

Industry & Trade Summary

Pneumatic Tires and Tubes

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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 pneumatic tires and tubes primarily covers the period 1988-92 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 chemicals and textiles 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
2736	February 1994	Antibiotics
2739	February 1994	Pneumatic Tires and Tubes
Textiles and apparel:		
2543	August 1992	Nonwoven Fabrics
2580	December 1992	Gloves
2642	June 1993	Yarn
2695	November 1993	Carpets and Rugs
2702	November 1993	Fur Goods
2703	November 1993	Coated Fabrics

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

This summary contains information on new pneumatic tires and inner tubes for the 5-year period, 1988-92. Retreaded or used tires are not covered. Pneumatic tires are used worldwide on a great variety of vehicles, providing traction, a cushioned ride, and added shock absorption. The products covered include pneumatic tires and tubes for passenger cars, trucks, busses, aircraft, motorcycles, bicycles, tractors and agricultural equipment. The major producers and consumers are the United States, the European Union (EU),¹ and Japan.

Automobile tires, the largest-volume product covered by this summary, account for more than 55 percent of the value of domestically produced tires. They constitute about 50 percent of U.S. tire imports and almost 60 percent of U.S. tire exports. Truck and bus tires comprise 37 percent of U.S.-produced tires, and about 40 percent and 30 percent of U.S. tire imports and exports, respectively. Tractor and farm implement tires represent another 4.5 percent of U.S. tire production, while imports and exports represent, respectively, 3 percent and 5 percent of total U.S. tire imports and exports. Other pneumatic tires, which include aircraft, motorcycle, and bicycle tires, make up less than 4 percent of domestic tire production value and less than 10 percent of U.S. tire imports and exports.

The value of U.S. pneumatic tube (inner tube) production was about 1.0 percent of domestic tire production value during 1988-92. The value of U.S. inner tube imports averaged 2.7 percent of U.S. tire imports while inner tube exports averaged 3.0 percent of domestic tire exports during the period covered. Automobile-, truck-, and bus-tire inner tube production averaged more than 50 percent of domestic inner tube production; tractor- and motorcycle-tire inner tubes averaged another 40 percent of production. U.S. imports of bicycle-tire inner tubes (tubes) averaged almost 40 percent of total tube imports during 1988-92. Automobile-, truck-, and bus-tire tube imports averaged 35 percent, while tube imports for tractor and motorcycle tires averaged 25 percent of total tube imports during the period covered. On the export side, tubes for automobile, truck, and bus tires averaged just over 50 percent of total U.S. tube exports. Tubes for bicycle tires averaged 3.0 percent of U.S. tube exports; 46 percent of U.S. inner tube exports were tractor- and motorcycle-tire tubes.

Most tire production in the United States is of radial-ply construction. In radial-ply tires the ply cords run archwise from bead to bead² at a 90-degree angle to the plane of the tire. In bias-ply tires the cord angle is generally between 30 and 40 degrees away from the bead. More than 90 percent of tractor and farm implement tires as well as automobile temporary spares

are of bias-ply construction. Virtually all car tires (with the exception of the temporary spares) and more than 80 percent of truck and bus tires are of radial ply construction.

A ply cord (also termed a carcass ply) is a layer of rubberized fabric extending from bead to bead and reinforcing the tire. Polyester is the cord material used in the carcass plies of radial tires; nylon is used in bias-ply tires.

Belts are narrow layers of tire cord placed in the crown of the tire beneath the tread rubber. The crown is the part of the tire that meets the road. Steel wire mesh is the belted cord material used in 99 percent of radial tires, while fiberglass is used in all bias-belted tires.

The tire production process consists of mixing elastomers,³ carbon blacks,⁴ pigments, and other chemicals such as vulcanizing agents to form a rubber compound; processing the various fabrics and coating them with rubber in a calendaring operation; extruding the rubber tread and sidewall material; assembling the components on a tire-building machine; curing the tire with heat and pressure; and then finishing the product.

In tire manufacturing, most of the rubber goes into forming the tread (the wearing surface of the tire) and the sidewall. Rubber compound is fed into an extruder and forced through a die (a shaped slot). Following extrusion, the continuous stream of formed compound is bevel cut to a predetermined length, weighed, cooled, and cemented. These strips of tread or sidewall rubber are then ready for tire building. Rubber is also used to coat the bead wires. The bundles of wire are passed through an extrusion die where a coat of rubber is added. The rubber-coated wires are then wound in a hoop of specific diameter.

