# MERGERS and ECONOMIC CONCENTRATION

## in the Douglas-fir lumber industry

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# PREFACE

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# INTRODUCTION

The strength and condition of the industry which is dependent upon timber from the forests of the Pacific Northwest determines to a great extent the amount of forestry which can be practiced on both public and private lands. Our Nation is dedicated to the principle that our society will benefit most if our economic activities are as free and competitive as practicable. For these reasons the public has become concerned over the recent merger activity in the wood-using industries. The purpose of this report is to objectively present the merger activity that has been going on and to examine the degree of economic concentration that has resulted.

In this study the record of mergers during the 1940's and 1950's was examined. Conclusions are drawn concerning the trend of economic concentration and the present competitive position of the industry at three different levels: timber resource ownership, lumber production, and wholesale lumber distribution.

The Douglas-fir lumber industry is that segment of the United States lumber industry operating in the Douglas-fir subregion. The Douglas-fir subregion includes the 19 counties of western Oregon and the 19 counties of western Washington lying between the crest of the Cascade Range and the Pacific Ocean.

The Douglas-fir subregion, with only 1.8 percent of total U. S. land area and accounting for 4.5 percent of the Nation's forest-land area, contains 37 percent of the remaining softwood sawtimber volume and accounts for 29.2 percent of total U. S. softwood lumber production. The subregion is, therefore, regarded as a major center of the lumber industry for the Nation.

# Mergers and the Trend Of Concentration In the U. S. Economy

The extent of merger activity and the trend of economic concentration in the U. S. economy need to be examined in order to place lumber industry mergers in proper perspective. This brief survey of concentration in the total economy will be concerned, first, with the record of merger activity over a long period of years in order to identify what has been termed "merger movements," and second, with the present degree of economic concentration in the U. S. economy. The present position is, of course, the result not only of mergers but of internal growth as well.

The term "merger" is broadly defined as any combination into a single enterprise of two or more previously independent firms. The merger process most commonly involves a single large firm absorbing partially or totally one or more smaller firms, where the acquiring firm survives and the assets of the acquired firm are absorbed into the surviving organization.

Use of the term "movement" implies a significant increase in merger activity. An outstanding characteristic of American economic development has been successive waves of mergers. Three clearly identifiable merger episodes are commonly referred to in U. S. economic history since 1898: 1898-1902, 1926-30, and 1950 to date.

As an aid in grasping the idea of episodic merger movements, the number of firms disappearing annually through mergers has been plotted in figure 1 for the period 1895 through 1961. The reader should be cautioned against a precise interpretation of trends shown in figure 1. The data are subject to two major limitations: (1) The figure shows only the number of disappearing firms as reported in two business publications, i.e., "Moody's Industrials" and "Standard Corporation Descriptions." The list is, therefore, not a complete record of all mergers but presumably does include the most significant. Because the list is based upon press reports, it is subject to changing standards of reporting. (2) The data are unweighted. Therefore, no distinction is made between the major acquired firm and the minor acquired firm. Each firm is counted as one regardless of its size and importance. These two limitations notwithstanding, figure 1 is useful

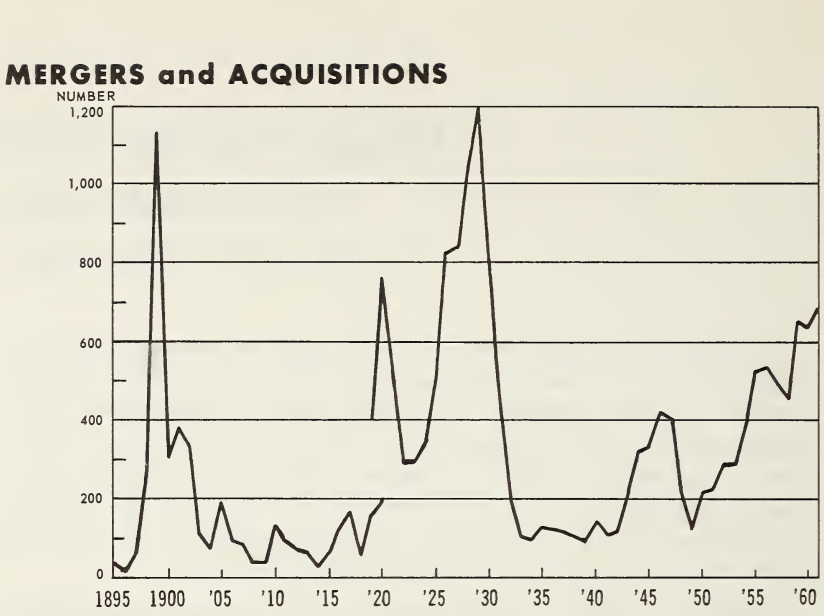


Figure 1. — Number of mergers and acquisitions in manufacturing and mining, 1895-1961.

in identifying trends and the so-called merger movements periodically taking place in American economic development.

An impression prevails that the U. S. economy is becoming less competitive and more concentrated with the passage of time. Several research studies have been made testing this commonly accepted hypothesis by analyzing the trend of economic concentration in individual industries. Professor Stigler, in his lectures at the London School of Economics in 1949, reported on the long period from the end of the Civil War to World War II. After classifying industries into those fitting his definition of competitive as opposed to cartelized and monopolized industries, he concluded as follows (Stigler, 1950, p. 54):[1]

[1] Names and dates in parentheses refer to Literature Cited, p. 79.

> It is my present judgment that competition declined moderately from the Civil War to the end of the 19th century, and thereafter (to 1940) increased moderately. I certainly have not proved this to be the case, but on the other hand there is no obvious evidence for the more popular thesis that competition has been declining steadily for a half century or more.

In another study more exhaustive than Stigler's, G. Warren Nutter classified productive organization into "effectively monopolistic," "workably competitive," and "governmental." With two different methods employed in estimating 1937 industrial organization, he concluded that with the first method competition increased from 1899 to 1937 and with the second method competition declined. In an attempt to draw an average from his two methods of estimation, he concluded that analysis indicates "a slight decline in the extent of monopoly relative to the economy but a very slight increase relative to the extent of competition" (Nutter, 1951, p. 39).

In a review and analysis of existing competitive studies of the U. S. economy, Professor Adelman was unable to substantiate the hypothesis of increasing concentration. His own interestingly phrased conclusion is as follows (Adelman, 1951, pp. 292-293): "The odds are better than even that there has actually been some decline in concentration. It is a good bet that there has at least been no actual increase; and the odds do seem high against any substantial increase."

While economic research has not substantiated longrun increasing concentration in U. S. industry over the last half century, the periodic merger movements do occur and result in at least temporary increases in industrial concentration. The U. S. Senate Subcommittee on Antitrust and Monopoly recently completed what is probably the most exhaustive statistical analysis of concentration in American industry ever undertaken. This study indicates clearly the effect of the present merger movement in increasing industrial concentration, and also indicates the degree of concentration among the largest firms in the year 1954. As shown in table 1, the 200 largest companies in the U. S. economy accounted in 1947 for 30 percent of all value added by manufacture. The share of the 200 largest firms increased to 37 percent by 1954. Moreover, most of the increase in concentration among the 200 largest firms was, in fact, accounted for by the 50 largest among them. Thus the 50 largest firms in 1947 accounted for 17 percent of all value added by manufacture, increasing to 23 percent by 1954. There are some 4 million companies in business in the United States. The 50 largest firms among them are but one eighty-thousandth, or 0.00125 percent of the total number of firms. This small fraction of total firms in 1954 contributed nearly one-fourth of all value added by manufacture.

Table 1. — Share of total value added by manufacture accounted for by the largest manufacturing companies, 1947 and 1954

| Company ranking in designated year | Percent of value added by manufacture | |
|---|---|---|
| | 1947 | 1954 |
| | Percent | |
| Largest 50 companies | 17 | 23 |
| Largest 100 companies | 23 | 30 |
| Largest 150 companies | 27 | 34 |
| Largest 200 companies | 30 | 37 |

Source: U. S. Congress (1957a, p. 11).

# Mergers in the Douglas-Fir Lumber Industry

The rate of merger activity in the lumber industry increased considerably from 1955 to 1960. Although the lumber and furniture segment of the U. S. economy contributes only 1.3 percent of total national income, it accounted in 1960 for 4 percent of total number of mergers. The combined lumber and furniture and paper and allied products sectors of the economy contribute 2.3 percent of national income. But in 1960 they accounted for 11 percent of total merger activity. A comparison of mergers and acquisitions in several industries within the manufacturing and mining category is shown in table 2.

Table 2. — Mergers and acquisitions of manufacturing, nonmanufacturing, and mining concerns, by industry group of acquiring concern, 1955-61

| Industry group of acquiring concern | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 |
|---|---|---|---|---|---|---|---|
| | Number of mergers | | | | | | |
| Mining | 34 | 35 | 31 | 39 | 29 | 17 | 30 |
| Manufacturing: | | | | | | | |
| Food and kindred products | 54 | 53 | 32 | 36 | 55 | 52 | 62 |
| Tobacco manufactures | 2 | 3 | 4 | 1 | 3 | 3 | 5 |
| Textiles | 30 | 34 | 23 | 16 | 31 | 33 | 33 |
| Apparel | 2 | -- | 3 | 3 | 5 | 9 | 10 |
| Lumber and Furniture | 5 | 11 | 5 | 7 | 19 | 25 | 13 |
| Paper and allied products | 18 | 21 | 30 | 26 | 32 | 44 | 27 |
| Printing and publishing | 4 | 8 | 4 | 10 | 15 | 17 | 20 |
| Chemicals | 42 | 53 | 35 | 41 | 62 | 59 | 66 |
| Petroleum and coal products | 7 | 13 | 4 | 9 | 18 | 12 | 21 |
| Rubber products | 4 | 5 | 6 | 4 | 4 | 6 | 9 |
| Leather products | 3 | 5 | 1 | 1 | 5 | 1 | 4 |
| Stone, clay, and glass products | 18 | 13 | 22 | 16 | 26 | 19 | 22 |
| Primary metals | 40 | 23 | 31 | 22 | 37 | 19 | 21 |
| Fabricated metals | 45 | 27 | 46 | 34 | 50 | 41 | 35 |
| Machinery, except electrical | 79 | 79 | 57 | 59 | 76 | 61 | 67 |
| Electrical machinery | 45 | 39 | 40 | 40 | 60 | 92 | 88 |
| Transportation equipment | 39 | 46 | 25 | 38 | 47 | 47 | 38 |
| Professional and scientific instruments | 12 | 14 | 16 | 21 | 30 | 17 | 26 |
| Miscellaneous | 16 | 12 | 23 | 9 | 19 | 28 | 13 |
| Nonmanufacturing | 26 | 43 | 52 | 25 | 33 | 33 | 61 |
| Total | 525 | 537 | 490 | 457 | 656 | 635 | 671 |

Note: Data limited to actions reported by Moody's Investors Service and Standard and Poor's Corporation.

The Federal Trade Commission cautions that the mergers shown are only a partial list and are published only to show the trend. There are many smaller mergers not listed by Moody's or by Standard and Poor's.

Source: Federal Trade Commission news releases.

The shortcomings of simply counting mergers recorded in a 12-month period within several industries are legion. Principal among them is the assumption that all mergers are of the same size. Three mergers involving Georgia-Pacific Corp. as the acquiring firm may exceed in importance four-score small mergers elsewhere. For example, in 1959 Georgia-Pacific acquired Booth-Kelly Lumber Co. for $93 million. Assets included 200,000 acres of timberland, as well as producing plants and an operating railroad. In 1956 the Hammond Lumber Co. was acquired for $75 million, bringing 127,000 acres of timberland into Georgia-Pacific ownership. In 1955 the Coos Bay Lumber Co. was purchased for $70 million, and included among its assets 120,000 acres of timberland (Moody's Investors Service, 1960, pp. 275-276). It is obvious that these three mergers, which involve a total cost of $238 million, may far outweigh in economic significance a large number of smaller mergers. With these reservations in mind, table 2 should be interpreted with caution. The tabulation of mergers shown in table 2 indicates that total merger activity from 1955 through 1961 expanded modestly. The lumber and furniture segment of manufacturing activity and the paper and allied products segment are both among those sectors showing the greatest relative increases in a number of mergers.

## Mergers Among the Present Four Largest Lumber Producing Firms in the Douglas-Fir Subregion, 1940-60

The foregoing has provided a general view of mergers in the lumber industry relative to other U. S. manufacturing industries. For a more detailed examination of mergers in the Douglas-fir sector of the lumber industry, we may examine mergers among the four largest firms producing lumber in the Douglas-fir subregion. The Big Four lumber producers in 1960 were Weyerhaeuser Co., Georgia-Pacific Corp., U. S. Plywood Corp., and Pope & Talbot, Inc. The first three have been involved in extensive merger activity. Pope & Talbot has not been a party to a merger during the 20-year period ending with 1960. In 1961, Pope & Talbot acquired Columbia Veneer Co. At the close of World War II, Georgia-Pacific Corp. (then called the Georgia Hardwood Lumber Co.) was an unimportant factor in the lumber industry. Today, Georgia-Pacific holds second place in regional lumber production.

United States Plywood Corp. acquired full ownership of its first plywood plant as late as 1937 and, by 1940, still had no lumber production in the Douglas-fir subregion. Today, U. S. Plywood is the third largest lumber producer in the subregion, and its mills are supported largely by fee ownership of timber.

Weyerhaeuser Timber Co. (name changed to Weyerhaeuser Co. in 1959) and Pope & Talbot have a long-held leading position in the lumber industry.[2]

In the following list of acquired firms, mergers are listed in which Weyerhaeuser, Georgia-Pacific, and U. S. Plywood are the acquiring firms. The acquired firms in these mergers are not restricted to the Douglas-fir subregion nor to the lumber industry. Judged by the number of such mergers alone, U. S. Plywood has been the most active of the three, having acquired, totally or partially, 28 firms in the 21-year period. Georgia-Pacific made 21 acquisitions beginning in 1944 and at an accelerated rate since 1947. The acquisitions by Georgia-Pacific include some large asset holdings and therefore are of greater significance than the larger number acquired by U. S. Plywood. Weyerhaeuser Co. recorded 18 acquisitions during the 21-year period. The largest was the Kieckhefer-Eddy Companies. Neither firm had operations within the Douglas-fir subregion. The combined purchase price amounted to approximately $200 million, made up of $20,837,448 cash and 5,398,004 shares of Weyerhaeuser Co. stock valued at approximately $180 million (Weyerhaeuser Timber Co., 1957, pp. 4-5).

Following is a list of mergers involving the three largest lumber producing firms as the acquiring firm, Douglas-fir subregion, 1940-60 (sources were Federal Trade Commission and annual reports of acquiring firms):

U. S. Plywood Corp.:

1. Hamilton Veneer Co., Orangeburg, S.C. (1940)
2. Algoma Plywood & Veneer Co., Algoma, Wis. (1940)
3. Tekwood Inc., Lakeport, N. H. (1942)
4. Hay & Co., Ltd., Woodstock, Ontario (1945)
5. Siuslaw Forest Products Co., Mapleton, Oreg. (1945)
6. Kosmos Timber Co. (1946)
7. G. A. Mason Door Co. (1947)
8. One billion feet of timber from Walker family of Minneapolis (1947)
9. National Brick Corp., Long Island City, N.Y. (1953)
10. Siuslaw Forest Products Co. (purchased remainder of minority stock, 1953)

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[2] For an interesting history of the Pope & Talbot operations dating back to 1849, see:

Caman, Edwin T., Jr., and Gibbs, Helen M. Time, tide and timber, a century of Pope & Talbot. 480 pp. Stanford: Stanford University Press. 1949.

Weyerhaeuser Co. history is found in the comprehensive book "Timber and Men: The Weyerhaeuser Story," by Ralph W. Hidy, Frank Ernest Hill, and Allan Nevins. 704 pp. New York: The Macmillan Co. 1963.

Two articles on Weyerhaeuser are also available from previous work:

Anonymous. Bunyan in broadcloth: the house of Weyerhaeuser. Fortune 9(4): 63-65, 170, 173-176, 180, 182. 1934.

Freedgood, Seymour. Weyerhaeuser timber: out of the woods. Fortune 60(1): 93-96. 1959.

For a review of Georgia-Pacific growth and financing, see:

McDonald, John. Georgia-Pacific: it grows big on trees. Fortune 65(5): 111-117. 1962.

11. Capital Plywood, Ltd. (1954)
12. Associated Plywood Mills, Inc., Eugene, Oreg. (plywood) (1954)
13. Shasta Box Co., Douglas City, Calif. (wooden boxes) (1954)
14. Canadian Plywood Ltd. (1955)
15. Muskoka Wood Products Ltd., Ontario (1955)
16. Seattle Export Lumber Co. (1955)
17. Youngs Bay Lumber Co., Inc., Roseburg, Oreg. (1956)
18. North Umpqua Timber Co. (acquired as a wholly owned subsidiary of Youngs Bay Lumber Co.)
19. Barasch Co., N.Y. (vinyl and other plastic materials) (1956)
20. Mutual Plywood Corp., Eureka, Calif. (plywood plant) (1958)
21. National Concrete Corp. (1958)
22. Western Battery Separator Co., San Francisco (wooden handles and plywood veneer) (1959)
23. D. D. Millar & Associates, Ltd., Montreal, Canada (architectural and industrial products; through Weldwood Plywood Ltd.) (1959)
24. Stebco Inc., Vancouver, Wash. (timber) (1959)
25. Walker Logging Co. (1959)
26. Berkeley Plywood Corp., Inc., San Leandro, Calif. (panelized roof system and other plywood building components) (1960)
27. Bohemia Lumber Co., Culp Creek, Oreg. (acquired 50 percent interest) (1960)
28. Panelbild Systems Inc., Seattle, Wash. (1960)

Georgia-Pacific Corp.:

1. Hillgard Lumber Co. (1944)
2. Bellingham Plywood Corp. (1947)
3. Washington Veneer Co. from Weyerhaeuser Timber Co., Olympia, Wash. (1948)
4. General Plywood (partial) (1948)
5. Acme Door Co., Hoquiam, Wash. (1950)
6. C. D. Johnson Lumber Co., Portland, Oreg. (1951)
7. Commercial Sash & Door, Pittsburgh, Pa. (1951)
8. Inman-Poulson Lumber Co. (1954)
9. Western Logging Co. (1954)
10. Saginaw Timber Co.
11. Feather River Pine Mills (1955)
12. Oregon-Mesabi Corp. (timber tracts) (1955)
13. Hammond Lumber Corp., San Francisco (timber holdings, finishing plants) (1956)
14. Sand (Charles E.) Plywood Co., Portland, Oreg. (building materials) (1956)

15. Coos Bay Lumber Co. (1956)
16. Williams Lumber Co., Enfield, N.C. (1957)
17. Denny Veneer Co., Roseboro, N.C. (partial) (1958)
18. Booth-Kelly Lumber Co., Springfield, Oreg. (1959)
19. Skelton Logging Co. (1959)
20. W. M. Ritter Lumber Co., Inc., Roanoke, Va. (lumber and wood products) (1960)
21. Pilot Rock Lumber Co., Inc., Pilot Rock, Oreg. (timber and lumber mills) (1960)

Weyerhaeuser Co.:

1. Washington Veneer Co. (1940)
2. Drew Timber Co. (1940)
3. Coos Bay Logging Co., North Bend, Oreg. (assets $7,186,607) (1944)
4. Kruse-Banks Shipyard, North Bend, Oreg. (1945)
5. Ewauna Box Co., Klamath Falls, Oreg. (1948)
6. Grandin-Coast Co. (1948)
7. Snoqualmie Falls Lumber Co. (purchased residual ownership) (1948)
8. Willapa Harbor Lumber Mills (purchased residual ownership) (1949)
9. White River Lumber Co. (purchased residual ownership) (1949)
10. Woodard (W. A.) Lumber Co., Cottage Grove, Oreg. (1956)
11. Hawaiian Pineapple Co. Ltd., Honolulu, T. H. (Honolulu corrugated and shipping container plant) (1957)
12. Kieckhefer Container Co. (1957)
13. Eddy Paper Co. (1957)
14. United Wood Corp., West Memphis, Ark. (1959)
15. Corrugated Containers Inc., Hartford, Conn. (corrugated shipping containers) (1960)
16. Lebanite Products Division of Cascade Plywood Corp. (1960)
17. Rilco Laminated Products Inc. (1960)
18. Roddis Plywood Corp. (1960)

## Rationale for Mergers in the Douglas-Fir Lumber Industry

In order to determine why the merger movement in the lumber industry has been relatively intense during the decade of the 1950's, the author conducted interviews with 18 people who have been involved in one way or another in merger activity. During the interviews, 23 separate mergers involving 10 acquiring firms and 23 acquired firms were discussed. Motives were examined from both the acquired firm and the acquiring firm point of view.

The limitations of this empirical study of merger motives should be clearly understood. The sample is not a large one, nor is it representative of all the mergers during any period. While the number of mergers examined is probably large enough to indicate the principal reasons for mergers, a larger sample would certainly increase the variety of less important merger motives. Further, an inquiry into motives for human behavior is never quite as simple as it first appears. A major management decision is a complex of many forces. The former owner of an acquired firm may not be able to indicate, with confidence, the single major factor that caused him to sell his firm. Several forces may have been present, any of which, in the absence of the others, might still have resulted in the same decision to sell. Because of the decision-making complexity and because the study is based upon a simple rather than a complete survey of all mergers, the conclusions must be interpreted cautiously.

