

# **An Exploratory Study of the Use of Lumber, OSB, Plywood, LVL, PSL AND LSL As Raw Materials in the Furniture and Cabinet Industries in the Southern United States**

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**Working Paper #46**  
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April 20, 2001

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## **Abstract**

Although particleboard and medium density fiberboard (MDF) are primary products used in the manufacture of value-added wood products such as furniture, cabinets and millwork, other raw material inputs are also used. The objectives of this study were to examine the use of some lesser-used wood-based inputs and to determine their selection criteria by furniture and cabinet manufacturers in the Southern United States. The study addresses technical, economic and performance characteristics. It was found that 42 percent of the total value of raw materials used by respondents in 1999 was comprised of hardwood lumber followed by hardwood plywood. Newer engineered wood products (laminated veneer lumber and laminated strand lumber) were used by only 1 percent of respondents. No respondents used OSB (oriented strandboard). Respondents in all industry sectors studied said that they planned to increase usage of lumber and plywood. The main reason respondents are not using OSB, LVL, PSL (parallel strand lumber) and LSL is customer objections.

## **Introduction**

Solid lumber and plywood have been traditionally used as framing material in the furniture and cabinet industries. However, prices for both solid lumber and plywood have been steadily increasing in recent years. Recent development of structural panel (i.e., oriented strandboard – OSB) and engineered lumber, including laminated veneer lumber (LVL), parallel strand lumber (PSL) and laminated strand lumber (LSL), provide an efficient and economic alternative. These products are manufactured with no core voids, knotholes and delamination problems. They can be easily sawn, drilled, nailed, planed, filed, sanded or painted to meet design specification. As a result, the products have been designed for numerous industrial applications including RV/campers, truck bodies, pallets, furniture frames, displays, shelving, construction barriers, racks, packaging, crating, void forms, bins and trunks and overlaid core (2).

Acceptance of new products by the manufacturers and their customers has always been a slow process. A recent study on use of particleboard and MDF in the southern furniture industry (7) showed that customer objection was one of the primary reasons for the manufacturers not to use the industrial panels.

The objective of this study was to develop information on customer perspectives for lumber and engineered wood products and to determine the selection criteria used by the manufacturers based on technical, economic or performance characteristics. A better understanding of reasons for acceptance or rejection of structural panels and engineered lumber as raw material for furniture and cabinet framing could lead to further expansion of their uses by manufacturers and better sales and marketing by the raw materials manufacturers and distributors. This study is a companion to research conducted by the authors on the use of particleboard, MDF and plywood as raw materials in the furniture and cabinet industry in the southern United States (7).

## **METHODOLOGY**

We examined solid lumber (hardwood and softwood), oriented strandboard (OSB) and engineered wood product (PSL, LVL and LSL) usage by furniture and other value-added manufacturers in the southern United States (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina and Texas) in six Standard Industrial Classification (SIC) categories<sup>1</sup>.

A random sample of 1,340 companies in these SIC categories was drawn from the 1997 PhoneDisk PowerFinder CD-ROM directory (1). This is the same sample frame used by Wu and Vlosky (7) in the study of panel usage in this industry. The study was conducted using mailed surveys. The survey instrument was modified from a 1999 study by Wu and Vlosky (7), which, in turn, was an iteration of surveys that examined the structure of the hardwood dimension and wood component industries (6) and the furniture industry in the southern U.S. (5). Survey development and implementation followed methods and procedures recommended by Dillman and described as the Total Design Method (TDM) (3). Accordingly, mail questionnaire procedures included pre-testing, pre-survey notification of the initial mailing, a post-survey reminder and a second survey mailing. Of the 1,340 surveys mailed, 161 were undeliverable because the company had moved or had gone out of business, 8 were inappropriate industries

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<sup>1</sup> 2511-wood household furniture, except upholstered; 2512-wood household furniture, upholstered; 2521-wood office furniture; 2434 wood kitchen cabinets; 2517 wood television, radio and other cabinets and; 2541 wood office and store fixtures, partitions and shelving.

and 8 companies requested removal from the study. Of the remaining companies, 88 surveys were returned and 80 were usable resulting in a response rate of 7 percent. Due to the low response rate, we can only consider this study to be exploratory.

Second mailing respondents, often used as a proxy for non-respondents respondents (4) were compared to first mailing respondents across all study questions. By examining differences between the two mailings using two-tail t-tests, statistically significant differences (at  $\alpha = .05$ ) were found for 2 of the 12 questions that could be compared in the study. Larger companies, as measured by 1999 gross sales and number of employees were more prevalent in the second mailing.

