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The University of Michigan, Ph.D., 1964
Agriculture, forestry and wildlife

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PERFORMANCE AND STRUCTURE OF MAJOR VENEER LOG MARKETS IN THE NORTH CENTRAL STATES

by
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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in the
University of Michigan
1964

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PREFACE

For the past 30 years economists have shown new concern with the relationships between market structure and market performance. Before that time economic theory offered determinate models only of the extreme cases of pure competition and pure monopoly. Both described market structures which bore little resemblance to the real world. Markets were classified as either purely competitive or purely monopolistic, but these categories were virtually sterile for further analytical treatment at the micro-economic level. Consequently, much empirical research and public policy discussion in what has come to be called industrial organization was descriptive, discursive, and unillumined by adequate conceptual lights.

The 1930s ushered in new theories in economics which shook the very foundations of the classical world. The Keysian revolution in macro-economics is certainly the most celebrated of these developments, and one that by now has become a new orthodoxy. Another such development was the almost simultaneous arrival of two micro-economic models of states of the market. These models were presented by Mrs. Robinson and Professor Chamberlin. One of their chief virtues was their fruitfulness in generating operationally meaningful hypotheses. This, in turn, provided a stimulus

to empirical research in economics and to an integration of the theoretical and the empirical which was badly needed.

The result after 30 years is a branch of economics, industrial organization, which is characterized both by a theoretical structure and a body of empirically verified hypotheses derived from that structure but tested against the unyielding stuff of economic reality. The theory is neither so well developed nor so elegant as the classical models of pure competition and monopoly. The empirically tested conclusions are neither so numerous nor so well established as one might wish. Nevertheless, the job of tool making in this particular area has proceeded far enough so that the tool users have begun to profit from it. The study reported herein is an example of such tool using. It is an application of the conceptual framework and tested generalizations provided by the new industrial organization to two closely related forest products markets.

This dissertation could not have been written without the help of many people. My debt is great to G. Robinson Gregory, whose stimulating teaching and contagious enthusiasm kindled my interest in the economics of forestry. His advice during the preparation of this dissertation is only the latest of his contributions throughout my graduate study. My colleagues in the Department of Agriculture Economics at the University of Wisconsin have generously made it possible for me to spend time on my dissertation and have served as a continual source of intellectual stimulation. My fellow members of the NCM-27 Regional Technical Committee, and

particularly its chairman, Lee M. James, have designed and conducted the regional research project which has provided much of the data I have used. My students, and particularly Thomas E. Hamilton and Stephen S. Sackett, have done much of the work of collecting and analyzing data throughout the course of the regional project, and have provided many ideas as well. I fear that they have been repaid chiefly by my neglect of their problems during the final few weeks before this dissertation was completed. My wife, my children, and my parents have sustained and encouraged me through the completion of my graduate study, and have suffered my neglect throughout the final weeks without complaints. The greatest debt of all I owe to my wife, Lorraine, whose moral support and secretarial assistance have made this dissertation in many ways truly a joint product. Needless to say, I alone am responsible for any errors of ommission or commission which may remain.

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1. INTRODUCTION

Veneer is a thin layer of wood which has been sliced or sawed from a log, block, or flitch. It is made from both hardwood and softwood species. In the United States, softwood veneer has been manufactured almost entirely on the West Coast[1]. It is used in the manufacture of softwood plywood, a product which finds its major use in construction. Hardwood veneer is manufactured almost entirely in the eastern and central sections of the United States. It is classified in four different types. They are special and face veneer, commercial and utility veneer, container veneer, and flat veneer. Special and face veneer is a high-valued product of pleasing appearance which is used where such appearance is desired, as in furniture and paneling. Commercial and utility veneer, which is made from less attractive species or grades, is used largely in plywood for cores and backing. Container veneer is a low-valued product used in the manufacture of a number of different types of containers, among them berry baskets, cheese boxes, and the familiar bushel basket. Flat veneer is a minor product used for the manufacture of tongue depressors, ice cream spoons, and similar products. Plywood is fabricated of two

[1] In very recent years a rapidly expanding softwood plywood industry has sprung up in the South.

or more layers of veneer or, in thicker plywoods, of a lumber or other core sandwiched between layers of veneer. The grain of alternate veneer layers crosses at right angles. The layers are bound together by glue. The construction of plywood resists the tendency of wood to split, shrink, or swell.

The United States veneer and plywood industry is the third largest of our forest products industries. In 1958 it consumed some 3,183,184,000 board feet of logs[2] and produced products with a value of $884,111,000. It employed 59,346 persons in its 588 establishments, as well as providing jobs for many timber producers. The aggregate payroll of veneer and plywood plants alone was $240,821,000[3]. The output of the industry continues to grow at a healthy rate, due to the increasing substitution of softwood plywood for lumber in construction.

Hardwood plywoods and veneers are used in both construction and in manufacturing. In construction, they are used for millwork, wall panels, door panels, shelving, and partitions. In manufacturing they are used in furniture and fixtures, in radio and television cabinets, and in small boats. The furniture and fixtures industry is the largest user of hardwood plywood and veneer.

Hardwood veneer and plywood use in the United States has

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[2]U.S., Bureau of the Census, U.S., Dept. of Commerce, U.S. Census of Manufactures:1958. Industry Report MC58(2)-24B, Millwork, Veneer, Plywood and Prefabricated Structural Wood Products. (Washington: U.S. Government Printing Office, 1960), p. 18.

[3]Ibid, p. 5.

risen steadily and substantially to a current log equivalent of about 1.6 billion board feet[4]. For the past decade, however, the increases in demand have been entirely satisfied by a rapid increase in imports of hardwood plywood from Japan and the Philippines. Luaun logs are commonly cut in the Philippines, shipped to Japan, converted into plywood, shipped to the United States, and sold at competitive prices in U.S. markets despite a substantial tariff barrier.

Hardwood veneer production in the United States has fluctuated about a level of approximately 10 billion square feet annually during the postwar period[5]. This represents nearly 1 billion board feet of veneer log consumption annually[6], as shown in Table 1. About 60 percent of each year's hardwood veneer production is used in the manufacture of hardwood plywood[7].

The future development of the hardwood veneer and plywood industry is problematical, affected as strongly as it is by competitively priced imported products and by substitute materials. The larger and rapidly growing softwood plywood industry, on the other hand, seems assured of a bright future if present trends continue.

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[4]U.S., Forest Service, Timber Resources for America's Future (Washington: U.S. Government Printing Office, 1958), p. 17.

[5]Ibid, p. 446.

[6]Dwight Hair and Alice H. Ulrich, The Demand and Price Situation for Forest Products, U.S. Dept. of Agriculture, Misc. Pub. No. 953 (Washington: U.S. Government Printing Office, 1963) p. 44.

[7]U.S., Forest Service, Timber Resources . . . , p. 445.

TABLE 1

Production of Veneer Logs and Bolts in the United States, 1951-1962[a/]

(Million board feet, log scale)

Year	All Species	Softwoods	Hardwoods
1951	2,271	1,232	1,039
1952	2,467	1,548	919
1953	2,815	1,861	954
1954	2,894	1,978	916
1955	3,433	2,431	1,002
1956	3,443	2,493	950
1957	3,305	2,455	850
1958	3,734	2,884	850
1959	4,438	3,488	950
1960	4,221	3,446	775
1961	4,636	3,836	800
1962	5,033	4,158	875

[a/] Hair and Ulrich. "The Demand and Price . . ." p. 44. Includes small volumes of imported logs.

2. FRAMEWORK OF THE ANALYSIS

The objective of this study is to evaluate and explain the performance of the major veneer log markets in the North Central region. The analytical framework employed is that of market structure analysis. It is based upon the economic theory of the firm and market developed by E. H. Chamberlin[8] and Joan Robinson[9], and refined and embellished by subsequent writers. Hypotheses derived from this theoretical foundation have been tested by a variety of empirical studies over the past few decades.

Many factors are important in explaining the performance of a particular market. Some of these explanatory variables, such as population, income, and weather, are external to the market. External factors are of little concern in this study because, despite their importance, they must normally be taken as given and cannot be manipulated to improve the performance of the market.

Market structure analysis is founded on the notion that the economic results flowing from a market or industry are affected by the way in which that market or industry is

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[8] E. H. Chamberlin, The Theory of Monopolistic Competition (7th ed.; Cambridge: Harvard University Press, 1956).

[9] Joan Robinson, The Economics of Imperfect Competition (London: Macmillan and Co., Ltd., 1934).

organized, in addition to the external factors already mentioned. The economic results are termed market performance while the organizational characteristics of the market are termed its structure. The many aspects of the structure of a market serve as a framework of constraints and incentives which influence the behavior of the individual buyers and sellers comprising that market. The behavior of these individual enterprises, which is called market conduct, in the aggregate determines market performance. Market conduct is thus the connecting link between structure and performance.

There are many difficulties in the empirical determination of market structure and market performance, but these difficulties pale almost to insignificance by comparison with the problems encountered in a study of market conduct. The data required for the study of structure and performance pertain to all the buyers or sellers in the market and can often be approximated by published statistical series. The data required for the study of market conduct concern the operating policies of individual firms and are at best expensive to collect. Much of this information represents closely guarded details of competitive behavior. Some of it may even pertain to behavior punishable under anti-trust or other legislation. Consequently, adequate information on market conduct is always difficult, and frequently impossible, to obtain.

The inherent difficulty of obtaining adequate information on market conduct has led researchers in industrial organization to search for observed relationships between

forms of market structure and patterns of market performance. These relationships are suggested by economic theories, such as those of perfect competition, monopoly, and monopolistic competition. The latter, in particular, has been a fruitful source of hypotheses of this type. A considerable number of "industry studies" has provided empirical tests of these hypotheses.

Eventually, of course, it will be desirable to test directly the relationships between market structure and conduct and between market conduct and performance. For the time being, however, the tentatively verified structure-performance associations may be accepted as provisional bases for applied research. The main focus of this study is upon market structure and market performance, although market conduct is not ignored whenever relevant data are available.

Products, Industries, and Markets

A perfectly competitive market in economic theory is a collection of sellers and buyers of a homogeneous product. An industry is composed of all of the sellers of such a homogeneous product. A product is homogeneous if it is a collection of goods or services whose individual units are economically indistinguishable from each other, in the sense that the prospective buyers of such units have absolutely no preference between them. In other words, all of the units of the particular good or service are perfect substitutes for each other in the eyes of prospective buyers.

Economists have long appreciated the fact that the concept of a homogeneous product is an abstract tool of analysis and that few such homogeneous products are to be found in the real world. Hence very few industries are composed of firms producing products which are physically indistinguishable from each other. Even fewer industries are composed of firms offering identical services along with the products they sell, and fewer still are composed of firms offering identical products accompanied by identical services at identical locations. Most buyers will prefer a product available at a particular location to the same product available at some other location.

The seminal work of Chamberlin[10] incorporated the fact of imperfect substitutability between the products of various sellers into the theory of partial equilibrium. The theory of monopolistic competition is based essentially on the fact that the product of any one seller is not identical in the eyes of buyers to that of any other seller. This development has had the very important positive result of opening the way to consideration of what we really mean by competition between firms in economic life.

Perfect competition is hardly competition at all. A seller in a perfectly competitive market is selling exactly the same thing as all other sellers in that market. Furthermore, he supplies so little of the total quantity of the product that he cannot affect the market price by increasing or decreasing the amount he offers for sale. Therefore,

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[10]Chamberlin. The Theory . . . .

he may not sell anything above the market price and has no incentive whatsoever to charge less than the ruling market price.

Sellers of products which are imperfect substitutes for each other may compete in a wide variety of ways. A seller may determine the price he wishes to charge, within certain limits, because his demand curve is less than perfectly elastic. He may also modify the characteristics of his product, or of the services which accompany it, or the costs which he incurs in promoting its sale, in an attempt to increase his profits. The theory of monopolistic competition has thus introduced active competition into economics for the first time[11].

If the theory of monopolistic competition has provided real benefits in the definition of competition it has also considerably muddied the concepts of product, industry, and market. If the product of no seller is a perfect substitute for that of any other seller, and if the product of any seller is in some sense an imperfect substitute for that of any other seller, then the concept of an industry as a group of enterprises producing competing products becomes essentially arbitrary.

"All that may be involved is a question of

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[11] There have been some earlier models which explicitly considered competitive behavior e.g. the Cournot and Edgeworth models of duopoly. But these models have been based on very restricted assumptions and have never been incorperated successfully into the body of economic theory or demonstrated any real fruitfulness in practical application.

> degree: Every firm competes with all other firms in the economy, but with different degrees of closeness. . . . In the general pure theory of value, the group and the industry are useless concepts."[12]

But what may be appropriate for a general pure theory of value may not be appropriate for an empirical investigation of competition in a particular place at a particular time. As Triffin recognizes, the group or industry may still be a valuable, if arbitrary, concept for empirical research. In such a case, however, it will be essential for the investigator to carefully examine his classifications and terminology.

Some economists have proposed that the cross-elasticity of demand between the products of two sellers be used as a measure of whether those products are sufficiently similar to qualify as a single product for practical purposes[13]. Just what the critical value of the cross-elasticity of demand should be to permit such a classification is a very difficult matter to decide. Then, too, the empirical determination of cross-elasticities of demand is a most difficult task, and one that has been seldom undertaken for the products of individual firms. The cross-elasticity device must be viewed as a useful tool in understanding the problem of classification, but one of little practical value in

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[12] Robert Triffin, Monopolistic Competition and General Equilibrium Theory (Cambridge: Harvard University Press, 1940), pp.88-89.

[13] Ibid.

effecting that classification[14].

For purposes of this study we shall define a product by paraphrasing Bain's definition of an industry as a group of goods or services "which are close substitutes to buyers, available to a common group of buyers, and are relatively distant substitutes for all (other) products"[15]. An industry, then, is a group of firms producing one particular product. By extension a market will be defined as a group of sellers of a single product, who are in effective competition with each other, together with the buyers who buy that product from them.

Measures of Market Structure

Market structure refers to the organizational characteristics of the market. It is particularly concerned with those relationships between and among buyers and sellers which affect pricing behavior and the degree of competition in the market.

Four aspects of market structure are usually given prominent attention:

1) The degree of seller concentration
2) The degree of buyer concentration
3) The extent of product differentiation
4) The conditions of entry.

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[14] W. W. Cochrane, "The Market as a Unit of Inquiry in Agriculture Economics", Journal of Farm Economics, (February, 1957), p. 28.

[15] Joe S. Bain, Industrial Organization (New York: John Wiley and Sons, 1959), p. 110.

Other aspects include the spatial organization of the market, the type of ownership or form of organization of firms in the market, and the extent of vertical integration.

The Degree of Seller Concentration

The degree of seller concentration in a market is measured by the number and size distribution of sellers in that market. Whether the sellers in a particular market are one, few, or many to a very considerable extent determines the character and intensity of competition in that market.

Moreover, the degree of concentration is too complex a concept to be indicated by so simple a measure as the number of sellers alone. Obviously, the size of each seller is also relevant. The size distribution of sellers may be represented conveniently by a measure of the percentage of sales or other aggregate variable controlled by the various numbers of sellers. Such a measure is termed a concentration ratio. It has become conventional in industrial organization literature to refer to the percentage of the market controlled by the four largest sellers, the percentage controlled by the eight largest sellers, and sometimes the percentage controlled by the twenty largest sellers.

Various classification schemes have been proposed which would rank industries according to their concentration ratios. The one proposed by Bain contains six types of industries ranging from very highly concentrated oligopolies on down to atomistically competitive industries. The concentration ratios characterizing the various types are

shown in Table 2.

TABLE 2

Classification of Industries by Concentration Ratios[a]

Industry Type (degree of concentration)		Number of Firms	Percentage of Market Controlled by four largest firms	Percentage of Market Controlled by eight largest firms
I	Very high			
a	(no competitive fringe)	5-10	90-100	95-100
b	(competitive fringe)	20 +	90-100	95-100
II	High	20 +	65-75	85-90
III	High-moderate	20 +	50-65	70-85
IV	Low-moderate	50 +	35-50	45-70
V	Low	100+	20-35	30-45
VI	Atomistic	100+	0-20	0-30

[a] Bain, Industrial Organization, pp. 124-133.

Industries of types I, II, and III are sufficiently concentrated to be termed strongly oligopolistic. Obvious interdependence among the larger firms exists in such industries. No such obvious interdependence characterizes industries of types IV, V, and VI, although those in types IV and V might be termed weakly oligopolistic. Thus, the dividing line between the two groups occurs at about the point at which 50 percent of the market is controlled by the four largest firms. Those markets in which more than 50 percent is controlled by the four top firms would be substantially different (strongly oligopolistic) from those markets in which less than 50 percent is controlled by the top four

firms.

The Degree of Buyer Concentration

In developing his classification, Bain was referring to concentration of sellers. However, there is a clear symmetry between the selling and buying side of the market, and there seems to be no reason why the same categories could not be applied to measure buyer concentration. No further discussion of the degree of buyer concentration is necessary because the section on seller concentration applies directly merely by exchanging the word "buyer" for "seller" whenever it appears above.

The Degree of Product Differentiation

The degree of product differentiation refers to the imperfection of substitutability of the competing outputs of the various sellers, or the extent to which buyers distinguish between and prefer the output of one seller to that of another. Similarly, service differentiation refers to the degree to which sellers distinguish between, and prefer to sell to, one buyer instead of another in the absence of price differences.

It should be emphasized again that the extent of product differentiation is intimately related to the concept of the industry itself. It is unlikely that the products offered by any two sellers will be perfect substitutes for each other. Inevitably, prospective buyers will prefer one to the other, however slightly. And on the other hand, it is also true to some slight extent most products are

substitutes for each other. In all market structure studies, then, there is an element of arbitrariness in defining the industry and, correlatively, the extent of product differentiation within the industry.

In general, the outputs of different sellers may be considered to be the same product, and therefore the sellers of these products may be considered to be in the same industry, providing that the outputs, ". . . are all varieties of the same sort of good or service . . . with similarity in form or function and fulfilling the same sort of specific want or need of buyers"[16]. An additional requirement, less frequently emphasized, is that the locations of sellers and buyers permit all of the outputs to be effectively offered to a common group of buyers.

The extent to which locational factors are important, and the extent to which they may be treated as delineating markets or as being an aspect of product differentiation within a market, are parts of the problem just discussed. The general method of treating distance in the industrial organization literature has been to consider it a form of product differentiation. Consider a buyer situated at a particular location who finds an identical product available to him from sellers at two locations, A and B. If the distance from A to the buyer's location is less (as measured by the cost of transporting the product between the points) than that from B to the buyer's location, then

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[16]Bain, Industrial Organization, pp. 211-212.

clearly, price and all other things being equal, the buyer will prefer to buy from the seller located at A. Thus, the same good available at both points A and B will not be the same good when considered from the point of view of the buyer. The goods will be imperfect substitutes for each other, and thus the product will be differentiated by location.

The products offered by any two sellers are almost never exactly alike. Still in large areas of the economy products offered by competing sellers are sufficiently alike so that the cross-elasticities of demand will be very large (that is a small price reduction for one such commodity will tend to attract most of the buyers away from the other). Such products are generally characterized by being well standardized, unbranded, unadvertised, and relatively inexpensive to transport.

Some of the sources of product differentiation are; first, differences in quality or design; second, ignorance of buyers regarding essential characteristics and qualities of the products; third, buyer preferences which are shaped by persuasive promotional activities; and fourth, location[17]:

A measure of differentiation can be achieved by buyers, just as by sellers. In this case, however, since the buyer does not control the quality, design, or other characteristics of the product itself, the sources of differentiation open to him involve only the services to the seller which

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[17]Bain, Industrial Organization, pp. 214-215.

may be a part of his purchasing activities. Normally, service differentiation of this type will be less important and it will be more difficult for buyers to differentiate their services than for sellers to differentiate their products and services. However, location may be an important source of service differentiation on the buying side.

The Conditions of Entry

The condition of entry refers to ". . . the advantages of established sellers in an industry over potential entrant sellers, these advantages being reflected in the extent to which established sellers can persistently raise their prices above a competitive level without attracting new firms to enter the industry."[18] On the buying side, it may be measured by the extent to which buyers may depress prices below the value of the marginal product without causing new firms to enter the market.

Bain lists several types of barriers to entry[19]. First among them is the presence of product differentiation. Buyer preference for the products of established firms, when compared with new ones, may enable the established firms to charge a higher price than can new entrants for the same product. Thus, established firms could charge a price somewhat higher than the average costs of production, and yet the price which new firms would have to charge to

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[18]Joe S. Bain, Barriers to New Competition, (Cambridge: Harvard University Press, 1956), p. 3.

[19]Ibid.

capture a share of the market would be below such average costs and would not induce entry. It is also possible that the potential entrant would have to incur selling costs higher than those incurred by established firms or, given equivalent selling costs, would be able to capture a share of the market so small as to make it impossible for him to operate at the most efficient scale, and therefore would result in higher average costs of production. Any of these advantages due to product differentiation will give established firms a favorable position vis a vis possible entrants. A second type of barrier to entry occurs when established firms incur lower production or distribution costs. Through control of superior production techniques, patents, exclusive ownership of required resources, or more favorable access to labor or investment funds, established firms sometimes are able to enjoy significantly lower costs than those which would be available to potential entrants. A third sort of barrier to entry may occur if there are economies of large-scale production and distribution in the industry which make it necessary for an entrant to attain a very large size in order to be competitive. Entry on this scale might so significantly increase supplies of the product in the market that a reduction in industry selling price would ensue and would make production of the product temporarily, at least, unprofitable for all firms in the industry. Alternatively, the potential entrant might operate at a smaller scale, and consequently not enjoy the lower costs incurred by the established firms which are of optimum size.

Patterns of Market Conduct

Market conduct refers to the behavior patterns of sellers and buyers in the market. Market structure analysis is particularly concerned with those aspects of behavior which represent an attempt by firms to adapt or adjust to the markets in which they sell or buy. These behavior patterns, which are shaped by market structure, in turn result, in the aggregate, in the performance of the market.

Countless aspects of market conduct could be listed. Some of the more significant, as listed by Clodius and Mueller, are:

> ". . . (1)methods employed by the firm or group of firms in determining price and output; (2) product policy; (3) sales promotion policy; (4) means of coordination and cross-adaptation of price, product, and sales-promotion policies among competing firms; and (5) presence or absence of, and extent of, predatory or exclusionary tactics directed against either established rivals or potential entrants."[20]

Three additional aspects which are important in this study are research and development policy, raw material procurement policy (including price, quantity, and spatial elements), and industrial location decisions.

Dimensions of Market Performance

The performance of industries and markets may be evaluated by several criteria. These criteria should reflect the ways in which the outcome of the decisions made by the firms making up these industries or markets may affect the general

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[20]Robert L. Clodius and Willard F. Mueller, "Market Structure Analysis as an Orientation for Research in Agricultural Economics," Journal of Farm Economics, XLIII (August, 1961), p.517.

welfare. Seven dimensions of market performance are listed by Bain. They are: 1) productive efficiency, 2) price-cost margins and profit rates, 3) the size of selling and buying costs, 4) progressiveness in production techniques, 5) product performance, 6) conservation performance, and 7) price flexibility[21]. Others undoubtedly could be given, but these are the seven which have most concerned economists. Some are clearly more important than others and some, although important, are less amenable to measurement and evaluation than others.

Productive Efficiency

Productive efficiency is a major dimension of market performance. It is measured by the degree to which firms operating in the industry approach the lowest possible costs for the outputs they produce. Three considerations are important in evaluating productive efficiency: the size of the optimum scale (minimum cost) firm and the degree to which firms in the industry attain that size, the optimum (minimum cost) degree of vertical integration and the extent to which firms in the industry are vertically integrated, and the long-run rate of utilization of plant capacity by the industry.

The optimum scale of plant is a long-run concept in economics. It should not be confused with the short-run problem of the rate of utilization of existing plant. The theory of the firm requires a priori that as output is

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[21]Bain, Industrial Organization, pp. 340-405.

increased from a given plant in the short-run the average cost per unit of output should first decline and then rise, giving the familiar U-shaped cost curve. However, the theory provides no such a priori restriction on the shape of the long-run cost curve (which is the relationship of unit costs of production to the scale or size of the plant in which such units are produced). Reasons are given in the literature both for decreasing costs (often called increasing economies or economies of large-scale production) and for increasing costs (diseconomies of scale) as the size of the firm increases[22]. It is not necessary that the factors producing increasing economies should fail to offset, just offset, or more than offset the factors producing decreasing economies in any particular case. However, it is generally observed that the specialized machinery employed in technologically advanced industries requires fairly high outputs to achieve most efficient production[23]. Therefore, for a substantial range of plant, increasing economies of scale may be anticipated in many modern industries. If this is true, then an industry composed of plants below the optimum scale (that size at which average unit costs of producing the product are lowest) is using more resources per unit of product than would be necessary and is correspondingly

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[22]Jacob Viner, "Cost Curves and Supply Curves," Readings in Price Theory, ed. George J. Stigler and Kenneth E. Boulding (Chicago: Richard D. Irwin, Inc., 1952), pp. 206-222.

[23]Alfred Marshall, Principles of Economics, (8th ed.; New York: The Macmillan Co., 1948), pp. 278-290.

inefficient. The same resources used by plants of optimum scale could produce greater output or, alternatively, the same output could be produced through the use of fewer resources. And, of course, the opposite conditions would hold where decreasing returns to scale predominated.

Vertical integration is defined as a form of business organization in which firms control two or more successive production processes rather than specialize in a single one. Such integration of processes may be accomplished through actual ownership of several processes or through contractual arrangements which permit managerial decisions to be made jointly rather than individually. There are instances in which two or more production processes, when performed by the same firm, may be performed at a lower total unit cost than would be possible were the various processes carried out by separate firms. In such a case, it would be inefficient to have separate firms performing the two functions.

