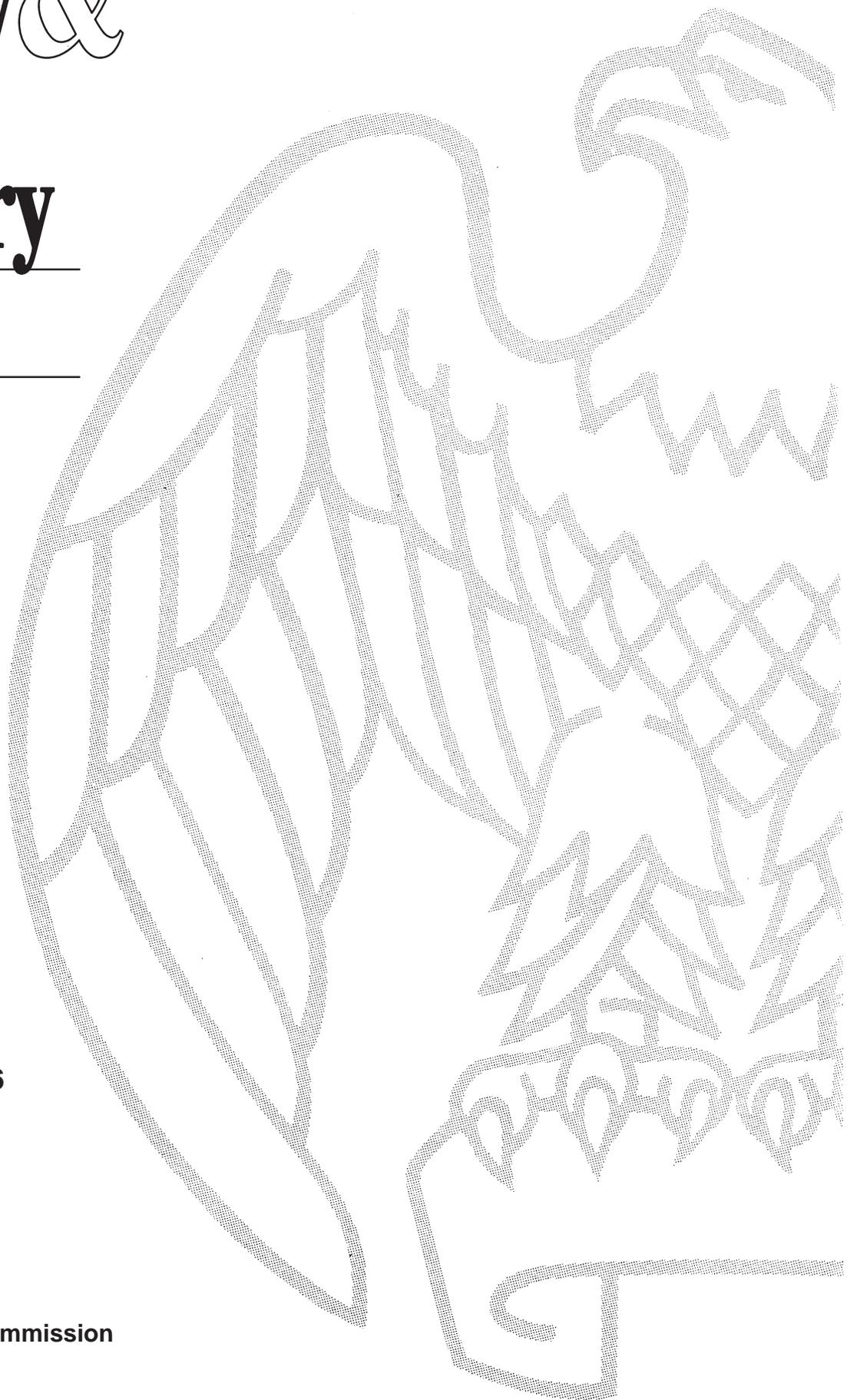


Industry & Trade Summary

Millwork

USITC Publication 3096
April 1998

OFFICE OF INDUSTRIES
U.S. International Trade Commission
Washington, DC 20436



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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 millwork covers the period 1992-96. Listed below are the individual summary reports published to date on the agriculture and forest product sectors.

<i>USITC publication number</i>	<i>Publication date</i>	<i>Title</i>
2459	November 1991	Live Sheep and Meat of Sheep
2462	November 1991	Cigarettes
2477	January 1992	Dairy Produce
2478	January 1992	Oilseeds
2511	March 1992	Live Swine and Fresh, Chilled, or Frozen Pork
2520	June 1992	Poultry
2544	August 1992	Fresh or Frozen Fish
2545	November 1992	Natural Sweeteners
2551	November 1992	Newsprint
2612	March 1993	Wood Pulp and Waste Paper
2615	March 1993	Citrus Fruit
2625	April 1993	Live Cattle and Fresh, Chilled, or Frozen Beef and Veal
2631	May 1993	Animal and Vegetable Fats and Oils
2635	May 1993	Cocoa, Chocolate, and Confectionery
2636	May 1993	Olives
2639	June 1993	Wine and Certain Fermented Beverages
2693	November 1993	Printing and Writing Paper
2726	January 1994	Furskins

¹ The information and analysis provided in this report are for the purposes 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.

PREFACE—*Continued*

<i>USITC publication number</i>	<i>Publication date</i>	<i>Title</i>
2737	March 1994	Cut Flowers
2749	March 1994	Paper Boxes and Bags
2762	April 1994	Coffee and Tea
2865	April 1995	Malt Beverages
2859	May 1995	Seeds
2875	May 1995	Certain Fresh Deciduous Fruits
2898	June 1995	Certain Miscellaneous Vegetable Substances and Products
2918	August 1995	Printed Matter
2917	October 1995	Lumber, Flooring, and Siding
2828	November 1995	Processed Vegetables
3022	April 1997	Industrial Papers and Paperboards
3080	February 1998	Canned Fish, except Shellfish
3083	February 1998	Dairy Products
3095	March 1998	Milled Grains, Malts, and Starches
3096	April 1998	Millwork

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ABSTRACT

This summary covers a wide range of wooden products, including dowels, moldings, picture frames, windows, doors, blinds, shutters, and screens, that are collectively referred to as “millwork.” Information is provided on the structure of the U.S. industry, domestic and foreign tariffs, U.S. trade in millwork products, and foreign millwork industries for 1992-96.

- ❑ The U.S. millwork industry has been transformed in recent years from an industry with domestically sourced raw materials and low import levels to one that now sources raw materials from many foreign countries and faces rising import competition. Many of the countries that furnish the U.S. industry with its raw materials now also export increasing quantities of millwork products to this country. The competitive pressures felt by U.S. producers as they have adjusted to the globalization of their industry have been significant. Still, the industry’s strengths, such as quality, reliability of supply, and greater variety of products, make it competitive in the U.S. market as well as in foreign markets.
- ❑ U.S. shipments of millwork products increased from \$10.1 billion in 1992 to \$11.9 billion in 1996. Exports accounted for less than 3 percent of U.S. shipments. Imports of millwork products rose 80 percent over the period to \$800 million, and import penetration grew from 4.4 percent to 6.4 percent. Major export markets included Canada, Japan, Mexico, South Korea, and the United Kingdom. Mexico, Canada, Chile, Indonesia, Thailand, Brazil, Malaysia, and China were major suppliers to the United States.
- ❑ More than 80 percent of millwork imports entered the United States free of duty in 1996. The trade-weighted average duty rate on the remainder was less than 1 percent ad valorem. Tariffs on U.S. millwork exports to major markets range from free to 9 percent ad valorem.
- ❑ There are two distinct markets for millwork products--the new construction market and the residential repair/home improvement market. In the new construction market, millwork is marketed primarily to architects, home builders, and, to a lesser extent, home buyers. In the repair market, these products are primarily used by professional renovators, home improvement contractors, and the do-it-yourself homeowner. Demand for millwork products is driven by the level of housing starts and by home repair and remodeling activity.

INTRODUCTION

Background

This summary covers a wide range of wooden products, including dowels, moldings, picture frames, windows, doors, blinds, shutters, and screens, that are collectively referred to as “millwork.” Information is provided on the structure of the U.S. industry, domestic and foreign tariffs, U.S. trade in millwork products, and foreign millwork industries. The summary covers the period 1992-96. Millwork products are primarily made of wood; many also incorporate metal, vinyl, or plastic.

Millwork is used throughout the world, especially in the construction and maintenance of buildings. Although millwork products are used in all types of structures, this summary will focus primarily on their use in the residential housing market.¹ The United States is a major producer and consumer of millwork products. In 1996, wooden doors accounted for 30 percent of the value of U.S. shipments of millwork products, while windows and moldings accounted for 26 percent and 14 percent, respectively. The remaining millwork market consists of miscellaneous products such as dowels, frames, carvings, blinds, shutters, porch columns and rails, and similar items. Millwork products are generally manufactured at dedicated production facilities across the United States. However, the production of moldings is concentrated on the west coast, while the production of doors and windows is concentrated in the Midwest.

The products covered herein are generally produced from coniferous, or softwood, species of trees, although some millwork items are produced from deciduous (hardwood) species. In recent years, the composition of the millwork industry’s wood supply has changed somewhat as certain traditional wood species have become less available and the physical properties of the materials that were available have become less desirable. For example, ponderosa pine (*Pinus ponderosa*) had traditionally been the species of choice for door, window, and molding manufacturers because of its straight grain, low shrinkage, resistance to warping or twisting,² and availability.³ However, increased restrictions on logging activity in national forests have led to a decrease in the quantity of ponderosa pine available to the millwork industry, and thus alternative species such as southern yellow pine⁴ and radiata pine (*Pinus radiata*) have been

¹ Kitchen cabinets, vanities, and other cabinetry, also known as millwork, are not covered by this summary.

² U.S. Forest Service, Agriculture Handbook 72, *Wood Handbook: Wood as an Engineering Material*.

³ Throughout the Western United States, where ponderosa pine is native, there are 11.3 million hectares of ponderosa pine stands, of which 5.4 million hectares are contained in national forests. U.S. Forest Service, North Central Forest Experiment Station, General Technical Report NC-168, *Forest Statistics of the United States, 1992 Metric Units*.

⁴ Southern yellow pine represents an aggregate of four major pine species grown in the southeastern United States: longleaf pine (*Pinus palustris*), shortleaf pine (*P. echinata*), loblolly pine (*P. taeda*), and slash pine (*P. elliottii*). The wood of these species is quite similar. Botanically,
(continued...)

able to capture market share. Radiata pine, although native to the coast of California, is imported primarily from Chile and New Zealand and is very similar to the more traditional millwork species in terms of machinability and physical characteristics. Intensive forestry practices in Chile and New Zealand produce wood with a relatively knot-free appearance, a strong attraction for millwork producers.⁵

U.S. millwork shipments rose gradually between 1992 and 1994, from \$10.1 billion to \$11.7 billion. Shipments fell off slightly in 1995 and then increased to an estimated \$11.9 billion in 1996. The growth in shipments over the period reflected increased housing and related construction activity. Millwork consumption followed the same pattern as shipments, increasing between 1992 and 1994, decreasing in 1995, and then increasing (to \$12.5 billion) in 1996. Consumption in 1996 was 22 percent greater than in 1992. Imports of millwork, primarily moldings, picture frames, and doors, totaled \$800 million in 1996, 80 percent more than in 1992. Thus, imports captured a larger share of the U.S. market for millwork products during the period. Mexico is the principal source of U.S. imports; it accounted for 26 percent of the value of imports in 1996. U.S. exports totaled \$274 million in 1996, with Canada and Japan the largest markets. Doors, windows, and moldings were the principal products exported.

Millwork Products

The millwork industry manufactures a wide array of products, from relatively simple dowels to complex window and door units. The types of millwork covered in this summary are described below.

