Secondary Products (Markets, Competition, and Technological Improvements)

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Competitiveness, imports, exports, and technological improvements--these are issues facing secondary wood-product manufacturers. The major problems focus on increasing foreign imports and the inability of U.S. industries to repell the imports. How and where should we, as researchers, allocate our efforts to enhance the competitiveness of secondary forest industries in the United States? Is our purpose to help ensure that current and planned utilization research is properly focused on making the United States more competitive not only in the U.S. market but also in the world marketplace?

In this paper I discuss several types of secondary products but focus on furniture products, including cabinets. Furniture products are the most important secondary hardwood products in the United States. I also discuss the hardwood sawtimber resource situation for the Eastern United States, technological improvements, and potential research. Other hardwood products such as millwork, mouldings, dimension, flooring, and pallets are reviewed.

U.S. Furniture Market

The U.S. wood household furniture market is the most important market for domestic hardwood products such as lumber, veneer, and dimension stock. But the U.S. furniture market is under attack by many nations around the world that apparently have a competitive advantage in major segments of this market. Imported furniture (including cabinets), subassembled furniture, and furniture parts are entering the United States in increasing amounts each year. These imports appear to be satisfying new demands for furniture in this country, while domestic production and shipments have remained relatively stable.

The numbers in Table 1 and Figure 1 tell the story. In deflated dollars, U.S. producers' shipments from 1973 to 1986 ranged from $2,002 to $2,677 million, with high years in 1973 and 1978. Overall, U.S. producers' shipments actually decreased over the 1973-86 period. Exports were consistently weak, ranging from $28 to $111 million with the high year in 1981. Imports increased from $151 to $677 million, the largest growth occurring since 1982.

On a percentage basis, the ratio of U.S. exports to apparent consumption ranged from 1 to 4.6 percent (Table 1, Figs. 1-2). The export ratio increased from 1973 to 1981. After 1981, the ratio dropped steadily to 1.8 percent in 1986, Lack of competitive advantage, lack of desire to compete in the international marketplace, and/or the fact that the U.S. market is the largest in the world, so why leave it, could account for our poor performance in the export market.

Table l--Wood household furniture market. (Values deflated using the wood household furniture price index with 1967 = 100)

Year	U.S. producers' shipments	Exports	Imports	Apparent consumption	Ratio of imports/exports to consumption	
	Million dollars				Percent	
1973	2,652	28	151	2,775	5.4	1.0
1974	2,388	41	155	2,502	6.2	1.6
1975	2,039	39	120	2,120	5.6	1.8
1976	2,354	57	161	2,458	6.6	2.3
1977	2,450	59	191	2,582	7.4	2.3
1978	2,677	76	255	2,856	8.9	2.7
1979	2,502	80	283	2,705	10.5	3.0
1980	2,246	89	260	2,417	10.8	3.7
1981	2,227	111	277	2,393	11.6	4.6
1982	2,002	89	288	2,201	13.1	4.1
1983	2,091	77	365	2,379	15.3	3.2
1984	2,263	69	481	20675	18.0	2.6
1985	2,231	55	619	2,795	22.2	2.0
1986	2,379	55 (est.)	677	3,001	22.6	1.8

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

Note: Values for wood upholstered furniture are not included in the U.S. producers' shipment statistics but are included in the import and export statistics because of reporting categories. These amounts appear to be minor.

The U.S. import market for wood furniture and parts has changed in an upward direction for the period that we are considering (Table 1, Figs. 2-3). In deflated dollars, imports grew from $151 to $677 million, with the greatest growth occurring from 1983 to 1986. On a percentage basis, the ratio of imports to apparent consumption ranged from 5.4 percent in 1973 to 22.6 percent in 1986.

Although imports are coming into the United States from more than 90 countries, a majority are coming from just 10 countries, with over 73 percent shipped from the top 6 countries. The major shippers were, in order of total value of shipments in 1986, Taiwan, Canada, Italy, Denmark, Yugoslavia, and West Germany, followed by the United Kingdom, Mexico, Japan, and Sweden.