One further limitation results from the nondisclosure agreement consummated prior to each interview. The executives interviewed were assured that firm names would not be associated with information gathered in the interviews. This nondisclosure limitation, of course, does not apply to already published information.

## Merger Motives from the Acquired Firm Point of View

The interview design was based upon the division of merger motives into tax considerations and nontax considerations, each with the following subcategories:

1. Tax motives for selling
    a. estate tax considerations
    b. capital gains vs. ordinary income tax considerations
2. Nontax motives for selling
    a. management considerations
    b. investment difficulties
    c. financial difficulties

The above interview design is adapted from another study of merger motives concerned with a cross section of the U. S. economy. The same interview design was used in order to make comparisons possible between motives found for mergers in the lumber industry and merger motivation found in the more broadly based study (Butters et al., 1951).

## Tax Motives of Acquired Firms

In the Butters, Lintner, and Cary study of 104 mergers involving manufacturing companies and occurring from 1940 through 1949, the conclusion was reached that "Taxes constituted an important reason for the sale of about one-tenth of the total number of selling companies . . ." (Butters et al. 1951, p. 232). Taxes were found to be a more important consideration motivating the sale of a large firm than of a small firm.

Estate tax considerations. — For lumber mergers, 2 of the 23 acquired firms cited estate tax considerations as an important factor leading to a merger. In one of these, involving a $17 million cash transaction, estate taxes were important but were not held to be the prime factor leading to the sale. In the words of the owner-seller, "the cash requirements to pay inheritance taxes would have stripped the estate of cash." In this instance, the merger transaction took place during the lifetime of the owner, but the second instance where estate taxes were important involved a sale after the death of principal owners. In this case, three partners died within a short period of time leaving their shares in the business to their widows. Cash was not available to pay inheritance taxes, and the enterprise was sold to a larger firm in the same industry. In this instance, estate tax considerations appeared to be the dominant factor leading to merger.

Capital gains vs. ordinary income tax considerations.——Liquidation of a company through merger, in order to avoid the high ordinary income tax rates in favor of lower capital gains tax rates, was often mentioned as a factor leading to merger. However, in no instance was this motive given as the principal motive for merger. It can be reasoned that taking the capital gains route would be less important as a merger cause in the lumber industry than for other U. S. industries. In all 23 cases studied, the acquired enterprises also owned timber. Firms owning the natural resource, timber, have access to capital gains treatment of income from sale or use of timber without the need of sale of the entire enterprise. Capital gains treatment for timber cut during a given year became established in the Revenue Act of 1943, Section 117(k)(1), conferring upon the timber owner who cut his timber for sale or further processing within his own plants the right of treating a gain in stumpage value as a capital gain rather than ordinary income. Prior to the enactment of Section 117(k)(1), the timber owner was required to sell his stumpage or stumpage and land outright in order to get capital gains treatment. Section 117(k)(1) allowed the bookkeeping procedure of selling one's own timber to one's self for further processing. The Internal Revenue Code of 1954 contains Section 631(a) which preserves and expands Section 117(k)(1).

In harvesting timber and processing it into lumber and other products, capital gains treatment is accorded the difference in value between the cost or other basis for depletion accounting and fair market value on the first day of the taxable year in which the timber is harvested. It is widely acknowledged in the lumber industry that much of the profit from harvesting one's own timber and processing it into lumber and other products can and does stem from capital gains due to timber ownership if one has established a low cost basis relative to current fair market value. This may be documented in tax returns of the major firms in the industry. For example, in 1960, Weyerhaeuser Co., the principal lumber producer in the Douglas-fir subregion and the Nation, paid Federal income taxes amounting to $23,700,000 out of $71,451,000 before-tax net income for the year.[3] The effective tax rate is 33.1 percent for comparison with the 25-percent rate prevailing on capital gains and with the 52-percent basic rate applying to corporations. For all U. S. corporations in the $50 million to $100 million tax bracket, the effective tax rate was 46 percent (U. S. Treasury Department, 1961, p. 109). For Georgia-Pacific Corp., the second largest lumber producer in the subregion, the effective Federal income tax rate was 31 percent on $22,200,000 of 1960 net profit before taxes. The effective tax rate for all U. S. corporations in the $10 million to $25 million tax bracket was 45 percent. The third and fourth largest producers in the subregion, U. S. Plywood and Pope & Talbot, had effective 1960 Federal income tax rates of 43.5 percent and 39.7 percent, respectively.

Acquired companies having income from sources other than timber ownership also realized substantial benefits from capital gains tax treatment. For example, Coos Bay Lumber Co. in 1954 paid Federal income taxes amounting to $844,611 on $2,694,903 of net income before Federal income taxes. The effective rate was 31.3 percent compared with 45 percent for all U. S. corporations in a similar tax bracket. In 1956, Coos Bay Lumber Co. was acquired by Georgia-Pacific Corp. (Georgia-Pacific Corp., 1956, p. 4). The M&M Woodworking Co. in 1955 had an effective Federal income tax rate amounting to 37.4 percent. In the following year, 1956, Simpson Timber Co. acquired M&M Woodworking Co. in a cash transaction exceeding $50,000,000.[4]

In order to take maximum advantage from the capital gains provision within the context of continued operations as an independent operator, the firm must have income from sources other than holding and harvesting timber. Such other sources might consist of lumber milling as a minimum, and preferably plywood and pulp and paper production in addition. This

[3] Company data are taken from annual reports of the respective firms.
[4] Federal Trade Commission Dock 7713, in the matter of the Simpson Timber Co. and Simpson Redwood Co., p. 4. April 20, 1960.

is necessary for two reasons: (1) Such expenses as property taxes and timber management incurred to produce a capital gain are chargeable against ordinary income which, for corporations, may be subject to a 52-percent tax bracket. (2) Fair market value at the time of harvest is not an arms-length transaction, but rather a determination based on judgment (subject to examination by the Internal Revenue Service). In this process stumpage is assigned a value. This value is thereafter considered as the cost of such timber for the purpose of further processing. The higher the assigned cost, the higher will be the capital gain subject to a low tax rate and the lower will be normal income subject to higher ordinary income tax rates. Therefore, there must be substantial ordinary income before such tax benefits may be fully realized.

For these reasons, there is an incentive for the nonintegrated timber owner to sell out and take his income via the capital gains route.[5] However, since all of the acquired enterprises studied here owned both timber reserves and some milling facilities, they already enjoyed some of the benefits of capital gains tax treatment. Thus, one would expect the study to reveal, as it does, that the capital gains tax incentive to merge would be found with less frequency than for the firms and industries studied by Butters, Lintner, and Cary.

## Nontax Motives of Acquired Firms

Nontax factors were found in the Butters, Lintner, and Cary study to constitute an important reason for sale of about nine-tenths of the total number of selling companies and were of greater importance to small acquired firms than to large firms. Butters, Lintner, and Cary concluded that, among the nontax merger motives, management considerations accounted for about half of the smaller mergers (where the acquired firm asset size was less than $15 million) and about one-fourth of the mergers involving selling firms with assets in excess of $15 million.

Management considerations as merger motives.——Principal among the management considerations is a condition described by Butters, Lintner, and Cary as follows: "Top management had become incapable of keeping up with its competition."

In this lumber industry study, more than half of the 23 acquired firms decided in favor of merger principally as a result of concluding that they were unable to compete with the larger integrated firms. This inability to compete was, in turn, commonly attributed to two related factors: lack of integration and lack of assured timber supply. Most of the interviewees

[5] For a more complete discussion of the economics of capital gains treatment for the lumber industry see pages 81-89 of: Mead, Walter J. Taxation and conservation of privately owned timber, the impact of capital gains taxes on timber resource utilization. Proceedings of Conference, University of Oregon, Eugene. 95 pp. 1959.

connected an inability to become integrated with an inability to meet competitive prices for increasingly scarce or more distant stumpage supplies. Or, conversely, an assured supply of timber was necessary in order to protect heavy investments needed to build competitive processing facilities. This motive was identified by another research study involving mergers in the lumber industry. Dealey wrote, "One of the most evident reasons is a shortage of timber supply. If a company is in such a position that it does not have sufficient timber of its own to continue operations and is not able to compete successfully for other timber, it must close its plant or sell it to a company which has available timber" (Dealey, 1958, p. 101).

One owner-manager interviewed explained that there was U. S. Forest Service timber to the east and west, but there were fully integrated producers owning timber to the north and south in close proximity to the Federal timber. He continued by pointing out that he had an efficient sawmill and a modern plywood plant and was able to sell his chips to a pulpmill; however, the market price of his chips was only $8 per unit. He argued, the same chips were worth about $20 per unit to an integrated firm with a pulp operation, because it could profit from chip conversion to pulp. Some of his competitors for Federal stumpage possessed this advantage, and he felt that this enabled them to outbid him for Federal stumpage. He also added that other producers in the area have plyboard and hardboard plants plus further degrees of integration and thereby are apparently able to outbid him for stumpage.

In a similar instance, the owner-seller justified the merger on the grounds that integration is a prerequisite to effective competition. Prior to selling, this firm considered the addition of a pulpmill to existing multiple lumber mills and a single plywood mill, but timber holdings were not adequate to completely support a fully integrated operation. Large quantities of chips would have to be purchased and, in addition, stumpage secured from Federal sources. It was known also that two other firms in the same geographical area, but with better timber positions, were also interested in establishing fully integrated units. The owner-seller being interviewed concluded that the optimum means of reaching full integration was to allow his firm to be acquired in a merger with other firms having similar interests. The result would be a far more secure raw material position. Thus, in this instance, inability to compete as an independent was the principal motive leading to the merger. But the motive may also be described as an attempt to obtain vertical integration. The family of the owner-seller became major stockholders of the surviving firm, with immediate family members in top-management positions. Vertical integration was a motive for the acquired firm in this case.

One owner of a lumber mill and a small quantity of timber pleaded, "I'm too old." The merger path was taken as the best alternative method of retiring. In another instance, "The family got old on the job. There was no steam left." There were no sons to continue the operation and "the family wanted to cash out." In yet another case, the owner-operator wished to retire and found that his sons had interests elsewhere. The firm's timber was sold for cash to two large competitors and the sawmill scrapped. And finally, in another case, management had been a "one-man show" for years and had declined in effectiveness.

Dissension among owners, who in one case were recent heirs, contributed to a merger move in two instances. In neither instance was this motive described as dominant.

Investment position of owners as a merger motive.——In two instances where the firms were running low on timber, merger offered the possibility of salvaging more than scrap value from sawmilling facilities. In both cases, the acquiring firm owned timber near that owned by the acquired firm. The sawmill thus had functional value to the buyer in addition to the value of the remaining timber. Alternatively, if merger had been rejected and operations continued until timber owned was exhausted, then a greater probability would have existed that the sawmilling facilities owned would yield only dismantled and used-equipment value.

Butters, Lintner, and Cary argued that, largely for tax reasons, "a closely held company often has a substantially greater value to a potential purchaser than to its existing owners. A large purchaser is, therefore, likely to be able to offer a price so favorable that the existing owners will feel that it would be foolhardy to decline the opportunity to consolidate their position by cashing in their gain" (Butters et al., 1951, p. 14). Although the causal relationship in the lumber industry may not be as simple, the evidence clearly indicates that acquired firms were often of substantially greater value to the buyer than to former owners, as reflected in security values. The value differential to the buyer over the seller must be sufficient to cover any capital gains tax liability to the buyer, in addition to providing the financial inducement to sell. The tax liability is limited to the low capital gains tax rate and applies only to the gain in value between original acquisition and sale.

When a merger offer is made involving a cash or stock value far in excess of normal market value for securities of the acquired company, this in itself becomes a strong motive to merge. There are abundant illustrations of the point both outside and within the lumber industry. For example, in 1961 Weyerhaeuser Co. proposed to acquire the stock of Hamilton Paper

Co., a nonlumber company. The stock of Hamilton normally traded at less than half the value of Weyerhaeuser stock, as shown in table 3. But the merger proposal offered Hamilton shareholders 9 shares of Weyerhaeuser stock for 10 of Hamilton stock. When the Hamilton shareholders received their proxy statement requesting approval of the merger, Weyerhaeuser stock was shown to have a recent closing value amounting to 36-7/8. Hamilton stock had traded throughout 1960 at an average price of about $18 per share. The exchange for Weyerhaeuser stock would yield approximately $33 of market value, an inducement to merge amounting to an 83-percent increase over the existing Hamilton stock value. Hamilton stock promptly rose in value to the $33 area in the first quarter of 1961 and was quoted at $29.50 in the proxy statement requesting merger approval. If the stockholders voted negatively, they presumably would find their stock dropping in value back to the approximately $18 level.

Table 3. — Weyerhaeuser Co. and Hamilton Paper Co. common stock prices prior to merger (midpoint between high and low for period)

| Period | Weyerhaeuser Co. | Hamilton Paper Co. |
|---|---|---|
| | Dollars | |
| 1959: | | |
| First quarter | 46 | 19-5/8 |
| Second quarter | 43-3/4 | 16-3/8 |
| Third quarter | 45 | 16-1/2 |
| Fourth quarter | 41-1/2 | 14-1/2 |
| 1960: | | |
| First quarter | 38-3/4 | 17-1/2 |
| Second quarter | 36-1/4 | 18-7/8 |
| Third quarter | 33 | 18-3/4 |
| Fourth quarter | 32-1/2 | 18-1/2 |
| 1961: | | |
| First quarter | 36-7/8 | -- |
| Closing prices contained in Plan of Reorganization and Agreement between Hamilton and Weyerhaeuser | 36-1/2 | 29-1/2 |

Source: Hamilton Paper Co. proxy statement, April 7, 1961.

In 1956 the International Paper Co. tendered a merger offer to Long-Bell Corp., a holding company, and the Long-Bell Lumber Co., an operating company. As shown in table 4, the common stock of Long-Bell Lumber Co. in the fourth quarter of 1955 traded at an average price of 25-1/4. By an exchange of stock, one share of Long-Bell Lumber Co. stock could be converted into 0.42642 share of International Paper Co. stock.

On August 31, 1956, International Paper stock was traded at 126-3/8; thus, one share of Long-Bell became valued through merger at $53.89. In addition, there was a contingent interest set aside to protect International Paper from loss due to a lawsuit filed by Harbor Plywood Corp. against

Long-Bell and, secondly, from unknown Federal tax liabilities of Long-Bell. This contingent interest could add as much as $3.17 to the value of the merger offer to Long-Bell stockholders. Without the contingent interest, Long-Bell Lumber Co. stockholders were offered a market value amounting to more than double (213 percent) the fourth quarter 1955 average value of their shares.

Table 4. — International Paper Co. and Long-Bell Lumber Co. common stock prices prior to merger (mid-point between high and low for period)

| Period | International Paper Co. | Lang-Bell Lumber Co. |
|---|---|---|
| | Dollars | |
| 1954: | | |
| First quarter | 53-1/4 | 17-3/8 |
| Second quarter | 61-7/8 | 17-3/4 |
| Third quarter | 70 | 17-5/8 |
| Fourth quarter | 81-1/2 | 19-1/8 |
| 1955: | | |
| First quarter | 84 | 20-7/8 |
| Second quarter | 96 | 22-3/8 |
| Third quarter | 105 | 26-1/4 |
| Fourth quarter | 105-1/2 | 25-1/4 |
| 1956: | | |
| First quarter | 115 | 38-1/2 |
| Second quarter | 133 | 49-3/4 |

Source: International Paper Co. proxy statement, September 8, 1956, p. 17.

When Simpson Timber Co. acquired M&M Woodworking Co., a cash payment amounting to $35 per share was offered for M&M shares normally selling for about $15 per share (Business Week, 1956, p. 139).

A series of newspaper accounts also illustrate this merger motive. On May 29, 1959, U. S. Plywood announced an offer to purchase the assets of Booth-Kelly Lumber Co. in Springfield, Oreg., for about $85 million. In the preceding year, the stock of Booth-Kelly sold within the range of $650 to $700 per share. The U. S. Plywood offer would have netted Booth-Kelly stockholders $3,906 per share, representing a gain of 479 percent.[6] On July 13, 1959, Georgia-Pacific Corp. bypassed management and offered to purchase the outstanding stock of Booth-Kelly for $4,250 per share, or approximately $93 million for the lumber company in total.[7] The Georgia-Pacific offer represented a gain of 530 percent over the average 1958 selling price of Booth-Kelly shares. Georgia-Pacific's offer required that 51 percent or more of the Booth-Kelly stock be deposited with an intermediary bank. On July 17, 1959, more than the required number of shares were deposited and the short contest between U. S. Plywood and Georgia-Pacific was settled in favor of the latter.[8]

[6] New York Times, p. 29, May 29, 1959.
[7] New York Times, p. 37, July 13, 1959.
[8] New York Times, p. 27, July 17, 1959.

These four cases illustrate well how an attractive merger offer may be a sufficient motive, from an investment point of view, for the acquired firm (through its stockholders) to accept a merger offer in preference to continued independent operations.

Among the 23 acquired firms studied, receipt of an attractive merger offer appears to be the dominant consideration leading to sale in one instance and a very important factor, though not the dominant one, in a second case. It should be understood that in all cases the sale price at which a merger is accomplished is attractive relative to the investment value of continuing independent operations. Otherwise the sale would not have taken place.

Financial difficulties of sellers as merger motives.——Among the 23 acquired lumber firms, only one reported financial difficulties as primary condition leading to merger. In this instance, the firm owned some timber and was operating on inadequate working capital. Its lumber production was loaded directly from the green chain into railroad boxcars for shipment and sold at the end of each day to a wholesale lumber company. The seller would receive a cash advance daily, covering the sale. The wholesale lumber company, in turn, would start such loaded freight cars moving east toward their ultimate market, but without a prior purchaser or a final destination. This process, termed "transit shipping," was restricted during 1960 by order of the Interstate Commerce Commission. The consequent decline of transit shipping meant that the firm in question was no longer able to get payment from the wholesaler simultaneously, or nearly so, with production. Financial difficulties resulted, and the firm, together with its timber, was sold to a more securely financed organization.

## Merger Motives from the Acquiring Firm Point of View

Shifting now to the acquiring firm's point of view to examine factors leading to merger, we should differentiate two levels of motives. We assume that firms decide to acquire other existing firms primarily for reasons pertaining to profit maximization or stabilization. Our interest is in the second level of motives, namely, the manager's reasons for believing a merger path will in turn serve the objectives of profit maximization or stabilization. In examining this second level of motivation, the framework provided by Butters, Lintner, and Cary will again be employed. The categories of motives to be examined are as follows:

1. Tax motives for buying
2. Nontax motives for buying
    a. Vertical integration and closer utilization
    b. New product, new plant, and new production organization
    c. Financial advantage

## Tax Motives for Buying

First, concerning taxation as a motive for the acquiring firm, Butters, Lintner, and Cary concluded that this motive was "of little consequence." They found only three instances out of 104 cases studied where taxation was believed to be the principal motive. The lumber industry stands in contrast. From the acquiring firm viewpoint, taxation provides an important incentive for merger in the lumber industry, at least during the present wave of merger activity.

Capital gains income may result either from physical growth of timber, which causes value to increase, or from an increase in value of stumpage independent of growth. From 1890 to 1916, Douglas-fir stumpage values increased from $0.10 to $2.50 per thousand board feet (Kirkland, 1917, p. 35). During the last two decades, stumpage value independent of growth

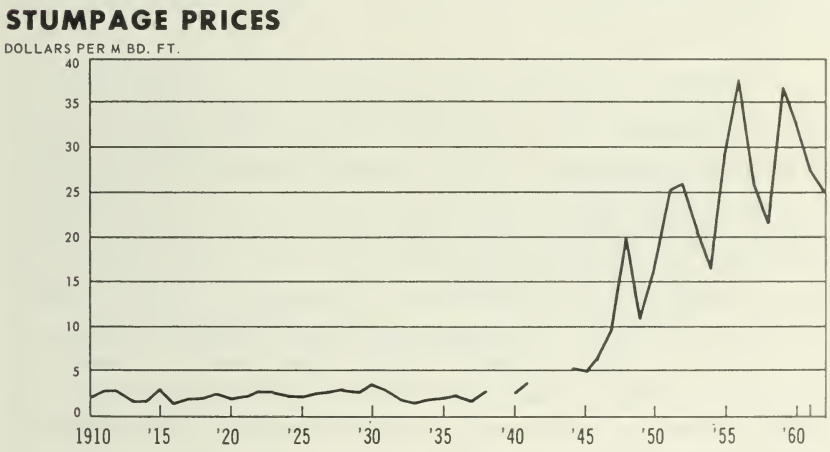



Figure 2. — Douglas-fir stumpage prices, 1910-62.

has again increased sharply. Figure 2 illustrates this remarkable development in the period of time from 1910 through 1962. Stumpage value

remained below $5 per thousand board feet until the beginning of World War II. From 1940 through 1960, Douglas-fir stumpage prices increased more than 1,300 percent. During the same period of time, the index of all commodities' wholesale prices increased only 134 percent. The management of Georgia-Pacific pointed out to stockholders that "old-growth timber, by its very nature is in diminishing supply and is a sound investment. The average cost of our total old-growth timber ownership is about $10 per thousand feet, without assigning any value to either the land or the young growth" (Georgia-Pacific Corp., 1956, p. 5). In another annual report, the president of Georgia-Pacific wrote: "Timber values are constantly increasing. Our present holdings could not be duplicated. Choice logs are in great demand and good, well-located, accessible timber is a sound and liquid investment." Though Georgia-Pacific entered the Douglas-fir lumber industry after the close of World War II, the president was able to say that the current market value of the Corporation's timber was worth approximately 2-1/2 times its cost (Georgia-Pacific Corp., 1954, p. 4).

