

CURRENT TRENDS IN REGIONAL HARDWOOD LUMBER

PRODUCTION AND TIMBER USAGE¹

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Abstract.--Hardwood lumber is one of the most important products obtained from our eastern forests. Production of hardwood lumber is increasing with important shifts in output among producing regions. Comparative U.S. and alternative lumber production data are presented, regional shifts noted, and their impact on long-term timber availability discussed.

INTRODUCTION

In recent years, the demand for many solid hardwood products has increased dramatically. Between 1980 and 1986, exports increased by 40 percent, while the production of wood pallets, furniture, and flooring increased by 44, 5, and 86 percent, respectively (U.S. Dep. Comm., Bur. Cens. 1981-87; U.S. Dep. Cens., International Trade Administration 1988; National Wooden Pallet and Container Association 1987; and National Oak Flooring Manufacturers Association 1980-87). Increased demand caused inflation-adjusted hardwood lumber prices to move higher by 10 percent between 1980 and 1986 (U.S. Dep. Labor, Bur. Labor Stat. 1987). Such changes in demand and price ultimately cause hardwood lumber production to increase and may stimulate changes in comparative economic advantage among producing regions.

Although it may be a foregone conclusion that hardwood lumber production has dramatically increased, information released in the Current Industrial Reports (U.S. Dep. Comm., Bur. Cens. 1957-87) indicated only a 4 percent or 285 million board-foot increase between 1980 and 1986.³

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³Between 1980 and 1986, annual pallet production increased more than 114 million units (National Wooden Pallet and Container Association 1987). If we use a conservative assumption that the average pallet contained 12 board feet of hardwood lumber, this expansion in pallet production represented an increased annual consumption of nearly 1.4 billion board feet of hardwood lumber.

Such an increase is probably one-fifth the amount of the additional hardwood lumber used by the pallet industry, alone, during this period.

The thesis that underreporting of the increase in hardwood lumber production occurred between 1980 and 1986 is consistent with Cardellichio and Binkley's (1984) finding that hardwood lumber consumption was significantly greater than reported production during this period. Because of the differences in reported and apparent hardwood lumber production, Luppold and Dempsey (in press) developed an alternative series of hardwood lumber production statistics. This series is compared to the Current Industrial Reports (CIR) and Cardellichio and Binkley's findings in figure 1.

This paper is divided into three parts. The first part recaps the procedure used to develop the Luppold-Dempsey hardwood lumber production estimates. These statistics are then used to analyze absolute growth and regional shifts in hardwood lumber production. The last section presents reasons for the changes in hardwood lumber production and the potential impact of current market trends on long-term timber availability.

ALTERNATIVE PRODUCTION NUMBERS

An alternative hardwood lumber production series was developed through a comparative analysis of state production data reported in the CIR and state production figures reported by alternative sources. The most complete source of alternative production data was the timber product output studies compiled periodically by state forestry officials in cooperation with USDA Forest Service forest resource survey units. These studies report volume of sawlogs destined for and/or received by sawmills. The time intervals for these assessments ranged from annually in some states to every 10 years in other states.