## RESULTS AND DISCUSSION

Information about respondents by their self-identified major industry sector can be found in **Figure 1**. Just over 36 percent of respondents said kitchen cabinets were their major productline with another 20 percent primarily in the non-upholstered furniture sector. Five percent of respondents produced TV, radio and other cabinets. With regard to geographic location, just under over a quarter of respondents were from Texas followed by North Carolina with 17.7 percent (**Figure 2**). Least represented states were South Carolina, Mississippi, Louisiana and Arkansas with 2.5 percent, 5.1 percent, 8.9 percent and 5.1 percent of respondents, respectively.

Figure 1. **Respondent Manufacturing Category**  
(n=80)

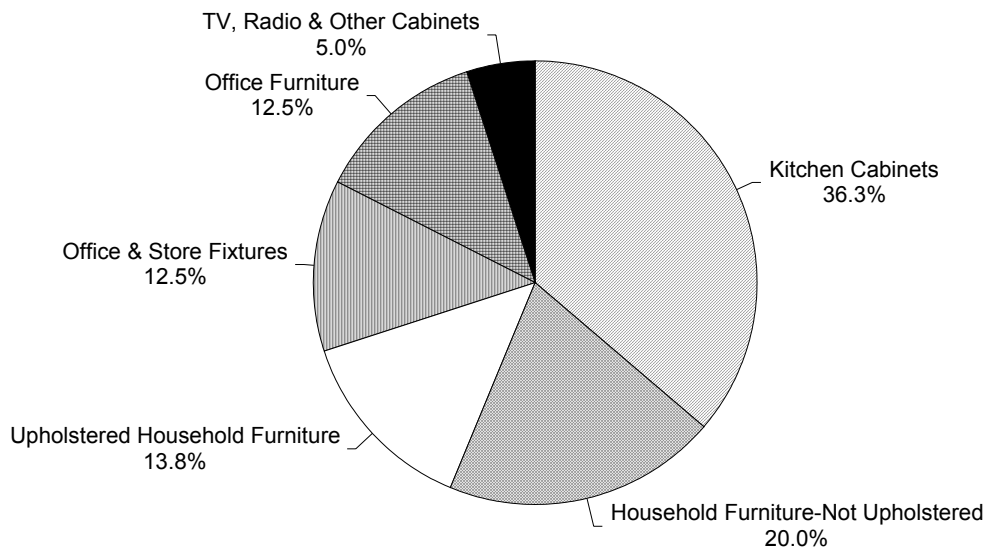
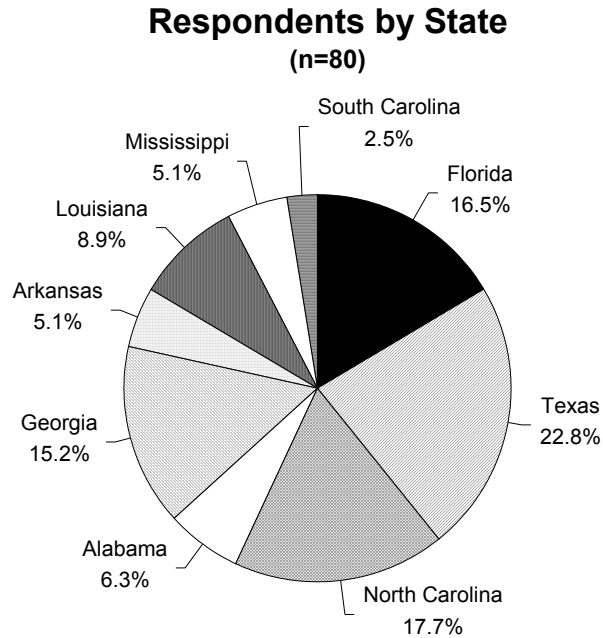


Figure 2.



Average 1999 sales for all respondents (n=76) was \$5.4 million. As shown in **Figure 3**, just under two-thirds of companies had sales of less than one million dollars. Twelve percent of respondents had sales over \$10 million. Respondents that produced non-upholstered furniture as their primary product had the highest average 1999 sales of \$62.0 million and highest average number of employees (592 employees). This was followed by upholstered household furniture at \$3.3 million and 47 employees. TV, radio and other cabinet producers had the lowest level of sales, averaging \$270 thousand in 1999 sales in addition to having an average of 4 employees per firm. An interesting demographic is the average sales per employee (**Figure 4**). Non-upholstered furniture respondents had the highest average at \$105 thousand/employee and TV, radio and other cabinet employees produced the least at an average of \$68 thousand in 1999.

Figure 3.