The long-run rate of utilization of plant capacity is also an important consideration in the evaluation of economic efficiency. Normally the unit costs of production rise when a plant is operated at less than its capacity rate because the overhead (fixed) costs are spread over fewer units of output. Some excess capacity is virtually inevitable in modern industry due to cyclical fluctuation in the economy and other normal exigencies of economic life. However, random or cyclical excess capacity which may not be attributed to structural factors of the industry concerned should be distinguished from long-run or chronic excess capacity.

Chronic excess capacity is a form of inefficiency because it results in unnecessarily high costs of production.

Price-Cost Margins and Profit Rates

Historically, perhaps the major concern over imperfect or monopolistic structures has been with the possible presence of monopolistic exploitation and excess profits. A monopolist enjoys some discretion over the price at which his product will be sold because the demand curve for his product is less than perfectly elastic. Profits are maximized when marginal revenue and marginal cost are equated, and at that point the monopoly price will be higher and the output lower than under perfect competition. If excess profits are possible at any output, the monopolist can secure them. These excess profits are taken by the monopolist at the expense of the consumers of the product which he sells. Similarly, a monopsonist (a firm which is the sole buyer of a particular factor of production) will buy less of a particular factor than would a perfectly competitive industry, and he will buy it at a lower price.

Some economists, following Schumpeter, have claimed that the presence of monopoly profits makes possible discovery and innovation of improved products and production techniques[24]. In this view, while monopoly or monopsony may be undesirable from the standpoint of the static allocation

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[24]Joseph A. Schumpeter, Capitalism, Socialism, and Democracy (New York: Harper and Brothers, 1950), and John Kenneth Galbraith, American Capitalism: The Theory of Countervailing Power (Boston: Houghton Mifflin, 1956).

of resources or distribution of income, in the long-run it may facilitate economic progress. This, in turn, may mean greater income for all than would a more equitable division of a smaller total income generated by a purely competitive (and hence stagnant) economy.

The Size of Selling and Buying Costs

Selling or buying costs in excess of those necessary to convey needed market information to prospective buyers and sellers may be viewed as evidence of adverse market performance. The roots of this judgement lie in the theory of monopolistic competition as developed by Chamberlin. Excessive selling or buying costs are related to the attempt to create and maintain product differentiation. Such costs are justifiable only to the extent that they are incurred in fulfilling the function of informing potential buyers or sellers of the availability, characteristics, and prices of products. To the extent that they go beyond providing information in trying to persuade buyers or sellers to transfer their patronage from one firm to another they are regarded as socially wasteful.

Progressiveness in the Development of Products and Techniques of Production

Perhaps one of the most distinctive aspects of a modern industrial society is the rate at which products are improved and expanded in number and the rate at which the costs of producing these products are lowered. However, the rates at which these improvements occur varies greatly

between industries. Other things than the structure of the industry may be important in determining such rates of improvement. However, relative to its opportunities to do so, the industry which makes rapid advances in the rate of product improvement, in the invention or discovery of new production techniques, and in the innovation of newly discovered and available techniques must be given high marks from the standpoint of market performance.

Product Performance

The general level of quality of products offered by an industry at a particular time is an important dimension of the performance of that industry. It is possible to evaluate the level of quality of a product of an industry against the possible or attainable standards of quality open to it. An industry falling short of such attainable product performance may be criticized on that account.

Conservation Performance

Conservation is yet another dimension of market performance, and one which is particularly relevant in natural resource-oriented industries. It is inconsequential for perhaps 90 percent of the industries in the U.S. economy but of central importance in some of the few remaining. The petroleum, coal, lumbering, commercial fishing, and agricultural industries have been charged with poor conservation performance in the past. (There has been a curious popular identification of resource depletion with monopoly, although the industries just listed are typically unconcentrated at

the extractive level.)

Most cases of allegedly unsatisfactory conservation performance can be attributed to one or more of the following three situations:

1) A private time preference rate substantially higher than the social rate
2) Numerous enterprises exploiting a limited common resource
3) Imperfections in capital markets which deny capital to resource-users and drive up their alternative rates of return.

The first situation is not particularly related to market structure and is somewhat ambiguous, due to the difficulty of determining society's time preference rate. The second situation is basically structural. Examples are the common oil pool case and the case of ocean fisheries or whaling. The third situation is structural in that small firms seldom have the same access to or reception in the capital market that large firms enjoy.

Price Flexibility

Price flexibility is a dimension of market performance which has attracted great interest in the past. During the 1930s there was great concern over whether prices in the various industries changed frequently and over the extent of such changes when they did occur. Statistical studies showed that there were substantial differences between industries in the amount of price flexibility they displayed.

A related discussion of "administered prices" arose in the mid 1950s. Unfortunately we have as yet no very clear theoretical standards by which to judge performance in this particular dimension. Despite a fairly wide-spread popular impression that price flexibility is desirable the theoretical indications on this point are conflicting, contradictory, or inconclusive. Although we can certainly say that price flexibility is a dimension of market performance we cannot, in turn, say what optimum price flexibility or desirable price flexibility would be.

3. SOURCES OF DATA

The Census of Manufactures

The periodic Census of Manufactures of the U.S. Bureau of the Census provides an invaluable source of data on the structure and performance of manufacturing industries. This census has been taken twenty-six times since 1809. Since World War II it was taken in 1947, 1954, and 1958. The data are summarized by industry and by geographical area.

Manufacturing industries are classified according to the categories of the Standard Industrial Classification system[25] in general use in and outside the Government. The SIC system is not ideally suited for market structure studies because it sometimes separates industries whose products are close substitutes for each other (and are thus a single industry from the market structure viewpoint) and, more often, groups together in one industry firms producing products which are not close substitutes for each other (and are thus in different industries from the market structure viewpoint)[26]. Nevertheless, the SIC four digit classification employed by the Census is quite detailed and, taken together

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[25] U.S., Bureau of the Budget, Standard Industrial Classification Manual (Washington: U.S. Government Printing Office, 1957).

[26] Bain, Industrial Organization, pp. 110-119.

with the geographical summarization also performed, makes Census of Manufactures data the most useful secondary source for local and regional market structure studies (SEC and other data series are useful at the national level but of little assistance for more limited markets).

Among the useful data collected and reported in the Census of Manufactures are number of employees, payrolls, man-hours worked, cost of materials, individual materials consumed, value of shipments, and value added by manufacture.

The SIC industry with which this study is concerned is 2432 - Veneer and Plywood Plants. It includes plants manufacturing a range of products which are not close substitutes, i.e. face and utility grades of veneer and commercial plywood (regardless of core or facing material). It does not distinguish between softwood and hardwood veneer and plywood. It does not include container veneer or veneer containers, however.

The North Central Regional Timber Products Marketing Project

Much of the analysis reported herein is based on a portion of the field data collected during the year 1960 by the North Central Regional Technical Committee as part of the cooperative regional research project, NCM-27, "Timber Products Marketing in Selected Areas of the North Central Region".

Nine state agricultural experiment stations - Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Ohio, and Wisconsin - participated in the project. The Central

States' Forest Experiment Station and the Lake States' Forest Experiment Station of the U.S. Forest Service cooperated.

Objectives of the regional project were as follows:

1. To evaluate how effectively present marketing practices reflect wood-use demands backward to wood processors and timber producers, and producers' supplies forward to primary manufacturers or concentrators;
2. To determine the costs and margins of moving forest products from the woods to primary manufacturers or concentrators;
3. To determine the changes in marketing practices which might raise marketing efficiencies and strengthen working relations between landowners, producers, processors, and market agents.

In carrying out the project objectives, the cooperating states followed a uniform approach. Localized study areas were selected in each state. Standardized interview schedules were developed for use at each market stage considered in the study - producer, intermediate market agent, and primary manufacturer[27]. Definitions and procedures, including sampling, were standardized. Agreement was reached to obtain regional coverage of the following wood-products industries: lumber, face veneer, container veneer, cooperage, woodpulp, and posts, poles, and piling.

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[27]Facimiles of these schedules may be found in the Appendix.

Study areas were delineated within each state participating in the regional project (Figure 1). They were selected to provide coverage of an area of active timber production in each state rather than to provide a statistical sampling of the region as a whole. Attention was given to scattering the study areas so that a diversity of market conditions would be sampled.

Boundary lines of study areas were not considered to be rigid. Market agents outside the delineated areas were included in the sampling when their activities were found to be heavily influenced by marketing within a study area or if they, in turn, exerted a substantial influence on marketing activities within a study area.

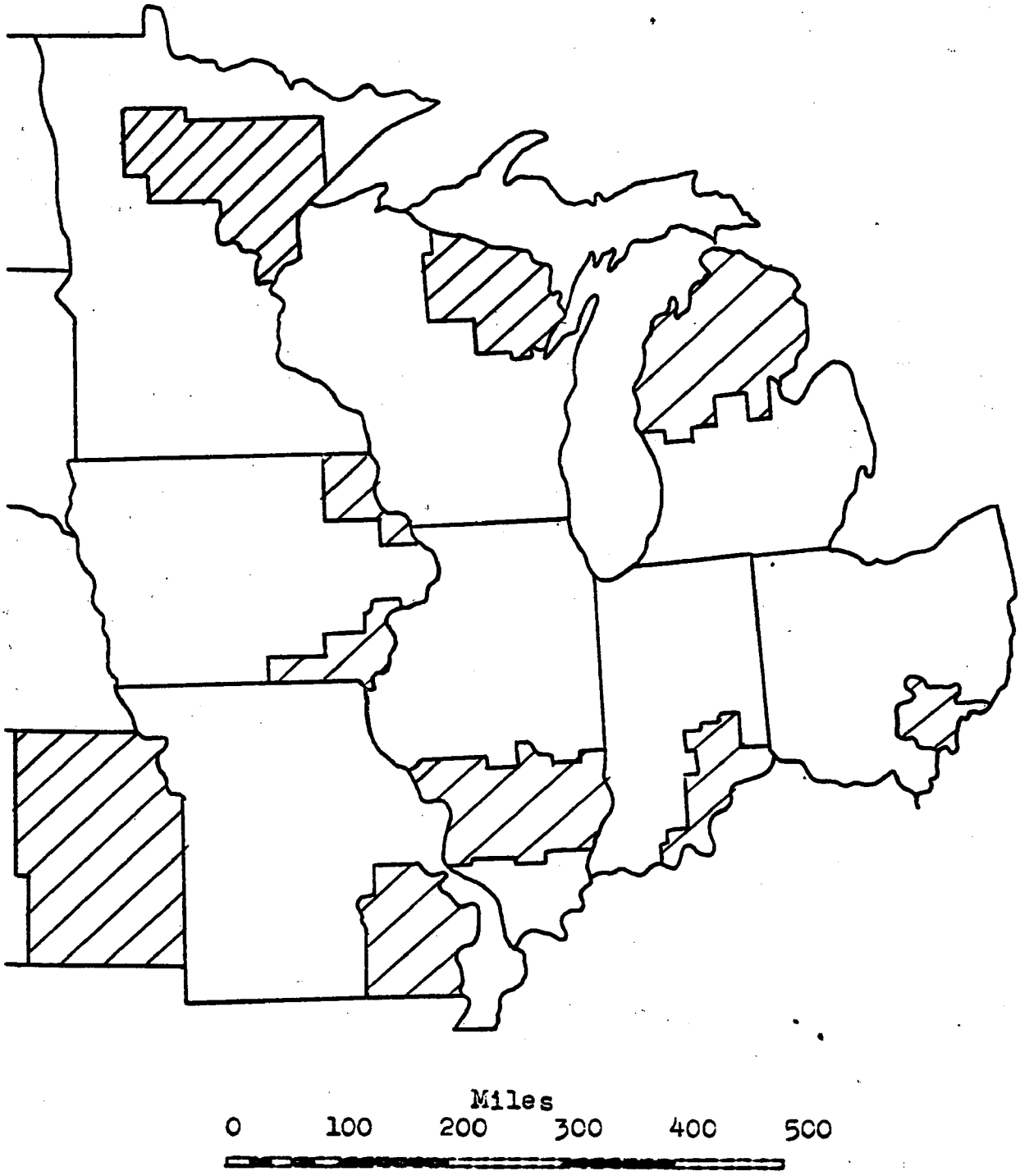
The North Central region was divided into three sub-regions in the analysis of veneer log marketing patterns. These sub-regions were the three northern states of Michigan, Wisconsin, and Minnesota; the three eastern states of Ohio, Indiana, and Illinois; and the three western states of Missouri, Kansas, and Iowa.

Detailed interviews were held in 1960 with representatives of firms at three levels of the marketing chain; producer, intermediate market agent, and primary manufacturer. Interview schedules were standardized for each market level, and identical schedules were used in all states. Interest was focused on data for the year 1959.

A 100 percent sample of primary manufacturers and intermediate market agents was sought. In the case of producers, the objective was more variable and was affected by the

FIGURE 1

LOCATION OF STUDY AREAS IN NORTH CENTRAL REGIONAL TIMBER PRODUCTS MARKETING RESEARCH PROJECT



product under investigation. For veneer logs, producers were sampled in each study area only to the extent that their identities could be determined or that the investigator felt was necessary for a reasonable cross-section of producers.

Problems of definition required arbitrary decisions. Agreement was reached as to the distinctions among producer, intermediate market agent, and primary manufacturer, and the treatment of firms which exercised more than one role in the market.

A producer was defined as an individual (or firm) who harvests purchased stumpage or stumpage from his own land and sells the cut product roadside or delivered to a designated point without substantially changing its form. In this sense, a veneer log producer is one who produces and sells logs from which veneer is subsequently manufactured.

An intermediate market agent was defined as an individual (or firm) who purchases cut products from a producer and sells them without substantially changing their form. Intermediate market agents in the veneer log industry sell their veneer logs, in turn, to primary manufacturers. For convenience, intermediate market agents will henceforth be referred to as "dealers".

A primary manufacturer or processor was defined as a firm which sells its products only after performing some type of processing operation which substantially changes their original form. Primary manufacturers in the veneer log industry purchase veneer logs and manufacture veneer from

them. In many cases they also manufacture plywood, containers, flush doors, or other products from veneer. Primary manufacturers will subsequently be referred to as "manufacturers" or, simply, as "mills".

One type of dual role was associated with interviewed market agents in the veneer industries. Many of the sampled producers of veneer logs also act as dealers. These "producer-dealers" purchase cut logs from other independent producers and sell these logs along with logs that they have harvested themselves as producers. Producer-dealers were interviewed both as producers and as dealers. For example, a firm purchasing 50 thousand board feet of veneer logs as a dealer and harvesting 50 thousand board feet of logs from its own or purchased stumpage was sampled both as a producer and as a dealer. The firm would be recorded as a dealer in regard to its activities associated with the purchase and sale of 50 thousand board feet of cut logs. The firm would also be recorded as a producer in regard to its activities associated with the 50 thousand board feet of logs harvested from stumpage.

Primary manufacturers were not classified as producers of the product they process even if they obtain some part of their raw material by harvesting their own or purchased stumpage.

Table 3 shows the total regional sample of firms engaged in the marketing of veneer logs. Thirty-four hardwood veneer or plywood plants, representing 40 percent of all such plants located within the North Central region, were sampled.

TABLE 3

Regional Sample of Firms Engaged in the Marketing of Veneer Logs, by States, Sub-regions, and Market Roles, 1959.

State or Sub-region	Veneer Manufacturer	Dealer	Producer Dealer	Producer
Michigan	1			9
Wisconsin	10	1	3	10
Minnesota	1	1		1
North	12	2	3	20
Ohio		4	7	33
Indiana	8		3[a]	19
Illinois	1		3[a]	13
East	9	4	12	65
Missouri				
Kansas	1	3	6	2
Iowa	2	2	7	14
West	3	5	13	16
Total	24	11	27	101

[a] Includes one producer-dealer operating and counted in both Indiana and Illinois.

These plants received about one-half of the veneer logs received by all plants in the North Central states in 1959. Twenty-three of these plants produced face or commercial veneer. Ten plants produced only container veneer. They will not be considered further in this analysis because the veneer container industry industry has characteristics and

problems markedly different from those of the other veneer industries.

Eleven dealers, 27 producer-dealers, and 101 producers were interviewed. By separating producer from dealer activities, it was possible to add the 27 producer-dealers to both the producer and dealer samples.

Table 3 is a composite of all interviewed firms engaged in the marketing of veneer logs. The location by state or sub-region refers to the sample marketing area in which the firm was found to be active, and not necessarily to the state or sub-region in which the firm is actually located.

Other Sources

The Forest Survey

The nationwide Forest Survey of the U.S. Forest Service conducts periodic inventories of the timber resources of each state. It also provides annual, biennial, or occasional data on the production and consumption of certain primary forest products. Such data are summaries of information provided by manufacturing firms in the forest products industries. Veneer log production and consumption figures are available for the Lake States and the Central States on a biennial basis. Data on the origin by state of the veneer logs consumed in each state are also available. Unfortunately, the North Central state of Kansas is not included in these series. Also, the data were not collected before 1956 in the Central States.

The Bureau of Labor Statistics Productivity Study

In a 1952 study of seven hardwood veneer and plywood mills the Bureau of Labor Statistics developed information on factors affecting productivity[28]. Three processes or stages in the manufacture of plywood were identified and studied separately. The three processes are log preparation (sawing, heating, and barking), veneer production (peeling, clipping, drying, and sorting), and plywood manufacture (splicing, gluing, pressing, and trimming). Man-hour requirements for each of the seven mills for each process were determined, as was the size of each mill. Some of the sample mills were located in the Southern states and some in the Northeast. None was located in the North Central region. This study provides information in much greater depth than available elsewhere, but at the price of a very small sample.

State Forest Product Price Reports

A few state extension services or agriculture departments publish periodic forest product price reports. Such reports are available for both Wisconsin and Indiana, the former on a semiannual basis, the latter on a roughly annual basis since 1955. The Wisconsin reports give only the range of prices reported by sample mills, a severe limitation on their utility. The Indiana reports give both price ranges

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[28] U.S., Bureau of Labor Statistics, Case Study Data on Productivity and Factory Performance: Veneer and Plywood, Bureau of Labor Statistics Report No. 37 (Washington: U.S. Government Printing Office, 1953).

and average prices, although in the averaging process the reported prices are weighted equally rather than by the volume to which they apply. Wisconsin prices apply to the entire state, while separate figures are given for northern and southern Indiana. A major limitation in both series of reports is the variety of grading systems employed by the various veneer mills and a resulting ambiguity in the price reports.

4. THE VENEER INDUSTRY IN THE NORTH CENTRAL STATES

Production, Employment, and Size of Firm

The North Central region is a major center of hardwood veneer and plywood production. In 1958 mills in the region shipped $75,451,000 worth of these products, over one-fourth of the United States' total in that year. They also shipped one-fourth of the 20 million flush doors produced in the nation in 1958[29]. Tables 4 and 5 show the relative importance of the region in the shipments of hardwood veneer and hardwood plywood. (Much hardwood veneer and plywood is not shipped as such but is further manufactured before being shipped as a more highly finished product. For example, regional hardwood plywood production was 254,384,000 square feet in 1962, even though only 163,138,000 square feet were shipped.)[30]

There were 84 veneer and plywood plants in the North Central region in 1958. As shown in Table 6, these firms employed 6,918 persons and contributed a payroll of $25,364,000 to the economy of the region. The average

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[29] U.S., Bureau of the Census, U.S. Census of Manufactures: 1958, Industry Report MC58(2)-24B, p. 15.

[30] U.S., Bureau of the Census, Current Industrial Reports M24F(62)-1, Hardwood Plywood: Production and Shipments (Washington: U.S. Government Printing Office, 1962), pp. 2-3.

employment for veneer and plywood mills was 82 persons each. It is apparent, then, that the veneer and plywood industry in this region is an industry of many small firms. The largest firm employs more than 1,000 persons, but 98 percent employ less than 250 and 49 percent employ less than 50 persons each[31].

TABLE 4

Value of Shipments of Hardwood Veneer and Plywood in 1958, by Origin

Origin	Value of Shipments		
	Hardwood Veneer	Hardwood Plywood	Total
Indiana	$18,960,000	$ 14,274,000	$ 33,234,000
Wisconsin	6,413,000	24,967,000	31,380,000
Other North Central States	7,294,000	3,543,000	10,837,000
Other United States	56,163,000	139,799,000	195,962,000

Source: U.S., Bureau of the Census, U.S. Census of Manufactures: 1958, Industry Report MC58(2)-24B, p. 15.

Veneer Log Trade Patterns

Location of Manufacturing Plants

Veneer and plywood production within the North Central region is heavily concentrated in two of the twelve states.

[31] U.S., Bureau of the Census, U.S. Census of Manufactures: 1958, Special Report MC58(S)-2.3, Location of Manufacturing Plants by Industry, County, and Employment Size. Part 3 - Lumber and Wood Products (Washington: U.S. Government Printing Office, 1961), p. 37.

TABLE 5

Hardwood Plywood Market Shipments (Except Container and Packaging Type), 1954 to 1962

Year	All types	Veneer core	Other core
	(Thousands of Square Feet)		
	United States		
1954	755,464	698,537	56,927
1955	933,948	864,442	69,506
1956	886,640	820,285	66,355
1957	791,431	738,572	52,859
1958	803,572	752,982	50,590
1959	976,717	915,404	61,313
1960	850,267	791,995	58,272
1961	1,088,561	1,037,182	51,379
1962	1,214,840	1,156,121	58,719
	North Central Region		
1954	92,187	69,770	22,417
1955	122,392	93,986	28,406
1956	119,590	93,002	26,588
1957	114,587	90,051	24,536
1958	107,013	84,535	22,478
1959	130,672	103,217	27,455
1960	117,445	90,493	26,952
1961	138,765	113,074	25,691
1962	163,138	134,616	28,522

Source: U.S., Bureau of the Census, U.S. Census of Manufactures: 1958, Special Report MC58(S)-2.3, p. 2-3.

TABLE 6

Selected Statistics for Veneer and Plywood Plants in the North Central Region

Item	1954	1958
Number of establishments	77	84
Number of employees	6,400	6,918
Payroll, $1,000	21,845	25,364
Value added by manufacture, $1,000	35,290	42,466
Value of shipments	71,515	95,461

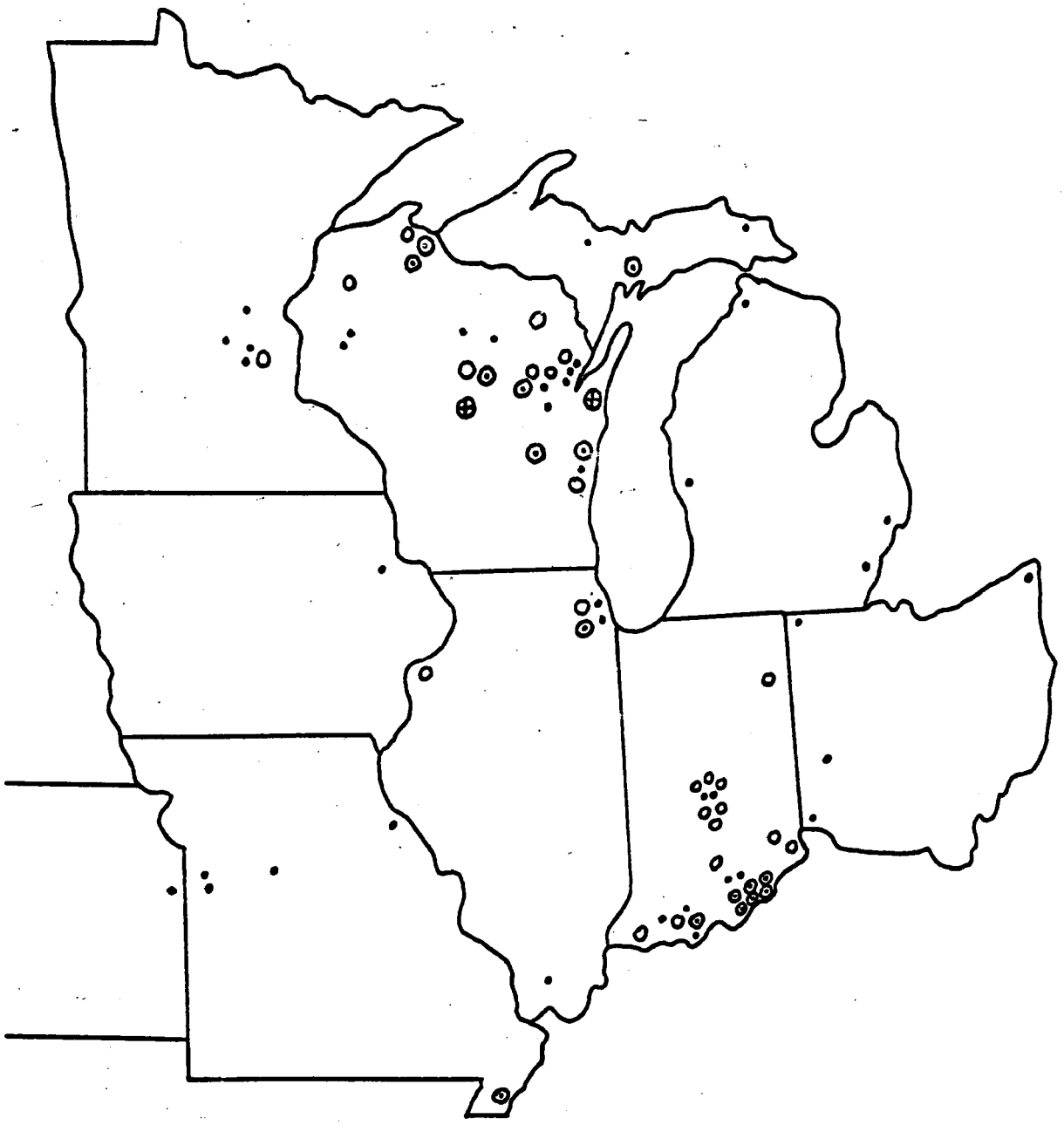
Source: U.S. Bureau of the Census, U.S. Census of Manufactures: 1958, Industry Report MC58(2)-24B, p. 5.

