	2
Japan	(2)	(2)	21	16	-2
Mexico	(2)	(2)	-6	6	5
Germany	(2)	(2)	-51	-47	-55
Belgium	(2)	(2)	83	96	84
Korea	(2)	(2)	33	41	49
France	(2)	(2)	-29	-31	-22
China	(2)	(2)	9	17	45
Australia	(2)	(2)	59	65	47
All other	(2)	(2)	98	260	203
Total	164	482	283	558	439
EC-12	(2)	(2)	2	79	42
OPEC	(2)	(2)	64	75	70
ASEAN	(2)	(2)	-6	18	-1
CBERA	(2)	(2)	16	36	41
Eastern Europe	(2)	(2)	-1	1	4

¹ Import values are based on customs value; export values are based on f.a.s. value, U.S. port of export. U.S. trade with East Germany is included in "Germany" but not "Eastern Europe."

² Country-level detail is provided only for years in which there are actual trade data under the Harmonized Tariff Schedule of the United States (HTS) and the new Schedule B (based on HTS).

³ Less than \$500,000.

Source: Compiled from official statistics of the U.S. Department of Commerce.

APPENDIX A

EXPLANATION OF TARIFF AND TRADE AGREEMENT TERMS

TARIFF AND TRADE AGREEMENT TERMS

The *Harmonized Tariff Schedule of the United States* (HTS) replaced the *Tariff Schedules of the United States* (TSUS) effective January 1, 1989. Chapters 1 through 97 are based upon the internationally adopted Harmonized Commodity Description and Coding System through the 6-digit level of product description, with additional U.S. product subdivisions at the 8-digit level. Chapters 98 and 99 contain special U.S. classification provisions and temporary rate provisions, respectively.

Rates of duty in the *general* subcolumn of HTS column 1 are most-favored-nation (MFN) rates; for the most part, they represent the final concession rate from the Tokyo Round of Multilateral Trade Negotiations. Column 1-general duty rates are applicable to imported goods from all countries except those enumerated in general note 3(b) to the HTS, whose products are dutied at the rates set forth in *column 2*. Goods from Albania, Armenia, Belarus, Bulgaria, the People's Republic of China, the Czech Republic, Estonia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Mongolia, Poland, Russia, Slovakia, and the Ukraine are currently eligible for MFN treatment. Among articles dutiable at column 1-general rates, particular products of enumerated countries may be eligible for reduced rates of duty or for duty-free entry under one or more preferential tariff programs. Such tariff treatment is set forth in the *special* subcolumn of HTS column 1. Where eligibility for special tariff treatment is not claimed or established, goods are dutiable at column 1-general rates.

The *Generalized System of Preferences* (GSP) affords nonreciprocal tariff preferences to developing countries to aid their economic development and to diversify and expand their production and exports. The U.S. GSP, enacted in title V of the Trade Act of 1974 and renewed in the Trade and Tariff Act of 1984, applies to merchandise imported on or after January 1, 1976 and before July 4, 1993. Indicated by the symbol "A" or "A*" in the special subcolumn of column 1, the GSP provides duty-free entry to eligible articles the product of and imported directly from designated beneficiary developing countries, as set forth in general note 3(c)(ii) to the HTS.

The *Caribbean Basin Economic Recovery Act* (CBERA) affords nonreciprocal tariff preferences

to developing countries in the Caribbean Basin area to aid their economic development and to diversify and expand their production and exports. The CBERA, enacted in title II of Public Law 98-67, implemented by Presidential Proclamation 5133 of November 30, 1983, and amended by the Customs and Trade Act of 1990, applies to merchandise entered, or withdrawn from warehouse for consumption, on or after January 1, 1984; this tariff preference program has no expiration date. Indicated by the symbol "E" or "E*" in the special subcolumn of column 1, the CBERA provides duty-free entry to eligible articles, and reduced-duty treatment to certain other articles, which are the product of and imported directly from designated countries, as set forth in general note 3(c)(v) to the HTS.