Dowels

Dowels are cylindrical pins or rods of wood used to strengthen, align, and join wood pieces, usually ranging in diameter from 6 millimeters to 50 millimeters and from 25 millimeters to 1 meter in length. They may have shallow grooves along the axis and be chamfered on the ends. The grooves increase the surface area of the dowel, thus aiding in the application of adhesives. A chamfer, basically a bevel, allows easier installation of the dowel in the wood piece. Dowels are manufactured by numerous companies in the United States, generally from hardwoods such as beech (*Fagus grandifolia*) and birch (*Betula spp.*). These species are well suited for dowel manufacturing because of their lack of resins, which impede the application of adhesives, and their relatively high shear strength. Most wood dowel manufacturing in the United States is in New England, where beech and birch are native timber species. U.S. shipments of wooden dowels increased steadily between 1992 and 1996, from \$51 million to \$60 million.⁶

⁴ (...continued)

ponderosa pine also belongs to the yellow pine group, but commercially it is closer to the white pine group.

⁵ Intensive forestry practices include the pruning of lower branches of the tree, which allows the tree to “lay down” new, knot-free wood.

⁶ U.S. Department of Commerce, *1992 Census of Manufactures*, for 1992 data. Data for 1993-96 were estimated by the staff of the USITC.

Doors

Entry doors are exterior doors; passageway doors are used in bedrooms, closets, pantries, and similar interior applications.⁷ Residential passageway doors are predominantly wooden, and residential entry doors are predominantly steel clad, with or without a wood-based core. As illustrated in figure 1, there are various types of wooden doors, including flush, stile and rail, patio, louvered, French, screen, and garage.

There are three types of wooden flush doors--hollow-core doors, solid-core doors, and fire-rated doors. Hollow-core doors are the most common of these doors because of their light weight and low cost. As shown in figure 2, hollow-core units utilize a wide assortment of "fillers," including fiber blocks, lattice, and ribs. The face materials used in the construction of wooden flush doors are hardboard,⁸ wood veneer, plastic laminates, or of molded construction.⁹ Molded doors are manufactured by pouring wood fibers and resins into a mold and subjecting them to heat and pressure. The mold embosses the fibers, and a wood grain appearance results. Wood veneer doors utilize thin slices of wood (veneer) on the face of the door to give the effect of a solid door. Oak, birch, maple, cherry, and mahogany are the most popular types of wood veneer for doors.

A French door has glass panels that extend the length of the door. French doors are used primarily in interior applications, usually serving as a separator between two rooms (such as a dining room and a living room). Patio doors may resemble French doors or may have undivided panes, but are used to separate the interior of a house from the exterior. Patio doors are opened and closed by a sliding action, whereas French doors are hinged to allow for a swinging action. The exterior faces of patio doors are frequently clad with aluminum or vinyl.

Garage doors are large, multipaneled doors allowing for entry of an automobile into a garage. Hardboard is used to make the main structural parts of the panels, and molding is then applied to the hardboard for decoration.

Wooden doors make up the largest sector of the U.S. millwork industry, accounting for 30 percent of the value of industry shipments in 1996.¹⁰ Shipments of wooden doors totaled an estimated 31 million units in 1996, with residential passageway and entry doors accounting for 81 percent and 10 percent, respectively. Nonresidential entry and passageway doors made up the remainder.¹¹

⁷ By convention, entry doors generally open into the house or building, except in some rare building-code-mandated commercial applications, while passageway doors may be either "inswinging" or "outswinging."

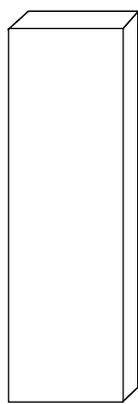
⁸ Hardboard is thin board made from compressed wood fiber.

⁹ National Wood Window & Door Association, *Research Update on Wood Window and Door Marketplace*, Feb. 1995.

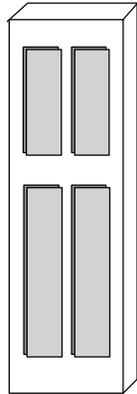
¹⁰ Shipment data for 1996 estimated by the staff of the USITC.

¹¹ American Architectural Manufacturers Association and National Wood Window & Door Association, *1997 Industry Statistical Review and Forecast*.

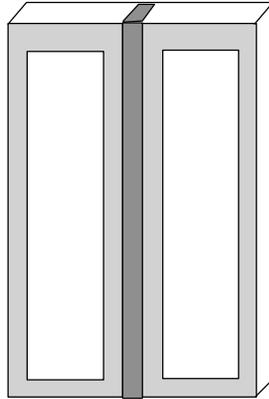
Figure 1
Types and functions of wooden doors



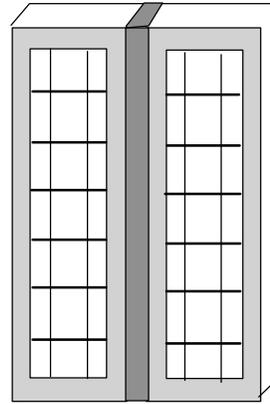
Flush:
Flat face, sometimes covered with veneer showing wood grain.



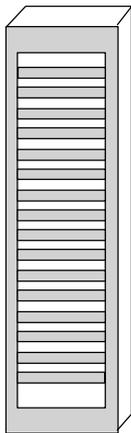
Sile and Ret:
Solid wood door with raised panels.



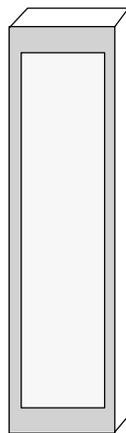
Pair:
Large glazing area allowing view and passage to outside. Doors slide on track.



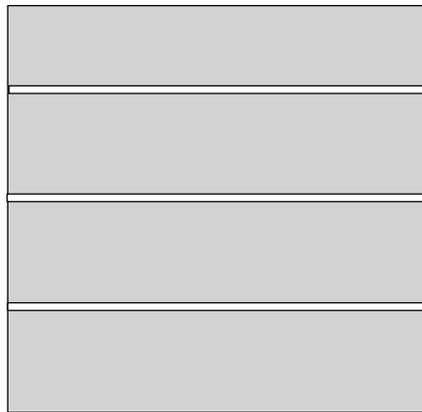
French:
Large unit used as partition between rooms. Both doors may be opened by hinge action. Shown with muntins.



Louver:
Louvers provide ventilation while reducing view.



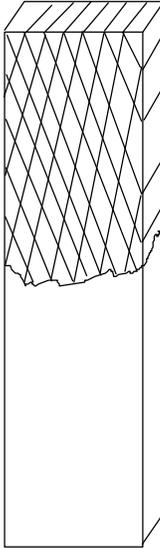
Screen:
Mesh provides a barrier to prevent insects from entering structure while permitting ventilation.



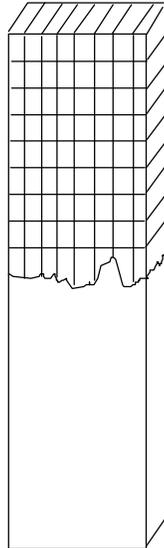
Garage:
Large, multipaned unit allowing automobile to enter or exit.

Source: Staff of the USITC.

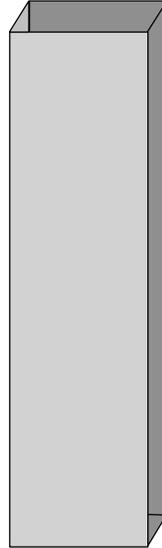
Figure 2
Hollow door construction



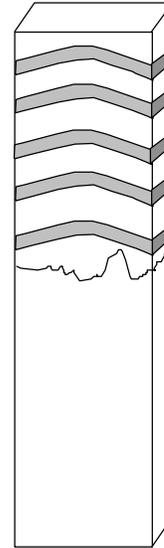
Honeycomb:
Honeycombs made from
paperboard, usually has
a veneer skin.



Lattice:
Similar to honeycomb,
but lattice core.
Lightweight.



Fiber:
Wood and non wood fiber
combined with resins
give feel of solid core
door without the weight.
Plastic laminate skin
embossed with wood
grain texture.



Ribbed
Variation of honeycomb-
or lattice-core.
Traditionally wooden
ribs, now being replaced
by paperboard.

Source: Staff of the USITC.

Windows

Window technology has developed throughout history in conjunction with the technology used in the manufacture of glass. In the colonial era, for example, most windows used panes of glass no more than 4 inches square because the glass industry could not manufacture larger sizes. It was common for windows constructed in that era to have 12 panes of glass per sash.¹² However, as glass manufacturing technology improved and allowed for larger panes, the use of multiple panes became purely aesthetic. In fact, most windows manufactured today use double panes of glass in conjunction with moldings to give the illusion of a multipane window unit.

As with doors, there are many framing materials and styles to choose from depending on the application and budget of the purchaser. Wood, vinyl, and aluminum are the primary framing materials used for windows.¹³ For the purposes of this summary, only window units with wood as the main framing material are discussed in detail.

Numerous styles of wooden windows are used in residential and light commercial¹⁴ applications and are usually designed to be opened and closed to provide ventilation. Double-hung and casement windows are the main types used in both new construction and residential repair/home improvement.¹⁵ Other types of windows include single- and triple-hung, awning, slider, combination, or specialty, as shown in figure 3. Ponderosa pine is the dominant species of wood used in window frames owing to its performance, workability, and availability. Other species used include southern yellow pine, radiata pine, white pine, and other softwoods. Occasionally, white oak and cherry are used for framing windows; these are expensive and limited to custom design.

Shipments of wooden windows and wooden window frames by U.S. producers in 1996 totaled \$3.1 billion.¹⁶ Sales of wooden windows closely follow new housing construction and residential repair/home improvement activity; sales of wooden window units in new construction increased from 10.2 million in 1992 to an estimated 12.5 million in 1996.¹⁷ During the same period, sales of wooden windows for residential repair/home improvement purposes increased from 8.3 million units to an estimated 9.6 million units (figure 4).

In recent years, vinyl windows have gained market share, mostly at the expense of aluminum windows; market share for wooden windows has remained stable at 47 percent. Vinyl windows are relatively maintenance free, a feature popular with consumers. Consequently, future demand for wooden windows is expected to slacken as the vinyl window industry makes inroads into the traditional wooden window markets. To meet the competition, the wooden window industry has offered consumers windows with aluminum-clad or vinyl-clad wood as the framing material.

¹² Jefferson Kolle, "Taking a Look at Windows," *Fine Homebuilding*, Aug./Sept. 1995.

¹³ National Wood Window & Door Association, *Research Update on Wood Window and Door Marketplace*, Feb. 1995.

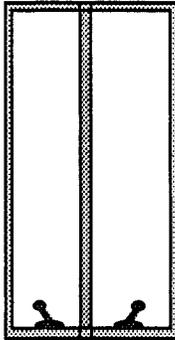
¹⁴ Light commercial windows are usually associated with smaller buildings such as banks and restaurants.

¹⁵ National Wood Window & Door Association, *Research Update on Wood Window and Door Marketplace*, Feb. 1995.

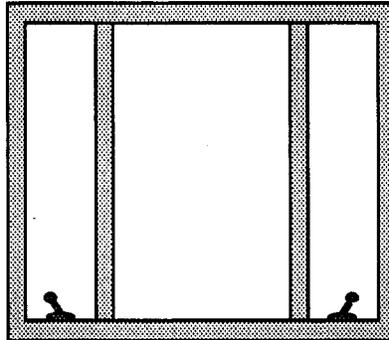
¹⁶ Shipment data for 1996 estimated by the staff of the USITC.

¹⁷ American Architectural Manufacturers Association and National Wood Window & Door Association, *1997 Industry Statistical Review and Forecast*.

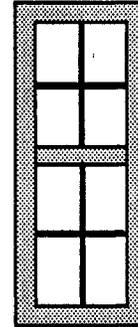
Figure 3
Various common window styles



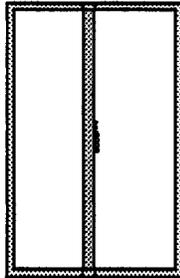
Casement:
Sash opens to the outside by turning a crank.



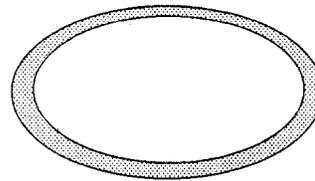
Bay:
Three windows, usually made up of a large center window and two flanking windows at 30- or 45-degree angles to the wall.