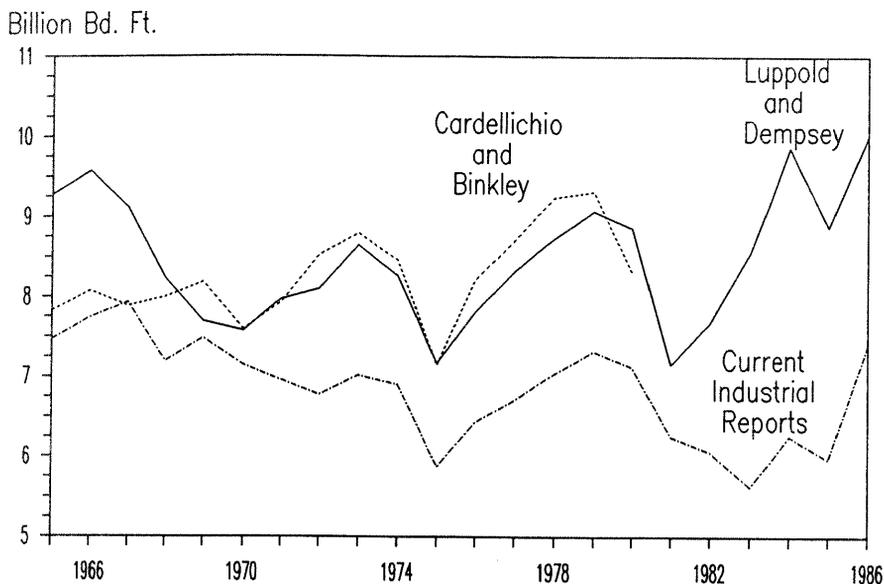


Figure 1.--Comparison of Current Industrial Reports hardwood lumber production volumes to Cardellichio and Binkley usage volumes and Luppold and Dempsey production volumes.

Timber product output data were supplemented with information collected from state lumber production reports, state tax records, and the Tennessee Valley Authority industry surveys.

Because comparative data for every state and year were unavailable, it was necessary to develop annual lumber production multipliers based on the differences between the CIR and alternative-source data for each year. The multiplier developed for a particular year could be used to adjust CIR reported production numbers for which there was no comparable match. Details of this procedure are presented in Appendix A, while results are reported in Appendix, table 2.

After the development of this data, a large regional shift in the volume of hardwood lumber produced from south to north was noted. Regional multipliers were then developed but not reported because of the lack of observations for specific regions for some years. However, the regional multipliers indicated an even more pronounced shift in lumber production from the southern to the northern regions.

REGIONAL SHIFTS IN HARDWOOD LUMBER PRODUCTION

Examination of table 1 indicates hardwood lumber production grew in the mid-1980's, but was fairly high in the mid-1960's. However, between the years 1965 and 1986 there was a major shift in hardwood lumber production from southern to northern regions. During this period, total U.S. hardwood lumber output increased by 8 percent, while production for the southeast region increased less than 4 percent and output in the south-central region decreased by 18 percent. By contrast, hardwood lumber production in the north-

eastern and north-central regions increased by 26 and 32 percent, respectively.

Although these absolute changes are interesting, the changes in proportion of production are indicators that are invariant to overall production. (These proportions are shown in parentheses in table 1.) In 1965, 53 percent of eastern hardwood lumber production originated from southern regions and 47 percent from the northern regions. By 1986, these proportions were nearly reversed with 46 percent originating from the south and 54 percent originating from the north. The greatest changes were the almost 7-point drop in the production originating from the south-central region and the 3- and 4-point increase in the production originating from the northeast and north-central regions. The southeast region showed virtually no change in its proportion of eastern production.

In addition to the changes in hardwood lumber production between north and south, there was a smaller proportional shift from the central regions to the eastern regions. This shift occurred because of the large decrease in south-central production, which was counteracted by increases in both the northeast and north-central regions. This decreased the proportion of production in the central areas from 60 percent in 1965 to 57 percent in 1986. Still, the two central regions dominated the two eastern regions in total and proportional production.

FACTORS AFFECTING REGIONAL SHIFTS

There are several potential explanations for changes in regional hardwood lumber production. Among these are the impacts of increased international and domestic demand for quality lumber,

Table 1.--Estimated annual hardwood lumber production in the Eastern United States, by region, 1965-86, (regional proportions in parentheses).

Year	Northeast	North-central	Southeast	South-central	Total* Eastern U.S.
- - - - - Million board feet - - - - -					
1986	2262 (22)	3171 (32)	2117 (21)	2474 (25)	10024
1982-85	2105 (24)	2714 (31)	1745 (20)	2176 (25)	8739
1978-81	2008 (24)	2428 (29)	1785 (21)	2230 (26)	8451
1974-77	1788 (23)	2274 (29)	1644 (21)	2178 (28)	7884
1970-73	1723 (21)	2271 (28)	1797 (22)	2276 (28)	8067
1966-69	1764 (20)	2306 (27)	1945 (22)	2636 (30)	8650
1965	1800 (19)	2409 (28)	2042 (21)	3028 (32)	9279

*Data may not add due to rounding.

changes in the markets for lower value species or grades, and market reactions to long-term timber management decisions.

