HARDWOOD LUMBER DISTRIBUTION YARDS: OUTPUT, DEMANDS, AND PERCEPTIONS OF THEIR ROLE

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Abstract.—Efficient and effective supply chains strengthen the entire forest products industry value chain. As the secondary wood products industry has been transformed by the decline of large manufacturers in some industry segments, the industry's supply chain has responded to these new realities. Remaining and new customers tend to be smaller and have unique needs and expectations of their supply chain. Hardwood lumber distributors are adapting to meet these needs by sourcing products in a way that facilitates their expanding role in the new domestic industry. This study assessed the sourcing needs and perceptions of hardwood lumber distributors and depicts parts of the ongoing transformation of the hardwood lumber supply chain.

INTRODUCTION

The primary hardwood lumber industry predominantly serves the secondary wood products industry, including the furniture, cabinet, flooring, millwork, pallet, and railroad tie manufacturing segments. Most of these domestic manufacturers have been affected significantly by increased imports, slowing housing starts, growth in repair and remodeling, and changing buyer habits (Buehlmann and Schuler 2009).

Wood species utilization also has changed during the last decades. For instance, oaks have lost market share. Assuming that the frequency of displaying a species at the High Point, NC, furniture market is positively correlated with consumer preference, large shifts in consumer preferences can be demonstrated. For example, in 1998, oak (*Quercus* spp., red and white combined) represented 22 percent of the wood species displayed in bedroom and dining room furniture, compared to 18 percent for cherry (*Prunus serotina* Ehrh.) and 10 percent for maple (*Acer* spp.). By 2008, however, oak showings had declined to 10 percent of the total while cherry was 12 percent and maple was 9 percent (Appalachian Hardwood Manufacturers, Inc. 2008). Luppold and Bumgardner (2007) discuss the design/fashion trends associated with the shift from red oak to more diffuse-porous species such as cherry and maple in the U.S. marketplace for appearance-based products.

The volume of lumber used by industry segments changed over the last 10 years as well. For example, while the furniture industry was the largest user of appearance-grade lumber in 1999, consuming an estimated 2.6 billion board feet (bbf), the segment's consumption had decreased to 1.2 bbf by 2005 (Hardwood Market Report 2007); by 2009 the furniture industry's lumber consumption had shrunk below 1 bbf (Buehlmann and Schuler 2009). Other segments experienced growth over the period, including flooring, cabinets, railroad ties, and exports (Hardwood Market Report 2007). Table 1 shows lumber use by industry segment.

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Table 1.—Lumber use by market segment 1999-2005 (billion board feet) (Hardwood Market Report 2007).

	1999	2000	2001	2002	2003	2004	2005
Pallets	4.5	4.4	4.0	4.0	4.0	4.0	3.8
Furniture	2.6	2.5	2.2	1.8	1.6	1.3	1.2
Exports	1.2	1.2	1.1	1.2	1.2	1.2	1.3
Millwork	1.3	1.3	1.3	1.3	1.3	1.2	1.3
Cabinets	1.2	1.2	1.3	1.4	1.4	1.5	1.6
Flooring	1.4	1.4	1.5	1.5	1.5	1.6	1.5
Railway ties	0.7	0.6	0.7	0.7	0.8	0.9	0.9

Manufacturers of hardwood products in the United States have lost considerable market share to overseas producers in many categories (Schuler and Buehlmann 2003, Buehlmann and Schuler 2009). One portion of the domestic industry that has fared well against cheaper imported products is the smaller, customized manufacturing sector. These manufacturers often offer customized services and products in niche markets that are insulated from imported products. Examples include small cabinet, millwork, or flooring companies that can design, manufacture, and/or install customized products, often with short lead times. Luppold and Bumgardner (2008) document the increasing relative importance of these construction- and remodeling-related markets to overall hardwood lumber consumption over the past 20 years. These firms frequently are located close to urban centers where new home construction and repair and remodeling markets are substantial. While collectively these producers account for significant use of hardwood lumber, the dispersed and small nature of these firms requires specialized systems of lumber delivery. Among the existing hardwood lumber channels through which sawmills can sell lumber, the distribution yard is emerging as a key supply chain player in the new dynamics of domestic manufacturing.