Double-hung:
Sashes open vertically.



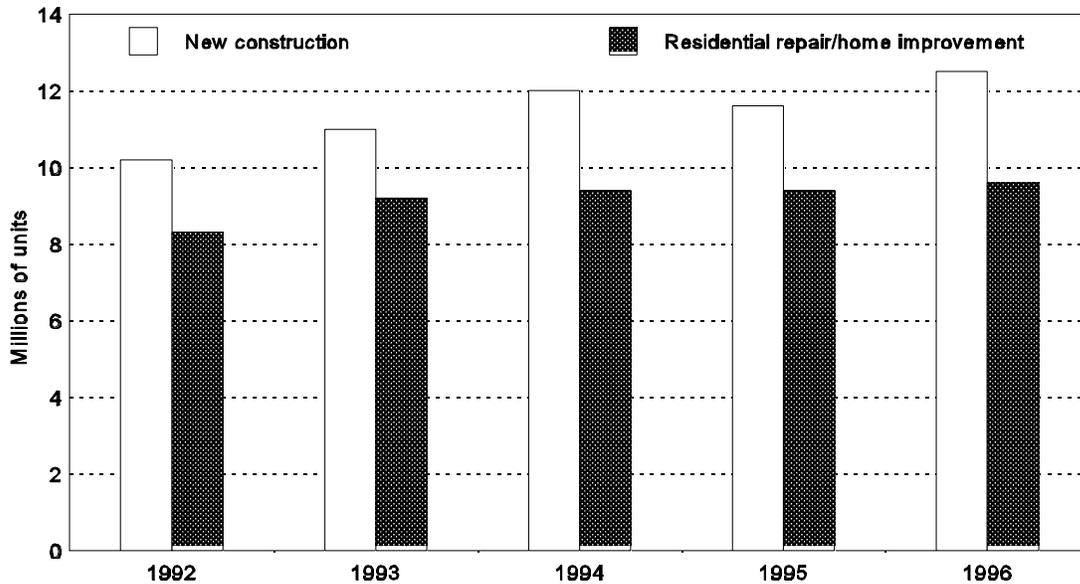
Sliding:
One sash slides horizontally. Used where space is limited.



Fixed-frame:
Stationary, nonventing unit available in many different shapes.

Source: Pella Corp., Lincoln Wood Products, Staff of the USITC.

Figure 4
Wooden windows: Sales in the new construction and residential repair/home improvement markets, 1992-1996



Source: National Wood Window & Door Association.

Wooden windows are required to perform to a minimum standard to be certified by the American National Standards Institute and the National Wood Window and Door Association. In 1995 the wooden window industry adopted a new system for certifying the performance of their products in conjunction with the National Fenestration Rating Council (NFRC).¹⁸ Previously, wooden window manufacturers employed various testing procedures to determine the quality and performance of their products, ultimately leading to confusion among buyers. The new system provides for a “U-value;” the lower the value, the better the energy performance of the unit.¹⁹ The system allows a common comparison among the various window manufacturers that use the NFRC rating system. According to the NFRC, wooden windows are tested, under guidelines of the American Standards for Testing and Materials, for five criteria, as described below.

Operational force: The maximum amount of force required to open and close the window.

Air infiltration: Tests are done to determine the amount of infiltration under 25 mph wind conditions.

Water infiltration: Done to determine if water passes beyond the interior face of the window and overflows into the room or wall area. Testing simulates a rainfall at 8"/hour.

¹⁸ “Fenestration” (from the Latin word for window) refers to the disposition of windows in a wall or architectural plan.

¹⁹ U-value is a measure of heat flow per unit area between the warm side (e.g., inside of a house) and the cool side (e.g., outside of a house on a winter’s day). The lower the value, the less heat is exchanged.

Structural performance: Tests the amount of pressure the window unit could withstand.

Forced entry: Tests the amount of force needed to corrupt the physical structure of the window unit, excluding the glazing materials.

Moldings

Wooden moldings serve as a functional as well as a decorative application for windows, doors, floors, ceilings, walls, furniture, picture frames, and so forth. While there are thousands of types of moldings, they are classified into several categories on the basis of function and are generally used in combinations giving a “built-up” effect to the door, window, or other area to be decorated.²⁰ This effect may be relatively simple, with only a few different styles of moldings used, or involve an elaborate system of moldings, providing a grand entryway or window treatment.

Wooden moldings are available in either long clear lengths or finger-jointed lengths.²¹ Clear lengths of molding are usually stained; finger-jointed (FJ) molding is generally painted or covered with veneer or plastic materials. FJ molding’s share of the market has increased markedly in recent years because supplies of long clear lengths of lumber have become increasingly difficult to obtain.²²

All moldings are produced in a similar fashion—i.e., the removal of wood in a certain pattern to yield the desired profile. However, the manufacturing process varies greatly depending on the scale of the molding manufacturer. Moldings may be made simply by a small wood shop using just a router and/or shaper and an assortment of bits and/or cutters, or they may be made by large firms using computer-controlled molders.

Other millwork products

Other millwork products include items such as stairwork, carvings, and window blinds and shutters. Stairwork includes the risers, treads, balusters, and rails that make up a staircase. A riser is the vertical part of a step in a staircase; a tread is the horizontal section. Balusters are spindles supporting the rails. Carvings are decorative pieces of wood that have been gouged, skewered, or otherwise altered into a distinct pattern or design.

Window blinds are a contrivance inhibiting view and may serve to diffuse light. They are made from thin louvers and are encased in either a wooden frame or a mechanism that allows the

²⁰ Examples of these moldings include crown (a large molding used to decorate the intersection of walls and the ceiling), chair rail (molding which protects walls from marring from chairs), and mullion casing (molding applied vertically to separate window or door frames).

²¹ Finger-jointing is a method used to make long lengths of clear moldings from short clear lengths of lumber. The short lengths of lumber are grooved on the ends and then glued together to make a long length of clear wood.

²² C.C. Crow Publications, Inc., *Moldings & Millwork: A Global Perspective*, Aug. 1997.

blinds to be rolled up or down. Window shutters are panels encased in a wooden frame that when closed will completely inhibit view or block light from entering the structure. Shutters are traditionally mounted on the outside of the house and in earlier times were closed during inclement weather or when the amount of light entering the house needed to be restricted. However, today most exterior shutters do not use panels encased in a wooden frame; rather, they consist of framed louvers and are non-operable. Shutters are also used in interiors, often as replacements for draperies; these may have movable louvers.

U.S. INDUSTRY PROFILE

The Standard Industrial Classifications (SICs) applicable to products in this summary are windows (SIC 24311-24313), doors (SIC 24314-24315), moldings (SIC 24316-24317), other millwork products (SIC 24310, 24318), picture frames (SIC 24991), and dowels (SIC 2499462). Figure 5 illustrates the structure of the U.S. millwork industry.

Number of Firms, Employment, and Geographic Distribution

In 1996, the U.S. millwork industry employed more than 110,000 people and shipped products worth nearly \$12 billion.²³ The industry had a payroll of over \$2.2 billion in 1995, the latest year for which data are available.²⁴ Of the 42 SIC industries that constitute the overall construction industry, millwork is sixth in terms of the value of products shipped.²⁵

Millwork firms are located throughout the United States. The vast majority have fewer than 100 employees, and only a handful have more than 1,000 employees.²⁶ Moldings, carvings, and stairwork are manufactured by both large and small firms; wooden doors and windows are primarily produced by large companies in the Midwest.

Labor Intensity and Skills

Labor intensity in the millwork industry varies from very labor-intensive techniques used in the production of handcrafted carvings to highly automated production techniques employed in the manufacture of windows and doors. Most millwork products require the use of power

²³ U.S. Department of Labor, Bureau of Labor Statistics, *Employment and Earnings*. Shipment data were estimated by the staff of the USITC.

²⁴ U.S. Department of Commerce, *1995 Annual Survey of Manufactures*.

²⁵ U.S. Department of Commerce, *Construction Review*, Summer 1995.

²⁶ U.S. Department of Commerce, *1992 Census of Manufactures*.

Figure 5
U.S. millwork industry: Principal raw materials, products and consumers

Principal raw materials	Principal products	Principal consumers
<p>Wood</p> <ul style="list-style-type: none"> -Industrial lumber -Cutstock <ul style="list-style-type: none"> -Ponderosa pine -Lodgepole pine -Southern yellow pine -Radiata pine -Oak, maple, walnut, -Mahogany -Other hardwoods <p>Glass</p> <ul style="list-style-type: none"> -Single, double, triple panes -Low emissivity coatings -Inert gas fillings <p>Hardware</p> <ul style="list-style-type: none"> -Brass -Plastics <p>Cladding</p> <ul style="list-style-type: none"> -Vinyl -Aluminum 	<p>Wooden windows</p> <ul style="list-style-type: none"> -Single-hung -Double-hung -Casement <p>Wooden doors</p> <ul style="list-style-type: none"> -Flat, hollow -Flat, solid -Panel -Patio -Garage <p>Window treatments</p> <ul style="list-style-type: none"> -Blinds -Shutters <p>Moldings</p> <ul style="list-style-type: none"> -Carvings -Decorative trim <p>Other items</p> <ul style="list-style-type: none"> -Dowels -Picture frames -Exterior applications -Trellises -Columns -Stairworks 	<p>Wooden windows</p> <ul style="list-style-type: none"> -Residential new construction -Residential repair and remodeling <p>Wooden doors</p> <ul style="list-style-type: none"> -Residential new construction -Residential repair and remodeling -Light commercial buildings <p>Window treatments</p> <ul style="list-style-type: none"> -Residential repair and remodeling -Residential new construction <p>Moldings</p> <ul style="list-style-type: none"> -Residential repair and remodeling -Residential new construction -Light and commercial buildings -Cabinetmakers -Carpenters <p>Other items</p> <ul style="list-style-type: none"> -Residential repair and remodeling -Residential new construction -Cabinetmakers -Carpenters

Source: Staff of the USITC.

machinery (ranging from light to heavy industrial units) such as saws, lathes, planers, routers, and shapers.²⁷ Light-industrial units are generally used by smaller, custom-oriented millwork shops employing relatively few workers, while heavy-industrial units are used by the large millwork shops, especially in the door and window sector.

The millwork industry employs many highly skilled craftspeople to create such products as richly figured carvings, elaborate staircases and entryways, and fine moldings. Less skilled workers are needed to operate machinery and for other less technical aspects of millwork manufacturing. Average wage rates earned by workers in the millwork industry reflect their general level of skills. Of the 17 SIC industries that make up the overall lumber and wood products industry, the millwork industry was fourth in terms of employee compensation. Workers in this industry averaged over \$29,000 in compensation in 1995 (the latest year for which data are available).²⁸ Carpenters installing millwork products were generally paid at higher rates than the factory workers producing millwork, earning around \$31,000 in annual compensation.²⁹

Skill levels involved in the manufacture of custom staircases, moldings, and carvings approach the artisan level. In certain instances, workers fabricating millwork items also deliver and install the items. For example, a custom staircase worker may design and build the risers, treads, and other staircase parts at the shop and then install them in the structure.

An emerging trend in the millwork industry is greater use of computers in the design and manufacture of millwork items. This has increased demand for computer operators because computer aided design and computer numerically controlled processes require a relatively high level of computer skills and a solid understanding of the physical characteristics of wood and woodworking practices.

Building Codes

Use of wooden millwork items is highly dependent on local building codes because these items are combustible. Consequently, certain building codes can preclude their use in particular applications. Local building codes use one of three model building codes to customize regulations concerning the use of all construction materials, not just millwork.³⁰ The three model building codes in the United States are the Uniform Building Code (UBC), the National Building Code (NBC), and the Standard Building Code (SBC). Geographically, the UBC predominates in the West; the NBC, in the Northeast and Central States; and the SBC, in the Southeast.

²⁷ Light-industrial machinery is differentiated from heavy-industrial machinery primarily by the power requirements of the machine. For example, light-industrial machinery may run on regular household electric current, while heavy-industrial machinery may involve three-phase power sources and require a higher voltage.

²⁸ U.S. Department of Commerce, *1995 Annual Survey of Manufactures*.