As pointed out earlier, the growth in value of timber is of added significance in the lumber industry compared to other manufacturing industries for the reason that such gains in value are taxable as capital gains and not as ordinary income. This provides an incentive for the larger companies with corporate structure to acquire timber from others whose life span may be shorter or whose economic horizon is more limited.

In addition to the rapidly rising value of timber per thousand board feet, several other changes have taken place in rapid succession during the last two decades. First, standards of utilization have changed. Some of what were weed species of timber now have economic value. Second, trees of smaller diameter that were passed up as being of submarginal value prior to World War II are economically merchantable today. Finally, timber is still occasionally valued on the basis of old cruises which not only underestimated volume but neglected weed species and timber of small diameter as well. These three points together were identified by one careful observer as strong motives to acquire timber at bargain prices. As it is harvested and manufactured into various timber products, a large part of the profit may be treated as capital gain and taxed at relatively attractive rates.

Georgia-Pacific has been able to take maximum advantage of these factors. The Booth-Kelly timber acquired in 1959 represented one of the largest "independent" holdings of timber in the West. Management reported that "we sold some of the Booth-Kelly assets to others, but the great majority of the timber and timberlands were retained for our own use"

(Georgia-Pacific, 1959, p. 4). By selling a minority of the timber and timberland, Georgia-Pacific was able to liquidate the majority of the original cost, reducing it from $93 million to $40 million. Management was then able to say, "our over-all timber cost stands at only a fraction of current market value" (Georgia-Pacific, 1959).

Acquisitions prior to 1957 likewise produced capital gains for Georgia-Pacific. Between July 1956 and September 1957, the corporation sold 1.5 billion feet of its previously acquired timber for $30 per thousand board feet and contemplated the sale of approximately 1 billion additional feet under the same terms. Yet the corporation retained timber which was valued on the books at a cost of only $10 per thousand board feet, "a remarkably low figure for the quality of the timber reserve owned. It is sufficient to note that the present market value of Georgia-Pacific timber is considerably higher than this book value" (Blyth & Co., Inc., 1957, p. 10).

Tax motives leading to merger from the acquiring firm point of view were found by Butters, Lintner, and Cary to be of "little consequence" for the cross section of mergers included in their study. For the lumber industry, a combination of anticipated growth in stumpage value and favorable tax treatment of such capital gains, results in complex capital gain tax considerations —— an important cause leading to merger from the acquiring firm point of view.

## Nontax Motives for Buying

Remembering that pursuit of profit is the single underlying force that must be assumed behind all mergers, we may examine secondary nontax motives under three subheadings: first, vertical integration based on timber ownership plus one or more processing stages for facilitating closer utilization of raw material input; second, the need to obtain already established new products, plants, and proven production organizations; and third, an interest in financial advantages related to the money markets.

Vertical integration and closer utilization.——The most common nontax motive, accounting for 18 of the 23 mergers studied, was vertical integration for the buying firm. For the lumber industry, vertical integration is of significantly greater importance than for the cross section of industries studied by Butters, Lintner, and Cary, wherein vertical integration was a principal motive for only one-third of the mergers studied.

Vertical integration in the lumber industry is characterized by ownership of timber, logging operations, and processing facilities for one or more of the following products: lumber, veneer, plywood, particle board, hardboard, or pulp and paper. Residual from sawmills and veneer plants would

be processed into chips which in turn become raw material for a pulpmill. A firm may also utilize bark for various products and may produce electric power from burnable material not otherwise utilized.[9] Finally, vertical integration might be continued to include wholesale distribution and retail outlets.

An integrated firm can channel logs from company timberlands into their optimum economic utilization, thus enabling one manager to claim that "if stumpage is worth $20 per thousand board feet to a nonintegrated company, my company can get $40 of value per thousand board feet with full integration."

One firm was able to purchase a substantial quantity of timber plus processing plants where the existing facilities did not include equipment to remove the bark from the logs nor facilities to chip the bark-free residual. Utilization was limited to lumber and plywood. The acquiring firm was able to add a pulp and paper mill and thereby substantially increase the capitalized value of the stumpage. Whereas the management of the acquired firm had argued that their timber holdings were insufficient to justify large investments in further utilization, the acquiring firm combined the timber obtained through this and prior mergers in the same operating area and was able to justify substantial investments in further degrees of utilization.

In another instance, a major lumber producing firm was a minority partner in a processing plant sustained by timber ownership. The majority partners were unwilling to invest in further degrees of utilization. The former elected to buy out the latter and carry through additional degrees of integration. In yet another instance, the acquiring firm was principally a marketing organization, purchasing finished products from many suppliers. Backward integration was pursued in order to gain greater quality control over products being marketed.

Conclusions with reference to the vertical integration motive (a non-tax motive) for mergers, and the tax motive for mergers from the acquiring firm point of view must be interpreted with considerable caution. Where acquisition of timber is the principal factor leading one firm to acquire another, management may be motivated by a desire to improve vertical integration, while at the same time it may recognize that such timber will

[9] The gains of vertical integration might also be realized by nonintegrated firms if free and adequate markets existed at several levels of processing. Then it would be possible for a timber owner who had only a sawmill to sell his peelable logs to a veneer plant and his pulp logs and chips to a pulpmill. However, such ready markets do not exist for all nonintegrated firms. Using chips as an example, there are 22 pulpmills scattered through the Douglas-fir subregion to which chips might be sold. Sixteen of these are owned by four firms. The remaining six are owned by six firms. Because of the relatively heavy cost of transporting low value chips and the presence of few buyers necessarily clustered about the waterways of the subregion, the chip procurement market is accurately described as an oligopsony, i.e., few large buyers.

likely grow in value and that resulting values are subject to favorable tax treatment under the capital gains tax provision accorded to timber. The motives are difficult to separate, both in the mind of the decision-maker and in that of the researcher. The two factors together account for nearly all lumber industry mergers from the acquiring firm point of view.

New product, new plant, and new production organization.——This group of motives was found by Butters, Lintner, and Cary to be a major class of motives accounting for more than half of the acquisitions studied. In contrast, this class of motives is relatively unimportant in the lumber industry. All of the acquired firms owned timber in varying amounts. The principal interest centered around acquiring timber for reasons listed above.

Financial advantage.——This final nontax motive for purchase accounted for "about a dozen" cases of the 104 studied by Butters, Lintner, and Cary. They refer to "specific financial advantages such as improved marketability of stock or increased availability of outside capital." In no instance was financial advantage felt to be the most important motive for purchase in the lumber industry. Historically, firms in this industry have been owned, operated, and managed by men who have been, relatively speaking, production-oriented almost to the complete absence of a finance orientation. In recent years, a finance and marketing orientation has appeared, especially in the management of some of the new and large firms in the industry. However, even among these firms, the dominant purchase motive for mergers in which they were involved is felt to be adequately accounted for by either the vertical integration motive or the complex motive involving anticipated capital gains from timber ownership and favorable tax treatment of such gain.

## Summary

From the acquired firm's point of view, taxes appear to be less important as a merger motive in the lumber industry than in the cross section of cases studied by Butters, Lintner, and Cary. The difference is that firms owning and processing timber have access to favorable capital gains tax treatment without the need of selling out.

Second, among the management considerations, the pressure of competition was found to account for well more than half of the mergers in lumber. Management seems to believe that effective competition requires vertical integration in today's lumber industry. One owner-seller concluded that the simplest solution to competition was to sell out.

Third, investment considerations motivated mergers in this lumber industry study with approximately the same frequency as in the Butters, Lintner,

and Cary study. An offer to merge per se becomes a merger motive when it obviously is significantly more profitable to merge than to operate independently. Similarly, a fourth motive, financial difficulty, was found with approximately the same frequency.

From the acquiring firm's point of view, the tax motive was found to be far more important in the lumber industry than those industries in the general study. This arises out of past and anticipated future capital gains from holding and processing timber, subject to favorable capital gains tax treatment.

The most common motive for the surviving firm in lumber mergers, and far more important than shown in the general study, was vertical integration. The impression that there are significant economies of scale associated with vertical integration seems to be held by both parties to the merger.

A major class of nontax motives in the Butters, Lintner, and Cary general study —— obtaining a new plant, new product, and new production organization —— was represented in lumber industry mergers, but not in the same degree of importance.

# Economic Concentration In Timber Resource Ownership

In this section, we will be concerned with the concentration of economic power that exists at the first of three market levels in the Douglas-fir lumber industry: (1) timber resource ownership, (2) lumber production, and (3) wholesale lumber distribution. In order to draw conclusions about the degree of economic concentration and its trend over time, concentration ratios will be used. A concentration ratio refers to the share of a given market accounted for by a few large sellers in the market. In the context of timber resource concentration, it is a ratio where the numerator is the summation of timberland held by the "big few" and the denominator is the total ownership by all firms in the industry.

## The Present Degree of Economic Concentration In Resource Ownership

What do the facts show about the present degree of economic concentration in timber ownership and the trend of concentration over time? Table 5 has been prepared to show the present position of the four largest and the eight largest ownerships in the Douglas-fir subregion. As of 1960, the Big Four in the Douglas-fir subregion accounted for 13.7 percent of all commercial forest land in the subregion. Thus, a little more than one-seventh of all commercial forest land is held in fee ownership by the four largest producers. The eight largest firms owning commercial forest land in the area account for 17.9 percent of all commercial forest land.

The concentration of ownership by the Big Four and the Big Eight may also be viewed in terms of their share of the privately owned commercial forest land. Table 5 shows that the four largest owners account for 26.2 percent, or a little more than one-fourth of all privately owned commercial forest land in the Douglas-fir subregion. The eight largest owners account for 34.1 percent, or more than one-third of all privately owned commercial forest land.

Finally, we have estimated concentration within the private forest industry sector only. Here the Big Four hold approximately 48 percent and the Big Eight hold 62 percent of all private forest industry ownership.

Table 5. — Economic concentration in commercial forest-land ownership in the Douglas-fir subregion, 1953 and 1960

| Commercial forest land | 1953 | | | 1960 | | |
|---|---|---|---|---|---|---|
| | Area | All ownerships | Private ownerships | Area | All ownerships | Private ownerships |
| | Thousand acres | — — — Percent — — — | | Thousand acres | — — — Percent — — — | |
| Public and private ownerships | 25,455 | 100.0 | -- | 25,455 | 100.0 | -- |
| Privately owned | 13,325 | 52.3 | 100.0 | 13,325 | 52.3 | 100.0 |
| Four largest private ownerships | 2,988 | 11.7 | 22.4 | 3,493 | 13.7 | 26.2 |
| Eight largest private ownerships | 3,656 | 14.4 | 27.4 | 4,549 | 17.9 | 34.1 |

Source: 1960 data supplied by cooperating firms or developed from published annual reports or Federal Trade Commission records on mergers; however, public and private totals for 1960 are same as for 1953. Data for 1953 developed from records supplied by U. S. Forest Service (1958, p. 548).

Within the four largest ownerships there is a high degree of concentration. The largest commercial forest-land owner in the Douglas-fir subregion owns well more than half (61.6 percent) of the acreage shown for the Big Four. Further, the single largest firm's holdings account for nearly half (47.3 percent) of the eight largest ownerships in the Douglas-fir subregion.

Concentration in timberland ownership may also be viewed in terms of those ownerships in excess of 50,000 acres (see table 6). In 1953 there were 23 such ownerships out of a total of 67,983 ownerships in the Douglas-fir subregion. These ownerships accounted for 5,009,000 acres out of a total private ownership of 13,325,000 acres. Thus, the 23 largest ownerships were only three one-hundredths of 1 percent (0.03 percent) of the total number of timberland owners but they owned more than 37 percent of all private timberland.

Table 6. — Concentration in private timberland ownership in the Douglas-fir subregion and selected other regions, 1953

| Item | Ownerships | | Area | | Average size of ownership |
|---|---|---|---|---|---|
| | Number | Percent | Thousand acres | Percent | |
| | | | | | Acres |
| Douglas-fir subregion: | | | | | |
| Less than 50,000 acres | 67,960 | 99.966 | 8,316 | 62.410 | 122 |
| 50,000 acres and larger | 23 | 0.034 | 5,009 | 37.590 | 217,783 |
| All private holdings | 67,983 | 100.000 | 13,325 | 100.000 | 196 |
| South Atlantic: | | | | | |
| Less than 50,000 acres | 594,409 | 99.996 | 38,510 | 91.395 | 65 |
| 50,000 acres and larger | 23 | 0.004 | 3,626 | 8.605 | 157,652 |
| All private holdings | 594,432 | 100.000 | 42,136 | 100.000 | 71 |
| Southeast: | | | | | |
| Less than 50,000 acres | 778,447 | 99.989 | 73,882 | 84.731 | 95 |
| 50,000 acres and larger | 82 | 0.011 | 13,314 | 15.269 | 162,366 |
| All private holdings | 778,529 | 100.000 | 87,196 | 100.000 | 112 |

Source: U. S. Forest Service (1958, p. 553).

Other regions are shown also in table 6 for the purpose of comparison, not in order to establish a norm. By chance, there are also 23 firms in the South Atlantic region holding 50,000 or more acres of timberland. This represents a far smaller percent of the total number of timberland owners, and the degree of concentration accounted for by the 23 largest is much smaller than for the Douglas-fir subregion. In the Southeast, a larger number of firms having 50,000 acres or more account for a smaller percent of the total acreage than is found in the Douglas-fir subregion. Hence, again the degree of concentration is considerably smaller. In California, fewer firms (16) are in the 50,000 acres or larger class, but they control a slightly higher percent of total timberland within the State. Hence, in terms of the concentration ratio method of analysis, economic concentration in timberland ownership is greater in California than in the Douglas-fir subregion.[10]

One should not attempt to use the comparative data shown in table 6 as the basis for establishing a norm for concentration ratios in timberland ownership. The southern pine subregion grows small trees rapidly and a larger proportion of the crop is devoted to pulp use. The quantity of timber per acre in the South is very small relative to the Douglas-fir subregion. As shown in table 7, the average volume of live sawtimber per acre of privately owned Douglas-fir subregion forest land amounts to 20,300 board feet. In contrast, the South Atlantic and southeastern regions contain about 2,000 board feet per acre on private timberland. Secondly, by custom in the South, timberland owned in smaller parcels by independent farmers is often managed under contract for the pulp companies that are also substantial timber owners. Therefore, the large timber owners may control substantial amounts of timberland in addition to their fee ownership. In contrast, there is relatively little similar controlled-but-not-owned timberland in the Douglas-fir subregion.

Table 7. — Volume of sawtimber per acre

| Region | Net volume of live sawtimber, private | Commercial forest land, private | Average per acre |
|---|---|---|---|
| | Million board feet | Thousand acres | Thousand board feet |
| Douglas-fir subregion | 270,872 | 13,325 | 20.3 |
| South Atlantic | 97,958 | 42,136 | 2.3 |
| Southeast | 124,425 | 87,196 | 1.4 |

Source: U .S. Forest Service (1958, pp. 553 and 555).

Before interpreting the significance of the present degree of economic concentration in Douglas-fir subregion timber ownership, one should have a clear understanding of the different ownership classes in the subregion

10 Some of the large firms in the 50,000 acres or larger class are also in this large class within the Douglas-fir subregion.

and of the different means of measuring such ownership. Table 8 shows a breakdown of all ownerships into its several parts. We find that in 1953 Federal ownership or trusteeship, which includes Indian lands, accounted for 38.1 percent of the total acreage in the Douglas-fir subregion, 48.5 percent of the net volume of timber, and 51.6 percent of the sawtimber stands.[11] Privately owned forest land accounted for 52.3 percent of the total acreage, 45.6 percent of the net volume, and 43.3 percent of the sawtimber stands. These figures reveal that a higher proportion of the Federal ownership or trusteeship holds virgin old-growth timber and a larger share of the private ownership consists of cutover lands and new young forests.

Table 8. — Commercial forest area and net volume on commercial forest land, by ownership in the Douglas-fir subregion, 1953

| Ownership | Commercial forest land | | Sawtimber stands | | Commercial forest | | |
|---|---|---|---|---|---|---|---|
| | Area | Percent | Area | Percent | Net volume | Percent all ownerships | Percent private |
| | Thousand acres | | Thousand acres | | Million bd. ft. | | |
| Public: | | | | | | | |
| Federal or trusteeship | 9,707 | 38.2 | 7,540 | 51.6 | 288,403 | 48.5 | -- |
| State | 1,971 | 7.7 | 593 | 4.1 | 28,553 | 4.8 | -- |
| County or municipal | 452 | 1.8 | 148 | 1.0 | 6,547 | 1.1 | -- |
| All public | 12,130 | 47.7 | 8,281 | 56.7 | 323,503 | 54.4 | -- |
| Private: | | | | | | | |
| Farm | -- | -- | -- | -- | 13,103 | 2.2 | 4.8 |
| Forest industries and others | -- | -- | -- | -- | 257,769 | 43.4 | 95.2 |
| All private | 13,325 | 52.3 | 6,330 | 43.3 | 270,872 | 45.6 | 100.0 |
| All ownerships | 25,455 | 100.0 | 14,611 | 100.0 | 594,375 | 100.0 | -- |

Source: U. S. Forest Service (1958, pp. 548 and 555).

Table 8 also reveals that for the Douglas-fir subregion, timber in farm ownership is of relative insignificance, being only 4.8 percent of the total privately owned commercial forest net volume while 95.2 percent is owned by nonfarm forest owners, mostly forest industries. In this respect, the Douglas-fir subregion differs markedly from other regions in the United States. For example, in the South, 45 percent of private sawtimber volume is in farm woodlot ownership (U. S. Forest Service, 1958, p. 554).

The ownership data shown in table 8 document what is widely known — that the greatest single concentration of control over timber and timberland is in the hands of the Federal Government. A question automatically appears and was raised by Professor Weintraub: "Is the Forest Service a monopolist?" Professor Weintraub discussed this point with reference to the consequences of concentrated control by a public agency (Weintraub, 1958, pp. 150-153).

[11] "Timber Resources for America's Future" defines sawtimber as stands of trees having a minimum net volume per acre of 4,000 board feet, International 1/4-inch rule.

From the point of view of economic analysis, interest in monopoly is restricted to the consequences of monopoly behavior. Behavior of a noncompetitive industry is of economic concern because, through price and output decisions, the distribution of income may be altered in favor of the monopolist compared with the pattern allowed by competition. As a consequence, the allocation of resources through an economy will differ from the pattern dictated by a free price mechanism. As a second consideration, monopoly is of concern to economic analysis through its effect on technological improvements and product innovations. Weintraub (1958) concludes:

> Everything hinges, then, on the market behavior of the single seller; whether the consequences are exactly those of competition, or whether price is higher and production is lower, as under monopoly, depends on the seller's conduct. So far there has not been any evidence to suggest that the Forest Service has so manipulated its offerings as to maximize the aggregate sum of proceeds to it. The facts seem to be quite otherwise, to-wit, that the volume of offerings has approached pretty close to the total that could be processed with funds available and in light of the difficulty of opening new areas because of the access road situation . . . . To make the charge of 'monopoly' stick, therefore, it would have to be demonstrated that the Forest Service has consciously managed its sales offerings with a design of enlarging its aggregate sales proceeds by narrowing its stumpage offerings.

Even if the behavior of a public agency were similar to that of a private monopolist, the consequences would still be of relatively little significance. Where private monopoly profits appear, those favored few able to benefit from monopoly profits would gain substantially through greater capital gains, higher dividends, and higher salaries or the bonus equivalent. The gains would be highly concentrated, except as they are distributed through public donations, tax payments, and the like. In contrast, the monopoly profit realized by monopolistic behavior of a public agency would be more widely distributed in the form of either lower taxes than would otherwise be necessary or through public expenditures on such items as schools, roads, national defense, etc.

## The Trend of Economic Concentration In Resource Ownership

By piecing together scanty information and developing additional information, it is possible to draw some conclusions concerning the trend of concentration in resource ownership. From data given previously in table 5,

we find that from 1953 to 1960, merger activity in the lumber industry has significantly increased concentration ratios in timberland ownership. Ownership by the Big Four increased from 2,988,000 acres to 3,493,000 acres. Concentration ratios for the Big Four increased from 11.7 percent to 13.7 percent of all commercial forest land and from 22.4 to 26.2 percent of all private commercial forest land. The increase in concentration among the eight largest ownerships was slightly greater. By expanding ownership from 3,656,000 acres to 4,549,000 acres, the ratios for the Big Eight grew from 14.4 percent to 17.9 percent of all commercial forest land and from 27.4 to 34.1 percent of all private commercial forest land.

The 43-year period from 1910 to 1953 may be compared by relating ownership data for the States of Oregon and Washington in total. Information for the Douglas-fir subregion is not available since data for the 1910 base were not broken down by subregion. The available data are shown in table 9. The 1910 data reflect the large land grants made by Congress to the railroads. The principal source of timber for Weyerhaeuser Timber Co. was the Northern Pacific Railroad grant from Congress, acquired in part by Weyerhaeuser in 1899. The Northern Pacific Railroad remained (in 1910) the third largest holder of timberland in the two States.

The composition of the four largest firms changed between 1910 and 1953. Only one firm is a member of both the 1910 and the 1953 Big Four. There is a substantial decline in resource ownership concentration over the 43-year period. Acreage held by the Big Four in 1953, for the two States in combination, declined from 5,941,000 acres to 3,714,000 acres. The 1953 acreage held by the Big Four is only 63 percent of the 1910 holdings. In the two States separately, a similar deconcentration took place. Acreage held by the four largest firms in Oregon in 1953 was only 52 percent of the 1910 figure. For Washington, the 1953 percentage is 71 percent of the earlier period.

