

Industry & Trade Summary

Flat Glass and Certain
Flat Glass Products

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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 flat glass and certain flat glass products covers the period 1988 through 1992 and represents one of approximately 250-300 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 minerals, metals, and miscellaneous manufactures sector.

<i>USITC publication number</i>	<i>Publication date</i>	<i>Title</i>
2426	November 1991	Toys and models
2475	July 1992	Fluorspar and certain other mineral substances
2476	January 1992	Lamps and lighting fittings
2504	November 1992	Ceramic floor and wall tiles
2523	June 1992	Prefabricated buildings
2587	January 1993	Heavy Structural Steel Shapes
2623	April 1993	Copper
2653	June 1993	Glass containers

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 covers flat glass and certain flat glass products. It examines U.S. and foreign industry profiles, tariff and nontariff measures, and U.S. industry performance in domestic and foreign markets during 1988-92.

The globalization of the flat glass industry continued during 1988-92, with French, Japanese, British, and U.S. firms expanding their worldwide networks of production facilities. Firms have shown a tendency to build or acquire foreign production facilities rather than service foreign markets with exports. Because transportation costs associated with flat glass are relatively high, they undoubtedly work against extensive trade. Domestic producers indicate that transportation costs tend to limit the effective sales range for flat glass to a few hundred miles from a factory.

The industry's products consist of flat glass¹ and the following products fabricated from flat glass: tempered glass, laminated glass, mirrors, insulating units,² and miscellaneous products.³ The product mix

¹ Flat glass is largely unworked; it has not been tempered, laminated, bent, edge-worked, engraved, drilled, enameled, or otherwise worked, whether or not it has an absorbent or reflecting layer.

² These may be variously referred to as multiple-walled insulating units or multiple-glazed, sealed insulating units.

³ Miscellaneous fabricated flat glass products are defined as flat glass that has been bent, edge-worked,

of U.S. producers' shipments and imports is roughly comparable, but imports are slightly more concentrated in fabricated products with higher value added (figure 1). The primary markets for both flat glass and fabricated flat glass products are the construction and automotive markets.

Flat Glass

Flat glass is typically produced by the float process, a process developed, patented, and licensed throughout the world by Pilkington Brothers, Ltd. (Pilkington), of the United Kingdom.⁴ Since its introduction in the 1950s, the float process has largely

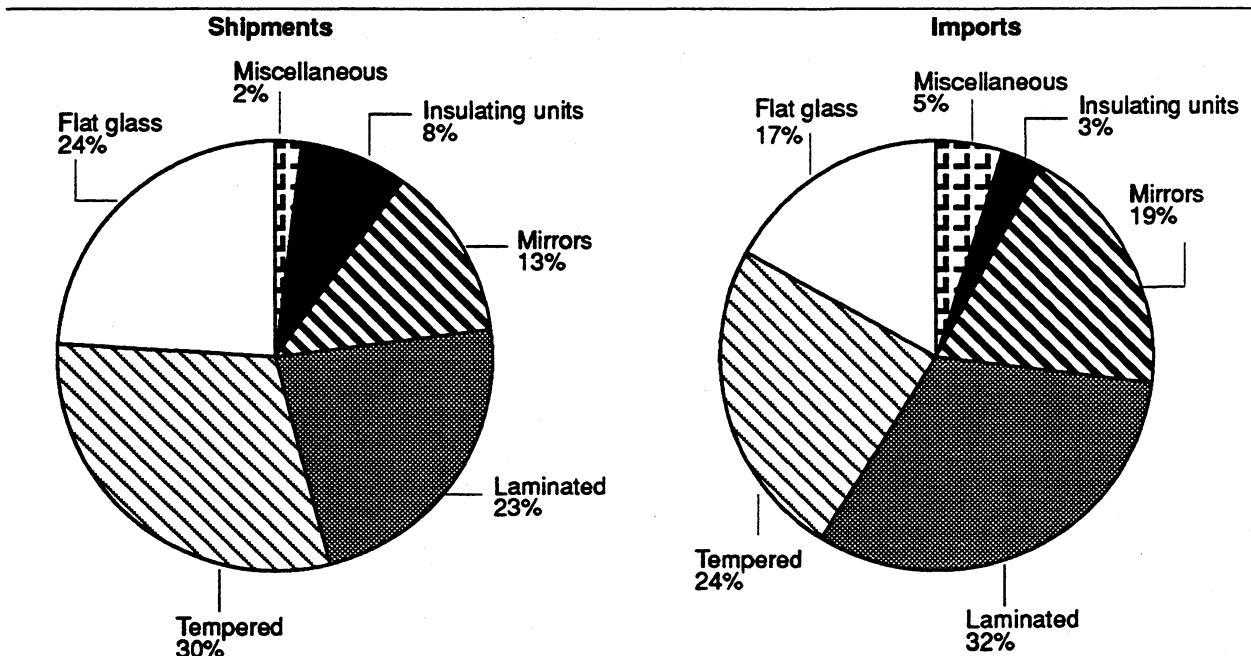
³—Continued

engraved, drilled, enameled, or otherwise worked but not framed or fitted with other materials. They may be finished products or intermediate products used in the manufacture of other goods. They may be used for table and desk tops, curved display windows, counter glass, and partition glass.

⁴ "In 1975, PPG Industries, Inc., a U.S. float glass manufacturer, publicly announced the development of its own float process, the LB process, which is now patented and does not infringe upon the Pilkington patents." For further information, see U.S. International Trade Commission, *Unprocessed Float Glass From Belgium and Italy* (investigations Nos. 104-TAA-11 and 104-TAA-12), USITC publication 1344, Feb. 1983, p. A-4.

Figure 1

Flat glass and certain flat glass products: Value of U.S. producers' shipments and imports for consumption, by types, 1992¹



¹ Most recent shipment data are for 1987.

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

displaced the production of flat glass by the sheet (continuous drawing) or plate (rolling-grinding-polishing) processes. Float production achieves plane and parallel surfaces without the visual distortions of sheet glass and without the grinding and polishing required by the plate process. Flat glass may also be produced through rolling processes, but rolling is practical only for low-volume, specialty products.⁵

The raw materials used to make float glass include silica sand, soda ash, limestone, dolomite, cullet (scrap glass), and small amounts of other materials. Raw materials are proportioned to meet specific physical characteristics, are mixed, and are then fed into the melting tank (or furnace), where temperatures of about 1,600 degrees Celsius reduce the material to glass. The glass itself may be clear or may be produced to varying degrees of translucence through the addition of coloring agents or opacifiers to the raw material mix. The molten glass is fed as a continuous ribbon from the furnace onto a bath of molten tin where the glass is fire polished by controlled temperatures.⁶ The ribbon of glass leaves the float bath and enters the annealing lehr, or oven, where it is gradually cooled in order to prevent flaw-causing stresses. The glass is then cut. Manufacturing operations diverge at this point. Glass may be packaged and sent to a customer, immediately subjected to further processing, or sent to storage for inventory or future processing. Additional processing often involves coating glass with microscopically thin coatings of metal or chemical compounds that absorb infrared light or improve the reflecting qualities of the glass.

Fabricated Flat Glass Products

Tempered Glass

Toughened (tempered) glass is a type of safety glass made from flat glass that has been specially treated to increase its strength. Tempered glass disintegrates into small, nonjagged pieces when broken, minimizing the danger of serious injury. It is used principally for nonwindshield glazing in automobiles and trucks. It is also widely used for architectural and construction applications such as shower and entrance doors, in appliances, and in the production of insulating units.

⁵ Rolling processes are typically used to produce translucent glass by means of a rough surface texture or definite pattern on one or both sides. The product of these processes is termed rolled glass, sometimes designated cast glass, and is produced by passing rollers over still-molten glass. The surface texture or patterns diffuse light, and rolled glass is used for decorative as well as utilitarian purposes for which transparency is unnecessary or objectionable but where light is needed, as in skylights, office partitions, or lavatories.

⁶ Wire netting may also be embedded into the glass while it is still molten to produce wire glass, a safety glass used to minimize potential injury from broken glass where there is danger of fire, explosion, or similar hazards.

Tempered glass is typically produced by the thermal process,⁷ in which heating and subsequent rapid cooling produce surface and interior stresses in the glass that make it three to five times stronger than ordinary glass.⁸ Tempered glass products must be sized and formed before tempering, because tempered products cannot be cut without shattering the glass and cannot be altered in form without losing their tempered qualities.

Laminated Glass

Laminated glass is another type of safety glass made from flat glass. It consists of two or more layers of glass separated by, and bonded to, thin transparent sheets of plastic. The plastic layer prevents the glass from shattering when broken. Laminated glass may be shaped and/or framed. The automobile industry is the largest market for this type of glass. Laminated glass typically is used in automobile and truck windshields and in the side and rear windows of buses and certain trucks.

Glass mirrors

Mirrors are produced in a wide range of shapes and sizes. They may be used in automobiles, cosmetic cases, furniture, doors, medicine cabinets, and decoration. Framed mirrors are the most significant mirror application.

Mirrors are produced by a capital-intensive process whereby glass is cleaned and then successively coated on one side with an adhesive compound, a reflective compound, and a binding compound.⁹ In some instances a sealant is also applied to the back and edges.¹⁰ Cutting to size and shape may occur before glass has been transformed into a mirror or after processing. Exposed edges on the finished mirror are beveled or ground smooth. The mirror may also be framed or encased in metal, wood, or other materials.

Insulating Units

Insulating units consist of two or more parallel separated panes of flat glass joined at the edges by metal seals or by fusing the edges of the panes, with the space between the panes of glass entirely evacuated or containing dry air or another gas.¹¹ Insulating units primarily are used to provide thermal insulation, reduce surface condensation, and reduce sound transmission.¹²

⁷ A limited amount of tempered glass is produced by the chemical process. In the chemical process the surface of the glass is chemically altered to attain additional strength. Chemical tempering can produce stronger and more flexible glass than thermal tempering, but it is more expensive.

⁸ USITC, *Conditions of Competition Between U.S. and Mexican Fabricated Automotive Glass in the U.S. Market* (investigation No. 332-286), USITC publication 2299, July 1990, p. 4.

⁹ USITC, *Certain Unfinished Mirrors From the Federal Republic of Germany, Italy, Japan, Portugal, and the United Kingdom*, (investigations Nos. 731-TA-321-325 (final)), USITC publication 1938, Jan. 1987, p. A-5.

¹⁰ Ibid.

¹¹ USITC, *Summary of Trade and Tariff Information: Flat Glass and Certain Flat Glass Products*, USITC publication 841, Oct. 1982, p. 5.

¹² Ibid., p. 6.

GLOBALIZATION

The world industry for flat glass is increasingly dominated by five firms. These five firms and associated subsidiaries represented 74 percent of world float glass capacity in 1986.¹³ In recent years they have expanded their operations through construction of new plants, acquisitions, and joint ventures. Currently these firms are focusing on the expanding markets of China, Eastern Europe, India, and Southeast Asia. The scope of world involvement (including plant investments and plant construction contracts) by each of these five firms is shown in table 1.

Recent investments in China, Eastern Europe, and India are a good example of the willingness of these

¹³ Mike O'Driscoll, "Glass Markets Added Value Impetus," *Industrial Minerals*, Aug. 1987, p. 35.

firms to compete globally with each other in previously unattainable markets. In China the flat glass joint venture between PPG Industries, Inc. (PPG), of the United States and a local firm¹⁴ began its first full year of production in 1988. Asahi Glass (Asahi) of Japan acquired half of PPG's Chinese holdings, and the two firms are considering building a float glass plant in Dalian, China.¹⁵ In Eastern Europe Asahi bought a minority share¹⁶ and then control of Czech flat glass operations¹⁷ and also invested in facilities in

¹⁴ "PPG Starts Production at Chinese Glass Plant," *American Glass Review*, Aug. 1987, p. 10.

¹⁵ "PPG Announces Asahi Agreement and 1991 Earnings," *Glass Magazine*, Mar. 1992, p. 7.

¹⁶ "Glaverbel's Prolific 1990," *American Glass Review*, Feb. 1991, p. 11.

¹⁷ "New Company Helps Glaverbel Finance Foreign Investments," *American Glass Review*, Sept. 1991, p. 10.