The locations of the various mills, by size class, are shown in Figure 2. Wisconsin is the leading state in the nation in the production of hardwood plywood, and manufactures over half of the plywood produced in this region. Indiana is the leading state in the nation in the production of hardwood veneer, and manufactures over half of the veneer produced in this region. Together, Wisconsin and Indiana accounted for 85 percent of the value of all the veneer and plywood shipped from North Central mills in 1958, as shown in Table 4.

Veneer log consumption, like veneer and plywood production, is heavily concentrated in the states of Wisconsin and Indiana. Table 7 shows how consumption of veneer logs by mills in the North Central region has varied over the past decade. A substantial decline in consumption has occurred in the northern states of Michigan, Wisconsin, and Minnesota, although they still account for over half the

FIGURE 2

LOCATION OF VENEER AND PLYWOOD PLANTS, BY EMPLOYMENT SIZE CLASS, IN THE NORTH CENTRAL REGION IN 1958



LEGEND

- 1-49 employees
- 50-99 employees
- 100-249 employees
- 250 or more employees

TABLE 7

Annual Veneer Log Consumption in the North Central Region, by Sub-Region and State, 1952 to 1960[a]

Sub-region and State	Veneer Log Consumption, Thousand Board Feet, Int. ¼" scale				
	1952	1954	1956	1958	1960
Northern Sub-region[a]					
Wisconsin	60,629	59,573	53,234	43,063	51,298
Michigan	28,338	21,872	10,838	12,597	12,075
Minnesota	1,856	2,214	596	1,838	1,062
Total	90,823	83,659	64,668	57,498	64,435
Eastern Sub-region[b]					
Indiana	- - -	- - -	28,779	24,997	32,324
Illinois	- - -	- - -	6,891	8,304	9,683
Ohio	- - -	- - -	5,658	6,086	6,739
Total	- - -	- - -	41,328	39,387	48,746
Western Sub-region					
Missouri[b]	- - -	- - -	8,686	8,305	6,408
Iowa[b]	- - -	- - -	[d]	[d]	1,749
Kansas[c]	1,515	1,800	1,800	1,655	1,410
Total	- - -	- - -	10,486	9,960	9,567

[a] Lake States Forest Experiment Station data.

[b] Central States Forest Experiment Station data.

[c] Estimates by P. L. Roth, Kansas State University.

[d] Included in Missouri figure.

veneer log consumption of the region. Apparently consumption is also declining in the western states of Missouri and Iowa, and the noticeable rise in the eastern states of Ohio, Indiana, and Illinois is not sufficient to offset consumption declines in the north and west.

Location of Veneer Log Production

Veneer log production is not as highly concentrated as is consumption in the North Central states. Table 8 shows that Wisconsin is now the leading state in log production, due to the precipitous drop in production in Michigan over the past decade. However, Michigan's production was not a great deal lower than Wisconsin's in 1960, and most of the states produced at least 10 million board feet of veneer logs in that year.

Intraregional and Interregional Veneer Log Movements

Geographically concentrated markets together with relatively widely dispersed production indicate that much of the veneer log volume of the North Central region must be transported fairly lengthy distances, often across state lines. Mills in the northern sub-region, composed primarily of Wisconsin plywood plants, obtain 90 percent of their log supply from within the sub-region. Most of the remaining 10 percent is imported from Canada. Mills in the eastern and western sub-regions, composed largely of Indiana veneer mills, draw 80 percent of their log supply from within the two sub-regions, 15 percent from Kentucky, and most of the remainder from Michigan.

TABLE 8

Annual Veneer Log Production in the North Central Region, by Sub-Region and State, 1952 to 1960

Sub-region	Veneer Log Production, Thousand Board Feet, Int. ¼" scale				
	1952	1954	1956	1958	1960
Northern Sub-region[a]					
Wisconsin	29,956	27,109	30,403	23,724	25,467
Michigan	40,219	34,499	39,655	19,958	18,486
Minnesota	8,051	10,389	8,961	9,031	10,093
Total	78,226	71,997	79,019	52,713	54,046
Eastern Sub-region[b]					
Indiana	- - -	- - -	9,396	9,918	12,416
Illinois	- - -	- - -	8,373	9,050	11,760
Ohio	- - -	- - -	8,731	8,035	11,135
Total	- - -	- - -	26,500	27,003	35,311
Western Sub-region					
Missouri[b]	- - -	- - -	15,385	13,470	6,819
Iowa[b]	- - -	- - -	[d]	[d]	8,949
Kansas[c]	1,170	1,340	1,560	1,855	1,900
Total	- - -	- - -	16,945	15,325	17,668

[a] Lake States Forest Experiment Station data.

[b] Central States Forest Experiment Station data.

[c] Estimates by P. L. Roth, Kansas State University.

[d] Included in Missouri figure.

Regional Veneer Log Markets

Veneer log marketing is the process of transforming and transferring standing timber into logs at the mill. The institutions and procedures by which this process is accomplished vary throughout the North Central region, just as do the characteristics of the veneer and plywood industry itself.

Veneer and plywood mills in the northern sub-region purchase veneer logs within an average radius of 273 miles, those in the eastern sub-region purchase their log supplies within an average radius of 407 miles, and those in the western sub-region purchase their log supplies within an average radius of 212 miles. This information, together with the location of the regional veneer and plywood mills shown in Figure 2.,[32] suggest that regional veneer log markets be identified and classified as follows[33]:

1) Major markets
   a. Wisconsin and Western Upper Michigan (hereafter called the Wisconsin market)
   b. Indiana and Western Ohio (hereafter called the Indiana market)
2) Secondary markets
   a. Chicago area
   b. Minneapolis area
   c. Kansas City area

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[32] p.43.

[33] Excludes consideration of container veneer log marketing.

3) Remainder of the region, characterized by several relatively isolated mills and correspondingly minor markets.

These market areas are not perfectly distinct; in fact, there is much overlapping at the boundaries. Such overlapping blurs but does not vitiate the analysis[34].

Ten of the 29 veneer and plywood mills in the Wisconsin market area were sampled in the regional study. These mills reported purchasing 28,394,000 board feet of veneer logs in 1959. During the preceeding year, mills in Wisconsin, Michigan, and Minnesota purchased 57,498,000 board feet of logs[35]. This latter volume includes container veneer logs as well as quality veneer logs. The sampled mills in this market area, then, accounted for well over half of the total volume of veneer logs purchased in the entire three-state area of Wisconsin, Michigan, and Minnesota and an even greater share of the purchases of mills within the Wisconsin market.

Eight of the 29 veneer and plywood mills in the Indiana market area were sampled in the regional study. All were located in Indiana. They reported purchasing 20,729,000 board feet of veneer logs in 1959. During the preceeding year, mills in this market purchased 39,387,000 board feet

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[34]Andreas G. Papandreou and John T. Wheeler, Competition and its Regulation (New York: Prentice-Hall, Inc., 1954), p.33.

[35]A. G. Horn, Veneer Log Production Declines Sharply in Lake States as Result of Mill Closures, 1958, Lake States Forest Experiment Station Technical Note No. 567, July, 1959.

of logs[36]. This latter volume includes container veneer logs as well as quality veneer logs. Thus the sampled mills in this market area accounted for over half of the total volume of veneer logs purchased in the three-state area of Ohio, Indiana, and Illinois, and probably about half of the purchases of veneer and plywood mills within the Indiana market.

Veneer and Plywood Marketing

Wisconsin

Veneer and plywood plants in the Wisconsin area market products in three broad categories; hardwood plywood, hardwood veneer, and veneer products such as flush doors. Hardwood plywood is sold to a variety of buyers. Wholesalers provide the major market, but smaller amounts are sold to manufacturers and brokers. Most of the plywood produced by firms sampled in the regional project was sold to buyers in the North Central region. Hardwood veneer, on the other hand, is sold principally to manufacturers, who use it to manufacture furniture, doors, and similar products. The market for veneer produced by northern mills is nation-wide.

Large mills (those consuming more than 3.5 million board feet of veneer logs annually) sampled in the Wisconsin area produce both veneer and plywood or veneer only. In all cases, however, veneer was the major product. Smaller mills are likely to sell only plywood, possibly because they do

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[36]Joseph G. Mendel, Central States Forest Experiment Station Technical Paper, No. 166 (December, 1959).

not have the resources to successfully market veneer. Large mills report an average of over 300 product buyers and smaller mills an average of about 40 buyers. These figures, together with the greater geographic extent of veneer markets, indicate the greater complexity of the marketing operations of the larger firms.

Indiana

Veneer and plywood plants in the Indiana area produce and market two principal products, face veneer and hardwood lumber. Only one of the eight firms sampled in the regional project produced plywood and only one produced some other product. All of the eight firms produced and sold hardwood veneer and three also produced and sold hardwood lumber.

Face veneer, the primary product of Indiana veneer mills, is sold almost entirely to manufacturers. Ninty-five percent of the veneer sold by the eight sampled mills was sold to manufacturers, 4 percent to wholesalers, 1 percent to industrial users, and a negligible amount to retailers.

Half of the sampled Indiana veneer mills reported selling to buyers all over the United States. The other half reported selling only to buyers in the eastern part of the United States or to even more restricted local markets. The mills which sold in national markets, however, reported selling most of their veneer in nearby states. It seems clear that the primary market for face veneer produced by Indiana manufacturers is the wooden furniture industry located in North Carolina, Virginia, Indiana, Illinois and

other states in this general area. North Carolina furniture manufacturers were the most frequently mentioned buyers of Indiana veneer production.

Sampled veneer mills in Indiana reported selling veneer to an average of just over 100 buyers each in 1959. This average is somewhat misleading, however, because three of the four largest mills (those consuming over 2.5 million board feet of veneer logs annually) reported 200 to 250 product buyers while the smaller mills each reported less than 50 product buyers in 1959. There are apparently two quite different patterns of marketing operation for Indiana mills. One, typified by the larger firms, consists of a large number of fairly small sales, while the other is characterized by a much smaller number of fairly large sales. A typical annual volume per buyer for mills with the first sort of marketing pattern is a veneer equivalent of about 20,000 board feet of veneer logs per year while the other type of operation shows an annual sales per buyer of approximately 50,000 board feet. In general, the volume of sales per product buyer appears to be inversely correlated with the size of the selling mill.

Prices

It is difficult to speak of the prices of hardwood veneer and plywood products, because there is such a wide variety of species, thicknesses, and grades of material manufactured. Walnut veneer, for instance, sells for prices from as low as $10 per thousand square feet to as high as

$500 per thousand square feet. For the nation as a whole, in 1958 the average price for all special and face type veneer was $38.40 per thousand square feet, the average for commercial and utility grades, $21.70, and the average for container grades, $10.60 per thousand square feet.[37] Information provided by North Central mills does not indicate that prices in this region diverged noticeably from the national averages. The behavior of veneer and plywood prices over the past decade has been different for the different grades. Hardwood plywood prices dropped by some 4½ percent over the period 1951-59. Between 1954 and 1958, commercial and utility veneer prices rose some 14 percent and special and face veneer prices rose by 18 percent. This price behavior reflects the increasing scarcity and high cost of quality veneer logs on the supply side. On the demand side it reflects increasing foreign competition in plywood markets.

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[37] The figures on product prices were computed from the quantities and values of products shipped, as reported in U.S., Bureau of the Census, U.S. Census of Manufactures: 1958, Industry Report MC58(2)-24B, p. 12 with supplementary information from U.S., Bureau of Labor Statistics, Wholesale Prices and Price Indexes, 1959, Bureau of Labor Statistics Bulletin No. 1295 (Washington: U.S. Government Printing Office, 1961).

5. THE VENEER LOG MARKET IN WISCONSIN

Market Structure

Degree of Buyer Concentration

Mills manufacturing commercial veneer and plywood or, in some cases, face veneers, are the ultimate buyers of veneer logs in the Wisconsin market. In 1958 there were 29 such mills in this market area. This is a fairly substantial number of buyers. By this measure alone the degree of buyer concentration might well be considered rather low. However, the number of buyers alone is not an adequate measure of concentration. The size distribution of buyers is also an important dimension of concentration, and one which is reflected in the concentration ratio.

The only measure of size available for all mills in the North Central region is the number of employees, as reported by the Census of Manufactures. It is only an approximation of the annual volume of veneer log receipts, the relevant measure of size for purposes of this study. The number of employees leads to an exaggerated estimate of the size of those mills which are vertically integrated or diversified to the extent that many workers are not engaged in veneer production but in fabricating products from veneer or other materials, in sawing lumber, or in harvesting forest products.

The fact that such integration or diversification is most common in the larger companies suggests that the use of number of employees as an index of veneer log receipts leads to an exaggeration of size differences between firms and thus to an exaggeration of the degree of buyer concentration prevailing in the market.

On the other hand, there appear to be economies of large scale production in the veneer and plywood industry. Such economies, if they do exist, imply that fewer employees per unit of output or per unit of veneer log input are required in the larger firms than in the smaller ones. Their existence would lead to an underestimation of the degree of buyer concentration when number of employees is used as an index of volume of veneer log receipts.

Even if number of employees were an ideal measure of firm size in the sense of veneer log purchases, there would be at least two additional difficulties involved in measuring or evaluating the degree of buyer concentration in the veneer log markets of the North Central region. First, the sample data show that smaller mills do not reach out as far as larger ones for their veneer log supplies. Only a part of the small mills in Wisconsin and Upper Michigan will be buying logs in any part of that area, thus the number of competing mills is overstated and the degree of buyer concentration understated for any particular point.

Second, considering only veneer and plywood plants as buyers of quality veneer logs leads to an overestimation of the degree of buyer concentration because it neglects the

competition of sawmills which also purchase hardwood logs. High-grade veneer logs command much higher prices at veneer mills than at sawmills, but logs of lower (but still good) quality may be sold as either low-grade veneer logs or high-grade saw logs. Prices offered by mills in both industries are frequently quite similar for this latter material. Consequently the number of buyers in effective competition for such logs may be considerably greater than the number of veneer mills alone would suggest (although it is also true that these lower quality veneer logs are not transported as far as the better logs and, therefore, there may be fewer veneer mills buying them in a particular area than is indicated by our figures).

Fortunately, these difficulties in assessing the degree of buyer concentration in quality veneer log markets produce opposing errors which must be in considerable degree mutually offsetting. Then too, the concept of degree of concentration itself is not susceptible of precise measurement or interpretation. Consequently, the amount of error present in the estimates offered here is not a serious problem when considering the rather rough purposes which such estimates serve.

If the 29 veneer and plywood plants located in the Wisconsin veneer log market area were all approximately the same size, this market could be described as relatively unconcentrated. However, such is far from the case. The four largest firms employ about 55 percent of the workers employed by all 29 firms. The top eight firms account for about

73 percent of the total employment. This market is apparently one in which a few large firms account for the bulk of the logs purchased, while a much larger number of much smaller firms accounts for the remainder. Economists describe such a market as a high to moderately concentrated oligopsony with a competitive fringe[38]. There is a substantial degree of interdependence among the few large firms which share the power to determine price.

The ten veneer and plywood plants sampled in Wisconsin and Upper Michigan provided information which should be broadly representative of veneer log buyers in the Wisconsin market, even though the sample was not selected in such a way as to permit statistical generalization. More complete data on size of firm are available for these mills. For the purposes of this study, the annual volume of wood receipts was used to classify sampled mills because it is the relevant measure of size in a marketing context. Fortunately, information on this particular variable was available for almost all the mills contacted. The volume of wood receipts is also related to such other possible measures of size as value of sales and number of employees.

All mills consuming more than 3.5 million board feet of veneer logs annually were considered large, while those consuming less than 3.5 million board feet of logs annually were considered small. By these standards there were three large and seven small veneer and plywood mills among the ten

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[38]Table 2, p. 13.

mills sampled in the Wisconsin market area. Table 9 shows the mean volume of log receipts, mean value of sales, and mean number of employees reported by mills of each size class in 1959

TABLE 9

Mean Size of Sampled Veneer and Plywood Mills in Wisconsin and Upper Michigan

	Large	Small
Number of mills	3	7
Mean Volume of Wood Receipts, 1959 (Million Board Feet, Int. ¼" scale)	4,973	1,925
Mean Number of Fulltime Employees, 1959	143[a]	98
Mean Number of Seasonal Employees, 1959	15[a]	1
Mean Value of Sales, 1959 ($ thousands)	$1,754	$806[b]
Mean Utilization of Plant Capacity, 1959 (%)	80	96

[a] Excludes one firm for which employment data included sawmill operation.

[b] Excludes one firm not reporting value of sales.

Degree of Seller Concentration

There can be no doubt that the degree of seller concentration is very low in the Wisconsin veneer log market. Census of Manufactures data are not available for veneer log producers, but data collected in this study provide ample confirmation of this judgement. Sampled mills in the area

reported an average of 51 producers and 11 dealers[39] supplying them with veneer logs in 1959. Producers reported supplying an average of four mills apiece, while dealers reported supplying an average of three mills apiece. Therefore, there must be roughly 500 sellers of quality veneer logs in the Wisconsin market (number of mills x number of suppliers per mill ÷ number of mills per supplied per producer).

The size distribution of producers and dealers, while little more uniform than that of the mills, does not reveal an appreciable degree of seller concentration. With very few exceptions (none in the case of the sample producers and dealers) sellers in the Wisconsin market each sell less than one percent of the volume of veneer logs purchased by mills in this market. A market with so little seller concentration may be described as virtually atomistic. No seller controls a sufficient share of the market to permit him to

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[39]Dealers are here regarded only as sellers of veneer logs even though they do buy and sell by definition. They are so regarded because they clearly compete with producers in selling logs to mills, but they compete less effectively with the mills in buying logs from producers. Any producer who can sell direct to the mill will do so because the price offered by the dealer is bound to be lower (mills in this industry do not offer dealer bonus, so the dealer's cost and profits must be covered by the difference between the mill price which he receives and the price he pays for logs). As a logical corollary of this position, producers who sell to veneer log dealers, whether because they handle volumes too small to justify dealing with a mill, because they lack transportation equipment, because they are dealing with a sawmill and do not realize that some of their logs are worth more as veneer logs, because they are too distant from a buying mill to permit direct dealing, or whatever, are not regarded as sellers in the market under examination. They could be regarded as sellers in another market in which the buyer population is composed entirely of dealers.

influence price. No small group of sellers acting in concert possesses such power to any appreciable extent.

Fourteen sellers of veneer logs in Wisconsin and Upper Michigan were contacted and interviewed during the course of the regional project. Of that number, ten were veneer log producers who sold only logs that they themselves had produced, while the other four purchased and resold veneer logs from other producers in addition to the veneer logs which they produced. There were no intermediate market agents who did not also produce veneer logs themselves.

Eight of the fourteen sellers of veneer logs were engaged solely in wood products activities. Table 10 shows the distribution of sampled veneer log sellers among the various occupations reported.

TABLE 10

Number of Sampled Veneer Log Sellers in Wisconsin and Upper Michigan Reporting Various Business Activities, by Type of Activity

Type of Activity	Number Reporting
Full-time Timber Producer	6
Farmer	4
Sawmill Operator	2
Other Business Activity	2

Producing timber products was the major form of economic activity for almost all of the producers of veneer logs contacted. Only one seller reported receiving less than two-thirds of his gross income from wood products activities.

Such other activities as farming or local business of one kind or another are generally only comparatively minor income supplements.

There are several ways by which the size of the operation of various veneer log sellers might be measured. One is the volume of veneer logs sold annually[40]. This volume ranges from 5,000 board feet up to 280,000 board feet for the sampled sellers. However, in almost every case the veneer log sales of a particular enterprise were only a comparatively small part of annual timber products sales of that enterprise. Veneer log production, in other words, is an incidental, although it can be quite a lucrative incidental, to the production of such major forest products as pulpwood and sawlogs. This being the case, it is perhaps more meaningful for most purposes to classify veneer log sellers according to the value of their annual sales of all timber products. When this is done, the sellers in the regional sample range from $1,000 to $200,000 annually. Furthermore, they seem to fall in two rather distinct categories. Five of the eleven sellers answering this question reported sales of $10,000 or less in 1959. The other six all reported sales in excess of $20,000 in 1959. All three of the part-time farmers reporting on their annual sales fell in the smaller size group, while all of the sawmills fell in the larger group. There seems to be a clear distinction between the full-time timber-producing firm and the

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[40]This is the appropriate measure for the determination of concentration ratios.

smaller part-time operation run by one man, or at most a few. Number of employees reported further bears out this distinction. The bulk of the firms in the $20,000 and over size class report from two to four permanent employees and eight or more seasonal employees, whereas the producers reporting sales of $10,000 or less per year are almost invariably one or two-man operations.

It is also interesting to note that the six larger firms report that they have been in business for an average of 12 years while the five smaller firms report that they have been in business for an average of 25 years. This suggests that large timber-producing firms are not built up gradually by small producers of the type predominating in this market. On the contrary, the smaller operations appear to be those which are more traditional in character and which have probably been operating at a fairly constant level for many years. Larger operations are perhaps the more dynamic and growing and they differ in kind as well as degree from their smaller competitors.

Extent of Product and Service Differentiation

The extent of existing product and service differentiation[41] can be measured, at least theoretically, by the cross-elasticities of demand between competing products. As is generally the case, there are no data by which to estimate

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[41] Service differentiation is the term employed by Nicholls to represent the various ways in which buyers may decrease the elasticity of the factor supply curve facing them. William H. Nicholls, Imperfect Competition (Ames: Iowa State College Press, 1941).

such cross-elasticities in the Wisconsin veneer log market. Some indirect evidence is available, however, which permits a highly tentative evaluation.

Seller preferences between competing buyers are affected by a number of considerations. Mills do offer some services to their veneer log suppliers in this market area (these services are covered in the discussion of market conduct). In addition, differences can be found between mills in areas such as log scaling and grading practices and the form of the buyer-seller agreement (contract or otherwise). All of these things may lead a seller to prefer to deal with one mill instead of another. It is doubtful, however, that they would go far to offset a difference between buyers in prices paid for veneer logs.

In product markets such as that for pulpwood, where supplies are ample relative to demand, contractual arrangements between seller and buyer (and their implied continuance in force indefinitely if) can be the source of substantial imperfections in substitutability between buyers. Veneer log markets, however, are mostly sellers' markets, and contractual ties, although present, are not likely to be effective forms of service differentiation.

Were it not for locational factors, then, service differentiation would be slight between buyers in the Wisconsin market area. However, locational factors are frequently a major source of service differentiation in raw materials markets because transportation costs are high relative to product value. In order to evaluate the effects of buyer

location on seller preference between buyers we observe that:

1) Log-transportation costs, whether by truck or rail, are commonly paid by the seller[42].

2) A linear regression of trucking costs reported by sampled sellers on reported average distance of haul indicates that fixed costs are about $7.20 per thousand board feet and variable costs are about 20¢ per thousand board feet per mile.

3) A linear regression of rail freight costs reported by sampled mills on reported average distance of haul indicates that fixed costs (including trucking to railroad) are about $15.45 per thousand board feet and variable costs are about 9¢ per thousand board feet per mile.

4) Buyers are distributed as shown in Figure 2[43]. The reader will note that twenty of the 29 mills in the market area can be enclosed in a circle with a radius of approximately 100 miles. The remaining nine mills are scattered throughout northern Wisconsin and Michigan's Upper Peninsula.

Service differentiation as a direct result of location is probably slight within the 100 mile circle of mill concentration. If the twenty mills in this area were evenly

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[42]Literally speaking, such costs are paid by the buyer, but they are deducted from the price paid to the seller for his veneer logs.

[43]P. 43.

spaced the distance between adjacent mills would be approximately 40 miles (square root of the ratio between total area and number of mills). The mean distance between a point of veneer log production and the closest mill would be 14 miles. The mean distance between a point of veneer log production and the next closest mill would be 26 miles. Thus, for this area, in which truck transportation is cheaper than rail, the average advantage enjoyed by a mill over its nearest competitor would be $2.40 per thousand board feet (difference in length of haul x variable hauling cost). This sum represents one to two percent of the average delivered price for veneer logs at Wisconsin mills. While it is impossible to estimate cross-elasticities from this knowledge, in the absence of additional information on the elasticity of the veneer log supply curve facing an individual mill, it is possible to say that the contribution of location to service differentiation for the twenty mills within the 100 mile circle is relatively small. This conclusion, together with the judgement that non-locational factors causing service differentiation are of relatively slight importance leads to the further conclusion that the degree of service differentiation for the bulk of the Wisconsin veneer log market is at most slight to moderate.

The nine veneer and plywood plants outside the 100 mile circle undoubtedly offer a markedly greater degree of service differentiation than the twenty contiguous firms, by virtue of the greater distances separating them from competing buyers. The fact that veneer logs apparently can be

transported economically nearly 300 miles in this market, and the fact that none of the thirty buyers is located more than 100 miles from its nearest competitor, suggest that service differentiation is at most moderate among veneer and plywood mills in Wisconsin and Upper Michigan.