Table 9. — Resource ownership concentration, 1910 and 1953

| Item | Oregon | Washington | Oregon and Washington |
|---|---|---|---|
| Total commercial forest land, 1953 _____M acres__ | 25,875 | 19,490 | 45,365 |
| Total private commercial forest land, 1953 _____M acres__ | 9,768 | 9,806 | 19,574 |
| Four largest holders, 1953[1] | | | |
| _____ M acres__ | 1,587 | 2,454 | 3,714 |
| _____ percent of total commercial forest land__ | 6.1 | 12.6 | 8.2 |
| _____ percent of total private forest land__ | 16.2 | 25.0 | 19.0 |
| Four largest holders, 1910[1] | | | |
| _____ M acres__ | 3,045 | 3,438 | 5,941 |
| _____ percent of 1953 total commercial forest land__ | 11.8 | 17.7 | 13.1 |
| Eight largest holders in 1910 by company: | | | |
| Southern Pacific Railroad _____ M acres__ | 2,079 | __ | 2,079 |
| Weyerhoeuser Timber Co. _____ M acres__ | 393 | 1,533 | 1,926 |
| Northern Pacific Railrood _____ M acres__ | __ | 1,612 | 1,612 |
| Booth-Kelly _____ M acres__ | 324 | __ | 324 |
| Chicago Milwoukee and St. Poul Railroad __ M acres__ | __ | 276 | 276 |
| C. A. Smith interests _____ M acres__ | 249 | __ | 249 |
| Wheeler interests _____ M acres__ | 129 | __ | 129 |
| T. B. Walker interests, Missouri Lumber and Land Exchange interests _____ M acres__ | __ | 17 | 17 |

[1] In each case, four largest holders are based on each State separately and on the two States combined. For this reason, total for the line is not the sum of two States. The four largest in 1910 are not the same as the four largest in 1953.

Sources: Data for 1910 from U. S. Bureau of Corporations (1914, pp. 173-176); data for 1953 developed from data supplied by U. S. Forest Service.

In 1953, we find that the Big Four ownership in Oregon and Washington accounted for 8.2 percent of all 1953 commercial forest land (both private and public) and 19 percent of private commercial forest land.

Three years after the Bureau of Corporations' report on land ownership was published covering the year 1910, another review of land tenure was made.[12] Cary observed, "The general conclusion drawn from all the data obtained is that timber buying and consolidation of property was largely checked in Oregon by the year 1912. That this check in timber buying is permanent is not, however, to be inferred."

The Capper Report published in 1920 concluded that "Since 1910 the three largest holdings in this region (Oregon and Washington) have been decreased" (U. S. Forest Service, 1920, p. 61).

During the period 1910 to 1953, one major contribution to deconcentration in private ownership was made when the Federal Government revested approximately 2.5 million acres of land granted in 1866 to the Oregon and California Railroad Co. The timber contained on the land was not of great value at the time, and the railroad, in spite of its land grant, fell into financial difficulties. The railroad was in receivership when the Southern Pacific Railroad Co. leased it in 1887. The Government was able to prove that the grantee failed to comply with the terms of the grant, and the Oregon District Court held that the unsold lands were to be forfeited

[12] Cory, Austin. Timber ownership and lumber production in the Douglas fir region. 1917. Unpublished manuscript prepared for U. S. Dept. of Agriculture. On file School of Forestry Library, University of California, Berkeley.

to the Government. The Supreme Court reversed the lower court's decision, however, and suggested that Congress enact legislation providing for the disposition of the unsold grant lands.[13]

Further contributing to deconcentration, the Weyerhaeuser Timber Co. sold approximately 250,000 acres of its timberland chiefly to operating companies. In its initial years, Weyerhaeuser Timber Co. was primarily interested in holding timber and only later became an operating company. Similarly, the Northern Pacific Railroad Co. sold approximately 522,000 acres of timberland in Washington to operating companies.

The decline in concentration from 1910 to 1953 primarily reflects a transition from temporary railroad ownership, resulting from a nonrecurring land-grant situation, to a more permanent land-tenure position. The increase in concentration from 1953 to 1960 may be viewed as a continuation of this transition to what is probably a more permanent ownership position.

## Possible Unfavorable Effects of Increased Concentration in Resource Ownership

The present degree of concentration requires interpretation. We need to establish the meaning of the concentration ratios shown in tables 5 and 6. First, a given degree of concentration in resource ownership may have a more undesirable effect on competition than the same degree of concentration in industrial production distant from an equally limited resource base. For example, the four largest firms producing motors and generators account for 48 percent of total shipments of these products. This higher degree of concentration may be of less significance than a similar degree of concentration in timberland ownership. New plants may be constructed by new firms entering the business of manufacturing motors and generators which, in turn, would develop new competition for the existing firms. Additional competition cannot be established in timberland ownership with equal ease. The amount of land devoted to timber production may be increased only by shifting land from farm or other uses. To produce a merchantable timber crop requires about 60 years on the best timber growing sites in the Douglas-fir subregion. Thus, new supply cannot be established either with equal ease or within a comparable time period to offer effective competition.

Second, all of the eight largest timberland-owning firms are also periodic bidders and buyers of Federal timber. The firms having substantial

[13] For a full description of the revesting procedure, see: Ballaine, Wesley C. The revested Oregon and California railroad grant lands: a problem in land management. Land Econ. 29: 219-232. 1953.

timberland holdings containing large quantities of mature timber are in a preferred bidding position. Such firms have a timber reserve to supply their mills in the event that competition forces stumpage prices to high levels in a given sale. The firm without reserve timber may be forced to bid relatively high prices in order to keep its processing plants operating. Again, the firm with substantial reserves is in a position to take only the more favorable sales. To the extent that timber and timberland holdings are concentrated, the benefits of the reserve supply will be correspondingly concentrated.

Third, as was illustrated in figure 2, stumpage prices developed from bidding for National Forest timber have increased sharply since World War II. Firms holding timber over all or part of this period of rapid stumpage price increase have a substantial competitive advantage in lumber and other production.[14] In contrast, the firm buying stumpage for current needs must pay current prices, and such stumpage must be logged over a relatively short period of years. Because the cost of log input for the firm holding timber acquired prior to all or part of the recent price increase will be much lower than for the firm currently buying stumpage, relatively large profits may be earned by the former. To the extent that ownership of low-cost stumpage is concentrated, the cost advantages outlined above will also be concentrated.

A fourth important competitive consequence arises from the facts that timberland is immovable, growing stock is economically immovable, and, in the absence of relatively cheap water transportation, heavy marginal cost of hauling logs by truck or rail restricts the geographical area of effective competition. Timber is offered for sale in a given location. Processors who may effectively compete for a given timber offering are those located relatively close to the timber. Rarely can a mill with more than a 50-mile truck haul compete effectively with mills in the vicinity of the sale. To the extent that private timber surrounding the Federal timber is concentrated in one or a few holdings, there will be fewer independent and competing mills in the area of the Federal timber sale. A high degree of concentration in timberland ownership in the vicinity of a Federal timber sale, for example, may substantially reduce competition for such timber.

[14] Low stumpage prices for timber acquired years earlier do not, however, show the fact that the timber-owning firm must pay annual property taxes on the land and timber held, must obtain or forego a fair rate of return on funds invested in timber, and must also meet other charges of timber management such as protection costs. Excepting imputed interest, these costs are deductible for the purpose of computing income taxes against ordinary income, while a capital gain is taxable at not more than the 25-percent capital gain tax rate.

## Possible Benefits from Increased Concentration in Resource Ownership

The above interpretation concludes that the greater the concentration in resource ownership, the greater performance will diverge from that theoretically produced by a more competitive structure. However, the analysis is not complete until the other half of the case is examined. There is evidence to support a claim of beneficial performance resulting from concentration of timber ownership in a few large units.

Research carried on and published in 1948 by the U. S. Forest Service concluded that "Large private owners, on the average, treat their lands better than the small owners" (U. S. Forest Service, 1948, p. 48). The character of timber cutting on private lands is shown in table 10.

The Forest Service analysis revealed that "poor" and "destructive" cutting were found more frequently on small holdings than on large, and that "fair," "good," and "high-order" cutting were found more frequently on large than on small holdings. Further, the Forest Service found that "On the public lands cutting is notably better than on private lands" (U. S. Forest Service, 1948, p. 47). It should be noted that this study was based on nationwide data and may not correctly depict the Douglas-fir subregion condition.

In a more recent study, the same performance pattern was found both nationwide and for the Douglas-fir subregion. The Forest Service reported that "Productivity of recently cut areas on private lands is directly related to the size class of ownership — the smaller the ownership, the lower the proportion of recently cut land in the upper productivity class" (U. S. Forest Service, 1958, p. 238). Judgment concerning the level of productivity was based upon the degree of existing stocking, the prospective stocking, the species composition, and the presence of premature cutting.

Table 10. — Character of timber cutting on private lands by size of holding, United States, 1945
(In percent)

| Size af halding | Character of cutting[1] | | | | |
|---|---|---|---|---|---|
| | High-arder | Gaad | Fair | Paar | Destructive |
| Small[2] | 0 | 4 | 25 | 63 | 8 |
| Medium[2] | 1 | 7 | 31 | 50 | 11 |
| Large[2] | 5 | 24 | 39 | 28 | 4 |

[1] Accarding to definitians emplayed by the Farest Service, "high-arder" cutting requires the best types of harvest cutting which will maintain quality and quantity yields consistent with the full productive capacity of the land. Wherever needed, it requires cultural practices such as planting, timber-stand impravement cutting, thinnings, and cantral of grazing.

"Good" cutting requires gaad silviculture that leaves the land in passessian af desirable species in candition far vigaraus growth in the immediate future. It is substantially better than fair cutting.

"Fair" cutting marks the beginning af cutting practices which will maintain an the land any reasanable stock of grawing timber in species that are desirable and marketable.

"Paar" cutting leaves the land with a limited means far natural repraductian, aften in the form of remnant seed trees. It aften causes deteriaratian af species with the consequent reduction in bath quality and quantity of farest grawth.

"Destructive" cutting leaves the land withaut timber values and withaut means far natural reproduction.

[2] Small, less than 5,000 acres; medium, 5,000 to 50,000 acres; and large, 50,000 acres ar mare. Source: U. S. Farest Service (1948, p. 48).

Table 11 shows the productivity rating in terms of upper, medium, or lower, by size class, for the Douglas-fir subregion. We find a strong correlation within each productivity class, such that the larger the size class of ownership, the larger will be the percent of land classified in the upper productivity group.

One might reasonably expect to find better management practices in large timber holdings, generally operated by wood manufacturing corporations, than in small private timber holdings.

Large firms expect to be in business for periods far exceeding the lifetimes of their present management and stockholders. Decision making may more frequently be premised on long-term considerations rather than short-term. Reforestation to produce intermediate crops from thinnings in 30 to 50 years and a final crop in perhaps 60 to 80 years may be a more rational economic act for a firm with an indefinite life, given a relatively attractive discounted rate of return. For a small enterprise, based upon the limited life of the owners and upon their present needs, an investment decision involving returns delayed for decades may not seem worthwhile, even though the discounted rate of return may be attractive.[15]

[15] If a reliable free market far timberland containing immature timber was believed to exist, then even the small firm with a relatively short time harizan might profitably make capital outlays for refarestatian. It cauld then expect ta sell the land with its immature crap far a reasanable return.

Table 11. — Productivity of recently cut forest land by size class, Douglas-fir subregion, 1953 (In percent)

| Size class of ownership | Proportion of operating area by productivity class | | |
|---|---|---|---|
| | Upper | Medium | Lower |
| 10-100 acres | 59 | 34 | 7 |
| 100-500 acres | 57 | 27 | 16 |
| 500-5,000 acres | 63 | 27 | 10 |
| 5,000-50,000 acres | 75 | 16 | 9 |
| 50,000 acres and larger | 94 | 4 | 2 |

Source: U. S. Forest Service (1958, p. 608).

There may be additional welfare benefits resulting from more concentrated timberland ownership. When the timber resources of a given producer are sufficiently large to allow lower elevation logging during the more severe winter weather, and high elevation logging during other periods, a more stable pattern of seasonal employment in logging and lumber operations will likely result. Further, if economic resources of the larger companies allow the construction of all-weather roads into winter logging operations, more stable seasonal employment patterns will again result. Evidence on seasonal employment patterns indicates that the largest firm in the lumber industry does, indeed, have a considerably more stable pattern of employment than is found in the lumber industry as a whole. The seasonal employment index for the lumber division of Weyerhaeuser Co. shows the lowest employment month to be only 5 percent below average for the year. In contrast, the employment index for "Lumber and Other Wood Products" in the State of Oregon shows a normal decline at its lowest month amounting to 25 percent. The same series for the State of Washington shows a normal decline amounting to 23 percent.[16]

## Summary

The present degree of concentration in resource ownership within the Douglas-fir subregion is low relative to concentration ratios elsewhere in the American economy. But the ratios themselves are highly concentrated where the largest firm owns nearly half of the Big Eight ownership and one-sixth of all private commercial forest land in the subregion. More than half of the sawtimber volume is held by public agencies, principally the U. S. Forest Service.

The degree of economic concentration in private timberland ownership involves serious public policy issues since concentration in timber

[16] The seasonal character of employment in the Douglas-fir lumber industry was explored elsewhere. See: Mead, Walter J. The forest products economy of the Pacific Northwest. Land Econ. 32:127-133. 1956.

ownership may carry with it concentrated advantages in bidding for Federal stumpage.

On the other hand, there is evidence to support the claim of welfare advantages for the Nation resulting from large timberland ownerships. Evidence was produced indicating that silviculturally more intensive resource management is correlated with size of landownership. Additional welfare advantages may follow from a higher degree of timber resource utilization, of research, and of economic stability associated with a larger resource base and more diversified operations.

The trend of concentration in timber resource ownership has passed through two phases from 1910 to 1960. It is clear that a significant degree of deconcentration took place from the early part of the 20th century to its midpoint although timberland ownership was passing from relatively temporary railroad ownership to more permanent industrial and Government ownership.

One may speculate about the course of events in the 1960's. As we found in table 5, the level of concentration among the Big Four and the Big Eight holders of timberland is still relatively small. The eight largest holders of timberland account for approximately one-third of all privately owned commercial forest land. If we assume that economic pressure for full utilization continues, further merger activity resulting in higher timber resource concentration ratios seems likely to follow in the decade of the 1960's.

# Economic Concentration In Lumber Production

The concept of a lumber producing industry for the Douglas-fir subregion is subject to serious shortcomings. There is obviously a high degree of substitution between Douglas-fir lumber on one hand and ponderosa pine or southern pine on the other. The degree of substitution is relatively high compared, for example, with the degree of substitution between lumber and brick or aluminum as alternative building materials. However, as was pointed out earlier, the Douglas-fir subregion itself contains a high concentration of the Nation's lumber production. Douglas-fir accounts for a large share of the construction lumber; and for certain uses requiring large timbers from old-growth trees, the Douglas-fir subregion occupies an even more exclusive position.

Even though the concept of a Douglas-fir lumber industry has the aforementioned technical shortcomings, it is still pertinent and useful to inquire into the trend of economic concentration within this important segment of the total lumber industry. But partly because of these shortcomings and partly for purposes of comparison, concentration ratios will be shown for the total United States lumber industry as well as the Douglas-fir subregion and certain intermediate industry concepts.

## Economic Concentration In the United States Lumber Industry

In the past, the approach of the Bureau of the Census in identifying concentration ratios for various industries has been to use standard industry classifications. Both employment and value added by manufacture have traditionally been measured by classifying each leading firm into a single industry class. Thus, a firm primarily engaged in lumber production, but in addition producing chips, veneer, broom handles, and so forth, would be classed in the lumber industry, and all of its value added by manufacture and employment would be credited to the lumber industry. Because this approach has been the principal one used by the Bureau of the Census, it is commonly used to compare trends in economic concentration over time.

With the introduction of electronic computers to tabulate census data, information produced from the 1954 census may be calculated in terms

of a more useful concept, the product classification. By this classification method, the shipments of each product of a plant are classified in the industry to which that product primarily belongs. Thus, in the above illustration, lumber output would be classified in the appropriate lumber industry classification, veneer shipments would be classified in the veneer industry, etc. Because this method was first put into use in 1954, it is not possible to make historical comparisons analyzing the Bureau of the Census data.[17]

By use of the newer product classification approach, we find, as shown in table 12, a very low degree of economic concentration accounted for by the 4, 8, and 20 largest firms. In the sawmill and planing mill products classification, the Big Four account for only 6 percent of the total value of shipments of sawmill and planing mill products. Sawmill and planing mill products is one of 426 4-digit product classes in United States manufacturing industries analyzed by the Senate Subcommittee in its concentration study. Of these 426 4-digit product classes, only 5 have lower concentration ratios for the four largest firms than is found for the sawmill and planing mill products class. In terms of the 8 largest firms and 20 largest firms, only two product classes have lower concentration ratios than sawmill and planing mill products. The two with lower concentration ratios are (1) fur goods and (2) women's suits, coats, and skirts (U. S. Congress, 1957a, p. 163).

Table 12. — Concentration ratios for the United States lumber and wood products industries, 1954 (product classification method)

| Product classification | Standard industrial classification number | Value of shipments | Concentration ratios; percent of total value of shipments accounted for by — | | |
|---|---|---|---|---|---|
| | | | Four largest firms | Eight largest firms | Twenty largest firms |
| | | M dollars | | | |
| Sawmills and planing mills products | 2421 | 3,037,326 | 6 | 8 | 13 |
| Dressed lumber, except flooring | 24212 | 1,606,192 | 10 | 13 | 19 |
| Veneer | 2422 | 124,139 | 8 | 14 | 28 |
| Softwood veneer | 24222 | 41,212 | 24 | 39 | 72 |
| Plywood | 2432 | 504,725 | 16 | 24 | 40 |
| Softwood plywood, interior type | 24322 | 247,841 | 16 | 26 | 47 |
| Softwood plywood, exterior type | 24323 | 87,266 | 22 | 36 | 64 |

Source: U. S. Congress (1957a, p. 46).

[17] For a discussion of the industry classification and product classification methods, see U. S. Congress report (1957a, p. 3).

A more specialized product (5-digit), "dressed lumber except flooring," has a slightly higher degree of concentration, the four largest firms accounting for 10 percent of total value of shipments. Other subclasses of output within the standard industrial classification 24 are also shown in table 12. All of the wood products subclasses show a highly competitive structure. Of the 1,023 5-digit product classes analyzed in the Senate study, only 18 have lower concentration ratios for the Big Four than is shown in table 13 for "dressed lumber except flooring." Only eight of the 5-digit product classes have lower ratios for the Big Eight firms, and only three product classes have lower ratios than the Big Twenty shippers of "dressed lumber except flooring" (U. S. Congress, 1957a, p. 163).

In order to establish a norm, we may examine concentration ratios in industries producing products competitive with lumber. As shown in table 13, the sawmill and planing mill products category has one of the most competitive structures of any of the products competing for construction expenditures. Only "concrete block and brick" has a more competitive structure, and this industry does not sell in a national market. The average concentration ratio for the industries shown is far in excess of that prevailing in the lumber industry and ranges as high as 98 percent of all product shipment value accounted for by the Big Four in the plate glass industry.

Table 13. — Concentration ratios for lumber and other products based on value of product shipments and, for lumber, based on volume of production, 1954 (product classification method)

(In percent of total)

| Product classification or product | Standard industrial classification | Concentration ratios | | |
|---|---|---|---|---|
| | | Four largest firms | Eight largest firms | Twenty largest firms |
| **VALUE OF PRODUCT SHIPMENTS[1]** | | | | |
| Concrete block and brick | 32711 | 3 | 5 | 10 |
| Sawmill and planing mill products | 2421 | 6 | 8 | 13 |
| Veneer | 2422 | 8 | 14 | 28 |
| Metal doors, sash and trim | 3442 | 12 | 19 | 29 |
| Brick and hollow tile | 3251 | 13 | 20 | 33 |
| Plywood | 2432 | 16 | 24 | 40 |
| Paper and paperboard | 2612 | 19 | 31 | 46 |
| Pulp | 2611 | 29 | 42 | 61 |
| Cement, hydraulic | 3241 | 31 | 48 | 73 |
| Plastic materials | 2823 | 45 | 61 | 78 |
| Insulating board and hard pressed wood-fiber board | 26132 | 61 | 84 | 99 |
| Gypsum products | 3272 | 89 | 97 | 99 |
| Structural steel shapes and piling | 33126 | 92 | 97 | [2] |
| Aluminum plate and sheet | 33521 | 93 | 98 | 99 |
| Plate glass | 32112 | 98 | 99 | 99 |
| **VOLUME OF PRODUCTION[3]** | | | | |
| Lumber: | | | | |
| Douglas-fir subregion | -- | 16.6 | 22.1 | 31.6 |
| Pacific Northwest | -- | 14.1 | 19.0 | 27.1 |
| Pacific coast | -- | 10.2 | 13.9 | 20.9 |
| United States | -- | 5.1 | 7.0 | 10.7 |

[1] Percent is of total for U. S. for the product class indicated in column 1. Size ranking is also within all of U. S.

[2] Not applicable.

[3] Base of each percent is the total lumber production for the region indicated in column 1. Size ranking is also within the indicated region.

Source: Data for lumber developed from directories of the forest industries published by The Lumberman and The Timberman, Portland, Oreg., 1961, 1956, and 1949. For all other product class groups, from U. S. Congress report (1957a, pp. 46-55).

