

Changes in the International Trade Balance of U.S. Hardwood Products from 1990 to 2013

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We examine U.S. exports and imports of hardwood products from 1990 to 2013. These products include logs, lumber, veneer, chips, molding, cooperage, plywood, and flooring. The values of hardwood products exported and imported have fluctuated over the years but have generally increased. More substantial changes have occurred with the countries and regions receiving U.S. exports, as well as with those importing into the United States. The primary region receiving U.S. hardwood log and lumber in 1990 was Western Europe, but today, China is the most important market. East Asia has been the most important source region for U.S. hardwood plywood imports, but the specific sources have shifted from Indonesia and Taiwan in 1990 to China today. The overall balance of U.S. hardwood product trade has remained positive for most of the years examined, with the United States having a comparative advantage in exporting logs and lumber. In contrast, the United States has a comparative disadvantage in hardwood plywood exports.

Keywords: U.S. hardwood exports; U.S. hardwood imports; International trade; Hardwood products

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INTRODUCTION

The adoption of floating exchange rates in the early 1970s resulted in increased exports of hardwood lumber and other primary hardwood products (Luppold and Araman 1988). While exports of hardwood products surged in the early and mid-1970s, assessing changes in trade became difficult in the 1980s because of increased underreporting of smaller hardwood product shipments between the U.S. and Canada (Luppold 1995). By 1990, these data problems were rectified, and thus the year 1990 is the earliest starting point for this study. The complementary products to hardwood exports are hardwood imports for consumption. U.S. hardwood exports and imports have increased in value since 1990, but the specific products exported and imported, as well as the source and destination countries, have changed continuously.

Balance of trade, in simple terms, is expressed as the dollar value exported versus the dollar value imported. This balance can be reported in arithmetic terms (value of exports - value of imports) or as a ratio (value of exports/value of imports). The economic theory that best explains the balance of trade of any product is the law of comparative advantage. Bressler and King (1970) define the law of comparative advantage in general terms, stating, “a producer (individual, region, or nation) will tend to specialize in the production of a commodity in which it has the highest comparative advantage or the least comparative disadvantage and to obtain by trade the commodities which it has the least comparative advantage or the greatest comparative disadvantage.” For example, if country

A has an abundance of resource A and country B has an abundance of resource B, then country A will specialize in the production of resource A and export this resource to country B, while country B will do the opposite.

The objective of this study was to examine U.S. exports and imports of hardwood products from 1990 to 2013, by determining: (1) the receiving countries and regions of these exports, (2) the source countries and regions of these imports, (3) the overall balance of U.S. hardwood product trade, and (4) the balance of trade for individual products and product groups and the comparative advantages and disadvantages affecting trade. The results of this study shed light on the competitiveness of the United States as an exporting country, as well as the relative competitiveness of sources of imports into the country.

METHODS

This study focused only on products that are specifically classified as hardwood; thus, products such as furniture that may contain an unknown softwood component were excluded from analysis. The hardwood products examined in this study included hardwood *logs and primary products* (lumber, chips, and veneer), *milled secondary products* (cooperage, siding, and molding), and *further-processed secondary products* (plywood and flooring). Logs, lumber, chips, and veneer are raw materials. Siding, cooperage (barrels and barrel parts)¹, and molding are considered milled secondary products because they are made from lumber or barrel staves. Hardwood plywood is considered a further-processed secondary product because it is made of glued-up veneer and normally has a face and back material of a higher value species. Hardwood flooring is also considered a further-processed secondary product because it can be constructed of glued-up material, have a glued-on back material (such as fabric webbing), or be prefinished.

All import and export values analyzed in this paper were obtained from the U.S. Department of Agriculture, Foreign Agricultural Service (USDA FAS 2014), and were deflated to 1982 dollars. The specific deflator used was WPU00000000 – All Commodities (USDL 2014). Although there is no ideal deflator given the broad range of products being examined, the general All Commodities deflator allows the data to be adjusted for the 75% increase in the price of raw commodities during the time period examined.