²⁹ U.S. Department of Commerce, *Construction Review*, Spring and Summer 1996.

³⁰ Currently, there is no national building code governing construction practices comparable to the National Electrical Code and the National Plumbing Code, which govern electrical or plumbing installations.

Typically, the model building codes define construction types (as combustible and noncombustible) and the level of built-in fire resistance of the structural elements. The level of fire resistance required in exterior walls and, consequently, in the openings of a building, is determined by the occupancy or use of the building and its setback from the property line or adjacent structure.³¹ The design and application of wooden windows and doors are affected by these codes. The intentions of the model building codes are as follows:

- To prevent a fire from spreading to an adjacent building;
- To shield the interior of a building from exposure to the radiant energy of a fire in an adjacent building; and
- To prevent a fire from spreading to other parts of a building.

Table 1 summarizes the various model building codes and whether openings in exterior walls are permitted. If an exterior wall opening is not permitted, there cannot be a wooden window or door. If an opening is permitted, table 1 shows the required fire rating.³²

Wood-frame construction in the model building codes is classified as protected or unprotected. The difference between the two is the level of built-in fire resistance of the structural elements—e.g., framing members, bearing walls, and floor/ceiling assemblies. Structural elements of protected wood-frame construction are required to have a 1-hour fire rating and ¾-hour protected openings.³³ (The level of protection required decreases as the setback increases.) Protected wood-frame construction is normally built only to gain an increase in the height or area of a building or to allow a use of the building that might otherwise not be permitted.³⁴ A rated exterior wall may be required regardless of whether a building is a protected or unprotected wood-frame construction, depending upon the building's proximity to the adjacent property line.

³¹ Setback is the minimum distance required by code or ordinance between a building and a property line or other reference. Kornelis Smit, ed., *Means Illustrated Construction Dictionary* (Kingston, MA: R.S. Means Company, Inc., 1985), p. 448.

³² For example, a 1-hour fire rating means that the structural element is able to withstand a fire for at least 1 hour before failing.

³³ A protected opening is an opening in a rated wall or partition that is fitted with a door, window, or shutter having a fire resistance rating appropriate to the use of the wall. Smit, *Means Illustrated Construction Dictionary*, p. 392.

³⁴ An example of a protected wood-frame construction is an apartment complex in a densely populated area.

Table 1
Model building codes, use groups, setback requirements, and openings

Model code	Use group	Setback	Openings/fire resistance required
Uniform Building Code	Restaurants, retail stores, office buildings	0 to < 5 feet	Not permitted
		5 to < 10 feet	¾ hour
		10 feet or more	No protection required
	Apartment houses	0 to < 5 feet	Not permitted
		5 feet or more	No protection required
Standard Building Code	Restaurants, retail stores, office buildings	0 to 3 feet	Not permitted
		>3 to 15 feet	¾ hour
		>15 feet	No protection required
	Apartment houses	0 to 3 feet	Not permitted
		>3 to 15 feet	¾ hour
		>15 feet	No protection required
National Building Code	Restaurants, office buildings	0 to 5 feet	1½ hour
		>5 to 10 feet	¾ hour
		>10 feet	No protection required
	Retail stores	0 to 5 feet	2 hour
		>5 to 10 feet	1½ hour
		>10 feet to 15 feet	¾ hour
	Apartment houses	>15 feet	No protection required
		0 to 5 feet	¾ hour
		>5 to 10 feet	¾ hour
		>10 feet	No protection required

Source: Derived by the staff of the USITC.

Vertical Integration

Millwork manufacturers are generally relatively small firms that specialize in the production of millwork products. They typically purchase their raw materials from wood, glass, and hardware suppliers and then convert these materials into doors, windows, moldings, and other products. Millwork manufacturers work closely with their suppliers to ensure the quality and consistency of raw materials.

Marketing Methods

Millwork producers distribute their products through a variety of market channels. Factors such as market location, transportation costs, and general building practices and preferences can play a role in the particular market channel used. In general, the more specialized the millwork product, the fewer the levels in the distribution chain. However, two distinct markets exist—the new construction market and the residential repair and home improvement market (RRHI).

New Construction Market

Millwork intended for use in new construction is primarily marketed to architects, home builders, and, to a lesser extent, home buyers. Architects, when designing a house, specify the location and types of doors, windows, moldings, and other treatments within the confines of the relevant building code and may consult with interior designers in determining various stylistic schemes. Whether the house is a production unit or a custom unit, the builder generally works in close concert with millwork sales representatives in determining the type, style, and location of millwork items.³⁵ Detached production housing accounts for 44 percent of new housing construction, while custom housing represents 32 percent. Generally, the custom housing market uses \$3,000 per house more in millwork appointments than does detached production housing.³⁶

RRHI Market

Primary consumers of millwork in the RRHI market include professional renovators, home improvement contractors, and especially, the do-it-yourself (DIY) homeowner. DIY homeowners generally possess average carpentry skills and own or have access to hand tools and power machinery used in the installation of various millwork items. Millwork manufacturers advertise heavily in magazines targeted at the DIY homeowner and work with home improvement centers by offering evening seminars conducted at the centers to educate consumers about the proper use and installation of their products. However, the materials usually obtainable at the large home improvement center chains are not the manufacturers' "premium" brands. These brands are generally available only through professional outlets.

Pricing Practices

Millwork product pricing practices vary by type of millwork. Generally, large home building firms, by virtue of the large volumes purchased, are able to negotiate more favorable prices than are small contractors or other small buyers.

Dowels

Pricing practices for dowel pins and rods are straightforward because of their relative simplicity. When purchasing these products, the consumer may consult various woodworking magazines or catalogs, or trade journals, or the price displayed at the retail center, home center, or lumberyard. Manufacturers vary their prices depending on the type of wood, as well as the size and type of the dowel.

³⁵ *Professional Builder*, July 1996. Detached production houses are houses in a subdivision where the buyer generally visits the builder's model home and decides whether or not that style is suitable. Although the builder offers variations of the model home, the preponderance of the homes in the subdivision are similar.

³⁶ Wood Moulding & Millwork Producers Association.

Moldings

Standard wood moldings are priced by the linear foot according to the intricacy of the profile, length, grade, and the species used. All things being equal, the grade of the molding is the main determinant of the price. Stain-grade moldings are more expensive than paint-grade moldings because the stain grade is made from a single piece of clear wood, while the paint-grade molding generally involves finger joints, which reduce aesthetic appeal. Paint-grade moldings may be primed at the factory; these generally cost 15 percent more than non-primed paint-grade moldings.³⁷ Custom wood moldings are considerably more expensive than standard wood moldings because of the extra labor and machining involved, especially if custom knives need to be ground to make the desired profile. Prices are set on a bid basis, where the customer works closely with the molding manufacturer, generally a small, local business.

Doors

Pricing practices regarding doors are relatively straightforward, with the only variables being style, type of wood, and size. Doors may be purchased in either a slab form or a prehung form and generally do not include installation charges. A slab door is just the door without any further processing for locks, hinges, or knobs. Prehung doors have holes drilled at the factory for locks and knobs as well as hinge and strike plate recesses mortised, and are usually prefitted with hinges and top and side jambs.

Windows

Although prices for windows are highly variable because of the many different types and sizes available, the manner in which prices are determined is relatively straightforward. After a general decision regarding the type, style, and size is made by the builder or homeowner, a sales representative from a window company usually visits the site to discuss the products the company currently offers and give an estimate for the total cost of the windows. Unlike the price of doors, the price of windows for new construction generally includes installation, which is usually subcontracted. In the RRHI market, windows are priced without installation, allowing the experienced DIY homeowner to perform the installation.

When purchasing windows, the consumer is presented with numerous options that increase the performance and aesthetics of the window. As more options are included, the price of the window unit rises. Some of the more common options include low-emissivity glass, double glazing,³⁸ insect screens, and removable muntins that offer the look of old-fashioned, single-light windows.

In the RRHI market, the price of replacement windows may also depend on the complexity of installing the window unit—the easier it is to install, generally the more expensive it is. For

³⁷ *Fine Homebuilding*, Aug. 1995.

³⁸ Low-emissivity glass is a type of glass with a transparent material fused into its surface that acts as a thermal mirror. Double glazing is the use of two panes of glass in the window to increase energy efficiency.

example, some wooden window manufacturers sell replacement units which include the window as well as the jambs, stops, and other pertinent window parts. These types of windows usually command a premium because the labor to install them is minimized. Other wooden window makers sell a kit which, although less expensive, requires more time and skill to install.

Research and Development

Research and development activities in the millwork sector generally involve developing processes that minimize labor inputs and maximize the yield from the raw material. Owing to the decreasing availability of long clear lumber, millwork manufacturers are now using computers to manufacture clear lumber by electronically scanning shorter pieces of lumber for defects, then cutting out the defects and joining the remaining clear pieces of wood to form a long piece of clear lumber.³⁹ This technique increases the efficiency of the millwork shop by reducing labor intensity and allowing for a more efficient use of raw materials.

While large millwork producers have incorporated computer processes in manufacturing for some time, smaller millwork shops initially moved slowly to use them. This has changed in recent years as the smaller shops, equipped with personal computers, have increased their use of various computer aided design programs and computer numerically controlled processes.⁴⁰

In the wooden door and window sector, significant research has been conducted on using engineered wood products (articles manufactured from wood residues and fibers) instead of solid wood products in the manufacture of doors and windows. Engineered wood products, such as particleboard, medium-density fiberboard, and laminated veneer lumber, are used in the manufacture of doors because of their physical stability compared with solid wood. Engineered wood can be milled like traditional wood products and even extruded in more complex forms, while retaining more strength than solid wood.⁴¹

Globalization

Like many other sectors of the U.S. economy, the domestic millwork industry in recent years has been transformed from an industry with domestically sourced raw materials and little import competition to one that now sources raw materials globally and faces increased imports from a multitude of countries. Ponderosa pine from Federal timberlands in the Western United States had traditionally been the species of choice for door, window, and molding producers owing to its straight grain, resistance to warping or twisting, low shrinkage, and availability. But a change in Federal policy that significantly reduced the amount of timber that could be cut on

³⁹ C.C. Crow Publications, Inc., *Moulding & Millwork: Patterns of Change*, May 1992.

⁴⁰ Computer numerically controlled processes involve the use of computers and woodworking equipment such as lathes, routers, and saws to turn or cut the wood stock in a precise, programmable fashion, thereby reducing waste caused by miscuts.

⁴¹ C.C. Crow Publications, Inc., *Industrial Lumber: Species and Issues*, July 1996.

these lands had led by the early 1990s to a large decline in the ponderosa pine available to domestic millwork producers. In an attempt to find alternative species, these producers searched domestically, as well as overseas, for new suppliers.⁴²

Chile and New Zealand, with large and well-established forest product industries, have helped meet U.S. demand with radiata pine, a good substitute for ponderosa pine in many millwork applications. These two countries have vast plantations of radiata pine and are likely to be a presence in the U.S. market for years to come.⁴³ Brazil and Mexico have also become large suppliers of pine lumber to U.S. millwork producers. Other countries with the potential to supply lumber to U.S. millwork producers include South Africa and Russia.⁴⁴

Chile, New Zealand, Brazil, and Mexico have coupled their increased lumber exports to the United States with increased exports of finished millwork products, particularly moldings. By producing the end product rather than just the intermediate product, foreign producers have retained more of the value-added manufacturing in their own countries. Imports of millwork items from many other countries have also grown rapidly as the large and growing U.S. market has presented attractive opportunities for foreign producers. These increased imports and import market share have intensified the competitive pressures felt by U.S. producers.

U.S. MARKET

Consumer Characteristics and Factors Affecting Demand

Consumers of millwork products vary considerably, from the average homeowner to large construction companies. Major factors affecting demand include general housing construction activity, architectural style, and cost. In recent years, consumers have become more sophisticated in specifying the types of millwork products desired, especially in the wooden door and window sector. They view wooden doors and windows as costly and involving a great deal of maintenance. Consequently, new and improved products (those requiring less maintenance) have been developed and introduced.