The cut carcass plies and belts plus the extruded tread, sidewall, and beads are assembled at the tire-building machine (drum). The tire-building process begins with the application of a thin layer of rubber compound, called the inner liner, to the innermost carcass ply. In tubeless tires the inner liner is the air-retaining member. The carcass plies are placed on the drum one at a time, after which the beads are set in place and the plies are turned up around them. At this stage the belts and tread rubber are added. The drum is then collapsed and the uncured (green) tire is loaded into an automatic tire press to be cured (vulcanized) at high temperature and pressure. The vulcanization process converts the rubber and fabric into a tough, highly elastic product and also bonds the various parts of the tire into one singular unit.

After curing, the tire is cooled by mounting it on a rim and inflating it to reduce internal stresses. Finishing the tire involves trimming, buffing, balancing, and inspection for imperfections by quality control procedures.

¹ The *European Union* formerly was known as the *European Community*.

² Tire beads are composed of high tensile strength steel wire formed into hoops which anchor the carcass plies and hold the tire on the rim of the wheel.

³ Elastomers are synthetic rubber polymers.

⁴ Carbon blacks are finely divided forms of carbon used as reinforcing agents for rubber.

The primary purpose of an inner tube is to hold air under pressure. Therefore, it must not stretch or flow excessively to prevent bubble formation; it must not harden or crack with age; it should be tear resistant; and it should have a low diffusion rate with respect to air. Inner tubes made of butyl rubber⁵ most ideally meets these requirements.

In the manufacture of tubes, butyl rubber is fed into extruders and formed into a hose, which is then cut to length, spliced, fitted with an air valve, and vulcanized. This procedure remains the simplest and most cost-effective method of production.

U.S. INDUSTRY PROFILE

Industry Structure⁶

The raw materials, producer types, major products, and principal consumers of the U.S. pneumatic tire and tube industry are shown in figure 1. In the United States, tires and tubes are produced by 12 tire and rubber companies, which operated

⁵ Butyl is the best synthetic rubber for preventing the loss of air pressure by diffusion through the rubber. Although modern technology has reduced the necessity of inner tubes, the inner liner of a tubeless tire is composed of butyl rubber.

⁶ Pneumatic tires and tubes are classified in SIC 3011, Tires and Inner Tubes.

39 establishments in 1992. These establishments are located principally in the Southern States where labor rates have historically been lower than the national average. Labor costs currently represent about 30 percent of the cost of tire and tube production for U.S. manufacturers.

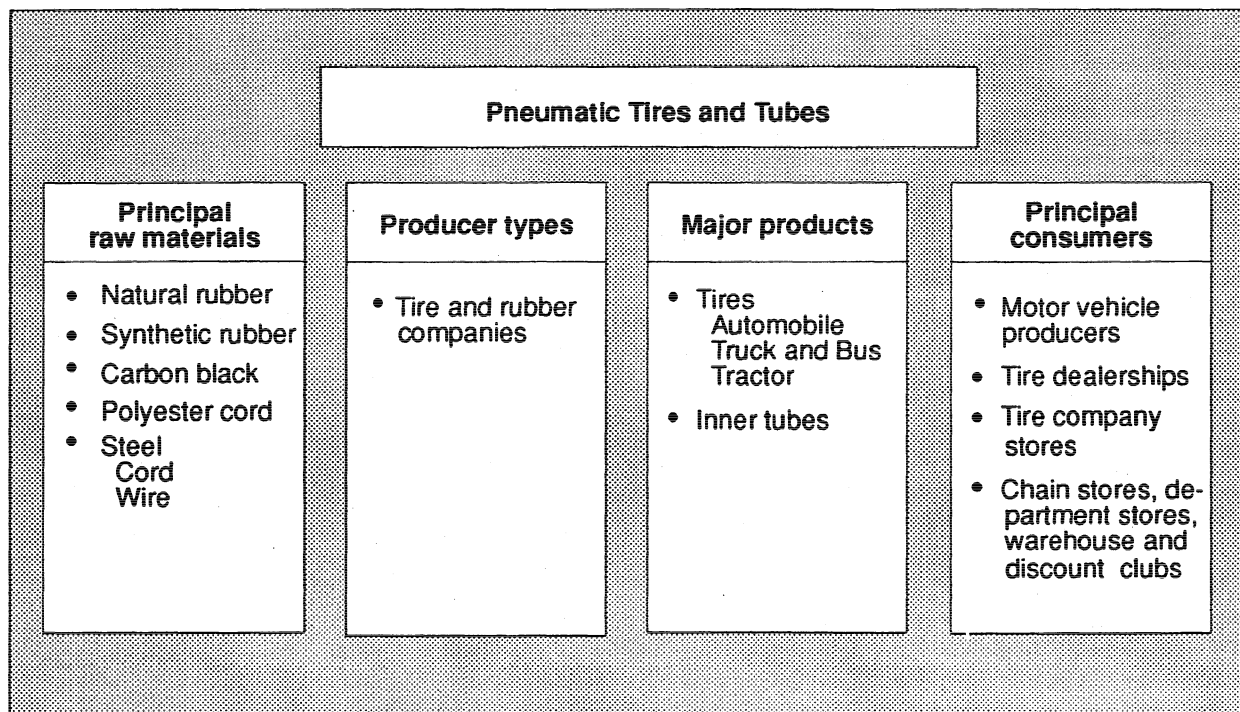
The two largest producers in 1992 accounted for about 55 percent of production. The four largest producers (33 percent of the companies producing tires and tubes in the United States) produced 80 percent of the total, while the eight largest companies produced 97 percent of domestic product. During the period covered by this summary, the four largest producers have reflected similar concentration ratios.