Preferential rates of duty in the special subcolumn of column 1 followed by the symbol "IL" are applicable to products of Israel under the *United States-Israel Free Trade Area Implementation Act* of 1985 (IFTA), as provided in general note 3(c)(vi) of the HTS. Where no rate of duty is provided for products of Israel in the special subcolumn for a particular provision, the rate of duty in the general subcolumn of column 1 applies.

Preferential rates of duty in the special subcolumn of column 1 followed by the symbol "CA" are applicable to eligible goods originating in the territory of Canada under the *United States-Canada Free-Trade Agreement* (CFTA), as provided in general note 3(c)(vii) to the HTS.

Preferential nonreciprocal duty-free or reduced-duty treatment in the special subcolumn of column 1 followed by the symbol "J" or "J*" in parentheses is afforded to eligible articles the product of designated beneficiary countries under the *Andean Trade Preference Act* (ATPA), enacted in title II of Public Law 102-182 and implemented by Presidential Proclamation 6455 of July 2, 1992 (effective July 22, 1992), as set forth in general note 3(c)(ix) to the HTS.

Other special tariff treatment applies to particular *products of insular possessions* (general note 3(a)(iv)), goods covered by the *Automotive Products Trade Act* (APTA) (general note 3(c)(iii)) and the *Agreement on Trade in Civil Aircraft* (ATCA) (general note 3(c)(iv)), and *articles imported from freely associated states* (general note 3(c)(viii)).

The *General Agreement on Tariffs and Trade* (GATT) (61 Stat. (pt. 5) A58; 8 UST (pt. 2) 1786) is the multilateral agreement setting forth basic principles governing international trade among its 108 signatories. The GATT's main obligations relate to most-favored-nation treatment, the maintenance of scheduled concession rates of duty, and national (nondiscriminatory) treatment for imported products; the GATT also provides the legal framework for customs valuation standards, "escape clause" (emergency) actions, anti-dumping and countervailing duties, and other measures. Results of GATT-sponsored multilateral tariff negotiations are set forth by way of separate schedules of concessions for each participating contracting party, with the U.S. schedule designated as Schedule XX.

Officially known as "The Arrangement Regarding International Trade in Textiles," the *Multifiber Arrangement* (MFA) provides a framework for the negotiation of bilateral agreements between importing and producing countries, or for unilateral action by importing countries in the absence of an agreement. These bilateral agreements establish quantitative limits on imports of textiles and apparel, of cotton and other vegetable fibers, wool, man-made fibers and silk blends, in order to prevent market disruption in the importing countries—restrictions that would otherwise be a departure from GATT provisions. The United States has bilateral agreements with many supplying countries, including the four largest suppliers: China, Hong Kong, the Republic of Korea, and Taiwan.

APPENDIX B

STATISTICAL TABLES

Table B-1

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
— Thousand dollars —					
5004.00.00	Silk yarn: Other than yarn spun from silk waste, not put up for retail sale	5.0%	Free (A,E,IL) 3% (CA)	3,887	2,607
5005.00.00	Spun from silk waste, not put up for retail sale	25.0%	Free (E*,IL) 3% (CA)	3,254	939
5006.00	Put up for retail sale:				
.10	Containing 85 percent or more by weight of silk or silk waste	5.0%	Free (A,E,IL) 3% (CA)	3135	548
.90	Containing less than 85 percent by weight of silk or silk waste	5.0%	Free (E*,IL) 3% (CA)	3134	117
5105.10.00	Wool and fine or coarse animal hair, carded or combed: Carded wool	7.7¢ /kg + 6.25%	0.8 ¢/kg + 0.6% (IL) 4.6¢/kg + 3.7% (CA)	386	11
5105.21.00	Combed wool in fragments	7.7¢ /kg + 6.25%	0.8 ¢/kg + 0.6% (IL) 4.6¢/kg + 3.7% (CA)	746	374
5105.29.00	Wool tops and other combed wool	7.7¢ /kg + 6.25%	0.8 ¢/kg + 0.6% (IL) 4.6¢/kg + 3.7% (CA)	40,051	3,040
5105.30.00	Fine animal hair	7.7¢ /kg + 6.25%	0.8 ¢/kg + 0.6% (IL) 4.6¢/kg + 3.7% (CA)	5,090	236
5105.40.00	Coarse animal hair	3.7%	Free (A,E,IL) 2.2% (CA)	64	7
5106.10.00	Yarn of wool, not put up for retail sale: Carded, 85 percent or more by weight of wool	9.0%	0.8% (IL) 5.4% (CA)	309	7,697
5106.20.00	Carded, less than 85 percent by weight of wool	9.0%	Free (IL) 5.4% (CA)	160	2,820
5107.10.00	Combed, 85 percent or more by weight of wool	9.0%	0.8% (IL) 5.4% (CA)	1,464	22,666
5107.20.00	Combed, Less than 85 percent by weight of wool	9.0%	0.8% (IL) 5.4% (CA)	787	3,062
5108.10	Yarn of fine animal hair, carded, not put up for retail sale:				
.30	Of Angora rabbit hair	5.0%	0.5% (IL) 3% (CA)	316	92
.60	Of other than Angora rabbit hair	9.0%	0.8% (IL) 5.4% (CA)	316	807
5108.20	Yarn of fine animal hair, combed, not put up for retail sale:				
.30	Of Angora rabbit hair	5.0%	0.5% (IL) 3% (CA)	328	17
.60	Of other than Angora rabbit hair	9.0%	0.8% (IL) 5.4% (CA)	329	2,326