Another factor affecting demand for millwork products is environmental certification. To assuage consumers' environmental concerns, millwork manufacturers are starting to certify products manufactured from wood from "sustainable forests" or "plantation-grown forests."

⁴² Canada traditionally had been and continues to be a supplier of the lumber used by the U.S. millwork industry.

⁴³ C.C. Crow Publications, Inc., *Mouldings & Millwork: A Global Perspective*, Aug. 1997.

⁴⁴ Ibid.

Doors

In the residential door market, wood competes with other materials, primarily steel and fiberglass. Wooden doors accounted for an estimated 27 percent of all residential entry doors installed in 1996; steel doors and fiberglass-clad doors accounted for the remainder. For residential passageway applications, however, wood is the material of choice. Wooden doors had an estimated 95 percent share of this market in 1996.⁴⁵

The market for nonresidential doors is considerably smaller than that for residential doors. In this market too, wood competes with other materials, including aluminum and steel. In 1996, wooden doors accounted for only 6 percent of the market for nonresidential entry doors, but 38 percent of the market for nonresidential passage doors.⁴⁶

Windows

An important consideration for consumers of windows is maintenance. In recent years, vinyl windows, because of their relatively maintenance-free features, have become an alternative to wooden windows. Protective coatings, such as paint or stain, are not needed on vinyl windows and are generally a detriment to their performance. However, vinyl windows are not considered as physically attractive as wooden windows, and, partly as a result of inferior construction practices, some vinyl windows have experienced premature performance failures.⁴⁷ Wooden window manufacturers have introduced windows with a cladding on the exterior portions of the window, thus giving consumers the best of both—the low maintenance of vinyl (there is no need to coat the exterior portions) and the physical attractiveness and performance of wood on the interior.⁴⁸

Some consumers of wooden windows may choose a new offering by the industry, where a simple flick of a switch “frosts” the window, allowing for privacy. These windows are well suited for the elderly or disabled, who may not be able to operate a drape or blind.

Moldings

Moldings are used by a wide array of consumers, from the homeowner tackling home improvement projects to professional cabinetmakers, interior designers, and trim carpenters. Selection of moldings by the consumer depends, in part, on the architectural style of the structure and the cost of the molding. For a homeowner conducting a home improvement project, selection of moldings may be contingent on the skill level required and access to tools.

⁴⁵ American Architectural Manufacturers Association and National Wood Window & Door Association, *1997 Industry Statistical Review and Forecast*.

⁴⁶ *Ibid.*

⁴⁷ While windows, regardless of the framing material used, may suffer from performance failures if they are not constructed correctly, vinyl windows have a propensity to contract and expand more than wooden windows. This contraction and expansion cycle may lead to a break in the thermal seal of the window unit, causing the “fogging” of the glazing. Also, condensation along the bottom of the glazing during periods of extremes in indoor and outdoor temperatures contributes to performance failures.

⁴⁸ Andersen Corp., *A Complete Guide to Andersen Windows & Patio Doors*, 1996.

For example, because crown moldings are difficult to install without suitable skills and tools, the homeowner typically will contract with a trim carpenter to install the molding. Polyurethane resin-based moldings, an alternative to wooden moldings, are becoming more popular, although they currently represent only a small share (12 percent) of the molding market.⁴⁹

Dowels

Furniture makers and toy and novelty companies are large consumers of dowels.⁵⁰ Biscuit joinery is an alternative to the use of dowels in various joinery applications. Biscuit joinery is a method of joinery involving an oval-shaped cut where a “biscuit,” which is simply compressed beech shaped like a football, is used in joining and aligning pieces of wood. As the adhesive dries, the compressed beech expands, strengthening the joint.⁵¹

Other Millwork Products

Other millwork products, such as stairwork and carvings, are generally purchased directly by homeowners with advanced carpentry skills and by professional carpenters and home builders. Because of various local building code requirements, homeowners with only average skills are more likely to contract with an experienced carpenter to install structural millwork elements.⁵²

Consumption

Apparent U.S. consumption of millwork products rose irregularly from \$10.2 billion in 1992 to \$12.5 billion in 1996, or by 22 percent, as the U.S. economy grew steadily and new construction and residential repair/home improvement activity increased (table 2). Consumption of millwork products is closely associated with the level of housing starts, especially single-family housing starts, as shown in figure 6. The decline in consumption in 1995 was due to a decrease in single-family housing starts; in 1996, as housing starts rebounded, millwork consumption rose 5.2 percent.

U. S. imports of millwork products increased 80 percent between 1992 and 1996, from \$445 million to \$800 million. The growth in imports was more rapid than the growth in the

⁴⁹ Wood Moulding & Millwork Producers Association.

⁵⁰ Telephone interview with industry official, Dec. 1997.

⁵¹ Rob Cook, “17 Biscuit Alternatives for the Plate Joiner: Biscuit,” *Woodworker’s Journal*, 1996.

⁵² Local building codes may require a building permit when constructing or renovating structural elements, such as stairwork and structural columns.

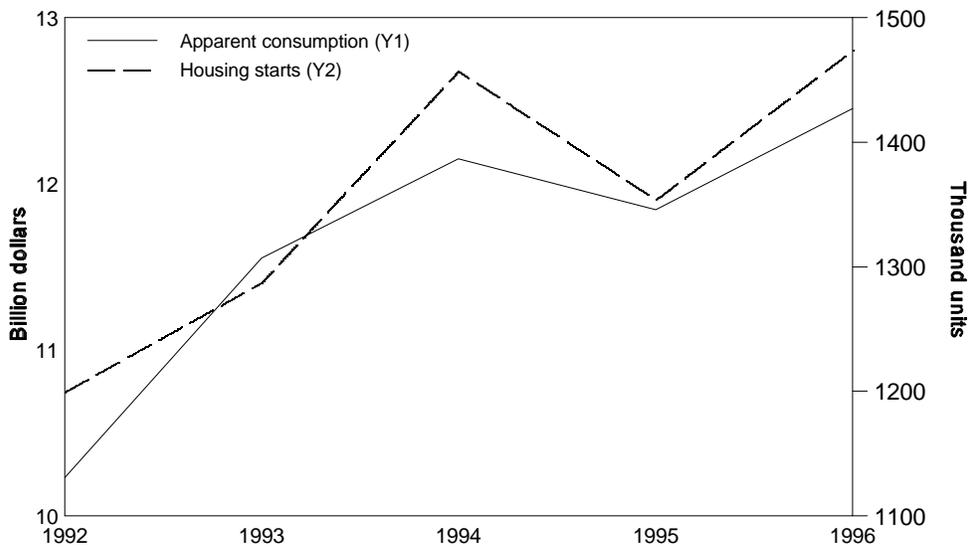
Table 2
Millwork products: U.S. shipments, exports of domestic merchandise, imports for consumption, apparent U.S. consumption, ratio of imports to consumption, and ratio of exports to shipments, 1992-96

Year	U.S. shipments	U.S. exports	U.S. imports	Apparent U.S. consumption	Ratio of imports to consumption	Ratio of exports to shipments
	Value (million dollars)				Percent	
1992	10,077	290	445	10,232	4.4	2.9
1993	11,259	273	566	11,552	4.9	2.4
1994	11,738	246	659	12,150	5.4	2.1
1995	11,420	231	656	11,844	5.5	2.0
1996	¹ 11,930	274	800	¹ 12,455	¹ 6.4	¹ 2.3

¹ Estimated by the staff of the USITC.

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

Figure 6
Apparent U.S. consumption of millwork products and single-family housing starts, 1992-96



Source: Compiled from official statistics of the U.S. Department of Commerce. Single-family housing starts follow right axis.

market, and consequently import penetration increased from 4.4 percent in 1992 to 6.4 percent in 1996. U.S. exports of millwork products were relatively small each year (under \$300 million), and accounted for less than 3 percent of U.S. shipments.

Production

U.S. shipments of millwork products grew from \$10.1 billion in 1992 to \$11.9 billion in 1996 as increased housing starts and residential repair/home improvement activity fueled demand for these products (table 3). With the exception of other millwork, each of the major millwork categories experienced gains in shipments over the period. The two largest categories, doors and windows, enjoyed healthy increases: door shipments rose 25 percent to \$3.6 billion, and window shipments grew 16 percent to \$3.1 billion.

Shipments of picture frames increased from \$869 million in 1992 to \$1.1 billion in 1996, and shipments of moldings rose 20 percent to \$1.6 billion. Shipments of other millwork products declined 2 percent between 1992 and 1996.

Table 3
Millwork products: U.S. shipments, by types, 1992-96

(Million dollars)

Item	1992	1993	1994	1995	1996 ¹
Dowels	51	55	57	59	60
Picture frames	869	929	947	1,003	1,100
Moldings	1,347	1,679	1,655	1,542	1,620
Doors	2,879	3,301	3,689	3,478	3,600
Windows	2,674	2,775	2,982	2,891	3,100
Other interior and exterior	1,033	1,064	1,154	1,244	1,250
Other millwork	1,224	1,457	1,255	1,204	1,200
Total	10,077	11,259	11,738	11,420	11,930

¹ Estimated by the staff of the USITC.

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

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

U.S. TRADE

Overview

Total U.S. trade in millwork products rose from \$735.6 million to \$1.1 billion during 1992-96. Increased imports accounted for this growth, increasing from \$445.3 million to \$799.6 million. U.S. exports over the period fell from \$290.3 million to \$274.2 million. The United States ran a trade deficit in millwork products in each year of the period; the deficit increased steadily from \$154.9 million in 1992 to \$525.4 million in 1996. Figure 7 presents U.S. imports and exports of millwork products by major trading countries during 1996. Table 4 shows imports, exports, and the trade balance for major U.S. trading partners during 1992-96.

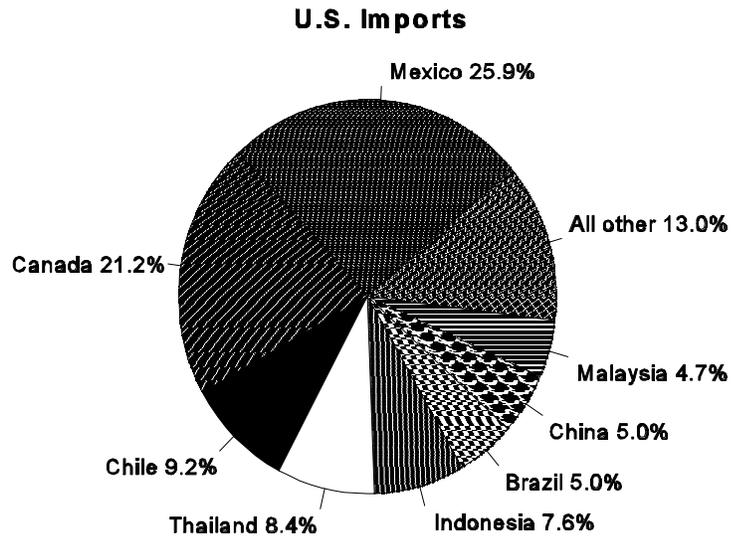
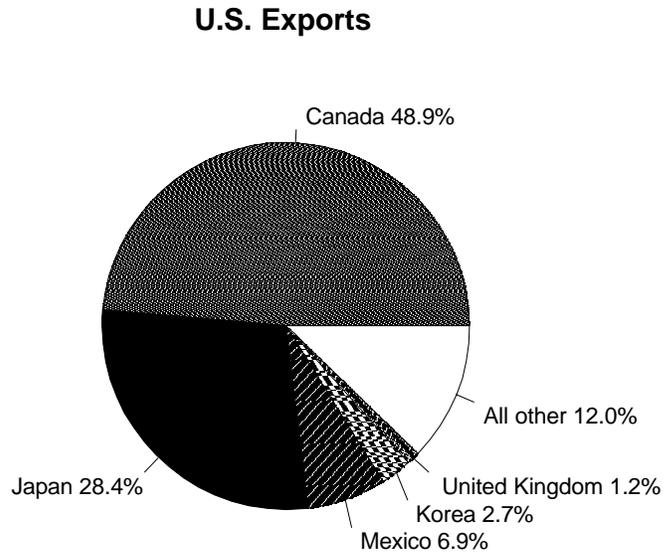
The United States ran a trade deficit with most of its major trading partners, and in all cases but one, these deficits increased over the period. The deficit with Mexico rose from \$98.8 million in 1992 to \$188.5 million in 1996, and that with Chile jumped from only \$7.6 million to \$73.3 million. U.S. trade with Canada swung from a surplus of \$104.3 million in 1992 to a deficit of \$35.4 million in 1996. The United States enjoyed trade surpluses with only three of its major trading partners—Japan, South Korea, and the United Kingdom. The trade surplus with Japan grew rapidly from only \$17.5 million in 1992 to \$77.5 million in 1996; the surpluses with South Korea and the United Kingdom were much smaller, at \$6.8 million and \$1.6 million, respectively, in 1996.