Imports from Taiwan have by far been the most impressive (Table 2, Fig. 3). In deflated dollars, Taiwan's exports to the United States grew from $15.5 million in 1973 to $201.5 million in 1986. Much of this furniture was manufactured in new plants developed for the export market, which included

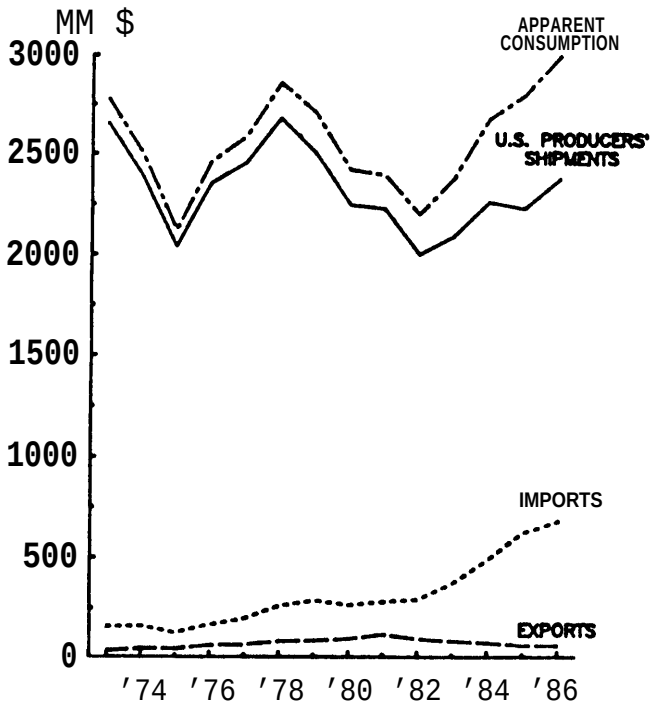

Figure 1. Wood household furniture: U.S. producers' shipments, exports of domestic merchandise, imports for consumption, and apparent consumption, 1973–1986 (values deflated using the wood household furniture price index with 1967=100).

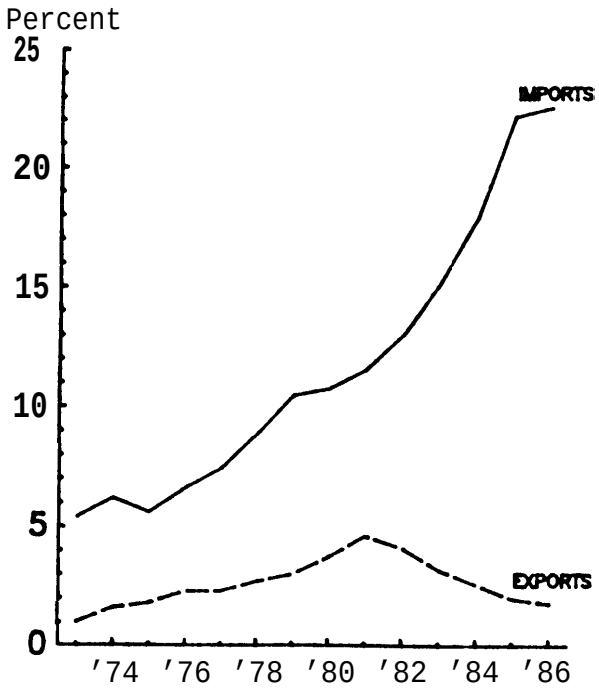

Figure 2. Ratio of wood household furniture imports and exports to consumption, 1973–1986.