Product differentiation among sellers of veneer logs in this market is even less significant than service differentiation among sellers. Location is inconsequential for product differentiation because buyers normally do not pay any of the costs of transporting logs to veneer and plywood plants[44]. Some slight differences do exist between sellers in the way of quality of logs supplied and timing of product deliveries, as well as such omnipresent matters as cooperativeness, dependability, and other forms of goodwill.

Probably the most important difference between sellers arises from their size. Veneer mills commonly assume most of the initiative in buyer-seller relationships through the efforts of their buyers (referred to as "field men" in the industry). Presumably the unit cost of dealing with larger sellers is lower than it is with smaller sellers, for a few mills report paying somewhat higher prices to a few of their largest suppliers[45]. All things considered, however, the degree of product differentiation prevailing in the market is perceptible but slight.

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[44]A very few small mills pay distance differentials and in this way share transportation costs with their suppliers.

[45]Alternatively, these price differentials represent a form of price discrimination if they are not cost-justified.

Conditions of Entry

The conditions of entry in an industry may be measured by the extent to which prices may be raised above average costs of production (or may be depressed below the value of the marginal product on the buying side). Inadequate cost data for veneer and plywood production preclude the estimation of the value of the marginal product of veneer logs.

Average costs of veneer log production were reported by sampled veneer log sellers. However, these data are open to serious question. It is clear from the reports of sampled sellers that veneer logs are almost always produced jointly with other forest products (both sawlogs and pulpwood are important examples in Wisconsin and Upper Michigan). The marginal costs of producing two or more such joint products can be determined, just as in the single product case, but the average cost of production of a joint product cannot be so determined[46]. Any purported average cost of a joint product involves an assignment of overhead costs between the several products, and such an assignment can only be made in an arbitrary (that is, theoretically unsupportable) way. Consequently, the average costs of veneer log production reported by sampled sellers are ambiguous and ill-suited to the problem of measuring barriers to entry.

Even though the possibility of directly measuring the height of barriers to entry is foreclosed it is sometimes possible to infer the presence or absence of such barriers

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[46]Marshall, Principles of Economics, p.390.

through a search for factors which give rise to them.

Product and service differentiation is an unlikely source of barriers to entry because location is the only important differentiating factor, and it is this factor alone which does not create barriers to entry. In fact, the locational pattern of veneer and plywood plants shows a concentration, perhaps due to historical factors no longer relevant, which suggests that careful selection of the location of a new firm might well permit it to enjoy a greater degree of service differentiation than is now enjoyed by most of the existing firms. Product differentiation is so slight as to be an insignificant barrier to the entry of new veneer log producers.

It is unlikely that the other sources of barriers to entry are operative to any significant degree on either the buying or the selling side of the Wisconsin veneer log market. Production techniques of both veneer and plywood plants and veneer log producers are largely traditional, stumpage is owned for the most part by neither producers nor mills, labor requirements are not particularly demanding, and there is no evidence of economies of scale in veneer log production. As will be shown, there is evidence of economies of scale in veneer and plywood production. However, it is unlikely that the entry of another firm of firm of optimum size would perceptibly lower price through expanding supply. As shown in Figure 2.[47] the Wisconsin market supplies only

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[47] P. 43.

about 10 percent of the nation's hardwood veneer and plywood production. A new firm of three times the average size in this market would increase supply by only about one percent. Therefore, we conclude that barriers to entry are not significant on either the buying or the selling side in the Wisconsin veneer log market.

Market Conduct

Buyer Conduct

Sampled veneer and plywood mills in Wisconsin and Upper Michigan produce primarily to fill existing orders rather than for inventory accumulation in anticipation of orders. The three large mills produce partially for inventory, but all other mills report producing only to order. As a result of this production policy, finished products inventories are relatively small and unimportant in the Wisconsin market. This prevailing policy of producing to order did not seem to result in major seasonal fluctuations in production in 1959. The three larger firms reported producing at an average of 80 percent of capacity in that year. The smaller firms were nearly unanimous in reporting production at 100 percent of capacity in 1959, but the monthly production figures given by some of them show fluctuations of about the same type reported by the large firms. Consequently, the 80 percent of capacity figure reported by the larger firms may be a good indication of the industry average. The annual production peak usually occurs in late winter or early spring, and the trough in the fall.

Veneer log inventories of Wisconsin and Upper Michigan mills, unlike their product inventories, fluctuate greatly throughout the year. Markets and veneer production may be fairly steady but veneer log production is highly seasonal. In the Lake States, most veneer logs are harvested in the winter time. Log inventories of veneer mills are generally at their lowest level in the fall just before this winter logging season. As the season progresses logs come in at a faster rate than the mill can use them, and inventories accumulate. This process of inventory accumulation ceases in late winter or early spring at the close of the winter logging season. From this point on inventories fall throughout the spring and summer as veneer production consumes logs faster than they are brought into the yard by producers. Sampled veneer mills reported that they would like to keep the volumes of their veneer log inventories lower than they have been able to do, in order to minimize the investment and risk involved in carrying such a large inventory. In particular, they would like to keep inventories as low as possible during the hot summer months, because logs stored over the summer deteriorate in quality for veneer production. Nonetheless, if inventories are necessary, due to the pronounced seasonal nature of veneer log production, mills clearly prefer to hold these inventories in the form of logs rather than in the form of finished products. By so doing they are able to keep their veneer production at a nearly uniform level throughout the year and avoid costly shutdowns and layoffs of skilled personnel.

For the most part, veneer logs are cut under stumpage contract by a small producer and then sold to a veneer mill. A few of the larger mills operate their own logging crews, in most cases on their own land, and may obtain a sizeable share of their veneer log requirements in this way. As has been mentioned previously, intermediate market agents are also active in the veneer log market. About 15 percent of the volume reported by sample mills in the Wisconsin area was received from such market intermediaries. By far the bulk of the volume of veneer logs received by reporting mills came directly from independent producers. Over three-fourths of the 1959 receipts reported by source came from such producers. Vertically integrated operations, then, are of minor importance in veneer log marketing in this area. Their presence may be explained largely by historical factors rather than by current market conditions. The mills which do own substantial areas of forest land and which harvest veneer logs from this land are old and well-established forest products firms which are also horizontally integrated (that is, they produce several different forest products) and have owned their land for many years. It is interesting to note that these same firms are likely to be vertically integrated forward through the stages of processing the veneer and plywood into more highly manufactured products such as cabinets, furniture or doors.

Although veneer and plywood mills in the Wisconsin market area receive an average of 15 percent of their total veneer log receipts from dealers, and although they deal

with an average of approximately 12 dealers each, at least so far as sampled mills may be representative, this does not fully describe the role played by intermediate market agents in this market. Most firms do not buy any of their veneer log supplies from intermediate market agents; however, the few who do rely to a considerable extent on such suppliers. Consequently, the mill which does deal with intermediate market agents reports that it deals with an average of 40 to 50 of these intermediaries, while most of the remaining mills deal with none. This is particularly true for the smaller mills. Larger mills are likely to have more diverse sources of veneer log supplies, not only relying to a greater extent on their own lands, but also relying on both intermediate market agents and independent producers to supply their requirements. All sampled mills, however, reported receiving at least a part of their log supplies from independent timber producers. The mean number of such producers supplying a single mill was slightly over fifty. However, this number varies greatly by the size of mill, ranging around 100 in the case of some of the larger mills down to 25 to 50 for most of the smaller mills.

Apparently veneer and plywood mills assume the initiative in arranging for the bulk of their veneer log supplies. This is usually accomplished through the activities of "field men". Here again, there is significant variation between mills of different sizes. Mills in the largest size class, for instance, buy 80 percent of their veneer logs on their initiative and only 20 percent on the basis of seller

initiative. The importance of seller initiative climbs as the size of mill declines, so that the smaller mills approach a 50-50 split between mill and buyer initiative. Perhaps this helps to account for the fact that the mean procurement radius reported by the large mills was no greater than that reported by the smaller mills. Large mills are obviously much heavier buyers of veneer logs within their procurement territories than are their smaller counterparts.

Most veneer and plywood mills in the Wisconsin market area find it necessary to coordinate the timing and amount of their veneer log receipts through some prior agreement with suppliers. About one-fourth of the 1959 log receipts of sampled Wisconsin mills were purchased under written contracts, 40 percent under less formal oral agreements, and the remaining third without agreement between buyer and seller prior to log delivery.

The terms of written contracts cover such things as quantity, species, quality and size standards, price, point and timing of deliveries, and time and method of payment. Informal oral agreements cover many of the same points, although often by tacit understanding until explicitly changed. Written contracts commonly cover a period of one year and are negotiated just before the start of the logging season. Oral agreements are less definite in duration, but generally cover a period of one to three months.

Contracts employed in veneer log marketing, as in pulpwood marketing, in the Lake States are not considered to be binding legal documents by either buyer or seller. Veneer

and plywood firms try to adhere to the terms of their contracts, even at the cost of some inconvenience, because they operate in a sellers' market. A seller who frequently fails to fulfill the terms of his contracts may find it increasingly difficult to obtain a contract. Legal action by either buyers or sellers to enforce contracts is virtually unknown.

Veneer and plywood mills, intermediate market agents and veneer log producers contacted in the regional study were asked to report the veneer log prices paid or received by them in 1959. Many of them did not provide this information and the variations were great among the answers of those who did. Furthermore, the multiplicity of species and grades resulted in a very small number of quotations for any particular species and grade. Tabular presentation of the prices reported is thus impractical. However, a few tentative generalizations do seem possible despite the difficulties presented by the price information.

It seems clear that prices are usually determined by the veneer and plywood mills rather than being set by producers or being negotiated by both parties. The usual procedure is for a veneer mill to announce the price that it is willing to pay for each species and grade of veneer log either through its field men, through letter to its suppliers, through newspaper advertising, or in some other fashion. Then prospective sellers can decide to whom they wish to sell their particular veneer log supplies. This is probably a fairly accurate description of how veneer logs prices are set in the case of mills which buy on a no-prior-agreement

basis. Where there is some form of coordination between the buyer and seller beforehand, the complications introduced render this simple explanation no longer completely accurate.

Loans or advances are extended to suppliers by most of the sampled veneer and plywood firms. These financial aids are received by comparatively few sellers, however. Policies vary as to the amount of aid which may be extended in this fashion. Some mills set a limit of a few thousand dollars, others may advance almost the entire value of the contract, and still others advance only enough to cover the cost of stumpage purchase.

Seller Conduct

The radius of the area within which sampled veneer log sellers reported obtaining their veneer log supplies in 1959 varied from 5 miles to 130 miles. The average for all twelve sellers reporting was 44 miles, and there was no noticeable difference between the radius reported by the larger sellers and that reported by the smaller ones.

Large veneer log sellers handled an average of 75,000 board feet of veneer logs in 1959. Of this total 60 percent was produced by these large sellers with their own logging crews while the remaining 40 percent was obtained from other producers in the form of cut logs. In contrast the five smaller sellers reporting volumes reported handling an average of 15,000 board feet of veneer logs in 1959, all of it produced by themselves or their employees.

The land from which the log supplies of the veneer log sellers came also showed interesting differences between large and small sellers. Large sellers reported obtaining over two-thirds of their 1959 veneer log receipts either directly or indirectly from national forest land. This is by far the major land ownership category for these sellers. The small sellers, however, reported obtaining over half of their 1959 veneer log supplies from their own lands, a category of negligible importance for large sellers. This reflects the importance of farmers in the small seller category. Other private lands supplied most of the balance for the small sellers. The amount obtained from public lands by this group was negligible.

Stumpage contracts were held by veneer logs sellers in both size categories, with the larger sellers typically holding around three such contracts in a sample year, while the small sellers were more likely to hold a single contract. The small sellers also assume the initiative in obtaining stumpage contracts for all of the stumpage which they purchased, while the large sellers assumed the initiative for only one-half of their 1959 veneer log stumpage contracts. This reflects the importance of public land sources to the large sellers, because public landowners normally advertise stumpage, and thus may be considered to take the initiative in locating buyers. The smaller sellers buying mostly from private lands actively seek stumpage of this class.

The production of veneer logs, like that of most forest products in the Lake States, appears to be highly seasonal

in nature. It is primarily a winter activity. Logs are delivered soon after they are cut. Weather is the principal governing factor which makes log production so highly seasonal. Skidding and hauling are more practical in the poorly drained northern Lake States areas in the winter when the ground is frozen than in the summer when it is likely to be wet. Also, veneer log deterioration does not take place as rapidly in cold weather as in warm weather. The road restrictions, in effect during the spring thaw, commonly called the break-up, mark the effective end of the veneer log season in this region.

There seem to be significant differences between the length of the veneer log season reported by the larger producers or sellers as against that reported by the smaller sellers. Large sellers reported a season which averaged approximately six months in length while that reported by the smaller sellers averaged about three months. In part this difference appears to be due to the buyers of veneer logs. Larger sellers who reported the longer season also reported that the timing of their deliveries of veneer logs to the mill was not affected by the requirements of the buyers. On the other hand, the majority of smaller sellers reported that the timing of their deliveries of veneer logs was determined by mill requirements. In some cases the smaller sellers did not transport veneer logs to the mill but relied on the mill to pick them up. A further factor contributing to the shorter length of the veneer log production season for the smaller seller may be the fact that half of these

small sellers were also farmers and were able to devote full time to timber production only in a few months of the year when farm work did not require much of their time.

Logging is performed by the seller himself (in the case of the smaller operators), by his employees, or by independent sub-contractors. The distinction between employees and sub-contractors is a fuzzy one because employees are commonly paid on a piece-work basis, as are contract loggers. No matter what the method of getting the logging done, however, most veneer log sellers were willing to give an estimate of the cost of this logging incurred by them in 1959. These cost estimates ranged from $18 to $25 per thousand board feet. There did not seem to be any significant difference between the costs reported by the larger sellers and those reported by the smaller ones. Perhaps the most impressive conclusion about logging costs is that sellers do not appear to have a very sophisticated knowledge of the level of their costs. Rather the estimates given appear to be very rough and perhaps more in the nature of conventional wisdom in the industry. For instance, nearly half of all the reported costs were reported on a per-cord basis rather than on a board-foot basis, even though veneer logs are sold and measured by the board foot. The value per cord in every case was $10, which is a nice, round, easy-to-remember number.

Logging costs reported by veneer log producers may be compared with saw timber logging cost data given in the U.S. Forest Service Region Nine handbook on timber appraisal 1961 edition. The Forest Service figure for Wisconsin and

Upper Michigan is $17.52 per thousand board feet for saw logs. No separate figure is given for veneer logs. There is some indication from the interview data in this study that veneer log production costs may be on the order of $3 per thousand higher than saw log production costs (some respondents gave cost figures for both). If this is true the regional study data and the Forest Service figure agree almost exactly. A rough average figure for veneer log production costs in Wisconsin and Upper Michigan might be $20.50 per thousand board feet[48].

The twelve sellers of veneer logs contacted in Wisconsin and Upper Michigan sold veneer logs only to veneer mills, as far as they knew. It is possible that some of the saw logs sold to sawmills by these individuals and firms later found their way to veneer mills. This, however, is unlikely. It is more likely that veneer logs handled by sawmills come largely from small producers who do not sell veneer logs directly to veneer mills. The larger veneer log sellers sold to an average of slightly over two veneer mills, together with an average of over eight other wood-using mills of such types as pulp mills, sawmills, and box factories. The smaller veneer log sellers sold to an average of slightly over one veneer mill apiece and an average of slightly less than three other wood-using mills each.

The sampled veneer log sellers sold an average of just over 50,000 board feet apiece in 1959, or about 30,000 board

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[48]This value cannot be interpreted without ambiguity. See p. 66.

feet apiece to each of the veneer mills with whom they dealt. The larger sellers, of course, sold more, an average of 75,000 board feet each per year, while the smaller sellers sold an average of 15,000 board feet each per year. The larger sellers sold approximately 40,000 board feet per year to each of the mills which they supplied while for the smaller sellers this figure was 13,000 board feet each.

Although the majority of veneer mills sampled in the Wisconsin market reported extending financial aid in the form of loans or advances to at least some of their veneer log suppliers, the sampled veneer log sellers with a single exception reported receiving no aid of this sort from veneer log buyers in 1959. Apparently, then, the practice of extending loans or advances to finance a portion of the producer's operation is not extensive in the veneer log market.

Market Performance

Data collected in the regional study of veneer log marketing, together with information available from other sources, may be used to evaluate the performance of the Wisconsin veneer log market and to indicate those dimensions in which performance might be improved.

Productive Efficiency

Productive efficiency is measured by the degree to which firms operating in the industries approach the lowest possible cost for the outputs they produce. Three considerations are important in evaluating productive efficiency: the size of the optimum scale (minimum cost) firm and the

degree to which firms in the industry attain that size, the optimum (minimum cost) degree of vertical integration and the extent to which firms in the industry are vertically integrated, and the long-run rate of utilization of plant capacity by the industry.

Some information is available on economies of scale in the production of veneer and plywood. This information indicates that pronounced economies of scale may exist in veneer and plywood production, and that most mills in the Wisconsin area are too small to achieve these economies. The information available comes from two studies, both of small sample size but completely independent of each other, and both suggesting the same conclusion.

In its 1952 study of seven hardwood veneer and plywood mills in the eastern United States, the Bureau of Labor Statistics developed information on factors affecting productivity[49]. Man-hour requirements for the seven mills for each production process are shown in Table 11. If one may draw a conclusion from a sample of only seven mills it is that to achieve maximum labor productivity a plywood mill should be in at least the size class of 150 to 200 employees.

Regional study data collected from sampled veneer and plywood mills in the Wisconsin market area suggest a quite similar conclusion. Of the ten mills supplying data, six were plywood plants. Their annual veneer log receipts ranged from half a million board feet to four million board

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[49] P. 37.

TABLE 11

Man-Hour Requirements for Manufacturing in Seven Veneer and Plywood Mills, by Process

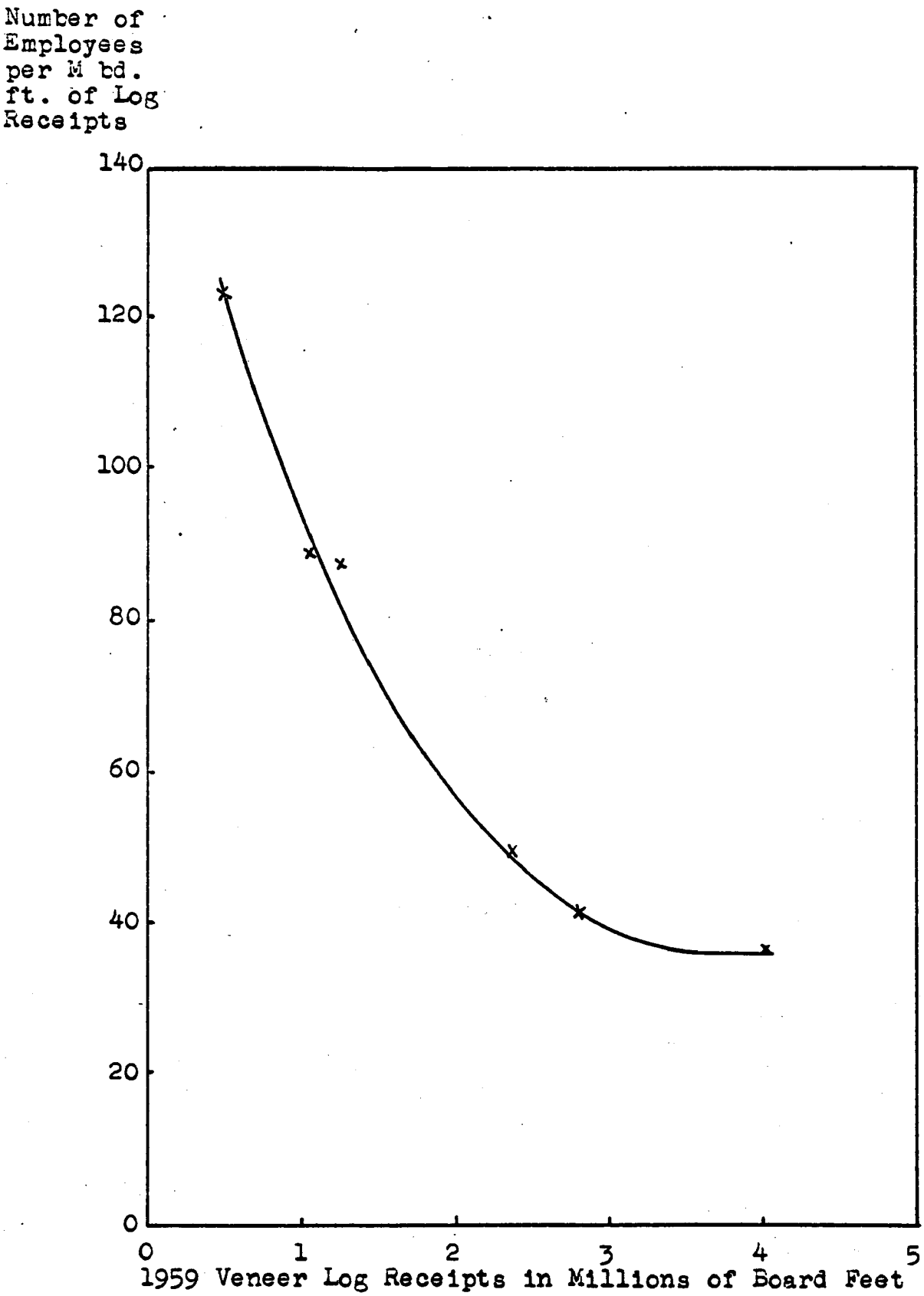
Mill Number	Number of Employees	Manufacturing Process: Log Preparation	Veneer Mill	Plywood Mill	Total
		(Man-hours per Thousand Board Feet)			
1	200 - 400	7.92	1.14	4.74	13.80
2	150 - 200	7.99	2.08	4.86	14.93
3	100 - 150	12.18	1.71	7.47	21.36
4	50 - 100	8.06	3.81	15.04	26.91
5	50 - 100	9.99	2.53	12.98	25.50
6	50 - 100	12.62	2.31	18.34	23.27
7	Under 50	10.15	1.92	- - -	12.07

Source: U.S., Bureau of Labor Statistics, Case Study Data . . ., Report No. 37.

feet in 1959. The smallest firm employed 62 employees and the largest, 146. No information was supplied on the number of man-hours worked. However, when the number of employees per million board feet of log receipts is plotted against the total volume of log receipts in 1959 (the relevant measure of firm size) the resulting curve, as shown in Figure 3., indicates a very sharp difference in labor productivity between the three smaller firms and the three large firms. The three small firms each employed more than 85 employees per million board feet of log receipts while the three large firms employed less than 50 employees per million board feet of log receipts each. Furthermore, a smooth curve drawn through these points fit them almost exactly. While this

FIGURE 3

LABOR PRODUCTIVITY IN SIX WISCONSIN PLYWOOD PLANTS IN 1959



curve may not be a perfectly accurate indication of the labor cost curve for plywood mills, it at least strongly suggests that substantial economies of scale in the use of labor in plywood manufacture do exist, and that a firm of optimum size from this standpoint is one employing at least 100 employees, and quite likely 150 employees. Labor costs per thousand board feet for the small firms in the plywood industry must be at least double the labor costs of the optimum-sized firm, given equal wage rates in all firms.

Table 12 shows the distribution of veneer and plywood

TABLE 12

Number of Veneer and Plywood Plants in Wisconsin and Western Upper Michigan in 1958, by Number of Employees

Number of Employees	Number of Mills
1 - 19	6
20 - 49	6
50 - 99	8
100 - 249	7
500 +	2

Source: U.S., Bureau of the Census, Location . . .

plants in the Wisconsin market area by employment size class. Twenty of the twenty-nine firms employed fewer than 100 persons in 1958. Only nine employed 100 or more. The optimum-sized plant producing only veneer may be somewhat smaller than the optimum-sized plywood plant. However, the regional study data indicate that the smaller plants produce

plywood and the larger plants are more likely to be producing and selling face veneer. If this is so, surely the conclusion is that the great majority of the plywood plants in the Wisconsin market area are well below the size necessary to achieve optimum labor productivity.

Of course, labor is not the only cost incurred by veneer manufacturers. It is possible that firms incurring higher labor costs may also have a much lower investment in machinery and capital equipment, and thus incur lower capital costs. However, examination of the Census of Manufactures data for Wisconsin veneer and plywood firms in 1958 shows that two-thirds of the value added by manufacture in these firms was attributed to labor costs and the other third to other costs and profits. Thus labor is the major cost factor in veneer and plywood manufacture, and labor costs higher than those of the optimum-sized firm by a given percentage would have to be offset by other costs lower than these of the optimum-sized firm by twice that percentage if total costs were to be equal. The conclusion then, seems inescapable that the small firms in the industry are too small to achieve optimum economies of scale.

Perhaps the only major qualification necessary to this part of the analysis deals not with the production process itself so much as with the character of the product produced. Many of the smaller firms are not producing standardized veneer or plywood products. Traditionally this is an industry which has been composed in large part of nearly captive firms; in other words, firms producing non-standardized

products to the specifications demanded by individual product buyers. Some of the larger firms produce standardized 4' by 8' plywood sheets or doors, and thus escape the semi-captive status of the smaller firms. In so doing, larger firms are able to reduce costs. There is a question, however, whether similar economies would be open to the small firm, which is producing what might be called specialty products. Its limited marketing resources may not permit it to operate competitively in the standardized product markets.