The industry is characterized by improving process technology that is capital-intensive and that requires skilled production workers. During the last decade there has been a shift toward radial-ply design, virtually complete in the auto tire sector and nearing completion in the truck-tire market.⁷ Radial tire construction and tread design permit more tread on the road surface during hard cornering for a safer ride, and also provide less forward rolling resistance, thereby improving fuel economy. Improving process technology in the tire and tube industry has resulted in tires for the consumer with less rolling resistance, longer wear, and higher durability.

⁷ U.S. Department of Commerce, "Plastics and Rubber," *U.S. Industrial Outlook—1993*, pp. 12-5 to 12-6.

Figure 1

U.S. pneumatic tires and tubes Industry: Principal raw materials, producer types, major products, and principal consumers



Source: Compiled by the U.S. International Trade Commission staff from various sources.

The estimated total employment of the tire and tube industry is 68,000 people, about 80 percent of whom are production workers.⁸ During 1988-92, annual output per production-worker hour (productivity) increased an average of 4.1 percent. Wage rates for production workers increased an average 4.6 percent annually during the same period, from average hourly earnings of \$15.52 in 1988 to an estimated \$18.60 in 1992.⁹

All of the four major producers are integrated back to the production of the elastomers used in tire production; two of these producers own and operate natural rubber plantations. More than 80 percent of the sales revenue of the four major producers is derived from tires and related transportation products such as rubber belts and hoses. Chemical and plastic products production provide most of their remaining revenue.

In 1992, tire dealerships were the leaders in retail sales of passenger tires, with a 54 percent market share. Chain stores and department stores ranked second, with a 19 percent market share, followed by tire company stores which had 12 percent of the retail market. During 1989-92, warehouse membership clubs increased from 296 to 594 and increased their share of the auto tire retail market from 5 percent to 8 percent.¹⁰ The wholesale and retail distribution channels through which replacement passenger tires reached the market in 1992 were independent dealers (66 percent of replacement tires), chain stores, department and discount stores, and warehouse clubs (20 percent), tire company stores (12 percent), and oil companies (2 percent). Since consumers do not perceive much product differentiation among the tire producers, tires are marketed mainly on the basis of price. Any competitive action, such as a price reduction by one company, will be matched by its competitors. A tire company charging higher prices would have falling sales and declining market share.

Research and development funds in the U.S. tire and tube industry are directed toward safety and performance criteria as well as cost-cutting developments in the tire-building process.

In 1992, it was estimated that the United States had as many as two billion scrap tires, with annual additions of 200 to 250 million more. Not only are these tires unsightly, but they also pose an environmental threat. Tire piles are a fire hazard and burn with an intense heat, giving off dense black smoke. These fires are extremely difficult to extinguish; some have burned for weeks. Tire casings form natural air pockets that supply the oxygen which feeds the flames. Discarded tires are bulky, virtually indestructible, and when buried tend to work their way back to the surface as casings compressed by the dirt slowly spring back into shape and "float" the tire upward.

⁸ Ibid.

⁹ Ibid.

¹⁰ "Facts/Directory 1993," *Modern Tire Dealer*, Jan. 1993, p. 30.