Table 1
Flat glass and certain flat glass products: Plant locations (including flat glass and fabrication operations) and construction contract sites for selected firms, by countries, 1992

Country	Asahi Glass ¹	Guardian Industries Corp. ²	La Compagnie de Saint Gobain ³	Pilkington Brothers, Ltd. ⁴	PPG Industries, Inc. ²
Argentina	(5)	(5)	(5)	Yes	(5)
Australia	(5)	(5)	(5)	Yes	(5)
Belgium	Yes	(5)	Yes	(5)	(5)
Brazil	(5)	(5)	Yes	Yes	(5)
Canada	Yes	Yes	(5)	Yes	Yes
China	Yes	(5)	(5)	Yes	Yes
Czech Republic	Yes	(5)	(5)	(5)	(5)
Finland	(5)	(5)	(5)	Yes	(5)
France	Yes	(5)	Yes	(5)	Yes
Germany	Yes	(5)	Yes	Yes	(5)
Hungary	(5)	Yes	(5)	(5)	(5)
India	Yes	Yes	(5)	Yes	(5)
Indonesia	Yes	Yes	(5)	(5)	(5)
Italy	(5)	(5)	Yes	(5)	Yes
Japan	Yes	(5)	(5)	(5)	(5)
Korea	(5)	(5)	Yes	Yes	(5)
Luxembourg	(5)	Yes	(5)	(5)	(5)
Malaysia	Yes	(5)	(5)	(5)	(5)
Mexico	(5)	(5)	(5)	Yes	(5)
Morocco	Yes	(5)	(5)	(5)	(5)
Netherlands	Yes	(5)	(5)	(5)	(5)
New Zealand	(5)	(5)	(5)	Yes	(5)
Philippines	Yes	(5)	(5)	(5)	(5)
Poland	(5)	(5)	(5)	Yes	(5)
Portugal	(5)	(5)	Yes	(5)	(5)
Saudi Arabia	(5)	Yes	(5)	(5)	(5)
Spain	(5)	Yes	Yes	(5)	(5)
Sweden	(5)	(5)	(5)	Yes	(5)
Taiwan	(5)	(5)	(5)	Yes	(5)
Thailand	Yes	Yes	(5)	(5)	(5)
Turkey	(5)	(5)	(5)	Yes	(5)
United Kingdom	(5)	(5)	Yes	Yes	(5)
United States	Yes	Yes	(5)	Yes	Yes
Venezuela	(5)	Yes	(5)	(5)	Yes

¹ Headquartered in Japan

² Headquartered in the United States

³ Headquartered in France

⁴ Headquartered in the United Kingdom

⁵ Not applicable.

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

former East German territory.¹⁸ Pilkington acquired an automotive glass producer in former East German territory,¹⁹ reportedly was selected over Asahi for a Polish float glass joint venture,²⁰ and purchased Polish distribution facilities.²¹ Guardian Industries, Corp. (Guardian), of the United States entered into a float glass joint venture in Hungary.²² Following a relaxation of India's restrictions on foreign investment in 1991,²³ Guardian opened a float plant in India in 1992.²⁴ Asahi recently announced plans to construct a float plant in India that is expected to open by late 1994.²⁵

This expansion and restructuring is one reflection of the industry's recognition that the flat glass market is now global. Other competitive responses include targeting product niches, trimming employment, eliminating inefficient operations, and improving customer service. Creativity, flexibility, and rapid adaptability to emerging customer needs and values are believed to be crucial to a firm's long-term viability in the global glass industry according to a spokesman for Pilkington's U.S. subsidiary, Libby-Owens-Ford Co. (LOF).²⁶ Joint ventures are widely recognized throughout the industry as a mechanism for globalization by establishing manufacturing facilities in new markets.²⁷ Joint ventures also tend to reduce expenses for individual companies, as do working agreements with other producers to pool research, development, and engineering information.²⁸

U.S. INDUSTRY PROFILE

Industry Structure

The U.S. flat glass industry²⁹ is one of the world's four largest producers of flat glass, along with the industries of France, Japan, and the United Kingdom. The U.S. industry consists of an estimated 1,100 companies, 1,300 establishments, and 56,000

employees. California, Michigan, North Carolina, Ohio, and Pennsylvania are the major producing areas.

Multinational producers are predominant in the United States and in other major flat glass-producing countries. The major U.S. producers are AFG Industries, Inc. (AFG), Ford Motor Co. (Ford), Guardian, LOF, and PPG. All of these firms have foreign operations and two of them are owned by foreign producers: AFG, by Asahi, and LOF, jointly by Pilkington and Nippon Sheet Glass (NSG) of Japan. Major firms in the United States and in the market economies tend to be publicly held corporations rather than privately held operations.

The basic structure of the U.S. industry is shown in figure 2. An estimated 35 percent of industry shipments are from firms that produce flat glass and flat glass products from glass they manufacture by melting raw materials (primary producers). The remaining 65 percent of shipments are from firms that produce flat glass and flat glass products from purchased glass (secondary producers). Primary producers typically are vertically integrated downstream into the production of fabricated flat glass products. One primary producer, Ford, is vertically integrated into the manufacture of automotive products that require fabricated flat glass products as parts, e.g., laminated glass, tempered glass, and mirrors.

The primary-producer segment of the U.S. industry is relatively concentrated, with the 13 largest of the 84 establishments accounting for 76 percent of U.S. shipments. The secondary-producer segment of the U.S. industry is much less concentrated, with the 17 largest of the 1,429 establishments accounting for 28 percent of U.S. shipments.³⁰ Although U.S. firms are diversified into other products, U.S. manufacturing facilities are dedicated almost solely to the production or fabrication of flat glass. The specialization ratios for flat glass establishments are 99 percent for primary producers and 93 percent for secondary producers.³¹

Production facilities are dispersed throughout the United States and the world to minimize shipping costs of raw materials and finished products. Shipping costs can be significant for relatively heavy, low-value products such as flat glass; shipping costs associated with U.S. imports in 1992 equaled about 7 percent of import value, exclusive of imports from Canada and Mexico.

Automation-based differences in capital, raw material, and labor requirements produce different trends for primary and secondary producers. The float production lines of primary producers are highly automated in the United States and throughout the world, producing large volumes of relatively

¹⁸ Ibid.

¹⁹ "Pilkington Proceeds With Economics," *American Glass Review*, Mar. 1991, p. 10.

²⁰ Ibid.

²¹ "Pilkington Survives Tough Recession," *American Glass Review*, July 1992, p. 26.

²² "Hungarian Glass Industry Expands With Foreign Investment," *American Glass Review*, Oct. 1988, p. 10.

²³ "Asahi Builds Plant in India," *American Glass Review*, Jan. 1993, p. 11.

²⁴ Eileen Courter, "Guardian Steps Up Efforts To Expand Japanese Market," *American Glass Review*, June 1992, p. 10.

²⁵ "Asahi Building Indian Plant," *Glass Digest*, Mar. 15, 1993, p. 26.

²⁶ Ronald W. Skiddle, "Commitment to Product Development, to Customers, to Problem Solving Keeps Sales Ahead," *American Glass Review*, July 1992, p. 16.

²⁷ "In Business Think Globally," *American Glass Review*, Dec. 1991, p. 12.

²⁸ Thomas C. Walbridge, "Service Paramount as Customer Base Expands in Auto, Flat Glass," *American Glass Review*, Aug. 1989, p. 8.

²⁹ The coverage includes all of the industry included in Standard Industrial Classification (SIC) 3211, Flat Glass, and part of SIC 3231, Glass Products, Made of Purchased Glass.

³⁰ Includes firms that do not produce flat glass or flat glass products.

³¹ "Specialization ratio represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry." U.S. Department of Commerce, Bureau of the Census, *1987 Census of Manufactures, Glass Products*, app. A, May 1990, p. A-4.

Figure 2
Flat glass and certain flat glass products: Principal raw materials, producer types, major products, and principal consumers

Flat Glass and Certain Flat Glass Products			
Principal raw materials	Producer types	Major products	Principal consumers
<ul style="list-style-type: none"> • Silica sand • Soda ash • Dolomite • Limestone • Cullet 	<ul style="list-style-type: none"> • Primary <ul style="list-style-type: none"> – Vertically integrated into the manufacture of fabricated flat glass products – Vertically integrated into the manufacture of products that incorporate flat glass or fabricated flat glass products • Secondary 	<ul style="list-style-type: none"> • Flat glass • Fabricated flat glass products <ul style="list-style-type: none"> – Tempered glass – Laminated glass – Mirrors – Insulating units – Miscellaneous products 	<ul style="list-style-type: none"> • Construction industry • Automotive industry

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

standardized products. The automation of float glass production has been expensive, and the process is viewed as capital intensive.³² According to official statistics of the U.S. Department of Commerce, the average value of depreciable assets per employee for primary producers in 1987 was roughly triple the average figure for all U.S. manufacturing establishments, as shown in the tabulation at the bottom of the page. Additional fabrication stages vary in degrees of automation, since the smaller volumes, more customized features, and intermittent demand associated with fabricated flat glass do not always make automation financially practical. Secondary producers have lower capital costs and are less automated than primary producers. The average value of depreciable assets per employee for secondary producers in 1987 was below the average for all U.S. manufacturing establishments.

³² Guardian Industries Corp., posthearing brief to USITC in investigation No. 332-337, Nov. 24, 1992, p. 6.

Production costs in the U.S. flat glass industry reflect a process that requires relatively abundant unprocessed raw materials and considerable labor input. A comparison of 1991 data for U.S. flat glass manufacturers and all U.S. manufacturing establishments reveals below average material costs and above average labor costs in the flat glass industry, according to official statistics of the U.S. Department of Commerce (in percent), as shown in the tabulation at the top of the next page. Although the leading U.S. primary flat glass producer maintains that the basic float production process is capital-intensive rather than labor-intensive, the firm acknowledges that labor costs do account for a significant percentage of production costs.³³ Data show that labor costs are clearly above average in the flat glass industry.

³³ PPG Industries, Inc., prehearing brief to USITC in investigations Nos. TA-503(a)-18 and 332-279, Sept. 22, 1989, pp. 5-6.

	Primary flat-glass establishments	Secondary flat-glass establishments	All U.S. manufacturing establishments
Average value of depreciable assets per employee	\$151,199	\$36,644	\$48,636

Share of shipments	Primary flat-glass establishments	Secondary flat-glass establishments	All U.S. manufacturing establishments
Represented by material costs	39	46	53
Represented by labor costs	18	14	9

The above average labor costs reflect the relatively high wages paid by primary producers and relatively low productivity of secondary producers. Float production lines require more skilled workers than fabrication operations, and float lines represent a large portion of primary producer operations. According to official statistics of the U.S. Department of Commerce, production workers for primary producers are paid above average wages, as shown in the tabulation at the bottom of the page. Float lines are highly automated, and productivity among primary producers (as measured by the value added per production worker hour) tends to be above average for U.S. manufacturing establishments. In contrast, secondary producers pay production workers below average hourly wages. Fabrication operations often lack the degree of automation present in float lines, and the productivity of secondary producers is below average for U.S. manufacturing establishments when measured by the value added per production worker-hour.

The U.S. flat glass industry made new capital expenditures faster than did total U.S. manufacturing establishments during 1988-91. Primary producers spent 6 percent of the value of shipments during the period on new capital expenditures, and secondary producers, 4 percent, compared with 3 percent for all U.S. manufacturing establishments. These expenditures are believed to be largely responsible for a 3-percent increase in secondary producer productivity during the period (as measured by the value added per production worker hour), although their productivity remained below average for U.S. manufacturing establishments. The capital expenditures of primary producers did not result in similar productivity increases. The productivity of primary producers actually declined during the period by 10 percent (as measured by the value added per production worker-hour). The high costs of shutting down float lines tend to favor the continued operation of these lines at low utilization rates in periods of weak demand. This tendency likely prevented the capital expenditures of primary producers from showing positive productivity growth.

U.S. producers reportedly believe they are faced with mounting environmental regulation that is not always economically practical and is unevenly enforced.³⁴ Issues associated with environmental standards have surpassed imports and the cost of labor³⁵ to become a leading concern of firms in the ceramic industry (including the glass industry) in 1992, second to the challenge of adjusting to changing markets.³⁶ The industry is especially concerned that amendments to the Clean Air Act in 1990 appear to eliminate economic feasibility as a consideration in pollution control regulation, basing equipment requirements on technological feasibility.³⁷ In addition to having to spend more for equipment, having to monitor emissions, and having to obtain permits to meet current regulations, firms must also allocate resources to monitor legislative and regulatory developments that may affect future environmental regulations.

The domestic industry uses two channels of distribution, selling from factories or company-owned warehouses to—

1. Intermediate consumers such as secondary producers, manufacturers (users of flat glass and flat glass products in the production of non-flat-glass products such as aircraft, appliances, automobiles, doors, furniture, and windows), and glazing contractors and
2. Independent glass distributors that serve intermediate consumers, retailers, and end users.

³⁴ "Glass Problems Meeting Sets Records, Tackles 1990s Regulations," *American Glass Review*, Jan. 1992, pp. 4-8.

³⁵ "5th Annual Giants in Ceramics/USA," *Ceramic Industry*, Aug. 1987, p. 25.

³⁶ "10th Annual Giants in Ceramics," *Ceramic Industry*, Aug. 1992, p. 23.

³⁷ James T. Destefano, "How the Clean Air Act Impacts Glass Producers," *Glass Industry*, May 1992, pp. 32-35 and 50.