Finally, the Bureau of Labor Statistics report noted that two factors seemed to be important in depressing the productivity of mills of all size classes. One of these factors is the increase in use of lower quality and smaller logs as the better timber becomes increasingly scarce. No data on the quality of veneer log receipts over time are available, but the steadily rising prices of preferred species and the comments of industry representatives all confirm the conclusion that on the average quality is falling. The second factor depressing productivity in the veneer and plywood plant study by the Bureau of Labor Statistics was the prevailing pattern of producing to order rather than for inventory. Such behavior resulted in frequent stops to change machine settings, due to the many short-runs required, and raised costs appreciably. Production to order rather than for inventory is an inevitable aspect of producing specialty products of the type sold by many of the small plywood mills of the Wisconsin area. Conversion to production of standardized products makes possible production for inventory and the

economies inherent in such policy. Mills in this market area reported an almost universal policy of producing to order. They may be able to cut costs of production by producing for inventory instead. In order to do so they will need to construct or lease new storage facilities, for most report that limited storage now restricts the finished product inventories they are able to carry. Even more important they will have to actively seek to change the character of the markets they supply, either by changing the buying and manufacturing processes of their present buyers or by seeking new buyers for standardized products.

Veneer log production does not appear to be subject to economies of scale, at least in the range of production characterizing the sellers furnishing data for this study. This does not mean that no such economies of scale exist, for the sample is very small, the range of the size of producers reporting is very small, and many of the answers given suggest rather stereotyped conceptions of cost, probably derived from the prevailing contract logging rates in the northeastern part of Wisconsin where all of the sample producers were located. In any event, it did not appear that any of the producers contacted had a particularly sophisticated economic or accounting conception of their costs of veneer log production. Although there may well be economies of scale in veneer log production in the Wisconsin market area, the data of this study not only do not reveal such economies of scale but suggest that they do not exist.

The data collected provide no evidence of economies or

diseconomies of vertical integration of veneer and plywood mills backward through the veneer log production stage. Such vertical integration does exist, particularly for the larger firms in the industry. However, this appears to be a traditional pattern of operation, and it is more common among the firms which are horizontally integrated in the sense that they produce a number of other forest products besides veneer and plywood. Such firms often produce lumber and more highly manufactured products such as furniture, doors, millwork, and the like. Furthermore, their logging operations seem to be conducted primarily because they own rather large volumes of forest land and are the few surviving firms from the earlier days of large logging operations in the Lake States. In short, there do not appear to be any obvious current reasons for a veneer or plywood manufacturer to integrate into the stage of veneer log production. As a matter of fact, it is widely held that such integration is unprofitable because a firm operating at a fairly large scale in the production of veneer logs would be forced to pay workmen's compensation, would be subject to the wage and hour laws, and would otherwise incur higher labor costs than do small independent timber producers. It is somewhat surprising, however, in the light of the rather severe shortage of high quality veneer logs, that at least some veneer and plywood manufacturers have not attempted to gain control of some portion of the supply of such logs through vertical integration of one kind or another.

The final aspect of the performance dimension of

productive efficiency concerns the existence and cost of chronic excess capacity. Although excess capacity was observed to some extent in the veneer industry in the region in 1959 it is impossible to determine whether this situation was chronic or merely transitory. The fact that the larger firms producing veneer and plywood were the ones reporting unused capacity in 1959 indicates that these firms, which are those producing standardized products, may be feeling the effects of foreign competition to a greater extent than are the smaller firms producing specialty products to buyer specifications.

No evaluation of excess capacity in veneer log production is possible given the generally joint production, frequently seasonal, and often part-time nature of this process. There does seem to be excess capacity for timber production in general, however; a chronic excess capacity in fact, in the Wisconsin area. Many producers of timber products, and of pulpwood especially, report that they are unable to get contracts as large as they might like. Nonetheless, it is doubtful that producers are unable to sell any veneer logs that they might produce. The scarcity of high-quality veneer logs argues against the existence of such a situation.

Price-Cost Margins and Profit Rates

No data were collected on costs of veneer or plywood production in the regional study. Information on value of shipments, wages paid, and costs of materials on an aggregate basis is published in the Census of Manufactures.

However, this source does not include such cost items as depreciation, rent, and interest. Therefore it was impossible to estimate profit margins for veneer and plywood production. No direct statistics on profit rates in this industry could be located. Consequently, it is impossible to judge whether profits are subnormal, normal, or excessive.

The average costs of producing veneer logs, as reported by producers sampled in the regional study, cannot be used to calculate profit margins in that industry, because they are essentially without clear meaning[50]. Neither were direct data on profit rates available for the industry. Consequently, it is impossible to judge whether profits are subnormal, normal, or excessive in this case either.

The Size of Selling and Buying Costs

Another dimension of market performance is the size of selling and/or buying costs. Costs of this type in excess of those necessary to convey market information to prospective buyers and sellers may be judged evidence of adverse performance. In the veneer log market, selling costs are virtually non-existent. Buying costs reported by veneer mills averaged $3.72 per thousand board feet[51] and were composed chiefly of the costs of maintaining buyers or "field men" as they are called. This level of buying costs represents about two percent of product value, a level which can

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[50] P. 66.

[51] Only two mills reporting. All others claimed not to know the size of this cost item.

hardly be called excessive. In fact a case may be made that higher buying costs would result in more widely available market information and a more efficient market system. A small minority of veneer log producers complained of inadequate market information, but a larger number might agree if they knew the full extent of their lack of knowledge. No measure of producers' market knowledge was attempted and no conclusion is warranted without further research.

Progressiveness in Production Techniques

Industry in the United States is progressing rapidly in developing automated and other production processes which increase labor productivity. This, however, does not seem to be true of the hardwood veneer and plywood industry in Wisconsin and Upper Michigan. This industry appears to be extremely labor-intensive. Wisconsin veneer and plywood mills in 1958 required 345 labor hours to create $1,000 of value added in manufacture[52]. By way of contrast, the average for all manufacturing industry in the United States is 160 labor hours, and in the case of the quite similar softwood plywood industry is 233 labor hours. Thus the hardwood veneer and plywood industry requires two-thirds more labor per $1,000 value added in manufacture than does so similar an industry as that manufacturing softwood plywood (which has been faulted for mediocre progressiveness itself)[53].

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[52]These and the balance of the data in this section from U.S. Census of Manufactures: 1958, Industry Report MC58(2)-24B.

[53]Thomas A. Petit, "The Value of Competition: A Study

That value added per man-hour should be less than half the average for U.S. manufacturing plants in general and only 60 percent of that in so nearly comparable an industry as that producing softwood plywood is a most severe handicap.

The data do not permit a similar analysis of progressiveness in the production of veneer logs. The chain saw, crawler tractor, and self-loading truck are examples of productivity-increasing innovation which has occurred in logging in recent years. However, a measurement of the level or rate of increase in man-hour productivity has not been possible.

Census of Manufactures data can be used to evaluate the rate of increase in labor productivity in all forms of timber production. The data on logging camps and contractors, however, apply to only a small fraction of all timber producing enterprises. They may not be representative of the smaller enterprises which are not covered. For what they are worth, the computations indicate that timber production is extremely labor-intensive. Logging firms in the three states required 374 labor hours to create $1,000 of value added in manufacture in 1958.

Product Performance

Quantitative evaluation of product performance is virtually impossible, but a qualitative evaluation is far from meaningless. The basic product, hardwood veneer, has changed little in many years, although improved production techniques

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of the American Softwood Plywood Industry," Journal of Industrial Economics, 6 (October, 1957), p. 41.

and quality control have boosted quality, at least in the output of some firms. Innovations have occurred at higher manufacturing levels with the use of particle board cores and paper and plastic surfaces in plywood, and the development and wide-spread acceptance of flush doors and hardwood panelling. An adverse judgement on the hardwood veneer and plywood industry would be difficult to render on this account.

It is clear the product performance in the case of the veneer log producing industry is falling. The wide-spread complaint that veneer log quality continues to decline is adequate qualitative evidence for this conclusion. This decline, of course, is due to declining supplies of quality veneer log stumpage rather than to any fault of veneer log producers themselves. If anything, producers have increased their ability to fell and buck trees in a manner to make best use of their contents. Undoubtedly, there is still much room for improvement in this direction, although it may result in slightly higher logging costs. Perhaps the declining size and quality of veneer logs in the Wisconsin market area is better discussed under the heading of conservation performance.

Conservation Performance

Conservation performance is a dimension of market performance which is particularly relevant in natural resource-oriented industries. Much has been written of the development and legacy of the forest products industries in the

northern Lake States. It need not be repeated here. Suffice it to say that these industries have received poor marks from most writers for their past performance in the conservation dimension, but that the final and definitive evaluation has yet to appear. A more up-to-date evaluation is provided by the Timber Resource Review, in which forest industries in the Lake States are reported to be performing well, with over 93 percent of the industries' recently cut lands falling in the upper productivity class[54]. The veneer industries in Wisconsin and Upper Michigan probably deserve credit for good conservation performance on their own land. Public land in the Lake States is also well managed from the conservation viewpoint. However, this cannot be attributed to the structure or conduct of the forest industries and the firms that comprise them. Public agencies are not business firms and their conduct is shaped by market forces to a much lesser extent than is that of business firms.

Farm lands in the Lake States are slightly below the national average (65 percent)[55] in the proportion of recently cut land falling in the upper productivity class. Fifty-nine percent of recently cut farm woodlands in the Lake States fell in the upper productivity class[56]. Other private land in the three states approximates the national average in

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[54]U.S., Forest Service, Timber Resources for America's Future (Washington: U.S. Government Printing Office, 1958), p. 609.

[55]Ibid, p. 605.

[56]Ibid, p. 608.

this respect (66 percent)[57]. The veneer industries of Wisconsin and Upper Michigan obtain some of their log supplies from farm holdings, and inadequate conservation performance on these holdings is indicated.

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[57] Ibid, p. 609.

6. THE VENEER LOG MARKET IN INDIANA

Market Structure

Degree of Buyer Concentration

Mills manufacturing face veneers or, in some cases, commercial veneer and plywood, are the ultimate buyers of quality veneer logs in the Indiana market. In 1958 there were twenty-nine such mills in this market area as shown in Figure 2[58]. This is exactly the same number of mills as in the Wisconsin market. It is a substantial number of buyers for a primary forest products market. Although the number of buyers was the same for both markets, the size distribution of those buyers was somewhat different.

The number of employees is the only available measure of firm size for all mills in the Indiana veneer log market. The discussion of the limitations of this particular measure of firm size presented in the discussion of the Wisconsin market applies equally to consideration of the Indiana market. The number of employees, although a rough and, in part, inappropriate measure of firm size in this particular context, is still sufficiently well correlated with annual volume of veneer log receipts, the relevant measure of firm size, to be quite useful for the approximate purpose which it serves.

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[58] P. 43.

If the twenty-nine veneer and plywood plants located in the Indiana veneer log market area were all of approximately the same size, this market could be described as relatively unconcentrated. While these firms are by no means homogeneous and of exactly the same size, they are more nearly uniform in size than are the twenty-nine Wisconsin and Upper Michigan veneer and plywood mills. In the Indiana market area the top four firms accounted for 30 percent of the employment of the industry and the top eight firms for 52 percent of this employment in 1958. This market, then, while hardly atomistic, could be described as one of fairly low buyer concentration.

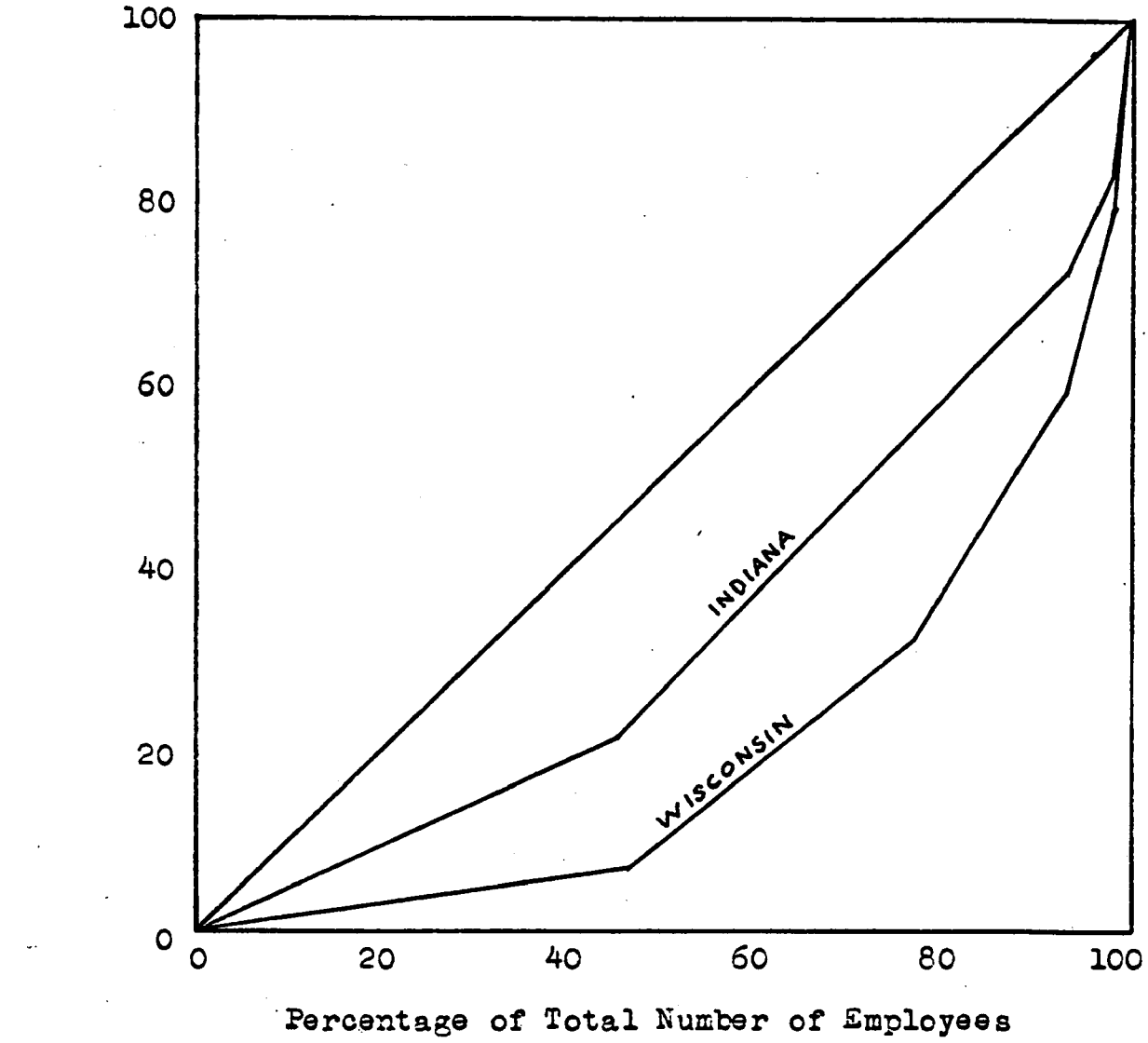
A comparison of the degree of buyer concentration in the two major veneer log markets in the North Central states is easily made with Lorenz curves[59]. These curves show the percentage of the market (as measured by number of employees in this case) controlled by any percentage of the total number of firms, when these firms are ordered from largest to smallest. The Lorenz curve for a market composed entirely of firms of a single size would be a simple diagonal line, as shown in Figure 4. The greater the departure of the Lorenz curve of a particular market from the diagonal, the greater is the disparity in size between firms in that market. (The Lorenz curve does not reflect differences in

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[59]P. E. Hart and S. J. Prais, "The Analysis of Business Concentration: A Statistical Approach," Journal of the Royal Statistical Society, Series A (1956), p. 152.

FIGURE 4

LORENZ CURVES SHOWING DEGREE OF BUYER CONCENTRATION, AS MEASURED BY NUMBER OF EMPLOYEES, IN WISCONSIN AND INDIANA VENEER LOG MARKETS IN 1958



numbers of firms, but merely differences in firm size[60]. Therefore, it is not a perfect indication of degree of concentration. Fortunately, the two markets compared here contain the same number of firms and, therefore, the Lorenz curve is an ideal device by which to compare them.) The Lorenz curves for buyers in the Wisconsin and Indiana veneer log markets are shown in Figure 4.

The Gini coefficient, which is the ratio of the area between a particular Lorenz curve and the diagonal to the area under the diagonal, provides a numerical measure of the disparity in size between firms in a market[61]. The Gini coefficient ranges from zero to unity as the disparity in size of firms increases. For the Wisconsin veneer log market the value of this coefficient is approximately 0.60, while for the Indiana market it is approximately 0.34.

The eight veneer and plywood plants sampled in Indiana provided information which should be broadly representative of veneer log buyers in the Indiana market, even though the sample was not selected in such a way as to permit statistical generalization. More complete data on size of firm are available for these mills.

As in the Wisconsin market area, mills in the Indiana area were classified by size according to their annual volume

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[60]John M. Blair, "Statistical Measures of Concentration in Business," Bulletin of the Oxford University Institute of Statistics (November, 1956), pp. 355-356.

[61]Hart and Prais, "The Analysis . . ., p. 152.

of wood receipts. All mills consuming more than 3.5 million board feet of veneer logs annually were considered large, those consuming from about 1 million to 3.5 million board feet of logs annually were considered intermediate in size, and those consuming substantially less than 1 million board feet of logs annually were considered small. By these standards, there were one large, six medium, and one small veneer and plywood mills among the eight mills sampled in Indiana.

A table showing mean volume of log receipts, mean number of employees, mean value of sales, and mean rate of utilization of capacity for Indiana veneer and plywood plants by size class, similar to that presented for Wisconsin and Upper Michigan plants[62], could be presented. It is not presented because confidential information for the single large plant and the single small plant would be revealed. The mean volume of 1959 log receipts for the six medium-sized mills was 2,730 thousand board feet. These mills employed an average of 90 full-time employees each in 1959. They reported no seasonal employees. The mean rate of utilization of capacity for these mills was 94 percent. Only two of the sampled mills reported the value of their 1959 sales, and an average of these two reports is not considered meaningful.

Degree of Seller Concentration

As in the case of the Wisconsin market area, there can be little doubt that the degree of seller concentration in the Indiana market is very low. Data collected in the

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[62] P. 57.

regional study provide a good indication of the degree of concentration prevailing in the market. Sampled mills in the area reported an average of 53 landowners and 44 producers supplying them with veneer logs in 1959. No dealers were reported supplying any of the sampled mills in 1959. Producers and dealers[63] reported supplying an average of two mills apiece. Therefore, there must be roughly 600 producers and dealers selling quality veneer logs in the Indiana market (number of mills x number of suppliers per mill ÷ number of mills per supplier).

The number of landowners supplying these mills is indeterminate because no landowner interviews were taken and consequently the number of mills supplied by each landowner is not known. Since this is farm woodland country, it is quite likely that the average number of mills supplied by each landowner in any given year is little more than one, in which case there might be somewhere in the neighborhood of 1500 landowners supplying the twenty-nine mills of the market area. This particular study, however, is concerned with the buying and selling relationships between timber producers and mills. Little further attention will be given to

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[63]Ten dealers were encountered and interviewed in the Indiana veneer log market area. The fact that none of the veneer and plywood mills contacted in this area were aware of any dealers supplying them with logs in 1959 did not mean that there were no such dealers. Dealer bonuses, such as those paid in the pulpwood industry, are not found in veneer log markets. Therefore, there is no reason why the veneer and plywood mills would realize that the individual or firm from which it buys logs had not produced all those logs itself but had purchased some of them from other timber producers.

landowners.

The size distribution of producers and dealers, like that in the Wisconsin market area, is far from uniform but does not reveal any appreciable degree of seller concentration. None of the sampled producers and dealers in the market area sold one percent or more of the volume of veneer logs purchased by mills in the market in 1959. A market with so little seller concentration may be described as virtually atomistic.

In the regional project 80 sellers of veneer logs were contacted in Ohio, Indiana, and Illinois. Of that number 60 were veneer log producers who sold only logs that they themselves had produced, 15 purchased and resold veneer logs from other producers in addition to the veneer logs which they themselves produced, and 5 produced no veneer logs themselves, but functioned solely as intermediate market agents.

Nearly half of the 80 sampled veneer log sellers were engaged only in wood products activities. The other half combined their wood products activities with other lines of work, chiefly farming. Twenty-one of the 80 were farmers. The outstanding characteristic of veneer log sellers in the Central states, however, was that two-thirds of these individuals and firms were sawmill operators. Here is clear evidence that vertical integration in the forest products industries is much more pronounced in the Indiana market than in Wisconsin. Only 9 of the veneer log sellers in the sample of 80 in the three Central states were full-time

timber producers. Table 13 shows the distribution of sampled veneer log sellers in the Central states among the various occupations reported.

TABLE 13

Number of Sampled Veneer Log Sellers in Ohio, Indiana, and Illinois in 1959 Reporting Various Business Activities, by Type of Activity

Type of Activity	Number Reporting[a]
Veneer log producer	75
Veneer log dealer	20
Sawmill operator	54
Farmer	21
Other	16

[a] Eighty respondents, most of whom reported more than one form of activity.

Further evidence of the fact that timber producing activity is a relatively minor part of the total business activity of veneer log sellers in the Central states is provided by the percentage of total 1959 business receipts derived from their activities as timber producers. Veneer log sellers who were not full-time timber producers reported an average of 25 percent of their gross receipts from timber production. The inescapable conclusion is that producing and selling veneer logs in the Indiana market area is a relatively minor adjunct to running a sawmill, and by extension that sawmill operators do the bulk of their own logging, since so few of them reported acting as intermediate market agents.

It would be possible to classify veneer log sellers in the Indiana market according to the volume of veneer logs which they sold in 1959. This volume ranges from 1,000 board feet up to 588,000 board feet for the 80 sampled veneer log sellers. However, this is not a very reliable indication of the size of the forest products business in which the individual or firm is engaged, in view of the limited importance of veneer log sales in the total revenue of almost all of these respondents.

Because veneer log production and sales is a comparatively incidental aspect of the business of most Central States veneer log sellers it is perhaps more meaningful to classify these sellers according to the value of their annual sales of all timber products. The value of that part of gross revenues derived from the individual's or firm's business as a timber producer and intermediate market agent (but for all kinds of timber products) ranged from $200 to $85,000 among the 80 respondents in the Central States. Veneer log sellers in the Indiana market do not fall into distinct categories as do those in the Wisconsin area. There seems to be a rather continuous distribution between the large and the small sellers. Furthermore, the sellers reporting a 1959 income of $20,000 or more from their business as timber producers did not seem to differ in any other significant respects from those sellers who were much smaller. This is true even of the number of employees reported (which one would expect to be larger for the firms reporting larger income from their timber producing business). Furthermore,

the mean length of time which the firm had been in the timber producing business was not significantly different between those firms with the annual receipts from timber production of under $20,000 and those whose receipts were over $20,000 in 1959. Firms in both groups reported to have been in operation an average of fifteen years. Perhaps the main conclusion to be drawn from this lack of difference between the so-called large and small firms is that the timber producing and selling side of the business for these firms is relatively minor and is not a very reliable indication of the age or other character of the firms involved.

Extent of Product and Service Differentiation

No data are available which could be used to directly evaluate the cross-elasticities of supply between competing buyers or the cross-elasticities of demand between competing sellers in the Indiana veneer log market. As in the case of the Wisconsin market indirect evidence permits a tentative evaluation of product and service differentiation.

Seller preferences among competing buyers in the Central States were affected by many of the same factors observed in Wisconsin and Upper Michigan. The services offered to sellers by mills will be discussed in the section on market conduct. Although there are a number of such services offered, they do not appear to lead to a very significant degree of service differentiation.

Contractual arrangements between buyers and sellers in this market are somewhat more formal than those between buyers

and sellers in Wisconsin and Upper Michigan. They appear to be no more effective sources of service differentiation than in the latter market, however.

Location factors, again, seem to be the major form of service differentiation in the Indiana market. However, they appear to be even less consequential in this market than in the Lake States, because Indiana mills are even more concentrated geographically (twenty-five of the twenty-nine mills can be enclosed in a circle with a radius of about 100 miles) and because equal transportation costs amount to a smaller percentage of product value in Indiana, where the major species is the high-priced black walnut.

Product differentiation among sellers of veneer logs in this market, as in Wisconsin and Upper Michigan, is of little consequence. The same factors causing product differentiation appear to be present in both markets to about the same (slight) extent.

Conditions of Entry

Data on the costs of veneer and plywood manufacture are not available for the Indiana veneer log market. For this reason the importance of barriers to entry in veneer log buying cannot be directly determined.

As in Wisconsin and Upper Michigan, veneer logs are produced jointly with other timber products (chiefly sawlogs) in the Central States. Consequently veneer log prices and average costs of production cannot be compared to determine directly the importance of barriers to entry in veneer log

selling.

The importance of barriers to entry may be inferred from the presence or absence of factors which may be the source of such barriers. In the Indiana market, as in Wisconsin and Upper Michigan, product and service differentiation, production techniques, natural resource control, labor or capital scarcity, and economies of scale are either absent or so slight as to create no effective barriers to the entry of new firms on either the buying or the selling side of the market.

Market Conduct

Buyer Conduct

Plywood mills in Indiana produce primarily for inventory accumulation in anticipation of orders rather than to fill existing orders. Sampled mills of all sizes reported producing 50 percent or less to order. The average for all was 25 percent to order and 75 percent for inventory. The sketchy reports on inventories of finished products carried by these mills does not permit any conclusion about the average height of such inventories or any seasonal fluctuations in finished product inventories that may result from this policy of producing primarily for inventory. However, the Indiana mills did not report any large amount of unused capacity in 1959. The production of all eight sampled Indiana veneer mills was at an average of 88 percent of capacity in 1959. There did not seem to be any significant variations in capacity utilization by mill size. Most of the slack

which was reported seems to come during the summer months, when several mills reported producing at significantly less than the rate sustained during the rest of the year.