### Sales Category 1999 Total Company Revenue (n=76)

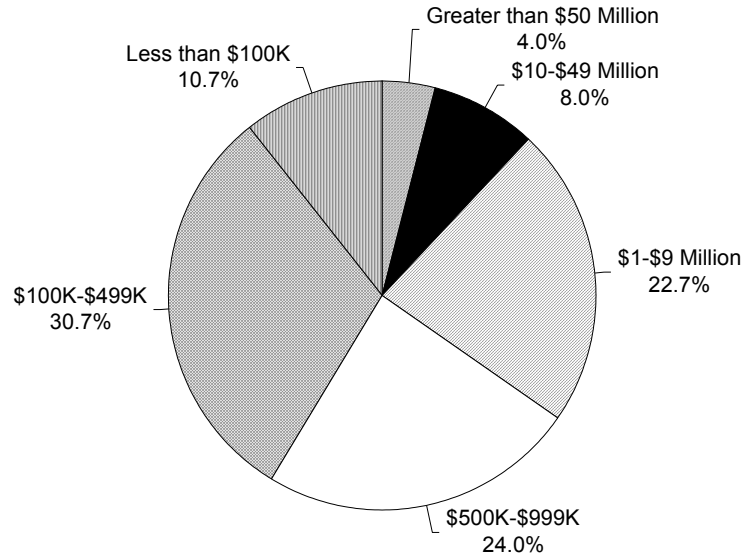
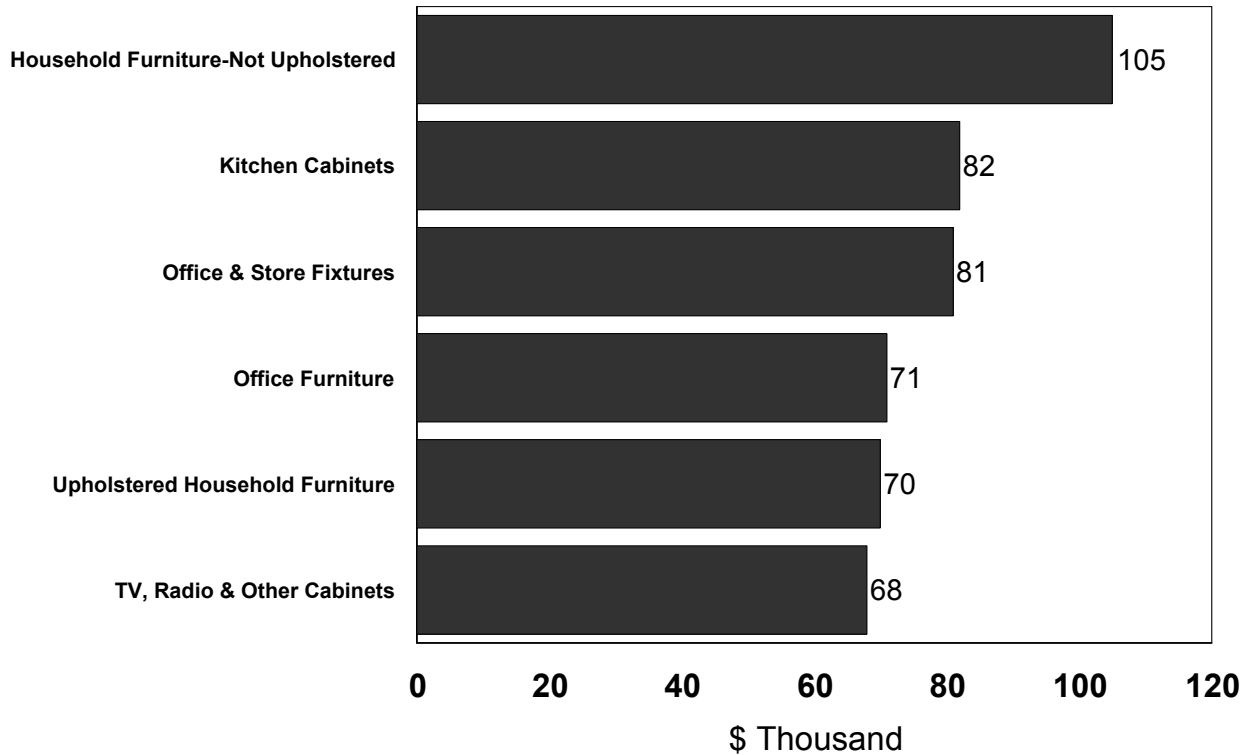


Figure 4.

### Average 1999 Sales/Employees by Manufacturer Category (n=76)



Hardwood lumber was the most used raw material (by value) in 1999 by all respondents combined, accounting for 42.6 percent of total raw material value (**Figure 5**). Following hardwood lumber was hardwood plywood, particleboard, MDF, softwood plywood, softwood lumber, and engineered wood products (LVL and LSL).

When viewed end-use industry segment, hardwood lumber was the most cited raw material, by value, non-upholstered household, upholstered and office furniture. Hardwood plywood was most cited for kitchen cabinets and TV, radio and other cabinets while particleboard ranked first for office and store fixture manufacturing (**Table 1**).

Figure 5.