Distribution yards acquire lumber; add value through services such as sorting, drying, or pre-manufacturing; and are capable of delivering small orders of specialized lumber products to custom manufacturers. While ongoing research efforts track hardwood lumber use by sector in the hardwood industry (e.g., pallets, furniture, cabinets, flooring, and exports), less is known about the emerging role of distribution yards. Distribution yards appear to be playing an increasingly crucial role in strengthening the future competitiveness of hardwood-based manufacturing in the United States by providing an important link between lumber producers and lumber users. U.S.-based distributors also are well positioned to help interested manufacturers source certified materials or products otherwise documented as "green." This study benchmarked the quantities of hardwood lumber being distributed by distribution yards in the United States, the types of services being demanded of distribution yards by the secondary industry, and the perceptions of distribution yard managers of their emerging and future role in the hardwood supply chain.

MATERIALS AND METHODS

QUESTIONNAIRE

A mail questionnaire using Dillman's (1978) total design method was chosen as the best way of collecting data due to the large number of questions, some of which required internal company data collection (Lees-Haley 1980). The questionnaire was segmented into four sections: 1) demographics, 2) distributor's operation questions, 3) customer questions, and 4) open-ended questions regarding the future of the hardwood distribution industry. Where historical trends were queried, data for 2003 and 2007 were collected.

DATA COLLECTION

A sample frame encompassing the hardwood lumber distribution industry in the United States was compiled using the databases of the National Hardwood Lumber Association (NHLA), the North American Wholesale Lumber Association (NAWLA), and the Hardwood Distributors Association (HDA). Use of a variety of associations helped to ensure more complete coverage of the overall distribution industry (Hollander and Wolfe 1999). We mailed 424 questionnaires, 388 in the United States, 32 to Canada, 3 to the United Kingdom, and 1 to Mexico. The foreign outlets' addresses were contained in the associations' directories, indicating that these companies do business in the United States. Twenty-six surveys were returned as undeliverable, and 10 respondents indicated they were not in the hardwood lumber distribution business, bringing the adjusted number of surveys mailed to 388. Seventy-nine usable questionnaires were returned within the survey time frame (August to October 2008), resulting in an adjusted response rate of 20.4 percent. The survey followed traditional surveying methods, with a pretest conducted with four selected companies. A first questionnaire mailing including a letter explaining the survey was mailed after some minor adjustments were made from the insights gained from the pretest. A reminder postcard followed this initial mailing after 2 weeks; another letter and questionnaire mailing printed on colored paper followed 2 weeks later. In a quest to enhance the response rate, a third postcard was mailed, followed by a third letter and questionnaire within 2-week intervals.

DATA ANALYSIS

Thirty-four nonrespondents were contacted after the closing of the survey to obtain answers to check for nonresponse bias (Dillman 1978). Using tests of proportions (Dimension Research 2009), we found no significant difference ($\alpha = 0.05$) between respondents and nonrespondents when asking, "*Is hardwood lumber distribution your only business*," "*What was your company's hardwood lumber volume input in 2007*," and "*What was your company's hardwood lumber volume input in 2003*." When we asked nonrespondents and respondents, "*On average, what was the species distribution of the domestic hardwood lumber that you sold in 2003 and 2007 (bdft basis)?*" (with nonrespondents answering for only five species, namely red and white oak, yellow-poplar [*Liriodendron tulipifera* L.], maple, and cherry), only the answer for cherry was found to be significantly different between respondents and nonrespondents, based on the results from the *t*-test. Likewise, when we asked, "*What percentage of your lumber went to each of the following market segments in 2003 and 2007 (bdft basis)?*" (with nonrespondents answering only for four markets, namely cabinets, millwork, pallets, and furniture), furniture turned out to be the only significantly ($\alpha = 0.05$) different answer. Thus, no major differences in answers between respondents and nonrespondents were detected.

Fifty-three percent of respondents are single-facility companies and 37 percent are involved solely in the hardwood lumber distribution business. On average, 63 percent of respondents' business stems from hardwood lumber distribution (min. 10 percent, max. 100 percent). Thirty-nine percent of the businesses are located in the South, and 27, 14, and 13 percent are located in the Northeast, the West, and the Midwest, respectively. Seven percent are located outside of the United States.

STUDY LIMITATIONS

Several limitations apply to the results presented in this manuscript. As with most survey research, results are based on responses from a single person from each company surveyed. Though this person typically has roles in ownership or upper management, his or her responses may not necessarily reflect the perspectives of

other decision-makers in the firm. Also, respondents are members of at least one of the associations (NHLA, NAWLA, HDA) from whom addresses were obtained. While the membership base of these associations is large and likely representative of the U.S. hardwood distribution business, caution is warranted in generalizing results discussed in this manuscript.