Information on veneer log inventories carried by Indiana mills was too sketchy to permit generalizations of the type offered for the Wisconsin market area, but it does appear that veneer log inventories fluctuate less in the Indiana market, and that veneer log production is not as highly seasonal as it is in the Lake States.

Table 14 shows the sources of the 1959 veneer log receipts of the sampled Indiana mills. It is interesting that

TABLE 14

Sources of Veneer Log Receipts of Sampled Indiana Veneer and Plywood Mills, 1959

Source	Volume (Million Board Feet)	Percentage of Total Log Receipts
Produced by Mill Employees		
a) From Mill-owned Lands	1,088	5
b) From Other Lands	8,030	34
Purchased From Dealers	10,571	16
Purchased From Producers	3,700	45

these mills do a great deal more logging than do Wisconsin mills, but that they do not own as much of the land from which their veneer log supplies are obtained. The very substantial degree of vertical integration through the logging stage reported by the Indiana mills is probably due to the absence of many full-time independent timber producers who could supply the mills with their log requirements. This is

probably due to the absence of a stranded rural labor force of the type so characteristic of the northern Great Lake States.

Although sampled veneer and plywood mills in Indiana received an average of 20 percent of their total veneer log receipts from intermediate market agents, only three of the eight reporting mills received any logs from such agents. Apparently, then, intermediate market agents were quite important for these three mills and much less important for the remaining five mills. Unfortunately, the three mills reporting veneer log receipts from intermediate market agents did not give estimates of the number of such agents with whom they dealt in 1959, so it is impossible to say anything about the number of such agents operating in this market area. The five mills who did report on numbers of suppliers of the various types reported dealing with an average of 92 landowners each and an average of 44 producers each in 1959. The number of producer-suppliers reported by the sampled mills ranged from 15 to 120 but there was no apparent correlation between the size of the mill and the number of producer-suppliers.

As in the Wisconsin market area, veneer mills in Indiana assume the initiative in arranging for the bulk of their veneer log supplies. On the average about 75 percent of veneer logs received by sampled firms were obtained through the initiative of the mill. Here again, there was no apparent correlation between the size of the mill and the extent to which mills assumed the initiative in obtaining their veneer log supplies. In no case, however, did any mill

report assuming the initiative in obtaining any less than one-half of its 1959 log receipts.

Most Indiana veneer mills find it necessary to coordinate the timing and amount of their veneer log receipts through some prior agreement with suppliers. Half of the 1959 log receipts of sampled mills were purchased under written contracts[64], a third under less formal oral agreements, and the remaining sixth without agreement between buyer and seller prior to log delivery.

It is by no means clear that veneer mills in Indiana set veneer log prices in the same way that veneer and plywood mills in Wisconsin do. Six of the eight mills reported that veneer log prices were arrived at by negotiation between buyer and seller. The other two reported that the buyer establishes the price which the producer or seller can then either accept or reject. This procedure seems entirely consistent with the rather different character of the Indiana veneer log supply. The face veneer manufactured by Indiana mills is manufactured from logs which may vary widely in quality, and the prices and quality standards are less uniform than those in the Wisconsin market.

Seller Conduct

The radius of the area within which sampled Central States veneer log sellers reported obtaining their 1959

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[64]There is some indication that much of veneer log volume purchased under written contracts was actually stumpage rather than veneer logs. The Indiana data are not clear on this point.

veneer log supplies ranged up to 250 miles. The average for all sellers in the three states was 44 miles. There was no noticeable difference between the radius reported by larger sellers and that reported by the smaller ones.

Central States veneer log sellers handled an average of 45,000 board feet of veneer logs apiece in 1959. The average did not differ appreciably between producers and intermediate market agents.

Veneer log sellers in the Indiana market area held a larger number of stumpage contracts than did such sellers in the Wisconsin area. The average was 15 such contracts per producer in the Central States. In general, the larger the volume handled by a producer, the larger number of stumpage contracts he held. Veneer log producers in these states assume the initiative in negotiating their stumpage purchases for about two-thirds of the total volume of veneer log stumpage they acquire. The other third is acquired through the initiative of the landowner. Stumpage is acquired in about equal proportions by written contract and by oral agreement in the Indiana market.

The production of veneer logs in the Central States is not nearly as seasonal as in the Lake States. A number of veneer log producers in the sample reported seasonal peaks and low points in activity. However, these seasonal peaks and troughs vary considerably from producer to producer. No firm conclusion can be drawn concerning any general peak or trough in veneer log production in this region. Weather does not appear to be the major governing factor as it is

in the Lake States. Instead, the requirements of other businesses in which the veneer log producer may be engaged seem to determine when he is able to produce veneer logs. Sampled producers stated that the timing of veneer log deliveries and production was seldom dictated by the requirements of the mills to whom they sold.

Logging costs reported by veneer log producers in the Central States were slightly lower than those reported by producers in the Wisconsin area. The average for Ohio, Indiana, and Illinois producers sampled in this study was $18.44 per thousand board feet. This compares very closely with the U.S. Forest Service Timber Appraisal handbook figure of $18.64 per thousand board feet for saw log production in Indiana, Illinois, and Ohio. It is likely that the figure reported by Central States' producers pertains primarily to saw logs, since most of these producers were sawmills.

The 82 sellers of veneer logs contacted in Ohio, Indiana, and Illinois sold veneer logs almost entirely to veneer mills, so far as they knew. These sellers sold to an average of 2.5 veneer mills each in 1959. The sampled veneer log sellers sold an average of approximately 45,000 board feet of veneer logs annually or about 18,000 board feet to each of the veneer mills with whom they dealt. Although the majority of the veneer mills sampled in the Indiana market reported extending financial aid in the form of loans or advances to at least some of their veneer log suppliers, most sampled veneer log sellers reported receiving no aid of this sort from veneer log buyers in 1959. (Half of the veneer mills

reported that extending such aid was not a usual practice on their part). Apparently, then, the practice of extending loans or advances to finance a portion of the producers' operation is not extensive in this market.

Market Performance

Data collected in the regional study of veneer log marketing, together with information available from other sources, may be used to evaluate the performance of the Indiana veneer log market and to indicate those dimensions in which performance might be improved.

Productive Efficiency

Some sketchy and quite inconclusive information is available on economies of scale in the production of hardwood veneer. This information indicates that moderate economies of scale may exist in veneer production and that most mills in the Indiana area are too small to achieve these economies. The information available comes primarily from the study of seven hardwood veneer and plywood mills in eastern United States reported by Bureau of Labor Statistics in 1952. This study of factors affecting productivity is discussed in some detail in the discussion of market performance of the Wisconsin veneer log market[65]. In considering the Indiana market, which is composed primarily of veneer mills rather than plywood mills, only the first two stages in the manufacture of plywood are relevant. These two processes are

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[65] Pp. 79-94.

log preparation and veneer production. Man-hour requirements for the seven mills for each of these processes are shown in Table 11[66]. The highly tentative conclusion suggested is that to achieve maximum labor productivity a veneer mill should be in at least the size class of 100 to 150 employees, but that the economies of scale are not large.

Data collected in the regional study from sampled veneer mills in the Indiana market area do not lead to any conclusion concerning economies of scale. Six of the eight mills contacted were of very nearly the same size; so near, in fact, that it is impossible to draw any meaningful regression line through them. The other two mills, one quite large and one very small, did not provide usable data. The large mill produced hardwood lumber and plastics in addition to veneer, and employed many more workers than would be normal for a veneer mill of its size. The small mill relied heavily on seasonal labor, but there was no indication of the proportion of the year for which these seasonal employees were used.

Table 15 shows the distribution of the veneer and plywood plants in the Indiana market by employment size class. Twenty-three of the 29 firms reported fewer than 100 employees in 1958. If labor productivity reaches its optimum only in plants employing 100 workers or more, as suggested by the Bureau of Labor Statistics study, then the great majority of Indiana veneer mills are below the size necessary

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[66] P. 81.

to achieve optimum labor productivity. In any case, however, the difference in labor productivity between small and medium-sized mills in Indiana is much smaller than that in Wisconsin and Upper Michigan. Therefore much smaller gains in labor productivity can be achieved by adjusting the scale of Indiana veneer mills.

TABLE 15

Number of Veneer and Plywood Plants in the Indiana Market Area in 1958, by Number of Employees

Number of Employees	Number of Plants
1 - 19	5
20 - 49	3
50 - 99	15
100 - 249	6

Source: U.S., Bureau of the Census, U.S. Census of Manufactures: 1958.

Labor cost is also a less important factor to Indiana veneer mills than to those in Wisconsin. According to the 1958 Census of Manufactures, payrolls made up slightly over half of the value added by manufacture for Indiana veneer mills, as opposed to the two-thirds figure characteristic of Wisconsin veneer and plywood plants[67]. The highly tentative conclusion seems to be that economies of scale may exist for Indiana veneer mills, and that the majority of such mills are smaller than the size necessary to achieve such economies,

[67] U.S., Bureau of the Census, U.S. Census of Manufactures: 1958, Industry Report MC58(2)-24B, p. 5.

but that the economies which can be achieved through adjustment of size of plant are not impressive.

The data collected from 39 sampled veneer log sellers in Ohio, Indiana, and Illinois suggest that economies of scale may be present in veneer log production as well as in veneer manufacture. Table 16 shows that large producers, that is those producing 100,000 board feet or more of veneer logs annually, reported costs substantially above average for all producers in the region. Medium-sized producers, which

TABLE 16

Mean Logging Costs Reported by Sampled Veneer Log Producers in Indiana, Ohio, and Illinois, by Volume of Veneer Logs Produced, 1959

Size Class	Number of Producers	Volume of Veneer Logs Produced (Million Board feet)	Mean Logging Costs per Million Board Feet
Small	15	0 - 25	$18.60
Medium	15	26 - 100	15.80
Large	6	100 +	19.33
Veneer Mills (All large)	6	101 +	19.45
All	42	- - -	$17.85

were those selling between 25,000 and 100,000 board feet of veneer logs annually, reported logging costs well below the average for all producers. Small producers, those producing less than 25,000 board feet of veneer logs annually, reported costs somewhat above the average for all producers. The

tentative conclusion would seem to be that the long-run cost curve for veneer log production is U-shaped. This conclusion is subject to the substantial ambiguity inherent in the concept of average cost of veneer log production[68].

An alternative formulation would be to separate producers into two groups, large and small, on the basis not of their veneer log production in 1959 but of their total receipts from all forms of timber production. By these criteria there were 15 large producers whose receipts from timber production amounted to $20,000 or more in 1959. Logging costs reported on the average for these 15 producers were $16.69 per thousand board feet. The costs of production reported by the much larger number of small producers whose receipts from timber production in 1959 were less than $20,000 apiece averaged $16.57. The difference between these two figures is insignificant. On the basis of the total volume of receipts from timber production, perhaps the more realistic measure of size of firm, there are no real economies of large-scale production indicated by the data for Ohio, Indiana, and Illinois veneer log sellers. However, the logging cost data reported by veneer log sellers in the Central States appear to be no more exact or sophisticated than those reported by sellers in the Lake States. The majority of quotations were such round numbers as $25, $20, and $15. Perhaps the only justifiable conclusion is that producers of veneer logs throughout the North Central

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[68] P. 66.

states have very inexact notions of their costs of production.

The productive efficiency of an industry or a market is also affected by the optimum (minimum cost) degree of vertical integration and the extent to which firms in the industry are vertically integrated. There is a great deal of vertical integration in the Indiana veneer log market. The sampled veneer log mills reported that 39 percent of their 1959 veneer log receipts was produced by logging crews employed by the mills themselves. The other 61 percent was purchased from independent producers or market intermediaries.

The average logging cost reported by veneer mills is $19.58 per thousand board feet, some $2 higher than the average cost reported by veneer log sellers. Thus, it appears that not only are there no economies of vertical integration in this particular market, but that there are absolute diseconomies of such a form of operation, insofar as logging costs alone are concerned. It would appear that, on the basis of logging costs considerations alone, vertical integration is unjustified for the veneer and plywood mills of Indiana and Western Ohio. The large degree of such integration which does exist must be explained on the basis of other factors.

One possible explanation of the extent of vertical integration lies in the size of buying costs reported by sampled mills. The average buying cost for the four mills which provided such information was approximately $40 per

thousand board feet, or over twice the size of average logging costs. Should this figure apply to log purchases from producers and dealers it would easily account for the observed incidence of vertical integration. Unfortunately, however, it is not clear from the data that such an interpretation is correct. In fact, it seems more likely that the high buying costs reported apply to the costs of locating and buying stumpage from landowners. But if this is the correct interpretation, then vertical integration can neither be attacked nor defended, because the buying costs of independent producers were not reported.

In view of this confusing situation, no conclusion is possible concerning the efficiency or inefficiency of vertical integration in the Indiana veneer log market, and no evaluation of the performance of the existing degree of vertical integration can be attempted.

The final aspect of the performance dimension or productive efficiency concerns the existence and cost of chronic excess capacity. There did not appear to be appreciable excess capacity in the sampled veneer mills in Indiana in 1959. The average rate of operation for all eight of these mills was 88 percent of capacity. Data for one year, of course, do not give any indication of the existence of chronic excess capacity and this is the only point of real interest from the standpoint of market performance.

No evaluation of excess capacity in veneer log production is possible given the generally joint-production and

frequently seasonal and part-time nature of this process.

Price-Cost Margins and Profit Rates

No data were collected on costs of veneer or plywood production in the regional study. Census of Manufactures data do not provide complete cost data, either. Nor were direct data on profit rates for this industry located. Consequently, no evaluation of the performance of the veneer and plywood industry is possible.

The average costs of producing veneer logs reported by sampled sellers cannot be used to calculate profit margins in that industry because veneer logs are produced jointly with other products[69]. Neither were direct data on profit rates available for the industry. Consequently, whether profits are subnormal, normal, or excessive in this case cannot be determined.

The Size of Selling and Buying Costs

Selling costs are virtually nonexistent in the Indiana veneer log market. Buying costs reported by Indiana veneer mills range from $2.20 per thousand board feet on up to $100 per thousand board feet and were composed chiefly of the cost of maintaining buyers or "field men" as they are called. This level of buying costs represents from 15 to 25 percent of product value, a rather substantial cost item. It is substantial probably because much of the cost of buying veneer logs is that of locating and negotiating for the

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[69] P.66.

purchase of individual walnut trees. Although high, these costs cannot be called excessive because there is no indication that this function could be fulfilled at less cost in any other way, and because they appear to serve the purpose of providing information rather than being primarily persuasive.

Progressiveness in Production Techniques

The hardwood veneer industry of Indiana appears to be lagging behind the national trend to higher labor productivity, although it does not seem to be as delinquent as the commercial veneer and plywood industry of Wisconsin and Upper Michigan. Indiana veneer and plywood mills in 1958 required 248 labor hours to create $1,000 of value added in manufacture. Wisconsin veneer and plywood mills required 345 labor hours to create $1,000 of value added in manufacture, the West Coast softwood plywood industry required 233 labor hours, and the average for all U.S. manufacturing was 160 hours. Thus the hardwood veneer and plywood industry in Indiana and Western Ohio requires slightly more labor per $1,000 of value added in manufacture than does the softwood plywood industry, which carries the product through one more stage of manufacture, and apparently a stage which is highly labor-intensive, at least in the eastern United States. On this basis the Indiana industry cannot be indicted nearly so severely as can the Wisconsin commercial veneer and plywood industry.

As in the case of the Wisconsin market area, data do

not permit an analysis of progressiveness in production of veneer logs in the Indiana market. The tentative conclusion that labor productivity is extremely low in all forms of timber production in the North Central states[70] applies equally to the Indiana and Wisconsin markets.

Product Performance

Quantitative evaluation of product performance is virtually impossible, and in the case of the Indiana veneer industry even a qualitative evaluation is extremely difficult. The basic product, hardwood veneer, has changed little in many years.

Product performance in the veneer log producing industry is falling, as evidenced by the continual decline in veneer log quality. There is some doubt that this decline can be attributed to the veneer log producing industry, rather than to forest landowners. In any case, it is properly discussed as an aspect of conservation performance

Conservation Performance

The Central States area, being primarily a hardwood area, did not go through the sort of heavy commercial logging which characterized the Lake States pineries around the turn of the century. However, many of the Central States hardwood stands have been cleared for farming, and much of what remains is in the form of farm wood lots. These small private ownerships are among those on which productivity is lowest

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[70] P. 91.

according to the Timber Resource Review appraisal of the productivity of recently cut lands. Farm and other private ownerships in this region, with 45 percent of recently cut lands in the upper productivity class, fall well short of the national average (65 percent) in this respect[71] (there is little public or industrial forest land in the Central States). Therefore, the conservation performance of the Indiana veneer log market might be regarded as unsatisfactory.[72]

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[71] U.S., Forest Service, Timber Resources. . ., p. 605

[72] It is not clear that the Forest Service criteria, which are essentially biological, are appropriate to judge conservation performance, which is a social concept.

7. SUMMARY AND CONCLUSIONS

This chapter consists of a summary and comparison of the essential information on market structure, conduct and performance developed for the two major veneer log markets in the North Central states, a discussion of structure-performance relationships, some resulting suggestions for improving market performance, and suggestions for further research.

Market Structures

The market environment, or structure, which constrains the behavior of individual firms in the Wisconsin veneer log market may be described briefly as follows:

1) Degree of buyer concentration - high-moderate concentration (30 buyers, 54 percent of market controlled by top four, 72 percent by top eight buyers)
2) Degree of seller concentration - virtually atomistic (about 500 sellers, all known sellers each control less than 1 percent of the market
3) Extent of service differentiation (buyers) - moderate differentiation (some minor services and goodwill, spatial differentiation slight to moderate)
4) Extent of product differentiation (sellers) -

slight differentiation (product quality, timing of deliveries, fulfillment of contracts), spatial differentiation unimportant

5) Barriers to buyer entry - slight importance (capital non-availability)

6) Barriers to seller entry - insignificant

7) Extent and character of vertical integration - moderate in extent (10 percent of market, extends to land ownership, concentrated in few large firms)

8) Characteristics of sellers - mostly timber producers, most of revenue from producing timber products, veneer log production a minor part of total timber production.

Similarly, the structure of the Indiana veneer log market may be described as follows:

1) Degree of buyer concentration - low-moderate concentration (29 buyers, 30 percent of market controlled by top four, 52 percent by top eight buyers)

2) Degree of seller concentration - virtually atomistic (about 600 sellers, all known sellers each control less than 1 percent of the market)

3) Extent of service differentiation (buyers) - slight differentiation (some minor services and goodwill, spatial differentiation slight)

4) Extent of product differentiation (sellers) - slight differentiation (product quality, timing

of deliveries, fulfillment of contracts), spatial differentiation unimportant

5) Barriers to buyer entry - insignificant

6) Barriers to seller entry - insignificant

7) Extent and character of vertical integration - extensive (40 percent of market, does not extend to land ownership, exists in most firms

8) Characteristics of sellers - mostly sawmill operators, most of revenue from sawing lumber or from non-timber business, veneer log production a minor part of total timber production.

Timber producers and dealers constitute the industries selling veneer logs in the two markets. In both cases these industries are atomistic, exhibit little product differentiation, are very easy to enter, and produce veneer logs only as an adjunct to the production of other forest products.

Market Conduct

Information on the behavior, or market conduct, of individual firms in the two veneer log markets is patchy and frequently ambiguous. This is but another instance showing the difficulty of obtaining and interpreting data on the behavior of individual firms. The information which is available for the Wisconsin market may be summarized as follows:

1) Production policies for buyers - production to meet orders, substantial seasonal fluctuations in log inventories

2) Wood procurement practices for buyers - most wood

from producers (75 percent), some from dealers (15 percent), little produced by own crews (10 percent), most of wood supply obtained through buyer initiative (75 percent), oral agreements between buyer and seller most common, but some written contracts and some by no prior agreement, loans made to a few suppliers

3) Pricing behavior - buyer establishes veneer log prices

4) Stumpage procurement methods for sellers - large producers obtain stumpage primarily from public landowners, small producers from own land and other private owners

5) Log production practices for sellers - production largely a winter activity, weather-determined

6) Marketing policies - sellers usually sell to more than one veneer mill.

In like manner, market conduct in the Indiana market may be summarized as follows:

1) Production policies for buyers - production for inventory accumulation, minor seasonal fluctuations in log inventories.

2) Wood procurement practices for buyers - much wood from producers (41 percent) and own crews (39 percent), some from dealers (20 percent), most of wood supply obtained through buyer initiative (75 percent), oral agreements and

written contracts about equally important, some prior agreement always employed, loans made to a few suppliers

3) Pricing behavior - veneer log prices arrived at by negotiation between buyer and seller
4) Stumpage procurement methods for sellers - farm lands are major source of stumpage, many small contracts held by most producers
5) Log production practices for sellers - production year-round, determined by time available
6) Marketing policies - sellers usually sell to more than one veneer mill.

Market Performance

The results of the conduct of the firms making up the Wisconsin veneer log market may be evaluated as follows (only those dimensions of market performance upon which the evidence permits some comment are listed):

1) Productive efficiency for buyers (economies of scale) - substantial economies possible, but largely unrealized, most firms too small for efficient operation, inadequate performance (vertical integration) - no economies established, adequate performance
2) Size of buying costs - low buying costs, adequate performance
3) Progressiveness (buyers) - very low labor productivity, inadequate performance

4) Productive efficiency for sellers (economies of scale) - none indicated, adequate performance
(chronic excess capacity) - probably present for timber production in general, but cannot be attributed to veneer log production, no evaluation possible

5) Size of selling costs - negligible, adequate performance

6) Progressiveness (sellers) - very low labor productivity, inadequate performance

7) Product performance - quality decreasing, may reflect premature cutting, (see conservation)

8) Conservation performance - recently-cut lands more productive than national average, adequate performance.

The performance of the Indiana veneer log market may be evaluated as follows:

1) Productive efficiency for buyers (economies of scale) - slight economies possible, most firms near optimum size, adequate performance
(vertical integration) - no conclusion possible

2) Size of buying costs - high buying costs tentatively indicated, but not persuasive in nature, adequate performance

3) Progressiveness (buyers) - fairly low labor productivity, inadequate performance

4) Productive efficiency for sellers (economies

of scale) - none indicated, adequate performance, diseconomies tentatively indicated, but evidence too weak to permit evaluation
(chronic excess capacity) - no conclusion possible

5) Size of selling costs - negligible, adequate performance
6) Progressiveness (sellers) - very low labor productivity, inadequate performance
7) Product performance - quality decreasing, may reflect premature cutting, (see conservation)
8) Conservation performance - recently-cut lands less productive than national average, inadequate performance.

Structure-Performance Relationships

Market structure analysis is justified on the grounds that the structure of a market is an important determinant of the performance of that market. Inadequate performance in several dimensions has now been tentatively indicated for the major veneer log markets of the North Central states. The next task is to determine to what extent these inadequacies are determined by the structure of the markets involved.

Unfortunately, at this stage in the development of the field of industrial organization, little can be said about how market structures influence market performance. Economic theory supplies a number of hypotheses about how this

influence is exerted, but the difficulties of empirical research on market conduct, the connecting link, have prevented wide-spread testing of these hypotheses. For the most part, then, only observed relationships between forms of market structure and types of market performance are available as guidelines for determining the extent to which inadequacies in performance are the result of particular market structures.

Unrealized Scale Economies in the Wisconsin Plywood Industry

No empirical evidence on structure-performance relationships is needed to show that inefficiency due to undersized firms is associated with market structure. This much is obvious. The pronounced economies of scale attainable in commercial plywood production, the much higher labor productivity of the optimum-sized firm, and the existence of many under-sized firms in the Wisconsin commercial plywood industry all point directly to the structural determinant of inefficiency in the attainment of economies of scale. There are obviously too many plywood plants, most of them too small for optimum efficiency, in this market.

It is possible that the existence of the many small Wisconsin plywood firms is due, in turn, to product differentiation and vertical coordination in the plywood market itself. Some of these smaller firms may be producing plywood dimension, a specialty product, to the orders and specifications of a few buyers. Such a relationship may or may not be efficient. It is possible that the standardized

products, which can be produced most efficiently, are not well suited to the requirements of certain buyers, and that over-all efficiency is greater under the present form of operation than it would be if all buyers were forced to use standard plywood sheets. If so, the small high-cost producers of plywood dimension are effectively filling interstices in the economy which could not be filled in any better way in the short run. Only more research can determine whether this is, in fact, the case.

Another possible explanation for the large number of small firms in the Wisconsin plywood industry is the extent of spatial service differentiation in the veneer log market. A widely dispersed resource base together with relatively high costs of transporting raw materials might be expected to favor an industry of widely dispersed small firms. This possible explanation is somewhat implausible in view of the observed geographic concentration of Wisconsin plywood mills.

Technological Backwardness in Veneer and Plywood Manufacture

Inadequate technological progressiveness also appears to be a characteristic of the Wisconsin plywood industry. Such inadequacy is popularly supposed to be associated with low concentration, and high profits are supposed to ensure progressiveness. Empirical research does not always substantiate this supposition. Some studies even tend to refute the association of high concentration with

progressiveness[73]. On the other hand, there is some evidence that industries with chronic subnormal profits, most of them atomistic, are not technologically progressive[74].