In the bottom section of table 13, concentration ratios are shown on a physical production basis for the total United States lumber production as well as for the Douglas-fir subregion, for the Pacific Northwest (Washington and Oregon) and for the Pacific coast (Washington, Oregon, and California). With the lumber industry centered in the Douglas-fir subregion, concentration ratios are naturally higher for this subregion than for the United States as a whole. But even so, compared with the whole United States, the 16.6 percent of total subregional output accounted for by the Big Four producers in the Douglas-fir subregion continues to place the Douglas-fir lumber industry in that class of industries having a highly competitive structure.[18]

[18] Table 13 shows a higher ratio when concentration is measured in terms of value of product rather than in terms of physical production. As shown in table 13, the 20 largest shippers of sawmill and planing mill products account for 13 percent of the total value of product shipments, but only 10.7 percent of the volume production. This difference would be expected since the larger firms process a much higher proportion of their total lumber production through kiln-drying than would be true for the total industry. This fact would be reflected in a value of product measure but not in a physical product measure.

If we now use the measure of industrial concentration more commonly employed by the Bureau of the Census, the industry classification, comparison over time is possible for the lumber industry for the years 1947 and 1954. Data for the lumber industry prior to 1947 are not comparable with 1947 or 1954 data by reason of a change in the system of industrial classification.

Data shown in table 14 indicate a clear increase in concentration ratios for the lumber industry. The four largest producers in the United States in the sawmill and planing mill category increased their share of the market from 5 to 7 percent between 1947 and 1954. For the Big Twenty, the increase in concentration is not only more reliable but is more marked. Whereas the Big Twenty in 1947 accounted for 11 percent of industry shipments, 7 years later they accounted for 18 percent of the total market. Over the same period of time, an interesting deconcentration is shown for veneer plants and plywood plants. In 1947, plywood production was still in its early stage of growth. By 1954, knowledge of technology had spread widely and a multitude of small operations had commenced production. Production (value of shipments) had increased 2-1/2 times. Entry into veneer and plywood production requires a relatively small amount of capital, products are not widely differentiated by brand names, and all producers have access to wholesalers for distribution of their product. Many operations that in 1947 were limited to lumber became partially integrated by 1954 to include veneer and possibly plywood plants.

Table 14. — Concentration ratios for lumber, veneer, and plywood in United States, 1947 and 1954 (industry classification method)

| Industry classification | Standard industrial classification number | Number of companies in class | Value of shipments | Concentration ratios; percent of total value of shipments accounted for by — | | |
|---|---|---|---|---|---|---|
| | | | | Four largest firms | Eight largest firms | Twenty largest firms |
| | | | Million dollars | | | |
| Sawmills and planing mills: | 2421 | | | | | |
| 1954 | | 16,594 | 3,247 | 7 | 11 | 18 |
| 1947 | | 19,223 | 2,519 | 5 | 7 | 11 |
| Veneer mills: | 2422 | | | | | |
| 1954 | | 252 | 121 | 9 | 15 | 30 |
| 1947 | | 136 | 67 | 20 | 31 | 52 |
| Plywood plants: | 2432 | | | | | |
| 1954 | | 219 | 515 | 17 | 25 | 42 |
| 1947 | | 142 | 272 | 22 | 34 | 56 |

Source: U. S. Congress (1957a, p. 202).

Comparable data are available over a longer time span, covering lumber production from mills producing 50 million board feet of lumber or more per year. This information is presented in table 15 and shows that the percent of total output accounted for by mills producing 50 million feet per year or more declined from 25.8 percent of total output in 1929 to a low of 11 percent of total output in 1947 and has since expanded to 17.7 percent of total output in 1960. These data are useful in showing the market importance of an absolute size class, including the very great importance of the size class in 1929, its decline during the depression and continuing decline to 1947, and its subsequent modest increase. The importance of this absolute size class is considerably diminished over the 31-year period from 1929 to 1960.

Table 15. — U. S. sawmills in the size class producing 50 million board feet or more per year

| Year | Number of mills in 50 million and larger production class (1)) | Total number of mills in industry (2) | Ratio of column 1 to column 2 (3) | Production from mills in 50 million and larger production class (4) | Total U. S. lumber production (5) | Ratio of column 4 to column 5 (6) |
|---|---|---|---|---|---|---|
| | | | Percent | Million bd. ft. | Million bd. ft. | Percent |
| 1960 | 65 | 30,918 | 0.2 | 5,827 | 32,880 | 17.7 |
| 1959 | 89 | 34,113 | .3 | 6,870 | 37,166 | 18.5 |
| 1958 | 67 | 31,645 | .2 | 6,056 | 33,385 | 18.1 |
| 1957 | 67 | 37,597 | .2 | 6,092 | 32,901 | 18.5 |
| 1954 | 60 | 45,929 | .1 | 4,872 | 36,356 | 13.4 |
| 1947 | 43 | 53,109 | .1 | 3,894 | 35,404 | 11.0 |
| 1938 | 44 | 14,644 | .3 | 3,420 | 21,646 | 15.8 |
| 1929 | 120 | 20,037 | .6 | 9,516 | 36,886 | 25.8 |

Source: For 1957-60, U. S. Bureau of the Census (1961, 1962); for 1929-54, National Lumber Manufacturer's Association (1961, p. 23).

The data also indicate that over the 9-year period, 1938 to 1947, there was a significant decrease in concentration in lumber production. The number of sawmills in the 50 million board feet or larger size class was approximately the same in 1938 and 1947. From the fact that approximately the same number of the largest mills accounted for 15.8 percent of total output in 1938 and only 11 percent of total output in 1947, we may conclude that a deconcentration took place over the 9-year period. From 1947 through 1960, however, the number of mills in this large size class increased 51 percent, accompanied by a 50-percent increase in production from such mills. Since total United States lumber production declined modestly, it follows that the gain in market share for the largest mills, accounting for less than 0.1 percent of the total number of mills in 1947, came at the expense of the others representing more than 99.9 percent of the total United States lumber mills. From the facts shown in table 15, we may

conclude that the large mills have become increasingly important in lumber production from 1947 to 1960 and that there is increased economic concentration in the sense defined and discussed in this paper.

From data published in the directories of the forest industries, it is possible to develop reasonably accurate lumber production data by firms. This has been done in table 16. For the United States lumber industry as a whole, the increase in concentration from 1947 to 1954 is rather modest. In the ensuing 6 years, however, a sharp increase in concentration took place. Compared with concentration ratios for other industries in the United States economy, the lumber industry structure remains as one of the most competitive to be found in the economy. This judgment is made even in face of the accelerated merger movement in the United States lumber industry in the decade of the 1950's and in face of the significant increase in concentration ratios during this period. Concentration ratios for the 8 largest and the 20 largest lumber producing firms are correspondingly modest, although both show significant increases over the 13-year period 1947 to 1960.

Table 16. — Economic concentration in the lumber industry, 1947, 1954, 1959, and 1960[1]

| Region and year | Four largest producers | | Eight largest producers | | Twenty largest producers | | Total production |
|---|---|---|---|---|---|---|---|
| | Million feet production | Percent of total | Million feet production | Percent of total | Million feet production | Percent of total | |
| Douglas-fir subregion: | | | | | | | |
| 1960 | 1,936 | 23.9 | 2,379 | 29.4 | 3,292 | 40.6 | 8,100 |
| 1959 | 1,961 | 21.5 | 2,503 | 27.5 | 3,404 | 37.4 | 9,104 |
| 1954 | 1,538 | 16.6 | 2,055 | 22.1 | 2,931 | 31.6 | 9,283 |
| 1947 | 1,429 | 15.9 | 1,847 | 20.6 | 2,688 | 30.0 | 8,962 |
| Pacific Northwest: | | | | | | | |
| 1960 | 2,244 | 20.2 | 2,901 | 26.2 | 3,969 | 35.8 | 11,082 |
| 1959 | 2,201 | 18.4 | 2,938 | 24.6 | 4,158 | 34.8 | 11,962 |
| 1954 | 1,670 | 14.1 | 2,258 | 19.0 | 3,222 | 27.1 | 11,879 |
| 1947 | 1,533 | 14.2 | 2,033 | 18.8 | 2,988 | 27.6 | 10,808 |
| Pacific coast: | | | | | | | |
| 1960 | 2,482 | 15.3 | 3,335 | 20.5 | 4,756 | 29.3 | 16,257 |
| 1959 | 2,440 | 13.5 | 3,389 | 18.8 | 5,000 | 27.7 | 18,025 |
| 1954 | 1,735 | 10.2 | 2,368 | 13.9 | 3,558 | 20.9 | 16,992 |
| 1947 | 1,615 | 11.4 | 2,140 | 15.1 | 3,248 | 22.8 | 14,216 |
| United States: | | | | | | | |
| 1960 | 3,021 | 9.2 | 4,104 | 12.5 | 5,872 | 17.9 | 32,880 |
| 1959 | 2,941 | 7.9 | 4,114 | 11.1 | 6,135 | 16.5 | 37,166 |
| 1954 | 1,846 | 5.1 | 2,528 | 7.0 | 3,874 | 10.7 | 36,356 |
| 1947 | 1,687 | 4.8 | 2,274 | 6.4 | 3,471 | 9.8 | 35,404 |

[1] Both the ranking and the percents apply within the region indicated in column 1.
Source: Developed from directories of the forest industries published by The Lumberman and The Timberman, Portland, Oreg., 1961, 1956, and 1949.

Professor Stigler urged the economics profession in its analysis of the structure of industry to include imports as an addition to domestic production for the purpose of calculating concentration ratios (Stigler, 1942). This

practice may change judgment concerning the performance of a highly oligopolistic industry. The principle would apply well to the automobile industry under the impact of European cars. For the United States lumber industry, the inclusion of imports makes an already competitive industrial structure even more so. In 1960, imports equaled 12 percent of domestic production and this percentage was up sharply from 1947 (see table 17). In 1960, the share of total lumber production accounted for by the Big Four is reduced from 9.2 percent to 8.2 percent by the inclusion of imports. However, little is known of the extent to which imports are from foreign producers wholly or partly owned by the Big Four.

Table 17. — Concentration ratios for four largest U. S. lumber producers, adjusted to include imports

| Year | U. S. lumber production | Imports | Total U. S. production plus imports | Ratio of imports to domestic production | Concentration ratios for U. S. lumber industry (four largest producers) | |
|---|---|---|---|---|---|---|
| | | | | | With imports included | As shown in table 16 |
| | Million bd. ft. | Million bd. ft. | Million bd. ft. | Percent | Percent | Percent |
| 1960 | 32,880 | 3,931 | 36,811 | 12 | 8.2 | 9.2 |
| 1959 | 37,166 | 4,077 | 41,243 | 11 | 7.1 | 7.9 |
| 1954 | 36,356 | 3,066 | 39,422 | 8 | 4.7 | 5.1 |
| 1947 | 35,404 | 1,314 | 36,718 | 4 | 4.6 | 4.8 |

Sources: For production, U. S. Bureau of the Census (1962). For imports, 1961 issues of "Business Statistics," weekly supplement to "Survey of Current Business," Office of Business Economics, U. S. Department of Commerce.

In summary, an examination of economic concentration in the total U. S. lumber industry confirms a highly competitive structure with the four largest firms shipping only 6 percent of all sawmill and planing mill products. Few other industries in the Nation have a more competitive structure.

Comparing concentration ratios among the building industries competing with lumber, we found the latter to have an uncommonly low concentration ratio. In contrast, 98 percent of all plate glass shipped in the United States originated with the four largest firms.

An analysis of trends over time revealed that from 1947 to 1954 a clear increase in concentration was recorded for the U. S. lumber industry. During the same time period, the Nation's veneer and plywood producers became less concentrated. By another type of measure, a longer time span was examined. From 1938 to 1947, deconcentration was registered for lumber, followed by increasing concentration.

## Economic Concentration in the Douglas-Fir Lumber Industry

Returning to table 16 for our concern with the Douglas-fir lumber industry, we find that the Big Four producers in 1947 accounted for only 15.9 percent of the subregion's total lumber production. By 1954 this degree of economic concentration had changed only slightly, to 16.6 percent. But in the next 6 years the merger movement in the lumber industry showed its impact and the concentration ratio for the Big Four increased to 23.9 percent. While this represents a considerable increase in degree of economic concentration over a 6-year period, relative to concentration ratios found in other industries in the U. S. economy, the Douglas-fir lumber industry must still be judged highly competitive, the merger movement notwithstanding.

Concentration ratios for the Big Eight and Big Twenty similarly increased sharply in the last half of the 1950's, but continued to keep the Douglas-fir lumber industry in the category of highly competitive industries. The reader may again refer to table 13 to compare concentration ratios for industries competing with lumber for construction expenditures.

The degree of economic concentration is also shown in table 16 for the Pacific Northwest (Oregon and Washington), the Pacific coast (California, Oregon, and Washington), and the United States. A similar increase in concentration is shown, with the most significant change occurring in the 1954 to 1960 period.

Table 16 is a summary of more detailed information provided in table 18. The latter table shows the dynamics of the 20 largest firms. Weyerhaeuser Co. maintained and expanded its commanding position in the lumber industry and all of its parts over not only the 13-year span of history shown but over a much longer period. Weyerhaeuser's leadership has grown steadily from 8.8 percent of total production within the Douglas-fir subregion in 1947, to 9.7 percent in 1954, to 12.9 percent in 1959, and 14.6 percent in 1960. In 1960, Weyerhaeuser produced 3.4 times as much lumber as its nearest rival and accounted for half the output of the eight largest firms. Yet Weyerhaeuser's share of either the Douglas-fir subregion output or total U. S. output is small relative to that of the leading firm in other major U. S. industries.

## Table 18. — Twenty largest lumber producing firms, by region and year

### DOUGLAS-FIR SUBREGION

**1947**

| Rank | Name | Production | Share of Douglas-fir subregion production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Timber Co. | 780,000 | 8.8 | 8.8 |
| 2. | Long-Bell Lumber Co. | 291,100 | 3.2 | 12.0 |
| 3. | Pope & Talbot, Inc. | 186,330 | 2.1 | 14.1 |
| 4. | Coos Bay Timber Co. | 162,003 | 1.8 | 15.9 |
| 5. | C. D. Johnson Lumber Corp. | 123,367 | 1.4 | 17.3 |
| 6. | Irwin & Lyons, Inc. | 108,190 | 1.2 | 18.5 |
| 7. | Inman-Poulson Timber Co. | 92,907 | 1.0 | 19.5 |
| 8. | Gardiner Lumber Co. | 92,782 | 1.0 | 20.5 |
| 9. | Santiam Lumber Co. | 92,692 | 1.0 | 21.5 |
| 10. | Shepard & Morse Lumber Co. | 89,885 | 1.0 | 22.5 |
| 11. | Willamette Valley Lumber Co. | 80,902 | .9 | 23.4 |
| 12. | Medford Corp. | 76,864 | .9 | 24.3 |
| 13. | Oregon American Lumber Corp. | 72,400 | .8 | 25.1 |
| 14. | Schafer Bros. Lumber Shingle Co. | 72,000 | .8 | 25.9 |
| 15. | St. Paul & Tacoma Lumber Co. | 69,254 | .8 | 26.7 |
| 16. | West Oregon Lumber Co. | 64,342 | .7 | 27.4 |
| 17. | Roseburg Lumber Co. | 58,562 | .7 | 28.1 |
| 18. | Walton Lumber Co., Inc. | 56,552 | .6 | 28.7 |
| 19. | Edward Hines Lumber Co. | 54,842 | .6 | 29.3 |
| 20. | Rosboro Lumber Co. | 52,924 | .6 | 30.0 |

**1954**

| Rank | Name | Production | Share of Douglas-fir subregion production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Timber Co. | 900,000 | 9.7 | 9.7 |
| 2. | Long-Bell Lumber Co. | 282,342 | 3.0 | 12.7 |
| 3. | Pope & Talbot, Inc. | 190,282 | 2.0 | 14.7 |
| 4. | Coos Bay Timber Co. | 165,415 | 1.8 | 16.5 |
| 5. | Georgia-Pacific Corp. | 147,267 | 1.6 | 18.1 |
| 6. | Willamette Valley Lumber Co. | 146,118 | 1.6 | 19.7 |
| 7. | Roseburg Lumber Co. | 130,000 | 1.4 | 21.1 |
| 8. | Santiam Lumber Co. | 94,575 | 1.0 | 22.1 |
| 9. | Rainier Manufacturing Co. | 89,257 | 1.0 | 23.1 |
| 10. | Simpson Logging Co. | 86,690 | .9 | 24.0 |
| 11. | Irwin & Lyons, Inc. | 84,567 | .9 | 24.9 |
| 12. | Ross Lumber Co. | 78,766 | .8 | 25.7 |
| 13. | Medford Corp. | 75,795 | .8 | 26.5 |
| 14. | Diamond Lumber Co. | 71,431 | .8 | 27.3 |
| 15. | Edward Hines Lumber Co. | 69,998 | .7 | 28.0 |
| 16. | St. Paul & Tacoma Lumber Co. | 68,019 | .7 | 28.7 |
| 17. | LHL Lumber Co. | 65,380 | .7 | 29.4 |
| 18. | Clemens Forest Products, Inc. | 62,842 | .7 | 30.1 |
| 19. | Robert Dollar Co. | 62,338 | .7 | 30.8 |
| 20. | Booth-Kelly Lumber Co. | 59,859 | .6 | 31.4 |

## Table 18. — Twenty largest lumber producing firms, by region and year — Continued

DOUGLAS-FIR SUBREGION

1959

| Rank | Name | Production | Share of Douglas-fir subregion production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Co. | 1,170,000 | 12.9 | 12.9 |
| 2. | Georgia-Pacific Corp. | 335,349 | 3.7 | 16.6 |
| 3. | United States Plywood Corp. | 242,238 | 2.7 | 19.3 |
| 4. | Pope & Talbot, Inc. | 213,102 | 2.3 | 21.6 |
| 5. | Simpson Logging Co. | 158,360 | 1.7 | 23.3 |
| 6. | International Paper Co. | 154,419 | 1.7 | 25.0 |
| 7. | Santiam Lumber Co. | 115,000 | 1.3 | 26.3 |
| 8. | Willamette Valley Lumber Co. | 114,175 | 1.3 | 27.6 |
| 9. | Roseburg Lumber Co. | 90,000 | 1.0 | 28.6 |
| 10. | Rainier Manufacturing Co. | 87,610 | 1.0 | 29.6 |
| 11. | St. Regis Paper Co. | 82,311 | .9 | 30.5 |
| 12. | Al Pierce Lumber Co. | 82,082 | .9 | 31.4 |
| 13. | Coos Head Timber Co. | 81,384 | .9 | 32.3 |
| 14. | Edward Hines Lumber Co. | 77,961 | .9 | 33.2 |
| 15. | Medford Corp. | 72,418 | .8 | 34.0 |
| 16. | Buchanan Lumber Co. | 68,282 | .8 | 34.8 |
| 17. | Aborigine Lumber Co. | 67,500 | .7 | 35.5 |
| 18. | Anderson & Middleton Lumber Co. | 64,955 | .7 | 36.2 |
| 19. | Park Loading Co. | 63,500 | .7 | 36.9 |
| 20. | Steve Wilson Co. | 63,465 | .7 | 37.6 |

1960

| Rank | Name | Production | Share of Douglas-fir subregion production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Co. | 1,187,207 | 14.6 | 14.6 |
| 2. | Georgia-Pacific Corp. | 350,000 | 4.3 | 18.9 |
| 3. | United States Plywood Corp. | 220,723 | 2.7 | 21.6 |
| 4. | Pope & Talbot, Inc. | 178,368 | 2.2 | 23.8 |
| 5. | Simpson Timber Co. | 124.137 | 1.5 | 25.3 |
| 6. | Willamette Valley Lumber Co. | 118,850 | 1.5 | 26.8 |
| 7. | Rainier Manufacturing Co. | 106,381 | 1.3 | 28.1 |
| 8. | Stomar Lumber Co. | 93,156 | 1.2 | 29.3 |
| 9. | Santiam Lumber Co. | 90,851 | 1.1 | 30.4 |
| 10. | Roseburg Lumber Co. | 90,000 | 1.1 | 31.5 |
| 11. | Coos Head Timber Co. | 88,308 | 1.1 | 32.6 |
| 12. | Edward Hines Lumber Co. | 86,185 | 1.1 | 33.7 |
| 13. | Olson-Lawyer Lumber, Inc. | 83,615 | 1.0 | 34.7 |
| 14. | St. Regis Paper Co. | 79.013 | 1.0 | 35.7 |
| 15. | Medford Corp. | 78,653 | 1.0 | 36.7 |
| 16. | International Paper Co. | 71,997 | .9 | 37.6 |
| 17. | Timber Products Co. | 67,064 | .8 | 38.4 |
| 18. | Steve Wilson Co. | 62,738 | .8 | 39.2 |
| 19. | Mountain Fir Lumber Co. | 57,810 | .7 | 39.9 |
| 20. | Clemens Forest Products, Inc. | 57,436 | .7 | 40.6 |

