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INDUSTRIAL STRUCTURE OF THE PULP AND PAPER INDUSTRY IN MICHIGAN

By

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ABSTRACT

INDUSTRIAL STRUCTURE OF THE
PULP AND PAPER INDUSTRY
IN MICHIGAN

By

Catherine Jean Boggs

This research consisted of an investigation and evaluation of the structure of the pulp and paper industry in the State of Michigan. This was done by examining the elements that determine structure, and then applying them to a sample of twenty-three active pulp and paper companies in the state.

The study primarily used secondary data. It began with an examination of spatial competition in supply and demand markets for pulp and paper products. The study also examined ownership patterns, concentration, integration, diversification, differentiation, and barriers to entry.

The twenty-three companies examined are primarily owned by large diversified corporations. There are eight integrated mills, although the majority of mills are corporately integrated. Products are differentiated by brand name, watermarks, and service. Absolute cost advantages provide the highest barrier to entry. The industry can be considered an oligopoly with a competitive fringe.

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Finally, if a dedication were in order, it would go to my parents, Alyene and Robert Boggs. Their unfailing support and encouragement kept me going. While I shall take credit for my failings, the positive aspects of my character must be attributable to them.

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CHAPTER I

INTRODUCTION

Problem Statement

With the realization that the earth is finite, an increasing concern with the appropriate use of natural resources has developed. Man has concerned himself with the problem of determining the "highest and best" use of his resources, because there is often competition for resources. Dr. Raleigh Barlowe describes highest and best use of land resources "when they are used in such a manner as to provide the optimum return to their operators or to society.[1] Optimum, however, is defined by the goal set, and the optimal solution for the operator may not be the optimal solution for society. In order to determine the "wisest" use of resources it is necessary to understand the physical, economic, and institutional aspects of their nature. Oftentimes, however, resources do not succeed to their highest and best use. Many economic and institutional factors inhibit physical succession to higher uses.

Robert Haveman indicated that the inherent characteristics of natural resources create the potential for market failure.[2] The

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[1]Raleigh Barlowe, Land Resources Economics, (Englewood Cliffs: Prentice-Hall, Inc., 1973), p. 14.

[2]Robert Haveman, "Efficiency and Equity in Natural Resource and Environmental Policy," American Journal of Agricultural Economics 55 (December 1973): 868.

"commons" and "public goods" nature, and the external diseconomies produced provide the impetus for misallocation and misuse. Anthony Scott indicated that the nature and distribution of property rights, along with the character of ownership has inhibited the proper succession of resource use. "...inappropriate types of property tenure... ...may cause 'owners' to exploit non-specific natural resources at a faster rate than social welfare would warrant."[3] John Kenneth Galbraith argues that corporate ownership of resources has provided a serious interstice between the objectives of managers and owners.[4] Manager motivations for resource use may differ decidedly from stockholders. Consequently, resources are often not used in the "best" manner.

The pulp and paper industry is the third largest user and polluter of water in the country. It is a heavy user of one of Michigan's most valuable natural resources--timber. It is also a heavy user of chemicals and energy. Because of the need to determine wise use of resources it is important to discover the role that pulp and paper plays in the economy of the state.

To evaluate the economic impacts of resource use, one can examine the performance of the industry to determine if it meets the criteria established for "wise" use. The criteria are various measures of "optimal returns" provided by resource use. The final analysis and conclusions as to whether an industry's performance is good or bad, lies with the subjective judgement of the policy maker who establishes

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[3]Anthony Scott, Natural Resources: The Economics of Conservation, (Toronto: McCelland and Stewart Limited, 1973), p. 158.

[4]John K. Galbraith, The New Industrial State, (Boston: Houghton Mifflin Co., 1967).

what criteria are used. But once the impacts of the industry's performance are discerned, public policy can be adjusted accordingly to either change an industry's performance, or else solidify its existence. In order to correctly assess the policy change needed to change performance, one must first examine the structure of the industry. Thus, the problem is to establish the structure of the pulp and paper industry in the state.

Objectives of the Study

Primary Objective

The primary objective of this study was to delineate the structure of the pulp and paper industry in Michigan.

Specific Objectives

The specific objectives of this study include:

- to determine the ownership patterns of the pulp and paper companies in Michigan.
- to determine the degree of integration of pulp and paper companies in Michigan.
- to determine diversification of products and firms within the industry.
- to assess the degree of concentration in sales and employment within the local industry.
- to determine if interlocking directorships exist between firms within the industry.
- to identify barriers to entry.
- to determine the spatial distribution of plants.
- to delineate supply and demand regions.

Past and Current Work Relevant to Study

Numerous books have been written on the subject of industrial organization. F. M. Scherer's book, Industrial Market Structure and Economic Performance,[5] and Joe S. Bain's book, Industrial Organization,[6] provide good insight into the topics of integration, concentration, and differentiation. Likewise, numerous articles have been written that provide a sound background on industrial organization.

Literally hundreds of articles and books have been written on the subject of performance criteria. Particularly helpful in basic welfare theory and resource allocation are the works done by Kenneth Boulding and Richard Leftwich.[7] With regards to the manner in which welfare economics can be applied to the natural resources area, the book, Quality of the Environment by Orris C. Herfindahl and Allen V. Kneese, was a good starting point.[8]

Helpful in relating economics to the pulp and paper industry were John A. Guthrie's book, The Economics of Pulp and Paper, and Forest Resource Economics by G. Robinson Gregory.[9] The Handbook of Pulp and

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[5]F. M. Scherer, Industrial Market Structure and Economic Performance, (Chicago: Rand McNally College Publishing Company, 1970), particularly chapters 11, 14, 15.

[6]Joe S. Bain, Industrial Organization, (New York: John Wiley & Sons, Inc., 1968).

[7]Kenneth E. Boulding, "Welfare Economics," in A Survey of Contemporary Economics, edited by Bernard F. Haley, (Homewood: Richard D. Irwin, Inc., 1952), pp. 1-34; Richard H. Leftwich, The Price System and Resource Allocation, 5th ed., (Hinsdale: The Dryden Press, 1973), pp. 382-395.

[8]Orris C. Herfindahl and Allen V. Kneese, Quality of the Environment: An Economic Approach to Some Problems in Using Land, Water, and Air, (Baltimore: The Johns Hopkins Press, 1965), pp. 81-96.

[9]John A. Guthrie, The Economics of Pulp and Paper, (Pullman: The State College of Washington Press, 1950); G. Robinson Gregory, Forest Resource Economics, (New York: The Ronald Press Company, 1972).

Paper Technology served as a helpful reference concerning the technical side of the industry.[10]

A number of doctoral dissertations have been written concerning the pulp and paper industry in Michigan. These include works by Robert Manthy, Robert John Englehard, Harley Hastings Thomas, and Harold Edwin Cristen.[11] These studies provided useful technical information, in addition to information concerning marketing and pricing behavior.

Finally, the dissertation work of Joseph Diamond on impacts of the industry in Manistee County, and work by Carla Moore will provide some necessary background material, as well as providing some parallel research.[12]

Research Hypothesis and Model

The study attempts to answer the following questions concerning the pulp and paper industry:

1) What is the structure of the industry?

2) Can the industry be characterized as integrated, concentrated, or diversified?

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[10]Kenneth W. Britt, Handbook of Pulp and Paper Technology, (New York: Reinhold Publishing Corporation, 1964).

[11]Robert Manthy, "Marketing Pulpwood in the North Central Region," (Ph.D. dissertation, Michigan State University, 1963); Robert John Englehard, "The Role of Wood Procurement in the Dynamic Paper Industry of Wisconsin and Upper Michigan," (Ph.D. dissertation, Michigan State University, 1968); Harley Hastings Thomas, "A Marketing Study of Fine Wood Residue in Southern Lower Michigan," (Ph.D. dissertation, Michigan State University, 1969); Harold Edwin Christen, "A Survey of the Capabilities of the Lake States' Forests to Support an Expanding Pulp and Paper Industry," (Ph.D. dissertation, Michigan State University, 1961).

[12]Carla A. Moore, "Economic and Institutional Factors Surrounding the Management of Small Private Nonindustrial Forest Lands in Michigan," (Masters paper, Michigan State University, 1977); Joseph E. Diamond,

3) Who owns the pulp and paper companies in the state?

4) What are the barriers to entry into the industry?

5) How does structure influence behavior?

6) Do ownership patterns influence income flows?

Model

A model of industrial organization was used to establish structure of the industry. F. M. Scherer and Joe Bain have both developed models of industrial organization.[13] Scherer's model stresses conduct in examining structure-performance links. Bain, on the other hand, emphasizes the linkage between structure and performance without much concern for the intermediate conduct of the industry. He contends that conduct is empirically difficult to measure, and linkages between structure and conduct, and conduct and performance often give ambiguous results. It is difficult to separate determinants as to whether they fit into structure, conduct, or performance categories. Often these features are measures of both conduct and performance. Scherer counters Bain's objections to the use of conduct by indicating that by the inclusion of a large "complement" of independent attributes one can discern conduct from structure and performance from conduct. He also indicates that increased research funds will make possible in-depth studies of firms' pricing policies, products policies, and innovation behavior.

"Some Impacts on Resource Use by the Woodpulp Industry in Manistee County," (Ph.D. dissertation, Michigan State University, 1977).

[13]Scherer, p. 5; Bain, p. viii.

Both gentlemen list a number of determinants of industrial structure.[14] A sample of these determinants was used including concentration, integration, differentiation, diversification, and barriers to entry. They were chosen with data availability in mind. Traditional neo-classic theory uses a model of perfect competition to analyze industrial structure. Imperfect competition theory developed in order to explain divergence from perfect competition. As a starting point, the competitive model was used to determine how closely the structure of the pulp and paper industry approaches or deviates from it. There are arguments on both sides of the fence as to whether these determinants are anti-competitive or not. The arguments were traced and then a conclusion was reached as to how they applied to the pulp and paper industry.

Research Methods

This research relied primarily on secondary data and a case study method in which a sample of the active pulp and paper companies in Michigan was examined. The difficulty in examining the pulp and paper industry is that it is, in fact, many industries, defined by several Standard Industrial Codes (SIC). The industry is also a highly integrated one and produces a varied product line. Terminology and classifications are often not used consistently. Thus, it is difficult to delineate the boundaries of the industry, and consequently what firms to include or exclude from the study.

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[14] Scherer discusses the following determinants of structure: number of buyers and sellers, product differentiation, barriers to entry, cost structures, vertical integration, conglomerateness, economies of scale, government policies, growth, and chance. Bain limits his discussion of determinants to: seller and buyer concentration, product differentiation, and condition of entry.

The "industry" includes pulp mills (SIC-2611), paper mills (2621), paperboard mills (2631), paper products (2647), boxes, corrugated, and solid fiber (2653), building paper and board mills (2661). The firms are denoted with SIC's according to the products they products they produce and/or the processes used. The Standard Industrial Code Manual defines industry 2611, pulp mills as,

> Establishments primarily engaged in manufacturing pulp from wood or from other materials such as rags, linters, waste paper, and straw...; and pulp mills combined with paper mills or paperboard mills, and not separately reported, are classified with the latter in Industries 2621 and 2631, respectively.

The Manual defines industry 2621, paper mills, except building paper mills as,

> Establishments primarily engaged in manufacturing paper (except building paper--Industry 2661) from wood pulp and other fibers, and which may also manufacture converted paper products.