RESULTS

HARDWOOD LUMBER INPUT AND OUTPUT VOLUME

The average volume of hardwood lumber purchased by U.S. hardwood lumber distributors increased 10 percent from 2003 to 2007, from an average of 12.0 million board feet (mmbf) in 2003 to 13.2 mmbf in 2007 (Table 2). Sales increased by 8 percent from a total volume of 565.7 mmbf in 2003 to 612.1 mmbf in 2007. On average, hardwood lumber distributors sold 12.0 mmbf of hardwood lumber in 2003 and 12.75 mmbf in 2007. However, as can be seen when comparing average company sales (which increased by 6 percent from 2003 to 2007) with the median company sales (which decreased by 6 percent from 2003 to 2007), the increase in sales was due to gains of a few, larger industry participants, while other participants experienced decreasing sales.

SPECIES DISTRIBUTION

When survey participants were asked, "*On average, what was the species distribution of the domestic hardwood lumber that you sold in 2003 and 2007 (bdft basis)?*," the most noticeable responses were the large reduction in red oak sales (-33 percent), and the large increases in sales of ash (*Fraxinus* spp.; +88 percent), black walnut (*Juglans nigra* L.; +88 percent), hickory (*Carya* spp.; +37 percent), beech (*Fagus grandifolia* Ehrh.; +85 percent), and other species (+41 percent). Figure 1 shows the changes in sales by species from 2003 to 2007 as indicated by respondents.

MARKET DISTRIBUTION

Lumber purchases by market segment also changed substantially over the 5-year period. Sales to the furniture industry segment decreased by 37 percent, while millwork (+14 percent), exports (+29 percent), flooring (+34 percent), retail (+40 percent), and other (+23 percent, encompassing distribution and stair manufacturing) posted solid gains. The largest growth, however, came from railroad ties, which doubled sales over the 5-year period investigated (+103 percent). Only the cabinet markets (-3 percent), besides furniture, lost in importance, a decline that could have been a very early sign of the coming recession (Dicks 2008). Figure 2 shows the percentage of distributors' lumber going into different market segments in 2003 and 2007 on a board foot-basis.

Table 2.—Average, standard deviation, median, and total lumber volume purchased and sold.

	Lumber Input			Lumber Sales		
	2003 mmbf	2007 mmbf	Change %	2003 mmbf	2007 mmbf	Change %
Average	12.02	13.22	10	12.04	12.75	6
Std. Dev	12.14	11.10	-9	8.77	9.61	10
Median	10.05	10.00	0	10.60	10.00	-6
Total	577.1	634.5	10	565.7	612.1	8