See footnotes at end of table.

Table B-1—Continued

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
— Thousand dollars —					
5109.10	Yarn containing 85 percent or more of wool or fine animal hair, put up for retail sale:				
.20	Colored, cut into uniform lengths of not over 8 cm	Free		³ 167	329
.40	Of Angora rabbit hair	5.0%	0.5% (IL) 3% (CA)	³ 167	83
.60	Of wool or fine animal hair other than Angora rabbit	9.0%	0.8% (IL) 5.4% (CA)	³ 167	4,817
5109.90	Yarn containing less than 85 percent of wool or of fine animal hair, put up for retail sale:				
.20	Colored, cut into uniform lengths of not over 8 cm	Free		³ 65	10
.40	Of Angora rabbit hair	5.0%	0.5% (IL) 3% (CA)	³ 65	15
.60	Of wool or fine animal hair other than Angora rabbit	9.0%	Free (IL) 5.4% (CA)	³ 66	2,093
5110.00.00	Yarn of coarse animal hair or of horsehair, whether or not put up for retail sale	3.7%	Free (A,E,IL) 2.2% (CA)	65	2
5203.00.00	Cotton, carded or combed	5.0%	Free (E,IL) 3% (CA)	7,805	195
5204.11.00	Cotton sewing thread: Containing 85 percent or more of cotton, not put up for retail sale	5.0%	0.5% (IL) 3% (CA)	8,808	1,690
5204.19.00	Containing less than 85 percent of cotton, not put up for retail sale	5.0%	0.5% (IL) 3% (CA)	9,435	17
5204.20.00	Put up for retail sale	5.0%	0.5% (IL) 3% (CA)	5,303	1,268
	Cotton yarn containing 85 percent or more by weight of cotton, not put up for retail sale:				
	Single yarn uncombed:				
5205.11	Not exceeding 14 nm:				
.10	Unbleached, not mercerized	3.7%	0.4% (IL) 2.2% (CA)	³ 6,393	692
.20	Bleached, dyed, etc	5.8%	0.6% (IL) 3.4% (CA)	³ 6,393	90
5205.12	15 nm to 43 nm:				
.10	Unbleached, not mercerized	5.2%	0.4% (IL) 3.1% (CA)	³ 7,707	12,338
.20	Bleached, dyed, etc	7.3%	0.7% (IL) 4.3% (CA)	³ 7,707	389
5205.13	44 nm to 52 nm:				
.10	Unbleached, not mercerized	6.5%	0.5% (IL) 3.9% (CA)	³ 2,812	20,916
.20	Bleached, dyed, etc	8.6%	0.9% (IL) 5.1% (CA)	³ 2,548	212
5205.14	53 nm to 80 nm:				
.10	Unbleached, not mercerized	7.8%	0.8% (IL) 4.6% (CA)	³ 1,200	1,763
.20	Bleached, dyed, etc	9.9%	1% (IL) 5.9% (CA)	³ 1,199	48

See footnotes at end of table.