Item	Primary flat-glass establishments	Secondary flat-glass establishments	All U.S. manufacturing establishments
Average hourly wage paid to production workers, 1991	\$16.77	\$9.92	\$11.49
Average value added per production-worker hour, 1988-91	58.12	37.72	53.80

Producers use various methods, such as location and creditworthiness, to limit the number of firms that may purchase flat glass directly from factories.³⁸ Other firms must purchase from distributors (or their customers) at higher prices.³⁹

Pricing practices vary for flat glass and flat glass products. For example, primary and secondary producers generally bid for sales of products such as tempered or laminated glass to the automotive industry.⁴⁰ For flat glass, primary producers maintain published price lists. However, despite published price lists, flat glass is usually sold on a negotiated price basis that can vary significantly depending on the quantities sold and market conditions.⁴¹

Restructuring was commonplace within the U.S. industry during 1988-92 as firms reacted to market conditions and the activities of domestic and global competitors. The restructuring of the U.S. industry has involved both U.S. and foreign firms, with establishments having been bought, sold, closed, and opened (table 2). One of the most significant elements of restructuring was the increased participation of all three Japanese producers in U.S. operations:

- Asahi, Japan's leading producer, added its second U.S. automotive-glass plant during the period, as its A.P. Technoglass subsidiary opened a plant in Elizabethtown, KY, on March 21, 1989.⁴²
- Asahi purchased a 20-percent share of AFG through its Brussels-based subsidiary Glaverbel during a management buyout in 1988⁴³ and acquired the remainder of the firm in December 1992.⁴⁴ The acquisition expands Asahi's North American distribution network and product capabilities, giving Asahi float lines and fabrication equipment in both the United States and Canada. The operations of the two firms are especially complementary in the United States, linking Asahi's automotive-glass plants with potential sources of supply of raw flat glass in AFG's float glass plants. As a whole, the AFG acquisition is expected to give Asahi control of 20 percent of the U.S. market.⁴⁵

³⁸ USITC, *Unprocessed Float Glass From Belgium and Italy*, USITC publication 1344, pp. A-12 to A-13.

³⁹ O'Driscoll, "Glass Markets Added Value Impetus," pp. 43-44.

⁴⁰ USITC, *Conditions of Competition Between U.S. and Mexican Fabricated Automotive Glass in the U.S. Market*, USITC publication 2299, July 1990, p. 40.

⁴¹ USITC, *Unprocessed Float Glass From Belgium and Italy*, USITC publication 1344, p. A-36.

⁴² USITC, *Conditions of Competition Between U.S. and Mexican Fabricated Automotive Glass in the U.S. Market*, USITC publication 2299, p. 6.

⁴³ "Glaverbel Increases AFG Stake," *American Glass Review*, July 1990, p. 29.

⁴⁴ Official of AFG Industries, Inc., statement, Apr. 1, 1993.

⁴⁵ "Flat Glass Maker Subject of Story on Japan's Exclusionary Practices," *American Glass Review*, Oct. 1991, p. 12.

- Nippon Sheet Glass (NSG), Japan's second-largest producer, bought a 20-percent share of LOF in 1989.⁴⁶ The balance of LOF is owned by Pilkington of the United Kingdom. The acquisition gives NSG a presence in all three North American markets through LOF's U.S. and Canadian facilities and the NSG-LOF joint venture to produce automotive glass in Mexico, L-N Safety Glass. Another NSG-LOF joint venture to produce automotive glass, United L-N Safety Glass, Inc.,⁴⁷ began its first full year of operation in Versailles, KY, in 1988.
- Central Glass (Central), Japan's third-largest producer, entered into a joint venture with Ford to produce automotive glass at a plant in Tennessee.⁴⁸

Industry expansion and restructuring have not been confined to domestic markets. Two of the five major U.S. producers—AFG and Guardian—established operations in Canada during the period, joining the remaining three major producers, Ford, LOF, and PPG, that already had facilities in Canada. AFG entered the Canadian market by purchasing two plants from Ford.⁴⁹ Guardian entered the Canadian market by opening new plants. Guardian was the U.S. company most active in other foreign markets, constructing or planning the construction of facilities in Hungary, India, Indonesia, Luxembourg, Saudi Arabia, Spain, Thailand, and Venezuela.

Consumer Characteristics and Factors Affecting Demand

Demand for flat glass and flat glass products is derived demand,⁵⁰ based primarily on construction activity and automotive production (figure 3). These two markets dictate overall flat glass demand, since other applications are relatively minor. Competitive products are limited for most flat glass applications.

Consumers of flat glass and flat glass products are numerous, diverse in nature, and scattered throughout the United States. They include intermediate consumers, glazing contractors, distributors, and the ultimate end users. Although these consumers are diverse, price⁵¹ and customer service are usually their most important purchasing considerations.⁵² However,

⁴⁶ "Pilkington/LOF/Nippon Deal Is Strategy for Globalization," *American Glass Review*, May 1989, p. 10.

⁴⁷ "Kentucky Site of Nippon Sheet Glass Plant To Open in Fall," *American Glass Review*, Mar./Apr. 1987, p. 10.

⁴⁸ Ford Motor Co., statement before the USITC in investigation No. 332-286, Apr. 12, 1990, p. 2.

⁴⁹ R.C. Cunningham, "Why Glass Demand Continues Despite Downturns," *American Glass Review*, Aug. 1989, p. 11.

⁵⁰ PPG Industries, Inc., prehearing brief to USITC in investigations Nos. TA-503(a)-18 and 332-279, Sept. 22, 1989, pp. 6-7.

⁵¹ USITC, *Unprocessed Float Glass From Belgium and Italy*, USITC publication 1344, p. A-9.

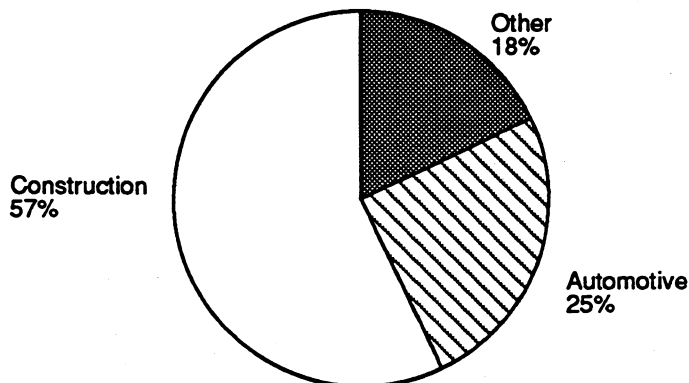
⁵² PPG Industries, Inc., prehearing statement to USITC in investigation No. 332-286, Apr. 6, 1990, pp. 8-11.

Table 2
Flat glass and certain flat glass products: U.S. plant restructuring for selected firms, 1988-92

Firm and plant location	Year	Item
AFG Industries, Inc.:		
Cinnaminson, NJ	1989 ..	Float-glass plant idled.
Sweetwater, TN	1989 ..	Sold majority interest in fabrication plant to German glass producer.
Vincennes, IN	1989 ..	Sold majority interest in fabrication plant to German glass producer.
Spring Hill, KS	1990 ..	Float-glass plant opened.
Menomonie, WI	1992 ..	Float-glass plant opened and sold to Cardinal IG, a fabricator of insulating glass.
Ford Motor Co.:		
Claremore, OK	1988 ..	Fabrication plant sold to former employees.
Nashville, TN	1989 ..	Float line idled.
Vonore, TN	1992 ..	Automotive-glass plant opened, joint venture with Japanese glass producer.
Guardian Industries Corp.:		
Richburg, SC	1988 ..	Float-glass plant opened.
Jamestown, NY	1991 ..	Fabrication plant acquired.
Lewistown, PA	1991 ..	Fabrication plant acquired.
Ligonier, IN	1991 ..	Automotive-glass plant opened.
Galax, VA	1992 ..	Fabrication plant acquired.
Libby-Owens-Ford Co.:		
Brackenridge, PA	1989 ..	Fabrication plant sold to British glass producer.
Mason City, IA	1991 ..	Fabrication plant closed.
Shelbyville, IN	1991 ..	Automotive-glass plant opened.
PPG Industries, Inc.:		
Burlington, IA	1988 ..	Tempered- and heat-strengthened glass plant opened.
Berea, KY	1989 ..	Automotive-glass plant opened.
Lincoln, IL	1989 ..	Insulating-unit plant closed.
Marshall, MN	1990 ..	Insulating-unit plant closed.
Perry, GA	1989 ..	Float-glass plant opened.
Crystal City, MO	1990 ..	Float-glass plant closed.
Chehalis, WA	1991 ..	Float-glass plant idled.
Mt. Zion, IL	1991 ..	Float line idled.

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

Figure 3
Flat glass and certain flat glass products: U.S. demand, by markets, 1992



Source: U.S. Department of Commerce, *U.S. Industrial Outlook 1993*, p. 7-8.

quality differences have been found to be important in some low-volume flat glass products, such as thin sheet glass.⁵³ Key aspects of customer service include availability of stock, speed of delivery, and customer relations as reflected in credit or replacement of damaged products.⁵⁴

FOREIGN INDUSTRY PROFILE

World flat glass production and consumption are concentrated in the European Community (EC), Japan, and the United States. The industries in the three markets are technologically equal. Table 3 provides a perspective on the relative sizes of these foreign industries compared with the U.S. industry. Demand for flat glass in each of these markets is filled primarily by domestic production, with each country being a net exporter of flat glass (figure 4). The world market for flat glass currently suffers from overcapacity, depressed demand, and low prices.⁵⁵

EC

The EC is the world's largest producer (figure 5) and consumer (figure 6) of flat glass, although none of the individual EC countries has a market as large as that of the United States or Japan. Pilkington and Saint Gobain are based in the EC, and the other three leading global producers also have production facilities in the EC.

Pilkington currently is the world's leading producer of flat glass,⁵⁶ annually competing with

⁵³ USITC, *Thin Sheet Glass From Switzerland, Belgium, and the Federal Republic of Germany* (investigations Nos. 731-TA-127-129 (preliminary)), USITC publication 1376, May 1983, p. A-10.

⁵⁴ USITC, *Unprocessed Float Glass From Belgium and Italy*, USITC publication 1344, p. A-9.

⁵⁵ "Belt Tightening Pays Off at PPG but More To Be Done Says Sami," *American Glass Review*, June 1992, p. 12.

⁵⁶ "Giants in Glass," *Ceramic Industry*, Aug. 1992, p. 33.

Asahi and Saint Gobain for the position. Pilkington is a diversified company. However, about 80 percent of the firm's total sales are in flat glass.⁵⁷ This concentration in flat glass is believed to be the highest of the five leading global producers. Pilkington has been restructuring operations, with the most significant of these efforts focusing on restructuring European operations; by 1993 core flat and safety glass operations in the United Kingdom, Germany, and Scandinavia will be run as one unit from Belgium.⁵⁸ The consolidation of such control is an attempt to become more attuned to European markets and will reportedly reduce duplication in sales and marketing, improve utilization of equipment, and remove overlaps in research.⁵⁹ In addition to Pilkington's expansions into Eastern Europe, the company has entered into joint ventures to produce float glass in India⁶⁰ and automotive glass in the United States.⁶¹

Not all of Pilkington's recent actions have been expansive in nature. The firm sold its share of South African operations to its partner,⁶² and it closed an unprofitable New Zealand sheet glass plant in 1991.⁶³ Pilkington sold a 20-percent share in its U.S. subsidiary LOF to NSG of Japan in 1989, with the hope that this alliance would help them enter the Japanese market.⁶⁴

⁵⁷ "Giants in Glass," *Ceramic Industry*, Aug. 1991, p. 42.

⁵⁸ "Pilkington Becomes More 'European?'," *American Glass Review*, Dec. 1991, p. 10.

⁵⁹ *Ibid.*

⁶⁰ "Pilkington Plans India's First Float Plant," *American Glass Review*, Oct. 1987, p. 10.

⁶¹ "Kentucky Site of Nippon Sheet Glass Plant To Open in Fall," p. 10.

⁶² "Glass South Africa Restructures," *Glass Digest*, Nov. 15, 1992, p. 27.

⁶³ "Pilkington in Midst of Economics," *American Glass Review*, May 1991, p. 11.

⁶⁴ "Pilkington/LOF/Nippon Deal Is Strategy for Globalization," p. 10.