### Raw Materials Used Percent of 1999 Total Raw Material Usage by Value

(n=80)

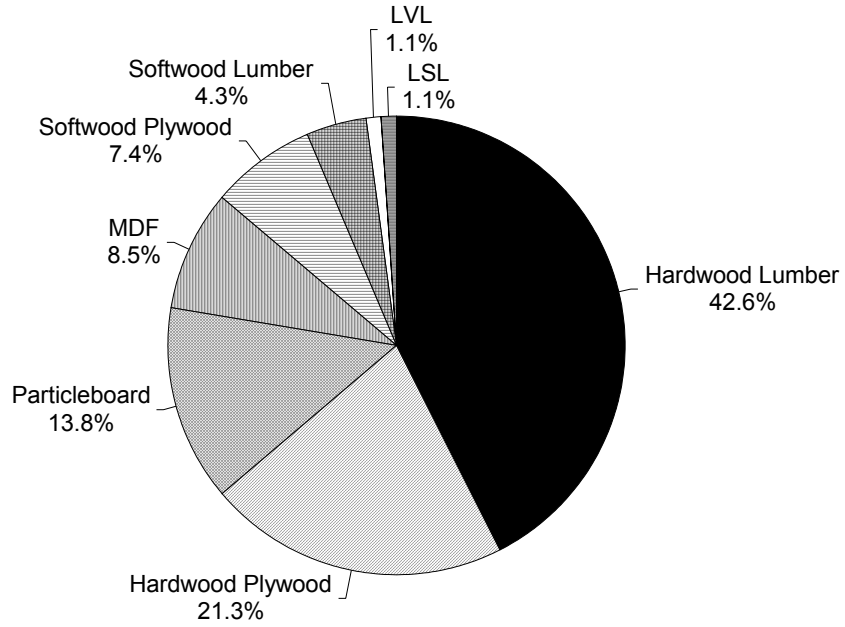


Table 1.

**Percent of Raw Materials Used (by Value)  
by Manufacturing Sector in 1999  
(n=80)**

	Kitchen Cabinets	Household Furniture	Upholstered Furniture	TV, Radio, Etc. Cabinets	Office Furniture	Office & Store Fixtures
<b>Hardwood Lumber</b>	24	61	73	12	36	9
<b>Hardwood Plywood</b>	27	13	4	38	19	27
<b>Particleboard</b>	16	4	3	23	12	28
<b>MDF</b>	6	10	0	7	18	12
<b>Softwood Plywood</b>	11	2	5	8	6	12
<b>Softwood Lumber</b>	6	4	8	8	6	7
<b>LVL</b>	1	1	2	0	1	4
<b>LSL</b>	1	0	0	0	0	0
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Respondents were asked if they planned to increase or decrease their usage of solid lumber, plywood, LVL, PSL and LSL in the future (**Table 2**). An average of 61 percent and 54 percent respondents said that they planned to increase usage of solid lumber and plywood. The few companies that currently use engineered wood products (LVL, PSL, LSL) in the kitchen cabinet sector plan to increase their usage, while those in the office and store fixture sector said they would decrease usage.



Table 2.

**Percent of Companies that Plan to Increase  
or Decrease Usage of Wood-Based Raw Materials  
by Manufacturing Sector**

		Kitchen Cabinets	Household Furniture	Upholstered Furniture	TV, Radio, Etc. Cabinets	Office Furniture	Office & Store Fixtures
<b>Solid Lumber</b>	<b>Increase</b>	73	69	59	50	50	60
	<b>Decrease</b>	3	0	9	0	10	0
<b>Plywood</b>	<b>Increase</b>	76	30	36	50	50	80
	<b>Decrease</b>	3	0	0	0	0	0
<b>LVL</b>	<b>Increase</b>	10	6	0	0	0	0
	<b>Decrease</b>	0	0	0	0	0	10
<b>PSL</b>	<b>Increase</b>	7	0	0	0	0	0
	<b>Decrease</b>	0	0	0	0	0	10
<b>LSL</b>	<b>Increase</b>	7	0	0	0	0	0
	<b>Decrease</b>	0	0	0	0	0	10

Respondents were asked the reasons that they use or don't use the wood-based input materials discussed in this study. Because too few respondents currently use OSB, PSL, LVL and LSL, **Figure 6** shows that the main reason for not using these products. The common element for the four products is that customer objection is the number one reason for respondents not using them. Therefore, the inference is that derived demand from downstream customers is an influence on whether these raw materials are used in the manufacture of furniture and cabinets by the respondents in this study.

With regard to the inputs that respondents are currently using in great volumes, **Figure 7** shows both the reasons for respondent usage and non-usage of plywood and solid lumber. For plywood (hardwood and softwood combined), their top rated reasons for usage were dimensional stability, finishing characteristics, readily available volumes and uniform thicknesses. The main reason for non-usage was customer objection followed by fastening problems.