Table B-1—Continued

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
				— Thousand dollars —	
	Cotton yarn containing 85 percent or more by weight of cotton, not put up for retail sale (con.): Single yarn uncombed (con.):				
5205.15	Exceeding 80 nm:				
.10	Unbleached, not mercerized	9.9%	0.9% (IL) 5.9% (CA)	3546	6
.20	Bleached, dyed, etc	12.0%	1.2% (IL) 7.2% (CA)	3546	3
5205.21.00	Single yarn, combed: Not exceeding 14 nm	5.8%	0.6% (IL) 3.4% (CA)	1,242	141
5205.22.00	15 nm to 43 nm	7.3%	0.7% (IL) 4.3% (CA)	1,970	2,580
5205.23.00	44 nm to 52 nm	8.6%	0.9% (IL) 5.1% (CA)	2,334	9,870
5205.24.00	53 nm to 80 nm	9.9%	1% (IL) 5.9% (CA)	2,874	4,540
5205.25.00	Exceeding 80 nm	12.0%	1.2% (IL) 7.2% (CA)	447	5,277
5205.31.00	Multiple (folded) or cabled yarn, uncombed: Not exceeding 14 nm per single yarn	5.8%	0.6% (IL) 3.4% (CA)	2,603	2,651
5205.32.00	15 nm to 43 nm per single yarn	7.3%	0.7% (IL) 4.3% (CA)	3,141	17,810
5205.33.00	44 nm to 52 nm per single yarn	8.6%	0.9% (IL) 5.1% (CA)	19	2,213
5205.34.00	53 nm to 80 nm per single yarn	9.9%	1% (IL) 5.9% (CA)	37	1,702
5205.35.00	Exceeding 80 nm per single yarn	12.0%	1.2% (IL) 7.2% (CA)	115	17
5205.41.00	Multiple (folded) or cabled yarn, combed: Not exceeding 14 nm per single yarn	5.8%	0.6% (IL) 3.4% (CA)	668	822
5205.42.00	15 nm to 43 nm per single yarn	7.3%	0.7% (IL) 4.3% (CA)	1,832	446
5205.43.00	44 nm to 52 nm per single yarn	8.6%	0.9% (IL) 5.1% (CA)	1,039	214
5205.44.00	53 nm to 80 nm per single yarn	9.9%	1% (IL) 5.9% (CA)	2,186	2,199
5205.45.00	Exceeding 80 nm per single yarn	12.0%	1.2% (IL) 7.2% (CA)	1,930	719
	Cotton yarn containing less than 85 percent by weight of cotton, not put up for retail sale: Single yarn, uncombed:				
5206.11.00	Not exceeding 14 nm	10.8%	1.1% (IL) 6.4% (CA)	414	99

See footnotes at end of table.