The conflict between these opposing points of view may be more apparent than real. There seems to be some confusion between the processes of discovery, development, and innovation. Industry does not appear to be as successful as universities and other research institutions in discovering new knowledge (a few notable exceptions, such as the Bell Labs, are conspicuous enough to prove the rule). There is, then, little relationship between scale or concentration and progressiveness as far as the process of discovery is concerned. The processes of development (developing practical applications of new discoveries) and innovation (putting these applications into practice) are handled effectively by many industries, however. Development, in particular, seems to be handled best by industries composed of large firms, whether concentrated or not, and by certain atomistic industries for which research and development has been institutionalized in the public sector (agriculture being the notable example). Innovation seems to proceed satisfactorily in all industries except those in which a chronic profit shortage prohibits the necessary level of capital investment.

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[73] Willard F. Mueller, "A Case Study of Product Discovery and Innovation Costs," Southern Economic Journal, 24 (July, 1957), pp. 80-86.

[74] Bain, Industrial Organization, p. 419, and Almarin Phillips, "Concentration, Scale, and Technological Change in Selected Manufacturing Industries 1899-1939," Journal of Industrial Economics, 4 (June, 1956) pp. 179-193.

Discovery and development may or may not be proceeding at adequate rates in the hardwood veneer and plywood industry, but it seems clear that the rate of innovation of existing production techniques is inadequate in the Wisconsin plywood industry. Large firms in the industry have demonstrated the feasibility of labor-saving technology. Many small firms have not adopted this technology. Capital scarcity resulting from chronic profit deficiencies may explain this lack of innovation, however, the data available are not adequate to test the hypothesis and further research is indicated.

Technological Backwardness in Veneer Log Production

Most of the discussion of technological backwardness in veneer and plywood manufacture applies equally to veneer log production. The great majority of timber producing enterprises are much too small to engage in research and development. Chronic subnormal profits are often alleged to typify timber production, and innovation, too, may be impeded if this allegation is true. Further research is needed to test the hypothesis.

It does seem that much of the development and innovation occurring in timber production might be credited to equipment manufacturers and wood-using industries. For example, paper companies in Wisconsin have financed and encouraged the adoption of mechanical peelers rather than waiting for pulpwood producers to adopt this innovation on their own. If this is so, innovation in log production is

likely to lag, because small sawmills and plywood plants are less likely to stimulate innovation than are paper companies.

Depletion of Timber Resources

Inadequate conservation performance of the type tentatively characterizing the timber producing industries of the Central states is usually associated with atomistic industries. It is especially likely to occur when such an industry is utilizing a resource in which the individual firms do not hold property rights. The classical case in point is the common pool situation in the petroleum industry. The farm forests of the Central states provide another example, at least from the timber producers' point of view. Timber producers in this area seldom own the land from which they harvest timber, and consequently they have no long-term interest in any particular tract. The resulting lack of incentives to preserve long-run productivity of the forest, coupled with the strong incentives favoring resource depletion which affect farm woodland owners[75], leads to poor conservation performance. But, despite the fact that atomism in the timber producing industry encourages this inadequate performance, it is likely that the more important causal factors are those shaping the behavior of the landowners.

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[75] William B. Lord, "A Reconsideration of the Farm Forestry Problem," Journal of Forestry, 61 (April, 1963), pp. 262-264.

Structural Changes for Improved Performance

The foregoing discussion suggests that the most important structural change which might improve the performance of the veneer and plywood industries of the North Central region would be wide-spread consolidation among the many small plywood plants in Wisconsin. The plywood produced by the twenty firms with less than 100 employees each could be produced by about five plants of a size just sufficient to achieve potential economies of scale.

Before a recommendation for wide-spread consolidation can be made, however, a study of the production and marketing of plywood itself should be undertaken to determine whether the high costs of manufacturing plywood in small plants are due not to scale of production but to the process of manufacturing dimension and, if this is so, whether the high costs of manufacturing dimension are offset by economies due to the use of dimension in subsequent stages of manufacturing.

One concomitant of consolidation of small veneer and plywood firms would be a very considerable increase in buyer concentration in the Wisconsin veneer log market. Buyer concentration in this market is currently at about the threshhold above which monopsonistic exploitation may be expected (industries with 75 to 80 percent or more of total output controlled by the eight largest firms are often associated with chronic excess profits and monopolistic exploitation[76]). This may well be a situation in which competing goals are

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[76] Bain, Industrial Organization, p. 414.

involved. Optimum efficiency, progressiveness, and perhaps conservation performance may be attainable only at the cost of monopsonistic pricing and output restriction. Conversely, competitive pricing and output levels may involve inefficiency, technological backwardness, and resource depletion.

Many forest products markets, including the smaller secondary veneer log markets which were found in the North Central region[77], are highly concentrated. The problem of conflicting goals may be a very general one in formulating economic policy for such markets. Further research should be undertaken to determine the extent of monopsonistic pricing and output behavior in some of these more concentrated markets, so that the dimensions of this problem can be revealed.

The discussion of structure-performance relationships also suggests that consolidation and reorganization of small veneer and plywood manufacturing firms and of timber producing enterprises in the North Central region might increase the rate of technological progress occurring in these industries. Without such an increase the markets of these labor-intensive industries are likely to experience ever more severe inroads by imported and substitute products. Such inroads are already serious, and may well become disastrous to the United States hardwood plywood industry unless more far-reaching remedies than the high tariff walls requested by the industry are employed.

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[77] Pp. 47-48.

The required research and development can be done in the public sector, as it has been done in agriculture in the past. Industry reorganization probably cannot be accomplished rapidly enough to ensure technological progressiveness without some major public contribution as well.

Technological progress, whether it is generated primarily within industry or elsewhere, is likely to result in new products as well as more efficient production processes. In the long run such progress is likely to lead to the displacement of products like lumber and hardwood plywood by new products which involve a more substantial reconstitution of the basic wood material. These products will be more homogeneous and better suited as raw materials for mechanized processes of producing finished products. They will utilize sizes, grades, and species of timber which can be grown and harvested more rapidly and more inexpensively than can veneer logs. The size of the research and development effort in the forest products field is more likely to determine the overall importance of wood as an industrial raw material than the future of any particular timber product and industry. The implication for the hardwood veneer and plywood industry may well be a choice between no structural change and a gradual loss of markets or structural changes which will bring new product developments and a complete change in the character of the industry. Certainly the latter alternative is the better one.

APPENDIX

CONFIDENTIAL

Form No. 1

Date _____
Recorder _____
State

NCM-27 Project

PRIMARY MANUFACTURER

Name of firm _____

Address _____

A. General:

1. Do you process logs or bolts in your mill? Yes__ No__

2. How many years has your firm been operating at this location? ____Years

3. Does your firm operate other wood-using mills? Yes__ No__
   If YES, how many? _____
   If YES, how many in the study area? _____

4. Is your firm engaged full time in the processing of timber products? Yes__ No__
   If NO, what other business or occupation is your firm engaged in? (specify) _____
   If NO, what percentage of your firm's gross revenues in 1959 was realized from the sale of forest products? ____ percent

5. What were the principal products of your firm at this location in 1959?
   a. _____ c. _____ e. _____
   b. _____ d. _____ f. _____

6. How many full-time employees did you have at this location in 1959? _____

7. How many seasonal employees did you have at this location in 1959? _____

B. Quantities of wood receipts: (volume by _____ log rule)

1. What was the total volume of wood receipts at your mill in 1959? (List by species, raw product, peeled or unpeeled, and units of measure.)

_____

_____

_____

_____

_____

2. What was the monthly pattern in volume of wood receipts at your mill in 1959?

Jan.	_____	July	_____
Feb.	_____	Aug.	_____
Mar.	_____	Sept.	_____
April	_____	Oct.	_____
May	_____	Nov.	_____
June	_____	Dec.	_____

If monthly data are not available, what were the:
a. Peak-use months and amounts (aver.) _____
b. Lowest-use months and amounts (aver.) _____
c. Other months and amounts (aver.) _____

3. Do you consider the monthly pattern in volume of wood receipts at your mill in 1959 to be a typical pattern? Yes__ No__
If NO, why not? _____

4. Do you prefer seasonal variations in the volume of wood receipts at your mill? Yes__ No__
If YES, what is your preferred pattern of receipts?
_____

5. How do you explain the seasonal variations in the typical pattern of wood receipts at your mill?
_____

6. Were any of your wood receipts in 1959 resold in the same form in which they were received? Yes__ No__
If YES, what species and amounts? _____
If YES, why was this wood not processed at your mill?
_____

7. What changes in the annual volume of wood receipts at your mill took place in the years 1950-59? (List by species)

Year:	All Species:
1959:	
1958:	
1957:	
1956:	
1955:	
1954:	
1953:	
1952:	
1951:	
1950:	

8. Did your mill do any custom processing of timber products in 1959? Yes__ No__
If YES, what species, products, and amounts?
_____

If YES, did you receive as payment a portion of the wood process? Yes__ No__
If YES, what percentage? ____ percent

C. Inventories of raw wood:

1. What was the monthly pattern in raw wood inventories on hand at your mill in 1959?

Jan.	_____	July	_____
Feb.	_____	Aug.	_____
Mar.	_____	Sept.	_____
April	_____	Oct.	_____
May	_____	Nov.	_____
June	_____	Dec.	_____

If monthly data are not available, what were the:
a. Peak-inventory months and amounts (aver.) _____
b. Lowest-inventory months and amounts (aver.) _____
c. Other months and amounts (aver.) _____

2. Do you consider the monthly pattern in raw wood inventories at your mill in 1959 to be a typical pattern? Yes__ No__
If NO, why not? _____

3. Do you prefer seasonal variations in the volume of raw wood inventories on hand at your mill? Yes__ No__
If YES, what is your preferred pattern of inventories?
_____
If NO, do you have an objective of maintaining a fixed ratio in the volume of raw wood inventories to annual receipts? Yes__ No__
If YES, what is this ratio? _____
If NO, do you have an objective of maintaining a fixed ratio in the volume of raw wood inventories to annual manufactured product sales? Yes__ No__
If YES, what is this ratio? _____

4. Is there a physical limit to the volume of raw wood inventories that can be stored in yard economically? Yes__ No__
If YES, what is the nature of the limitation?
_____
If YES, what is the maximum volume?_____

5. Is there a technological limit to the volume of raw wood inventories that can be stored in yard because of insects, fungi, etc.? Yes__ No__
If YES, what is the nature of the limitations?
_____
If YES, what is the maximum volume? _____

D. Sources of wood receipts:

1. Where is the 1959 wood supply area for your mill?

(List counties or states if only a few are involved. Outline on attached county map, if possible. State radius of operations in miles.)

a. Counties or states _____

_____

b. Radius of operations _____

2. Have there been any significant changes in the wood supply area for your mill over the period 1950-59?
Yes__ No__

If YES, what were the changes? _____

3. What is the ownership of the forest land from which the 1959 wood supply was obtained? (Estimate volume of wood or percentage of total volume obtained from each source.)

	Volume	%		Volume	%
a. Own land*			d. Nat. forest		
b. Farmer			e. State forest		
c. Other private			f. Other public		

*Include subsidiary company ownership

4. Have there been any significant changes in the wood supply obtained from different forest land ownership sources over the period 1950-59? Yes__ No__
If YES, what were the changes? _____
If YES, what explanations can you give for these changes? _____

5. From which agent sources was your 1959 wood supply obtained? (Estimate volume of wood or percentage of total volume obtained from each source.)

	Volume	%
a. Own employees:		
(1) From own lands		
(2) From other lands		
b. Producer		
c. Dealer		
d. Other agent (specify) _____		

6. Have there been any significant changes in the agent sources of your wood supply over the period of 1950-59? Yes__ No__
If YES, what were the changes? _____
If YES, what explanations can you give for these changes? _____

E. Wood procurement methods and policies:

1. What percentages of your firm's 1959 cut wood purchases were obtained under the following types of agreements?

a. Written contract	
b. Oral contract	
c. No prior agreement	

QUESTIONS 2 TO 6 APPLY ONLY TO WRITTEN CONTRACTS FOR CUT WOOD PURCHASES. IF THERE WERE NO SUCH CONTRACTS, SKIP TO QUESTION 7.

2. Har far in advance of the beginning of wood deliveries are contracts usually negotiated? _____

3. What are the details of standard written contracts for cut wood purchase? (Obtain printed copies where possible. Check the following items which are included in contract specifications; then describe as much as possible.)
   a. _____ Kind of wood _____
   b. _____ Amount of wood _____
   c. _____ Size of wood _____
   d. _____ Quality of wood _____
   e. _____ Time or period of delivery _____
   f. _____ Method of payment _____
   g. _____ Time of payment _____

4. Are there any differences in the cut wood purchase contracts made with different groups or agents?
   Yes __ No_
   If YES, what are these differences? _____

5. Does the standard cut wood purchase contract specify any conditions under which timber is to be harvested?
   Yes__ No__
   If YES, what are the conditions? _____

6. How binding are the provisions of standard written contracts for cut wood purchases (i.e., how much leeway is given suppliers in completing terms of contract and how much leeway does your firm allow itself in terminating contracts)? _____

QUESTIONS 7 to 11 APPLY ONLY TO ORAL CONTRACTS FOR CUT WOOD PURCHASES. IF THERE WERE NO SUCH CONTRACTS, SKIP TO QUESTION 12.

7. How far in advance of the beginning of wood deliveries are contracts usually negotiated? _____

8. What are the details of oral contracts for cut wood purchases? (Check the following items which are included in agreements; then describe as much as possible.)
   a. _____ Kind of wood _____
   b. _____ Amount of wood _____
   c. _____ Size of wood _____
   d. _____ Quality of wood _____
   e. _____ Time or period of delivery _____
   f. _____ Method of payment _____
   g. _____ Time of payment _____

9. Are there any differences in the oral contracts for cut wood purchases made with different groups or agents? Yes__ No__
   If YES, what are these differences? _____

10. Does the oral contract for cut wood purchases specify any conditions under which timber is to be harvested? Yes__ No__
    If YES, what are the conditions? _____

11. How binding are the provisions of oral contracts for cut wood purchases (i.e., how much leeway is given suppliers in completing terms of contract and how much leeway does your firm allow itself in terminating contracts?) _____

QUESTIONS 12 TO 16 APPLY ONLY TO STUMPAGE PURCHASES BY YOUR FIRM. IF NO STUMPAGE PURCHASES ARE MADE, SKIP TO QUESTION 17.

12. What percentages of your firm's 1959 stumpage purchases (in terms of volume) were obtained under the following types of agreements?

	%
a. Written contract with public landowners	_____
b. Written contract with private landowners	_____
c. Oral contract	_____

13. What are the details of your firm's standard contracts for stumpage purchases from private landowners? (Check the following items which are included in agreements; then describe as much as possible.)
    a. _____ Species _____
    b. _____ Amount of timber _____
    c. _____ Size of timber _____
    d. _____ Quality of timber _____
    e. _____ Time or period of harvest _____
    f. _____ Method of payment _____
    g. _____ Time and basis of measurement _____

14. If the standard contract for stumpage purchases from private landowners is a written contract, and if oral contracts are also made, how does the oral contract differ in its provisions from the written contract?
    _____

15. Are there any differences in the stumpage purchase contracts made with different groups of private landowners? Yes__ No__
    If YES, what are these differences? _____

16. Does the standard contract for stumpage purchases from private landowners specify any conditions under which timber is to be harvested? Yes__ No__
If YES, to what percentage of your 1959 private purchases do these specifications apply?
____ percent
If YES, what are the specifications? _____
If NO, are there any harvest conditions your firm will accept in contracts for stumpage purchases upon a private landowner's insistence?
If YES, what are the conditions? _____

17. What percentages of your 1959 wood purchases were obtained through negotiations initiated by your firm or initiated by sellers?

	%
a. Mill	_____
b. Sellers	_____
c. Indefinite	_____

18. When your firm takes the initiative in negotiating wood purchases, what are the methods you use in contracting potential suppliers? _____

19. From how many different persons or agencies was your 1959 wood supply purchased?

	No.		No.
a. Nonproducer landowner	_____	c. Dealer	_____
b. Producer	_____	d. Other agent	_____
		(specify)	_____

Was 1959 a typical year? Yes__ No__
If NO, why not? _____

20. What quantities of your 1959 raw wood receipts were purchased on the stump, roadside, and delivered?

	Quantity	%
On the stump		
Roadside		
F.o.b. railroad		
Delivered to mill		

21. Did the points of purchase of 1959 raw wood receipts vary by agent sources of wood? Yes__ No__
If YES, how did they differ? _____

22. To what degree does your firm perform the following functions in regard to wood procurement?
a. Logging _____
b. Hauling _____

QUESTIONS 23 AND 24 APPLY ONLY TO CUT WOOD PURCHASES FROM PRODUCERS

23. Are any producers offered payments (loans) in advance of time of payment specified in a standard contract? Yes__ No__
If YES, is this the usual procedure adopted by your firm? Yes__ No__
If YES, does the producer pay interest on such prepayments or loans? Yes__ No__
If YES, what is the size limitation on the prepayments or loans offered? _____

24. Are any producers offered other business aids by your firm? Yes__ No__
If YES, is this the usual procedure adopted by your firm? Yes__ No__
If YES, what are these business aids? _____

QUESTIONS 25 AND 26 APPLY ONLY TO CUT WOOD PURCHASES FROM DEALERS OR EQUIVALENT AGENTS.

25. Are any dealers offered payments (loans) in advance of time or payment specified in standard contract? Yes__ No__
If YES, is this the usual procedure adopted by your firm? Yes__ No__
If YES, does the dealer pay interest on such prepayments or loans? Yes__ No__
If YES, what is the size limitation on the prepayments or loans offered? _____

26. Are any dealers offered other business aids by your firm? Yes__ No__
If YES, is this the usual procedure adopted by your firm? Yes__ No__
If YES, what are these business aids? _____

27. Do you assign exclusive procurement territories to your wood suppliers? Yes__ No__
If NO, what policy do you follow to minimize the overlapping of procurement territories by your wood suppliers? _____

28. Do you object to having your wood suppliers take contracts to supply wood to other firms using the same kind of timber? Yes__ No__
If YES, what action do you take? _____

29. Do you have any wood procurement policy designed to minimize wide fluctuations in the volume of wood called for in successive contracts made with suppliers? Yes__ No__
If YES, explain what this policy is. _____

F. Prices:

1. What prices were paid per unit of volume (price scale

at end of 1959) for wood purchases by your firm? (Fill in as many items as possible, by species, product, and quality classes.)

	Species, product, and quality classes
a. Stumpage	
b. Roadside	
c. Delivered to rr.	
d. F.o.b. rr.	
e. Trucked at yard	
f. Rr. at yard	

2. Are there any differences in the prices paid to different groups of landowners or agents? Yes__ No__
   If YES, what are these differences (and which prices are quoted in item 1 above)? _____

3. Are there any differences in prices paid for delivered wood on basis of distance of haul? Yes__ No__
   If YES, what are these differences by mode of transportation (and which distances do the prices quoted in item 1 above refer to)? _____

4. Are the prices you pay for wood raw material the result of: (Check the correct explanation below)
   a. _____your offered price? c. _____negotiation?
   b. _____the seller's price? d. _____other (specify)____?

5. Are the prices received for your principal products sold the result of: (Check the correct explanation below)
   a. _____your price? c. _____negotiation?
   b. _____the buyer's price? d. _____other (specify)____?

6. What prices per unit of volume were obtained by your firm at the end of 1959 for the processed products you sold? (List by principal products.)

   _____

7. How frequently have the prices you pay for wood raw material changed during the 3-year period 1957-59?
   ____ times

8. How frequently have the prices received for the principal products sold by your firm changed during the 3-year period 1957-59? ____ times

G. Costs:

1. What logging costs (felling and bucking and skidding per unit of volume applied to wood products delivered to your mill at the end of 1959? (Estimate prevailing contract rates, if logging costs were not paid for

directly by your firm.) _____

2. What truck hauling costs per unit of volume applied to wood products delivered to your mill at the end of 1959? (Estimate prevailing contract rates, if hauling costs were not paid for directly by your firm.)
   a. Hauling by truck direct to mill.
      (1) Average cost? _____
      (2) Min. cost? _____
      (3) Max. cost? _____
      (4) Cost by distance zones? _____
   b. Hauling by truck to railroad.
      (1) Average cost? _____
      (2) Min. cost? _____
      (3) Max. cost? _____
      (4) Cost by distance zones? _____

3. Do truck hauling costs above include the cost of loading? Yes__ No__
   If NO, what is the estimated loading cost per unit of volume? _____
   If NO, who pays the cost of loading? _____

4. Do truck hauling costs direct to mill include the cost of unloading? Yes__ No__
   If NO, what is the estimated unloading cost per unit of volume? _____
   If NO, who pays the cost of unloading? _____

5. Do truck hauling costs to railroad include the cost of unloading and loading onto railroad cars? Yes__ No__
   If NO, what is the estimated cost per unit of volume? _____
   If NO, who pays this cost? _____

6. What railroad hauling costs per unit of volume applied to wood products delivered to your mill at the end of 1959?
   a. Average cost? _____
   b. Min. cost? _____
   c. Max. cost? _____
   d. Cost by distance zones? _____

7. What was your cost per unit of volume for wood purchasing activities in 1959? _____

H. <u>Transportation</u>:

1. What percentages of the volume of your raw wood receipts in 1959 were delivered to your mill by different methods of transportation?

	%
a. Truck	
b. Railroad	
c. Other (specify) _____	

2. What were the truck-hauling distances to your mill in 1959 in direct-to-mill wood hauls?

	Miles
a. Average distance	
b. Min. distance	
c. Max. distance	

3. What were the truck-hauling distances to railroad in 1959 in wood hauls where deliveries to your mill was by railroad?

	Miles
a. Average distance	
b. Min. distance	
c. Max. distance	

4. What were the railroad-hauling distances to your mill in 1959 in wood hauls where deliveries to your mill was by railroad?

	Miles
a. Average distance	
b. Min. distance	
c. Max. distance	

5. What changes in the use of different methods of transportation for deliveries of raw wood to your mill have occurred over the period of 1950-59? _____

6. What changes in the distances of haul for deliveries of raw wood to your mill have occurred over the period 1950-59?
   a. Truck deliveries? _____
   b. Railroad deliveries? _____

I. Sales of processed products:

1. What was the total volume of production at your mill in 1959? (List by products.) _____

2. What percentage of mill capacity did your 1959 production represent? _____ percent

3. What was the gross sales value of processed products at the mill in 1959? _____

4. What was the monthly pattern of production at your mill in 1959 (in terms of volume)?

Jan.		July	
Feb.		Aug.	
Mar.		Sept.	
April		Oct.	
May		Nov.	
June		Dec.	

If monthly data are not available, what were the:
a. Peak-inventory months and amounts (aver.) _____

b. Lowest-inventory months and amounts (aver.) _____
c. Other months and amounts (aver.) _____

5. Do you consider the monthly pattern of production at your mill in 1959 to be a typical pattern? Yes__ No__
If NO, why not? _____

6. What was the monthly pattern in processed wood inventories on hand at your mill in 1959?

Jan.	_____	July	_____
Feb.	_____	Aug.	_____
Mar.	_____	Sept.	_____
April	_____	Oct.	_____
May	_____	Nov.	_____
June	_____	Dec.	_____

If monthly data are not available, what were the:
a. Peak-inventory months and amounts (aver.) _____
b. Lowest-inventory months and amounts (aver.) _____
c. Other months and amounts (aver.) _____

7. Do you consider the monthly pattern in processed wood inventories at your mill in 1959 to be a typical pattern? Yes__ No__
If NO, why not? _____

8. Do you prefer seasonal variations in the volume of processed product inventories on hand at your mill? Yes__ No__
If YES, what is your preferred pattern of inventories? _____
If NO, do you have an objective of maintaining fixed ratio in the volume of processed product inventories to product sales? Yes__ No__
If YES, what is this ratio? _____

9. Is there a physical limit to the volume of processed product inventories that can be stored in yard economically? Yes__ No__
If YES, what is the nature of the limitation? _____
If YES, what is the maximum volume? _____

10. Is there a technological limit to the volume of processed product inventories that can be stored in yard because of insects, fungi, etc.? Yes__ No__
If YES, what is the nature of the limitation? _____
If YES, what is the maximum volume? _____

11. What percentages of the volume of your principal products in 1959 were produced to fill previously obtained orders?

	Product	%		Product	%
a.	_____		c.	_____	
b.	_____		d.	_____	

12. What area did your sales territory cover in 1959? (List by principal products. List counties or cities, or outermost states or cities. State maximum distances.) _____

13. Have there been any significant changes in the product market areas for your firms over the period 1950-59? Yes__ No__
If YES, what were the changes? _____

14. To which types of buyers did sales of your principal products in 1959 go? (Estimate, by products, the volume or percent of total volume.)