Because pulp mills are primary users of wood products, many studies have been done and much information has been collected on them. There are presently eight pulp mills in the state. Paper companies, on the other hand, are not monitored as well. Because they are secondary users of wood products it is difficult to clearly define processes that different firms use. Consequently, the whole agglomeration of different industries is spoken of as the "pulp and paper industry."

This study examined fifteen paper mills that were classified under SIC 2621, and the eight pulp mills in the state.[15] All the pulp mills

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[15]Paper mills classified under SIC 2621 include: Brown Company, Charmin Paper Products Company, Dunn Paper Company, Fletcher Paper Company, French Paper Company, Georgia-Pacific Corporation, International Paper Company, Kimberly-Clark Corporation-Munising Division, Plainwell Paper Company, Pioneer Paper Company, Port Huron Paper Company, Rochester Paper Company, SCM/Allied Paper Company, Simpson Lee Paper Company, and Watervliet Paper Company.

are integrated; therefore the Directory of Manufacturers lists three of the firms under SIC 2621, three of them under SIC 2631, and two pulp mills under SIC 2661.[16] The researcher could not find any definitive list of paper mills in the state. The list developed herein is a collaboration of a list taken from the Directory of Michigan Manufacturers 1976, and from Lockwood's Directory of Paper and Allied Trades. The Directory of Michigan Manufacturers is assembled from information from local Chambers of Commerce, questionnaires, and industry information, so the classifications and information were viewed with some suspicion. Other sources, letters, and telephone interviews with company personnel were used to try to substantiate a list of paper mills that would conceivably fall under SIC 2621.[17]

The structure of the industry was roughly sketched out by examining a number of elements. First, ownership patterns were examined to help establish control and vertical integration. This involved a look at subsidiaries, divisions, and affiliates of the various companies. The researcher also determined where the firm's headquarters are located. Secondly, the study examined diversification of firms and products. Companies were examined to determine to what extent large diversified corporations are involved in the industry, and in what

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[16] Pulp mills include: Escanaba Paper Company (2621), Manistique Pulp and Paper Company (2621), S.D. Warren Company (2621), Menasha Corporation (2631), Packaging Corporation of America (2631), Hoerner-Waldorf Corporation (2631), Abitibi Corporation (2661), and Celotex Corporation (2661).

[17] It was discovered just prior to completion of this study that the International Paper Company facility in Kalamazoo is a converting plant, rather than a paper mill. In addition, the Pioneer Paper Company is a sales and distribution office for Container Corporation of America. Nevertheless, discussion of these two companies was still included.

other types of activities they are involved. In addition, the researcher studied product differentiation.

Next, the researcher looked briefly at concentration in sales and employment within the industry. Concentration was determined by using national statistics which may be an accurate representation of the local market if the large companies are in the same proportion nationally as regionally. The researcher also looked for any signs of interlocking directorships. Finally, barriers to entry were examined, including those that result from scale economies, absolute cost advantages, product differentiation, and government regulation.

In a effort to generally describe supply and demand markets for the pulp and paper industry in Michigan, the study was limited to examining the supply and demand for pulp, and the supply and demand for paper products. An index, developed by Leonard Weiss, was used to describe market size based on distance-shipped data from the Census of Transportation.[18]

Much of the necessary data was collected from the companies' annual reports and Form 10-K Annual Reports to the Securities and Exchange Commission. Information concerning merger activity, stocks, and the Articles of Incorporation was available at the Corporation Division of the Michigan Department of Commerce. A simple questionnaire was devised and sent to fifteen of the companies. The purpose was specifically to see if an answer was received, indicating a firm was still in business. Ten responses were received, but the information was of a general nature. In some cases it revealed that companies

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[18]Leonard W. Weiss, "The Geographic Size of Markets in Manufacturing," Review of Economics and Statistics 54 (August 1972): 245-57.

were really subsidiaries of larger corporations. It also revealed some changes in ownership and mills that had ceased operation.

Much of the necessary information was not available due to disclosure rules. Consequently a fully integrated, comprehensive study was not possible. Since mostly secondary data were used, it was often difficult to discern regional or local trends because of the aggregation of data. Accordingly, there was extensive use of trade journals, and industrial studies by the Bureau of Census. In addition, information was provided by the Agricultural Experiment Station and Cooperative Extension Service at Michigan State University, and the Michigan Department of Natural Resources.

CHAPTER II

INDUSTRIAL ORGANIZATION THEORY

To begin an analysis of the structure of the pulp and paper industry, one should first examine the reasons why it is important to delineate structure.

> In addition to the effects of structure on performance, there are, however, likely to be important feedback effects of performance on structure. Thus, a complete analysis of performance should be based on a fundamental analysis of the determinants of market structure.[1]

Industrial structure influences the industry's conduct, which will, in turn, influence performance. Performance refers to the industry's assistance in achieving social goals. It is measured in an industry by a number of different criteria including allocative efficiency, income and wealth distribution, progressivity, dispersion of political power, economic growth, and macro stability. The most commonly used measures in American society are efficient allocation of resources, and income and power distribution (welfare effects). Consequently, delineation of industrial structure is indeed important; not only to the serious student of industrial economics, but also to decision makers within the industry and policy makers outside of the industry.

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[1] S. I. Ornstein, J. F. Weston, M. D. Intriligator, and R. E. Shrieves, "Determinants of Market Structure," Southern Economic Journal 39 (April 1973): 612-25.

Market Structures

Market structure is a term used to define the organizational characteristics of the relationship between buyers and sellers, sellers to each other, buyers to each other, and sellers to potential entrants.[2] There are several categories of structure, but in "real" life, industries rarely fall into clean-cut categories. Rather they tend to lie along a continuum. The extremes of the continuum are perfect competition and perfect monopoly. Where an industry falls on the continuum is dependent upon the amount of competition within the industry.

Competition is a broad concept with two basic components.[3] The first component concerns the behavior of buyers and sellers. Competition is a description of the independent rivalry for customers by sellers. The second component is more of a structural concept in which

> ...an industry is said to be competitive...only when the number of firms selling a homogeneous commodity is so large, and each individual firm's share of the market so small, that no individual firm finds itself able to influence the commodity's price significantly by varying the quantity of output it sells.[4]

The two components have only a subtle, but important difference. Both are empirically difficult to measure, although rivalry can often be seen. It is the second component that will be more important in terms of classifying an industry's structure.

Atomistic industries lie at one end of the measuring stick, and monopolies lie at the other end. The other varieties of industrial structure fall somewhere in between depending on the number of sellers and the nature of the product. Atomistic markets exist when there are so many sellers that no one can influence the price, and they sell a homogeneous product. A monopoly, on the other hand exists when there

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[2]Bain, p. 7. [3]F. M. Scherer, pp. 8, 9. [4]Ibid, p. 9.

is only one seller who has total control over the price. Oligopolistic competition exists when there are only a few firms and each firm takes into account the reactions of rival firms in determining its pricing and output decisions. Oligopolies can produce either homogeneous or differentiated products. Finally, the last relevant category is monopolistic competition, in which there are many sellers that produce a differentiated product.

The four basic market structures are all potential classifications for use in predicting performance in the pulp and paper industry. Each market structure can produce a different conduct and performance. Therefore, it is necessary to examine the number of sellers in the market, as well as the products they sell in order to help establish structure of the industry. The following will be a brief discussion of competition and monopoly to more clearly establish performance that each may produce.

Competition and Monopoly

It has been argued for centuries that competition is the paragon of market structures. Evils of market power are expounded as far back as Adam Smith, who claimed that monopoly power was "a great enemy to good management," and kept the "market constantly under-stocked."[5] Instead, he extolled the virtues of the "invisible hand" that guides the market by allocating resources in the manner that is "most agreeable to the interest of the whole society."[6]

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[5]Adam Smith, An Inquiry into the Nature and Causes of the Wealth of Nations, Modern Library edition, (New York: Random House, Inc., 1937), pp. 147, 61.

[6]Ibid., pp. 423, 9.

The demand curve facing the competitive firm is horizontal at the market price. If a seller raises its price above the market price, it will lose its share of the market. If it attempts to sell below the market price, it will either incur losses or else buyers will bid the price back up. The proportion of the market that each seller owns is so small that each seller can dispose of its entire output at the prevailing market price.

Competition, it is argued, is the best way to achieve efficient allocation of resources and equitable income distribution. Competition is thought to be an "optimal" solution, as compared with monopoly, for a number of reasons. First, the large number of buyers and sellers disperses power. It allows opportunity because without any barriers to entry, any producer is free to enter the market. Secondly, competition is considered an efficient means of allocating resources because it satisfies society's demand for the quantity of goods it wants at the least price. If society wants more of product X than Y, they will bid the price of X up, while the price of Y will fall. As profits fall in the Y industry resources will be released and move to a more productive capacity--producing more X. Consequently, resources will be used in the manner demanded by society. In an equilibrium state the marginal cost of producing a unit is equal to the price. In the long run, price is equal to average total cost for a firm, and there are no extraordinary profits. Return on investment is just sufficient to bring those necessary factors into production. In addition, in the long run equilibrium each firm will be producing at the lowest point on their average total cost curve. If a firm does not operate at the lowest possible point of their average total cost, they will incur

losses and will be forced from the market. For perfect competition to exist there must be no barriers to entry and perfect resource mobility.

A monopoly exists where a single firm sells a product for which no comparable substitutes exist. The firm is, in effect, the industry, and its demand curve is also the demand curve for the industry. The market demand curve demonstrates the limits of the monopolist's market. Given a downward sloping demand curve, and assuming "rational" consumer behavior, the monopolist can increase sales only by decreasing his price. Consequently, the marginal revenue curve lies below the demand curve, and thus will be less than price at different levels of output. The profit maximizing point is where marginal revenue equals marginal cost. Marginal revenue is less than price, therefore price is greater than marginal cost. Since profits will attract new entrants, the monopolist must block entry or else other firms will enter the market.

Monopoly power has often been considered, by neoclassic economists, to encourage inefficient resource allocation and foster inequitable income distribution. Allocation of resources is "inefficient" because it satisfies consumers desires with less than maximum effectiveness. Output is restricted because the monopolist is able to maintain profits by selling less at a higher price. Because of the higher price, some consumers will be priced out of the market. Monopoly profits are considered unearned because there is greater return than necessary to bring factors of production into use. Thus, there is a redistribution of income from labor and owners of other resources to the monopolist.

The pros and cons of competition versus monopoly have provided the basis for centuries of debate. It is argued that competition acts as an incentive for innovation because it forces firms to constantly be

seeking new cost-saving techniques of production. Conversely, some economists hold the view that it is only the monopolist who has the economic security to bear the cost and risk of innovation.[7] Proponents also argue that only monopolies can be large enough to achieve economies of scale. By achieving economies of scale resources can be used more efficiently.

There are two sides to each argument. In classifying market structures, industries are often a blend of competitive and monopolistic elements. Inasmuch as there are arguments concerning the performance that competitive and monopolistic market structures produce, there are also disputes as to the conduct that certain structural elements produce. The following will be a brief summary of the theoretical arguments surrounding ownership, concentration, integration, diversification, differentiation, and barriers to entry.

Ownership

"The capitalistic economy,..., is based on the institution of private property."[8] The property rights involved in ownership include 1) the right to exclusive use of the property; 2) the right to receive rent from the use of property; and 3) the right to exercise management functions. There are also limitations to property rights. Property rights are exclusive rights, but not absolute.[9] They are subject to the limitations and power of the controlling government. One's rights in property are realized only as long as society recognizes them, or a

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[7] J. A. Schumpeter, Capitalism, Socialism, and Democracy, (New York: Harper, 1942), p. 88.