U.S. Imports

Principal Suppliers and Import Levels

U.S. imports of millwork products increased 80 percent between 1992 and 1996, from \$445.3 million to \$799.6 million (table 4). Imports from almost all of the major suppliers rose over the period, with particularly large increases posted by Chile, Canada, Indonesia, Mexico, Brazil, Thailand, and China. The largest suppliers of millwork products in 1996 were Mexico, Canada, Chile, Thailand, and Indonesia. Mexico accounted for 26 percent of total U.S. imports in 1996, followed by Canada (21 percent), Chile (9 percent), and Thailand (8 percent). Although Mexico was the largest annual supplier of millwork products to the United States during 1992-96, its share of total imports eroded as imports from other countries grew at a more rapid pace. In particular, imports from Chile increased almost tenfold and imports from China nearly quadrupled.

Figure 7
Millwork products: U.S. exports and imports, by major countries, 1996



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

Table 4
Millwork products: U.S. exports of domestic merchandise, imports for consumption, and
merchandise trade balance, by selected countries, 1992-96

(1,000 dollars)

Item and country	1992	1993	1994	1995	1996
U.S. exports of domestic merchandise:					
Canada	155,282	171,956	154,462	113,466	133,979
Mexico	79,654	49,204	20,657	10,297	18,821
Japan	17,815	17,792	29,260	54,508	77,774
Chile	228	199	197	316	220
China	24	423	676	637	3,073
Thailand	0	59	265	730	598
Indonesia	18	30	3	110	218
Brazil	6	107	212	237	379
Taiwan	1,069	1,222	1,319	2,604	1,340
All other	36,250	31,854	39,182	48,150	37,812
Total	290,346	272,844	246,232	231,056	274,213
EU-15	17,984	10,016	9,054	10,048	8,216
OPEC	2,294	2,432	1,725	1,506	1,233
Latin America	86,399	59,006	30,833	23,536	32,812
CBERA	4,261	5,927	5,820	5,689	8,057
Asian Pacific Rim	26,067	27,240	47,323	77,746	93,577
ASEAN	231	297	981	1,780	1,721
Central and Eastern Europe	1,181	1,481	283	203	199
U.S. Imports for consumption:					
Canada	50,999	67,017	113,488	130,588	169,408
Mexico	178,459	211,826	199,916	170,891	207,361
Japan	318	488	211	294	233
Chile	7,852	24,104	37,386	40,165	73,494
China	10,315	19,729	28,227	31,628	39,751
Thailand	32,927	38,945	50,373	58,280	66,910
Indonesia	28,916	45,748	59,071	59,737	60,594
Brazil	14,454	17,094	22,439	30,985	40,226
Taiwan	39,245	40,424	36,374	28,121	23,173
All other	81,806	100,376	110,974	104,846	118,479
Total	445,291	565,752	658,458	655,535	799,630
EU-15	14,258	16,152	19,027	25,003	26,879
OPEC	29,040	45,998	59,277	59,880	60,687
Latin America	213,497	267,755	277,693	257,892	339,288
CBERA	11,183	12,728	13,770	10,561	11,216
Asian Pacific Rim	164,799	212,886	239,595	234,567	255,322
ASEAN	106,465	141,690	164,179	159,700	177,113
Central and Eastern Europe	34	22	285	542	557
U.S. merchandise trade balance:					
Canada	104,283	104,939	40,974	-17,121	-35,429
Mexico	-98,805	-162,622	-179,259	-160,594	-188,540
Japan	17,497	17,304	29,049	54,214	77,541
Chile	-7,624	-23,905	-37,188	-39,849	-73,274
China	-10,291	-19,306	-27,551	-30,990	-36,678
Thailand	-32,927	-38,886	-50,108	-57,550	-66,312
Indonesia	-28,898	-45,718	-59,068	-59,627	-60,376
Brazil	-14,447	-16,987	-22,228	-30,747	-39,847
Taiwan	-38,177	-39,202	-35,055	-25,518	-21,834
All other	-45,557	-68,523	-71,792	-56,697	-80,668
Total	-154,946	-292,908	-412,226	-424,479	-525,417
EU-15	3,726	-6,136	-9,973	-14,955	-18,663
OPEC	-26,746	-43,566	-57,552	-58,374	-59,454
Latin America	-127,098	-208,749	-246,860	-234,356	-306,476
CBERA	-6,922	-6,801	-7,950	-4,872	-3,159
Asian Pacific Rim	-138,732	-185,646	-192,272	-156,821	-161,765
ASEAN	-106,234	-141,393	-163,198	-157,920	-175,392
Central and Eastern Europe	1,147	1,459	-2	-338	-355

Note.--Because of rounding, figures may not add to totals shown. Import values are based on customs value; export values are based on f.a.s value, U.S. port of export.

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

More than 80 percent of millwork imports (by value) entered the United States free of duty in 1996. This high percentage was due both to duty-free treatment afforded to all imports for several of the millwork categories and to duty-free treatment given to imports that qualified for special tariff programs. These programs included the Generalized System of Preferences, the North American Free Trade Agreement, the Caribbean Basin Economic Recovery Act, the United States-Israel Free Trade Area, and the Andean Trade Preference Act. In 1996, virtually all of the millwork imports that entered under the special import programs entered under the North American Free Trade Agreement (\$349.1 million in imports) or the Generalized System of Preferences (\$238.5 million in imports).

Moldings are the largest category of U.S. millwork imports; they accounted for 40 percent of total imports in 1996 (table 5). Imports of moldings increased from \$189.7 million in 1992 to \$315.9 million in 1996. Mexico was the principal supplier, although imports from Mexico declined from \$121.3 million in 1992 to \$110.4 million in 1996 (table 6). Chile was the second largest source in 1996, supplying imports valued at \$67.3 million, representing a tenfold increase over imports in 1992. Other major suppliers included Canada, Indonesia, Brazil, and Malaysia.

Table 5
Millwork products: U.S. imports for consumption, by types, 1992-96

(1,000 dollars)

Item	1992	1993	1994	1995	1996
Moldings	189,706	247,037	263,657	244,524	315,926
Picture frames	111,788	137,085	163,613	180,253	205,023
Doors	83,234	109,572	153,105	156,186	189,801
Windows	24,390	32,425	37,128	37,533	52,547
Dowels	21,031	23,151	23,916	23,193	17,753
Blinds, shutters, screens, and shades	15,141	16,482	17,039	13,845	18,579
Total	445,290	565,752	658,458	655,534	799,630

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

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

Table 6
Moldings: U.S. imports for consumption, by principal sources, 1992-96

(1,000 dollars)

Source	1992	1993	1994	1995	1996
Mexico	121,319	145,789	125,057	89,932	110,422
Chile	6,769	19,136	28,062	34,875	67,265
Canada	13,914	22,514	31,214	32,971	38,521
Indonesia	12,238	16,645	25,056	26,273	26,986
Brazil	3,844	3,664	4,539	10,076	21,812
Malaysia	15,997	17,075	20,894	13,436	13,278
All other	15,625	22,213	28,835	36,963	37,642
Total	189,706	247,037	263,657	244,524	315,926

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

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

The second largest category of U.S. millwork imports comprises picture frames. Imports of picture frames rose steadily between 1992 and 1996, from \$111.8 million to \$205.0 million. Thailand and Mexico were the two principal suppliers, accounting for over 50 percent of the value of imports during the period (table 7). Imports from both of these countries more than doubled between 1992 and 1996.

Table 7
Picture frames: U.S. imports for consumption, by principal sources, 1992-96

Source	1992	1993	1994	1995	1996
Quantity (1,000 units)					
Thailand	(¹)	13,660	17,456	19,223	22,800
Mexico	(¹)	8,990	14,576	19,001	27,388
China	(¹)	8,712	10,594	11,007	13,711
Indonesia	(¹)	7,278	6,584	4,105	7,209
Taiwan	(¹)	5,238	4,025	2,662	2,574
Philippines	(¹)	130	150	468	750
Canada	(¹)	212	344	601	592
All other	(¹)	2,730	4,316	3,851	3,122
Total	(¹)	46,950	58,045	60,918	78,145
Value (1,000 dollars)					
Thailand	32,105	38,778	49,520	57,149	66,534
Mexico	31,221	37,149	49,200	57,156	64,071
China	6,928	16,400	21,512	24,562	29,769
Indonesia	5,418	11,783	11,943	9,702	14,773
Taiwan	23,970	20,011	14,605	10,553	10,060
Philippines	727	1,023	1,286	2,434	3,575
Canada	647	879	3,077	4,399	3,489
All other	10,772	11,062	12,470	14,298	12,753
Total	111,788	137,085	163,613	180,253	205,023
Unit value					
Thailand	(¹)	\$2.84	\$2.84	\$2.97	\$2.92
Mexico	(¹)	4.13	3.38	3.01	2.34
China	(¹)	1.88	2.03	2.23	2.17
Indonesia	(¹)	1.62	1.81	2.36	2.05
Taiwan	(¹)	3.82	3.63	3.96	3.91
Philippines	(¹)	7.87	8.57	5.20	4.77
Canada	(¹)	4.15	8.94	7.32	5.89
All other	(¹)	4.05	2.89	3.71	4.09
Total	(¹)	2.92	2.82	2.96	2.62

¹ Not available.

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

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

Doors are the third largest category of U.S. millwork imports, accounting for 24 percent of total millwork imports in 1996. Imports of doors more than doubled between 1992 and 1996, rising from \$83.2 million to \$189.8 million. Much of this growth was attributable to a sharp increase in imports from Canada (table 8), which jumped from only \$19.1 million in 1992 to \$82.3 million in 1996. A more robust housing sector in the United States than in Canada presented attractive export opportunities for Canadian producers.

U.S. imports of windows amounted to \$52.5 million in 1996. Imports from the largest supplier, Canada, grew from \$16.2 million in 1992 to \$43.3 million in 1996. Mexico, Germany, and Denmark were the other principal suppliers of windows. Asian countries were the primary sources of U.S. imports of dowels (Indonesia and Malaysia) and blinds, shutters, screens, and shades (China and Taiwan).

Table 8
Doors: U.S. imports for consumption, by principal sources, 1992-96

Source	1992	1993	1994	1995	1996
Quantity (1,000 units)					
Canada	556	717	1,705	2,044	3,391
Mexico	568	566	535	418	696
Malaysia	349	432	340	253	363
Brazil	557	770	781	834	1,023
Indonesia	263	622	926	708	615
Chile	292	574	525	325	189
All other	474	597	643	624	745
Total	3,059	4,278	5,455	5,207	7,022
Value (1,000 dollars)					
Canada	19,110	20,788	48,262	61,842	82,253
Mexico	13,998	16,308	18,915	17,173	23,146
Malaysia	11,457	21,032	17,485	12,444	18,620
Brazil	10,044	12,843	16,173	19,067	17,432
Indonesia	2,875	6,360	9,336	10,835	10,847
Chile	953	4,877	9,260	5,286	6,190
All other	24,798	27,364	33,675	29,540	31,313
Total	83,234	109,572	153,105	156,186	189,801
Unit value					
Canada	\$34.37	\$29.00	\$28.30	\$30.25	\$24.25
Mexico	24.67	28.79	35.38	41.11	33.26
Malaysia	32.82	48.68	51.43	49.22	51.27
Brazil	18.03	16.69	20.71	22.85	17.05
Indonesia	10.91	10.22	10.08	15.30	17.63
Chile	3.27	8.50	17.63	16.24	32.75
All other	52.31	45.85	52.32	47.33	42.02
Total	27.21	25.61	28.06	29.99	27.03

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

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

U.S. Trade Measures

Table 9 shows the column 1 rates of duty, as of January 1, 1998, for the articles included in this summary, and U.S. exports and imports for 1996. An explanation of tariff and trade agreement terms is set forth in appendix A. In 1998, the general (most-favored-nation) U.S. tariff rates applicable to millwork products range from free to 11.9 percent ad valorem. In 1996, U.S. imports of millwork items enjoyed low duties, with the trade-weighted average duty rate on millwork products at less than 1 percent. U.S. imports of millwork products are not subject to quotas, embargoes, or other nontariff measures.