## Table 18. — Twenty largest lumber producing firms, by region and year — Continued

PACIFIC NORTHWEST

1947

| Rank | Name | Production | Share of Pacific Northwest production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Timber Co. | 875,000 | 8.1 | 8.1 |
| 2. | Long-Bell Lumber Co. | 291,100 | 2.7 | 10.8 |
| 3. | Pope & Talbot, Inc. | 186,330 | 1.7 | 12.5 |
| 4. | Edward Hines Lumber Co. | 180,486 | 1.7 | 14.2 |
| 5. | Coos Bay Timber Co. | 162,003 | 1.5 | 15.7 |
| 6. | C. D. Johnson Lumber Corp. | 123,367 | 1.1 | 16.8 |
| 7. | Irwin & Lyons, Inc. | 108,190 | 1.0 | 17.8 |
| 8. | Shevlin, Hixon Co. | 106,965 | 1.0 | 18.8 |
| 9. | Inman-Poulson Timber Co. | 92,907 | .8 | 19.6 |
| 10. | Gardiner Lumber Co. | 92,782 | .8 | 20.4 |
| 11. | Santiam Lumber Co. | 92,692 | .8 | 21.2 |
| 12. | Brooks-Scanlon, Inc. | 91,905 | .8 | 22.0 |
| 13. | Shepard & Morse Lumber Co. | 89,885 | .8 | 22.8 |
| 14. | Willamette Valley Lumber Co. | 80,902 | .8 | 23.6 |
| 15. | Medford Corp. | 76,864 | .7 | 24.3 |
| 16 | .Oregon American Lumber Corp. | 72,400 | .7 | 25.0 |
| 17. | Schafer Bros. Lumber & Shingle Co. | 72,000 | .7 | 25.7 |
| 18. | St. Paul & Tacoma Lumber Co. | 69,254 | .6 | 26.3 |
| 19. | West Oregon Lumber Co. | 64,342 | .6 | 26.9 |
| 20. | Roseburg Lumber Co. | 58,562 | .5 | 27.4 |

1954

| Rank | Name | Production | Share of Pacific Northwest production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Timber Co. | 1,000,000 | 8.4 | 8.4 |
| 2. | Long-Bell Lumber Co. | 282,342 | 2.4 | 10.8 |
| 3. | Edward Hines Lumber Co. | 197,060 | 1.6 | 12.4 |
| 4. | Pope & Talbot, Inc. | 190,282 | 1.6 | 14.0 |
| 5. | Coos Bay Timber Co. | 165,415 | 1.4 | 15.4 |
| 6. | Georgia-Pacific Corp. | 147,267 | 1.2 | 16.6 |
| 7. | Willamette Valley Lumber Co. | 146,118 | 1.2 | 17.8 |
| 8. | Roseburg Lumber Co. | 130,000 | 1.1 | 18.9 |
| 9. | Diamond Match Co. | 119,837 | 1.0 | 19.9 |
| 10. | Santiam Lumber Co. | 94,574 | .8 | 20.7 |
| 11. | Rainier Manufacturing Co. | 89,257 | .8 | 21.5 |
| 12. | Simpson Logging Co. | 86,690 | .7 | 22.2 |
| 13. | Irwin & Lyons, Inc. | 84,567 | .7 | 22.9 |
| 14. | Ross Lumber Co. | 78,766 | .7 | 23.6 |
| 15. | Medford Corp. | 75,795 | .6 | 24.2 |
| 16. | Diamond Lumber Co. | 71,431 | .6 | 24.8 |
| 17. | St. Paul & Tacoma Lumber Co. | 68,019 | .6 | 25.4 |
| 18. | Brooks-Scanlon, Inc. | 67,183 | .5 | 25.9 |
| 19. | LHL Lumber Co. | 65,380 | .5 | 26.4 |
| 20. | Clemens Forest Products, Inc. | 62,842 | .5 | 27.0 |

## Table 18. — Twenty largest lumber producing firms, by region and year — Continued

PACIFIC NORTHWEST

1959

| Rank | Name | Production | Share of Pacific Northwest production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Co. | 1,300,000 | 10.9 | 10.9 |
| 2. | Georgia-Pacific Corp. | 335,349 | 2.8 | 13.7 |
| 3. | Boise Cascade Corp. | 323,490 | 2.7 | 16.4 |
| 4. | United States Plywood Corp. | 242,238 | 2.0 | 18.4 |
| 5. | Pope & Talbot, Inc. | 213,102 | 1.8 | 20.2 |
| 6. | Edward Hines Lumber Co. | 210,614 | 1.8 | 22.0 |
| 7. | Simpson Logging Co. | 158,360 | 1.3 | 23.3 |
| 8. | International Paper Co. | 154,419 | 1.3 | 24.6 |
| 9. | St. Regis Paper Co. | 144,639 | 1.2 | 25.8 |
| 10. | J. Herbert Bate Co. | 115,000 | 1.0 | 26.8 |
| 11. | Santiam Lumber Co. | 115,000 | 1.0 | 27.8 |
| 12. | Willamette Valley Lumber Co. | 114,175 | 1.0 | 28.8 |
| 13. | Brooks-Scanlon, Inc. | 97,871 | .8 | 29.6 |
| 14. | Roseburg Lumber Co. | 90,000 | .8 | 30.4 |
| 15. | Rainier Manufacturing Co. | 87,610 | .7 | 31.1 |
| 16. | Mountain Fir Lumber Co. | 87,607 | .7 | 31.8 |
| 17. | Kinzua Corp. | 82,990 | .7 | 32.5 |
| 18. | Al Pierce Lumber Co. | 82,082 | .7 | 33.2 |
| 19. | Coos Head Timber Co. | 81,384 | .7 | 33.9 |
| 20. | Biles-Coleman Lumber Co. | 81,000 | .7 | 34.6 |

1960

| Rank | Name | Production | Share of Pacific Northwest production | Cumulative shore of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Co. | 1,308,740 | 11.8 | 11.8 |
| 2. | Georgia-Pacific Corp. | 400,000 | 3.6 | 15.4 |
| 3. | Boise Cascade Corp. | 315,021 | 2.8 | 18.2 |
| 4. | United States Plywood Corp. | 220,723 | 2.0 | 20.2 |
| 5. | Edward Hines Lumber Co. | 215,891 | 1.9 | 22.1 |
| 6. | Pope & Talbot, Inc. | 178,368 | 1.6 | 23.7 |
| 7. | St. Regis Paper Co. | 138,357 | 1.2 | 24.9 |
| 8. | Simpson Logging Co. | 124.137 | 1.1 | 26.0 |
| 9. | Willamette Valley Lumber Co. | 118,850 | 1.1 | 27.1 |
| 10. | Rainier Manufacturing Co. | 106,381 | 1.0 | 28.1 |
| 11. | Stomar Lumber Co. | 93,156 | .8 | 28.9 |
| 12. | Sontiom Lumber Co. | 90,851 | .8 | 29.7 |
| 13. | Roseburg Lumber Co. | 90,000 | .8 | 30.5 |
| 14. | Coos Head Timber Co. | 88,308 | .8 | 31.3 |
| 15. | Brooks-Scanlon, Inc. | 88,109 | .8 | 32.1 |
| 16. | Olson-Lawyer Lumber, Inc. | 83,615 | .8 | 32.9 |
| 17. | Biles-Coleman Lumber Co. | 81,000 | .7 | 33.6 |
| 18. | Medford Corp. | 78,653 | .7 | 34.3 |
| 19. | Kinzua Corp. | 76,753 | .7 | 35.0 |
| 20. | International Paper Co. | 71,977 | .6 | 35.6 |

## Table 18. — Twenty largest lumber producing firms, by region and year — Continued

### PACIFIC COAST

1947

| Rank | Name | Production | Share of Pacific coast production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Timber Co. | 875,000 | 6.1 | 6.1 |
| 2. | Long-Bell Lumber Co. | 372,900 | 2.6 | 8.7 |
| 3. | Pope & Talbot, Inc. | 186,330 | 1.3 | 10.0 |
| 4. | Edward Hines Lumber Co. | 180,486 | 1.3 | 11.3 |
| 5. | Coos Bay Timber Co. | 162,003 | 1.1 | 12.4 |
| 6. | C. D. Johnson Lumber Corp. | 123,367 | .9 | 13.3 |
| 7. | Fruit Growers Supply Co. | 121,000 | .9 | 14.2 |
| 8. | McCloud River Lumber Co. | 118,833 | .8 | 15.0 |
| 9. | Irwin & Lyons, Inc. | 108,190 | .8 | 15.8 |
| 10. | Pacific Lumber Co. | 107,472 | .8 | 16.6 |
| 11. | Shevlin, Hixon Co. | 106,965 | .7 | 17.3 |
| 12. | Inman-Poulson Timber Co. | 92,907 | .7 | 18.0 |
| 13. | Gardiner Lumber Co. | 92,782 | .7 | 18.7 |
| 14. | Santiam Lumber Co. | 92,692 | .7 | 19.4 |
| 15. | Hammond Lumber Co. | 92,000 | .6 | 20.0 |
| 16. | Brooks-Scanlon, Inc. | 91,905 | .6 | 20.6 |
| 17. | Shepard & Morse Lumber Co. | 89,885 | .6 | 21.2 |
| 18. | Willamette Valley Lumber Co. | 80,902 | .5 | 21.7 |
| 19. | Medford Corp. | 76,864 | .5 | 22.2 |
| 20. | Pickering Lumber Corp. | 75,590 | .5 | 22.7 |

1954

| Rank | Name | Production | Share of Pacific coast production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Timber Co. | 1,000,000 | 5.9 | 5.9 |
| 2. | Long-Bell Lumber Co. | 347,342 | 2.0 | 7.9 |
| 3. | Edward Hines Lumber Co. | 197,060 | 1.2 | 9.1 |
| 4. | Pope & Talbot, Inc. | 190,282 | 1.1 | 10.2 |
| 5. | Fruit Growers Supply Co. | 176,000 | 1.0 | 11.2 |
| 6. | Coos Bay Timber Co. | 164,415 | 1.0 | 12.2 |
| 7. | Georgia-Pacific Corp. | 147,267 | .9 | 13.1 |
| 8. | Willamette Valley Lumber Co. | 146,118 | .9 | 14.0 |
| 9. | Roseburg Lumber Co. | 130,000 | .8 | 14.8 |
| 10. | Diamond Match Co. | 119,837 | .7 | 15.5 |
| 11. | McCloud River Lumber Co. | 110,923 | .6 | 16.1 |
| 12. | United States Plywood Corp. | 98,798 | .6 | 16.7 |
| 13. | Hammond Lumber Co. | 94,966 | .5 | 17.2 |
| 14. | Santiam Lumber Co. | 94,574 | .5 | 17.7 |
| 15. | Union Lumber Co. | 94,000 | .5 | 18.2 |
| 16. | Pacific Lumber Co. | 93,310 | .5 | 18.7 |
| 17. | Ralph L. Smith Lumber Co. | 92,774 | .5 | 19.2 |
| 18. | Rainier Manufacturing Co. | 89,256 | .5 | 19.7 |
| 19. | Simpson Logging Co. | 86,690 | .5 | 20.2 |
| 20. | Irwin & Lyons, Inc. | 84,567 | .5 | 20.7 |

Table 18. — Twenty largest lumber producing firms, by region and year — Continued

PACIFIC COAST

1959

| Rank | Name | Production | Share of Pacific coast production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Co. | 1,300,000 | 7.2 | 7.2 |
| 2. | Georgia-Pacific Corp. | 491,528 | 2.7 | 9.9 |
| 3. | United States Plywood Corp. | 324,533 | 1.8 | 11.7 |
| 4. | Boise Cascade Corp. | 323,490 | 1.8 | 13.5 |
| 5. | American Forest Products Corp. | 267,970 | 1.5 | 15.0 |
| 6. | Simpson Logging Co. | 255,660 | 1.4 | 16.4 |
| 7. | Pope & Talbot, Inc. | 213,102 | 1.2 | 17.6 |
| 8. | International Paper Co. | 212,365 | 1.2 | 18.8 |
| 9. | Edward Hines Lumber Co. | 210,614 | 1.2 | 19.9 |
| 10. | Pacific Lumber Co. | 182,928 | 1.0 | 20.9 |
| 11. | St. Regis Paper Co. | 144,639 | .8 | 21.7 |
| 12. | Ralph L. Smith Lumber Co. | 141,238 | .8 | 22.5 |
| 13. | Cheney Lumber Co. | 122,195 | .7 | 23.2 |
| 14. | McCloud River Lumber Co. | 120,535 | .7 | 23.8 |
| 15. | Aborigine Lumber Co. | 117,748 | .7 | 24.5 |
| 16. | Pickering Lumber Corp. | 116,950 | .6 | 25.1 |
| 17. | J. H. Bate Co. | 115,000 | .6 | 25.7 |
| 18. | Santiam Lumber Co. | 115,000 | .6 | 26.3 |
| 19. | Willamette Valley Lumber Co. | 114,175 | .6 | 26.9 |
| 20. | Trio Lumber Co., Inc. | 110,000 | .6 | 27.5 |

1960

| Rank | Name | Production | Share of Pacific coast production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Co. | 1,313,740 | 8.1 | 8.1 |
| 2. | Georgia-Pacific Corp. | 552,000 | 3.4 | 11.5 |
| 3. | Boise Cascade Corp. | 315,021 | 1.9 | 13.4 |
| 4. | United States Plywood Corp. | 300,767 | 1.8 | 15.2 |
| 5. | American Forest Products Corp. | 248,165 | 1.5 | 16.7 |
| 6. | Edward Hines Lumber Co. | 215,891 | 1.3 | 18.0 |
| 7. | Simpson Logging Co. | 211,472 | 1.3 | 19.3 |
| 8. | Pope & Talbot, Inc. | 178,368 | 1.1 | 20.4 |
| 9. | Pacific Lumber Co. | 166,746 | 1.0 | 21.4 |
| 10. | St. Regis Paper Co. | 138,357 | .8 | 22.2 |
| 11. | Ralph L. Smith Lumber Co. | 135,215 | .8 | 23.0 |
| 12. | Union Lumber Co. | 126,000 | .8 | 23.8 |
| 13. | International Paper Co. | 121,344 | .7 | 24.5 |
| 14. | Willamette Valley Lumber Co. | 118,850 | .7 | 25.2 |
| 15. | Diamond National Corp. | 110,247 | .7 | 25.9 |
| 16. | McCloud River Lumber Co. | 108,553 | .7 | 26.6 |
| 17. | Rainier Manufacturing Co. | 106,381 | .6 | 27.2 |
| 18. | Pickering Lumber Corp. | 101,077 | .6 | 27.8 |
| 19. | Cheney Lumber Co. | 95,000 | .6 | 28.4 |
| 20. | Stomar Lumber Co. | 93,156 | .6 | 29.0 |

## Table 18. — Twenty largest lumber producing firms, by region and year — Continued

UNITED STATES

1947

| Rank | Name | Production | Share of United States production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Timber Co. | 875,000 | 2.5 | 2.5 |
| 2. | Long-Bell Lumber Co. | 372,900 | 1.0 | 3.5 |
| 3. | Potlatch Forests, Inc. | 252,944 | .7 | 4.2 |
| 4. | Pope & Talbot, Inc. | 186,330 | .5 | 4.7 |
| 5. | Edward Hines Lumber Co. | 180,486 | .5 | 5.2 |
| 6. | Coos Bay Timber Co. | 162,003 | .5 | 5.7 |
| 7. | C. D. Johnson Lumber Corp. | 123,367 | .3 | 6.0 |
| 8. | Fruit Growers Supply Co. | 121,000 | .3 | 6.3 |
| 9. | McCloud River Lumber Co. | 118,833 | .3 | 6.6 |
| 10. | Irwin & Lyons, Inc. | 108,190 | .3 | 6.9 |
| 11. | Pacific Lumber Co. | 107,472 | .3 | 7.2 |
| 12. | Shevlin, Hixon Co. | 106,965 | .3 | 7.5 |
| 13. | Southwest Lumber Mills | 101,619 | .3 | 7.8 |
| 14. | Boise-Payette Lumber Co. | 101,542 | .3 | 8.1 |
| 15. | Inman-Poulson Timber Co. | 92,907 | .3 | 8.4 |
| 16. | Gardiner Lumber Co. | 92,782 | .3 | 8.7 |
| 17. | Santiam Lumber Co. | 92,692 | .3 | 9.0 |
| 18. | Hammond Lumber Co. | 92,000 | .2 | 9.2 |
| 19. | Brooks-Scanlon, Inc. | 91,905 | .2 | 9.4 |
| 20. | Shepard & Morse Lumber Co. | 89,885 | .2 | 9.6 |

1954

| Rank | Name | Production | Share of United States production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Timber Co. | 1,000,000 | 2.8 | 2.8 |
| 2. | Long-Bell Lumber Co. | 347,342 | .9 | 3.7 |
| 3. | Potlatch Forests, Inc. | 301,361 | .8 | 4.5 |
| 4. | Edward Hines Lumber Co. | 197,060 | .5 | 5.0 |
| 5. | Pope & Talbot, Inc. | 190,282 | .5 | 5.5 |
| 6. | Fruit Growers Supply Co. | 176,000 | .5 | 6.0 |
| 7. | Coos Bay Timber Co. | 165,415 | .5 | 6.5 |
| 8. | J. Neils Lumber Co. | 150,904 | .4 | 6.9 |
| 9. | Georgia-Pacific Corp. | 147,267 | .4 | 7.3 |
| 10. | Willamette Valley Lumber Co. | 146,118 | .4 | 7.7 |
| 11. | Roseburg Lumber Co. | 130,000 | .4 | 8.1 |
| 12. | Southwest Lumber Mills, Inc. | 123,307 | .3 | 8.4 |
| 13. | Diamond Match Co. | 119,837 | .3 | 8.7 |
| 14. | McCloud River Lumber Co. | 110,923 | .3 | 9.0 |
| 15. | United States Plywood Corp. | 98,738 | .3 | 9.3 |
| 16. | Hammond Lumber Co. | 94,966 | .3 | 9.6 |
| 17. | Santiam Lumber Co. | 94,574 | .3 | 9.9 |
| 18. | Union Lumber Co. | 94,000 | .2 | 10.1 |
| 19. | Pacific Lumber Co. | 93,310 | .2 | 10.3 |
| 20. | Ralph L. Smith Lumber Co. | 92,774 | .2 | 10.5 |

Table 18. — Twenty largest lumber producing firms, by region and year — Continued

UNITED STATES

1959

| Rank | Name | Production | Share of United States production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Co. | 1,300,000 | 3.5 | 3.5 |
| 2. | Potlatch Forests, Inc. | 597,933 | 1.6 | 5.1 |
| 3. | Georgia-Pacific Corp. | 538,836 | 1.5 | 6.6 |
| 4. | Boise Cascade Corp. | 504,000 | 1.4 | 8.0 |
| 5. | United States Plywood Corp. | 324,433 | .9 | 8.9 |
| 6. | St. Regis Paper Co. | 301,196 | .8 | 9.7 |
| 7. | Diamond National Corp. | 280,000 | .7 | 10.4 |
| 8. | American Forest Products Corp. | 267,970 | .7 | 11.1 |
| 9. | Simpson Logging Co. | 255,660 | .7 | 11.8 |
| 10. | International Paper Co. | 230,203 | .6 | 12.4 |
| 11. | Pope & Talbot, Inc. | 213,102 | .6 | 13.0 |
| 12. | Edward Hines Lumber Co. | 210,614 | .5 | 13.5 |
| 13. | Pacific Lumber Co. | 182,928 | .5 | 14.0 |
| 14. | Southwest Forest Industries, Inc. | 164,106 | .4 | 14.4 |
| 15. | Dierks Forests, Inc. | 145,168 | .4 | 14.8 |
| 16. | Ralph L. Smith Lumber Co. | 141,238 | .4 | 15.2 |
| 17. | Cheney Lumber Co. | 122,195 | .3 | 15.5 |
| 18. | McCloud River Lumber Co. | 120,535 | .3 | 15.8 |
| 19. | Aborigine Lumber Co. | 117,748 | .3 | 16.1 |
| 20. | Pickering Lumber Co. | 116,950 | .3 | 16.4 |

1960

| Rank | Name | Production | Share of United States production | Cumulative share of production |
|---|---|---|---|---|
| | | Thousand board feet | Percent | Percent |
| 1. | Weyerhaeuser Co. | 1,328,740 | 4.0 | 4.0 |
| 2. | Georgia-Pacific Corp. | 655,902 | 2.0 | 6.0 |
| 3. | Boise Cascade Corp. | 522,830 | 1.6 | 7.6 |
| 4. | Potlatch Forests, Inc. | 513,157 | 1.6 | 9.2 |
| 5. | United States Plywood Corp. | 300,767 | .9 | 10.1 |
| 6. | St. Regis Paper Co. | 286,240 | .9 | 11.0 |
| 7. | Diamond National Corp. | 248,247 | .8 | 11.8 |
| 8. | American Forest Products Corp. | 248,165 | .8 | 12.6 |
| 9. | Edward Hines Lumber Co. | 215,891 | .6 | 13.2 |
| 10. | Simpson Lumber Co. | 211,472 | .6 | 13.8 |
| 11. | Pope & Talbot, Inc. | 178,368 | .5 | 14.3 |
| 12. | Pacific Lumber Co. | 166,746 | .5 | 14.8 |
| 13. | Southwest Forest Industries, Inc. | 154,755 | .5 | 15.3 |
| 14. | Ralph L. Smith Lumber Co. | 135,215 | .4 | 15.7 |
| 15. | Union Lumber Co. | 126,000 | .4 | 16.1 |
| 16. | Dierks Forests, Inc. | 124,066 | .4 | 16.5 |
| 17. | International Paper Co. | 121,344 | .4 | 16.9 |
| 18. | Willamette Valley Lumber Co. | 118,850 | .4 | 17.3 |
| 19. | McCloud River Lumber Co. | 108,553 | .3 | 17.6 |
| 20. | Rainier Manufacturing Co. | 106,381 | .3 | 17.9 |

The composition of the leading firms in the Douglas-fir subregion has changed sharply over the 13-year period 1947 to 1960. Only 7 of the 20 largest firms of 1947 were still in the list for 1960. There were, therefore, 13 new firms in the 1960 list. The Big Four remained the same in both composition and order from 1947 to 1954, but two of them disappeared through merger before 1959.