Table 3
Flat glass and certain flat glass products: Industry profiles for selected countries, 1991

Item	European Community	Japan	United States
Producers (number)	(1)	(1)	21,300
Employees (number)	(1)	(1)	256,000
Shipments (million dollars)	28,115	24,063	26,300
Exports (million dollars)	3726	159	4786
Imports (million dollars)	3611	96	4584
Trade balance (million dollars) ..	3115	63	4202

¹ Not available

² Estimated by the staff of the U.S. International Trade Commission

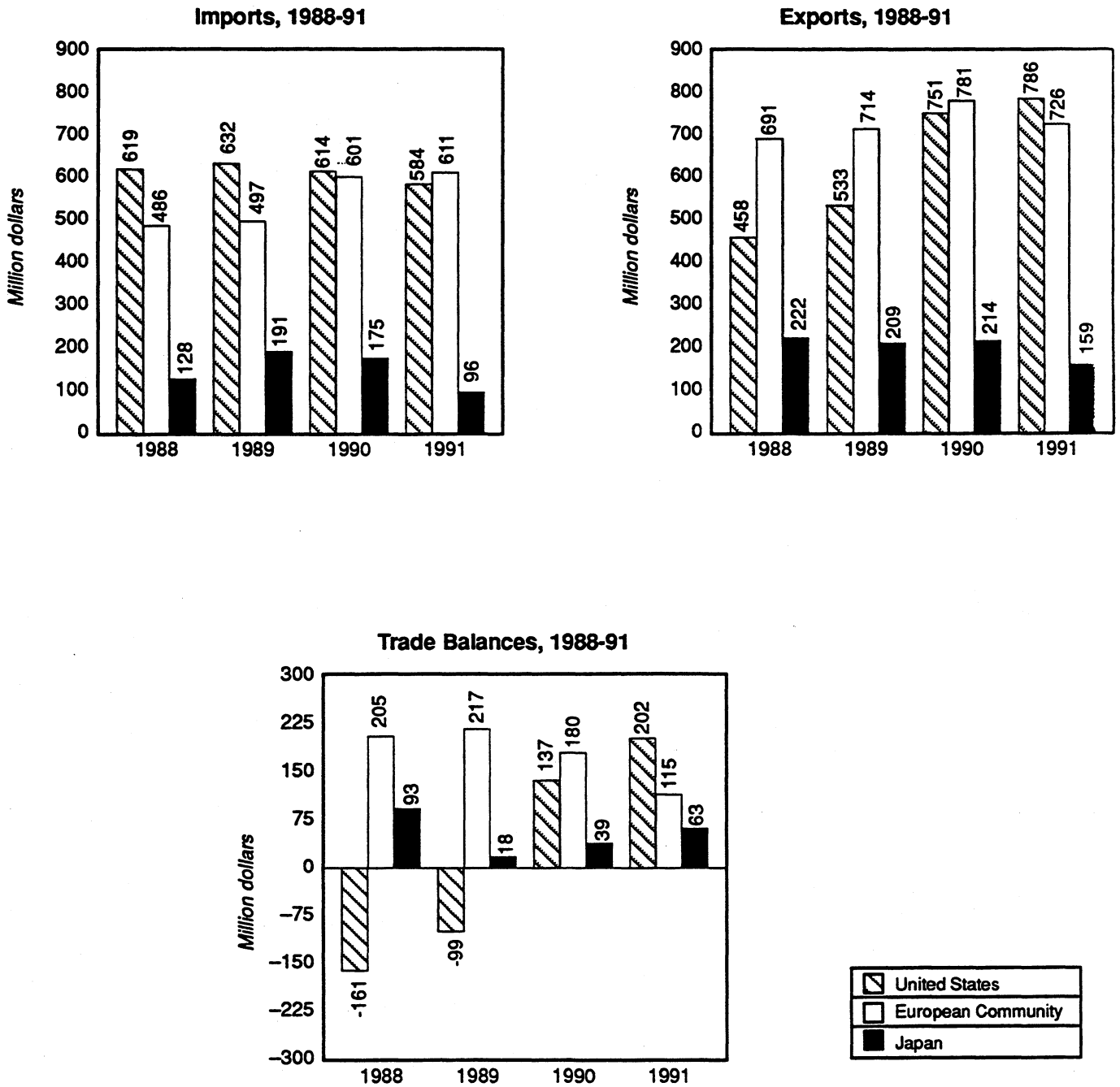
³ Trade with countries outside of the European Community. Compiled from official statistics of the European Community.

⁴ Compiled from official statistics of the U.S. Department of Commerce.

Source: Compiled from official statistics of the United Nations, except as noted.

Figure 4

Flat glass and certain flat glass products: Value of imports, exports, and trade balances, by selected countries,¹ 1988-91

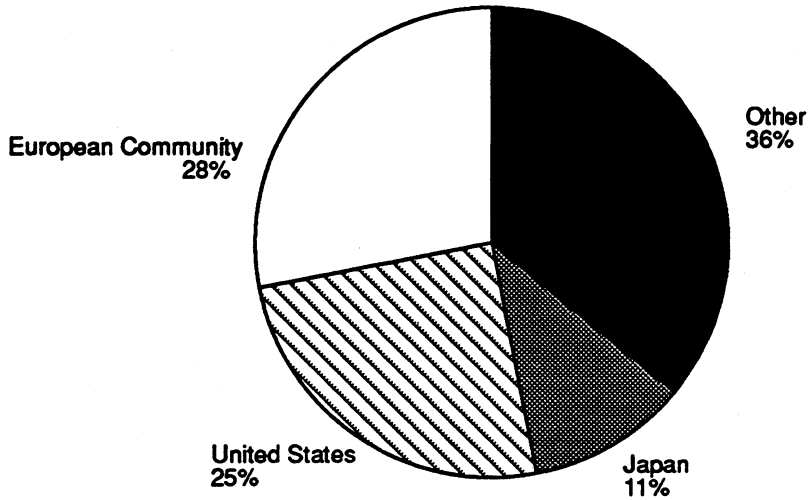


¹ EC data are for external trade.

Note.—Trade balances calculated from unrounded data.

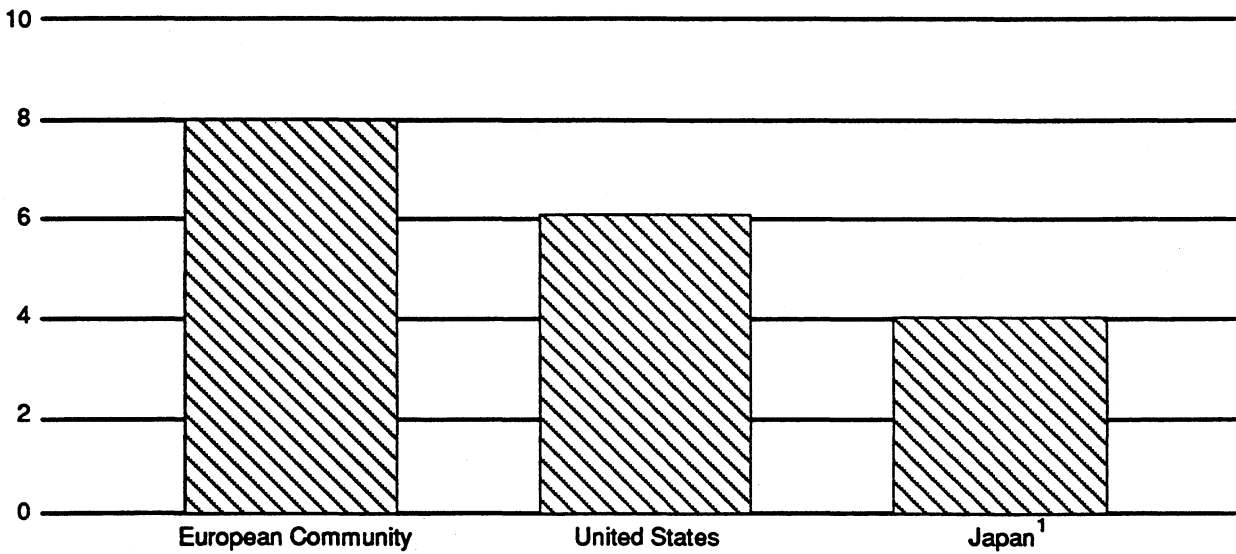
Source: U.S. data compiled from official statistics of the U.S. Department of Commerce; EC data compiled from official statistics of the European Community and Japanese data compiled from official statistics of the United Nations.

Figure 5
Flat glass and certain flat glass products: World production of flat glass, by selected markets,¹ 1989



¹ Data for European Community and Japan estimated by the staff of the U.S. International Trade Commission.
 Source: Compiled from official statistics of the United Nations, except as noted.

Figure 6
Flat glass and certain flat glass products: Consumption, by selected markets, 1991
Billion dollars



¹ Figure for Japan from "Japan Glass Market Proves Hard To Crack," *Wall Street Journal*, Aug. 7, 1991.
 Source: Estimated by the staff of the U.S. International Trade Commission, except as noted.

Saint Gobain is much more diversified than Pilkington; flat glass represents about 36 percent of its total sales.⁶⁵ Since 1986 Saint Gobain has constructed or invested in new flat glass plants in Brazil, Korea, Portugal, Spain, and the United Kingdom. Acquisition activity is expected to be limited for the foreseeable future, however, as the company does not plan any major purchases that would add to company debt.⁶⁶ Saint Gobain does not have investments in flat glass production in the United States.

Japan

Japan is the world's third-largest market for flat glass, trailing the EC and the United States. Its industry consists of three primary producers of flat glass—Asahi, NSG, and Central—with market shares of 50, 30, and 20 percent, respectively.⁶⁷ Asahi is the most diversified and global of the three firms, with flat glass representing 23 percent of sales.⁶⁸ For NSG and Central, flat glass sales represent 70 percent and nearly 66 percent of total sales, respectively.⁶⁹ No foreign producers are known to have established production facilities in Japan. This leaves the Japanese industry as the only national industry with manufacturing facilities in all three of the world's largest markets: the EC, the United States, and Japan.

All three Japanese firms are involved with foreign operations, but Asahi is the most active globally. The company has established automotive glass fabricating plants in the United States and, through its Glaverbel subsidiary, has gained plants in the United States, Canada, the EC, and Czech Republic. Asahi has also created a dominant position in the Pacific rim by establishing joint ventures in China, India, Indonesia, Malaysia, the Philippines, and Thailand. Nippon's foreign operations have taken the form of joint ventures with Pilkington in Korea, Mexico, Taiwan, and the United States. Central's known foreign operations are limited to a marketing operation, a wholly owned fabrication facility, and a joint venture with Ford, all in the United States.

U.S. TRADE MEASURES

Tariff and Nontariff Measures

Customs classification of flat glass and flat glass products is based on method of manufacture, application, and readily apparent physical characteristics, i.e., color, wire content, presence of a reflective layer, and size. The aggregate trade-weighted-average rate of duty for general imports from column 1 countries in 1992 was 5.8 percent ad valorem, excluding imports entering under special duty provisions (appendix A). Table 4 shows the column 1 rate of duty for products entering under *Harmonized*

⁶⁵ "Giants in Glass," Aug. 1991, p. 42.

⁶⁶ "No Expansion as St. Gobain Aims To Cut Debt," *American Glass Review*, Jan. 1991, p. 10.

⁶⁷ "Japan's Flat Glass Industry," *Glass Digest*, Aug. 15, 1992, p. 80.

⁶⁸ *Ibid.*

⁶⁹ *Ibid.*

Tariff Schedule of the United States (HTS) subheadings 7003.11.00 to 7009.92.50 as of January 1, 1993.

No U.S. nontariff measures are known to have a significant effect on trade in these products.

U.S. Government Trade-Related Investigations

The Commission has conducted one trade-related investigation with respect to flat glass during the past 5 years, an investigation under section 332 of the Tariff Act of 1930. The investigation, No. 332-286, was instituted in December 1989 by the Commission following a request from the United States Trade Representative for an investigation and report to the President with respect to conditions of competition in the U.S. market between U.S. and Mexican fabricated glass.⁷⁰ The Commission subsequently reported, among other things, that an industry in the United States would not be materially injured or threatened with material injury, nor would the establishment of an industry in the United States be materially retarded, if the outstanding countervailing-duty order on imports of fabricated automotive glass from Mexico were revoked by the Department of Commerce. The Department of Commerce subsequently revoked the countervailing-duty order (56 F.R. 14234, April 8, 1991).

FOREIGN TRADE MEASURES

Foreign tariffs applicable to U.S. exports tend to be equal to or higher than those of the United States (table B-1). Among the four leading U.S. export markets, Canada (free to 17.5 percent ad valorem) and the EC (free to 6.5 percent) have duties roughly equivalent to the United States; Japan (15 to 25 percent) and Mexico (10 to 20 percent) have higher duties.

The Japanese flat glass industry has been the subject of U.S.-Japanese trade talks on structural impediments to U.S. trade.⁷¹ In May of 1991 U.S. trade negotiators named glass as one industry that they want Japan's Fair Trade Commission to investigate for anticompetitive behavior.⁷² In conjunction with President Bush's January 1992 trip to Japan, the Japanese Government announced a number of measures designed to open its glass market to foreign producers:⁷³

- The Japanese Ministry of International Trade and Industry (MITI) will facilitate efforts of foreign firms to increase sales in Japan.
- MITI will encourage firms to increase imports of flat glass.
- MITI and the Japan Fair Trade Commission (JFTC) will encourage all Japanese glass manufacturers to adopt antimonopoly compliance programs.

⁷⁰ USITC, *Conditions of Competition Between U.S. and Mexican Fabricated Automotive Glass in the U.S. Market*, USITC publication 2299, p. 1.

⁷¹ Christopher J. Cipello, "Japan Glass Market Proves Hard To Crack," *Wall Street Journal*, Aug. 7, 1991.

⁷² *Ibid.*

⁷³ Courter, "Guardian Steps Up Efforts To Expand Japanese Market," p. 9.