[8] Bain, p. 63.

[9] Barlowe, p. 376.

government is willing to sanction and protect them. Barlowe refers to property rights as a "bundle of rights" in which "sticks" can be removed to reduce one's rights. Rights are subject to the government limitations of taxation, police power, and the power of eminent domain.

Property rights are often apparent in individual proprietorships, but the focus of property and resource ownership is changing. Increasingly, small individual ownership is being discarded to make way for large corporate ownership. The corporation is a unique business phenomena that has tremendous influence over the pattern of today's manufacturing sector. Corporations are significant for the changes they have produced which include: 1) altering the character of ownership in business property; 2) the survival powers of business concerns; and 3) the extent to which owners have the rights of property and managerial responsibility.[10]

The corporation is a device for joint ownership and yet limited liability. Stockholders own only a proportion of the business, with a right to the profits of the corporation that is proportionate to that ownership. Stock may be easily and anonymously transferred. The corporation is a separate legal entity, that can perform functions such as make contracts and borrow money, apart from its shareholders. Finally, the corporation limits liability because the obligation of the stockholders for debts incurred by the corporation is limited to the amount of money invested by the stockholder.

The corporation provides for separation of ownership and control. The board of directors is responsible for policy making, and management of the business. Thus, management of the company does not necessarily

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[10]Bain, p. 64.

lie directly with stockholders. As the number of stockholders increases their proportionate share of the business decreases. Consequently, the average shareholder has a minimum amount of voting power, and thus, little opportunity to influence policies and direction of the company. Three possible control situations exist within a corporation. Oftentimes a small number of stockholders own a majority share of the stock, in which case owners of small holdings can not change policy even if they can overcome the transactions costs of consolidating their voting power. A second situation to exist is called "minority control." In this situation a small number of individuals controls the corporation by holding a substantial minority interest. This interest has more shares than any other voting member, and the other stockholders take a relatively passive interest in management activities. The third situation is where no dominate group holds enough shares to control policy decisions. This "management control" situation exists when none of the stockholders initiate the organization of votes. As such, the existing management, being the only organized body, can easily solicit votes and perpetuate its existence.

Galbraith argues that almost no control lies with the stockholders. He claims that "It is not to individuals but to organizations that power in the business enterprise and power in the society has passed."[11] Decisions are made by a "technostructure" or interdisciplinary group of individuals who each have narrow, but deep knowledge concerning a certain aspect of the decision.[12] Information from a group is necessary because of advanced technological requirements, the

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[11] Galbraith, The New Industrial State, p. 60.

[12] Ibid., particularly chapters 6, 7, and 8.

necessity of planning, and the need for coordination. In order to anticipate future resource requirements, foresight and action are necessary. Consequently, planning requires a large amount of varied information. The corporate structure accommodates technostructures. The large size of corporations develops as a means of extending planning. Planning includes control of supply, control of demand, provision of capital, and minimization of risk. The corporation is able to make decisions concerning inputs and outputs far in advance, and thus, influence buyer demand. By having some control over quantity, price, and raw material purchases, large corporations reduce their own risk and uncertainty.

An individual's decision can be examined by a superior and easily reversed. A decision by a group can not be as easily reversed by an individual because, in order to avoid arbitrariness, the superior would need the judgement of another group of experts. Consequently, in making group decisions, the power of the organization increases. "By taking decisions away from individuals and locating them deeply within the technostructure, technology and planning thus remove them from the influence of outsiders."[13]

The significance of separation of ownership from control is not always clear, but a number of possibilities exist. There are numerous theories concerning the way in which separation of ownership affects aims, motivations, and consequently behavior of a business. It has been suggested that the objectives of managers diverge from the objectives of the stockholders. It is possible for managers to diverge from profit maximization in order to maximize other motivations such

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[13]Ibid., p. 80.

managerial utility. Along this line, if managers' salaries are tied to the amount of sales, managers could conceivably operate the business at the point where sales are maximized rather than profits.[14] In addition, it is possible that management may try and foster their own prestige and power by encouraging growth in the company. This can be done by reinvesting earnings rather than distributing greater dividends.[15]

Another source of separate control is where blocks of stock are owned by mutual investment funds and banks serving as trustees for individual stockholders. These financial institutions may enjoy considerable voting power.

> A tradition of reticence and legal restrictions have limited control which banks and other financial institutions have exercised over internal corporate decision-making, but as the volume of their holdings increases, their influence can not help but rise accordingly.[16]

It is difficult to establish exactly what the differential is between management and owner goals. In any event there are numerous possibilities for divergent actions. This divergence raises issues of the responsibility of ownership, business motivation, and the influences of corporate concerns on business behavior.

Ownership patterns are further complicated by the establishment and acquisition of subsidiaries and divisions. The Handbook of the Law of Corporations and other Business Enterprises defines a subsidiary

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[14]For a study of firm motivation see William J. Baumol, Business Behavior, Value and Growth, rev. ed., (New York: Harcourt Brace Jovanovich, 1967); Adolf A. Berle and Gardiner C. Means, The Modern Corporation and Private Property, rev. ed., (New York: Harcourt, Brace and World, 1968); Armen A. Alchian, "The Basis of Some Recent Advances in the Theory of the Management of the Firm," Journal of Industrial Economics 14 (November 1965): 30-41.

[15]Bain, p. 73.

[16]Scherer, p. 31.

corporation as:

> Separate corporateness of subsidiary and other affiliated corporations will be recognized, ..., where (a) their respective business transactions, accounts, and records are not intermingled, (b) the formalities of separate corporate procedures for each corporation are observed, (c) each corporation is adequately financed as a separate unit in the light of its normal obligations foreseeable in a business of rights, size, and character; and (d) the respective enterprises are held out to the public as separate enterprises. Where one corporation dominates another, the acts of the latter, on principles of agency law, might be attributed to the former.[17]

The distinction between subsidiary and division lies in legal theory. A subsidiary exists separately from the parent corporation and conducts its operations separately.[18] It has its own board of officers and directors, although these can and often are the same as those of the parent company. Divisions, on the other hand, are not separate entities. The officers of the parent company act as controllers of the division. The significant distinction, though, lies in the ramifications for liability. Theoretically, the parent company is not liable for the debts etc. incurred by the subsidiary, but it is wholly liable for its divisions. Profits of a subsidiary may be used in three ways: 1) used for the subsidiary, 2) reinvested in the subsidiary, or 3) directed to the parent company to be used or distributed as they see fit. If the subsidiary is 100% whooly owned by the parent company, there is total flexibility as to which manner the profits are used.

Finally, intercorporate linkages are of interest in assessing market structure. Ties between seemingly independent corporations are

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[17] Harry C. Henn, Handbook of the Law of Corporations and Other Business Enterprises, 2nd ed., (St. Paul: West Publishing Company, 1970), p. 258.

[18] The following information concerning subsidiaries, divisions, affiliates and their respective liabilities was obtained in an interview with Professor Ronald A. Trosty, Professor of Corporate Law at Thomas M. Cooley Law School on July 19, 1977.

increasingly found. Interlocking directorates are one means of establishing ties between corporations, and thus, provide opportunities for collusion. An interlocking directorate exists when a person sits on the boards of two corporations. Although such activities were outlawed by the Clayton Act, an indirect form of this linkage can still occur. An indirect linkage exists when separate directors from the same firm sit on competing firms' boards. Although it is difficult to say what is the exact effect of these ties, the collusive potential that it presents may be significant.

Concentration

Concentration deals with the manner in which shares of the market are distributed to firms in an industry. It is a measure of the extent to which the actual structure of an industry approximates the theoretical classifications of monopoly and competition. The measure provides a means of labeling industries in order to help predict their performance. As an empirical measure it takes into account two factors: the number of firms in the industry and the size distribution of the firms. In the long run, concentration is inversely related to total market size and directly related to optimum firm size.[19] The higher the concentration in an industry, the greater the ability for firms to collude. With only a few firms controlling a large share of the market, policing costs are reduced, and thus it is easier for the firms to reach agreement on pricing and output decisions.

Concentration is a difficult concept to measure. Various formulas have been developed, but the most common measure is the four-firm

[19] Ornstein, p. 612.

concentration ratio (C_4).[20] It measures percentage of sales of the total industry held by the four largest firms. Each method of measurement has advantages and disadvantages, but no one is the "best." The measure used should be that which is most appropriate for the particular situation. The basic problem is that one can not find information as to the market share (measured by percent of industry sales) of individual firms.

One of the disadvantages of the C_4 ratio is that it does not necessarily define markets accurately because of its reliance on SIC classifications. SIC groups firms according to similar products or processes, but this is not always a clear indication of the true market. The aggregation of data causes SIC classes to contain many non-substitutable products. It also excludes foreign sellers and it implicitly assumes the market is a national market, when, in fact, the market may be local or regional. This results in an understatement of true concentration levels.[21] The C_4 ratio does not account for the spatial distribution of the population, and consequently can assess spatial competition incorrectly.

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[20]Other prominent techniques of measurement include the 1) Herfindahl ratio which is a weighted average of market shares; $H = \sum_{i}^{m} P_i^2$ m = the number of firms in the industry; H is bounded by 0 and 1; for a monopoly H = 1 and for an atomistic industry H = 0; 2) Horbath ratio is a measure of the sum of the share of the largest firm plus the Herfindahl index reinforced by a multiplier.

[21]Dennis C. LeMaster, "Recent Merger Activity of the Largest Firms in the Forest Products Industries," (Ph.D. dissertation, Washington State University, 1974).

I. M. Grossack noted that "Concentration measures can not indicate, by themselves, the power of monopoly in an industry. The ultimate test of power is their ability to impede entry to new, smaller firms."[22] He hypothesized that market power was dependent on those factors that affect permanent concentration rather than temporary fluctuations. Thus market shares are not necessarily a reflection of entry-barrier ability as is the relative sizes of the larger firms and, most importantly, the degree to which a firm is able to maintain or expand their share over a period of time. Market shares have "permanent" and "transitory" components, and it is necessary to derive measures of concentration based on the permanent component.

Concentration is significant because when only a few firms supply the market, their output decisions affect the market price. Since competitors can view the effect that they, and other firms have on market price, they recognize their interdependence and are more likely to act together in pricing and output decisions. Thus, the fewer the number of sellers, the more likely that restrictions to price competition exist.

Integration

Vertical integration describes the extent to which firms participate in the entire range of production and distribution stages of a product. There is no single theory concerning the effects of vertical integration. Rather, there exists a series of ideas concerning vertical integration and the problems and economies that it poses.

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[22] I. M. Grossack, "The Concept and Measurement of Permanent Industrial Concentration," Journal of Political Economy 80(4) (July-August 1972): 745-60.

One of the problems that arises with this concept is a problem of definition. Vertical integration involves putting together two production processes that could be separated. This requires that one be able to distinguish separable processes and who potential buyers and sellers are along the production line of a product. Often neat distinctions are not easily made. Secondly, vertical integration is an extremely difficult concept to measure. Suggested means of measurement include using the ratio of value added to sales. This is perhaps the best measurement devised thus far, but it still says nothing of separable technical processes, and it is biased in that the further "upstream" one is in the process, the greater the ratio will be. Consequently, it is a topic area in which many hypotheses have been proposed, but quantitative data are difficult to find.