No U.S. Government trade-related investigations specific to the millwork industry have been conducted in recent years. However, there were two trade actions relevant to the millwork industry. In 1989, the Office of the United States Trade Representative (USTR) launched a Super 301 investigation on market access for wood products in Japan. As a result of the Super 301 case, the United States-Japan Wood Products Agreement was signed in 1990 requiring Japan to reduce high tariffs; reclassify certain tariffs; ensure that subsidies are consistent with international agreements; liberalize procedures for new product certification and grading/testing certification; and liberalize product standards and building codes.⁵³

In 1994 and 1995, USTR, not satisfied that Japan had fully implemented the terms of the 1990 Wood Products Agreement, placed Japan's wood product practices on the "watch list," indicating that if Japan's wood product import policies were not satisfactorily changed, future trade actions might be possible. After a series of discussions held within the United States-Japan Wood Products subcommittee, Japanese Government officials agreed to further strengthen the agreement by taking specific steps to improve market access for U.S. wood products. Consequently, in 1996, USTR, while still striving to increase market access for wood products in Japan, removed Japan's wood products sector from the "Super 301 Watch List."⁵⁴

Another trade-related action affecting the U.S. millwork industry concerns the 1996 United States-Canadian Softwood Lumber Agreement.⁵⁵ Although not specifically addressing any items covered by this summary, the 1996 agreement does affect some of the materials used by the millwork industry.⁵⁶

⁵³ Office of the United States Trade Representative, *1997 National Trade Estimate Report on Foreign Trade Barriers*.

⁵⁴ *Ibid.*

⁵⁵ On May 29, 1996, the United States and Canada entered into a 5-year agreement regulating Canadian exports of softwood lumber to the United States. The agreement allows Canada to export up to 14.7 billion board feet of softwood lumber to the United States without a fee; on more than 14.7 billion board feet and up to 15.35 billion board feet, a fee of \$50 per thousand board feet is assessed; on any amount in excess of 15.35 billion board feet, a fee of \$100 per thousand board feet is assessed. On April 1 each year, beginning in 1997, the fees will be adjusted for inflation on the basis of the annual percentage change in the simple average of the annual value in the U.S. Consumer Price Index and the Canadian Consumer Price Index over the previous calendar year. U.S. Trade Representative, "Canada-United States: Softwood Lumber Agreement," May 29, 1996, *International Legal Materials*, Sept. 1996, vol. XXXV, No. 5, p. 1195.

⁵⁶ For example, a U.S. window manufacturer that historically relied upon imported ponderosa pine lumber from Canada to remanufacture into the components used for millwork products (such as sashes and frames) might be affected by the agreement.

Table 9

Millwork: Harmonized Tariff Schedule subheading; description; U.S. column 1 rate of duty as of Jan. 1, 1998; U.S. exports, 1996; and U.S. imports, 1996

Subheading	Description	Col. 1 rate of duty as of Jan. 1, 1998		U.S. exports 1996	U.S. imports 1996
		General	Special ¹		
4409.10.40	Pine (<i>Pinus spp.</i>) standard wood moldings	0.3%	Free (A,CA,E,IL,J,MX)	210,487	
4409.10.45	Standard wood moldings, nesoi, coniferous	Free		² 66,543	19,892
4409.10.50	Wood moldings, nesoi, coniferous	0.9%	Free (A,CA,E,IL,J,MX)		9,110
4409.10.60	Wood dowel rods, plain, coniferous	0.5%	Free (A,CA,E,IL,J,MX)	³ 490	2,512
4409.10.65	Wood dowel rods, sanded, grooved, or otherwise advanced in condition	5.4%	Free (A+,CA,E,IL,J,MX)		286
4409.20.40	Standard wood moldings, nonconiferous	Free		⁴ 22,138	48,562
4409.20.50	Wood moldings, nesoi, nonconiferous	0.9%	Free (A,CA,E,IL,J,MX)		16,909
4409.20.60	Wood dowel rods, plain, nonconiferous	Free		⁵ 1,548	11,857
4409.20.65	Wood dowel rods, sanded, grooved, or otherwise advanced in condition	5.4%	Free (A+,CA,E,IL,J,MX)		1,350
4409.20.90	Other wood continuously shaped along any of its edges or faces	Free		11,370	10,967
4414.00.00	Wooden frames for paintings, photographs, mirrors, or similar objects	4.3%	Free (A,CA,E,IL,J,MX)	10,446	205,023
4418.10.00	Windows, French-windows and their frames, of wood	3.6%	Free (A,CA,E,IL,J,MX)	45,102	52,547
4418.20.40	French doors, of wood	5.3%	Free (A,CA,E,IL,J,MX)	⁶ 102,211	11,901
4418.20.80	Other doors and their frames and thresholds	5.3%	Free (A,CA,E,IL,J,MX)		177,900
4421.90.10	Wood dowel pins, plain, coniferous	0.5%	Free (A,CA,E,IL,J,MX)		93
4421.90.15	Wood dowel pins, plain, other	Free		⁷ 1,313	854
4421.90.20	Wood dowel pins, sanded, grooved, or otherwise advanced in condition	5.4%	Free (A+,CA,E,IL,J,MX)		801
4421.90.30	Wood blinds, shutters, screens, and shades consisting of wooden frames in the center of which are fixed louver boards or slats, with or without hardware	11.9%	Free (A,CA,E,IL,J,MX)	⁸ 13,052	968
4421.90.40	Other wood blinds, shutters, screens and shades, with or without hardware	5.7%	Free (A+,CA,E,IL,J) 4% (MX)		17,611

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); North American Free Trade Agreement, country of origin Canada (CA); Caribbean Basin Economic Recovery Act (E); United States-Israel Free Trade Area (IL); Andean Trade Preference Act (J); and North American Free Trade Agreement, country of origin Mexico (MX).

² Exports reported herein correspond to imports entered under HTS subheadings 4409.10.40, 4409.10.45, and 4409.10.50.

³ Exports reported herein correspond to imports entered under HTS subheadings 4409.10.60 and 4409.10.65.

⁴ Exports reported herein correspond to imports entered under HTS subheadings 4409.20.40 and 4409.20.50.

⁵ Exports reported herein correspond to imports entered under HTS subheadings 4409.20.60 and 4409.20.65.

⁶ Exports reported herein correspond to imports entered under HTS subheadings 4418.20.40 and 4418.20.80.

⁷ Exports reported herein correspond to imports entered under HTS subheadings 4421.90.10, 4421.90.15, and 4421.90.20.

⁸ Exports reported herein correspond to imports entered under HTS subheadings 4421.90.30 and 4421.90.40.

Source: Trade data compiled from official statistics of the U.S. Department of Commerce.

U.S. Exports

Principal Markets and Export Levels

U.S. exports of millwork products fell steadily between 1992 and 1995, from \$290.3 million to \$231.1 million (table 4). Exports increased in 1996 by 19 percent to \$274.2 million but were still lower than the 1992 level. Large declines in exports to two key markets, Canada and Mexico, accounted for the deterioration in export performance. Exports to Canada fell from \$155.3 million in 1992 to \$134.0 million in 1996, while exports to Mexico dropped significantly from \$79.7 million to only \$18.8 million. The economic downturn in Mexico and a sharp drop in housing starts in Canada during the period were factors behind these declines.

The only other large export market for millwork products was Japan. Exports to that country grew rapidly over the period, from \$17.8 million to \$77.8 million. Efforts by the Government of Japan to deregulate the housing industry and to increase imports of building materials, intense marketing efforts by U.S. building materials suppliers in Japan, and the cost competitiveness, quality, and desirability of U.S. products were important contributors to the rapid growth in exports to Japan.

During 1992-96, exports accounted for only a small portion (less than 3 percent) of U.S. shipments of millwork products. Door exports represented 37 percent of total millwork exports in 1996 (table 10), and moldings accounted for 36 percent. Exports of these two products fluctuated during the period, but were lower in 1996 than in 1992. Exports of other millwork products (windows, dowels, blinds, shutters, screens, shades, and frames) increased between 1992 and 1996.

The two largest markets for U.S. exports of doors were Japan and Canada (table 11). Exports to Canada fluctuated during the period; they totaled \$31.7 million in 1996, representing an 8-percent increase over the 1992 level. The average unit value of these exports fell from \$32.38 in 1992 to \$28.56 in 1996. Exports to Japan increased more than fivefold, from \$9.0 million in 1992 to \$47.1 million in 1996, primarily reflecting increased demand for U.S. doors, even though the overall condition of the Japanese housing industry has been weak in recent years. Strong increases in the quantity of exports and in average unit values accounted for this growth. During 1992-96, the Mexican market for U.S. doors collapsed as exports dropped from \$68.6 million in 1992 to only \$2.3 million in 1996. This collapse in demand was undoubtedly related to the extreme macroeconomic instability following the devaluation of the peso that began in November 1994, which resulted in rapid inflation, sharply rising interest rates, and a sudden drop in consumer expenditures per capita.⁵⁷

During 1992-96, Canada was the principal market for exports of moldings, and in 1996 accounted for 78 percent of total exports (table 12). Other principal export markets included Mexico, Japan, and Spain.

⁵⁷ U.S. Embassy Mexico City, *Mexico Economic and Financial Report*, Jan. 1997.

Table 10
Millwork products: U.S. exports of domestic merchandise, by types, 1992-96

(1,000 dollars)

Item	1992	1993	1994	1995	1996
Doors	132,109	94,335	70,468	77,169	102,211
Moldings	107,508	118,770	111,660	86,492	100,051
Windows	33,523	37,635	41,230	42,091	45,102
Blinds, shutters, screens, and shades	5,248	7,925	9,167	9,716	13,052
Frames	9,691	11,475	10,954	11,997	10,446
Dowels	2,267	2,704	2,753	3,591	3,351
Total	290,346	272,844	246,232	231,056	274,213

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

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

Table 11
Doors: U.S. exports of domestic merchandise, by principal markets, 1992-96

Market	1992	1993	1994	1995	1996
	Quantity (1,000 units)				
Japan	226	166	208	431	825
Canada	905	1,013	977	720	1,111
Korea	172	222	249	274	98
Mexico	1,573	865	236	86	82
Bahamas	69	84	22	52	39
United Kingdom	281	56	42	43	91
All other	319	351	389	420	358
Total	3,545	2,757	2,123	2,026	2,604
	Value (1,000 dollars)				
Japan	9,019	8,018	12,195	26,800	47,133
Canada	29,298	31,138	27,466	21,583	31,732
Korea	4,007	5,107	8,391	11,142	4,407
Mexico	68,613	36,237	6,248	1,813	2,330
Bahamas	1,140	1,006	1,079	874	1,700
United Kingdom	9,153	2,301	1,674	2,214	1,373
All other	10,879	10,528	13,415	12,743	13,537
Total	132,109	94,335	70,468	77,169	102,211
	Unit value				
Japan	\$39.94	\$48.22	\$58.68	\$62.22	\$57.12
Canada	32.38	30.75	28.11	29.96	28.56
Korea	23.23	23.01	33.74	40.65	45.09
Mexico	43.61	41.91	26.44	21.03	28.32
Bahamas	16.59	11.99	49.04	16.75	44.02
United Kingdom	32.63	40.98	40.17	51.00	15.03
All other	34.02	29.96	34.48	30.42	37.87
Total	37.26	34.22	33.20	38.09	39.25

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

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

Table 12
Moldings: U.S. exports of domestic merchandise, by principal markets, 1992-96

(1,000 dollars)

Market	1992	1993	1994	1995	1996
Canada	96,138	105,633	93,425	65,406	77,773
Mexico	5,684	7,054	8,260	3,443	9,689
Japan	2,196	2,472	5,768	8,316	6,796
Spain	290	285	238	880	1,093
All other	3,200	3,326	3,970	8,446	4,700
Total	107,508	118,770	111,660	86,492	100,051

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

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

Foreign Trade Measures

Tariffs on millwork products in major U.S. export markets are comparable to U.S. tariffs. Japanese tariffs on millwork products range from free to 5.2 percent ad valorem, while the South Korean tariff on these products is 8 percent. European Union tariffs range from 1.2 percent to 6 percent ad valorem; Canadian tariffs, from free to 1.1 percent; and Mexican tariffs, from free to 9.0 percent. Nontariff barriers are not believed to be a significant impediment to U.S. exports of millwork products.