The most common recycling methods include burning whole or shredded tires to produce energy; reducing tires to their basic components and reselling the resulting carbon black, petroleum, and other materials; treating or processing shredded tires for reuse in rubber and plastic products; incorporating tire crumbs in asphalt paving; burying whole or shredded tires in landfills; and reusing whole or pieces of tires as erosion-control devices, playground equipment, or other miscellaneous uses.

Federal, state, and local authorities have taken various approaches to the growing supply of unrecycled scrap tires. The Intermodal Surface Transportation Act of 1991 mandates that a "minimum utilization" of 5 percent of all asphalt pavement financed in whole or in part by the Federal Government be asphalt rubber starting in 1994. This minimum is to increase annually by 5 percentage points until 1997 when the minimum utilization will have risen to 20 percent. Use of rubber in asphalt could potentially consume virtually all scrap tires generated in the United States.¹¹ Currently, some cement kilns and paper mills are burning tires to generate some of the large amounts of energy they need. In addition, some power plants have replaced at least some coal with whole or shredded tires.¹²

During the 1980s, many sales, restructurings, consolidations, and acquisitions resulted in the globalization of the tire industry. Almost one-half of domestic capacity is now owned by foreign-based tire manufacturers, mainly European and Japanese. In 1988, the Bridgestone Corporation of Japan purchased all the holdings of the Firestone Tire and Rubber Company, the second largest tire producer in the United States. That same year, the Italian-owned Pirelli Group purchased Armtek's Armstrong Tire Company. Since then, the German-owned Continental AG purchased General Tire and the French-owned Michelin Tire Company, a subsidiary of Groupe Michelin, acquired the privately-held Uniroyal-Goodrich Tire Company.

This foreign investment was the result of the domestic industry's efficient performance and the advantages associated with production facilities in the U.S. market. Another contributing factor to the shift in ownership was the sharp devaluation of the U.S. dollar in the mid-1980s. This development eliminated the price advantage foreign producers had when the dollar was stronger. Only Goodyear Tire and Rubber Company remains an unaffiliated U.S. multinational. Other foreign participants in the U.S. tire market include Japanese-owned Sumitomo Tire Company, Toyo Tire Company, and Yokohama Tire Company, as well as some Korean tire companies.

As one of the most technologically advanced products in general use, the longer-lasting radial tire has been a factor in reducing growth in domestic tire

¹¹ "FHWA Acknowledges Asphalt Rubber Benefit," *Modern Tire Dealer*, August 1993, p. 12. FHWA is the Federal Highway Administration.

¹² "Scrap Tire Problem Can Solve Itself," *Modern Tire Dealer*, May 1993, p. 6.

demand. Nearly all passenger car tires and more than 80 percent of highway truck tires are radials. Another factor has been the competition from imported tires (whether as replacement tires or as original equipment tires on imported vehicles). In adjusting to these developments, the U.S. tire industry has closed numerous tire plants during the past decade. However, much of this rationalized capacity was for bias-ply or bias-belted construction, which was replaced by radial-ply capacity.

Consumer Characteristics and Factors Affecting Demand

The domestic industries consuming pneumatic tires and tubes are the motor vehicle producers, tire dealerships, chain stores, service stations, department stores, and warehouse and discount clubs (figure 1). Although tire companies advertise to sell tires and enhance the brand identification between consumer and producer, there is little perceived product differentiation within a category of tires by consumers. For example, all-season tires, high-performance tires, conventional auto or truck radials are all separate categories of tires. Within a given category of tire, quality and expected performance often are determined more by speed ratings, tread wear index, traction and temperature grades than by a particular brand name. Among tires of the same category with similar ratings, the consumer's purchase decision usually is determined by price. However, there is some evidence from auto tire sales that the consumer leans toward the brand name which originally equipped the car when purchasing the first set of replacement tires.

FOREIGN INDUSTRY PROFILE

Foreign tire producers consist of a few large multinational corporations and some local producers that do not engage extensively in international trade. The major multinationals (Goodyear, Michelin, Continental, Pirelli, and Bridgestone) account for about 75 percent of global production; their operations are centered in the United States, France, Germany, Italy, and Japan. These multinationals also operate in Canada, Mexico, Brazil, the United Kingdom, Spain, the Republic of Korea, and Taiwan. Much of the remaining world production is concentrated in Eastern Europe and the former Soviet Republics.

All the major multinationals are integrated back to the production of synthetic rubber and some operate natural rubber plantations. Many are also forward integrated to the retail selling of the finished products.