Vertical integration is thought to affect behavior in a number of ways. One school of thought views vertical integration as a means of increasing monopoly power. It potentially gives firms the ability to squeeze rivals out of business. Firms can adjust their price at different stages so that nonintegrated competitors at one stage cannot make a profit. They sacrifice profits at one stage for greater profits at a higher stage of production. Vertical integration is also thought of as a means of increasing price rigidity. According to the Adams-Dirlam version of this thesis, an industry is an inverted triangle.[23] At each stage of production the firm has a smaller successive part of the market than at the stage before. In order for firms to collude in their pricing decisions it is necessary to maintain a rigid vertical

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[23]Walter Adams and Joel B. Diriam, "Steel Imports and Vertical Oligopoly Power," American Economic Review 54 (September 1964): 626-55.

price structure. Vertical integration assists in this by positively controlling output at all levels, and limiting opportunities to hide it quietly in sales to nonintegrated firms. Vertical integration improves a firm's ability to discriminate in price. In order to discriminate the firm must be able to prevent resale from groups that receive low prices (high elasticity of demand) to groups that must pay high prices (less elastic demand). By integrating with a price group of less elastic demand, the firm can potentially discriminate more effectively. Finally, vertical integration might increase entry barriers in already concentrated industries.

In order for new entrants to enter a vertically integrated, concentrated industry, and compete effectively, they are obligated to enter at all stages of production. Thus, they can avoid being squeezed out by integrated firms, but at the same time capital costs are increased. In addition, it also means that one must obtain expertise at the different levels of production.[24] Vertical integration is also a means of enhancing a firm's control over its economic environment.[25] By integrating upstream, a firm can supply its own raw materials and thus protect its supply in times of shortage.

On the opposite side of the fence are those economists who indicate vertical integration has little effect on monopoly power. A University of Chicago school of thought indicates that market power is a function of horizontal market share and entry barriers.[26] Since,

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[24]Oliver E. Williamson, Markets and Hierarchies, (New York: Free Press, 1975), Chapters 5-7.

[25]Scherer, p. 70.

[26]John A. McGee and Lowell R. Bassett, "Vertical Integration Revised," Journal of Law and Economics 19(1) (April 1976).

they claim, vertical integration does not affect market share or entry barriers, it can not worsen industry behavior. Others see vertical integration as a means of coping with risk and uncertainty. "By conducting economic activities within the boundaries of its own organization for arm's-length bargaining."[27] Vertical integrations is seen also as a means of achieving cost and resource savings. In multi-step production, vertically integrated firms can eliminate repetition of certain steps in the process such as re-wetting or reheating. They can also achieve time economies by having a continuous production process and eliminate certain transportation costs.

Oliver E. Williamson developed a three part hypothesis that vertical integration is a response to what he calls "bounded rationality," "opportunism," and "information impactedness."[28] Bounded rationality refers to the inability of people to be perfectly rational because of the high costs of information and transactions. He further contends that firms practise "opportunism" by manipulating information and keeping relevant contract information private. If there are many buyers and sellers, the opportunity for "opportunism" is zero because it is to each firm's advantage to be as open as possible. Finally, "information impactedness" exists when the true condition is known by one party of the contract and the other party does not know, but could find out this information for a price. Because information contracting is so costly, vertical integration results. Williamson's model of vertical integration takes the transactions costs out of the market and

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[27]Roger Sherman, The Economics of Industry, (Boston: Little, Brown and Company, 1974), p. 163.

[28]Williamson, Chapters 5-7.

internalizes them in the organization. Through vertical integration, opportunism is curbed because two parties no longer have the same motivation to misrepresent information since they are all part of the same firm. Likewise, information impactedness is lessened because communication is improved. Convergence of expectations provides for better coordination.

Obviously, there is a considerable difference of opinion as to the true reasons firms integrate, and the subsequent effect that integration has on production. Whether or not vertical integration is harmful in promoting monopoly power, or improves efficiency of resource use appears to depend on the specific industry and its conduct in an integrated situation.

Diversification

Diversification exists when one firm produces a varied product line. Thus, a firm sells to a series of markets. As with other aspects of structure, diversification is also difficult to define and measure. The number of technologically distinct product lines is often used as a measure, but again a problem arises in defining distinct product lines.

Diversification may offer economies to the consumer and producer.[29] It provides a means of spreading risk over a number of areas and thus often makes funds easier and cheaper to borrow. It often offers oligopolists who can not increase their share in one market a means of growth by expansion into another market.

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[29]Sherman, p. 163.

Diversification is a relevant topic area of study because of the perspective it provides: 1) as a structural element, 2) as a condition affecting pricing behavior, and 3) as a stimulus for research and development. It is obtained by either developing an entirely new product line or else through mergers. Mergers, it can be argued, create and sustain market power.[30] They are thought to be anticompetitive because mergers among former competitors serve to lessen competition.[31] On the other hand, mergers can promote economies of scale, and facilitate efficient resource allocation.

Differentiation

The type of product produced by an industry also helps establish the type of market structure. Products are either homogeneous or differentiated. A homogeneous product is one in which competing products are considered to be perfect substitutes in the buyer's mind. Differentiation indicates a lack of perfect substitutability between products.

There are various means of product differentiation which include: 1) difference in quality and design, 2) product imagery produced by buyer ignorance of the product's essential characteristics, 3) sales-promotion and advertising, and 4) differences in the locations of sellers. By product differentiation, a seller hopes to increase its share of the market. In an atomistic market the effect of advertising on overall demand is an externality to the seller.[32] In the case of a limited number of sellers, the incentive to differentiate a product may be greater. Advertising can produce a gain somewhat proportional to the oligopolist's market share. By advertising the oligopolist can

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[30]Ibid., p. 171. [31]Ibid. [32]Ibid., p. 334.

capture sales from rivals without immediate retaliation, as well as gain overall expansion of market demand.

When the market is differentiated, two situations arise with respect to price. First, no common price is necessarily followed because the seller is not faced with the total loss of his market share. Thus, he gains some control over price. Secondly, some producers may establish a superior position in the preference hierarchy of consumers. Consequently, less advantaged sellers are unable to sell any of their product unless they price below their advantaged rival. Two or more different prices may be established for essentially the same good. The ability of a few firms in the industry to obtain strong product differentiation advantages has been a reason for the emergence of oligopolistic market structures.[33] In addition, disadvantages to those other firms that can only obtain small market shares explains the existence of a competitive fringe around an oligopolistic structure.

Differentiation of products influences pricing, establishment of market share, and potential range of conduct open to sellers. It has been argued that product differentiation promotes market control through persuasion rather than product information. Promotion economies favor large sellers. Scherer notes that, "...most of the product differentiation effort observed in modern private enterprise economy represents little more than a natural healthy response to legitimate demands."[34] Scherer also indicated that differentiation facilitated entry into markets. If a company can find an isolated area or a demand for particular product features, it is possible for them to carve out a share of

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[33]Bain, p. 231. [34]Scherer, p. 324.

the market. "Innovation is probably one of the most common and successful ways of hurdling otherwise formidable barriers to new entry."[35] Conceivably, the more differentiated a product becomes, the producer becomes more independent, and there is less reason to act collusively.

Barriers to Entry

Barriers to entry determine the competitive relationship between sellers already in the market and potential entrants. The higher the barriers, the less competitive is this relationship. Bain describes the condition of entry as "the 'disadvantage' of potential entrant firms as compared to established firms'..."[36] Theoretically the condition of entry refers to the degree to which firms can raise their price above minimum average cost without attracting new entrants into the industry.

There are basically four sources of entry barriers. They include: 1) advantages attributable to scale economies, 2) absolute cost advantages, 3) product differentiation, and 4) government regulation. Economies of large scale enable firms to market products at lower average costs per unit than small producers. Additionally, large scale production provides economies in time and also "economies of massed reserves."[37] By being able to maintain multiple machines a large company can protect itself against machine failure, etc. Large firms are also afforded pecuniary economies such as price concessions from suppliers, as well as economies in raising financial capital. But there appears to be a limit to the extent a large firm can capitalize on scale economies, i.e., scale economies may be subject to diminishing returns. As a firm gets larger, management costs increase and the

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[35] Ibid., p. 230. [36] Bain, p. 252.

[37] E. A. G. Robinson, The Structure of Competitive Industry, Rev. ed., (Chicago: University of Chicago Press, 1958), pp. 26-27.

complex hierarchy may increase the difficulties of effective communication. In addition, as a corporation grows it becomes more and more difficult to keep each branch of operation harmonious with the other parts.

Absolute cost advantages provide a second type of barrier. These advantages accrue to established firms whose costs are lower, at any scale, than those of potential entrants. Means of obtaining these advantages include control of processes by patents, exclusive ownership of required resources, the inability of entrants to acquire necessary factors of production on the same terms as existing companies, and less favorable access to financial funds for potential entrants.

The third source of barriers to entry is product differentiation. Possible sources of this type of barrier include buyer preference for established brand names, exclusive control of designs through patents, and ownership or control over advantageous distribution outlets.

The final source of barriers to entry is government regulation. The manner in which patents or licenses are distributed can effectively act as a barrier to entry. Government requirements and standards can also act as barriers.

The significance of entry barriers lies in the potential for market control. "The presence of entry barriers enables existing firms to behave in a cooperative way without having outsiders come in and upset the result."[38]

There are many theories concerning determinants of market structure and their relevance in determining market behavior. Few quantitative studies have been done that show conclusive results. Consequently,

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[38]Bain, p. 284.

it is often difficult to use these structural determinants to definitively establish market structure. Nevertheless, they provide a structural means for examining and predicting conduct and performance. Using these elements of structure, one can examine the pulp and paper industry to determine its structural characteristics.

CHAPTER III

SPATIAL ANALYSIS OF SUPPLY AND DEMAND MARKETS

Before one can discuss data concerning the structural characteristics of the industry, it is necessary to discuss the supply and demand markets for the industry.

Supply and Demand Regions

The market for pulp and paper products has been extremely volatile in the last four years. In 1973-1974, the United States experienced a surprising shortage of paper. Then, the following year the country experienced the worst economic slump in the post-World War II era.[1] Inventories were stockpiled by customers in response to shortages, consequently consumption dropped and excess capacity resulted. Operating rates fell to seventy percent of capacity.[2]

Pulp is a commodity used worldwide. Short term price movements can be significantly affected by the equilibrium between world supply and demand. An important aspect of the world pulp market is that Nordic countries, particularly Sweden, have built up inventories of market pulp.[3] This is possible because pulp inventories are subsidized by the government. In addition, there were several prolonged strikes

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[1]The Mead Corporation, Annual Report, 1976, p. 2.

[2]John Evans, "Paper Industry Successfully Weathered a Tough Year, Now Sees Brighter Outlook," Pulp and Paper, June 1976, p. 23.

[3]Ibid.

in Canada that removed large supplies of pulp from the market. The combination of strikes and withheld Scandinavian pulp resulted in high rigid prices for the pulp buyer.

Wholesale prices (Figure 1) and price indices (Table 1) indicate changes in supply and demand over a six year period from 1969-1975. The shortage of 1973-1974 is reflected in tremendous price increases for four items selected from the pulp and paper group. This is in contrast to the relatively stable period from 1970-1973. Woodpulp showed the greatest percentage increase, followed by newsprint. Prices for sulfate pulp more than doubled in the six year period.

TABLE 1.--WHOLESALE PRICE INDICES FOR PULP AND PAPER PRODUCTS. AVERAGE INDICES (1967=100).