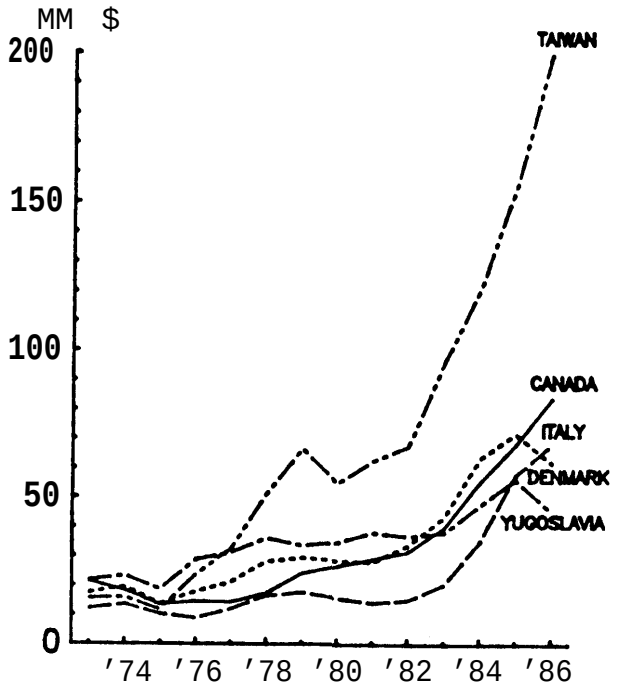

Figure 3. Leading exporters of wood household furniture to the U.S., 1973–1986 (values deflated using the wood household furniture price index with 1967=100).

shipments to Japan, Canada, and Western Europe. Taiwan also used the help and expertise of American designers, technical people, and American furniture companies in developing its furniture industry. A major portion of the furniture exported to the United States is sold to the American public through American furniture manufacturers. Because of this situation and the Taiwanese manufacturers' desire to export furniture to the U.S. market, Taiwan has purchased vast quantities of American hardwood. products.[1] Most of these purchases have been red and white oak logs, lumber, and veneer.

Table 2--Wood household furniture: U.S. imports for consumption (values deflated using the wood household furniture price index with 1967 = 100)

Year	Total imports	Country of origin					
		Taiwan	Canada	Italy	Denmark	Yugo-slavia	West Germany
	Million dollars						
1973	151.5	15.5	21.2	12.0	17.4	21.7	2.7
1974	155.3	15.9	18.2	13.5	19.4	23.2	3.1
1975	120.1	11.7	13.4	10.1	13.7	18.5	2.8
1976	160.6	23.5	14.4	8.6	17.7	28.6	3.4
1977	190.7	32.4	14.2	11.8	21.0	31.0	4.1
1978	254.5	50.9	17.2	16.3	28.0	36.0	6.5
1979	283.5	66.5	23.9	17.5	29.3	33.5	8.0
1980	260.4	54.7	26.5	15.6	28.4	34.6	6.3
1981	277.3	62.4	28.9	14.1	27.8	38.0	7.5
1982	287.8	67.3	31.4	15.0	33.7	36.8	8.4
1983	365.0	96.0	39.8	20.3	43.4	38.1	11.6
1984	480.8	120.9	55.1	34.9	63.3	47.3	17.6
1985	619.2	155.6	68.0	5706	71.8	56.1	31.7
1986	677.4	201.5	83.6	68.1	61.9	45.5	37.5

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

Canada traditionally has shipped furniture to the U.S. market mainly due to its proximity. Canada also uses large quantities of U.S. hardwood products in furniture it produces for both export and domestic markets.

[1]Araman, Philip A.; Hansen, Bruce G. 1987. Log, lumber, and veneer hardwood export markets. In: Hay, Ronald L.; Woods, Frank W.; DeSelm, Hal, eds. Proceedings. Central Hardwood Forest Conference 6; 1987 February 24-26; Knoxville, TN. Knoxville, TN: University of Tennessee: 387-394.

Value of imports from Denmark has paralleled Canadian imports. Denmark has been a "traditional" exporter to the U.S. market. Italy also has been a steady exporter to the United States, though at a reduced rate until major increases in 1985 and 1986.