U.S. TRADE MEASURES¹³

Table 1 shows the rates of duty, as of January 1, 1993, applicable to imports of pneumatic tires and tubes under the Harmonized Tariff Schedule of the United States (HTS). The table shows the column

¹³ See app. A for an explanation of tariff and trade agreement terms.

1-general rates of duty for countries considered for most-favored-nation (MFN) treatment, as well as duty rates under column 1 for countries qualifying under special tariff programs.

The North American Free Trade Agreement (NAFTA), as implemented by the North American Free Trade Agreement Implementation Act (Public Law 103-182, approved Dec. 8, 1993), provided for the elimination of U.S. duties, effective January 1, 1994 on articles covered by this summary imported from Mexico.

The recently completed (December 1993) GATT Uruguay Round of trade negotiations may result in reductions in U.S. and foreign duties on the articles covered by this summary. The Uruguay Round schedule of U.S. concessions was not available when this summary was prepared. There are no known domestic nontariff import restrictions on pneumatic tires and tubes.

FOREIGN TRADE MEASURES

During 1988-92, the major foreign markets for domestic producers of pneumatic tires and tubes were Canada, Mexico, and Germany. Foreign tariff rates for tires and tubes range from 5.8 percent ad valorem plus a 7 percent value-added tax on tires and tubes exported from the United States to Canada, to 20 percent plus a 10 percent value-added tax and a 0.8 percent customs processing fee on U.S. tire and tube exports to Mexico. Under NAFTA, which became effective on January 1, 1994, Mexico eliminated its duties on imports from the United States of aircraft tires and those designed for tractors and agricultural machinery. Mexico is obligated to phase out its duties on imports of the remaining articles covered by this summary from the United States either over a 5-year or a 10-year period. There are no known nontariff measures affecting U.S. exports of tires and tubes to U.S. major foreign markets.

U.S. MARKET

Consumption

The value of U.S. apparent consumption of pneumatic tires and tubes was \$13.3 billion in 1992, a 2.8 percent increase from 1988 (table 2). However, during 1988-89, apparent consumption had increased 4.4 percent to \$13.5 billion before dropping 4.5 percent by 1991 to 1988's level of \$12.9 billion. The value share of domestic consumption accounted for by imports ranged from 17.2 percent in 1991 to a high of 19.6 percent in 1989. The estimated level for 1992 is 18.1 percent.

The relative sluggishness of the tire and tube industry in recent years reflects further progress in the development of the radial tire. Today's conventional radials, averaging 40,000 to 50,000 miles of wear, last much longer than the original radials, averaging 30,000 miles, which were introduced more than 15 years ago.

Table 1

Pneumatic tires and tubes: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rate of duty as of Jan. 1, 1993; U.S. exports, 1992; and U.S. imports, 1992

HTS subheading	Description	Col. 1 rate of duty as of Jan. 1, 1993		U.S. exports, 1992	U.S. imports, 1992
		General	Special ¹		
— Million dollars —					
4011.10.00	New pneumatic tires, of rubber: Passenger car tires	4%	Free(A*,E, IL,J),2%(CA)	753	1,159
4011.20.00	Truck and bus tires	4%	Free(A*,E, IL,J),2%(CA)	396	898
4011.30.00	Aircraft tires	Free		21	12
4011.40.00	Motorcycle tires	4%	Free(A,CA, E,IL,J)	4	34
4011.50.00	Bicycle tires	5%	Free(E,IL,J) 2.5%(CA)	1	73
4011.91.10	Tires, n.e.s.i., having "herringbone" or similar tread: Designed for tractors and agricultural machinery	Free		44	19
4011.91.50	For equipment or vehicles, n.e.s.i.	4%	Free(A*,E, IL,J),2%(CA)	24	23
4011.99.10	Tires, n.e.s.i., having tread other than "herringbone" or similar tread: Designed for tractors and agricultural machinery	Free		16	29
4011.99.50	For equipment or vehicles, n.e.s.i.	4%	Free(A,E,IL, J),2%(CA)	41	103
4013.10.00	Inner tubes: Auto, truck and bus tubes	3.7%	Free(A,E,IL, J),1.8%(CA)	24	20
4013.20.00	Bicycle tubes	15%	Free(E,IL,J) 7.5%(CA)	1	23
4013.90.10	Tubes for tractors and farm machinery	Free		8	4
4013.90.50	Tubes for motorcycles and vehicles, n.e.s.i.	3.7%	Free(A,E,IL,J) 1.8%(CA)	8	10

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 or A*); United States-Canada Free-Trade Agreement (CA); Caribbean Basin Economic Recovery Act (E); United States-Israel Free Trade Area (IL); and Andean Trade Preference Act (J).