Table B-1—Continued

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
				— Thousand dollars —	
	Cotton yarn containing less than 85 percent by weight of cotton, not put up for retail sale (con.): Single yarn, uncombed (con.):				
5206.12.00	15 nm to 43 nm	10.8%	1.1% (IL) 6.4% (CA)	528	851
5206.13.00	44 nm to 52 nm	10.8%	1.1% (IL) 6.4% (CA)	373	770
5206.14.00	53 nm to 80 nm	10.8%	1.1% (IL) 6.4% (CA)	516	648
5206.15.00	Exceeding 80 nm	10.8%	1.1% (IL) 6.4% (CA)	6	0
	Single yarn, combed:				
5206.21.00	Not exceeding 14 nm	10.8%	1.1% (IL) 6.4% (CA)	119	10
5206.22.00	15 nm to 43 nm	10.8%	1.1% (IL) 6.4% (CA)	147	298
5206.23.00	44 nm to 52 nm	10.8%	1.1% (IL) 6.4% (CA)	82	5,164
5206.24.00	53 nm to 80 nm	10.8%	1.1% (IL) 6.4% (CA)	73	24,867
5206.25.00	Exceeding 80 nm	10.8%	1.1% (IL) 6.4% (CA)	68	84
	Multiple (folded) or cabled yarn, uncombed:				
5206.31.00	Not exceeding 14 nm	10.8%	1.1% (IL) 6.4% (CA)	112	1,088
5206.32.00	15 nm to 43 nm	10.8%	1.1% (IL) 6.4% (CA)	121	166
5206.33.00	44 nm to 52 nm	10.8%	1.1% (IL) 6.4% (CA)	178	12
5206.34.00	53 nm to 80 nm	10.8%	1.1% (IL) 6.4% (CA)	0	0
5206.35.00	Exceeding 80 nm	10.8%	1.1% (IL) 6.4% (CA)	32	0
	Multiple (folded) or cabled yarns, combed:				
5206.41.00	Not exceeding 14 nm	10.8%	1.1% (IL) 6.4% (CA)	119	163
5206.42.00	15 nm to 43 nm	10.8%	1.1% (IL) 6.4% (CA)	163	198
5206.43.00	44 nm to 52 nm	10.8%	1.1% (IL) 6.4% (CA)	21	199
5206.44.00	53 nm to 80 nm	10.8%	1.1% (IL) 6.4% (CA)	34	66
5206.45.00	Exceeding 80 nm	10.8%	1.1% (IL) 6.4% (CA)	249	192

See footnotes at end of table.

Table B-1—Continued

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
— Thousand dollars —					
5207.10.00	Cotton yarn put up for retail sale: Containing 85 percent or more by weight of cotton	5.0%	0.5% (IL) 3% (CA)	1,774	22,145
5207.90.00	Containing less than 85 percent by weight of cotton	5.0%	0.5% (IL) 3% (CA)	5,432	838
5306.10.00	Flax yarn: Single	6.6%	Free(CA,E*) 0.4% (IL)	1,075	1,929
5306.20.00	Multiple (folded) or cabled	6.0%	Free (CA,E*) 0.6% (IL)	104	535
5307.10.00	Yarn of jute or of other textile bast fibers (hemp and ramie excluded): Single	43.0%	Free (A,CA,E) 0.4% (IL)	144	2,051
5307.20.00	Multiple (folded) or cabled	54.0%	Free (A,CA,E) 0.4% (IL)	4,396	4,566
5308.10.00	Yarn of other vegetable textile fibers; paper yarn: Coir yarn	Free		3	3,105
5308.20.00	True hemp yarn	6.6%	Free (E*) 0.7% (IL) 3.9% (CA)	0	3
5308.30.00	Paper yarn	5.3%	Free (A,E,IL) 3.1% (CA)	402	68
5308.90.00	Yarns of abaca, ramie and other vegetable textiles fibers, not elsewhere classified	4.0%	Free (CA,E*) 0.4 (IL)	167	48
5401.10.00	Sewing thread of synthetic filaments, whether or not put up for retail sale	13.0%	1.3% (IL) 7.8% (CA)	35,421	5,735
5401.20.00	Sewing thread of artificial filaments, whether or not put up for retail sale	13.0%	1.3% (IL) 7.8% (CA)	1,853	4,233
Synthetic filament yarn, not put up for retail sale:					
High tenacity yarn:					
5402.10	Of nylon or other polyamides:				
.30	Single yarn	10.0%	Free (CA,IL)	358,766	46,164
.60	Multiple (folded) or cabled	9.1%	0.9% (IL) 5.4% (CA)	358,766	356
5402.20	Of polyesters:				
.30	Single yarn	10.0%	Free (CA,IL)	337,460	10,240
.60	Multiple (folded) or cabled	9.1%	0.9% (IL) 5.4% (CA)	337,459	428

See footnotes at end of table.