Yugoslavia, currently the fifth largest shipper, was ranked in the top three for many years. Apparently, it has not increased production capacity to keep up with increased market potential, or has lost and is continuing to lose some of its market share to Taiwan. Imports from Yugoslavia decreased from 1985 to 1986.

West German manufacturers are apparently serious about the American market, as shown by the major increases in shipments from West Germany over the last 3 years.

Manufacturers in these countries are successfully exporting competitively priced products demanded by the American public to the American furniture market. Why can't U.S. producers capture some or all of the increasing U.S. furniture market? Are resources the problem? Since most of our concerns and many of our major research efforts are resource related, let's look at our hardwood resource situation.

Hardwood Resource Picture

The United States has had strong demands for several of the more popular hardwood species in the form of logs, lumber, and veneer on both the domestic and export markets. The major select species demanded have been the select red and white oaks, yellow birch, hard maple, black walnut, black cherry, and the ashes. These strong demands have stirred many supply-side concerns. For instance, can the United States continue to supply the export market--can U.S. exports increase? Are U.S. resources being depleted? How much secondary-grade material will be produced in the future, while generating the needed top-grade clear or almost clear hardwood products?

The answers to these questions are just as important to secondary-product producers in the United States as they are to overseas end users. In this section, we will look at estimated 1985 sawtimber volumes for the Eastern United States and projections for 1990, 1995, and 2000. Next, we will look at the log grade distribution in U.S. commercial sawtimber resources and translate these data into estimates of top, secondary, and lower grade lumber output l Important utilization opportunities and/or problems are evident even with a terse overview of our resource situation.

Sawtimber quantities

Resource data were compiled on all hardwood sawtimber and on the group of species previously defined as select species from USDA Forest Service state

resource evaluation reports. Survey years for the state resource reports ranged from 1972 to 1987. Some data were collected directly from the Experiment Station inventory analysis units for recently resurveyed states or from recent inventory updates.

For each state, hardwood sawtimber inventory, growth, removals, and quality data were collected for the reported survey year. The inventory, growth, and removals data were then used to determine, by state, the current percent compound annual inventory changes for each of the select species, the combined select species, and all commercial hardwoods. Based on the compound annual rate of inventory change, the inventory data for each state were adjusted to 1985 and combined into the eastern hardwood summary shown in Table 3.

Table 3--Estimated Eastern U.S. sawtimber volumes and compounded annual inventory changes, in billion board feet (International l/4-inch rule)

Saw-timber volumes	All commercial hardwoods	All select hardwoods	Select oaks	Hard maple	Ash, walnut, cherry	Yellow birch
1985	727.9	233.0	136.9	43.4	44.0	8.8
% change	2.2	2.4	1.8	3.2	3.0	1.5

The eastern results show that 32 percent, or 233 billion board feet (International l/4-inch rule), of the 1985 estimated sawtimber inventories are in the select sawtimber species. Of that total, 59 percent are select oaks; 18 percent hard maple; 19 percent ashes, walnut, and cherry; and 4 percent yellow birch. This review also revealed that the select species are increasing in volume slightly faster than all commercial hardwood sawtimber inventories (2.4 vs 2.2 percent). The hard maple and the combined ash, walnut, and cherry resources also are increasing faster than the select oaks and yellow birch inventories.

Using the 1985 estimates, the percent annual inventory changes, and assuming the continuation of past resource-use trends, we estimated sawtimber volumes for 1990, 1995, and 2000 (Table 4). The projections show positive inventory growth for the Eastern United States for all categories. By the year 2000, 33 percent of the eastern sawtimber could be in the select species--up slightly from 1985. Further, by the year 2000, the eastern select-species sawtimber resources may have increased by 42 percent.