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

Table 2

Pneumatic tires and tubes: U.S. producers' shipments, exports of domestic merchandise, imports for consumption, and apparent consumption, 1988-92

Year	U.S. shipments	U.S. Exports	U.S. Imports	Apparent U.S. consumption	Ratio of imports to consumption
<i>Million dollars</i>					<i>Percent</i>
1988	11,240	690	2,389	12,939	18.5
1989	11,680	812	2,644	13,512	19.6
1990	11,861	1,097	2,522	13,286	19.0
1991	11,883	1,215	2,223	12,891	17.2
1992	112,240	1,341	2,407	13,306	18.1
<i>Thousand units</i>					<i>Percent</i>
1988	290,353	18,514	129,277	401,116	32.2
1989	286,073	21,352	135,654	400,375	33.9
1990	284,995	28,926	137,185	393,254	34.9
1991	280,528	31,838	140,793	389,483	36.1
1992	295,892	33,005	145,532	408,419	35.6

¹ Estimated by the staff of the U.S. International Trade Commission.

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

Shipments

U.S. shipments (quantity) of pneumatic tires and tubes increased 1.9 percent from 1988 to 1992. From 1989 to 1991, however, shipments had decreased from 290 million units to 281 million units, a 3.4 percent decrease during the period. A slowdown in the economy during that period resulting in reduced automotive sales and decreased vehicle miles traveled, translated to lower demand for original equipment tires on new autos and less demand for tires in the replacement market. In addition, the longer lasting radial tires on virtually all cars and most trucks contributed to the slow increase in shipments during this period. As car sales recover during 1993-95, overall tire shipments are forecast to grow annually 3-5 percent. Beyond 1995 however, U.S. shipments of tires are forecast to rise only 1 percent per year.

Imports

During 1988-92, the value of U.S. imports ranged from a low of \$2.2 billion in 1991 to a high of \$2.6 billion in 1989 (table 3). In 1992, U.S. imports of tires and tubes were valued at \$2.4 billion. Rising imports from Canada and Brazil accounted for most of the increase during 1991-92. These imports are mainly related-party transactions by multinational companies, such as Goodyear and Michelin. Increases in imports during 1992 were necessary to supplement domestic supply.

The principal suppliers of imported tires and tubes to the United States during 1988-92 were Canada and Japan. In 1992, Canada supplied 30 percent of U.S.

tire and tube imports, while Japan supplied another 26 percent. The principal consumers of these tire imports are the multinational tire producers, Goodyear, Michelin, and Bridgestone.

FOREIGN MARKETS

Foreign Market Profile

The predominant foreign markets for U.S. exports of tires and tubes during 1988-92 were Canada, Mexico, and Japan (table 4). These markets received more than 60 percent of U.S. exports during this period. As with imports, these exports are mainly related-party transactions by multinational corporations.

Industry analysts have indicated it is unlikely that the implementation of the EC 92 program or the shift of Eastern European and Commonwealth of Independent States to market economies will have any significant effect on international trade of pneumatic tires and tubes in the foreseeable future. However, an influx of tires from eastern Europe and Russia could temporarily undermine western European pricing of these products and adversely affect U.S. exports to the European Union.

Under NAFTA, the immediate or gradual phasing out of duties on tire imports among the three participants should increase U.S. tire exports to both Canada and Mexico. On average, these nations have higher duty rates for tire imports than the United States.

Table 3
Pneumatic tires and tubes: U.S. imports for consumption, by principal sources, 1988-92