RESULTS AND DISCUSSION

U.S. Hardwood Product Exports

Lumber

Lumber has been the most important hardwood product exported since 1990 (Table 1). In 1990, Canada was the largest export market for U.S. hardwood lumber, with a 25% market share (Table 2), but Western Europe was the most important export region, with a combined market share of 39% (USDA FAS 2014). Japan and Taiwan were the most important East Asian markets for lumber in 1990, but the lumber shipped to Japan generally remained in Japan, while lumber shipped to Taiwan often was transformed into furniture

¹ New and used barrels accounted for a minimum of 55% of cooperage product exports for the period being examined (USDA FAS 2014). In 2013, barrels accounted for more than 84% of exports. New and used barrels accounted for more than 80% of the cooperage imported since 1990.

and other secondary products that were exported primarily to the United States (Luppold and Bumgardner 2011; Luppold and Bumgardner 2013). In 2000, Canada remained the most important country receiving U.S. hardwood lumber and Western Europe remained the most important export region, but China² was the most important East Asian market as the wood furniture industry moved from Taiwan to mainland China (Luppold and Bumgardner 2011). In 2013, 45% of U.S. hardwood lumber exports went to China, while the export market share of both Canada and Western Europe declined to 14% each. Vietnam also was a major market for U.S. hardwood lumber in 2013, but similar to China and Taiwan, the lumber exported to Vietnam was processed into secondary products that were eventually exported back to the U.S. and other furniture-importing countries (Luppold and Bumgardner 2011).

Table 1. Market Share (by Value) of Specific Hardwood Products Exported by Year¹ (USDA FAS 2014)

Product	1990	1995	2000	2006	2009	2013
	--- % ---					
Lumber	52.9	53.0	52.0	53.8	45.4	59.4
Logs	16.6	12.5	14.3	20.6	25.6	18.3
Veneer	12.9	13.7	14.6	14.2	12.2	8.9
Cooperage	2.2	1.1	3.8	2.7	6.5	4.5
Flooring	2.4	1.3	2.8	3.3	3.1	3.2
Plywood	2.2	2.9	2.2	2.6	3.7	3.0
Chips	9.9	14.8	9.3	1.8	2.0	1.0
Other ²	0.9	0.7	1.0	1.0	1.4	1.8
¹ May not add up to 100% due to rounding error						
² Other products included siding and molding						

Logs

Logs generally have been the second-most important hardwood product exported by the U.S. (Table 1). In 1990, Japan was the largest export market for U.S. hardwood logs on a value basis (Table 2) and East Asia was the most important export region, with a 38% combined market share (USDA FAS 2014). Other important markets for hardwood logs were Canada, Germany, Italy, and South Korea. Canada, Germany, Japan, and Italy remained major export markets for hardwood logs in 2000. By 2013, 45% of logs exported by the United States were shipped to China and an additional 6% were exported to Vietnam. The relatively high prices of logs exported to China in 2013 (\$494 per cubic meter) suggests that a high proportion of these logs were made into veneer that was used for face ply for plywood or furniture veneer.

Veneer

Except for the mid- and late-1990s, veneer³ was the third-most important hardwood product exported from the United States (Table 1). In 1990, 64% of the veneer exported

² China as identified in this paper includes mainland China and the special administrative region of Hong Kong. Direct exports to mainland China surpassed exports to Hong Kong in 2003; by 2013, 98% of the exports to China and Hong Kong went directly to mainland China (USDA FAS 2014).

³ There are four broad categories of hardwood veneer, including sliced face veneer, rotary cut face veneer, rotary cut core stock, and rotary cut industrial veneer (agricultural and other containers). Traditionally, the export market has been for sliced face veneer, which is used in furniture, higher quality plywood, and panel production.

went to Western Europe, with Germany and the United Kingdom (U.K.) being the most important individual markets (Table 2). Other important markets for hardwood veneer in 1990 were Canada and Japan. Western Europe's share of the veneer market declined to 45% in 2000, and Canada became the most important single market. In the mid-1990s and early 2000s, Canada was a major source of furniture imported into the United States (Luppold and Bumgardner 2011), and some of the U.S. veneer exports to this country likely came back in the form of furniture.