Table B-1—Continued

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
— Thousand dollars —					
5402.31	Textured yarn: Of nylon or other polyamides not more than 500 decitex per single yarn:				
.30	Single yarn	10.0%	Free (IL) 6% (CA)	³ 30,679	6,067
.60	Multiple (folded) or cabled	9.1%	Free (IL) 5.4% (CA)	³ 30,679	7,609
5402.32	Of nylon or other polyamides, more than 500 decitex per single yarn:				
.30	Single yarn	10.0%	Free (IL) 6% (CA)	³ 41,418	45,961
.60	Multiple (folded) or cabled	9.1%	Free (IL) 5.4% (CA)	³ 41,418	1,328
5402.33	Of polyesters:				
.30	Single yarn	10.0%	Free (IL) 6% (CA)	³ 37,455	8,222
.60	Multiple (folded) or cabled	9.1%	0.9% (IL) 5.4% (CA)	³ 37,455	1,210
5402.39	Of synthetic filament, not specially provided for:				
.30	Single yarn	10.0%	Free (IL) 6% (CA)	³ 7,794	16,494
.60	Multiple (folded) or cabled	9.1%	0.9% (IL) 5.4% (CA)	³ 7,793	1,315
	Synthetic filament yarns, other than high tenacity or textured, not put up for retail sale:				
	Untwisted or with a twist not exceeding 50 turns/m, single:				
5402.41.00	Of nylon or other polyamides	10.0%	Free (IL) 6% (CA) ⁶	72,488	101,092
5402.42.00	Of polyesters, partially oriented	10.0%	Free (CA) 1% (IL)	13,905	4,383
5402.43.00	Of polyesters, not elsewhere specified	10.0%	1% (IL) 6% (CA)	24,345	32,081
5402.49.00	Of other synthetic fibers	10.0%	1% (IL) 6% (CA) ⁷	75,015	50,422
	Twist exceeding 50 turns/m, single:				
5402.51.00	Of nylon or other polyamides	10.0%	1% (IL) 6% (CA)	1,051	212
5402.52.00	Of polyesters	10.0%	Free (IL) 6% (CA)	2,109	876
5402.59.00	Of other synthetic fibers	10.0%	1% (IL) 6% (CA)	8,503	1,015
	Multiple (folded) or cabled:				
5402.61.00	Of nylon or other polyamides	9.1%	0.9% (IL) 5.4% (CA)	15,594	936
5402.62.00	Of polyesters	9.1%	0.9% (IL) 5.4% (CA)	7,573	2,486
5402.69.00	Of other synthetic fibers	9.1%	0.9% (IL) 5.4% (CA)	4,327	1,944

See footnotes at end of table.

Table B-1—Continued

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
— Thousand dollars —					
5403.10	Artificial filament yarns, not put up for retail sale:				
.30	High tenacity yarn of viscose rayon:				
.60	Single yarn	10.0%	Free (IL) 6% (CA)	31,711	9,592
	Multiple (folded) or cabled	9.1%	0.9% (IL) 5.4% (CA)	31,711	18
5403.20	Textured yarn:				
.30	Single yarn	10.0%	Free (CA,IL)	31,089	21
.60	Multiple (folded) or cabled	9.1%	Free (CA) 0.9% (IL)	31,089	59
5403.31.00	Other yarn, single: Of viscose rayon, untwisted or with twist not exceeding 120 turns/m	10.0%	Free (IL) 6% (CA)	1,329	21,715
5403.32.00	Of viscose rayon, with a twist exceeding 120 turns/m	10.0%	1% (IL) 6% (CA)	3,513	1,754
5403.33.00	Of cellulose acetate	10.0%	Free (IL) 6% (CA)	58,686	21,659
5403.39.00	Artificial filament yarns, not elsewhere specified	10.0%	Free (IL) 6% (CA)	441	10,449
5403.41.00	Other yarn, multiple (folded) or cabled: Of viscose rayon	9.1%	0.9% (IL) 5.4% (CA)	616	7,300
5403.42.00	Of cellulose acetate	9.1%	0.9% (IL) 5.4% (CA)	573	1,191
5403.49.00	Artificial filament yarns, not elsewhere specified	9.1%	0.9% (IL) 5.4% (CA)	626	225
5406.10.00	Manmade filament yarn put up for retail sale: Synthetic filament yarn	13.0%	Free (IL) 7.8% (CA)	26,940	3,890
5406.20.00	Artificial filament yarn	13.0%	Free (IL) 7.8% (CA)	354	920
5506.10.00	Manmade staple fibers, processed for spinning: Of nylon or other polyamides	6.5%	0.7% (IL) 3.9% (CA)	3,652	439
5506.20.00	Of polyesters	6.5%	0.7% (IL) 3.9% (CA)	2,585	1,674
5506.30.00	Of acrylic or modacrylic	6.5%	0.7% (IL) 3.9% (CA)	69,789	2,044
5506.90.00	Of other synthetic staple fibers	6.5%	0.7% (IL) 3.9% (CA)	8,352	75
5507.00.00	Of artificial staple fibers	6.5%	Free (CA) 0.7% (IL)	1,334	34