Source	1988	1989	1990	1991	1992
Quantity (1,000 units)					
Canada	9,585	12,736	14,399	15,761	17,064
Japan	19,128	18,854	17,195	14,978	13,462
Korea	18,194	14,362	14,661	10,593	9,401
France	3,076	2,751	3,113	3,184	3,339
Taiwan	53,362	56,482	54,513	63,926	62,063
Brazil	4,932	3,827	3,235	2,739	4,665
Germany	2,835	2,746	3,172	3,072	2,283
Spain	2,842	2,554	2,105	968	1,011
Italy	2,442	3,390	2,609	1,872	2,096
All other	12,881	17,952	22,183	23,700	30,148
Total	129,277	135,654	137,185	140,793	145,532
Value (1,000 dollars)					
Canada	438,196	577,074	602,825	660,557	733,775
Japan	741,789	833,400	783,542	622,176	628,891
Korea	195,824	195,058	225,295	190,425	206,000
France	133,256	136,302	123,721	120,553	129,369
Taiwan	87,623	93,564	109,909	118,062	129,470
Brazil	114,871	93,162	80,758	73,737	110,746
Germany	129,093	114,841	118,138	97,233	83,978
Spain	165,965	154,189	129,613	68,857	75,550
Italy	74,610	103,726	76,539	54,373	56,342
All other	307,591	342,994	271,445	217,360	252,549
Total	2,388,818	2,644,310	2,521,785	2,223,333	2,406,670
Unit value (dollars per unit)					
Canada	46	45	42	42	43
Japan	39	44	46	42	47
Korea	11	14	15	18	22
France	43	50	40	38	39
Taiwan ¹	2	2	2	2	2
Brazil	23	25	25	27	24
Germany	46	42	37	32	37
Spain	58	60	62	71	75
Italy	31	31	29	29	27
All other	24	19	12	9	8
Average	18	19	18	16	17

¹ The low unit values for Taiwan reflect the preponderance of inner tubes and bicycle tires in the U.S. import mix.

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

Table 4
Pneumatic tires and tubes: U.S. exports of domestic merchandise, by principal markets, 1988-92

Market	1988	1989	1990	1991	1992
Quantity (1,000 units)					
Canada	4,663	5,741	10,278	11,743	12,387
Mexico	1,267	2,213	4,188	4,881	4,882
Japan	4,570	5,907	6,104	5,345	5,062
Germany	422	740	788	808	936
Netherlands	750	184	601	628	653
Saudi Arabia	443	592	546	926	661
United Kingdom	352	466	453	484	656
Belgium	488	252	369	381	416
Venezuela	202	69	124	604	800
All other	5,357	5,190	5,475	6,038	6,552
Total	18,514	21,354	28,926	31,838	33,005
Value (1,000 dollars)					
Canada	239,302	280,806	481,141	506,024	542,565
Mexico	46,365	71,136	106,391	153,659	178,213
Japan	145,218	177,353	181,513	167,289	173,789
Germany	21,982	34,904	41,669	44,019	54,748
Netherlands	24,780	10,564	28,098	34,249	38,994
Saudi Arabia	17,111	23,500	20,172	43,171	36,552
United Kingdom	21,365	22,207	30,943	29,015	35,292
Belgium	20,998	12,020	17,992	23,575	27,584
Venezuela	10,044	4,398	5,633	20,276	24,216
All other	142,554	175,169	183,861	193,860	229,546
Total	689,719	812,057	1,097,413	1,215,137	1,341,499
Unit value (dollars per unit)					
Canada	51	49	47	43	44
Mexico	37	32	25	31	37
Japan	32	30	30	31	34
Germany	52	47	53	54	58
Netherlands	33	57	47	55	60
Saudi Arabia	39	40	37	47	55
United Kingdom	61	48	68	60	54
Belgium	43	48	49	62	66
Venezuela	50	64	45	34	30
All other	27	34	34	32	35
Average	37	38	38	38	41

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

U.S. Exports

During 1988-92, U.S. exports of tires and tubes as a percentage of shipments increased from 6.1 percent in 1988 to 11.0 percent in 1992. The value of these exports increased from \$690 million in 1988 to \$1,341 million in 1992, an increase of 94 percent. U.S. exports of these products have increased every year since 1987, as the acquisitions and mergers of domestic tire companies have led to a highly concentrated and efficient U.S. tire industry. Multinational producers such as Goodyear, Michelin, and Bridgestone are the principal exporters.

U.S. TRADE BALANCE

The United States maintained a negative trade balance for pneumatic tires and tubes during the 5 years covered in this summary (table 5). During this period, the trade balance went from a \$1.8 billion deficit in 1989 to a \$1.0 billion deficit in 1991. In 1992, the trade deficit was \$1.1 billion. As the level of imports during 1988-92 averaged \$2.4 billion, it was the doubling of exports to \$1.3 billion during this period, that was the driving force behind the deficit reduction.