Veneer exports peaked in 2007 and declined by nearly 47% between 2007 and 2013, with the largest declines occurring in Western Europe and China. The declining exports to Western Europe appeared to be the result of slow population and economic growth during this period (Bumgardner *et al.* 2014), while reduced exports to China coincided with reduced furniture exports to the United States.

Cooperage

Cooperage (new barrels, used barrels, and new and used barrel parts) is a relatively minor hardwood product in terms of the amount of timber used in production, but cooperage exports have been increasing (USDA FAS 2014). Most of the cooperage produced in the United States is tight cooperage used in whisky and wine aging. The United Kingdom has been the largest export market for U.S. cooperage, but the value exported to this country varied between 1990 and 2006. Since 2006, exports to the United Kingdom have increased six fold. Most of the cooperage exported to the United Kingdom has been previously used barrels, suggesting its being used for the production of scotch (Ludford 2011). Other major export markets since 1990 include Canada, Australia, Japan, Spain, and Ireland.

Chips

Hardwood chips are normally associated with pulp and paper production but also can be used to flavor and age beer and wine. While hardwood chips are currently a minor export, chips accounted for nearly 15% of wood products exports in 1995 (Table 1). Chip exports increased by 128% between 1990 and 1996 and remained at high levels until the early 2000s (USDA FAS 2014).

The increases in chip exports were primarily the result of shipments to Japan for pulp and paper production. In the 2000s, Japan started to import hardwood chips from Australia (ANU Forestry 2000; Honnold 2009). By 2013, chip exports to Japan represented less than 1% of total chip exports and Canada was the most important export market for chips (Table 2).

Flooring, plywood, and other products

Hardwood flooring exports increased by more than 55% between 1990 and 2013, and most of the flooring that is currently being exported is shipped to Canada (USDA FAS 2014). Hardwood plywood exports increased by 58% between 1990 and 2013, and more than 80% of the shipments of this product are currently being shipped to Canada and Mexico (Table 2). Hardwood molding exports in 2013 were \$15 million, with the bulk of the shipments of this product going to Canada and smaller amounts going to Mexico. Hardwood siding exports reportedly increased in recent years and totaled \$13 million in 2013 (USDA FAS 2014).

Table 2. Important Export Markets (by Value) for Hardwood Lumber, Logs, Veneer, Cooperage, Plywood, and Chips in 1990, 2000, and 2013 (USDA FAS 2014)

Product	Rank	1990	2000	2013
		Country (%)	Country (%)	Country (%)
Lumber	1	Canada (25)	Canada (28)	China/HK (45)
	2	Japan (17)	China/HK (9)	Canada (14)
	3	U.K. (9)	Italy (7)	Vietnam (8)
	4	Belgium (7)	Spain (7)	Mexico (6)
	5	Taiwan (6)	Mexico (7)	NA ¹
Logs	1	Japan (22)	Canada (44)	China/HK (45)
	2	Canada (21)	Germany (10)	Canada (17)
	3	Germany (17)	Japan (7)	Vietnam (6)
	4	Italy (7)	Italy (7)	NA
	5	S. Korea (6)	NA	NA
Veneer	1	Germany (37)	Canada (30)	Canada (35)
	2	Canada (13)	Germany (17)	Mexico (8)
	3	U.K. (8)	Spain (11)	China/HK (7)
	4	Japan (7)	China/HK (6)	Germany (7)
	5	NA	NA	NA
Cooperage	1	U.K. (52)	U.K. (27)	U.K. (54)
	2	Canada (13)	Spain (14)	Canada (8)
	3	Australia (6)	Ireland (11)	Ireland (5)
	4	Japan (5)	Canada (10)	NA
	5	NA	Australia (8)	NA
Plywood	1	Canada (42)	Canada (53)	Canada (71)
	2	Mexico (25)	Mexico (28)	Mexico (10)
	3	Bahamas (6)	NA	NA
	4	NA	NA	NA
Chips	1	Japan (83)	Japan (86)	Canada (59)
	2	Taiwan (10)	NA	Turkey (21)
	3	NA	NA	NA