Item	1969	1970	1971	1972	1973	1974	1975*
Woodpulp	100.0	109.3	111.5	111.5	128.3	217.8	283.6
Paper, except newsprint	106.3	112.0	115.2	116.3	121.0	147.7	169.4
Writing paper	106.3	111.9	116.5	116.7	127.4	147.8	162.8
Newsprint	104.4	107.6	113.0	116.7	122.2	151.2	184.0

SOURCE: Bureau of Labor Statistics, U.S. Department of Labor, Wholesale Prices and Price Indexes.

*Average calculated using quarterly figures.

Demand for pulp and paper is a derived demand. In other words, demand for it derives from demand for the final product in which it is used. Because of this, demand for pulp and paper is usually assumed to be relatively inelastic. Even though pulp and paper add only a small portion of the value to the final product, other raw material substitutes have proven uneconomical to use in place of woodpulp for most

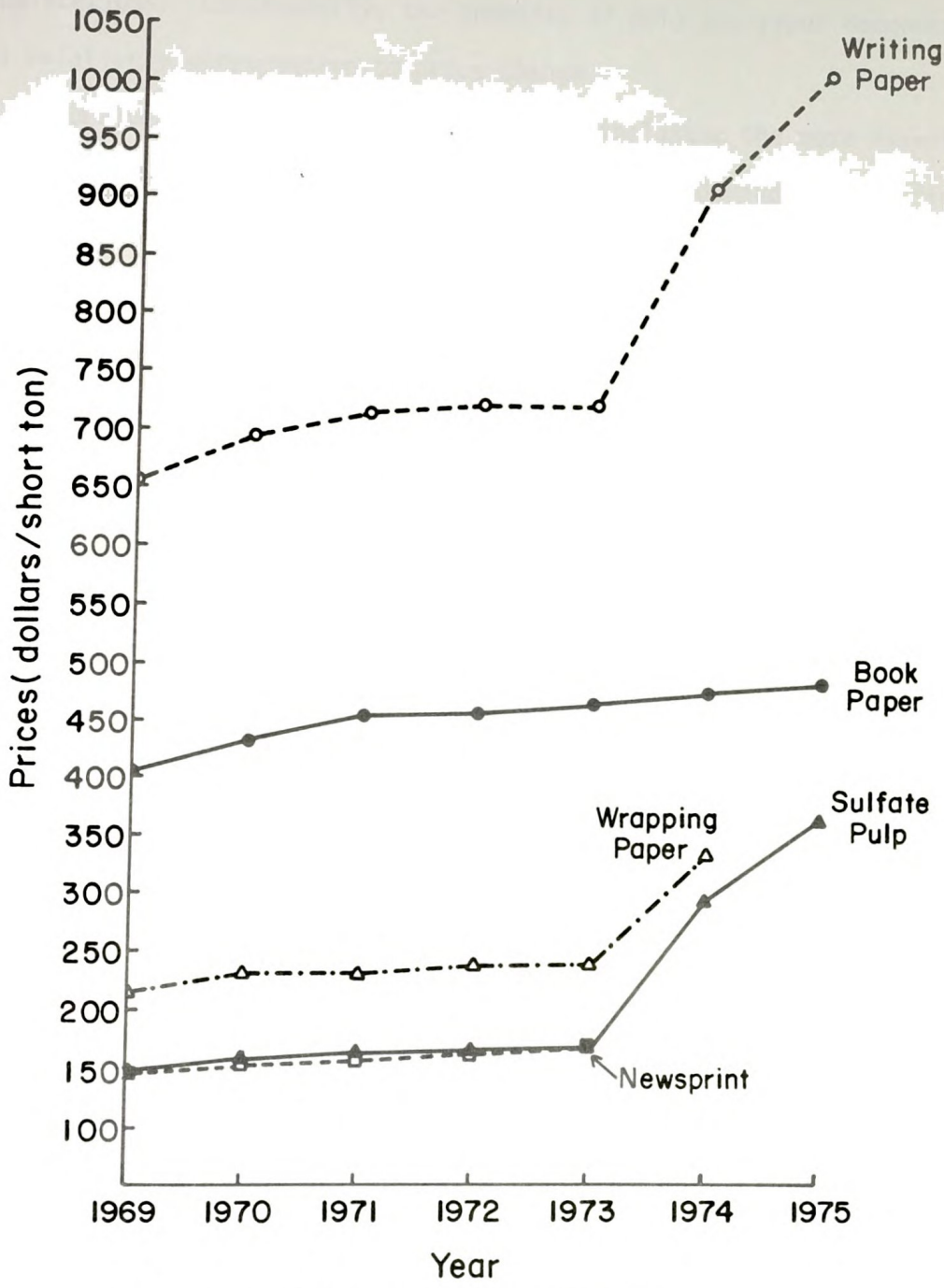

FIGURE 1.--PRICE TRENDS OF SELECTED PAPER PRODUCTS.

NOTE: Prices are in current dollars.

applications. Consequently, the quantity of pulp and paper demanded is relatively unresponsive to price change.

Derived demand is thought to be more inelastic the more essential the factor being examined; the more inelastic the demand for the final product; the smaller the percentage of total cost that goes to the factor; and the more inelastic the supply curve of other factors.[4] But, as Gregory points out, this applies to pulp and paper when they are viewed as a single commodity. When separated into finer product classes, the demand for a specific paper product may be relatively elastic.

The supply of pulp and paper is dominated, in part, by the nature of the industry. Excess capacity usually exists which makes supply relatively elastic. But, when excess capacity is used supply becomes largely inelastic due to time lags involved in expanding and adding new facilities. Fixed costs represent a large percentage of total costs. Thus, if there is excess capacity, a firm can decrease unit costs by increasing its sales volume.

Examination of supply and demand regions is, at best, a means of delineating the geographic extent of the market. A spatial representation of the market also says a good deal about industrial structure. The geographic extent of markets is a significant measurement of industrial concentration.[5] Traditionally, the spatial component has been largely ignored in the analysis of economic problems. But it is an important element of analysis, particularly in terms of spatial competition. Oftentimes, industries appear relatively unconcentrated when

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[4]Gregory, p. 151. [5]Weiss, p. 245.

examined over time, and on a national basis; but within a specific spatial context, concentration can be quite high.

Weiss defines the geographic market as "...the set of locations from which plants supply or could profitably supply a given consuming point."[6] He indicated that the "most straight-forward measure" of the market would be the maximum profitable shipping distance. The Commodity Transport Survey of the Census of Transportation provides information on percent distribution by distance of shipment of commodities. The maximum distance shipped is not an accurate means of measuring market size because most products have shipments in all distance classes; and the farthest distance is not representative of the true market situation.[7] Consequently, indices are used that measure the radius within which 80 percent of total tonnage (R_{80}) and 90 percent of total tonnage (R_{90}) are shipped. The percentage of tonnage shipped less than 500 miles (P_{500}) is also calculated.

Using data from the 1972 Census of Transportation, the application of Weiss' technique revealed estimated market sizes as follows:

S.I.C.	Industry group	R_{80} (miles)	R_{90}	P_{500} (%)
26	Pulp, paper & allied products	511	781	79.6
26111	Pulp	191	260	94.4
262	Paper, except building paper	750	929	66.0
2621	Paper	750	929	66.0
26213	Printing paper, coated & uncoated	723	922	68.8

These indices indicate that the market area for pulp has a radius approximately 225 miles from the point of production. At least 94 percent of the pulp produced in Michigan is shipped less than 500 miles

[6] Ibid. [7] Ibid., p. 247.

away. The Census of Transportation indicates 45 percent of the distribution travels less than 100 miles. The trend of local and regional supplying applies to the entire East North Central region. Approximately 61.3 percent of the distribution remains in the East North Central Region.[8] The pulp mills in the state show overlapping supply areas. From available information, each of the pulp mills indicated that pulp produced was used in their own paper production and the surplus sold on the market. Realistically, each pulp mill might supply smaller or larger areas, depending on their contract situation. Mills in the southern Lower Peninsula are within the supply areas of Menasha. Abitibi, S. D. Warren, and Packaging Corporation. Three of these companies produce principally paperboard, which uses a lower grade pulp than finer grade papers. Paper mills in the south also fall within Canadian supply regions and supply regions of other East North Central states.

The market for paper products is generally much larger than pulp markets. The R_{80} and R_{90} indices indicate that the market for paper products is approximately 825 miles from the source of production. This indicates a more regional or national market. Large population centers such as Detroit and Chicago fall within these regions. From these points products are conceivably distributed nationwide. Hunter indicated that the market for low quality paper, such as newsprint was probably more local, whereas the market for high quality paper is much larger.[9] Since the transportation figures aggregate all the paper

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[8]Charles L. Smith, "The Transportation of Pulp, Paper and Board," Pulp, Paper and Board, July 1971, p. 19.

[9]Hunter, "Innovation, Competition, and Locational Changes in the Pulp and Paper Industry 1880-1950," Land Economics 31(4): 321.

grades together, the R_{80} and R_{90} estimates probably overestimate market size for low grades of paper.

These indices are possibly inaccurate estimates of market size for a number of reasons. First, R_{80} and R_{90} are subject to interpolation, and thus may be inaccurate. Secondly, the distance commodities are shipped depends on established plant locations. The indices imply spatial equilibrium by assuming that long run optimal location patterns have been attained. Since long run equilibrium may not have been achieved, distance shipped either overstates or understates the area over which firms would compete.[10] Third, the indices may be inaccurate if customers are geographically centralized or if inter-regional cost differences coincide with high transportation cost.

According to the 1972 Census of Transportation, 95 percent of all pulp shipments from Michigan were by rail, and the remainder by motor carrier.[11] Over 50 percent of paper shipments were by rail. The greatest part of Michigan pulp and paper production was to the East North Central Region--Wisconsin, Illinois, Indiana, Michigan, and Ohio. The type of transport is a function of weight more so than distance. Railroads are generally used for longer, heavier shipments, whereas trucks are used for shorter and smaller hauls.

Optimal Location

Paper manufacturing has existed for hundreds of years. In the past, production was usually close to the market site, because of the

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[10] According to Helen Hunter long run optimal location patterns in the industry have not been achieved; p. 325.

[11] U.S. Bureau of the Census, Census of Transportation, 1972, Commodity Transportation Survey-Area Series: Area Report 3, TC72C2-3, (Washington, D.C.: U.S. Government Printing Office, 1975).

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process used. Major inputs were either straw, rags, or waste paper, which were available at population centers. In addition, pulp mills were located next to paper mills. In 1880 wood pulp was introduced as a raw material source. This caused a major change in optimal location patterns of pulp and paper mills. Hunter indicated three reasons why this change occurred.[12] Pulp manufacturing is a weight-losing process, therefore it is not economical to transport pulpwood logs over long distances, in order to process them. Secondly, woodpulp is most efficiently produced on a large scale. Because of high capital investment in plant and equipment, it is advantageous to locate close to where there is a long-time adequate wood supply. Finally, Hunter notes that newsprint and cheaper grades of paper are most efficiently produced at plants integrated with pulp mills. The economies of integration compensate for the cheaper transportation rate of pulp.

Location theory usually assumes that in the long run, competitive forces will cause the industry to conform to optimal location patterns. "Competition, in so far as it prevails, will reward and encourage well-located enterprises and shorten the lives of poorly located one."[13]

Hunter claims, though, that the optimal location pattern has not evolved. Her study of mill locations indicated that, "There seems to have been a continuing preference for locations near the traditional sites of paper production."[14] She claims that the high capital to value of output ratio has, in part, prevented competitive forces from forcing inefficiently located mills from the market. Liquidation of

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[12] Ibid., p. 317.