Georgia-Pacific became the second largest lumber producing firm in the Douglas-fir lumber industry of 1959 and had strengthened this position by 1960. This surviving corporation had absorbed four firms that had appeared on the Big Twenty list in either or both 1947 or 1954. Neither U.S. Plywood nor Weyerhaeuser[19] nor Pope & Talbot had absorbed any of the former Big Twenty firms.

A chain of mergers can be identified over the four points in time. Gardiner Lumber Co. and Oregon American Lumber Corp., appearing as numbers 8 and 13, respectively, on the 1947 list, were absorbed by Long-Bell, number 2 on the 1954 list. Long-Bell was in turn merged with International Paper Co. and became number 6 on the 1959 list and number 16 on the 1960 list.

The four largest lumber producing firms in the United States include two that are among the four largest in the Douglas-fir subregion, Weyerhaeuser Co. and Georgia-Pacific. The Big Four firms in the Pacific Northwest are the same as the Big Four in the Pacific Coast States, although the production for each differs except in the case of Weyerhaeuser Co.

Preoccupation up to this point with the 4, 8, and 20 largest firms tends to obscure other dynamic changes that have taken place in the industrial structure of the Douglas-fir lumber industry. Significant changes have taken place in the small mill class where a large number of firms have left the industry, resulting in only a small effect on the total output or the share accounted for by the 4, 8, or 20 largest firms.

Figure 3 illustrates graphically the changes taking place from 1948 to 1960 involving principally the small mills in the Douglas-fir subregion. Total lumber production from the subregion was approximately unchanged from 1948 to 1959 but declined in 1960. Production in 1960 was 15 percent below the 1948 level. But the 1948 output was produced by 1,675 mills in the Douglas-fir subregion, whereas the 1960 output was produced by only 614 mills. The disappearance of 1,061 mills from production over this period represents a decline of 63 percent in number of producing units.

[19] Schafer Bros. Lumber & Shingle Co. was acquired by Simpson Logging Co. in 1955. Weyerhaeuser Timber Co. in turn acquired lumber milling facilities and some timberland from the former Schafer Bros. holdings.

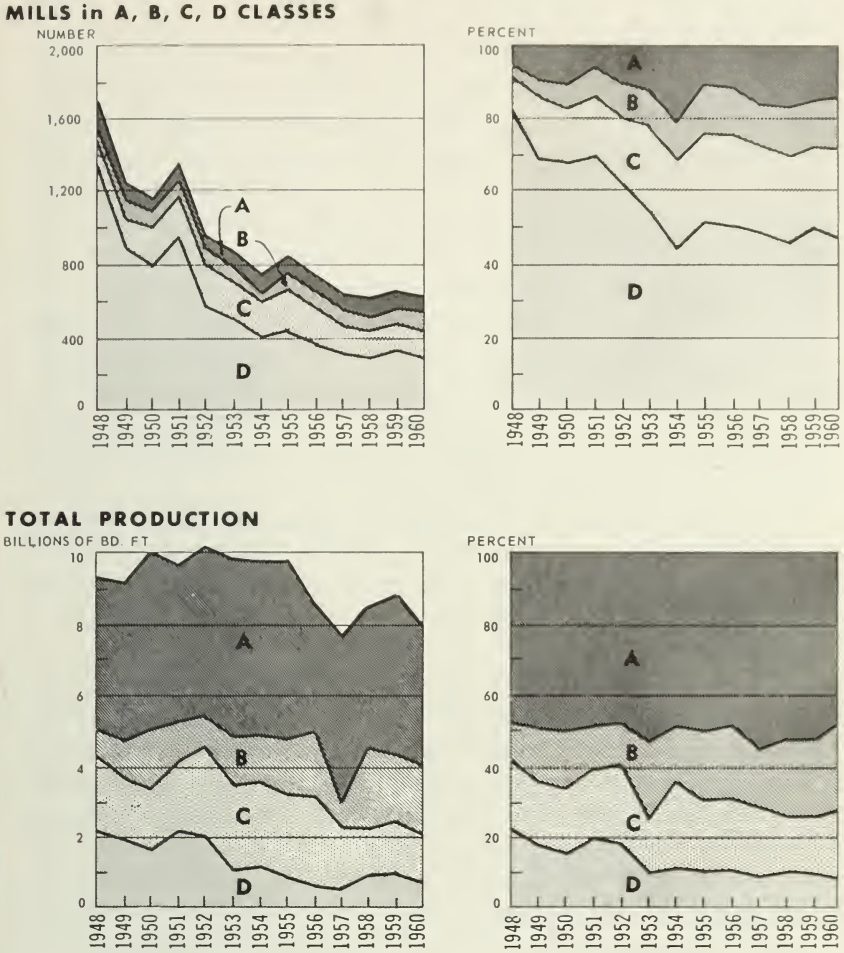



Figure 3. — Number of and production from sawmills in the Douglas-fir subregion by size class, 1948-60.

The number of mills making their exit from the Douglas-fir lumber industry during the increasingly unfavorable period 1948 to 1960 is almost exactly equal to the number of mills entering production during the increasingly favorable period 1933 to 1948. There were 606 mills operating in 1933 and 614 in 1960. Even further back, there were 631 mills operating in 1926, the number expanding to 883 in 1929 and declining to 441 in 1932.

Almost the entire 1948 to 1960 exit is accounted for by small mills (D class, producing less than 40,000 board feet per 8-hour shift). In 1948 there were 1,328 class D sawmills in production and in 1960 there were only 291 mills in this small class. This disappearance of 1,037 mills from the class D category represents a 78-percent decline.

The medium-small mills (defined as C mills, producing between 40,000 and 80,000 board feet per 8-hour shift) declined modestly from 191 mills in 1948 to 154 mills in 1960. This represents a disappearance of 19 percent of the 1948 C mills in production. Clearly, the great decline in small mills is not accounted for by an expansion in their output causing them to be classified as medium-small (class C) mills.

The medium-large mills (class B mills, defined as mills producing 80,000 to 119,999 board feet per 8-hour shift) increased by 26 mills, from 53 in 1948 to 89 in 1960. This represents a 68-percent increase and may be accounted for in part by some class C mills expanding output and shifting into the B category.

The large mills (class A mills, defined as mills producing 120,000 board feet or more per 8-hour shift) declined by 22 percent, from 103 mills in 1948 to 80 mills in 1960. Since the medium-small, medium-large, and large mills in total declined in number, we may infer that most small mills ceased production entirely rather than became larger. The considerable decline in number of active sawmills is not accounted for by merger activity since data reported are for plants rather than firms. The only exception to this generalization is where merger results in a mill being closed down and its supporting timber used to supply existing plants of the acquiring firm.

In 1948, small mills, representing 79 percent of the total number of mills, accounted for 24 percent of total production. In 1960, small mills accounted for only 47 percent of the total number of mills and only 8 percent of total output. On the other hand, the large mills in 1948 represented 6 percent of the total mills but produced 44 percent of total output. In 1960 the large mills, though fewer in number, represented 13 percent of total producing units and 49 percent of total output.

The most significant change in the structure of the Douglas-fir lumber industry in recent years is clearly the 1948-60 mass exodus of small mills

from the industry, almost exactly offsetting the mass entry from 1933 to 1948. At the same time the large mills, while fewer in number, accounted for a greater share of total production. Finally, concentration of output within the 4, 8, and 20 largest mills has expanded sharply, particularly in the latter half of the 1950's. Nevertheless, the lumber industry remains one of the most competitive industries in the U. S. economy, particularly so, because many of the small mills apparently could again operate if conditions became favorable.

The foregoing has outlined the structure of the lumber industry, noting both the present position and the trend over time. While the data indicate increasing economic concentration at the resource ownership level and at the production level in the decade of the 1950's, these facts do not allow us to render a judgment that the trend or current position is either "good" or "bad." To pass such judgment would require, first, agreement as to the objectives of a given industrial structure and, second, the probability of a competitive structure or oligopolistic structure serving the agreed-upon objectives. While forming a judgment concerning performance is important, it is well beyond the scope of a study concerned with the structure of an industry.

# Economic Concentration In Wholesale Lumber Distribution

The purpose of this section is to discover the degree of economic concentration in the process of wholesale lumber distribution. Knowledge of the structure of the wholesale lumber distributing function is important for at least two reasons. First, if this function is served by a few enterprisers (an oligopoly) with barriers to entry into the business, then it would be possible for a few wholesale distributors to exploit the many lumber producers. Second, even though a high degree of competition may prevail at the production level, oligopoly at the wholesale level can produce oligopolistic effects for consumers of lumber. A collusive oligopoly at the wholesale level would be able to establish noncompetitive wholesaler markups and pass the cost on to consumers.

## The Structure of Wholesale Lumber Distribution

In view of these possibilities, let us now turn to an examination of the structure of the wholesaling function. Figure 4 shows the multitude of possible routes that lumber may take between its production and final consumption. About 85 percent of all the Douglas-fir subregion lumber production moves through wholesalers. These firms take title to the lumber and extend normal trade credits. The so-called western wholesalers maintain close contact with supplying mills, buying from them and in turn selling to eastern wholesalers who have relatively close contacts with distribution yards, retailers, and large consumers. The western wholesaler may also sell directly to the same level of customers to which the eastern wholesaler attempts to sell, or the western wholesaler may utilize the services of a commission man who in turn is a step closer to the ultimate consumer.

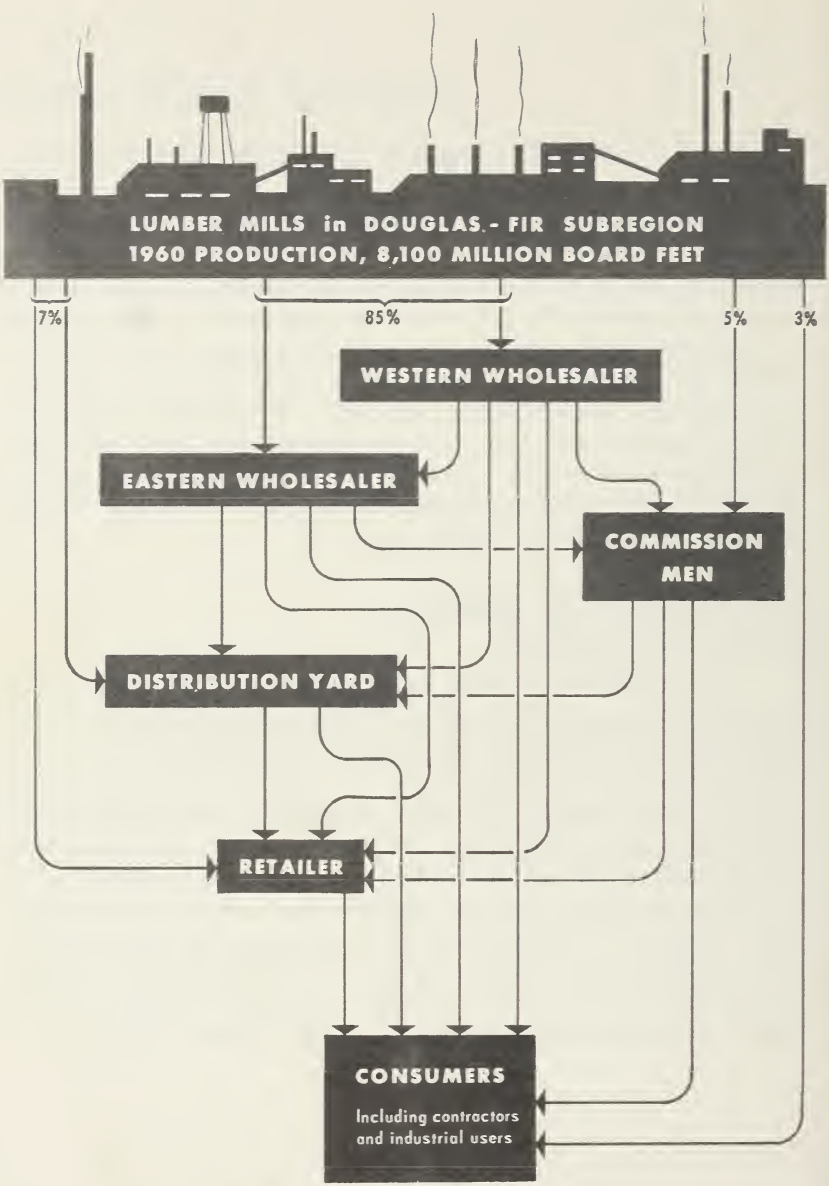



Figure 4. — Organization chart for lumber distribution.

About 7 percent of total Douglas-fir subregion lumber production is sold directly to distribution yards where lumber inventories are maintained, or directly to retailers. An estimated 5 percent of Douglas-fir subregion production is sold through commission men, who do not take title to lumber and do not generally extend credit but, rather, operate on a commission that seems to vary between $1 and $2 per thousand board feet. The remaining approximately 3 percent of Douglas-fir subregion lumber production is sold directly to consumers, including contractors and industrial users.

The wholesaling function is a highly fluid business. Two well-informed observers estimated widely different numbers of wholesalers and commission men actively engaged in the lumber distribution function. One estimate was that there are about 1,500 wholesalers (western and eastern) operating in the United States and that about 800 commission men are actively in business. Another estimate was that there are 5,000 to 6,000 wholesalers and 300 to 400 commission men. One source of the great disparity in estimates is that no precise definition exists of who constitutes a wholesaler or a commission man or a retailer. Wholesalers also commonly perform a commission service. Retailers may attempt to operate as wholesalers and wholesalers may do a retail business. Regardless of which estimate approximates the true universe, the industry is clearly not made up of a few operators with rigid barriers to entry. One wholesaler complained that "all it takes to enter this business is a telephone, a ditto machine, and $10,000 to $20,000 of working capital. Anyone can get on mailing lists to receive offerings from mills and can in turn send out price lists to potential buyers."

Though entry into the wholesaling function is relatively easy, it still may be true that a few wholesalers handle most of the volume. Table 19 shows that the three largest western wholesalers whose principal operations are in the Douglas-fir subregion handle 14.8 percent of total subregion lumber production. This market share is relatively small. It does not substantiate the hypothesis that a few large wholesalers are structurally in a position to control lumber distribution and exploit either the many lumber producers or the wholesalers, retailers, or large users to whom they sell.

Of the remaining 85 percent of the lumber supply coming from the Douglas-fir subregion, part will be accounted for not by wholesalers but by the large producers themselves who serve as not only their own wholesalers but in some cases have a string of retail yards as well. The share of the market accounted for by the four largest producers in the Douglas-fir subregion is also shown in table 19. We find that the large producer-sellers may control as much as 21.5 percent of the subregion's wholesale

lumber market and, together with the share accounted for by the three largest western wholesalers, may account for up to 36.3 percent of the market. This measure, however, involves some double counting because the large producers sell part of their output through the three western wholesalers. Therefore, 36.3 percent serves as a maximum, with the true market control accounted for by the seven largest sellers being less than 36.3 percent.

Table 19. — Wholesale lumber market shares, Douglas-fir subregion, 1959

| Item | Volume of lumber produced and/or shipped | Percent of market |
|---|---|---|
| | Million bd. ft. | |
| Three largest western wholesale lumber companies, total shipments[1] | 1,350 | 14.8 |
| Four largest producer-sellers, Douglas-fir subregion: | | |
| Weyerhaeuser Co.[2] | 1,170 | 12.8 |
| Georgia-Pacific Corp.[2] | 335 | 3.7 |
| U. S. Plywood Corp.[2] | 242 | 2.7 |
| Pope & Talbot, Inc.[2] | 213 | 2.3 |
| Total, four largest producer-sellers | 1,960 | 21.5 |
| Total, above seven sellers | 3,310 | 36.3 |
| All others | 5,794 | 63.7 |
| Total lumber production, Douglas-fir subregion | 9,104 | 100.0 |

[1] Data provided by the three wholesale lumber firms on a nondisclosure basis.
[2] Data from directories of the forest industries published by The Lumberman and The Timberman, San Francisco, 1961.

The three large western wholesalers do not restrict their buying operations to the Douglas-fir subregion. Therefore, in table 20 their share of the Pacific coast market is shown together with the production in the same three States. The three largest wholesalers handle 7.5 percent of the Pacific coast supply and the four largest producer-sellers, 13.5 percent. We, therefore, find that there is potential control over 21 percent of the Pacific coast supply, and true market control lies somewhere short of this 21 percent.

Because there is a high degree of substitution possible between lumber produced in the Douglas-fir subregion relative to the western pine subregion and the southern pine subregion, table 21 also includes concentration ratios in the wholesale market for the entire United States. The three largest wholesalers now control only 3.6 percent of the total United States market and the four largest producer-sellers, 7.9 percent. Together, there is a potential control of 11.5 percent with actual control somewhere below this figure.

Table 20. — Wholesale lumber market shares, California, Oregon, and Washington, 1959

| Item | Volume of lumber produced and/or shipped | Percent of market |
|---|---|---|
| | Million bd. ft. | |
| Three largest western wholesale lumber companies, total shipments[1] | 1,350 | 7.5 |
| Four largest producer-sellers, West Coast: | | |
| Weyerhaeuser Co.[2] | 1,300 | 7.2 |
| Georgia-Pacific Corp.[2] | 492 | 2.7 |
| U. S. Plywood Corp.[2] | 325 | 1.8 |
| Boise Cascade Corp.[2] | 323 | 1.8 |
| Total, four largest producer-sellers | 2,440 | 13.5 |
| Total, above seven sellers | 3,790 | 21.0 |
| All others | 14,235 | 79.0 |
| Total lumber production, West Coast | 18,025 | 100.0 |

[1] Data provided by the three wholesale lumber firms on a nondisclosure basis.
[2] Data from directories of the forest industries published by The Lumberman and The Timberman, San Francisco, 1961.

Table 21. — Wholesale lumber market shares, total United States, 1959

| Item | Volume of lumber produced and/or shipped | Percent of market |
|---|---|---|
| | Million bd. ft. | |
| Three largest western wholesale lumber companies, total shipments[1] | 1,350 | 3.6 |
| Four largest producer-sellers, United States: | | |
| Weyerhaeuser Co.[2] | 1,300 | 3.5 |
| Potlatch Forests, Inc.[2] | 598 | 1.6 |
| Georgia-Pacific Corp.[2] | 539 | 1.4 |
| Boise Cascade Corp.[2] | 504 | 1.4 |
| Total, four largest producer-sellers | 2,941 | 7.9 |
| Total, above seven sellers | 4,291 | 11.5 |
| All others | 32,875 | 88.5 |
| Total lumber production, United States | 37,166 | 100.0 |

[1] Data provided by the three wholesale lumber firms on a nondisclosure basis.
[2]Data from directories of the forest industries published by The Lumberman and The Timberman, San Francisco, 1961.

The foregoing information on market shares of the three largest western wholesalers was developed by direct questions to each wholesale lumber firm. As a second source, information was developed from lists of cars rolling, taken from the offering lists of wholesale lumber firms. Most, but not all, cars of lumber sold by wholesalers will be represented in this list. The data shown in table 22 will therefore be less than the true volume sold by each wholesale firm. These additional estimates serve as a useful check against understatement of market shares developed in interviews.

Data are summarized for the Big Three in order to be comparable with tables 19, 20, and 21. In addition, the market shares of the Big Four wholesalers and the Big Eight are also shown. The data for the three largest firms shown for 1959 indicate a less significant market share than was developed through direct questions. The three largest firms shown in table 22 are the same as those questioned directly.

In addition, table 22 shows the relationship between the three largest firms and the next five. There is no single dominant firm in wholesaling as there is in resource ownership and lumber production. The relationship among wholesalers did not change in any significant manner between 1959 and 1960.