For solid lumber, 64 percent of respondents said they used this product due to finishing characteristics closely followed by dimensional stability (60 percent of respondents). The main reason that respondents do not use solid lumber is that it is uneconomical for their desired uses. However, this was cited by only 4 percent of respondents

Downstream customer usage of different wood-based inputs is often based on awareness of properties and advantages. Nearly three-quarters of respondents said that they actively promote plywood to their customers (**Figure 8**) and 65 percent actively promote solid lumber. The remaining inputs studied were only marginally promoted by respondents at between 5 percent for LVL and 2 percent for LSL.

Figure 6.

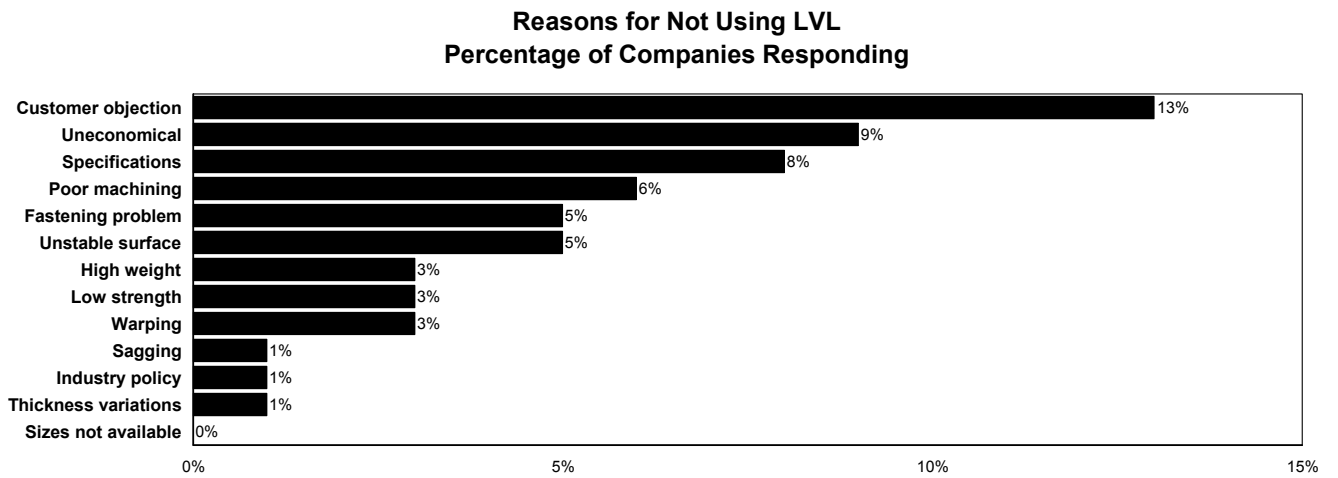
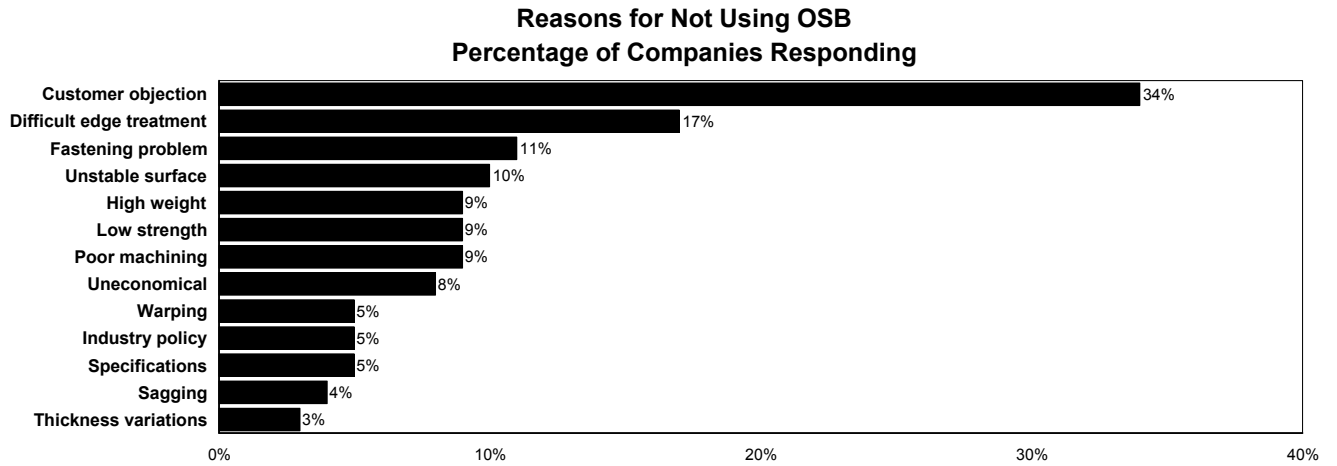
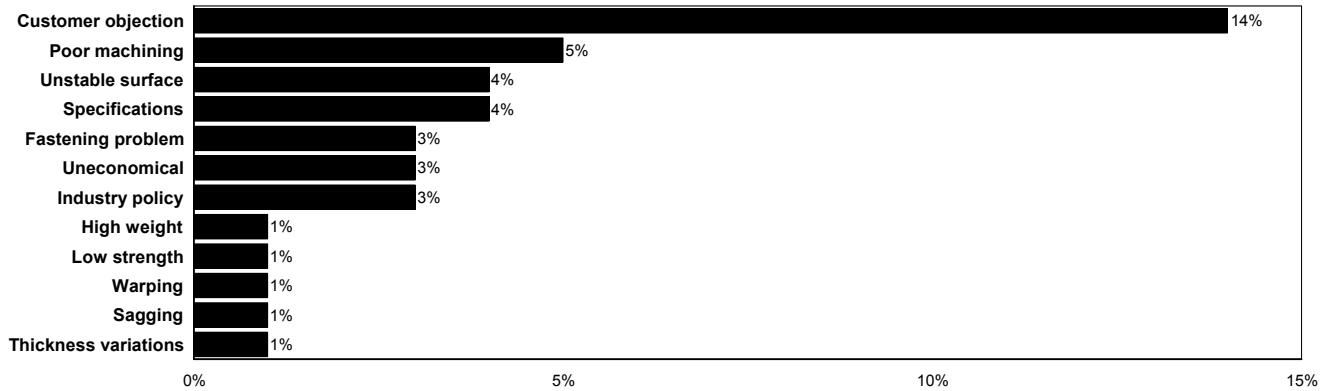