[13] Edgar M. Hoover, The Location of Economic Activity, (New York: McGraw-Hill, 1954). p. 9.

[14] Hunter, p. 318.

small mills did not result in heavy capital losses, but large plants continued production even at the added cost of transporting roundwood. As plant size and production increased, the proportion of fixed to total costs also increased. Therefore, the higher the proportion of fixed costs, the less influence competition had on eliminating ineffective mills. Secondly, Hunter indicates there was also an increase in firm size. "These large firms were not able to eliminate competition, but there can be no doubt that the paper and pulp market as a whole was less competitive..."[15] As the scale of production rose, large firms had greater staying power than small firms.

These factors are more prevalent in high-grade paper production, rather than in newsprint and wrapping paper. Expansion and new sites seemed to approach optimal locations for newsprint and wrapping paper. Fine quality paper production, however, continued to resist forces for optimal location. Due to high fixed costs, mills shifted from low grade to higher grade paper, and more profitable production. Higher grade paper is more differentiated, and thus, "...mills seem to have found competition less strenuous."[16] Paper mills did not have to locate near timber supplies, necessarily, due to the availability of Scandinavian pulp. It is more efficient to ship pulp to paper mills rather than ship pulpwood to pulp mills.

Hunter's analysis of the industry does not completely hold in Michigan's case. With the exception of the Menasha Corporation in Allegan County, the other seven pulp mills are located close to those areas where pulpwood production is clearly greatest (Figure 2). The western Upper Peninsula harvests the greatest amount of pulpwood,

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[15] Hunter, p. 320. [16] Ibid., p. 321.

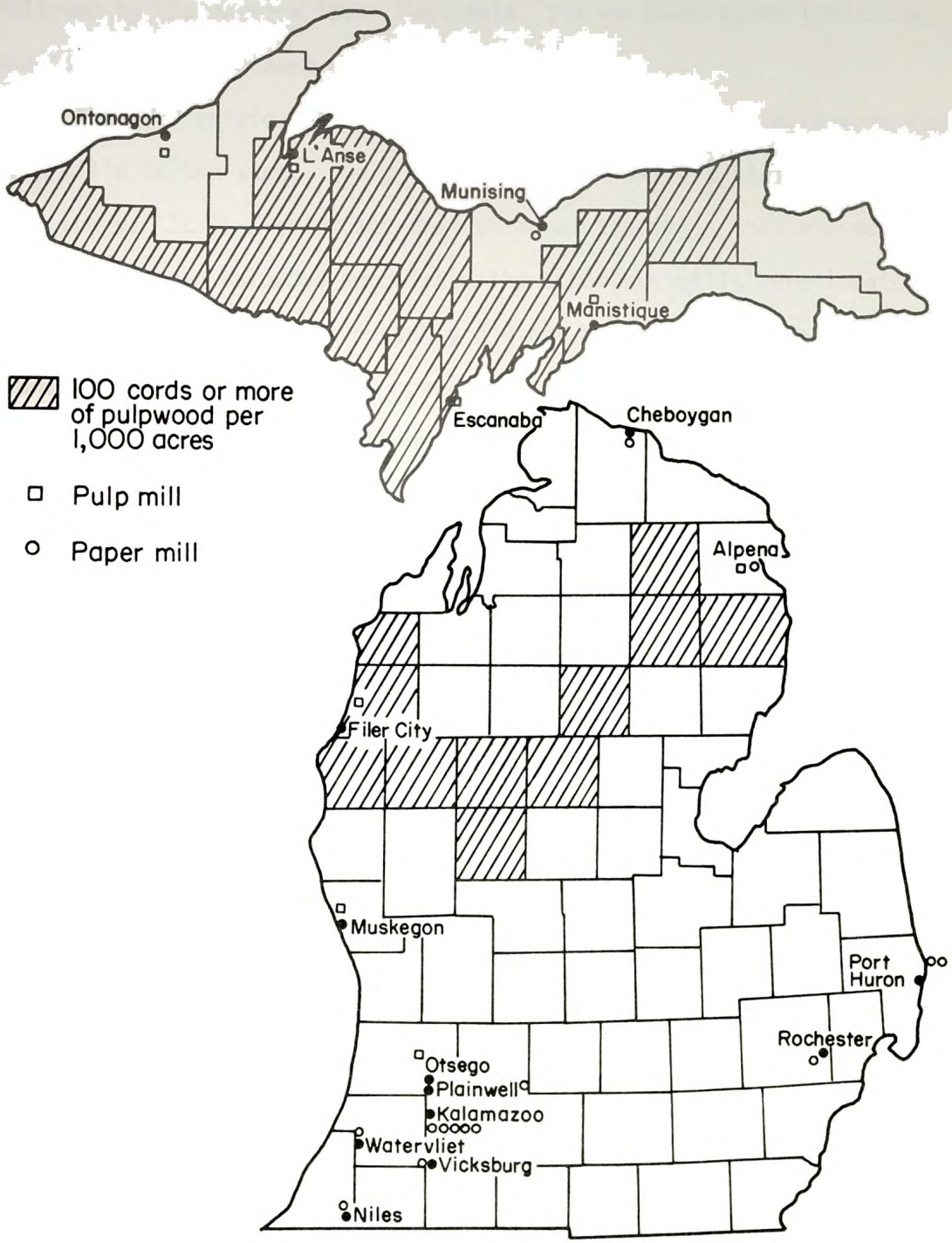

FIGURE 2.--LOCATION OF PULP AND PAPER MILLS.

followed by the eastern Upper Peninsula, the northern Lower Peninsula, and finally the southern Lower Peninsula.

The 1939 edition of Lockwood's Directory indicated there were ten pulp mills in the state. Only five of those mills are still in operation today. It is significant that three of the mills that closed were not located near pulpwood supplies. The other two mills were located near pulpwood sources, but probably did not achieve significant enough economies of scale to stay in operation. With the exception of Menasha, the remaining mills in operation today are located near pulpwood supplies. Hunter hypothesized that the high proportion of fixed to total costs was the reason for less than optimal firms remaining in business. Examination of the Michigan mills lends support to this theory.

CHAPTER IV

THE STRUCTURE OF THE PULP AND PAPER INDUSTRY IN MICHIGAN

Location

Twenty-three pulp and paper companies were examined in this study. Eight of the companies have integrated facilities, producing both pulp and paper. Four integrated pulp mills and ne paper mill are located in the Upper Peninsula of Michigan. Using the northern border of Muskegon County as the division between the northern and southern Lower Peninsula, two pulp and two paper mills are located in the northern Lower Peninsula; and two pulp mills and twelve paper mills are located in the southern Lower Peninsula. Most paper companies lie in the most populated area of the state and relatively close to large population centers (Detroit, Kalamazoo, Muskegon). Figure 2 indicates the location of the various mills.

Ownership

Twenty companies are either subsidiaries or divisions of large, national corporations. Only three companies in the state, Fletcher Paper Company, French Paper Company, and Port Huron Paper Company, are not part of larger firms. Six companies, Fletcher, French, Manistique, Menasha, Watervliet, and Simpson Lee, are all privately or closely held corporations for which no annual reports or stock prospectus are

available. Twelve companies are wholly-owned subsidiaries, while eight are considered divisions. Table 2 provides the location of the companies, their legal distinction, and the name and location of parent companies.

It was difficult to distinguish whether a company was a subsidiary or a division, according to legal definitions. Often companies use these terms interchangeably in annual reports. Delineation was made according to responses reported in the Form 10-K Report to the Securities and Exchange Commission. In addition, there is often a complex hierarchy of ownership that makes it difficult to identify the parent company, as in the case of Pioneer Paper Stock Company. Pioneer Paper is a division of Container Corporation of America which was a division of Marcor, Inc.[1] Marcor was recently acquired by Mobil Corporation in which Container Corporation, Montgomery Ward and Company, Inc. and Mobil Oil are all operating units. A diagram of this complex relationship is provided in Figure 3.

All companies are corporations with the exception of Kimberly-Clark Corporation-Munising Division. To do business in the state, a corporation must be registered with the Corporations Division of the Michigan Department of Commerce as either a domestic or foreign corporation. A domestic corporation is one which originally incorporated in the State of Michigan. A foreign corporation is one that has incorporated under the laws of another state, but wishes to conduct business in Michigan. Incorporation laws are different for each state. Some

[1]There was some confusion as to whether or not Container is still considered a division of Marcor. The 1976 Annual Report indicates that Container Corporation is considered one of five holding companies that comprise Mobil Corporation. It appears that the affiliation with Marcor is being dropped.

TABLE 2.--OWNERSHIP AND LEGAL DISTINCTION OF PULP AND PAPER COMPANIES IN MICHIGAN.

Company Name	S.I.C.	Location of Mill	Legal Distinction	Parent Company	Headquarters Location
Abitibi Corp.*	2661	Alpena	S	Abitibi Paper Co., Ltd.	Toronto, Ontario
Brown Co.	2621	Kalamazoo	S	Gulf & Western Industries	Pasadena, Ca.
Celotex Corp.*	2661	L'Anse	S	Jim Walter Corp.	Tampa, Fl.
Charmin Paper Products Co.	2621	Cheboygan	S	Proctor & Gamble	Cincinnati, Oh.
Dunn Paper Co.	2621	Port Huron	S	Dennison Manufacturing	Waltham, Ma.
Escanaba Paper Co.*	2621	Escanaba	S	Mead Corp.	Dayton, Oh.
Fletcher Paper Co.	2621	Alpena	Parent	Fletcher Paper Co.	Alpena, Mi.
French Paper Co.	2621	Niles	Parent	French Paper Co.	Niles, Mi.
Georgia-Pacific Corp.	2621	Kalamazoo	S	Georgia-Pacific Corp.	Portland, Or.
Hoerner-Waldorf Corp.*	2631	Ontonagon	D	Hoerner-Waldorf Corp.	St. Paul, Mn.
International Paper Co.	2621	Kalamazoo	D	International Paper Co.	New York, N.Y.
Kimberly-Clark Corp.	2621	Munising	D	Kimberly-Clark Co.	Neenah, Wi.
Manistique Pulp & Paper Co.*	2621	Manistique	S	Field Enterprises	Chicago, Ill.
Menasha Corp.*	2631	Otsego	D	Menasha Corp.	Neenah, Wi.
Packaging Corp. of America*	2631	Filer City	S	Tenneco	Houston, Tx.
Pioneer Paper Stock Co.	2621	Kalamazoo	D	Mobil Corp.	New York, N.Y.
Plainwell Paper Co., Inc.	2621	Plainwell	D	Philip Morris, Inc.	New York, N.Y.
Port Huron Paper Co.	2621	Port Huron	Parent	Port Huron Paper Co.	Port Huron, Mi.
Rochester Paper Co.	2621	Rochester	S	James River Paper Co.	Richmond, Va.
SCM/Allied Paper Co.	2621	Kalamazoo	S	SCM Corp.	New York, N.Y.
S.D. Warren Co.*	2621	Muskegon	D	Scott Paper Co.	Philadelphia, Pa.
Simpson Lee Paper Co.	2621	Vicksburg	D	Simpson Lee Paper Co.	Seattle, Wa.
Watervliet Paper Co.	2621	Watervliet	S	Parsons & Whittemore, Inc.	New York, N.Y.