See footnotes at end of table.

Table B-1—Continued

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
				— Thousand dollars —	
5508.10.00	Sewing thread: Of synthetic staple fibers	13.0%	1.3% (IL) 7.8% (CA)	10,105	20,438
5508.20.00	Of artificial staple fibers	13.0%	1.3% (IL) 7.8% (CA)	2,132	90
Yarn of synthetic staple fibers, not put up for retail sale:					
Containing 85 percent or more by weight of nylon or other polyamides:					
5509.11.00	Single yarn	11.0%	Free (IL) 6.6 (CA)	7,032	848
5509.12.00	Multiple (folded) or cabled	12.0%	1.2% (IL) 7.2% (CA)	13,377	667
Containing 85 percent or more of polyester:					
5509.21.00	Single yarn	11.0%	Free (IL) 6.6% (CA)	5,257	2,755
5509.22.00	Multiple (folded) or cabled	12.0%	1.2% (IL) 7.2% (CA)	3,940	3,624
Containing 85 percent or more of acrylic or modacrylic:					
5509.31.00	Single yarn	11.0%	Free (IL) 6.6% (CA)	3,913	6,152
5509.32.00	Multiple (folded) or cabled	12.0%	1.2% (IL) 7.2% (CA)	861	19,287
Containing 85 percent or more of other synthetic fibers:					
5509.41.00	Single yarn	11.0%	Free (IL) 6.6% (CA)	6,181	1,122
5509.42.00	Multiple (folded) or cabled	12.0%	1.2% (IL) 7.2% (CA)	800	1,296
Containing less than 85 percent of polyester:					
Mixed with artificial staple fibers:					
5509.51	Single yarn	11.0%	Free (IL) 6.6% (CA)	3 ¹ ,475	51
.30	Multiple (folded) or cabled	12.0%	1.2% (IL) 7.2% (CA)	3 ¹ ,474	10
.60					
5509.52.00	Mixed with wool or fine animal hair	15.0%	1.5% (IL) 9.0% (CA)	383	731
5509.53.00	Mixed with cotton	15.0%	1.5% (IL) 9.0% (CA)	17,938	5,595
5509.59.00	Mixed with fibers not elsewhere specified	15.0%	1.5% (IL) 9.0% (CA)	6,894	130
Containing less than 85 percent of acrylic or modacrylic:					
5509.61.00	Mixed with wool	15.0%	1.5% (IL) 9.0% (CA)	501	466
5509.62.00	Mixed with cotton	15.0%	1.5% (IL) 9.0% (CA)	129	40
Mixed with artificial fibers:					
5509.69	Single yarn	11.0%	Free (IL) 6.6% (IL)	3 ² 69	200
.20					

See footnotes at end of table.