## Table 22. — Wholesale lumber market shares by region, 1959 and 1960

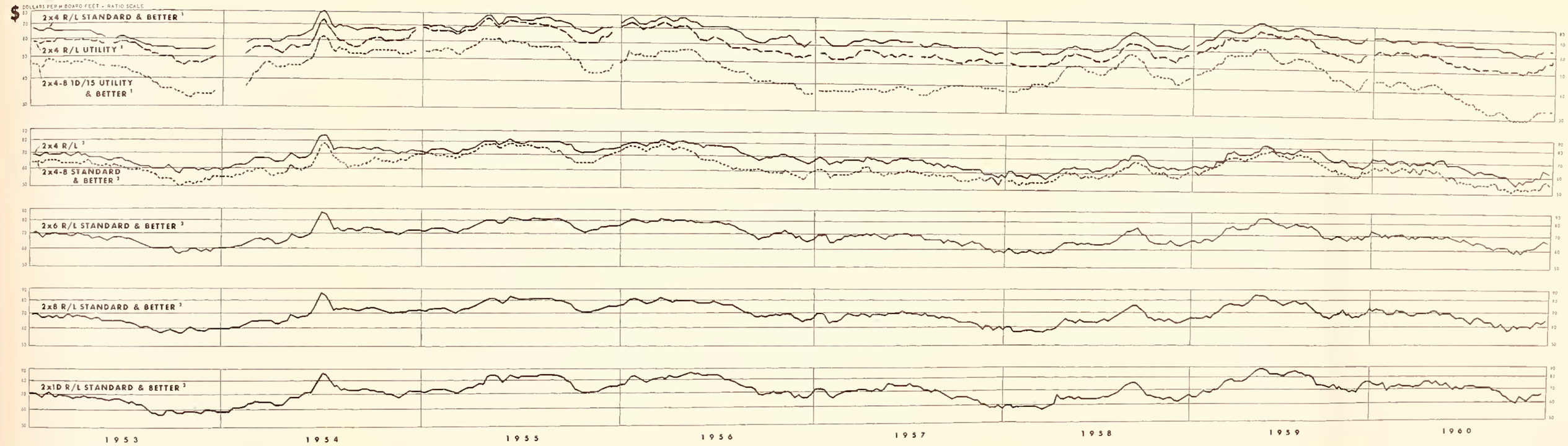
| Wholesale lumber company | 1960 | | | | | 1959 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Cars rolling | Volume | Rank | Market shares | | Cars rolling | Volume | Rank | Market shares | | | |
| | | | | Douglas-fir subregion | United States | | | | Douglas-fir subregion | Pacific Northwest | Pacific coast | United States |
| | Number | Thousand bd. ft. | | — — Percent — — | | Number | Thousand bd. ft. | | — — — — — — — — Percent — — — — — — — — | | | |
| Oregan-Pacific Lumber Co. | 12,465 | 373,950 | 1 | 4.6 | 1.1 | 11,087 | 332,610 | 2 | 3.7 | 2.8 | 1.8 | 0.9 |
| Timberlane Lumber Ca. | 10,223 | 306,690 | 2 | 3.8 | .9 | 11,499 | 344,970 | 1 | 3.8 | 2.9 | 1.9 | .9 |
| North Pacific Lumber Co. | 7,704 | 231,120 | 3 | 2.9 | .7 | 9,884 | 296,520 | 3 | 3.3 | 2.5 | 1.6 | .8 |
| Three largest firms[1] | 30,392 | 911,760 | -- | 11.3 | 2.7 | 32,470 | 974,100 | -- | 10.8 | 8.2 | 5.3 | 2.6 |
| Eugene-Willamette Lumber Co. | 6,144 | 184,320 | 4 | 2.3 | .6 | 5,379 | 161,370 | 4 | 1.8 | 1.3 | .9 | .4 |
| Faur largest firms[1] | 36,536 | 1,096,080 | -- | 13.6 | 3.3 | 37,849 | 1,135,470 | -- | 12.5 | 9.4 | 6.3 | 3.0 |
| United Lumber Co., Inc. | 4,270 | 128,100 | 5 | 1.6 | .4 | 3,947 | 118,410 | 5 | 1.3 | 1.0 | .7 | .3 |
| Shamrack Lumber Ca. | 3,273 | 98,190 | 6 | 1.2 | .3 | -- | -- | 10 | -- | -- | -- | -- |
| Vallstedt-Kerr Lumber Ca. | 2,984 | 89,520 | 7 | 1.1 | .3 | 2,995 | 89,850 | 6 | 1.0 | .8 | .5 | .2 |
| Chapman Lumber Co., Inc. | 2,467 | 74,010 | 8 | .9 | .2 | 2,842 | 85,260 | 7 | .9 | .7 | .5 | .2 |
| Western Lumber, Inc. | -- | -- | 11 | -- | -- | 2,793 | 83,790 | 8 | .9 | .7 | .5 | .2 |
| Eight largest firms[1] | 49,530 | 1,485,900 | -- | 18.3 | 4.5 | 50,426 | 1,512,780 | -- | 17.0 | 12.6 | 8.4 | 4.1 |
| Total praductian far geagraphical area indicated | -- | -- | -- | Million bd. ft. 8,100 | Million bd. ft. 32,880 | -- | -- | -- | Million bd. ft. 9,104 | Million bd. ft. 11,962 | Million bd. ft. 18,025 | Million bd. ft. 37,166 |

[1] Largest far the Dauglas-fir subregion.
Saurce: Develaped fram sales lists af cars affered by lumber wholesalers to patential custamers.

The facts presented above concerning economic concentration in wholesale lumber distribution show a highly competitive structure. The competitive structure in turn would clearly not allow monopolistic or oligopolistic exploitation of either the many lumber producers in the Douglas-fir subregion or the many who buy from wholesalers.

## Price Determination at the Wholesale Level

With a highly competitive structure in the production and wholesale distribution of lumber, one would expect to find competitive price behavior. Figure 5 shows a price series for three commonly traded lumber items as reported by "Random Lengths," a weekly market letter and price guide for the lumber industry. A second group of five lumber items is shown in figure 5 also. This latter series was developed from the weekly offering lists that one large western wholesaler mailed to prospective buyers. Both series show an extremely high degree of price flexibility characteristic of market-determined prices and in contrast to what has been termed "administered prices."




1 Source: "RANDOM LENGTHS," a weekly market letter, Eugene, Oregon.

2 Source: A western wholesale lumber company.

Figure 5. — Wholesale prices, Douglas-fir lumber, 1953-60 (weekly offering prices).

Price determination at the wholesale level follows a standard procedure. First, both lumber producers and wholesalers send prospective buyers an offering list, usually on a weekly basis. The offering list identifies the species, grade, sizes, moisture condition, quantity, and price of lumber available. From this point on, most lumber is sold over the telephone. Relationships between wholesalers and their usual customers differ with the personalities involved. One wholesaler analyzed his telephone selling as follows: When a customer inquires about a given offer contained on the wholesaler's list and finds it still available, a price must be agreed upon. The starting point is the published offering price. This price becomes the agreed-upon price in approximately 50 percent of the cases. In the other 50 percent, bargaining produces a lower price. The prospective buyer may make an offer that usually varies between $0.50 and $2 per thousand board feet below the listed price. Approximately 25 percent of such offers are accepted. The other 75 percent is split between the price offered by the prospective buyer and the price listed by the wholesaler.

The prices shown in figure 5 should be interpreted in this light. They are offering prices. Actual prices, however, are made over the telephone. These frequently deviate from the offering price, and they are highly responsive to market conditions rather than being subject to price administration.[20] Therefore, actual prices are even more flexible than shown in the wholesaler offering list.

## Market-Determined Vs. Administered Prices

Lumber prices, being highly sensitive to changes in supply and demand (market determined), stand in sharp contrast to administered prices in some United States industries. The term "administered prices" was coined by Gardiner C. Means in 1935 and is defined as follows (U. S. Congress, 1935, p. 1):

> **There are two essentially different types of markets in operation — the traditional market in which supply and demand are equated by a flexible price and the administered market in which production and demand are equated at an inflexible administered price. In the first type of market, economic adjustments are brought about primarily by fluctuations in price. In the second type of market, economic adjustments are brought about primarily by changes in volume of production, while price changes are of secondary significance in producing adjustment. The difference between market prices and administered prices is clear. A market price is one which is made in the market as a result of the interaction of buyers and sellers**

[20] A similar situation exists in the textile industry. One study explained that the fact of little control over textile prices is "aggravated by the fact that most textile sales are made over the telephone." (See page 125 of: Backman, Jules, and Gainsbrugh, M. R. Economics of the cotton textile industry. 244 pp. New York: Natl. Indus. Conf. Board. 1946.)

> . . . . An administered price is essentially different. It is a price which is set by administrative action and held constant for a period of time. We have an administered price when a company maintains a posted price at which it will make sales or simply has its own prices at which buyers may purchase or not as they wish.

The period of time for which administered prices are held constant was not precisely defined. A 1939 National Resources Committee study directed by Means classified market-determined prices as those prices which change more than 77 times in an 8-year period and administered prices as those which change less than 23 times in the same period. Between these two extremes, approximately one-fourth of all items studied "are not clearly dominated by either the market or administration" (U. S. National Resources Committee, 1939, p. 110). Testifying before Congress in 1957, Means limited his commitment stating that "an administered price is set, and may be kept constant for weeks or months at a time" (U. S. Congress, 1957b, p. 75).

There are two essential elements in Means' definition of the administered price category which differentiate it from the market prices. First is the phenomenon of a price set by administrative action and held constant for weeks or months at a time. And second is the administrative reaction to a weak demand (perhaps during a recession) by production curtailments, thereby enabling prices to be maintained (or even increased).[21]

In order to show clearly the contrast between market-determined prices in the lumber industry and administered prices, figure 6 is presented showing monthly changes in wholesale prices for lumber and steel. Over the 92-month period for which price data are shown covering structural steel shapes, there were only eight price changes, averaging one price change per year. Of the eight price changes, all but one were price increases. The one price reduction was not significant, being only 0.2 percent. The price decline was so minor that it is not discernible in figure 6. Thus, the first element in Means' administered price definition, that of prices being held constant for a period of time, is clearly evident in the price of structural steel shapes. The opposite is true for lumber prices. Over the same period, lumber prices changed 89 times out of 92 possible occasions.

[21] In identifying administered prices, Means does not imply a value judgment: that they are "good" or "bad." He stated, "I want to say that administered prices are here and I do not regard administered prices as something that can or should be done away with. I regard them as an inevitable and indispensable part of our modern economy. As such, however, they are obviously something we should understand so that we may be able to take their effect into account in developing public policy. Administered prices present a way of doing business that leads to greater efficiency and higher standards of living. We could not have our big efficient department stores and mail-order houses if prices were not administered. Without this method of pricing, big efficient industry would find it almost impossible to operate. Administered prices are an essential part of our modern economy. The point of my testimony is rather that we do not know enough about how administered prices actually operate to be able to make good national policy in such economic fields as inflation, full employment, and enforcement of competition." (U. S. Congress, 1957b, p. 75).

## FLUCTUATIONS in PRICE and OUTPUT

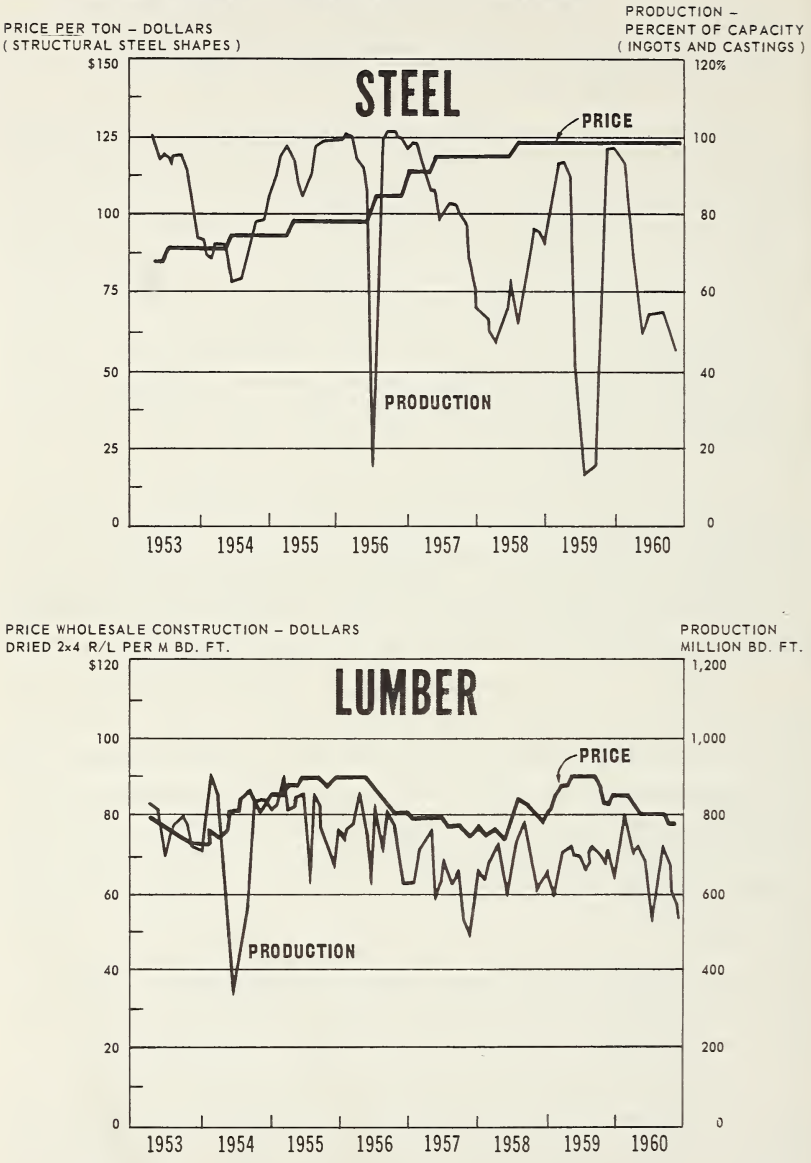



Figure 6. — Fluctuations in price and output — steel, 1953-60; lumber, 1953-60.

Also clearly evident in figure 6 is the second element of administered prices, that economic adjustments are brought about primarily by changes in the volume of production. In response to the 1953-54, 1957-58, and 1960-61 recessions, steel production was reduced to 63 percent, 48 percent, and 46 percent of capacity, respectively. By means of production curtailments, price responses (declines) were avoided. Contrary to the competitive response, steel prices were increased during the 1953-54 and 1957-58 recessions when there was abundant idle capacity. In the lumber industry, production curtailments are modest and are accounted for principally by marginal mills leaving the industry during periods of price weakness.

The price and output response shown for the lumber industry in figure 6 is precisely the kind of behavior that one would expect to follow from the competitive structure outlined in this study. The impressive merger movement notwithstanding, the industry remains sufficiently competitive in its structure so that no firm is able to restrict its output in a weak market and thereby prevent a price decline.

## Summary

The United States economy is subject to cycles of merger activity. The economy is currently in a post World War II merger revival period. Within the current merger wave the lumber industry has shown considerable merger activity, especially during the last half of the 1950's.

Examining the rationale for the current merger movement, we found that from the acquired firm's point of view the prime reason for selling out was an inability to compete in the open market for timber without the cost advantage of integration and diversification. The firm producing only lumber from its log input may be limited in its ability to bid for open market timber compared with some of its vertically integrated competitors. The latter are apparently able to develop much greater value from stumpage as a result of channeling logs into their optimum use and utilizing residual wood for pulp production.

The tax motive for selling out was found to be less important in the lumber industry than in other industries because capital gains tax treatment on income is available to operators processing their own timber. In contrast, the entrepreneur in most other industries must sell his firm in order to convert income from the ordinary income category to the capital gains category.

Receipt of an offer to merge which is high relative to its normal stock value appears in many cases to be a sufficient financial reason for merger, from the acquired firm's point of view. Illustrations are available showing that the value of a stockholder's investment may be increased from approximately 100 percent to approximately 500 percent by accepting the merger offer.

The desire to retire, together with an absence of successors or interested heirs to assume management responsibility, was a frequent reason given for selling. This management consideration was given more frequently in small firms than in large.

From the acquiring firm's point of view the principal motive for merger appears to be vertical integration. This motive is pursued as a means of profit maximization. The profit motive is enhanced when timber is involved due to the anticipation of capital gains tax treatment of profits from holding and growing timber. In this latter sense, the tax motive was found to be far more important in explaining mergers in the lumber industry, from the acquiring firm's point of view, than is true elsewhere in the U. S. economy.

The resource ownership structure of the Douglas-fir lumber industry has passed through several phases. As a result of the large land grants by Congress to the western railroads, a relatively high degree of concentration appeared by 1910. Two railroads, Southern Pacific and Northern Pacific, together owned 3,691,000 acres of timberland in Oregon and Washington. Weyerhaeuser Timber Co. had acquired nearly 2 million acres of timberland from the Northern Pacific Railroad. The four largest holders of timberland in 1910 owned 5,941,000 acres or 13.1 percent of all commercial forest land in Oregon and Washington. This had declined by 1953 to 3,714,000 acres held by the Big Four (not entirely the same four firms as in 1910) or 8.2 percent of the total and 19 percent of the privately owned commercial forest land in the two States. The Big Four of 1953 held only 63 percent as much timberland as the Big Four held in 1910.

From 1953 to 1960, however, the trend of economic concentration in resource ownership was reversed. Over this 7-year period in the Douglas-fir subregion the concentration ratio for the four largest firms increased from 22.4 percent to 26.2 percent. Thus, by 1960 the four largest firms owned more than one-fourth of all private commercial forest land in the Douglas-fir subregion. Concentration ratios for the eight largest firms increased from 27.4 percent to 34.1 percent of all private commercial forest land in the same period.

Relative to concentration ratios found in various manufacturing sectors of U. S. industry, economic concentration in resource ownership within the Douglas-fir subregion must be judged relatively low. However, concentration ratios in timberland ownership cannot be strictly compared to similar ratios in manufacturing. High concentration in the latter may be eroded away by new firms entering the industry and establishing new productive facilities. In contrast, new competition cannot enter timber resource ownership with equal ease. The amount of timberland can be increased only by converting land from other uses. With an expanding population, such conversions in large amounts seem highly improbable. In any case, nearly a lifetime must pass before a new timber crop will mature.

A further consequence follows from the present degree of concentration in resource ownership. Such concentration within small geographical supply areas of the Douglas-fir subregion carries with it possible concentrated advantages in bidding for open-market stumpage. Firms having a small reserve of private timber, or no reserves at all, may be placed at a substantial disadvantage in competing for timber.

On the other hand, there are potential welfare benefits for society resulting from large (in contrast to small) timberland ownerships. A Forest Service study of timberland management found that "large private owners, on the average, treat their lands better than the small owners." In another study, the Forest Service found that "productivity of recently cut areas on private lands is directly related to the size class of ownership — the smaller the ownership, the lower the proportion of recently cut land in the upper productivity class." Thus, there are both merits and demerits associated with the present trend toward blocking up timberland in large holdings.

Moving from economic concentration in resource ownership to concentration in lumber production, we find that the lumber industry in the United States is one of the most competitive industries in the entire economy. The four largest lumber producing firms in the Nation in 1954 accounted for only 6 percent of total lumber production. The 20 largest firms accounted for only 13 percent. When concentration ratios for the "sawmill and planing mill products" category are compared with concentration ratios for other industries competing for construction business, we find that lumber clearly has one of the most competitive structures found in the building materials industries. Of the 426 standard industry product classes (4-digit) listed for U. S. manufacturing industries, only 5 have lower concentration ratios for the four largest companies than is found for the "sawmill and planing mill products" class. In terms of the 8 largest firms and 20 largest

firms, only two product classes have lower concentration ratios than "sawmill and planing mill products." This very highly competitive structure existed in 1954 in spite of the merger movement in the lumber industry.

Over a long period of time, it was found that concentration declined from 1929 to 1947 and increased from 1947 to 1960. In the latter period, however, the share of total output produced by large mills was considerably lower than in 1929.

Similarly, within the Douglas-fir segment of the lumber industry a highly competitive structure is found. In 1960, the four largest lumber producers in the Douglas-fir subregion accounted for only 23.9 percent of total subregion lumber production. The 20 largest firms accounted for 40.6 percent of the subregion's lumber production.

From 1947 to 1954, concentration ratios in Douglas-fir lumber production increased only modestly. The market share of the four largest firms increased from 15.9 percent in 1947 to 16.6 percent in 1954. The current merger movement produced its major effects on the lumber industry from 1954 to 1960. The Big Four market share increased from 16.6 percent to 23.9 percent in this 6-year period.

Preoccupation with the large producers in the Douglas-fir lumber industry should not obscure the dynamic changes taking place in the small-firm category. The most significant change in the structure of the Douglas-fir lumber industry in recent years is clearly the mass exodus of small mills from the industry. In 1948 there were 1,675 mills in the Douglas-fir subregion. Twelve years later 78 percent of these mills had stopped production, leaving only 291 small mills in operation. The small mills did not disappear from the industry as a result of merger activity, but as a result of the relatively weak lumber market prevailing through most of the 1950's and the inability of the nonintegrated firms to compete for open-market stumpage. The mass exodus of mills under deteriorating profit conditions is an offset to the mass entry of mills during the increasingly profitable period 1933 to 1948. The number of firms leaving the industry in the post-1948 period is almost exactly equal to the number of entrants during the pre-1948 period.

Wholesale lumber distribution from the Douglas-fir lumber industry is similarly characterized by a highly competitive structure. There are a multitude of wholesale and commission firms performing a middleman function. There are no significant barriers to entry. The three largest western wholesale lumber firms handle only 14.8 percent of total Douglas-fir subregion lumber production. In addition, the four largest lumber producers

are also wholesalers of their product. They produce and market another 21.5 percent of total subregion production. Thus, the seven largest sellers of lumber account for not more than 36.3 percent of total Douglas-fir subregion production. Since part of the production of the four largest lumber producing firms is distributed through the three largest wholesalers, the market share of the seven largest sellers would be less than the 36.3 percent indicated above.

The behavior of wholesale lumber prices reflects the highly competitive structure of the industry. There is an extremely high degree of price flexibility demonstrated on a weekly or monthly basis. Wholesalers offer lumber at prices advertised by weekly mailings to prospective customers. However, the market price is arrived at by means of telephone conversations, and the price is highly responsive to rapid changes in supply and demand expectations.

Lumber prices are clearly market determined. They move upward with market strength and downward with market weakness. Market-determined lumber prices may be compared to administered prices for the steel industry. In the latter case, prices are fixed for long periods of time. There are few producers in the steel industry. The industry is characterized as oligopolistic. Output of steel is adjusted downward in periods of weak demand so that price may be maintained. In several instances, steel prices were increased though the industry was operating at only about half capacity. In contrast, when lumber demand declines, prices fall and marginal mills are forced out of production. While resulting reduction in output is modest compared with the steel industry, price declines are significant. The price and output behavior of lumber is characteristic of the highly competitive structure that has been outlined in this study.

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