¹ All others less than 5%

U.S. Hardwood Product Imports

Plywood

Hardwood plywood was the most important hardwood product imported into the United States for the study period (Table 3). The hardwood plywood designation is made up of a number of products ranging from door skins and flooring to products that are commonly perceived as plywood, and the traditional hardwood flooring products are classified with a different Harmonized System code than laminated flooring to prevent double counting. Harmonized System (HS) codes for these products changed several times during the study period. Between 1990 and 2013, there have been 193 different HS codes associated with hardwood plywood imported into the United States (USDA FAS 2014). In 2013, there were 32 different categories of hardwood plywood imported into the United States.

In 1990, nearly 55% of imported hardwood products were plywood; Indonesia was the major source country for this product (Tables 3 and 4). East Asia was the source region for more than 80% of plywood in 1990 (USDA FAS 2014). The majority of the plywood imported from East Asia in 1990 appeared to be tropical, with the exception of products from Taiwan, which primarily had face material of temperate species. While hardwood plywood imports increased by 33% between 1990 and 2000, they declined proportionally relative to other hardwood products because of large increases in the importation of lumber, veneer, and flooring. While East Asia remained the most important source region in 2000, there were large increases in temperate plywood imports from Canada and Russia between 1990 and 2000 (USDA FAS 2014).

The value of hardwood plywood imported by the United States peaked in 2006 at over \$1 billion but then decreased 47% between 2006 and 2009 (USDA FAS 204). The decrease in hardwood plywood imports during this period coincided with the continued reduction in domestic furniture production and the decline in U.S. home construction. Hardwood plywood is used in the production of kitchen cabinets, laminated flooring, and wood furniture. Plywood imports have increased since 2009 but have remained well below the levels recorded in the mid-2000s. In 2013, 76% of hardwood plywood imports originated in East Asia, with China being the most important source country and Indonesia the second most important source (Table 4). Sixty-two percent of the plywood imports in 2013 had temperate face material. Another 19% of plywood imports was represented by laminated flooring (HC 4412315125, 4412323125, and 4412943105), primarily imported from China.

Table 3. Percentage Market Share (based on value) of Hardwood Products Imported, by Year¹ (USDA FAS 2014)

Product	1990	1995	2000	2006	2009	2013
	--- Percent ---					
Plywood	54.5	47.7	37.9	46.1	53.6	56.6
Lumber	14.6	20.5	23.4	19.0	15.2	17.5
Cooperage	3.2	4.0	5.6	5.0	9.2	9.0
Veneer	16.9	17.8	16.4	8.7	9.9	7.3
Molding	5.1	4.4	6.7	10.6	9.9	7.2
Flooring	4.6	4.1	7.7	8.9	1.3	1.3
Logs	1.1	1.4	2.1	0.9	0.8	0.9
Other ²	0.0	0.2	0.2	0.7	0.1	0.2
¹ May not add up to 100% due to rounding error						
² Other products include siding and chips						

Lumber

Lumber accounted for nearly 15% of all hardwood product imported by the United States in 1990 (Table 3). While Canada was the most important individual source (Table 4), South and Central America was the most important source region in 2013, at 31% (USDA FAS 2014). Another 20% of hardwood lumber imported in 1990 was sourced from multiple East Asian countries. Hardwood lumber imports increased by more than 200% between 1990 and 2000, while imports of temperate lumber from Canada increased by 390%, making North America the most important source region in 2000 (Table 4). Hardwood lumber imports increased another 23% between 2000 and 2005, with the greatest increase being imports from South and Central America. Lumber imports declined by 66% between 2005 and 2009 but increased by 39% between 2009 and 2013. In 2012,

lumber imports from Brazil were slightly higher than imports from Canada on a dollar value basis, but Canada regained the leading market share in 2013. The most important component of Brazilian imports is ipe (*Tabebuia serratifolia*), a species commonly used for exterior purposes such as siding and decking, while maple (*Acer* spp.) and other temperate species have been the mainstay of the imports from Canada.