Figure 6. (continued)

**Reasons for Not Using PSL  
Percentage of Companies Responding**



**Reasons for Not Using LSL  
Percentage of Companies Responding**

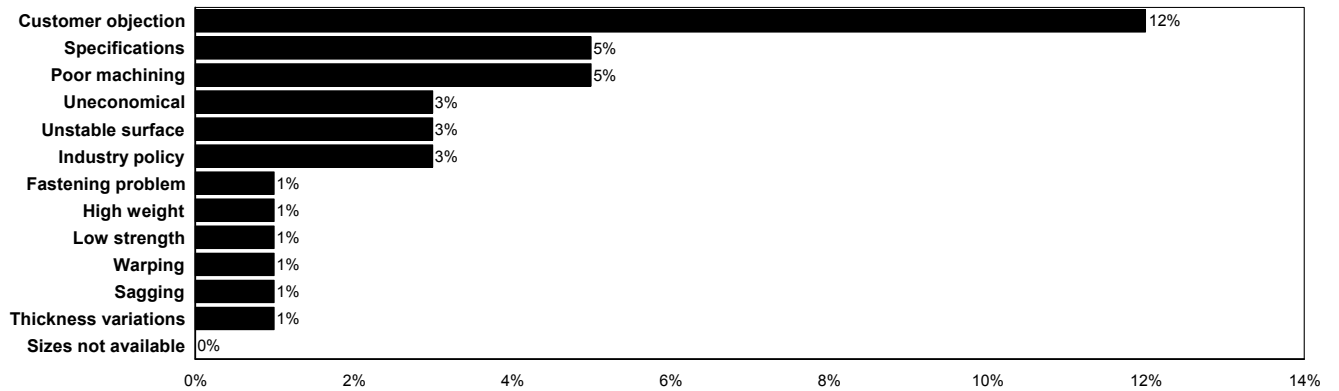


Figure 7.