Table 4

Flat glass and certain flat glass products: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rates of duty as of Jan. 1, 1993; U.S. exports, 1992;¹ and U.S. imports, 1992¹

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1993		U.S. exports, 1992	U.S. imports, 1992
		General	Special ²		
<i>Million dollars</i>					
	Cast glass and rolled glass, in sheets or profiles, whether or not having an absorbent or reflecting layer, but not otherwise worked:				
	Nonwired sheets:				
7003.11.00	Colored throughout the mass (body tinted), opacified, flashed or or having an absorbent or reflecting layer	1.8%	Free (A,B,CA,E,IL,J)	10	1
7003.19.00	Other	1.7%	Free (A,B,CA,E,IL,J)	14	17
7003.20.00	Wired sheets	1.7%	Free (A,B,CA,E,IL,J)	(3)	(3)
7003.30.00	Profiles	6.3%	Free (A,B,CA,E,IL,J)	(3)	(3)
	Drawn glass and blown glass, in sheets, whether of not having an absorbent or reflecting layer, but not otherwise worked:				
	Glass, colored throughout the mass (body tinted), opacified, flashed or having an absorbent or reflecting layer:				
7004.10.10	Having an absorbent or reflecting layer	4.9%	Free (A,B,CA,E,IL,J)	(4)	1
	Other:				
7004.10.20	In rectangular shape	1.3¢/kg + 2%	Free (A,CA,E,IL,J)	53	4
7004.10.50	Other	7.2%	Free (A,B,CA,E,IL,J)	51	(3)
	Other glass:				
	In rectangular shape:				
	Measuring not over 1.5 mm in thickness:				
7004.90.05	Measuring not over 0.26 m ² in area	1.5¢/kg	Free(CA,E,IL,J)	52	1
7004.90.10	Measuring over 0.26 m ² in area	2¢/kg	Free(CA,E,IL,J)	52	3
	Measuring over 1.5 but not over 2 mm in thickness:				
7004.90.15	Measuring not over 0.26 m ² in area	2.2¢/kg	Free(CA,E,IL,J)	55	(3)
7004.90.20	Measuring over 0.26 m ² in area	2.5¢/kg	Free(CA,E,IL,J)	53	(3)
7004.90.25	Measuring over 2 but not over 3.5 mm in thickness	0.9¢/kg	Free(A,CA,E,IL,J)	53	3
	Measuring over 3.5 mm in thickness:				
7004.90.30	Measuring not over 0.65 m ² in area	1.1¢/kg	Free(A,CA,E,IL,J)	50	(3)
7004.90.40	Measuring over 0.65 m ² in area	1.3¢/kg	Free(A,CA,E,IL,J)	51	(3)
7004.90.50	Other	7.2%	Free(A,B,CA,E,IL,J)	51	(3)
	Float glass and surface ground or polished glass, in sheets, whether or not having an absorbent or reflecting layer, but not otherwise worked:				
7005.10.00	Nonwired glass, having an absorbent or reflecting layer	4.9%	Free (A,B,CA,E,IL,J)	82	(3)
	Other nonwired glass:				
	Colored throughout the mass (body tinted), opacified, flashed or merely surface ground:				
7005.21.10	Measuring less than 10 mm in thickness	16.1¢/m ²	Free (B,CA,E,IL,J)	⁵ 101	15
7005.21.20	Measuring 10 mm or more in thickness	6.3% + 0.4%	Free (CA,E,IL,J)	55	(3)
	Other:				
	Measuring less than 10 mm in thickness:				
7005.29.05	Measuring not over 0.65 m ² in area	20.8¢/m ²	Free (B,CA,E,IL,J)	525	11
7005.29.15	Measuring over 0.65 m ² in area	16.1¢/m ²	Free (B,CA,E,IL,J)	⁵ 50	28
7005.29.25	Measuring 10 mm or more in thickness	5.5% + 0.4%	Free (A,CA,E,IL,J)	58	4

See footnotes at end of table.

Table 4—Continued
 Flat glass and certain flat glass products: Harmonized Tariff Schedule subheading; description; U.S. col. 1 rates of duty as of Jan. 1, 1993; U.S. exports, 1992;¹ and U.S. imports, 1992¹

HTS subheading	Description	Col. 1 rate of duty As of Jan. 1, 1993		U.S. exports, 1992	U.S. imports, 1992
		General	Special ²		
		— Million dollars —			
7005.30.00	Float glass and surface ground or polished glass, in sheets, whether or not having an absorbent or reflecting layer, but not otherwise worked:—Continued Wired glass	32.3¢/m ²	Free (A,B,CA,E,IL,J)	(³)	11
7006.00.10	Glass of heading 7003, 7004, or 7005, bent, edgeworked, engraved, drilled, enameled or otherwise worked, but not framed or fitted with other materials: Strips not over 15.2 cm in width, measuring over 2 mm in thickness, and having all longitudinal edges ground or otherwise smoothed or processed	8.8%	Free (A,CA,E,IL,J)	58	1
7006.00.20	Other: Glass, drawn or blown and not containing wire netting and not surface ground or polished	7.2%	Free (A,B,CA,E,IL,J)	51	3
7006.00.40	Other	4.9%	Free (A,B,CA,E,IL,J)	513	33
7007.11.00	Safety glass, consisting of toughened (tempered) or laminated glass: Toughened (tempered) safety glass: Of size and shape suitable for incorporation in vehicles, aircraft, spacecraft or vessels	6.2%	Free (A,B,E,IL,J) 3.1% (CA) ⁶	161	136
7007.19.00	Other	6.2%	Free (A,E,IL,J) 3.1% (CA)	25	8
	Laminated safety glass: Of size and shape suitable for incorporation in vehicles, aircraft, spacecraft or vessels: Windshields	5.5%	Free (A,B,C,E,IL,J) 2.7% (CA) ⁶	134	156
7007.21.10	Other	5.5%	Free (A,B,E,IL,J) 2.7% (CA) ⁶	39	30
7007.21.50	Other	5.5%	Free (A,E,IL,J) 2.7% (CA)	9	3
7007.29.00	Multiple-walled insulating units of glass	4.4%	Free (A,CA,E,IL,J)	15	17
7008.00.00	Glass mirrors, whether of not framed, including rear-view mirrors: Rear-view mirrors for vehicles	7.8%	Free (A,B,E,IL,J) 3.9% (CA) ⁶	80	45
7009.10.00	Other: Unframed: Not over 929 cm ² in reflecting area	7.8%	Free (A,B,E,IL,J) 3.9% (CA) ⁶	59	8
7009.91.10	Over 929 cm ² in reflecting area	10%	Free (A,B,E,IL,J) 5% (CA) ⁶	59	9
7009.91.50	Framed: Not over 929 cm ² in reflecting area	7.8%	Free (A,B,E,IL,J) 3.9% (CA) ⁷	58	35
7009.92.10	Over 929 cm ² in reflecting area	10%	Free (A,B,E,IL,J) 5% (CA) ⁶	58	16

¹ Compiled from official statistics of the U.S. Department of Commerce, except as noted
² 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); United States-Israel Free Trade Area (IL); and Andean Trade Preference Act (J)
³ Less than \$500,000
⁴ Estimated by the staff of the U.S. International Trade Commission to be less than \$500,000
⁵ Estimated by the staff of the U.S. International Trade Commission
⁶ Equipment originating in the territory of Canada, intended for use in the repair or maintenance of certain motor vehicles is free of duty
⁷ Equipment originating in the territory of Canada, intended for use in the repair or maintenance of certain motor vehicles is free of duty. Lighted mirrors originating in the territory of Canada are free of duty.

Source: USITC, *Harmonized Tariff Schedule of the United States (1993)*, pp. 70-3-70-7, except as noted.

- The JFTC will survey competitive policy conditions in the glass market.
- The Construction Ministry will facilitate efforts to meet Japanese building codes.
- The Governments of Japan and the United States have agreed to exchange information on glass issues.

Pilkington filed a dumping complaint in Australia against imports from Belgium, China, Germany, France, Indonesia, Malaysia, the Philippines, and Thailand in 1992.⁷⁴ Dumping duties were assessed in the case, but it is too early to assess the effects on Australian trade.

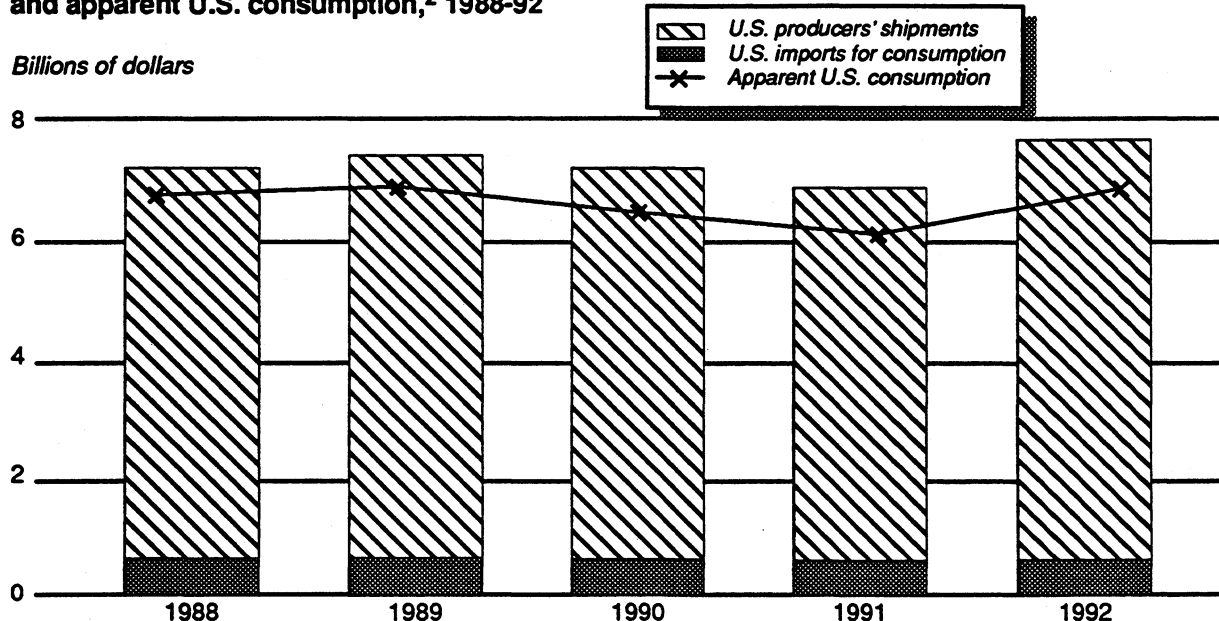
⁷⁴ "Pilkington Initiates Dumping Charges," *American Glass Review*, Apr. 1992, pp. 10-11.

U.S. MARKET

Consumption

U.S. consumption of flat glass fluctuated upward during 1988-92, with producers' shipments increasing and imports declining (figure 7). Apparent U.S. consumption increased by nearly 2 percent, or about \$102 million, during the period (table 5). Consumption followed the general trend in the construction and automotive markets (figure 8). Producers' shipments increased by nearly 8 percent during the period, compared with an import decline of 3 percent. The share of U.S. consumption represented by imports finished the period down slightly, at just below 9 percent.

Figure 7
Flat glass and certain flat glass products: U.S. producers' shipments,¹ imports for consumption, and apparent U.S. consumption,² 1988-92



¹ Data partially estimated by the staff of the U.S. International Trade Commission.

² Apparent consumption = producers' shipments + imports - exports.

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

Table 5
Flat glass and certain flat glass products: U.S. shipments, exports of domestic merchandise, imports for consumption, and apparent U.S. consumption, 1988-92

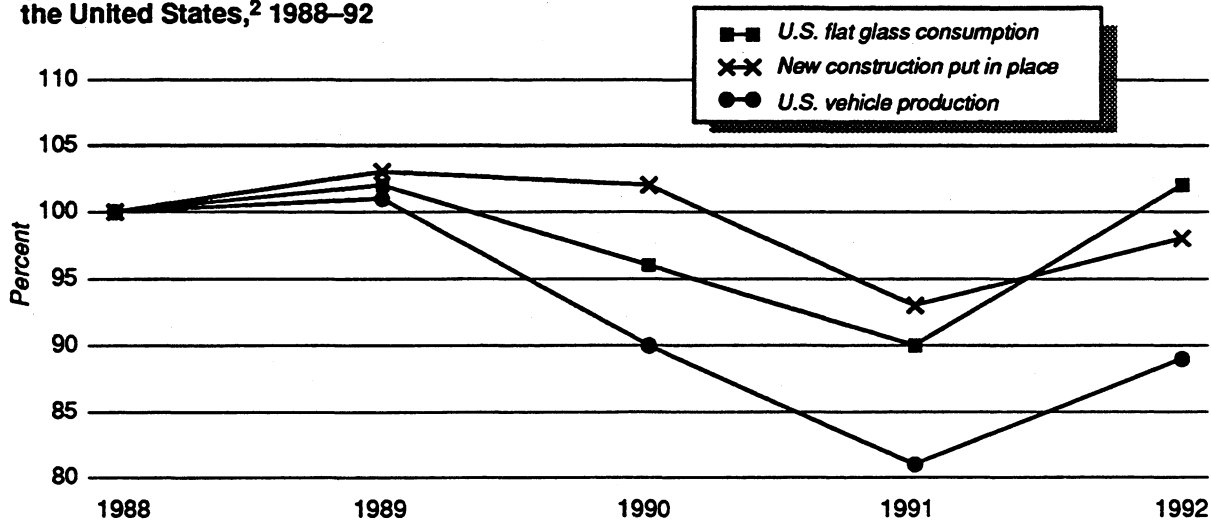
Year	U.S. shipments ¹	U.S. exports	U.S. imports	Apparent U.S. consumption	Ratio of imports to consumption
					Percent
1,000 dollars					
1988	6,600,000	458,220	619,284	6,761,064	9.2
1989	6,800,000	533,149	632,420	6,899,271	9.2
1990	6,600,000	751,043	613,988	6,462,945	9.5
1991	6,300,000	785,648	583,553	6,097,905	9.9
1992	7,100,000	835,579	598,846	6,863,267	8.7

¹ Data partially estimated by the staff of the U.S. International Trade Commission.