SOURCE: Lockwoods Directory to the Paper & Allied Trade, 1976; and Directory of Michigan Manufacturers, 1976.

* Integrated pulp and paper mill. S-Subsidiary. D-Division.

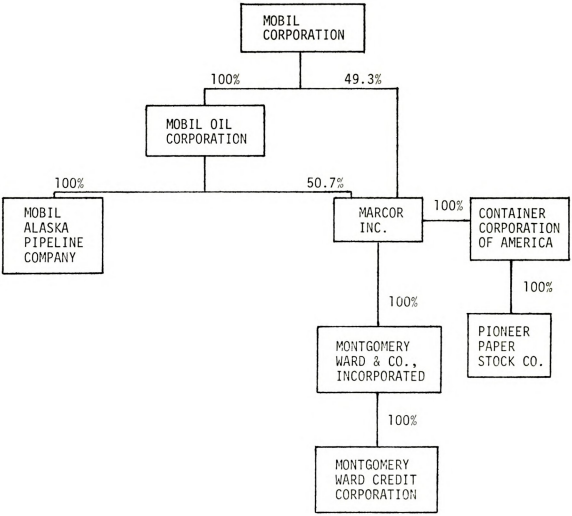

FIGURE 3.--CORPORATE STRUCTURE OF MOBIL CORPORATION.

NOTE: Percentages indicate respective stock ownership of each subsidiary.

are particularly lenient, as in the case of Delaware, providing for greater flexibility in management action. This is in an effort to attract industry and, thus, tax dollars to the state. Michigan had a particularly stringent and archaic Corporations Act until 1973.[2] Thus, it was to some companies' advantage to incorporate outside the state. In 1973, the Michigan legislature did almost a total revision of the Act, liberalizing it considerably. Oftentimes a parent company is a foreign corporation which controls a domestic company. Escanaba Paper Company is a domestic corporation even though its parent corporation, Mead Corporation, is incorporated in Ohio. The advantage of this is that Escanaba, and thus Mead, avoids paying a franchise tax. If a company is incorporated in another state, a foreign corporation is liable for tax payments in both states.[3] The type of corporation and the place of incorporation for the parent company are noted in Table 3.

Three companies have headquarters located in the state, whereas others are spread throughout the United States. All parent companies are corporations, consequently they are owned by a number of stockholders. The number of stockholders probably varies from a few in the case of the privately held companies, to thousands in the case of the larger national corporations. Information concerning stock ownership is not available, except in cases where one shareholder holds 10% or more of the stock. This was the case with four of the companies in Michigan. In 1976 the First Trust Company of St. Paul held 12.5% of

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[2]Ronald A. Trosty, Professor of Law, Thomas M. Cooley Law School: interviewed on July 19, 1977.

[3]Ibid.

TABLE 3.--PLACE OF INCORPORATION OF MICHIGAN PULP AND PAPER COMPANIES.

Company	Foreign or Domestic Corporation	Place of Parent's Incorporation
Abitibi Corp.	Foreign	Canada
Brown Co.	Foreign	Delaware
Celotex Corp.	Foreign	Florida
Charmin Paper Products Co.	Foreign	Ohio
Dunn Paper Co.	Domestic	Massachusetts
Escanaba Paper Co.	Domestic	Ohio
Fletcher Paper Co.	Domestic	Michigan
French Paper Co.	Domestic	Michigan
Georgia-Pacific Corp.	Foreign	Georgia
Hoerner-Waldorf Corp.	Foreign	Delaware
International Paper Co.	Foreign	New York
Kimberly-Clark Corp.	Foreign	Delaware
Manistique Pulp & Paper Co.	Foreign	n.a.
Menasha Corp.	Foreign	Wisconsin
Packaging Corp. of America	Foreign	Delaware
Pioneer Paper Stock Co.	Foreign	Delaware
Plainwell Paper Co., Inc.	Domestic	Virginia
Port Huron Paper Co.	Domestic	Michigan
Rochester Paper Co.	Domestic	Virginia
SCM/Allied Paper Co.	Foreign	New York
S.D. Warren Co.	Foreign	Pennsylvania
Simpson Lee Paper Co.	Foreign	Washington
Watervliet Paper Co.	Foreign	New York

SOURCE: Corporations Division, Michigan Dept. of Commerce.

the outstanding shares of Hoerner-Waldorf Company; Merrill Lynch, Pierce, Fenner and Smith, Inc. hold 10.4% of the stock of SCM/Allied Paper. The Kimberly-Clark Corporation provided a breakdown of their 1975 stockholders: 30.6% are male; 37.9% are female; 14.2% are joint; .6% are nonprofit organizations and brokers; 10.4% are fiduciaries, including trustees and executors; 2.6% are other corporations or companies, etc. Nominees, which represent 3.7% of the total number of shareholders own 52.3% of the stock of Kimberly-Clark.

Three owners hold significant shares of James River Corporation. Brenton Halsey, Chairman of the company owns 7.3% of outstanding common stock; Robert Williams, President of the Corporation owns 5.5% of the outstanding common shares. Finally, and perhaps most significant, FNCB Capital Corporation, a wholly owned subsidiary of Citbank N.A. owns 15.5% of the outstanding shares of common stock, and also owns 14,000 of 15,000 of the company's issue of outstanding Series A convertible preferred stock. Table 4 delineates the number of share of outstanding common stock and the record number of shareholders.

Another significant type of ownership exists between Mead and Scott Paper. Each of these companies owns 50% of the stock of a third pulp company, Brunswick Pulp and Paper Company. Brunswick located in Brunswick, Georgia, operates a pulp mill and two sawmills. Brunswick also owns a 27% common stock interest in British Columbia Forest Products Limited; a company in which Mead also owns a 15% interest.

Management and control of such large corporations are usually accomplished through a board of directors and executive officers in the corporation. Executive officers are often the "operating" officers who are at the top of the management ladder in terms of day-to-day concerns.

TABLE 4.--NUMBER OF SHARES OF OUTSTANDING COMMON STOCK AND NUMBER OF SHAREHOLDERS.

Company	Outstanding Shares of Common Stock	Number of of Shareholders (1975)
Abitibi Corp.	18,097,000	26,120
Brown Co.	6,737,257	5,600
Celotex Corp.	17,141,000	10,307
Charmin Paper Products	82,392,000	95,597 (1976)
Dunn Paper Co.	3,361,929	7,069
Escanaba Paper Co.	14,515,741	23,150
Fletcher Paper Co.	n.a.	n.a.
French Paper Co.	n.a.	n.a.
Georgia-Pacific Corp.	60,281,391	95,300
Hoerner-Waldorf Corp.	14,374,690	4,867
International Paper Co.	44,186,606	61,421
Kimberly-Clark Corp.	23,259,332	27,003
Manistique Pulp & Paper	n.a.	n.a.
Menasha Corp.	n.a.	n.a.
Packaging Corp. of America	75,608,800	238,856
Pioneer Paper Stock	105,831,339	265,246*
Plainwell Paper Co.	58,442,362	27,920 (1976)
Port Huron	809,445	671 (1976)
Rochester Paper Co.	975,107	1,021 (1976)
SCM/Allied Paper Co.	9,157,000	47,500
S.D. Warren Co.	34,575,064	76,418
Simpson Lee Paper Co.	n.a.	n.a.
Watervliet Paper Co.	n.a.	n.a.

SOURCE: Form 10-K, Reports to the Securities and Exchange Commission; and Annual Reports of the respective companies.

* 1976 figure includes all the stock of Mobil Corporation. In 1975 Marcor merged with Mobil Oil forming Mobil Corporation.

n.a.-information not available; privately held company.

The board of directors is often a diverse group, composed of university presidents, presidents of other corporations, as well as people from within each particular company. Interestingly, directors from the following large corporations hold positions on the boards of various pulp and paper companies: U.S. Steel (Proctor & Gamble), Armco Steel (Mead), American Telephone and Telegraph, Campbell Soup, Dunn & Bradstreet (International), Munsingwear (Hoerner-Waldorf), IBM (Mead, Mobil).

Examining the directors and officers of organizations can reveal indirect interlocking directorates and contacts with financial institutions. This type of interlocking control was found in six cases. A director of International Paper Company, and a director of Scott Paper Company are directors on the Board of Campbell Soup Company. In the second case, a director of Philip Morris, Inc. is executive Vice-President for the First National City Bank, New York; whereas a director on the Board of Kimberly-Clark Corporation is the former Chairman of the Board of the First National City Bank, New York. To further complicate this complex interlocking, the 1975 Chairman of the Board of Kimberly-Clark is a director of Citicorp, whose principal subsidiary is the First National City Bank. One of the directors on the Board of James River Corporation is Vice-President of Citicorp Venture Capital Ltd., an affiliate of Citibank, N.A. Two directors from Blyth Eastman Dillion & Co., Inc., investment bankers, sit on the boards of Georgia-Pacific and SCM Corporation. Two directors from International Business Machines (IBM) sit on the boards of Mead and Mobil Corporation. Finally, and perhaps most notably, Mr. George C. McGhee, former U.S. Ambassador to Turkey and Germany and Under Secretary of State for Political Affairs, sits on the boards of both Mobil Corporation and Procter & Gamble.

All of the companies, for which financial statements were available, had connections with various financial institutions either through stock ownership or through the board of directors. These financial institutions include commercial banks, savings and loan institutions, insurance companies and investment companies. Institutions that are directly or indirectly involved include: Morgan Guaranty Trust (Scott), Marine National Bank of Neenah and First National Bank of Neenah (Kimberly-Clark), Western & Southern Life Insurance (Proctor & Gamble), Liberty Mutual Insurance (Dunn), and First National Bank of Birmingham (Mead).

It is also interesting to note that directors from two of the banks in Neenah, Wisconsin, Marine National and First National sit on the board of Kimberly-Clark.

Concentration

Since data on individual market shares were not available, it was impossible to determine concentration for just the state. Average concentration ratios for the nation indicate an increasing concentration in the pulp and paper industry from 1947 to 1972 (Table 5).

TABLE 5.--AVERAGE CONCENTRATION RATIOS.

	1947	1954	1958	1963	1967	1970	1972
Pulp and Paper and Products	21.2	24.8	25.9	31.0	31.3	32.2	31.2

SOURCE: Bruce T. Allen, "Average Concentration in Manufacturing 1947-1972," Journal of Economic Issues 10(3): 664-73.

NOTE: Ratios indicate the average of the percent of value of shipments of the four largest firms for all of S.I.C. group 26.

While these average concentration ratios appear relatively low, examination of concentration ratios for particular classes of products, reveal much higher concentration in some of the markets (Table 6). The ratios for pulpmills, newsprint, tissue paper, and sanitary products is moderately high, and rises significantly for eight firm concentration ratios.

TABLE 6.--SHARE OF VALUE OF SHIPMENTS OF CLASSES OF PRODUCTS ACCOUNTED FOR BY THE LARGEST FIRMS, 1972.

Product Class	4 Largest Firms	8 Largest Firms
Pulpmills	43	61
Papermill products, except building paper	25	40
Newsprint	49	78
Book paper uncoated	30	47
Writing & related papers	32	49
Tissue paper & other machine creped paper	56	77
Sanitary paper products	65	82

SOURCE: U.S. Bureau of the Census, Concentration Ratios in Manufacturing Industry, 1972, (Washington, D.C.: Government Printing Office, 1976).