Table 4--Estimated Eastern U.S. sawtimber volumes for 1985 with projections for 1990, 1995, and 2000, in billion board feet (International l/4-inch rule)

Year	All commercial hardwoods	All select hardwoods	Select oaks	Hard maple	Ash, walnut, cherry	Yellow birch
1985	727.9	233.0	136.9	43.4	44.0	8.8
1990	811.5	261.9	149.9	50.8	51.0	9.5
1995	904.9	294.4	164.3	59.5	59.3	10.2
2000	1008.8	330.9	180.1	69.6	68.9	11.1

Sawtimber qualities

Two grading systems are used to present information on the quality of the standing sawtimber hardwood resources of the Eastern United States. The first is a log grading system described by Rast et al.[2] that is used by Forest Service inventory analysts to define the quality of potential sawlogs in a standing tree. The second is a lumber grading system for hardwood lumber that was developed by the National Hardwood Lumber Association.[3] In general, top-grade FAS&Sel (Firsts-and-Seconds and Select) lumber is used for mouldings, millwork, export, and other market demanders of clear or almost clear lumber. Secondary-grade lumber, graded lC (No. 1 Common) and 2C (No. 2 Common) is used by dimension, furniture, cabinet, flooring, and other manufacturers. Material in 2C and below 2C grades is used as railroad ties and mine timbers, or for the production of pallet parts and flooring.

The data used in this section were developed from the same Forest Service state resource reports used in the resource quantities section. By state, we gathered information on sawtimber quality expressed in quantity per log grade per species for the select species. The state data were then combined to generate the eastern data shown in Table 5. Using yield tables developed by

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[2]Rast, Everette D.; Sonderman, David L.; Gammon, Glenn L. 1979. A guide to hardwood log grading (revised). Gen. Tech. Rep. NE-1. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 32 p.

[3]National Hardwood Lumber Association. 1986. Rules for the measurement and inspection of hardwood and cypress. Memphis, TN: National Hardwood Lumber Association, P.O. Box 34518.

Hanks et al.[4], the log grade information was transformed into potential output of sawn lumber by lumber grade. The lumber-grade results assumed the production of lumber from the distribution of logs found in the woods. In actual practice, many of the small-diameter, low-grade logs and many other larger, low-grade logs are never removed from the forests. Consequently, the quality of logs removed from the woods is better than that found in the woods. This improves the actual distribution of sawn lumber produced over the percentages in Table 5, but it also points out the need for utilization and marketing research to develop profitable uses of the low-grade material left in the woods.

Table 5--Estimated quality of Eastern U.S. hardwood select-species sawtimber and potential output of sawn lumber

Species	Log grade			Lumber grade[a]		
	1	2	3 & 4	FAS & Sel	1C 2C	Below 2C
	Percent					
All select hardwoods	15	24	61	12	23 27	38
Select oaks	15	24	61	12	24 27	37
Hard maple	12	23	65	11	21 26	42
Ash, walnut, cherry[b]	15	25	60	19	25 29	27
Yellow birch	11	26	63	12	21 24	43

[a] Grade 4 not included, all logs grades 3 and 4 were considered as grade 3 in calculations.

[b] Lumber yields based on cherry yield tables from northern statistics.

The eastern results show that 15 percent of the select species are in log grade 1, 24 percent in log grade 2, and the remaining 61 percent in log grades 3 and 4. Potential output of sawn lumber by lumber grade for the Eastern United States is 12 percent in top grade (FAS&Sel), 50 percent in the lC/2C grades, and 38 percent in the below 2C grades. Results for hard maple and yellow birch are slightly lower, and results for combined ash, walnut, and cherry (based only on cherry yields) are slightly higher than the overall percentages.

[4] Hanks, Leland F.; Gammon, Glenn L.; Brisbin, Robert L.; Rast, Everette D. 1980. Hardwood log grades, and lumber grade yields for factory lumber logs. Res. Pap. NE-468. Broomall, PA: U.S. Department of Agriculture, Forest Service, Northeastern Forest Experiment Station. 92 p.