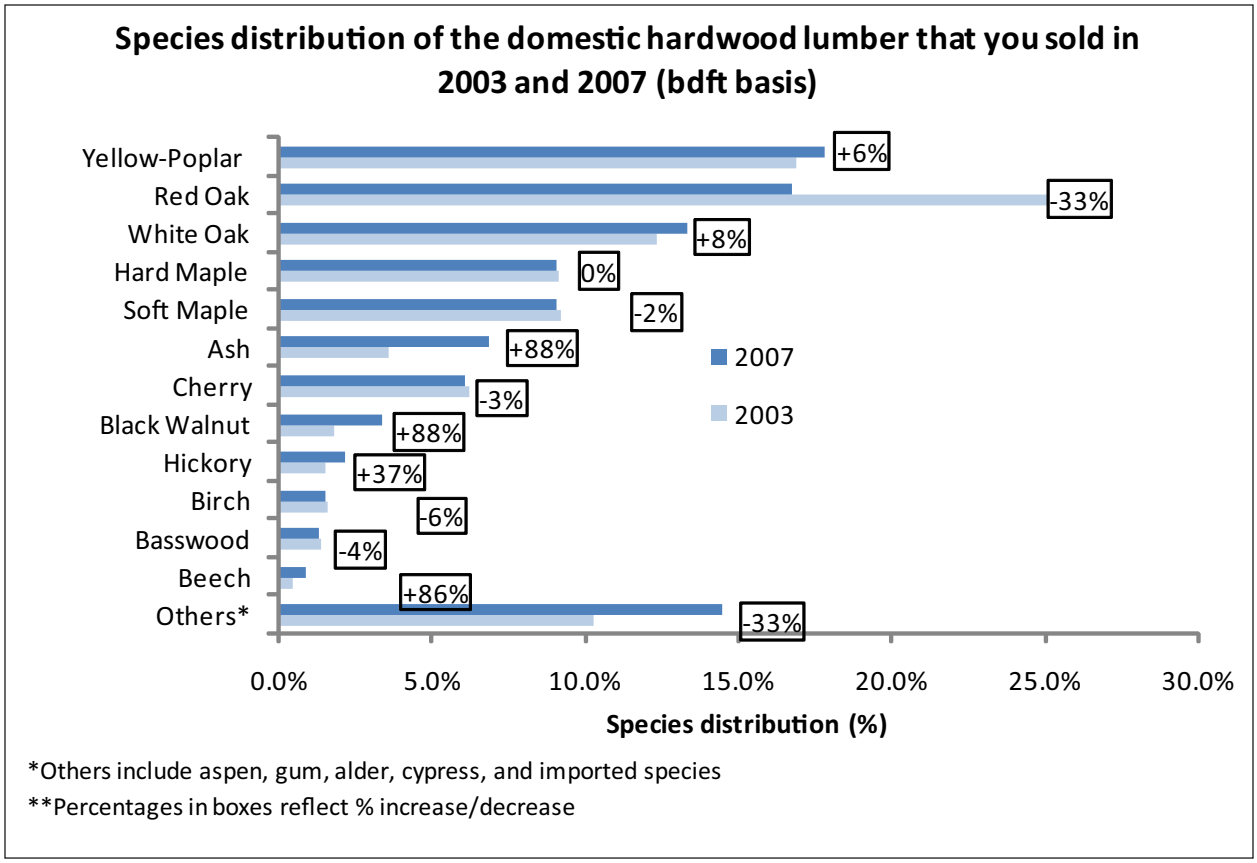

Figure 1.—Changes in sales by species from 2003 to 2007 (board foot-basis).

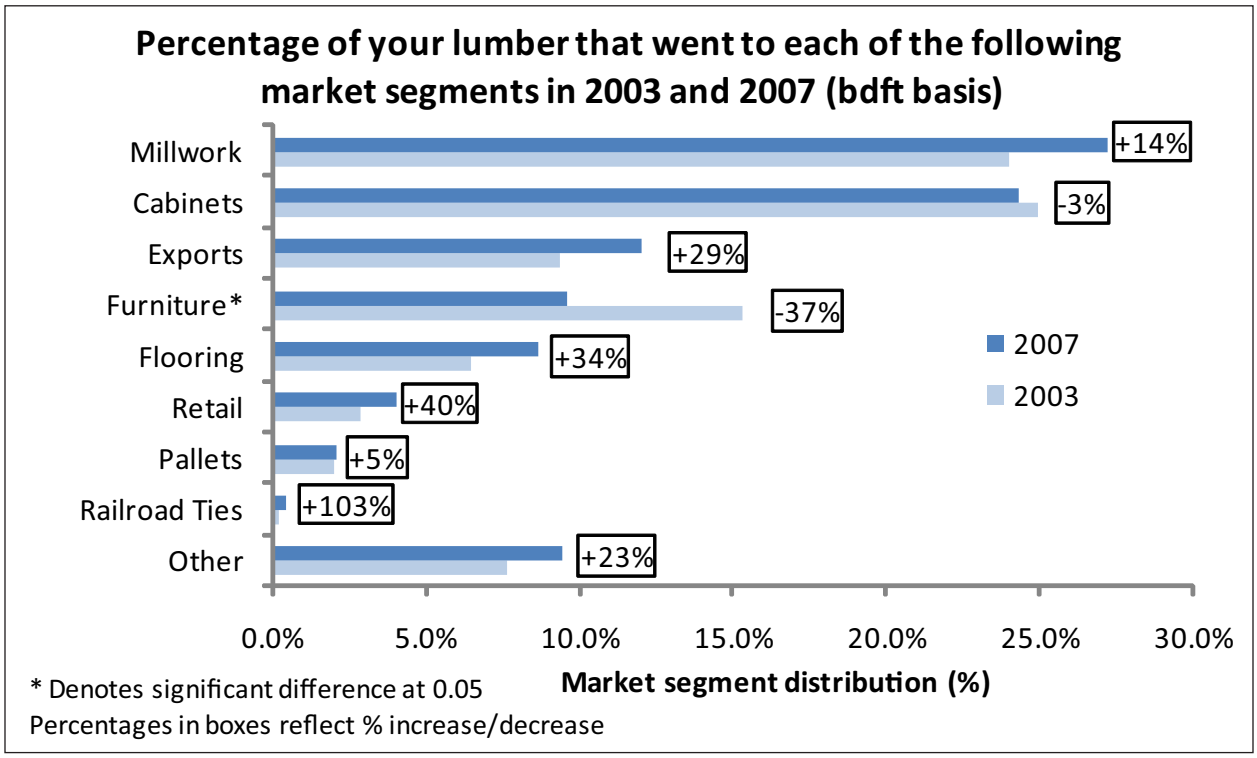

Figure 2.—Percentage of lumber going into different market segments in 2003 and 2007 (board foot-basis).