Since 1965, hardwood lumber exports have increased by more than 500 percent. Although not all lumber being exported is of the highest quality, the average price received was more than \$637 per thousand board feet in 1986 (U.S. Dep. Comm., Bur. Cens. 1981-87). The export price was above that for 1C (or furniture grade) lumber of nearly every species other than walnut. This indicates that a large proportion of the exports was comprised of higher grade lumber from the more select species (Lemsky 1953-87, Setzer 1987-88).

A recent study by Araman (1987) indicates that even though the south has 14 percent more commercial hardwood sawtimber than the north, the north has an 89 percent greater volume of what is characterized as "select export species." Although one could argue with Araman's selection of select species, the stronger demand for northern as compared to southern hardwood sawtimber is also apparent in the marketplace.

The domestic market for higher grade material has also changed during the past 20 years. As late as 1965, large quantities of lumber were used for localized uses such as building or fence construction, dunnage, and bridges (Luppold and Dempsey - in press). Oak and poplar were among the major species used for these purposes, but nearly every species had some use. This situation allowed sawmillers outlets for nearly all the lumber produced from mixed-species stands of hardwoods.

Changes in technology, building codes, softwood availability, and metal and plastic products have caused many of the localized markets for hardwood lumber to disappear. Today, in the absence of nearby pallet plants, there is a limited market for many of the less valuable species. The species that are in strong demand by the

domestic furniture, cabinet, and millwork markets tend to be the same select species in demand by international buyers. As Araman indicated, the concentration of these species is in the northern areas.

Even in areas where there are greater proportions of high-quality timber of the more desirable species, high-grade lumber cannot be profitably produced without an outlet for low-grade lumber. The largest user of low-grade lumber is currently the pallet industry (Cardellichio and Binkley 1984, Luppold 1987). Four of the top five pallet-producing states are located in the north (Luppold and Anderson 1986). Furthermore, pallet producers in southern areas often have the opportunity to substitute less expensive southern pine for hardwood, whereas pallet makers in northern areas do not normally have pine locally available. This decreases the market for the low-grade hardwood materials in the south and puts an upward cost pressure on lumber production.

A third argument relating to the regional shift in hardwood production is the effect of the strong emphasis on planting southern pine in the south during the past three or more decades (Squires 1969; U.S. Dep. Agr., Forest Service - in press). During the initial stages of this effort, large amounts of hardwood stumpage apparently came onto the market at relatively low prices. Low stumpage prices could have, in themselves, increased production above post-1889 historic levels. Also, the continual strong emphasis on the regeneration, management, and industrial use of pine may have left the south with a significant portion of its hardwoods on poorer growing sites and created a defacto de-emphasis on the management and industrial use of hardwoods.

IMPLICATIONS

Although southern pine management may have been a contributing factor to the shift in lumber

production from the south to the north, most of this shift can be related to domestic and international demands for higher quality lumber of a few select species including red oak, cherry, and ash. The result of this growing demand is evident in rising prices. For example, the current dollar prices of 1C northern red oak and Appalachian black cherry have increased by 199 and 206 percent, respectively, between 1973 (the start of the export boom) and 1988 (Lemsky 1953-87, Setzer 1987-88). The price of 1C southern red oak--not as popular in the marketplace as northern red oak, but still a partial substitute--increased by 169 percent during this period. Prices of the less preferred species, such as Appalachian poplar and southern sap gum, have only increased by 28 and 51 percent, respectively.

The continued demand for a few select species and grades of hardwood lumber may result in a contradiction of timber shortages in the midst of timber abundance. As stands with higher proportions of the more desired species are sought out, stands with lower proportions of these species will be left unharvested.

A potential result of this type of market action could be growing timber inventories with apparently escalating prices, while at the same time having timber stands that do not sell at any price. Because of the current species mix between the south and the north, southern inventories could be expected to grow faster than northern inventories after adjusting for biological factors.

Of course, the current hardwood lumber market trends cannot continue indefinitely. Prices of the select species will eventually increase to the point where substitution of the less desirable species will become an alternative, or the demand for the final products such as wood furniture will level off or decline. The value of the dollar and consumer preference will affect the timing and nature of these changes. Increased utilization of hardwood timber in pulp, paper, structural panels, and other uses may also make stands with lower proportions of the desired species more economical to harvest.