	Volume	%	Volume	%
a. Manufacturer				
b. Wholesaler				
c. Retailer				
d. Industrial user				
e. Other (specify)				

15. Have there been any significant changes in the volumes of products going to different types of buyers of your principal products over the period 1950-59? Yes__ No__
If YES, what were the changes? _____
If YES, what explanations can you give for these changes? _____

16. How many different buyers of your products did you sell to in 1959?

	No.		No.
a. Manufacturer		d. Industrial user	
b. Wholesaler		e. Other (specify)	
c. Retailer			

17. Have there been any significant changes in the numbers of buyers of your principal products over the period 1950-59? Yes__ No__
If YES, what were the changes? _____
If YES, what explanations can you give for these changes? _____

18. What is the typical time interval between receipt of an order from a buyer and the filling of that order? (List separately by principal products, if time interval varies.) _____
    a. How much variation from the typical time interval occurs? _____
    b. What are the causes of variations from the typical time interval? _____

J. Agent Sources of raw wood products, 1959:

Name	Address

CONFIDENTIAL

Form No. 2

Date _____
Recorder _____
State _____

NCM-27 Project

INTERMEDIATE MARKET AGENT

Name of agent or firm _____

Address _____

A. General:

1. Do you buy and sell or receive a commission for handling rough wood products? Yes__ No__

2. How many years has your firm been operating at your present location? ____ years

3. What form of business organization does your firm have?
   a. _____ Single owner
   b. _____ Partnership
   c. _____ Corporation
   d. _____ Cooperative

4. Is your firm engaged full time in the marketing of raw timber products? Yes__No__
   If NO, what other business or occupation is your firm engaged in?
   a. Sawmill operator ___
   b. Operator of other wood-using mill (specify _____) ___
   c. Store operator ___
   d. Farmer ___
   e. Wage earner ___
   f. Other (specify) _____ ___
   If NO, what percentage of your gross revenues in 1959 was realized by sales of raw timber products?
   ____ percent

5. What were the principal raw timber products handled by your firm in 1959?
   a. _____ b. _____ c. _____

6. Is your marketing of raw timber products typically a year-round business? Yes__ No__
   If NO, what are the typical months of operation?
   _____

7. How many full-time employees in your timber-marketing business did you have in 1959? ____employees

8. How many seasonal employees in your timber-marketing business did you have in 1959? ____employees

B. Quantities of wood purchases: (volume by _____ log rule)

1. What was the total volume by product and unit of

measure, of your raw timber purchases in 1959? (List only timber handled as part of your business as an intermediate market agent.)

Product	Volume	Product	Volume
a.		b.	

2. What was the monthly pattern in your raw timber purchases in 1959? (List separately by products.)

Jan.		July	
Feb.		Aug.	
Mar.		Sept.	
April		Oct.	
May		Nov.	
June		Dec.	

If monthly data are not available, what were the: (List separately by products)
a. Peak-inventory months and amounts (aver.) _____
b. Lowest-inventory months and amounts (aver.) _____
c. Other months and amounts (aver.) _____

3. Do you consider the monthly pattern in volume of your wood purchases in 1959 to be a typical pattern? Yes__ No__
If NO, why not? _____

4. How do you explain the seasonal variations in your typical pattern of wood purchases? _____

5. What changes in the annual volume of your wood purchases took place in the years 1950-59? (List by products.)

Year	All Products
1959	
1958	
1957	
1956	
1955	
1954	
1953	
1952	
1951	
1950	

C. Inventories of raw wood:

1. Did you assemble raw timber products at your own wood yard in 1959? Yes__ No__
IF YES, ANSWER QUESTIONS 2 TO 6.
IF NO, SKIP TO SECTION D. SOURCES OF WOOD PURCHASES

2. What raw timber products did you assemble at your own wood yard in 1959?
a. _____ b. _____ c. _____

3. Why do you assemble raw timber products? _____

4. What was the seasonal variation in the volume of raw timber inventories on hand at your yard in 1959? (List separately by products.)
   a. Peak-inventory months and amounts (aver.) _____
   b. Lowest-inventory months and amounts (aver.) _____
   c. Other months and amounts (aver.) _____

5. Do you consider the seasonal pattern in raw timber inventories at your yard in 1959 to be a typical pattern? Yes__ No__
   If NO, why not? _____

6. Do you have an objective of maintaining a fixed ratio in the volume of raw timber inventories to sales? Yes__ No__
   If YES, what is this ratio? _____

D. Sources of wood supply:

1. Where is your 1959 wood supply area located? (List counties or states if only a few are involved. Outline on attached county map, if possible. State radius of operations in miles.)
   a. Counties or states _____
   b. Radius of operations _____

2. Have there been any significant changes in your wood supply area over the period 1950-59? Yes__ No__
   If YES, what were the changes? _____

3. What is the ownership of the forest land from which your 1959 wood supply was obtained? (Estimate % of total volume from each source.)

	%		%
a. Own land	___	d. Nat. forest	___
b. Farmer	___	e. State forest	___
c. Other private	___	f. Other public	___
		g. Don't know	___

4. Have there been any significant changes in your wood supply from different forest land-ownership sources over the period 1950-59? Yes__ No__
   If YES, what were the changes? _____
   If YES, what explanations can you give for these changes? _____

5. From which agent sources was your 1959 wood supply obtained (estimate % of total volume obtained from each source)?

	%		%
a. Own employees		b. Producer	_____
(1) From own lands	___		

(2) From other lands _____ c. Other agent _____
(specify) _____

6. Have there been any significant changes in the agent sources of your wood supply over the period 1950-59? Yes__ No__
If YES, what were the changes? _____
If YES, what explanations can you give for these changes? _____

E. Wood procurement methods and policies:

1. What percentages of your 1959 cut wood purchases were obtained under the following types of agreements?
a. Written contract _____%
b. Oral contract _____%

QUESTIONS 2 TO 5 APPLY ONLY TO WRITTEN CONTRACTS. IF THERE WERE NO WRITTEN CONTRACTS, SKIP TO QUESTION 6.

2. How far in advance of the beginning of wood deliveries are contracts usually negotiated? _____

3. What are the details of standard written contracts for cut wood purchase? (Obtain printed copies where possible. Check the following items which are included in contract specifications; then describe as much as possible.
a. ____ Kind of wood _____
b. ____ Amount of wood _____
c. ____ Size of wood _____
d. ____ Quality of wood _____
e. ____ Time or period of delivery _____
f. ____ Method of payment _____
g. ____ Time of payment _____

4. How binding are the provisions of standard written contracts for cut wood purchases (i.e., how much leeway is given suppliers in completing terms of contract and how much leeway does your firm allow itself in terminating contracts)? _____

5. Did you buy cut wood in 1959 only when you had a contract for its resale? Yes__ No__
If NO, explain your policy of purchases in advance of sales contracts. _____

QUESTIONS 6 TO 9 APPLY ONLY TO ORAL CONTRACTS FOR CUT WOOD PURCHASES. IF THERE WERE NO SUCH CONTRACTS, SKIP TO QUESTION 10.

6. How far in advance of the beginning of wood deliveries are contracts usually negotiated? _____

7. What are the details of oral contracts for cut wood purchases? (Check the following items which are included in agreement; then describe as much as possible.)
   a. ____ Kind of wood _____
   b. ____ Amount of wood _____
   c. ____ Size of wood _____
   d. ____ Quality of wood _____
   e. ____ Time or period of delivery _____
   f. ____ Method of payment _____
   g. ____ Time of payment _____

8. How binding are the provisions of oral contracts for cut wood purchases (i.e., how much leeway is given suppliers in completing terms of contract and how much leeway does your firm allow itself in terminating contracts? _____

9. Did you buy cut wood in 1959 only when you had a contract for its resale? Yes__ No__
   If NO, explain your policy of purchases in advance of sales contracts. _____

QUESTIONS 10 TO 13 APPLY ONLY TO STUMPAGE PURCHASES BY YOUR FIRM. IF NO STUMPAGE PURCHASES ARE MADE, SKIP TO QUESTION 14.

10. What percentages of your firm's 1959 stumpage purchases (in terms of volume) were obtained under the following types of agreements?
    a. Written contract with public landowners _____%
    b. Written contract with private landowners _____%
    c. Oral contract _____%

11. What are the details of your firm's standard contracts for stumpage purchases from private landowners? (Check the following items which are included in agreements; then describe as much as possible.)
    a. ____ Species _____
    b. ____ Amount of timber _____
    c. ____ Size of timber _____
    d. ____ Quality of timber _____
    e. ____ Time or period of harvest _____
    f. ____ Method of payment _____
    g. ____ Time and basis of measurement _____

12. If the standard contract for stumpage purchases from private landowners is a written contract, and if oral contracts are also made, how does the oral contract differ in its provisions from the written contract? _____

13. Does the standard contract for stumpage purchases from private landowners specify any conditions under

which timber is to be harvested? Yes__ No__
If YES, to what percentage of the 1959 private purchases do these specifications apply? ___ percent
If YES, what are the specifications? _____
If NO, are there any harvest conditions your firm will accept in contracts for stumpage purchases upon a private landowner's insistence? Yes__ No__
If YES, what are the conditions? _____

14. What percentages of your 1959 wood purchases were obtained through negotiations initiated by your own firm or initiated by sellers?

	%
a. Own firm	
b. Sellers	
c. Indefinite	

15. When your firm takes the initiative in negotiating wood purchases, what are the methods you use in contracting potential suppliers? _____

16. From how many different persons or agencies was your 1959 wood supply purchased?

	No.		No.
a. Non-producer landowner		c. Other agent (specify)	
b. Producer			

Was 1959 a typical year? Yes__ No__
If NO, why not? _____

17. What quantities of your 1959 raw wood receipts were purchased on the stump, roadside, and delivered?

	Quantity	%
On the stump		
Roadside		
F.o.b. railroad		
Delivered to mill		

18. Did the points of purchase of 1959 raw wood receipts vary by agent sources of wood? Yes__ No__
If YES, how did they differ? _____

19. To what degree does your firm perform the following functions in regard to wood procurement?
a. Logging? _____
b. Hauling? _____

20. Are any wood suppliers offered payments (loans) in advance of time of payment specified in a standard contract? Yes__ No__
If YES, is this the usual procedure adopted by your firm? Yes__ No__
If YES, does the producer pay interest on such prepayments or loans? Yes__ No__
If YES, what is the size limitation on the

prepayments or loans offered? _____

21. Are any wood suppliers offered other business aids by your firm? Yes__ No__
If YES, is this the usual procedure adopted by your firm? Yes__ No__
If YES, what are these business aids? _____

22. Do you assign exclusive procurement territories to your wood suppliers? Yes__ No__
If NO, what policy do you follow to minimize the overlapping of procurement territories by your wood suppliers? _____

23. Do you object to having your wood suppliers take contracts to supply wood to other firms using the same kind of timber? Yes__ No__
If YES, what action do you take? _____

24. Do you have any wood procurement policy designed to minimize wide fluctuations in the volume of wood called for in successive contracts made with suppliers? Yes__ No__
If YES, explain what this policy is. _____

F. Prices:

1. What standard delivered prices did your firm pay per unit of volume to your wood suppliers at the end of 1959? (Fill in as many items as possible, by products and/or species.)
a. Products and/or species _____
b. Roadside _____
c. Delivered to rr. _____
d. F.o.b. rr. _____
e. Trucked to mill _____
f. Rr. to mill _____

2. Are there any differences in the prices paid by your firm for delivered wood on the basis of distance of haul? Yes__ No__
If YES, what are these differences by mode of transportation (and which distances do the prices quoted in item 1 above refer to?) _____

3. What changes in prices paid for wood by your firm have occurred over the period of 1950-59? _____

4. Do you have any difficulty in obtaining sufficient market price information as a basis for your business decisions?
a. On products you have to buy? Yes__ No__
b. On products you have to sell? Yes__ No__
If YES, to a. or b., explain. _____

G. Costs:

1. What stumpage costs per unit of volume applied to your wood purchases at the end of 1959? (Estimate prevailing contract rates, if stumpage was not paid for directly by your own firm.)
   a. Products and/or species _____
   b. Average cost _____
   c. Minimum cost _____
   d. Maximum cost _____

2. What logging costs (felling and bucking and skidding) per unit of volume applied to your wood purchases at the end of 1959? (Estimate prevailing contract rates, if logging costs were not paid for directly by your firm.)
   a. Products and/or species _____
   b. Average cost _____
   c. Minimum cost _____
   d. Maximum cost _____

3. What truck-hauling costs per unit of volume applied to your wood purchases at the end of 1959? (Estimate prevailing contract rates, if hauling costs were not paid for directly by your firm.)

   Product

   Truck to mill
   (1) Average cost _____
   (2) Minimum cost _____
   (3) Maximum cost _____
   (4) Cost by distance zones _____

   Truck to rr.
   (1) Average cost _____
   (2) Minimum cost _____
   (3) Maximum cost _____
   (4) Cost by distance zones _____

4. Do truck-hauling costs to mill include the cost of loading? Yes__ No__

5. Do truck-hauling costs to mill include the cost of unloading? Yes__ No__

6. Do truck-hauling costs to railroad include the cost of unloading and loading onto railroad cars? Yes__ No__

7. What railroad-hauling costs per unit of volume applied to wood products delivered to your markets at the end of 1959?

   Product

   Rr. to market
   (1) Average cost _____
   (2) Minimum cost _____

(3) Maximum cost _____
(4) Cost by distance zones _____

H. Sales of raw timber products:

1. What was the gross sales value of timber products sold by your firm in 1959? _____

2. What was the total volume, by product and unit of measure, of your timber products sales in 1959? (List only timber handled as part of your business as an intermediate agent.)

	Product	Volume
a.		
b.		

3. What changes in the annual volume of your timber products sales took place in the years 1950-59? (List separately by products.)

Year	All Products
1959	
1958	
1957	
1956	
1955	
1954	
1953	
1952	
1951	
1950	

4. What area did your sales territory cover in 1959? (List by principal products. List counties or cities, or outermost states or cities. State maximum distances.) _____

5. Have there been any significant changes in the product market areas for your firm over the period 1950-59? Yes__ No__
If YES, what were the changes? _____

6. To which types of buyers did sales of your principal products in 1959 go? (Estimate, by products, the volume or percent of total volume.)

	Volume	%	Volume	%
a. Manufacturer				
b. Wholesaler				
c. Retailer				
d. Industrial user				
e. Other (specify)				

7. Have there been any significant changes in the volumes of products going to different types of

buyers of your principal products over the period 1950-59? Yes__ No__
If YES, what were the changes? _____
If YES, what explanations can you give for these changes? _____

8. How many different buyers of your timber products did you sell to in 1959?

	No.		No.
a. Manufacturer	_____	d. Industrial user	_____
b. Wholesaler	_____	e. Other (specify)	
c. Retailer	_____	_____	_____

9. Have there been any significant changes in the numbers of buyers of your principal products over the period 1950-59? Yes__ No__
If YES, what were the changes? _____
If YES, what explanations can you give for these changes? _____

10. What is the typical time interval between date of a purchase contract with a buyer and product delivery? (List separately by principal products, if time interval varies.) _____
    a. How much variation from the typical time interval occurs? _____
    b. What are the causes of variations from the typical time interval? _____

I. Agent sources of raw wood products, 1959:

Name	Address

CONFIDENTIAL

Form No. 3

Date _____
Recorder _____
State _____

NCM-27 Project

TIMBER PRODUCER

Name of timber producer _____

Address _____

A. General:

1. How many years have you been operating as a timber producer at your present location? ____ years

2. Are you a full-time timber producer? Yes__ No__
If NO, what other business or occupation are you engaged in?
a. Sawmill operator ____
b. Operator of other wood-using mill (specify) _____ ____
c. Store operator ____
d. Farmer ____
e. Wage earner ____
f. Other (specify) _____ ____
If NO, what percentage of your gross revenues in 1959 was realized from your business as a timber producer? ____ percent

3. What were the principal raw timber products you handled in 1959?
a _____ b. _____ c. _____

4. Is your timber-producing business typically a year-round business? Yes__ No__
If NO, what are the typical months of operation?
_____

5. How many full-time employees in your timber-producing business did you have in 1959? ___ employees
How many are members of your family? ___ employees

6. How many seasonal employees in your timber-producing business did you have in 1959? ___ employees
How many are members of your family? ___ employees

B. Quantities of timber purchases: (volume by __ log rule)

1. Did you purchase any timber as a basis for your timber-producing business in 1959? Yes__ No__
If YES, what volume, by product and unit of measure, was purchased as stumpage in 1959?

	Product	Volume
a.		

Was 1959 a typical? Yes__ No__
If NO, why not? _____
If YES, what volume, by product and unit of measure, was purchased as cut wood in 1959?

	Product	Volume
a.		

Was 1959 a typical year? Yes__ No__
If NO, why not? _____
IF NO, SKIP TO C. SOURCES OF WOOD SUPPLY.

2. What changes in the annual volume of your timber purchases took place in the years 1950-59? (List by products)

Year	All products
1959	
1958	
1957	
1956	
1955	
1954	
1953	
1952	
1951	
1950	

C. Sources of wood supply:

1. Where is your 1959 wood supply area located? (List counties if only a few are involved. State radius of operations in miles.)
   a. Counties _____
   b. Radius of operations _____

2. Have there been any significant changes in your wood supply area over the period 1950-59? Yes__ No__
   If YES, what were the changes? _____

3. What is the ownership of the forest land from which your 1959 wood supply was obtained? (Estimate % of total volume from each source.)

	%		%
a. Own land	___	d. Nat. forest	___
b. Farmer	___	e. State forest	___
c. Otherprivate (specify)	___	f. Other public (specify)	___

4. Have there been significant changes in your wood supply from different forest land-ownership sources over the period 1950-59? Yes__ No__
   If YES, what were the changes? _____
   If YES, what explanations can you give for these changes? _____

5. From what agent sources was your 1959 wood supply

obtained? (Estimate % of total volume obtained from each source.)

	%		%
a. Own employees:		b. Other producer	___
(1) From own lands	___	c. Other agent (specify)	
(2) From other lands	___	_____	___

6. Have there been any significant changes in the agent sources of your wood supply over the period 1950-59? Yes__ No__

If YES, what were the changes? _____

If YES, what explanations can you give for these changes? _____

D. Wood procurement methods and policies:

1. What percentages of your 1959 wood supply were obtained by the following stumpage acquisitions methods?

	%
a. Stumpage from own lands	___
b. Stumpage purchased by producer	___
c. Stumpage purchased in producer's name by product buyer	___
d. Stumpage provided by product buyer	___

QUESTIONS 2 TO 15 APPLY ONLY TO STUMPAGE PURCHASES BY PRODUCER. IF NO STUMPAGE PURCHASES WERE MADE, SKIP TO QUESTION 16.

2. What percentages of your 1959 stumpage purchases (in terms of volume) were obtained under the following types of agreements?

	%
a. Written contract with public landowners	___
b. Written contract with private landowners	___
c. Oral contract	___

3. What are the details of your standard contracts for stumpage purchases from private landowners? (Check the following items which are included in agreements; then describe as much as possible.)

a. ____ Species _____
b. ____ Amount of timber _____
c. ____ Size of timber _____
d. ____ Quality of timber _____
e. ____ Time or period of harvest _____
f. ____ Method of payment _____
g. ____ Time and basis of measurement _____

4. If the standard contract for stumpage purchases from private landowners is a written contract, and if oral contracts are also made, how does the oral contract differ in its provisions from the written contract?

5. Does your standard contract for stumpage purchases from private landowners specify any conditions under which timber is to be harvested Yes__ No__
   If YES, to what percentage of your 1959 purchases do these specifications apply? ____ percent
   If YES, what are the specifications? _____
   If NO, are there any harvest conditions your firm will accept in contracts for stumpage purchase upon a private landowner's insistence? Yes__ No__
   If YES, what are the conditions? _____

6. How binding are your contracts for stumpage purchase (i.e., how much leeway do you allow yourself in terminating contracts)? _____

7. How far in advance of the beginning of harvest operations are stumpage purchase contracts usually negotiated? _____

8. Do you buy stumpage only when you hold a contract for the sale of products? Yes__ No__
   If NO, explain your policy of stumpage purchases in advance of contracts for the sale of products.
   _____

9. What percentages of your 1959 stumpage purchases were obtained through negotiations initiated by you or initiated by landowners?

	%
a. Producer	
b. Landowner	
c. Indefinite	

10. When you take the initiative in negotiating stumpage purchases, what are the methods you use in contacting potential suppliers? _____

11. How many stumpage purchase contracts did you make in 1959? ____ contracts
    Was 1959 a typical year? Yes__ NO__
    If NO, why not? _____

12. From how many different persons or agencies did you obtain your stumpage purchases in 1959?
    ____ persons or agencies
    Was 1959 a typical year? Yes__ No__
    If NO, why not? _____

13. Is there a minimum volume per acre below which you will not consider stumpage purchase? Yes__ No__
    If YES, what is this minimum? _____

14. Is there a minimum volume per tract below which you will not consider stumpage purchase? Yes__ No__

If YES, what is this minimum? _____

15. Is there a minimum value of timber per tract below which you will not consider stumpage purchase?
Yes__ No__
If YES, what is this minimum? _____

16. Did you receive funds from any of your product buyers for stumpage purchases in 1959? Yes__ No__
If YES, which buyers? _____
If YES, what portion of your total stumpage purchases in 1959 did these funds cover? _____

17. Did you subcontract some or all of the logging operations in your timber-producing business in 1959?
Yes__ No__
If YES, what percentage of the volume handled was subcontracted? ____ percent
If YES, did subcontracting apply to
a. Felling and bucking? Yes__ No__
b. Skidding? Yes__ No__
If YES, why didn't you handle all the logging operations yourself? (Check, if more than 1 reason, number in order of importance.)
a. ____ Lacked necessary equipment
b. ____ Lacked logging experience
c. ____ Inadequate family or hired labor available
d. ____ Believed subcontracting to be the cheaper method
e. ____ Producer's time more valuable for other purposes
f. ____ Other demands on producer's time
g. ____ Other (specify) _____

18. Did you subcontract some or all of the hauling operations in your timber-producing business in 1959?
Yes__ No__
If YES, what percentage of the volume handled was subcontracted? ____ percent
If YES, why didn't you handle all of the hauling operations yourself? (Check, if more than 1 reason, number in order of importance.)
a. ____ Lacked necessary equipment
b. ____ Lacked hauling experience
c. ____ Inadequate family or hired labor available
d. ____ Believed subcontracting to be the cheaper method
e. ____ Producer's time more valuable for other purposes
f. ____ Other (specify) _____

19. Did you receive in 1959 funds from any product buyers in advance of time of payment specified in a standard contract to facilitate your logging or hauling responsibilities? Yes__ No__

If YES, which buyers? _____
If YES, for what purpose? _____

20. Did you receive in 1959 any other business aids from any product buyers to facilitate your logging or hauling responsibilities? Yes__ No__
If YES, which buyers? _____
If YES, what aids? _____

E. Prices Received:

1. What prices did you receive per unit of volume for wood products you sold in 1959? (Fill in as many items as possible, by products and/or species.)

	Products and/or species
a. Roadside	
b. Delivered to rr.	
c. F.o.b. rr.	
d. Trucked to mill	
e. Rr. to mill	

2. To which agents did you sell the products and/or species listed above? (Check appropriate cells.)

	Products and/or species
a. Dealer	
b. Concentration yard	
c. Other intermediate agent	
d. Wood-using mill	
e. Other producer	
f. Other (specify)	

3. Did you have any difficulty in obtaining sufficient market price information as a basis for your business decisions?
a. On the products you have to buy? Yes__ No__
b. On the products you have to sell? Yes__ No__
If YES to a. or b., explain _____

F. Costs:

1. What stumpage costs per unit of volume applied to the wood products you handled in 1959? (Estimate cost imputed by you if you used your own stumpage.)
a. Products and/or species _____
b. Purchased stumpage _____
c. Own stumpage _____

2. What loggings costs (felling and bucking and skidding per unit of volume applied to the wood products you handled in 1959? (Estimate cost imputed by you if you performed your own logging.)
a. Products and/or species _____
b. Subcontracted logging _____
c. Own logging _____

3. What truck-hauling costs per unit of volume applied to the wood products you handled in 1959? (Estimate cost imputed by you if you performed your own hauling.)
   a. Products and/or species _____
   b. Subcontracted hauling _____
      Cost _____ Distance _____
   c. Own logging _____
      Cost _____ Distance _____

G. Sales of timber products:

1. What was the gross sales value of timber products sold by you in 1959? _____

2. What was the total volume, by product and unit of measure, of your timber products sales in 1959? (List only timber handled as part of your business as a timber producer.)

	Product	Volume
a.		

3. What were the seasonal variations by product, in your timber products deliveries in 1959?
   a. Peak-months and amounts (aver.) _____
   b. Lowest-months and amounts (aver.) _____
   c. Other months and amounts (aver.) _____

4. Do you consider the timing in your timber products deliveries in 1959 to be a typical pattern? Yes__ No__
   If NO, why not? _____

5. Was the timing in your timber products deliveries in 1959 required by your product buyers? Yes__ No__
   If YES, would you have preferred a different timing of deliveries? Yes__ No__
   If YES, what is your preferred timing of deliveries? _____
   If NO, how do you explain the timing of your deliveries? _____

6. What changes in the annual volume of your timber products sales took place in the years 1950-59? (List separately by products.)

Year	All products
1959	
1958	
1957	
1956	
1955	
1954	
1953	
1952	

1951 _____
1950 _____

7. What explanations can you give for annual fluctuations in your timber products sales? _____

8. To which types of buyers did sales of your principal products in 1959 go? (Estimate by % of total volume.)

	%		%
a. Manufacturer	___	d. Other intermediate agent (specify)___	___
b. Concentration yard	___	e. Other (specify ___	___
c. Dealer	___		

9. Have there been any significant changes in the volumes of your products going to different types of buyers over the period 1950-59? Yes__ No__
If YES, what were the changes? _____
If YES, what explanations can you give for these changes? _____

10. How many different buyers of your timber products did you sell to in 1959?

	No.		No.
a. Manufacturer	___	d. Other intermediate agent (specify) ___	___
b. Concentration yard	___	e. Other (specify ___	___
c. Dealer	___		

11. Have there been any significant changes in the numbers of buyers of your principal products over the period 1950-59? Yes__ No__
If YES, what were the changes? _____
If YES, what explanations can you give for these changes? _____

12. Did you have a contract(s) to sell prior to your harvesting of wood in 1959? Yes__ No__

13. What is the typical time interval between date of a purchase contract with a buyer and product delivery? _____
   a. How much variation from the typical time interval occurs? _____
   b. What are the causes of variations from the typical time interval? _____

H. Other producers of raw wood products, 1959:

Name	Address

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