Table B-1—Continued

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
				— Thousand dollars —	
	Yarn of synthetic staple fibers put up for retail sale (con.):				
	Containing less than 85 percent of acrylic or modacrylic (con.):				
	Mixed with artificial fibers (con.):				
.40	Multiple (folded) or cabled yarn	12.0%	1.2% (IL) 7.2% (CA)	3269	240
.60	Mixed with fibers not elsewhere specified	15.0%	1.5% (IL) 9.0% (CA)	3271	241
	Containing less than 85 percent by weight of other synthetic fibers:				
5509.91.00	Mixed with wool	15.0%	1.5% (IL) 9.0% (CA)	67	183
5509.92.00	Mixed with cotton	15.0%	1.5% (IL) 9.0% (CA)	5,400	6
5509.99	Mixed with artificial fibers:				
.20	Single yarn	11.0%	1.1% (IL) 6.6% (CA)	3796	16
.40	Multiple (folded) or cabled	12.0%	1.2% (IL) 7.2% (CA)	3796	1
.60	Mixed with silk, etc	15.0%	1.5% (IL) 9.0% (CA)	3797	459
	Yarn of artificial staple fibers not put up for retail sale:				
	Containing 85 percent or more by weight of artificial staple fibers:				
5510.11.00	Single yarn	11.0%	Free (IL) 6.6% (CA)	1,477	12,595
5510.12.00	Multiple (folded) or cabled	12.0%	1.2% (IL) 7.2% (CA)	2,463	738
	Containing less than 85 percent by weight of artificial staple fibers:				
5510.20.00	Mixed with wool	15.0%	1.5% (IL) 9.0% (CA)	246	202
5510.30.00	Mixed with cotton	15.0%	1.5% (IL) 9.0% (CA)	751	28
5510.90	Mixed with other fibers:				
.20	Mixed with synthetic staple fibers, single	11.0%	Free (IL) 6.6% (CA)	31,021	20
.40	Mixed with synthetic staple fibers, multiple	12.0%	1.2% (IL) 7.2% (CA)	31,022	489
.60	Mixed with fibers not elsewhere specified	15.0%	1.5% (IL) 9.0% (CA)	31,021	77
5511.10.00	Yarn 85 percent or more by weight of synthetic staple fibers, put up for retail sale	13.0%	Free (IL) 7.8% (CA)	11,761	7,035
5511.20.00	Yarn, less than 85 percent by weight of synthetic staple fibers, put up for retail sale	13.0%	Free (IL) 7.8% (CA)	2,221	1,359

See footnotes at end of table.

Table B-1—Continued

Yarns: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1992; U.S. exports, 1991; and U.S. imports, 1991

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1992		U.S. exports, 1991	U.S. imports, 1991
		General	Special ¹		
— Thousand dollars —					
5511.30.00	Yarn, of artificial staple fibers, not elsewhere specified, put up for retail sale	13.0%	Free (IL) 7.8% (CA)	20,112	606
5604.10.00	Rubber thread and cord, textile covered	7.2%	0.7% (IL) 4.3% (CA)	6,146	2,293
5604.20.00	High tenacity yarn of polyesters, nylon, or rayon, impregnated or coated	10.0%	Free (IL) 6% (CA)	4,940	405
5604.90.00	Textile yarn and strip and the like of heading 5404 or 5405., coated	10.0%	Free (E*,IL) 6% (CA)	8,471	1,265
5605.00.00	Metallized yarn	15.0%	Free (IL) 9.0% (CA)	560	8,957
5606.00.00	Gimped yarn and strip, chenille yarn, loop wale-yarn	11.5%	Free (E*) 0.6% (IL) 6.9% (CA)	13,120	15,378

¹ Programs under which special tariff treatment may be provided, and the corresponding symbols for such programs as they are indicated in the "Special" subcolumn, are as follows: Generalized System of Preferences (A); Automotive Products Trade Act (B); Agreement on Trade in Civil Aircraft (C); United States-Canada Free-Trade Agreement (CA); Caribbean Basin Economic Recovery Act (E); and United States-Israel Free Trade Area (IL).

² Duty on certain yarn spun from silk waste temporarily suspended. See heading 9902.50.05 in the HTS.

³ Estimated by the staff of the U.S. International Trade Commission.

⁴ Duty temporarily reduced. See subheading 9903.10.39 in the HTS.

⁵ Duty temporarily reduced. See subheading 9903.10.40 in the HTS.

⁶ Duty on certain yarns modified. See subheading 9905.54.05 in the HTS.

⁷ Duty on certain yarns modified. See subheading 9905.54.10 in the HTS.

Source: U.S. exports and imports compiled from official statistics of the U.S. Department of Commerce.