Cooperage

Similar to cooperage exports, cooperage imports also have been increasing over the last 24 years (USDA FAS 2014). In 1990, nearly all the cooperage was imported from Western Europe, with France being the largest single supplier (Table 4). In the late 1990s, imports from Hungary started to increase but remained less than 5% of total imports. In 2013, fully assembled new barrels (casks) accounted for 86% of the cooperage products imported from France, which remained the leading source (USDA FAS 2014).

Veneer

In 1990, nearly 17% of the hardwood products imported by the United States was veneer, and more than half of this veneer was imported from Canada (Tables 3 and 4). Between 1990 and 2000, veneer imports increased at a similar level to overall wood products, as indicated by the relatively stable market share (Table 3). Canada remained the most important source of this product during this period and subsequent years. Veneer imports declined by 65% between 2002 and 2011 and have remained at low levels since then (USDA FAS 2014). Similar to plywood and lumber, the decline in veneer imports coincided with declines in U.S. wood household furniture and cabinet production (Jones 2013).

Molding

U.S. imports of hardwood molding have fluctuated over the years (USDA FAS 2014), and the major source countries continue to change (Table 4). Historically, East Asia has been the most important source region for this product, but the major source countries in this region have shifted from Malaysia and Indonesia to China. Canada was once a major source for hardwood molding and was narrowly the most important source country in 2000. Since 2005, China has become the most important source country for hardwood molding, and in 2007, Brazil became the second most important source. Molding is primarily used as trim work in homes and can be used in combination with kitchen cabinets. The peak year for molding imports was 2006, but imports declined as U.S. home construction declined.

Flooring

The value of U.S. hardwood flooring imports increased by more than 580% between 1990 and 2005, but most of this increase occurred between 2003 and 2005 (USDA FAS 2014). While Table 4 indicates that Sweden and Indonesia were important sources of imported flooring in 1990 and 2000, China was the most important source of flooring during the peak year of 2005. It is believed that some of this flooring imported from China was bamboo (technically not a hardwood tree but a grass), but there is no way to verify this possibility, other than that 82% of the flooring imported in 2005 was classified as HS 4409202560—"HW floor other". Hardwood flooring imports declined by more than 96% between 2005 and 2010, and have subsequently remained low. Similar to other products

used in home construction, flooring imports declined sharply (92%) since the peak U.S. home construction year of 2005.

Table 4. Important Import Sources for Hardwood Plywood, Lumber, Cooperage, Veneer, Molding, and Flooring in 1990, 2000, and 2013 (USDA FAS 2014)

Product	Rank	1990	2000	2013
		Country (%)	Country (%)	Country (%)
Plywood	1	Indonesia (61)	Indonesia (29)	China/HK (57)
	2	Taiwan (13)	Canada (22)	Indonesia (11)
	3	Canada (7)	Malaysia (13)	Russia (9)
	4	Brazil (6)	Russia (11)	Canada (6)
	5	NA ¹	Brazil (10)	NA
Lumber	1	Canada (33)	Canada (52)	Canada (24)
	2	Brazil (23)	Brazil (14)	Brazil (16)
	3	Bolivia (12)	Peru (7)	Cameroon (7)
	4	Malaysia (6)	Malaysia (7)	Germany (6)
	5	Philippines (5)	NA	Ecuador (6)
Cooperage	1	France (97)	France (93)	France (92)
	2	NA	NA	NA
Veneer	1	Canada (56)	Canada (60)	Canada (49)
	2	Brazil (13)	Italy (9)	Italy (9)
	3	Germany (6)	Brazil (6)	Germany (8)
	4	NA	NA	China/HK (7)
	5	NA	NA	NA
Molding	1	Malaysia (19)	Canada (21)	China/HK (33)
	2	Canada (18)	Indonesia (21)	Brazil (25)
	3	Taiwan (17)	China/HK (12)	Canada (10)
	4	Indonesia (12)	Brazil (12)	Italy (7)
	5	Mexico (7)	Italy (10)	Malaysia (7)
Flooring ²	1	Sweden (30)	Indonesia (17)	Indonesia (34)
	2	Malaysia (23)	Sweden (15)	Malaysia (21)
	3	Canada (14)	Malaysia (12)	China/HK (17) ³
	4	Thailand (7)	Spain (11)	NA
	5	Indonesia (5)	Thailand (8)	NA
¹ All others less than 5%				
² The peak year for flooring imports was 2005. In that year, China was the source for 35% of imports				
³ This figure most likely included bamboo flooring				