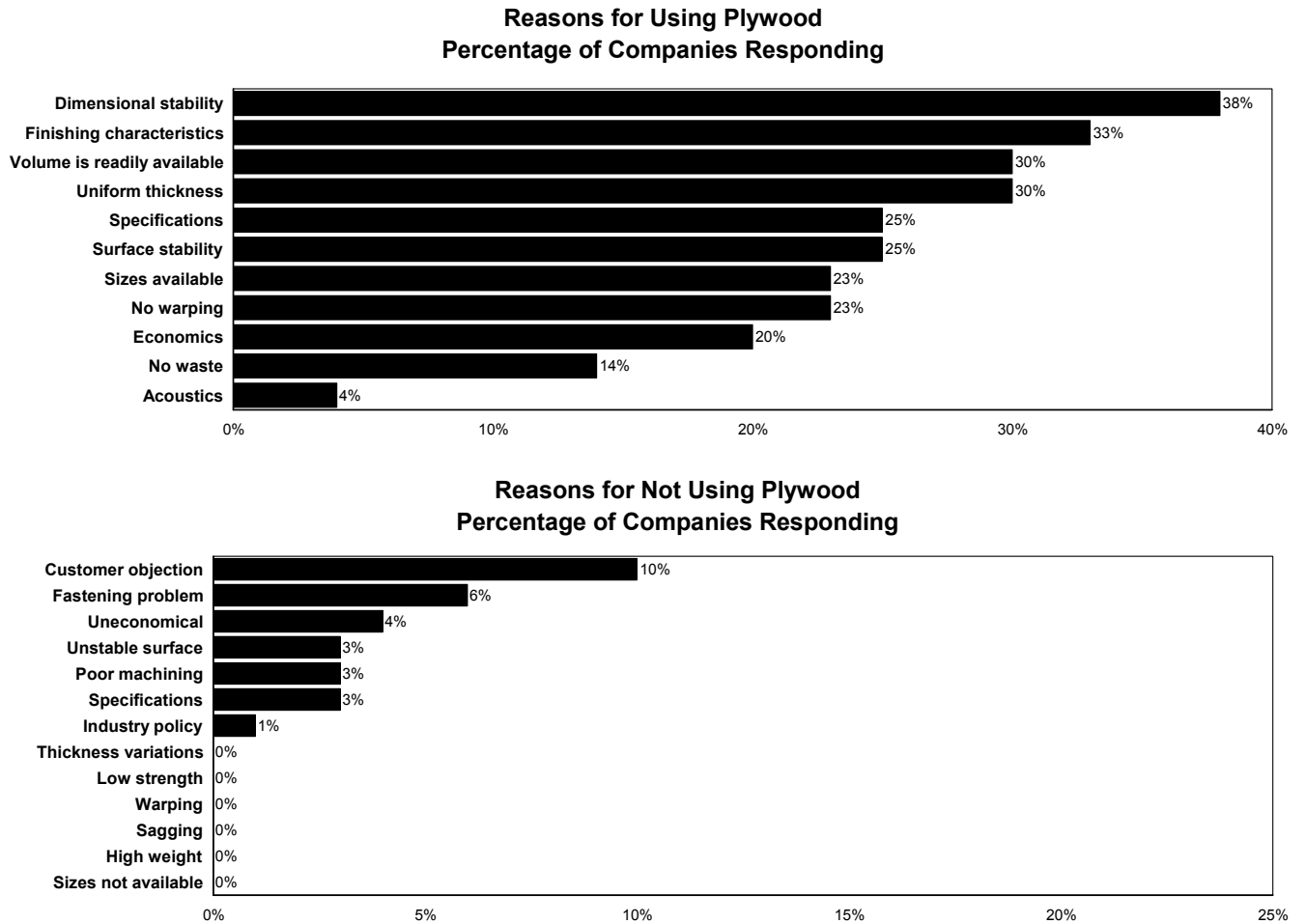
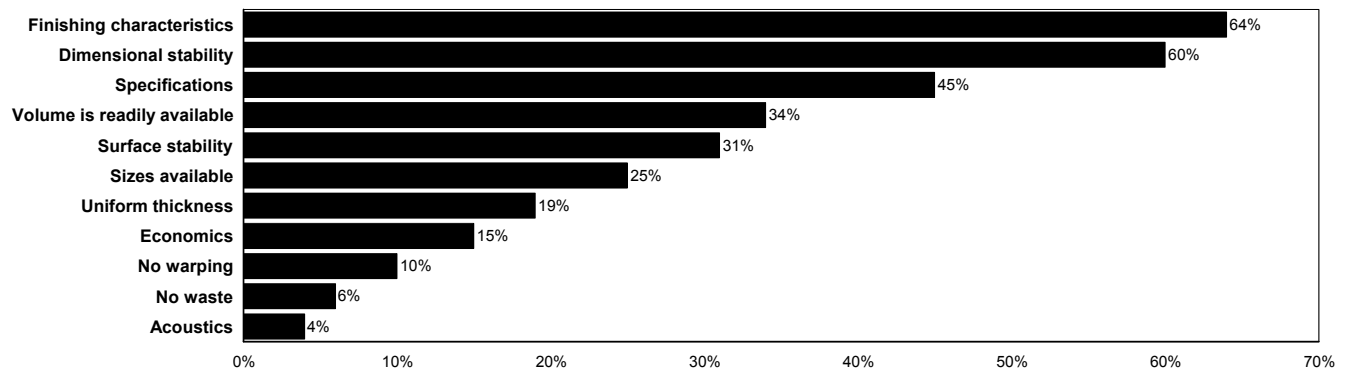


Figure 7. (continued)

