

# EFFECT OF VERTICAL INTEGRATION ON THE UTILIZATION OF HARDWOOD RESOURCES

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## **ABSTRACT**

The effectiveness of vertical integration in promoting the efficient utilization of the hardwood resource in the eastern United States was assessed during a series of interviews with vertically integrated hardwood manufacturers in the Appalachian region. Data from 19 companies that responded to the 1996 phone survey indicate that: 1) vertically integrated hardwood manufacturers can achieve higher value-added product yields from their sawmill's log inputs, 2) there are numerous lumber exchange systems in place within these firms, and 3) the goals and benefits derived from vertical integration are varied and complex.

## **INTRODUCTION**

Traditional systems of lumber conversion have been based on a system of two distinct profit centers: the sawmill and the dimension mill. Historically, the National Hardwood Lumber Association's (NHLA) grading rules have encouraged a model of lumber recovery in the sawmill that is based on optimizing lumber value given a limited number of standard grades. Hardwood lumber typically is edged and trimmed to meet specific grades and the graded product typically is sold to secondary industry rough mills (dimension mills).

In a vertically integrated company, a sawmill sells or transfers lumber to an internal customer—its own dimension mill. When transferring material to an internal customer, it is hypothesized that edging and trimming practices are driven by the desire to maximize raw material yield rather than comply with standard grading rules. Thus, if there is potential for increased utilization of wood by bypassing production of standard hardwood lumber grades, there should be evidence of higher yields within vertically integrated firms. The objective of this study was to determine the strategies used by vertically integrated hardwood manufacturers that might lead to higher yields of dimension parts from the log resource that is input into the sawmill.

## **METHODS**

Vertically integrated manufacturers were identified from directories published by the Hardwood Manufacturers Association, Appalachian Hardwood Manufacturers, Inc., Wood Component Manufacturers Association, American Furniture Manufacturers Association, and Kitchen Cabinet Manufacturers Association. Mills that operated both a sawmill and value-added dimension operation were the target sample population. Our criteria did not stipulate that company operations be had to be colocated. However, companies with a lesser degree of vertical integration such as a sawmill/dry kiln/remanufacturing operation or a sawmill/pallet operation were excluded from consideration.

We identified 32 eligible hardwood manufacturing companies in the Appalachian region that met our criteria. Of these, 19 participated in a telephone survey during the first half of 1996. Incomplete information was obtained from five additional firms. Six companies did not respond to multiple phone requests and two refused to participate in the survey.

Key data from the 19 respondents were entered into a spreadsheet and categorized as to: 1) company history, structure, and objectives, 2) sawmill structure and relationship with the company-owned dimension operation, or 3) dimension operation structure and relationship with the company-owned sawmill.

## **RESULTS**

### **Company History, Structure, and Objectives**

The following key results were derived from the compiled interview data that was obtained from the 19 completed surveys of vertically integrated hardwood manufacturing companies:

- Thirteen of the 19 responding companies operated a sawmill prior to operating a dimension production mill.
- Four companies started both the sawmill and dimension operations at the same time while only two firms started as dimension producers and integrated backward into sawmill operations.
- At the time of the survey, 8 of 18 companies reported that they became vertically integrated relatively recently - within the past 15 years; four firms had a long history of vertical integration exceeding 50 years.
- Not surprisingly, the most frequently cited reason for vertical integration (11 companies) was value-added market penetration and diversification.
- Four companies indicated their motivation for integration had more to do with finding an outlet for unpopular species, sizes, and grades of lumber. One fully integrated company indicated that lumber quality control was the primary reason for operating a sawmill to complement their dimension operation.
- For 13 companies, business (sales) between the sawmill and dimension operation was either mandated or given strong emphasis. Even when operating as profit centers, the two business operations were expected to support each other and give certain priority considerations to their sister operation.
- Six of the 19 companies indicated that it was a primary role of the sawmill to provide lumber to the dimension operation. Curiously, two firms that did not cite this as a primary role of the sawmill were sole lumber suppliers to their dimension operation. Therefore, at least 8 of the 19 companies seemed to be strongly oriented toward supporting their value-added manufacturing business as part of their sawmill's operating charter.

### **Sawmill Operations of Vertically Integrated Companies**

- Five companies reported selling more than 50 percent of their lumber production to their internal customer (the firm's dimension operation); three sawmills sold more than 90 percent of their production to their company's dimension operation(s). In fact, two of these sawmills transferred their entire production to their company's value-added operation(s).
- On average, the percentage of total lumber production that was sold to a company's dimension operation was 42 percent.
- Seven companies indicated that the lumber manufactured at their sawmill for purchase by the firm's dimension operation was manufactured to different specifications than lumber produced for external sales. The following differences were noted:
  - Edging and trimming were reduced (lighter) for the internal customer (four companies).
  - Short, thick, thin, and other "unsalable" lumber was sold to the internal customer.
  - Special moisture content specifications for certain products were supplied to the internal customer.
  - Lumber to be transferred to the internal customer was not double-end trimmed.
  - Special cuts were prearranged and sold to the internal customer.
  - The sawmill produced dimension parts in the mill for the company - a totally integrated operation.
- Seven companies answered "yes" to the question "Is there a price difference between the price charged to your internal (company dimension) customer compared to the price charged to external customers?" Five of these companies indicated the difference was that "no premiums" or a "lower markup" or, in one case, cost-based pricing, was typical for sales to the company's dimension operation.

### **Dimension Operations of Vertically Integrated Companies**

- Only three of the sawmills surveyed sold 90 percent or more of their lumber to their in-company customer, while seven dimension operations were at least 90 percent dependent on company sawmills for their wood (lumber) supply.
- On average, 57 percent of the lumber / strips / wood pieces used by the dimension mills of the 19 vertically integrated companies that responded to the survey were procured from a company-owned sawmill.
- Eight dimension operations indicated that the lumber they received from company-owned sawmills was nonstandard in some way. Nonstandard material forms included: lumber edged and trimmed less (four companies), lumber not graded to NHLA lumber grade rule specifications (six), lumber sorted differently (two), specific-width lumber provided (two), lumber thinner and more consistent in size (two), and higher quality lumber produced for species that are defect-prone (one).
- Another benefit of integration noted by three companies was better service from the company sawmill; however, one firm considered the service received from the company sawmill to be worse than that received from noncompany-owned sawmills.

- Eight companies that bought lumber from both company-owned and noncompany-owned sawmills indicated that they perceived or measured differences in part yields recovered from each lumber source. Seven of these firms believed that the material procured from the company-owned sawmill provided higher yields of dimension products.
- One dimension operation responded throughout the survey in a way that indicated a high level of communication and integration existed between the company's operating units. The firm stated that the yield derived from lumber supplied by the company-owned sawmill was higher because "the end product is known at the log stage." Of the 19 firms that responded to our survey, this company was operating at the most advanced level of vertical integration.

## **FUTURE RESEARCH**

The information obtained from our survey respondents indicates that many models of vertical integration are in place and working for companies. We can easily distinguish those companies that are minimally integrated in their functions and operational interdependence from firms that are moderately to highly integrated. Case studies of companies that fall within these three levels of integration would be useful in assessing the value of vertical integration to the hardwood industry. The primary objective would be to obtain sound data on: 1) lumber attributes and product yields and 2) income derived from and costs incurred by both the sawmill and the value-added operation.