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

Figure 8

Flat glass and certain flat glass products: Indexes of the value (in current dollars) of U.S. flat glass consumption¹ and new construction put in place and the number of vehicles produced in the United States,² 1988-92



¹ Data partially estimated by the staff of the U.S. International Trade Commission.

² Compiled from 1992 Market Data Book, published by Automotive News, p. 3, and Automotive News, Jan. 1, 1993, p. 51.

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

Imports

Production

U.S. production data for 1988-92 were available only for flat glass and exclude fabricated products. The overall trend in U.S. production of flat glass was similar to that of combined producers' shipments of flat glass and fabricated products during the period. However, production data for flat glass did not rebound sufficiently in 1992 to achieve overall growth for 1988-92. With the quantity of flat glass production down for the period, stronger prices by secondary producers and increased emphasis on higher value-added products are believed responsible for the growth in consumption value for the period. The producer price index for the net output of primary flat glass producers fell by 5.6 percent during 1988-92, compared with an increase of 6.4 percent for secondary flat glass producers. Production data for flat glass are presented in two units of quantity, as compiled from official statistics of the U.S. Department of Commerce:

Year	Quantity	
	(1,000 metric tons)	(1,000 square meters)
1988	3,907	467,300
1989	3,795	455,297
1990	3,702	440,087
1991	3,310	398,689
1992	3,557	433,461

U.S. imports reflected the downward trend in U.S. consumption during 1988-91 but did not rebound as sharply in 1992, posting a decline of 3 percent for the overall period (table 6). There was little change in product mix during the period; laminated and tempered glass were the principal import products (figure 9). The principal supplying countries also remained relatively stable, with Canada, Mexico, and Japan providing a combined 63 percent of total U.S. imports in 1992 (figure 10). U.S. importers typically consist of foreign producers (importing for specific sales or inventory), distributors, manufacturers, and both primary and secondary U.S. producers.

Although the value of imports entering under special duty provisions declined by 1 percent during the period, their share of total imports increased from 50 percent in 1988 to 52 percent in 1992 because the decline in other imports was more severe. The Generalized System of Preferences (GSP) was the most significant of these special duty provisions during the period, with duty-free imports under the GSP valued at \$118 million in 1992 (table 7). Imports under the GSP declined by 32 percent during the period with the graduation of Hong Kong, Korea, Singapore, and Taiwan from the GSP program.

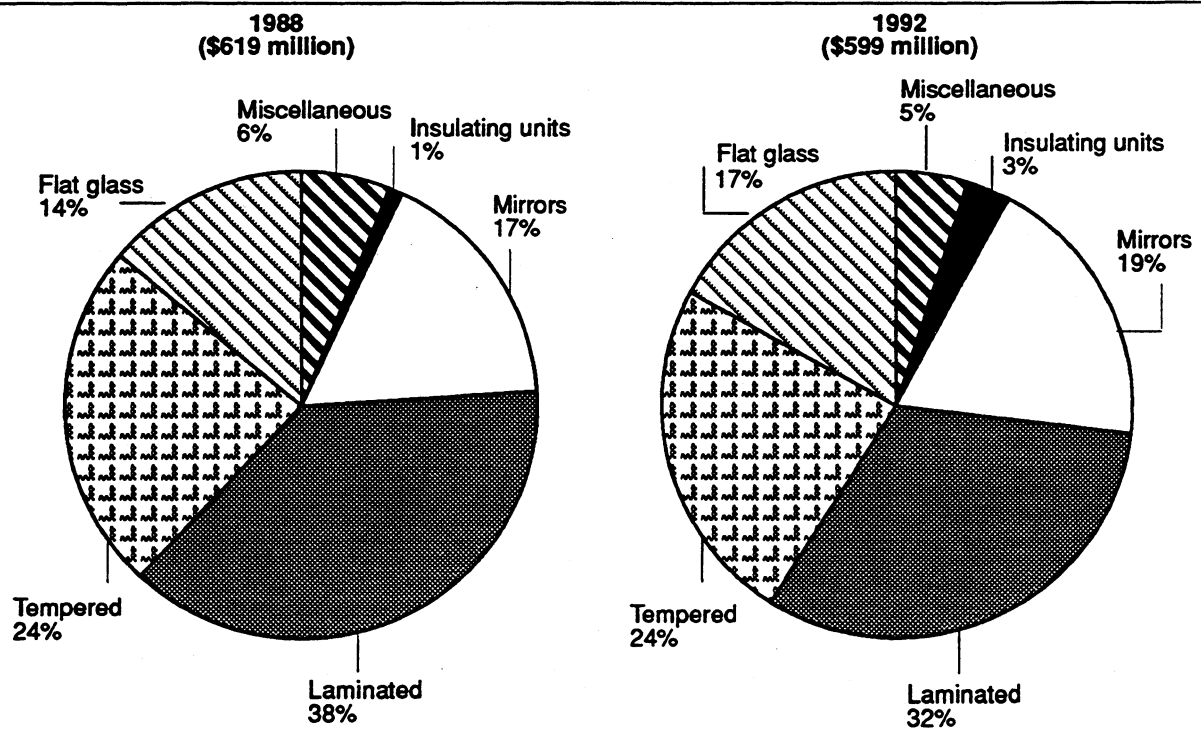
Table 6
Flat glass and certain flat glass products: U.S. Imports for consumption, by principal sources, 1988-92

(1,000 dollars)

Source	1988	1989	1990	1991	1992
Canada	194,805	200,039	82,699	167,994	186,752
Mexico	116,861	111,875	121,839	122,929	121,807
Japan	82,424	81,515	78,678	78,548	70,150
Germany	41,667	35,313	39,217	36,540	49,016
Taiwan	41,838	41,147	34,166	30,345	32,715
China	6,598	16,478	14,883	18,485	25,307
United Kingdom	16,195	20,468	17,721	20,124	17,205
South Africa	15,285	21,508	21,556	18,636	14,698
Belgium and Luxembourg	14,435	14,365	10,253	11,273	11,438
Korea	16,822	18,288	16,708	12,637	10,554
All other	72,354	71,424	76,268	66,042	59,204
Total	619,284	632,420	613,988	583,553	598,846

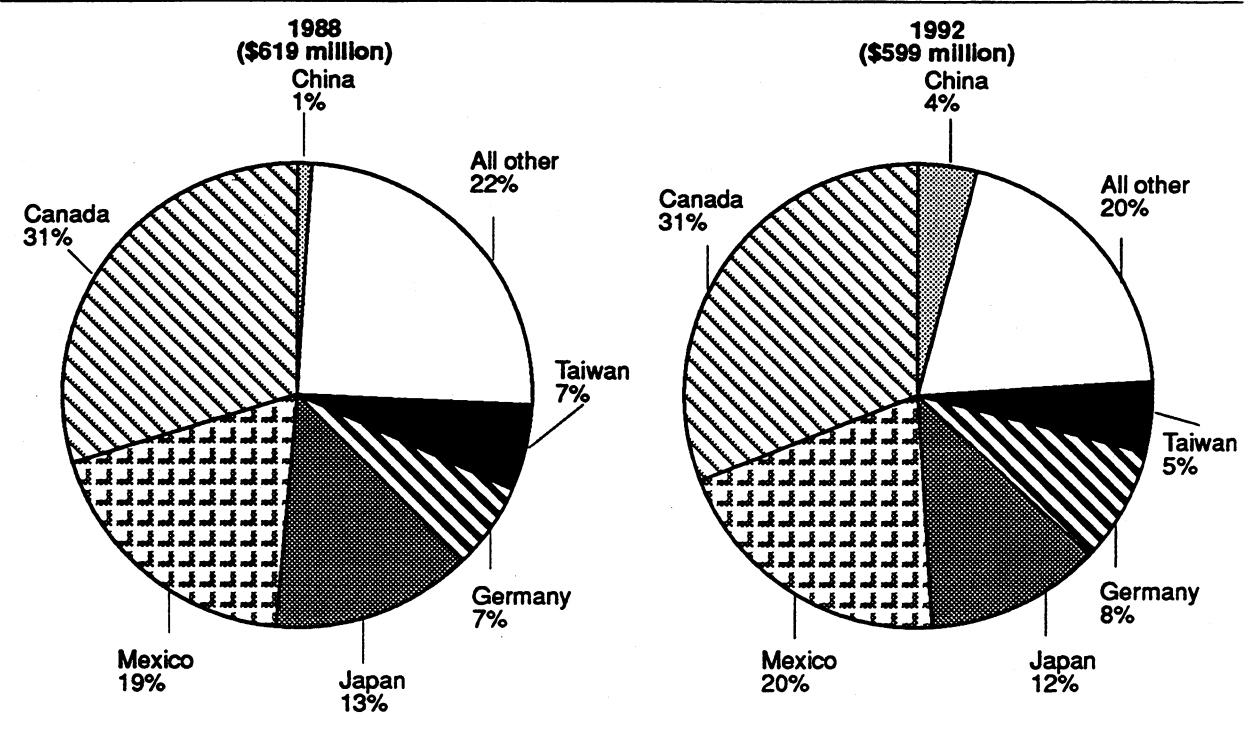
Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 9
Flat glass and certain flat glass products: Value of U.S. Imports for consumption, by types, 1988 and 1992



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

Figure 10
Flat glass and certain flat glass products: Value of U.S. imports for consumption, by principal sources, 1988 and 1992



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

Table 7
Flat glass and certain flat glass products: U.S. imports for consumption under special duty provisions, by types, 1988-92

Type	(1,000 dollars)				
	1988	1989	1990	1991	1992
Generalized System of Preferences	172,255	104,046	115,021	123,447	117,906
Automotive Products Trade Act ..	131,934	129,940	99,180	91,568	95,524
U.S.-Canada Free-Trade Agreement	(¹)	53,333	59,274	73,882	87,622
Agreement in Civil Aircraft	5,758	9,415	9,514	7,922	4,694
Imports under HTS subheading 9802	1,667	4,556	5,132	3,788	3,971
Caribbean Basin Economic Recovery Act	5	14	15	17	51
U.S.-Israel Free-Trade Agreement	501	314	435	365	44
Total	312,120	301,618	288,571	300,989	309,812

¹ Agreement did not become effective until 1989.

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

FOREIGN MARKETS

Foreign Market Profile

International trade in flat glass is generally limited by the prevalence of flat glass plants in many world markets and high transportation costs.⁷⁵ U.S. firms are responding to demand growth in areas such as China, Eastern Europe, India, and Southeast Asia by constructing local plants. U.S. exports tend to be limited to Canada and Mexico, where transportation costs are minimized. These two countries represented 64 percent of the value of U.S. exports in 1992, up slightly from 59 percent in 1988 (figure 11). Exports to markets other than Canada and Mexico tend to be low-volume sales. Japan's position as the fourth-largest U.S. export market is believed to be largely due to extensive marketing efforts by U.S. producers.

With the exception of Mexico, recent efforts to liberalize business conditions in Latin America have not significantly increased the region's importance to the U.S. industry and are unlikely to do so in the future. Transportation costs to the region, the limited purchasing power of the population, and the prevalence of current producers throughout the region limit U.S. trade with Latin America. Exclusive of Mexico, U.S.

trade turnover with the region represented 3 percent of the value of total U.S. trade turnover in 1992. The region's investment opportunities are also limited. Latin American countries with sufficient populations and per capita income to sustain glass industries such as Argentina and Brazil already have such industries. Smaller and poorer countries cannot sustain such industries on the basis of their internal markets, and transportation costs prevent them from becoming export platforms to other markets.