### Reasons for Using Solid Lumber Percentage of Companies Responding



### Reasons for Not Using Solid Lumber Percentage of Companies Responding

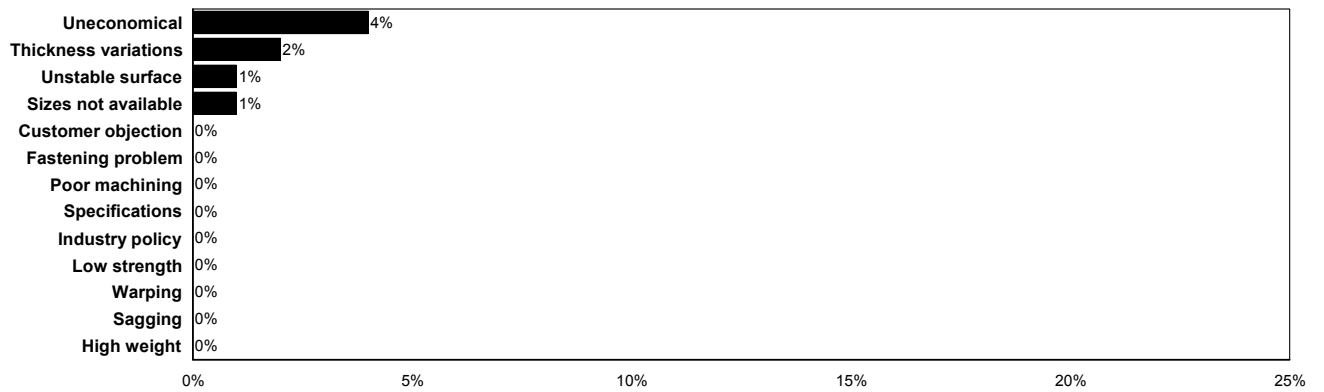
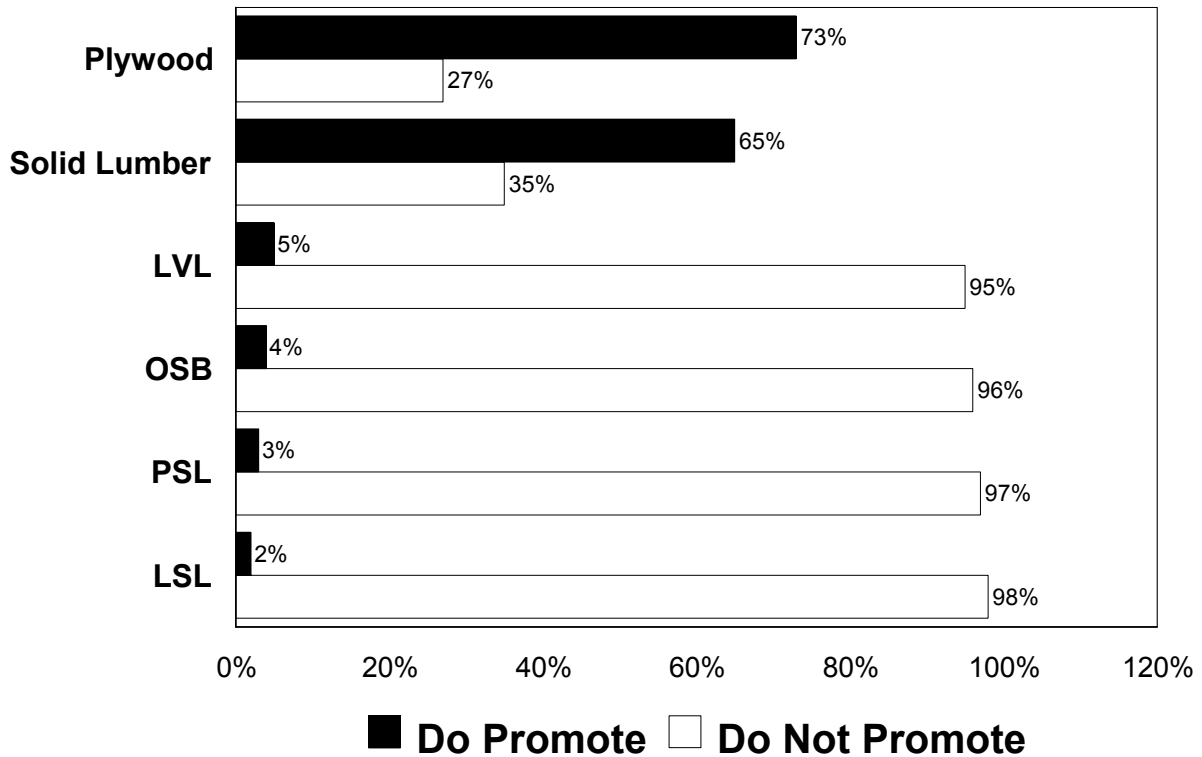


Figure 8.

### Percent of Companies that Actively Promote Wood-Based Products to Customers (n=80)



#### SUMMARY

Panel products such as particleboard and medium density fiberboard are important raw material inputs for the furniture, cabinet and allied industries. However, there are other wood-based products that are currently used or have the potential to be used in these applications. This paper identifies the usage and relative importance of these additional inputs for six value-added secondary wood manufacturing industries. Respondents indicated the characteristics that encourage or discourage them from using these products. This information is useful to companies in the secondary industries discussed in the paper because it helps them to understand their own industry structure.

In addition, the information is important to suppliers to furniture and cabinet manufacturers customers. By better understanding their customer concerns, needs and manufacturing issues, wood products suppliers can better serve their customers and compete in the marketplace.

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