FOREIGN INDUSTRY PROFILE

Canada, the European Union, and Japan have sizable millwork industries. Most of the trade in millwork is between countries that have a large per capita consumption of wood products in general, and favorable building codes for wood use in construction in particular.

Canada

The Canadian millwork industry is similar to the industry in the United States, but is more dependent on exports to maintain its financial health. The two markets are very similar because of comparable building codes. Like the United States, Canada relies on performance-based standards in assessing the application of millwork items. Unlike the United States, Canada has a nationwide model building code that could be adopted by all municipalities in Canada.⁵⁸

In 1995, the Canadian wooden door and window industry consisted of an estimated 315 establishments located primarily in the Provinces of Quebec, Ontario, and British Columbia. Total employment in the industry was an estimated 10,660. International trade has grown in importance in recent years as Canadian producers have steadily increased their exports of

⁵⁸ National Research Council of Canada 1996, Canadian Codes Centre.

wooden doors and windows while facing increased import competition in their domestic market.⁵⁹ Canadian shipments of wooden windows and doors totaled \$795 million in 1996, representing an increase of 3.4 percent in real terms over shipments in 1995. Exports of wooden windows and doors in 1996 jumped 45 percent over those in 1995 to \$139 million, while imports rose 15 percent to \$48 million. Most of this trade was with the United States.⁶⁰

European Union

Demand for millwork in the European Union (EU) is driven by new construction activity as well as by renovation work. Renovation work has grown rapidly in recent years and currently accounts for almost half of the housing sector activity in the EU. Consequently, the millwork industry is less dependent on the cyclical new construction market. Production and apparent consumption of millwork products have increased in the past few years, driven in part by the greater popularity of wood as a building material. International trade in millwork products has been relatively limited as EU producers have concentrated primarily on supplying the EU market, and imports into the EU, although growing, have accounted for a small share of the market. The increased integration of EU countries and greater harmonization of technical standards, however, have led to an expansion of intra-EU trade in millwork products as producers have looked beyond local and regional markets.⁶¹

Small- to medium-sized enterprises dominate the structure of the millwork industry in the EU. The size of these enterprises is well suited for the EU market because of geographic considerations and technical specialization. Like millwork producers in North America, the European millwork producer tends to be specialized for the particular market it serves. For example, smaller millwork companies concentrate on serving the needs of local consumers and builders. The larger EU millwork companies mass-produce highly standardized millwork components and then market the products to builders and consumers. Price is the primary selling point since the end product is usually required to meet a certain performance standard. Finally, some millwork firms in the EU market products with specific technical properties. As the standards for these products become increasingly harmonized across the EU, sales opportunities for these firms will broaden.⁶²

⁵⁹ Canada Industry Statistics Development Team, *SIC-E 2543-Wooden Door and Window Industry*, June 1996.

⁶⁰ Industry Canada, Forest Industries and Building Products, *Windows and Doors Quarterly Review*, Mar. 1997. Based on US \$0.73/Can\$1.

⁶¹ European Commission, *Panorama of EU Industry 97*, pp. 5-22 through 5-27.

⁶² Ibid.

Japan

Japan's total building products market is quite large, and in 1996 was valued at approximately \$143 billion. Although this market has contracted in recent years owing to sluggish economic growth in Japan, the long-term outlook is for an upturn in demand as the economy strengthens. Millwork products accounted for a small share of the total building products market.⁶³

The wooden window industry in Japan, although relatively small, has developed rapidly in the past decade. Traditionally, aluminum windows accounted for virtually the entire residential window market in Japan. However, the energy efficiency and attractive design of wooden windows created growing demand for them. Initially, demand was primarily met by imports from the United States and Scandinavia, but in recent years a large number of small- to medium-sized Japanese firms have entered the market. These firms have had some success, but have been hindered by their lack of production experience, limited production capabilities, and use of expensive European-made tilt and turn hardware. Consequently, most of these companies served only a small domestic market area and generally produced expensive, custom-made windows.⁶⁴

In 1996, wooden windows accounted for 2 percent of the total Japanese residential window market. Aluminum windows and vinyl windows had market shares of 90 percent and 8 percent, respectively. Two factors have inhibited the growth of wooden windows in Japan. First, they are generally much more expensive than aluminum and vinyl windows. Second, stringent fire-safety regulations require that wooden windows in Japanese residential areas be fire approved.⁶⁵ Despite these obstacles, wooden windows are expected to continue to make inroads into the market share held by aluminum windows.

Japanese producers accounted for an estimated 19-percent share of the Japanese wooden window market in 1996; imports from the United States, Canada, Denmark, and Sweden accounted for most of the remainder. Japanese wooden window producers will continue to face strong competition in their domestic market because of foreign producers' greater production experience, economies of scale, and lower raw material costs.

The moldings industry in Japan is heavily dependent upon the health of the new residential construction market. Japan's moldings market was estimated to be \$2.4 billion in 1993, and imports of moldings were only 7 percent of total consumption.⁶⁶ There were eight major Japanese producers of moldings, all of them large companies that also manufactured other building materials. Moldings in Japan traditionally were custom-produced by carpenters at the construction site rather than mass-produced at the factory. But as the market for prefabricated

⁶³ U.S. Department of Commerce, International Trade Administration, Market Research Reports, *Japan-Wood Windows and Vinyl Windows*, June 1997.

⁶⁴ Ibid.

⁶⁵ The Building Standard Law (BSL), enacted in 1950, is the Japanese national building code regulating the construction industry. In effect, the BSL divides Japan into three levels of fire-protection districts. Fire-protection districts are densely populated and densely built areas. Quasi-fire-protection districts are areas not as densely populated or built, such as the suburbs. And there are areas where no distinctions are made, such as rural areas.

⁶⁶ U.S. Department of Commerce, International Trade Administration, Market Research Reports, *Japan-Molding*, Mar. 1995. The latest year for which data are available is 1993.

housing in Japan increased, so too did the demand for mass-produced moldings. Moldings produced by carpenters at the job site accounted for 80 percent of the total moldings market; mass-produced moldings accounted for the remainder.

The market for doors for houses in Japan depends on the overall condition of the housing industry, which has been weak in the past few years.⁶⁷ The residential door market consists of two segments) exterior doors, which are usually aluminum or steel to satisfy strict fire regulations, and interior doors, which are usually wooden since they do not have to comply with the fire regulations. In 1995 the wooden door market in Japan amounted to an estimated \$3.4 billion, almost all of which was supplied by domestic producers. These producers were either large building products manufacturers that produced doors as well as a variety of other building products, smaller companies that produced only doors, or small local companies that served the custom-made door market. The wooden door industry in Japan was not at all concentrated as no one producer had even a 5-percent share of the market in 1995. In order to offset the appreciation of the yen and high labor costs in Japan, many Japanese door manufacturers have established manufacturing facilities in Southeast Asian countries (particularly Indonesia) to supply the Japanese market. This trend is expected to continue, and with it some displacement of domestic wooden door production by increased imports is anticipated.

⁶⁷ U.S. Department of Commerce, International Trade Administration, Market Research Reports, *Japan-Doors for Houses*, May 1996.

APPENDIX A
EXPLANATION OF TARIFF AND TRADE
AGREEMENT TERMS

TARIFF AND TRADE AGREEMENT TERMS

In the *Harmonized Tariff Schedule of the United States* (HTS), chapters 1 through 97 cover all goods in trade and incorporate in the tariff nomenclature the internationally adopted Harmonized Commodity Description and Coding System through the 6-digit level of product description. Subordinate 8-digit product subdivisions, either enacted by Congress or proclaimed by the President, allow more narrowly applicable duty rates; 10-digit administrative statistical reporting numbers provide data of national interest. Chapters 98 and 99 contain special U.S. classifications and temporary rate provisions, respectively. The HTS replaced the *Tariff Schedules of the United States* (TSUS) effective January 1, 1989.

Duty rates in the *general* subcolumn of HTS column 1 are most-favored-nation (MFN) rates, many of which have been eliminated or are being reduced as concessions resulting from the Uruguay Round of Multilateral Trade Negotiations. Column 1-general duty rates apply to all countries except those enumerated in HTS general note 3(b) (Afghanistan, Cuba, Laos, North Korea, and Vietnam), which are subject to the statutory rates set forth in *column 2*. Specified goods from designated MFN-eligible 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 rate of duty column 1 or in the general notes. If eligibility for special tariff rates is not claimed or established, goods are dutiable at column 1-general rates. The HTS does not enumerate those countries as to which a total or partial embargo has been declared.

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 for 10 years and extended several times thereafter, applies to merchandise imported on or after January 1, 1976 and before the close of June 30, 1998. Indicated by the symbol "A", "A*", or "A+" in the special subcolumn, 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. Indicated by the symbol "E" or "E*" in the special subcolumn, 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.

Free rates of duty in the special subcolumn 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.

Preferential nonreciprocal duty-free or reduced-duty treatment in the special subcolumn 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 as 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 or free rates of duty in the special subcolumn followed by the symbol "CA" are applicable to eligible goods of Canada, and rates 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 and implemented effective January 1, 1994 by Presidential Proclamation 6641 of December 15, 1993. Goods must originate in the NAFTA region under rules set forth in general note 12(t) and meet other requirements of the note and applicable regulations.

Other special tariff treatment applies to particular *products of insular possessions* (general note 3(a)(iv)), *products of the West Bank and Gaza Strip* (general note 3(a)(v)), goods covered by the *Automotive Products Trade Act* (APTA) (general note 5) and the *Agreement on Trade in Civil Aircraft* (ATCA) (general note 6), *articles imported from freely associated states* (general note 10), *pharmaceutical products* (general note 13), and *intermediate chemicals for dyes* (general note 14).

The *General Agreement on Tariffs and Trade 1994* (GATT 1994), pursuant to the Agreement Establishing the World Trade Organization, is based upon the earlier GATT 1947 (61 Stat. (pt. 5) A58; 8 UST (pt. 2) 1786) as the primary multilateral system of disciplines and principles governing international trade. Signatories' obligations under both the 1994 and 1947 agreements focus upon most-favored-nation treatment, the maintenance of scheduled concession rates of duty, and national treatment for imported products; the GATT also provides the legal framework for customs valuation standards, "escape clause" (emergency) actions, antidumping and countervailing duties, dispute settlement, and other measures. The results of the Uruguay Round of 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.

Pursuant to the *Agreement on Textiles and Clothing* (ATC) of the GATT 1994, member countries are phasing out restrictions on imports under the prior "Arrangement Regarding International Trade in Textiles" (known as the **Multifiber Arrangement** (MFA)). Under the MFA, which was a departure from GATT 1947 provisions, importing and exporting countries negotiated bilateral agreements limiting textile and apparel shipments, and importing countries could take unilateral action in the absence or violation of an agreement. Quantitative limits had been established on imported textiles and apparel of cotton, other vegetable fibers, wool, man-made fibers or silk blends in an effort to prevent or limit market disruption in the importing countries. The ATC establishes notification and safeguard procedures, along with other rules concerning the customs treatment of textile and apparel shipments, and calls for the eventual complete integration of this sector into the GATT 1994 over a ten-year period, or by Jan. 1, 2005.