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Appendix A - Development of Multipliers

The first step in the development of adjustment multipliers was to match data from alternative sources with CIR data for particular states and years. The CIR data for which there were matching alternative data sources were summed for individual years. The data from alternative sources also were summed for individual years. An unadjusted multiplier (UMULT), for individual years, was calculated using the following formula:

$$\text{UMULT} = (\text{SCIR} - \text{SALT}) / \text{SCIR}$$

where:

UMULT = Unadjusted multiplier for a given year.

SCIR = Summed CIR data for states with alternative data for that year.

SALT = Summed alternative data for that year.

In any given year, the states for which alternative data sources were available ranged from 9 to 58 percent of the national total. This percentage (PROP) was calculated by dividing the summed CIR data by the total Eastern U.S. hardwood lumber production for individual years. The adjusted multiplier used to transform CIR data into the results shown in table 2 was calculated

for individual years by using a 3-year weighted average. (The UMULT figure for 1986 was substituted for the AMULT figure because of changes in the sample frame.) The rationale for choosing this approach is that it isolates the variation due to poor sampling techniques nationwide better than the unadjusted multiplier. This multiplier, AMULT, was calculated as follows:

$$AMULT = \frac{((UMULT_{t-1} \times PROP_{t-1}) + (UMULT_t \times PROP_t) + (UMULT_{t+1} \times PROP_{t+1}))}{PROP_{t-1} + PROP_t + PROP_{t+1}}$$

Appendix Table 2.--Comparison of Eastern U.S. hardwood lumber production, by state, between Current Industrial Reports (CIR) and other sources (in million board feet).

State	Year	CIR	Other	Percent difference	1984 estimate
Maine	1984	108	² 121	13	⁷ 121
New Hampshire	1982	18	¹ 52	189	⁶ 72
Vermont	1982	42	¹ 74	76	⁶ 67
Massachusetts	1984	50	¹ 55	10	⁷ 55
Connecticut/Rhode Island	1984	47	¹ 59	26	⁷ 59
New York	1985	226	² 524	132	⁶ 587
Pennsylvania	1980	NA	¹ 650	NA	⁵ 650
New Jersey	1984	10	² 23	130	⁷ 23
West Virginia	1984	384	² 425	11	⁷ 425
Delaware/Maryland	1984	86	³ 127	48	⁷ 127
Michigan	1984	220	³ 465	111	⁷ 465
Wisconsin	1981	NA	¹ 414	NA	⁵ 414
Minnesota	1985	95	³ 199	109	⁶ 214
Ohio	1983	249	¹ 374	50	⁶ 362
Indiana	1984	391	³ 390	0	⁷ 390
Illinois	1984	64	² 144	125	⁷ 144
Kentucky	1984	246	² 460	87	⁷ 460
Missouri	1983	150	³ 482	221	⁸ 450
Iowa	1984	27	NYA	NYA	⁹ 27
Kansas/Nebraska	1984	25	² 58	132	⁷ 58
Virginia	1984	421	¹ 709	68	⁷ 709
North Carolina	1983	366	¹ 580	58	⁶ 607
South Carolina	1984	192	¹ 279	46	⁷ 279
Georgia	1984	227	² 348	53	⁶ 264
Florida	1984	32	² 28	-13	⁷ 28
Tennessee	1984	387	² 613	58	⁷ 613
Alabama	1984	333	² 445	34	⁷ 445
Mississippi	1984	338	⁴ 509	51	⁷ 509
Arkansas	1985	236	³ 502	113	⁶ 436
Louisiana	1984	154	³ 262	70	⁷ 252
Texas	1985	130	² 175	35	⁶ 151
Oklahoma	1984	52	¹ 54	4	⁷ 54
Total	1984	6061			9517

NA - Comparable figure not published in CIR in 1980 or 1981.
NYA - Post 1980 report on lumber production or log use not yet available.

Data source footnotes:

- ¹Drain figures reported by USDA Forest Service staff covering the respective state.
 - ²Figures provided by state utilization foresters through drain and mill studies.
 - ³Figures developed from state tax records.
 - ⁴Figures provided by the Tennessee Valley Authority.
- 1984 estimate footnotes:
- ⁵Used production figure from most recent period.
 - ⁶Calculated 1984 figure using changes in CIR figure times figures from other sources.
 - ⁷Used 1984 other source estimate.
 - ⁸Estimated by state utilization forester (lowest estimate).
 - ⁹No data source available, so CIR figure assumed.