Log and other products

While hardwood logs are an important U.S. export product, U.S. hardwood log imports are minor (Table 3), and the vast majority of imports over the years have originated from Canada (USDA FAS 2014). Hardwood chips are also a minor U.S. imported product, and the major sources of chips have been Canada, Brazil, and Western Europe, depending on which year is being examined. While chips originating from Canada and Brazil are most likely used in pulp production, the increase in imports of chips from Western Europe is

most likely used for wine aging because aging wine with chips is less expensive than using imported or domestically produced barrels (Yeaman 2007). Hardwood siding is an extremely minor imported hardwood product, accounting for 0.1% or less of total imports during the entire study period.

Balance of U.S. Hardwood Product Trade

In 1990, the United States exported 36% more hardwood products than it imported (Fig. 1). Hardwood exports and imports increased at similar rates between 1990 and 1997, but imports continued to increase after 1997 while exports remained flat. In 2004, U.S. hardwood product imports surged past exports and continued to increase, and by 2006, imports reached \$2.2 billion. Imports started to decline in 2006 and continued to decline until 2009. Hardwood product exports also declined between 2006 and 2009 but at a lower rate than imports, allowing exports to once again surpass imports. Since 2009, both exports and imports of hardwood products have trended upward, but exports have remained higher than imports.

Nearly 60% of the increase in hardwood product imports between 2001 and 2006 was the result of an 84% increase in plywood imports (USDA FAS 2014). As previously stated, the increase in plywood imports coincided with an increase in U.S. home construction. Increases in flooring and lumber imports also contributed to the mid-decade surge, but imports of these products started to decrease after 2006, coinciding with declines in U.S. home construction and wood furniture manufacturing. Imports of all hardwood products decreased between 2006 and 2009, but the largest decreases in absolute terms were for plywood and lumber.

Hardwood logs and primary products

Another way of assessing the balance of trade is to analyze the ratio of exports to imports by products and major product groupings (Table 5). The export/import ratio (EIR) for lumber has consistently been above 2, indicating more than twice as much lumber was exported than imported. During the late 1990s, the United States imported increasing amounts of lumber from Canada, with imports hitting an all-time high in 2005 (USDA FAS 2014). While hardwood lumber exports also decreased in the late 2000s, imports decreased more, causing the EIR to approach 4 by 2009. The U.S. has abundant and growing hardwood resources (USDA FS 2009), a well-developed highway transportation system, numerous sea ports, and few obstacles restricting the exportation of hardwood lumber. Timber availability, transportation advantages, and a modern hardwood sawmilling industry (at larger facilities) have also allowed the United States to have a comparative advantage in lumber production and exportation.

Hardwood logs have consistently had the highest EIR of any major hardwood product (Table 5). The only year that the EIR for logs was under 10 was 2000 (Table 5), a year in which log imports from Canada were at an all-time high (USDA FAS 2014). The apparent U.S. comparative advantage for hardwood log exports may be related to the lack of restrictions on log exports (outside of sanitation requirements usually stipulated by importing countries), as well as the existence of higher quality saw timber of desirable species.