Table 5
Pneumatic tires and tubes: U.S. exports of domestic merchandise, imports for consumption, and
merchandise trade balance, by selected countries and country groups, 1988-92¹
(Million dollars)

Item	1988	1989	1990	1991	1992
U.S. exports of domestic merchandise:					
Canada	(2)	281	481	506	543
Japan	(2)	177	182	167	174
Korea	(2)	14	14	16	9
Mexico	(2)	71	106	154	178
Taiwan	(2)	4	7	11	13
France	(2)	9	7	7	10
Germany	(2)	35	42	44	55
Brazil	(2)	1	6	3	3
United Kingdom	(2)	22	31	29	35
Spain	(2)	1	2	2	2
All other	(2)	195	220	276	319
Total	690	812	1,097	1,215	1,341
EU-12	(2)	106	142	154	186
OPEC	(2)	43	40	77	82
ASEAN	(2)	5	8	8	11
CBERA	(2)	33	31	35	47
Eastern Europe	(2)	1	1	0	0
U.S. imports for consumption:					
Canada	(2)	577	603	661	734
Japan	(2)	833	784	622	629
Korea	(2)	195	225	190	206
Mexico	(2)	67	35	19	26
Taiwan	(2)	94	110	118	129
France	(2)	136	124	121	129
Germany	(2)	115	118	97	84
Brazil	(2)	93	81	74	111
United Kingdom	(2)	93	65	41	43
Spain	(2)	154	130	69	76
All other	(2)	286	248	211	240
Total	2,389	2,644	2,522	2,223	2,407
EU-12	(2)	629	544	403	401
OPEC	(2)	12	9	7	13
ASEAN	(2)	22	20	26	35
CBERA	(2)	1	1	2	1
Eastern Europe	(2)	35	41	39	27
U.S. merchandise trade balance:					
Canada	(2)	-296	-122	-155	-191
Japan	(2)	-656	-602	-455	-455
Korea	(2)	-181	-211	-174	-197
Mexico	(2)	4	71	135	152
Taiwan	(2)	-90	-103	-107	-116
France	(2)	-127	-117	-114	-119
Germany	(2)	-80	-76	-53	-29
Brazil	(2)	-92	-75	-71	-108
United Kingdom	(2)	-71	-34	-12	-8
Spain	(2)	-153	-128	-67	-74
All other	(2)	-91	-28	65	79
Total	-1,699	-1,832	-1,425	-1,008	-1,066
EU-12	(2)	-523	-402	-249	-215
OPEC	(2)	31	31	70	69
ASEAN	(2)	-17	-12	-18	-24
CBERA	(2)	32	30	33	46
Eastern Europe	(2)	-34	-40	-39	-27

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 detail provided only for years in which there are actual trade data based on the Harmonized Tariff Schedule of the United States (HTS).

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

The trade deficits are mainly the result of negative trade balances with Japan, followed by Canada, and the Republic of Korea. Except for those from the Republic of Korea, imports of these products were mostly related-party transactions between multinational corporations, such as Goodyear, Michelin, and Bridgestone. The Republic of Korea is reportedly attempting to increase market share in the United States through lower tire prices. The high level of U.S. imports in 1992 was necessary to supplement domestic supply, which was limited owing to capacity cutbacks

during the previous decade. Given the globalization of the domestic tire industry, imports are expected to approximate current levels, and capacity increases will occur only if exports continue their dramatic increase. In addition, industry sources report that in future years competition will increase in the service component of this industry, reflecting the practical limits to improvements in tire performance. Automated accounting and distribution systems will play a significant role in this regard.

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 nonembargoed countries except those enumerated in general note 3(b) to the HTS plus Serbia and Montenegro, 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, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Mongolia, Poland, Romania, Russia, Slovakia, Turkmenistan, and Ukraine are currently eligible for MFN treatment, as are the other republics of the former Socialist Federal Republic of Yugoslavia. 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 September 30, 1994. 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 4 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 7 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 8 to 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 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 11 to the HTS.

Preferential rates of duty in the special subcolumn of column 1 followed by the symbol "CA" are applicable to eligible goods of Canada, and those followed by the symbol "MX" are applicable to eligible goods of Mexico, under the *North American Free Trade Agreement*, as provided in general note 12 to the HTS, effective January 1, 1994.

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 5) and the *Agreement on Trade in Civil Aircraft* (ATCA) (general note 6), and *articles imported from freely associated states* (general note 10).

The *General Agreement on Tariffs and Trade* (GATT) (61 Stat. (pt. 5) A58; 8 UST (pt. 2) 1786) is a multilateral agreement setting forth basic principles governing international trade among its 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, antidumping 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.