Generally, the markets for the top grade lumber (FAS&Sel) are the most profitable, though the amount of these grades is limited. On the other end, sawmiller are satisfied to cover their costs in the sale of below 2C material. Therefore, the lC/2C lumber, which can account for about half of a sawmiller's total production, must have adequate and profitable outlets if the sawmiller's overall profit picture is to be positive.

Resource answers

The Eastern United States has substantial quantities of select species, and these resources are increasing and not decreasing. By the year 2000, U.S. inventories of the select species sawtimber could increase by 42 percent to 331 billion board feet (International l/4-inch rule). Thus, it would appear that the United States has the resources necessary to continue to supply domestic markets; to continue as a major player in the world hardwood market for log, lumber, and veneer products; and to increase supplies of secondary hardwood products on both domestic and export markets.

When considering the quality of the standing sawtimber and the potential output by lumber grade, about 50 percent of the output is secondary-quality (lC/2C) material and 38 percent is below this quality level. The vitality of the markets for the secondary-quality material dictates the overall economic performance of a sawmill and, therefore, is very important. Improvements in present and potential furniture, millwork, flooring, and dimension markets and development of new uses for this quality range of material, such as value--added export dimension, need to be constant goals for both the research and industrial communities.

Competitiveness and Resource Related Technological Improvements

In this section we will review some technological improvements that have been developed for furniture and other secondary-product industries. Some have been implemented to varying degrees, some are in the development/ introduction stage, and some are in the research stage. All are resource-related technological improvements focusing on increasing efficiencies, material yields, and reducing final product costs for present and future products.

Drying Predriers, RF vacuum driers, dehumidification driers, computerized kiln controls, vacuum driers, presurfacing before drying

Processing: Automatic Lumber Processing System (ALPS), System 6, edge gluing and end gluing by SEM or finger jointing, standard blanks, crosscut saw back gages and saw systems controlled by computers, ripsaw gages and gang-ripsaws with moveable arbors, lumber optimization computer assistance (OPTIGRAMI, RIP, Mini-Max), YIELD-O-MATIC, other automated rip or crosscut rough mills, abrasive and knife planers with centering

devices, laser and water jet cutting, automated finishing, better finishing of woods like yellow-poplar, computerized defect scanners for logs and lumber, and robotics

Composite wood products: Veneer wrapping or postforming, the 32 mm system,improved surface treatments (paper foils, etc.), improved fastening techniques, and performance testing

Summary

We have a growing furniture market in the United States, and given the amount of international trade in furniture around the world, we also have the potential to increase U.S. furniture exports. We have the hardwood resources needed to make increasing amounts of these and other secondary products. Our resources have been and are increasing. If we have markets here in the United States and potential overseas markets, and we have the necessary resources, then why are we losing the competitive edge? Is it because most secondary manufacturing is labor intensive, which is bad for U.S. producers in a world market with many countries with lower labor costs? Is "high tech" the answer? Are new products the answer? Whatever the solutions, the bottom line must be high-quality products at lower costs.

In future discussions we will explore the technology improvements listed in this paper and explore other problems and research needs in the areas of high tech, labor, quality, new products, and old products. Do we need to work on developing systems, computer-aided manufacturing (CAM), computer-aided design (CAD), computer-aided vision systems, and master computer systems to control different work centers? What levels of high tech are affordable by different size firms for particular products? Some of the potential improvements should be targeted to making useful, as input material, our abundant low-grade material left in the woods or generated in our sawmills.

To become more competitive, the end results must be quality secondary products that people want and can afford. Automation, high tech, and computers can be part of the answers, as could new markets and products. We need solutions that can be applied in present plants as well as new futuristic plants l The fact is that the United States is becoming more capital intensive, while our overseas competition is and will remain more labor oriented. Our industry can only benefit from new product and high tech research.

Forest Products Laboratory. Forest Products Research Conference 1987: The Role Of Utilization Research in Enhancing U.S. Competitiveness in Forest Products. Madison, WI: U.S. Department of Agriculture, Forest Service, Forest Products Laboratory; 1988.