SIZE OF CUSTOMERS AND ORDERS

Almost half of all respondents to the survey indicated that their current average customer is smaller today than 5 years ago (47 percent). Thirty-nine percent of respondents indicated that their current average customer is about the same size today compared to 5 years ago while 12 percent indicated that the current average customer is larger. Two percent of respondents indicated that they are not sure about the size of their current average customer. A full 75 percent of respondents, however, indicated that average order size (in board feet) decreased over the past 5 years. Thirteen percent responded that average order size stayed about the same and 12 percent indicated that their average order size grew larger during the past 5 years.

While no direct link between decreasing average order size and the smaller size of the average customer exists, it can be hypothesized that both trends—smaller customers and smaller orders—are the consequence of the exodus of manufacturing capacity from the United States (Buehlmann and Schuler 2009) and the competitiveness of smaller shops who directly serve customers with customized products (Schuler and Buehlmann 2003). Both trends also suggest an increasingly important role for lumber distributors in the hardwood supply chain.

FUTURE OF THE HARDWOOD LUMBER DISTRIBUTION BUSINESS

Table 3 shows a summary of responses received to the open-ended question, "*How do you feel the role of the hardwood lumber distributor will change in the next five years?*" Survey administrators categorized responses as follows: "*Wider product range*," "*Customization*," "*Smaller orders*," "*Improved services*," "*Faster service*," "*Concentration/consolidations*," "*Certification*," "*Customer-orientation*," "*Diverse Inventory*," "*Efficiency*," and "*Flexibility*."

Table 3.—Number of responses received (in 11 categories) to the open-ended question, "How do you feel the role of the hardwood lumber distributor will change in the next five years?"

Category	Number of responses
Wider product range	11
Customization	8
Smaller orders	7
Improved services	6
Faster service	4
Concentration / consolidation	4
Certification	4
Customer-orientation	3
Diverse inventory	3
Efficiency	2
Flexibility	2

The largest number of respondents to the questions about changes in the role of hardwood distributors over the next 5 years believes that they will have to offer a wider product range (11 responses). Customization of orders (8 responses), serving smaller orders (7 responses), and providing improved services (6 responses) followed in the frequency ranking (Table 3). Four responses were obtained for each of the following: the need for faster service, the occurrence of industry concentration/consolidation, and the need for certification of their product. Three responses pertained to the need for more attention to customer-orientation and the importance of building and maintaining a diverse inventory. The increased need for efficiency and flexibility drew two responses apiece.

CONCLUSIONS

The average lumber distributor purchased 13.2 mmbf of lumber in 2007, up 10 percent from 2003. Sales of hardwood lumber distributors participating in the survey increased by 8 percent between 2003 and 2007 for an average volume of hardwood lumber sold in 2007 of 12.75 mmbf. Ash, black walnut, beech, hickory,

and some other species such as aspen, gum, alder, cypress, and imported species, saw their sales grow between 2003 and 2007. Red oak sales, conversely, declined substantially, as red oak lost 33 percent in sales from 2003 to 2007. The furniture market declined in importance as a customer to the hardwood lumber distributors, while millwork, exports, flooring, retail, and some other markets grew in importance. The largest increase, however, came from the railroad ties segment.

Almost half of the respondents to this survey indicated that their current average customer is smaller today than 5 years ago, and 75 percent of respondents indicated that the average order size in 2007 was smaller than it was in 2003. These are important trends in the industry and suggest an increasingly important role for the services typically supplied by distributors in the hardwood lumber supply chain. Correspondingly, respondents indicated that, going forward, they will have to offer a wider product range, offer more customized orders, serve smaller orders, and provide improved services.

Future research could address the increasing importance of green building and certified products to the hardwood industry, and specifically the role of distributors in meeting this demand, as well as related policy implications (e.g., the amended Lacey Act of 2009). Ultimately, satisfying customer demand and ensuring sustainability are ways to improve the competitive position of the U.S.-based hardwood industry.

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