Canada

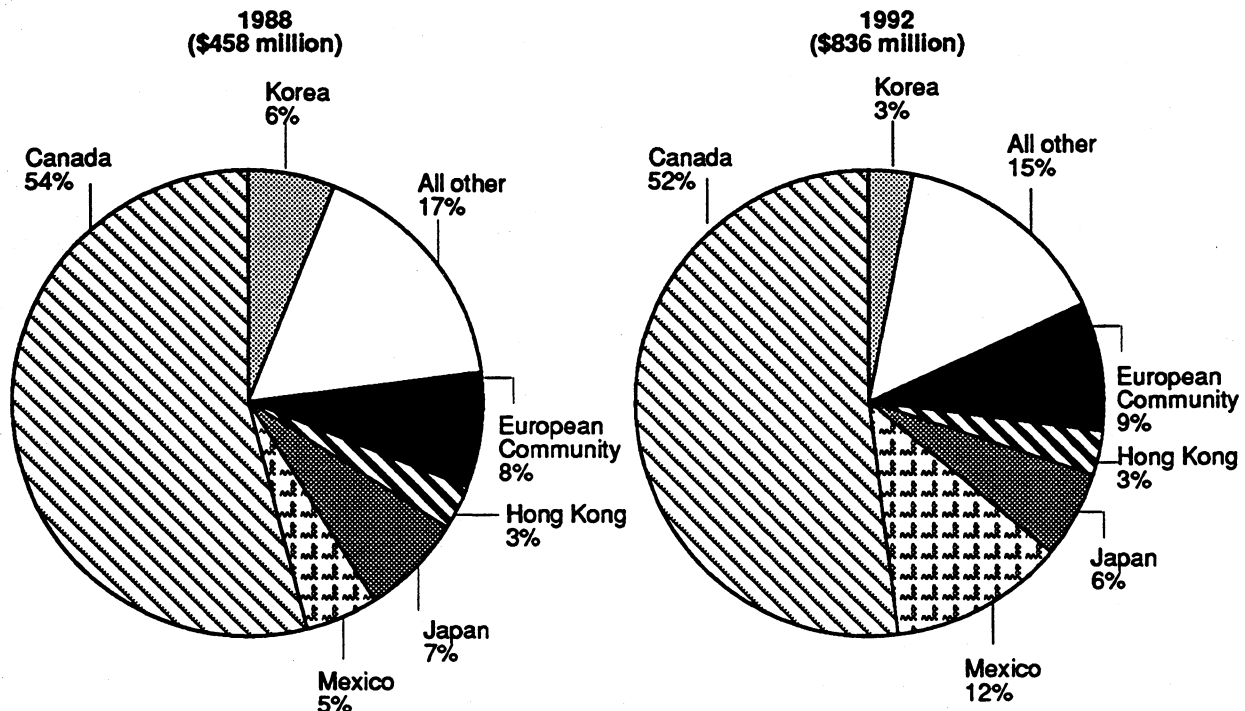
Canada's flat glass industry is linked closely to that of the United States through trade and corporate affiliations. All five major U.S. producers (PPG, LOF, Ford, AFG, and Guardian) have facilities in Canada, and PPG and AFG have float lines. However, Ford has announced that it will close its last plant in Canada early in 1994,⁷⁶ completing a shift of its non-U.S. automotive glass fabrication operations from Canada to Mexico. The establishment of a float glass producer, Glavbec, in Quebec by Asahi's Belgian subsidiary and Asahi's subsequent acquisition of AFG have made Asahi the largest producer in Canada.⁷⁷ With AFG and Glavbec under its control, Asahi now owns two of the three Canadian float glass plants.

⁷⁵ USITC, *Potential Effects of Foreign Governments' Policies of Pricing Natural Resources* (investigation No. 332-202), USITC publication 1696, May 1985, p. 51.

⁷⁶ *Glass Industry*, Mar. 1993, p. 6.

⁷⁷ *Ibid.*

Figure 11
Flat glass and certain flat glass products: Value of U.S. exports of domestic merchandise, by principal markets, 1988 and 1992



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

The Canadian industry's limited capacity (whether Canadian- or foreign-owned), corporate affiliations with foreign firms that have plant investments in many potential export markets, and relatively small home market tend to limit the Canadian industry's ability to expand into global markets. Canada was a net importer of flat glass during 1988-91 (figure 12), running trade deficits in flat glass, safety glass, mirrors, and miscellaneous fabricated flat glass in 1991. Canada had imports of \$429 million and exports of \$192 million in 1991 according to United Nations (U.N.) data, with the United States representing 98 percent of Canadian imports and 90 percent of Canadian exports. Canadian imports increased in value by 51 percent during 1988-91, compared with a decline in export value of 18 percent.

The U.S.-Canada Free-Trade Agreement (CFTA) and strong Canadian automotive production levels have contributed to Canada's position as the leading U.S. foreign market. In 1992 Canada accounted for 52 percent of the value of U.S. exports, and the U.S. trade balance with Canada increased to a surplus of \$244 million (up from \$53 million in 1988). The value of U.S. exports to Canada increased significantly during 1989-92, to \$431 million in 1992, concurrent with the implementation of the CFTA. The relatively high levels of Canadian vehicle production during this period are also believed to have contributed significantly to this export growth, since most increases were concentrated in tempered and laminated glass suitable for incorporation in vehicles, aircraft, spacecraft, or vessels.

Mexico

Vitro, S.A., a holding company for over 70 glass-related companies, dominates the Mexican flat glass industry. Pilkington (United Kingdom) has minority interest in all three of Vitro's float lines, the only float lines in Mexico. Six firms fabricate automotive glass in Mexico. Four of the firms are controlled by Vitro; Ford holds a minority share in one of the four.⁷⁸ The remaining two fabricators, L-N Safety Glass (L-N) and Autovidrio, S.A. de C. V. (Autovidrio), are maquiladora operations.⁷⁹ L-N is a joint venture of LOF (a U.S. firm jointly owned by Pilkington and NSG) and NSG (Japan). Autovidrio is wholly owned by Ford. In July 1992 Vitro bought ACI America (ACI), a U.S. firm with fabrication, distribution, retail, and installation operations in the southern region of the United States.⁸⁰

Mexico is viewed by the U.S. industry as a potentially attractive export market and strong competitor in the U.S. market. Firms believe that they can compete with Vitro in Mexico, but only if

⁷⁸ Ford Motor Co. statement, p. 2.

⁷⁹ USITC, *Conditions of Competition Between U.S. and Mexican Fabricated Automotive Glass in the U.S. Market*, USITC publication 2299, p. 29.

⁸⁰ "Vitro Buys ACI America, Joins American Research Center," *Glass Magazine*, July 1992, pp. 9 and 11.

Mexico's duties of 20 percent are eliminated.⁸¹ The U.S. industry is concerned that the North American Free-Trade Agreement (NAFTA) maintains a gradually declining Mexican tariff advantage for 10 years, enabling the Mexican industry to use profits generated in a protected home market to gain U.S. market share.⁸² Vitro's alleged business practices also raise concern among some U.S. producers that they are unlikely to have the open access to the Mexican market that Mexican producers will have in the United States under the NAFTA.⁸³ Mexico's expanded capacity (the third float line and sixth automotive glass fabrication plant opened in 1992), coupled with the capabilities of ACI, are likely to offer resistance to the current growth of imports from the United States and to facilitate further export growth to the U.S. market.

Mexico was the second-largest U.S. foreign market in 1992, accounting for 12 percent of the value of U.S. exports. The value of U.S. exports to Mexico increased nearly fivefold during 1988-92, to \$104 million in 1992. Much of this growth was in float glass (which can be used to produce automotive glass) and tempered glass suitable for incorporation in vehicles, aircraft, spacecraft, or vessels. The growth of vehicle production in Mexico during the period and corresponding growth of automotive glass fabricating in Mexico likely contributed to the growth in Mexican demand for these two products. However, the bulk of U.S. exports to Mexico (87 percent in 1991) are not destined for Mexican consumption but are shipped to maquiladora operations and subsequently reexported to the United States. The value of U.S. imports from Mexico increased by only 4 percent during 1988-92, to \$122 million, narrowing the U.S. trade deficit with Mexico in flat glass from \$95 million in 1988 to \$18 million in 1992.

Mexico is a net exporter of flat glass, with exports valued at \$144 million and imports at \$87 million in 1991 according to U.N. data. Mexico's trade surpluses in safety and miscellaneous fabricated glass were sufficient to offset its trade deficits in flat glass and mirrors throughout 1988-91. Mexican imports and exports both increased in value during the period, although the Mexican trade surplus in flat glass decreased by half, to \$57 million. According to U.N. data for 1991, the United States was Mexico's only significant export market (87 percent) and leading supplier (98 percent) of imports.

EC

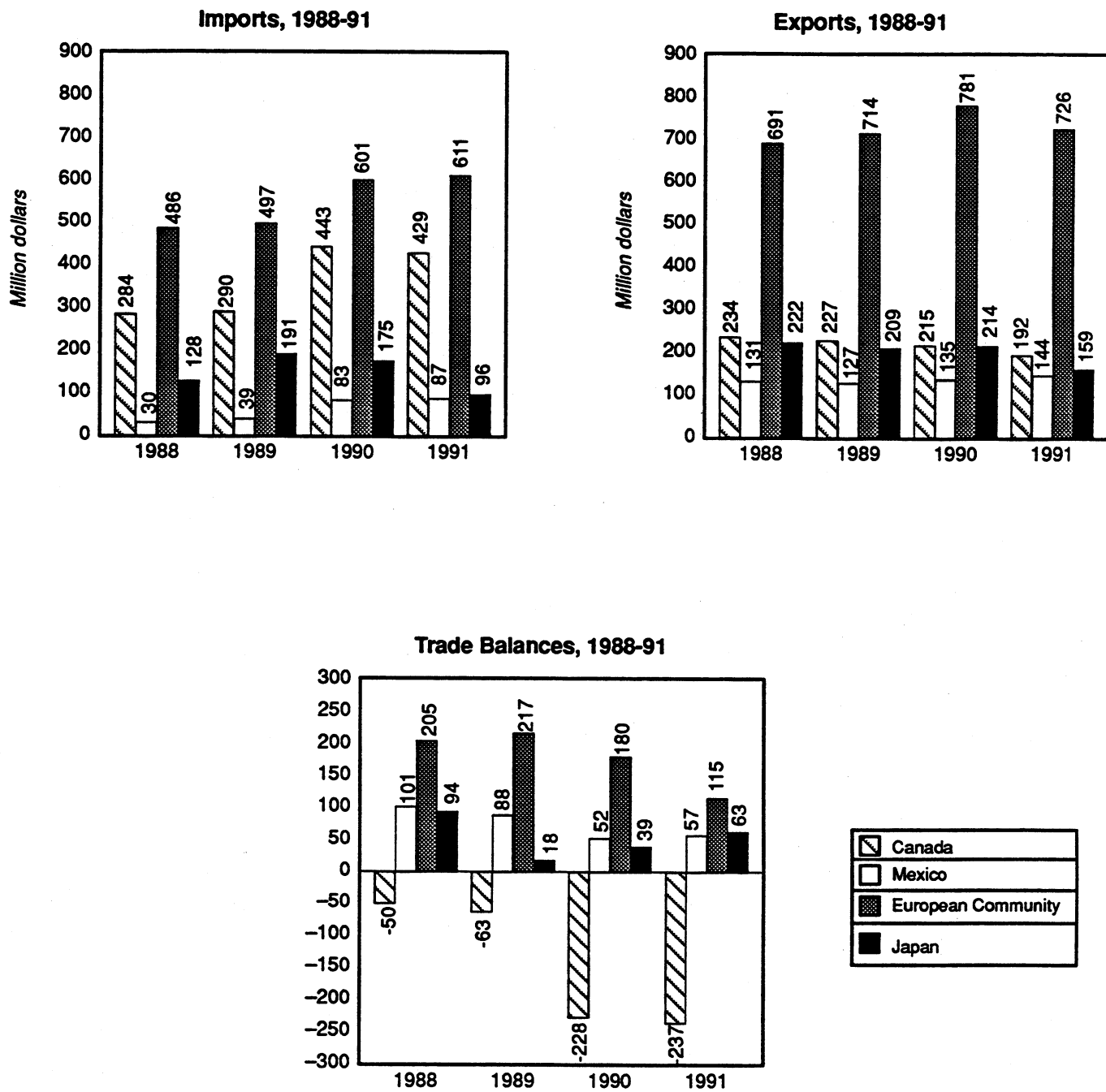
The EC offers limited potential for export growth, since PPG and Guardian already have production facilities in the EC and more facilities are under construction by Guardian. The EC was the third-largest U.S. foreign market in 1992, accounting

⁸¹ USITC, transcript of hearing on *Potential Impact on the U.S. Economy and Selected Industries of the North American Free-Trade Agreement* (investigation No. 332-337), Nov. 17, 1992, pp. 225 and 229.

⁸² USITC, *Potential Impact on the U.S. Economy and Selected Industries of the North American Free-Trade Agreement* (investigation No. 332-337), USITC publication 2596, Jan. 1992, p. 11-1.

⁸³ *Ibid.*

Figure 12
Flat glass and certain flat glass products: Value of imports, exports, and trade balances, by selected countries, 1988-91



Note.—Trade balances calculated from unrounded data.

Source: EC data compiled from official statistics of the European Community; Canadian, Mexican, and Japanese data compiled from official statistics of the United Nations.

for 9 percent of the value of U.S. exports. Italy, Germany, and the United Kingdom were the principal markets. Exports to the EC more than doubled during 1988-92, whereas U.S. imports from the EC finished the period unchanged.

The bulk of EC trade in flat glass and flat glass products is internal; trade with non-EC countries represented 20 percent of the value of total EC imports in 1991 and 23 percent of total exports. The EC external trade surplus declined by nearly 44 percent during 1988-91, as import growth of almost 26 percent outpaced export growth of 5 percent. Import growth of 37 percent from the United States during the period increased the U.S. share of EC external imports by nearly 4 percentage points, to 13 percent, according to EC data. The most significant change in the product mix of imports from the United States during 1988-91 was a shift from safety glass to insulating units. A decline in exports to the United States of almost 16 percent during the period decreased the U.S. share of EC external exports by nearly 6 percentage points, to 12 percent. The most significant change in the product mix of exports to the United States during 1988-91 was a shift from mirrors to unprocessed flat glass.