While the EIR for veneer was not at the level of lumber and logs, it has been consistently greater than 1, indicating the United States is a net exporter of this product. The EIR for chips was very high from 1990 to 2000, but after 2000, chip exports declined sharply. The relatively high EIR for chips in 2009 was the result of a large decrease in

imports. The overall EIR for all hardwood logs and primary products has been consistently over 2 for the period being examined.

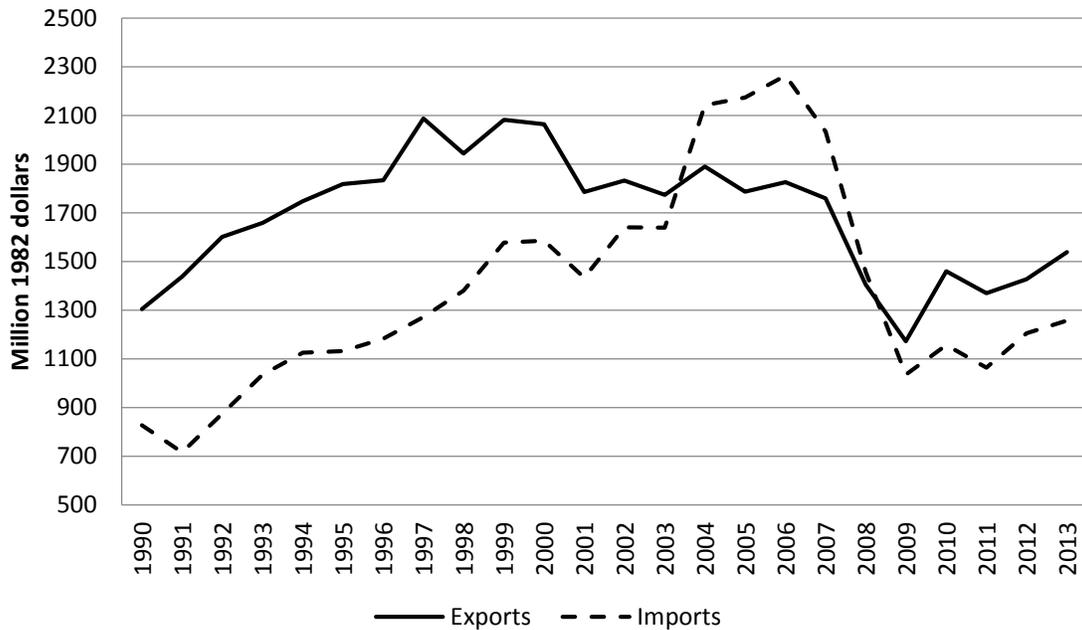


Fig. 1. U.S. hardwood product exports and imports, 1990 to 2013, in 1982 dollars (USDA FAS 2014); includes hardwood logs, lumber, veneer, cooperage, molding, siding, plywood, and flooring

Milled secondary products

The EIR for cooperage was slightly higher than 1 in the early 1990s but has consistently been lower than 1 since then (Table 5). The EIR for molding has consistently been lower than 0.3, as imports from East Asia and Canada have exceeded exports to Canada. The EIR for siding has sharply increased in recent years as a result of increased exports. The overall EIR for all milled secondary products has consistently been 0.6 or less for the period examined, with siding and cooperage being the most important products in this group.

Further-processed secondary products

The EIR for hardwood plywood is 0.1 for 1990, 1995, 2000, 2006, 2009, and 2013, indicating that the United States imported 10 times more plywood in those years than what was exported (Table 5). Given the recent finding on hardwood imports from China by the International Trade Commission in late 2013 (US ITC 2013), stating in part that “The Chinese product is typically manufactured utilizing more labor and less automation, particularly for repairing defects, preparing veneers, and laying up veneer sheets for pressing”, there likely will be no major increase in the EIR for plywood in the near future because the United States will continue to have a comparative disadvantage in the production of this product. From 1990 to the mid-2000s, the EIR for flooring was consistently under 1. The increase in the EIR in the late-2000s was the result of decreased imports, as exports have been relatively steady. The decline in flooring imports appears to be highly correlated with the decline in home construction. Overall EIR for further-

processed secondary products has been consistently less than 0.2 since 1990, largely as the result of relatively high plywood imports.

Table 5. Hardwood Product Export/import Ratios (EIR) for Logs and Primary Products, Milled Secondary Products, and Further-processed Secondary Products by Year (USDA FAS 2014)

Product Group and Product	1990	1995	2000	2006	2009	2013
--- Ratio ---						
Logs and primary products						
Lumber	5.7	4.2	2.9	2.3	3.4	4.2
Logs	24.1	14.4	9.0	17.8	36.0	24.4
Veneer	1.2	1.2	1.2	1.3	1.4	1.5
Chips	799.5	156.1	76.1	2.1	26.7	6.7
All products	4.5	3.8	2.8	2.5	3.7	4.1
Milled secondary products						
Cooperage	1.1	0.4	0.9	0.4	0.8	0.6
Molding	0.3	0.3	0.2	0.1	0.1	0.2
Siding	0.4	1.1	1.3	4.4	7.3	25.2
All Products	0.6	0.4	0.5	0.2	0.5	0.5
Further-processed secondary products						
Plywood	0.1	0.1	0.1	0.1	0.1	0.1
Flooring	0.8	0.5	0.5	0.3	2.7	3.0
All products	0.1	0.1	0.1	0.1	0.1	0.1

CONCLUSIONS

1. Hardwood lumber has remained the most important U.S. hardwood export product through the study period. However, the destination markets for this product have changed over time. In 1990, Western Europe, Canada, and Japan were the major markets, but by 2013, the majority of the lumber exported went to East Asia, with China/Hong Kong and Vietnam being the two most important markets in that region. U.S. hardwood log exports have changed in a similar manner to lumber exports, shifting from Western Europe, Japan, and Canada in 1990 to East Asia in 2013.
2. Of all the primary products, veneer exports have been the most consistent with respect to receiving countries; Canada and Germany were the top two markets throughout the study period. The EIR for veneer also has remained relatively stable, increasing slightly through the study period. From the early 1990s to 2000, hardwood chips were a major U.S. export product, but after Japan started to source chips from Australia, this market declined rapidly.
3. Three other important U.S. hardwood export products are cooperage, flooring, and plywood. The major market for cooperage is Western Europe, with the U.K. being the most important individual market. Exports of hardwood flooring and plywood have increased over the years, and the major receiving countries for these products remain Canada and Mexico. Hardwood molding and siding are minor export products; in 2013,

Canada was the most important market for hardwood molding and Mexico was the most important market for siding.

4. Plywood is by far the most important hardwood product imported by the United States. Except for the late 1990s and early 2000s, between 50 and 80% of U.S. hardwood plywood imports originated from East Asia. However, the most important source country for U.S. hardwood plywood has shifted from Indonesia to China. Between the late 1990s and early 2000s, approximately 20% of plywood imports came from Canada. Traditionally, Canada also has been the most important source of U.S. hardwood lumber imports, but Brazil temporarily displaced Canada for the top position in 2012. Hardwood veneer imports have been in decline since 2005.
5. Three other important hardwood products that are imported into the United States are cooperage, molding, and flooring. Cooperage imports have steadily increased over the years, and France has remained the dominant source of this product. In contrast, molding imports have been highly variable and the dominant source country changed continually until 2005, when China became the most important supplier. Flooring import levels and source countries have also fluctuated over time, but East Asia has consistently been the most important source region overall.
6. While the overall balance of hardwood product trade has remained positive for most of the years examined, the United States has an apparent comparative advantage in logs and primary product markets but a comparative disadvantage in hardwood plywood production. Given anticipated future changes in exchange rates and relative labor costs in China and other East Asian countries, these comparative advantages and disadvantages in international hardwood product trade are likely to continue, at least in the near term.

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