Japan

Increased marketing efforts by U.S. producers in the Japanese market apparently showed positive results during 1988-92. PPG recently formed a joint venture with a major Japanese trading company, C. Itoh and Co., Ltd., of Tokyo, to market its products in Japan, with PPG maintaining 51 percent ownership of the enterprise.⁸⁴ Guardian has announced the establishment of a subsidiary in Japan to distribute glass and glass products.⁸⁵ The U.S. trade balance in flat glass with Japan improved during the period, but the United States remained in a deficit position. Japan was the fourth-largest U.S. foreign market in 1992, accounting for 6 percent of the value of U.S. exports. Exports to Japan increased by 60 percent during the period, whereas U.S. imports from Japan declined by 15 percent. Recent actions by two U.S. producers and efforts to open the Japanese market by the U.S. Government may further improve exports to Japan.

Japan was a net exporter of flat glass during 1988-91, running trade surpluses in high-value-added safety glass, mirrors, and miscellaneous fabricated flat glass and a deficit in low-value-added flat glass. Japan

⁸⁴ "PPG and C. Itoh in Joint Venture," *American Glass Review*, Oct. 1990, p. 10.

⁸⁵ Courter, "Guardian Steps Up Efforts To Expand Japanese Market," p. 9.

had imports valued at \$96 million and exports at \$159 million in 1991 according to U.N. data, with the United States being Japan's principal trading partner and representing 69 percent of Japan's imports and 57 percent of Japan's exports. Japan's annual imports decreased in value by 32 percent during 1988-91, compared with a decline in exports of 28 percent. Weak demand for flat glass in Japan and in its principal trading partner, the United States, is believed largely responsible for the decline in Japan's flat glass trade during the period.

U.S. Exports

The value of U.S. exports nearly doubled during 1988-92, to \$836 million, with all but two of the major markets posting increases for the period. Canada, Mexico, and Japan accounted for much of the growth during the period, with Canada remaining the dominant market (table 8). Flat, tempered, and laminated glass were the principal export products during 1988-92, with little change in product mix during the period (figure 13). The bulk of exports are believed to be shipped by U.S. producers rather than other types of firms such as distributors.

U.S. TRADE BALANCE

The U.S. trade balance in flat glass changed from a deficit to a surplus during 1988-92 on the strength of export growth. Increased exports to Canada were responsible for about half of the improvement in the trade balance during the period, with the U.S. trade surplus reaching \$237 million in 1992 (table 9). Prospects for continued strength in the trade balance with Canada appear favorable, as tariffs continue to decrease under the CFTA and U.S. automotive firms increase Canadian glass demand by choosing to produce certain models exclusively in Canada. The trade balance with Mexico appears likely to deteriorate in the future because of increased Mexican shipments to the United States. U.S. import growth from Mexico is expected regardless of the implementation of the NAFTA because of the Mexican industry's new float capacity and recent purchase of U.S. distribution and fabrication facilities by the Mexican industry.⁸⁶ The recent declines in U.S. exports to Japan and the U.S.-Japanese bilateral trade balance experienced in 1991 and 1992 appear likely to continue, as the Japanese market registered its 3rd straight year of weak demand in 1992.

⁸⁶ USITC, *Potential Impact on the U.S. Economy and Selected Industries of the North American Free-Trade Agreement*, USITC publication 2596, p. 11-2.

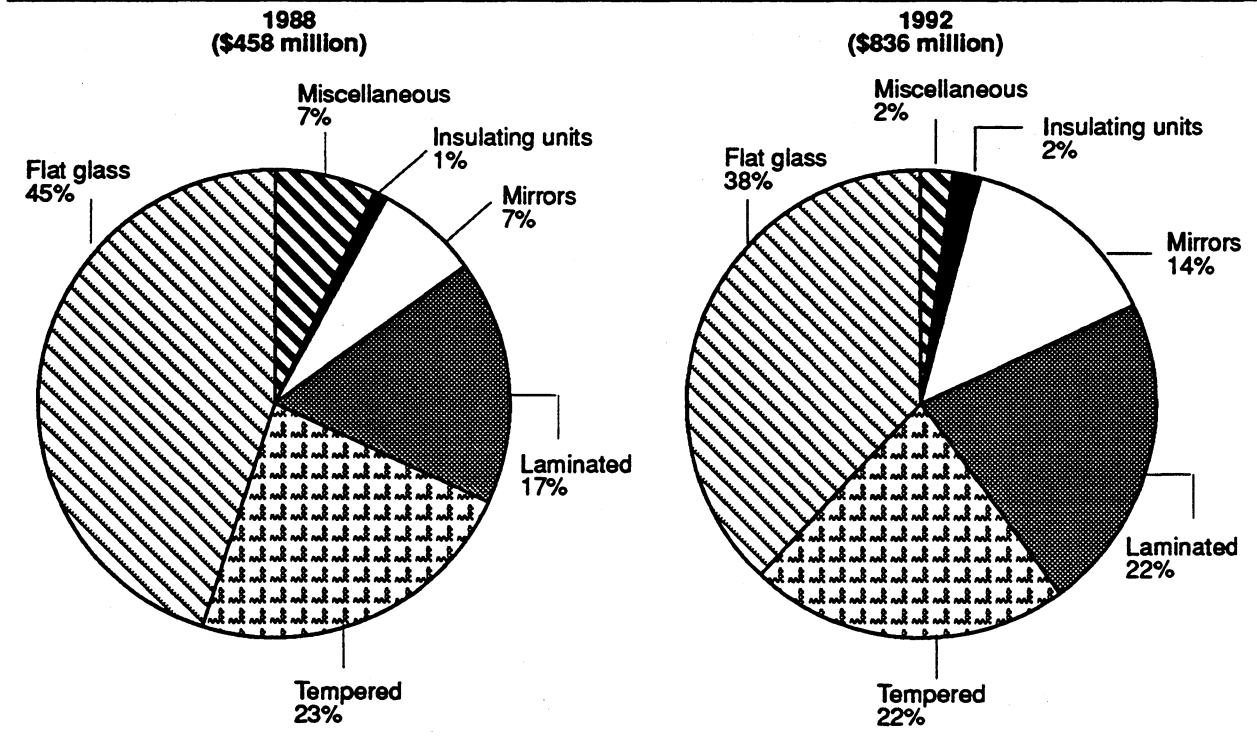
Table 8
Flat glass and certain flat glass products: U.S. exports of domestic merchandise, by principal markets, 1988-92

(1,000 dollars)

Market	1988	1989	1990	1991	1992
Canada	247,955	256,799	400,890	415,957	431,300
Mexico	21,592	30,509	74,081	85,021	103,676
Japan	32,493	54,037	70,550	64,594	51,835
Hong Kong	11,562	16,540	18,231	27,325	27,381
Italy	10,615	22,457	23,439	17,625	21,632
Korea	26,168	19,358	19,044	24,381	21,261
Germany	5,948	8,846	11,032	11,454	16,515
United Kingdom	10,407	17,117	21,478	17,904	15,257
Australia	19,263	24,090	18,387	12,112	10,921
Saudi Arabia	6,088	6,265	8,726	9,046	10,415
All other	66,129	77,131	85,185	100,229	125,386
Total	458,220	533,149	751,043	785,648	835,579

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

Figure 13
Flat glass and certain flat glass products: Value of U.S. exports of domestic merchandise, by types, 1988 and 1992



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

Table 9
Flat glass and certain flat glass products: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected country and country group, 1988-92¹
(Million dollars)

Item	1988	1989	1990	1991	1992
U.S. exports of domestic merchandise:					
Canada	248	257	401	416	431
Mexico	22	31	74	85	104
Japan	32	54	71	65	52
Germany	6	9	11	11	17
Taiwan	12	6	12	10	10
United Kingdom	10	17	21	18	15
Hong Kong	12	17	18	27	27
Korea	26	19	19	24	21
China	1	2	0	1	5
Italy	11	22	23	18	22
All other	78	100	100	110	132
Total	458	533	751	786	836
European Community	35	62	80	73	78
OPEC	19	21	21	28	29
ASEAN	4	6	6	11	19
CBERA	7	12	10	11	11
Eastern Europe	0	0	0	0	0
U.S. imports for consumption:					
Canada	195	200	183	168	187
Mexico	117	112	122	123	122
Japan	82	82	79	79	70
Germany	42	35	39	37	49
Taiwan	42	41	34	30	33
United Kingdom	16	20	18	20	17
Hong Kong	20	14	12	8	5
Korea	17	18	17	13	11
China	7	16	15	18	25
Italy	10	8	8	5	5
All other	72	86	88	82	75
Total	619	632	614	584	599
European Community	94	94	87	85	94
OPEC	0	1	2	5	5
ASEAN	2	6	4	6	6
CBERA	0	0	0	0	0
Eastern Europe	4	2	1	1	1
U.S. merchandise trade balance:					
Canada	53	57	218	248	244
Mexico	-95	-81	-48	-38	-18
Japan	-50	-28	-8	-14	-18
Germany	-36	-26	-28	-26	-32
Taiwan	-30	-35	-22	-20	-23
United Kingdom	-6	-3	3	-2	-2
Hong Kong	-8	3	6	19	22
Korea	9	1	2	11	10
China	-6	-14	-15	-17	-20
Italy	1	14	15	13	17
All other	6	14	12	28	57
Total	-161	-99	137	202	237
European Community	-59	-32	-7	-12	-16
OPEC	19	20	19	23	24
ASEAN	2	0	2	5	13
CBERA	7	12	10	11	11
Eastern Europe	-4	-2	-1	-1	-1

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."

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

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, Georgia, 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 111 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.

APPENDIX B
STATISTICAL TABLE

Table B-1

Flat glass and certain flat glass products: Comparison of rates of duty for selected countries and country groupings
(Percent ad valorem)

HTS subheading	Description	United States	European Canada	Community	Japan	Mexico
	Cast glass and rolled glass, in sheets or profiles, whether or not having an absorbent or reflecting layer, but not otherwise worked:					
	Nonwired sheets:					
	Colored throughout the mass (body tinted), opacified, flashed or having an absorbent or reflecting layer	1.8%	5-6.8%	5-5.8%	15%	20%
7003.11	Other	1.7%	5%	5-5.8%	20%	20%
7003.19	Wired sheets	1.7%	5%	5%	15%	20%
7003.20	Profiles	6.3%	5%	5.3%	15%	20%
7003.30	Drawn glass and blown glass, in sheets, whether of not having an absorbent or reflecting layer, but not otherwise worked:					
	Glass, colored throughout the mass (body tinted), opacified, flashed or having an absorbent or reflecting layer	2.3-7.2%	6.8%	5.8%-6%	15%	20%
7004.10	Other glass	0.4-7.1%	5.5%	5.8%-6%	20%	20%
7004.90	Float glass and surface ground or polished glass, in sheets, whether or not having an absorbent or reflecting layer, but not otherwise worked:					
	Nonwired glass, having an absorbent or reflecting layer	4.9%	5.5-6.8%	3.8%	25%	20%
7005.10	Other nonwired glass:					
	Colored throughout the mass (body tinted), opacified, flashed or merely surface ground	2-5.6%	4%	3.8%	25%	20%
7005.21	Other	2.5-4.3%	4%	3.8%	25%	10-20%
7005.29	Wired glass	1.3%	4%	3.8%	25%	20%
7005.30	Glass of heading 7003, 7004, or 7005, bent, edgeworked, engraved, drilled, enameled or otherwise worked, but not framed or fitted with other materials					
	Safety glass, consisting of toughened (tempered) or laminated glass:	4.9-8.8%	5.5-6.8%	5.3-5.8%	25%	20%
7006.00	Toughened (tempered) safety glass:					
	Of size and shape suitable for incorporation in vehicles, aircraft, spacecraft or vessels	6.2%	Free-17.5%	5.8%	25%	10-20%
7007.11	Other	6.2%	10.2%	5.8%	25%	20%
7007.19	Laminated safety glass:					
	Of size and shape suitable for incorporation in vehicles, aircraft, spacecraft or vessels	5.5%	Free-17.5%	Free-5.8%	25%	10-20%
7007.21	Other	5.5%	8%	5.8%	25%	20%
7007.29	Multiple-walled insulating units of glass	4.4%	10.2%	5.3%	25%	20%
7008.00	Glass mirrors, whether of not framed, including rear-view mirrors:					
	Rear-view mirrors for vehicles	7.8%	9.2%	6.5%	25%	10-20%
7009.10	Other:					
	Unframed	7.8%	11.3%	6.5%	25%	10-20%
7009.91	Framed	7.8-10%	11.3%	6.5%	25%	20%
7009.92						

Source: U.S. data compiled by the staff of the U.S. International Trade Commission from *Harmonized Tariff Schedule of the United States (1993)*, pp. 70-3 to 70-7; Canadian data from *McGoldrick's Canadian Customs Tariff "Harmonized System"* (Canada, 1990), Vol. 2, pp. 70-1 to 70-5; European Community data from *The International Customs Journal: European Economic Community, Year 1991-1992* (Brussels, 1992), pp. 265-266; Japanese data from *The International Customs Journal: Japan, Year 1990-1991*, (Brussels, 1990), p. 244; and Mexican data from *North American Free-Trade Agreement*, annex 302.2, Schedule of Mexico, pp. 1-4.