Each company views its markets as highly competitive. Many of the companies disclaim concentration in the markets. "The market in which the Company's (Proctor & Gamble) products are sold is highly competitive. It is made up of many large and small companies and there is no dominant competitor or competitors."[4] Proctor & Gamble, and its Michigan subsidiary, Charmin Paper Products compete in the sanitary tissue market. Mead Corporation which produces a line of paper grades including bond, banknotes, commercial ledger, index, and onion skin,

[4]Proctor & Gamble, Form 10-K Report to the Securities and Exchange Commission, p. 2.

claim that approximately 50 percent of the total market for these products is shared by the ten largest companies in the market, including Mead, but that no one company has more than 10 percent of the market.[5]

Gregory claims that concentration in the pulp-producing sector is high.[6] Five leading U.S. pulp producers have provided approximately 30 percent of U.S. production. In Michigan, Escanaba provides approximately 30 percent of the state's pulp production, Abitibi provides 17 percent and Packaging provides 16 percent of pulp production (Table 7).

How large a corporation is, of course, dependent on the scale used, and often an ordinal scale is only available for comparison. Nevertheless, Fortune magazine compiled a Directory of the "500 Largest Industrial Corporations" in the country according to net sales in 1976.[7] Included in this list were thirteen of the companies that own pulp and paper companies in the state of Michigan. Those companies that made the list and their ranking include: Mobil Oil (5), Proctor & Gamble (19), Tenneco (20), International Paper (52), Gulf & Western Industries (57), Philip Morris (65), Georgia-Pacific (68), Mead (141), Kimberly-Clark (143), Scott Paper (166), SCM (1972), Jim Walter (177), Container Corporation--before being acquired by Mobil Oil (237), and Hoerner-Waldorf (366). In addition, Mobil Oil was ranked 6th and Tenneco was ranked 49th in the 1974 Directory of the 50 Largest Industrial Companies in the World. The staff of Pulp & Paper, a trade journal, also compiled a list of the Top 15 Pulp and Paper Companies

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[5]The Mead Corporation, Form 10-K, p. 1

[6]Gregory, p. 128.

[7]"500 Largest Industrial Corporations," Fortune, (Time Inc., 1977)

TABLE 7.--24-HOUR DAILY CAPACITY OF WOODPULP MILLS (1974).

Plant Name	% of Total	Total Production	Sulfite	Sulfate	Ground Wood	Semi Chemical	Defibrated
Escanba Paper Co.	30	750	0	600	150		
Abitibi Corp.	17	430	0				430
Packaging Corp. of America	16	400	0			400	
S.D. Warren Co.	10	240	0	240			
Hoerner-Waldorf Corp.	9	220	0			220	
Menasha Corp.	9	225	0			225	
Celotex Corp.	5	135	0				135
Manistique Pulp & Paper	4	90	0		90		
Total	100	2490	0	840	240	845	565

SOURCE: Woodpulp Mills in the United States in 1974, USDA Forest Service Resource Report FPL-1 Forest Products Laboratory, 1977.

with sales in pulp production, and in paper production (Table 8).[8] Six of the corporations with companies in Michigan were listed in the top fifteen for sales; five were in the top fifteen in pulp production; and six were in the top fifteen in paper production.

Concentration in employment was also examined. The 1972 Census of Manufactures indicates that the four largest companies account for 60 percent of all employees in industry 2611-Pulpmills. The eight largest firms account for 83 percent of all employees in this industry group. The four largest companies account, in industry group 2621-Papermills, for 22 percent of all employees. The figure rises to 39 percent for eight firm concentration ratios in this industry group. In absolute numbers, some interesting facts concerning employment in the pulp and paper trades were discovered. Fortune compiled a rank ordered list of the 500 largest firms in terms of number of employees. Included in the 1976 list were Mobil Corporation (7), Gulf and Western Industries (19), Tenneco (28), International (62), Proctor & Gamble (63), Philip Morris (66), Georgia-Pacific (112), Kimberly-Clark (143), SCM (148), Mead (156), Jim Walter Corporation (1978), Container Corporation (197), Scott Paper (202), and Hoerner-Waldorf (373).

Within Michigan, Brown Company was the largest employer in absolute terms, of the companies studied. They employed approximately 3,000 people at their Kalamazoo Plant, but that only comprised 3.8 percent of the city's population, and 2.5 percent of the civilian labor force of the county (Table 9). Packaging Corporation employs 25.2 percent of Filer City's population. This, however, is not particularly

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[8] "Company Profiles," Pulp & Paper, June 30, 1976, p. 87.

TABLE 8.--FINANCIAL AND PRODUCTION CAPACITY OF LEADING U.S. AND CANADIAN FIRMS, 1975.

Company	
Top 15 in Sales (1975 net sales)	
International Paper*	$3,080,800,000
Weyerhaeuser Co.	2,421,271,000
Champion International	2,399,258,000
Georgia-Pacific Corp.*	2,358,610,000
Crown Zellerbach	1,758,120,000
Kimberly-Clark Corp.*	1,483,700,000
Boise Cascade Corp.	1,458,050,000
St. Regis Paper Co.	1,394,754,000
MacMillan Bloedel	1,296,689,000
Mead Corp.*	1,244,637,000
Scott Paper Co.*	1,191,883,000
Container Corp. of America*	953,000,000
Union Camp Corp.	835,931,000
Domtar Ltd.	815,221,364
Westvaco Corp.	797,455,000
Top 15 in Paper (total capacity)	
International Paper Co.*	19,070 tpd
Abitibi Paper Co.*	7,895 tpd
Crown Zellerbach	7,495 tpd
St. Regis Paper Co.	6,982 tpd
Weyerhaeuser Co.	6,918 tpd
Boise Cascade Corp.	6,715 tpd
Mead Corp.*	6,138 - 6,288 tpd
Great Northern Nekoosa	5,911 tpd
Union Camp Corp.	5,640 tpd
Scott Paper Co.*	5,562 tpd
MacMillan Bloedel Ltd.	5,550 tpd
Container Corp. of America*	5,393 tpd
Georgia-Pacific Corp.*	4,820 tpd
Continental Forest Ind.	4,759 tpd
Westvaco Corp.	4,740 tpd
Top 15 in Pulp (total capacity)	
International Paper Co.*	20,515 tpd
Weyerhaeuser Co.	9,620 tpd
Abitibi Paper Co.*	9,548 tpd
Crown Zellerbach	8,590 tpd
Boise Cascade Corp.	7,720 tpd
MacMillan Bloedel Ltd.	7,156 tpd
Georgia-Pacific Corp.*	6,495 tpd
St. Regis Paper Co.	6,450 tpd
Great Northern Nekoosa	5,720 tpd

TABLE 8.--Continued

Company	
Consolidated-Bathurst	5,535 tpd
Mead Corp.*	5,425 tpd
Union Camp Corp.	5,380 tpd
Bowater Inc.	4,995 tpd
Scott Paper Co.*	4,980 tpd
Westvaco Corp.	4,890 tpd

SOURCE: "76 Company Profiles," Pulp & Paper, June 1976, p. 87.

*Indicates those companies included in the study.

TABLE 9.--NUMBER OF EMPLOYEES AND PERCENTAGE OF CITY POPULATION AND COUNTY CIVILIAN LABOR FORCE.

Company	City	1973 City Population	County	Civilian Labor Force	Mill Employment	% of City Population	% of Labor Force
Abitibi Corp.	Alpena	14,275	Alpena	14,200	480	3.4	3.4
Brown Co.	Kalamazoo	78,152	Kalamazoo	122,200	3,000	3.8	2.5
Celotex Corp.	L'Anse	2,413	Baraga	3,100	245	10.0	8.0
Charmin Paper Products Co.	Cheboygan	5,760	Cheboygan	9,475	475	8.2	5.0
Dunn Paper Co.	Port Huron	36,628	St. Calir	44,626[a]	155	.4	.3
Escanaba Paper Co.	Escanaba	15,154	Delta	15,575	915	6.0	5.9
Fletcher Paper Co.	Alpena	14,275	Alpena	14,200	80	0.6	.6
French Paper Co.	Niles	13,470	Berrien	74,900	165	1.2	.2
Georgia-Pacific Corp.	Kalamazoo	78,152	Kalamazoo	122,200	629	.8	.5
Hoerner-Waldorf Corp.	Ontonagon	2,274	Ontonagon	4,250	178	7.8	4.2
International Paper Co.	Kalamazoo	78,152	Kalamazoo	122,200	122	.2	.1
Kimberly-Clark Corp.	Munising	3,544	Alger	31,775[b]	450	12.7	1.4
Manistique Pulp & Paper Co.	Manistique	4,377	Schoolcraft	3,225	180	4.1	5.6
Menasha Corp.	Otsego	4,531	Allegan	31,100	165	3.6	.5
Packaging Corp. of America	Filer City	1,921[c]	Manistee	9,525	485	25.2	5.1
Pioneer Paper Stock Co.	Kalamazoo	78,152[d]	Kalamazoo	122,200	-	-	-
Plainwell Paper Co., Inc.	Plainwell	3,264	Allegan	31,100	480	14.7	1.5
Port Huron Paper Co.	Port Huron	36,628	St. Clair	44,626[a]	558	1.5	1.2
Rochester Paper Co.	Rochester	7,351	Oakland	44,626[a]	88	1.2	.2
SCM/Allied Paper Co.	Kalamazoo	78,152	Kalamazoo	122,200	587	.8	.5
S.D. Warren Co.	Muskegon	43,014	Muskegon	73,600	1,150	2.7	1.6
Simpson Lee Paper Co.	Vicksburg	2,191	Kalamazoo	122,200	350	16.0	.3
Watervliet Paper Co.	Watervliet	2,079	Berrien	74,900	470	22.6	.6

SOURCE: Directory of Michigan Manufacturers, 1976, (Detroit: Manufacturer Publishing Company, 1976); Michigan Statistical Abstract 1976, 11th ed., edited by David I. Verway, Division of Research, Graduate School of Business Administration, Michigan State University, 1976.

[a]1970 labor force figures from County and City Data Book 1972, U.S. Department of Commerce, Bureau of the Census.

[b]Includes Marquette and Alger Counties. [c]1970 population for Filer Township.

[d]No employment figures as Pioneer is only a sales office, not a mill site.

meaningful because the plant is located so close to the City of Manistee, which has a population of 8,102. Considering the two populations together indicates that the mill employs approximately 5 percent of the Manistee and surrounding area population. Packaging does employ 5.1 percent of the county's labor force. Other large employers, in relation to city population, included Watervliet Paper, 22.6 percent; Plainwell Paper, 14 percent; Kimberly-Clark, 12.7 percent; and Celotex, 10 percent. In addition, the percentage of city population figures probably underestimates true employment concentration since it is derived from city population, rather than labor force estimates.

Integration

All companies in the state, with the exception of Fletcher and French, are integrated companies that vary in degree of integration. One must distinguish between corporate and functional integration. Corporation integration indicates that while a particular company, subsidiary or division of a larger company, is not integrated, other parts of the parent company do provide the necessary upstream or downstream processes[9] to make the product a result of an integrated effort. Functional integration applies to those companies which are integrated at the millsite. The large forest products companies including Abitibi, Mead, Georgia-Pacific, Hoerner-Waldorf, International, and Scott, own their own timber supplies and conduct pulping, paper making, converting, distributing, and sales activities, although at different locations around the country. Twenty companies are integrated upstream, and only

[9]Upstream integration means raw material or preliminary processes are owned by the same firm. Downstream integration means that processes that are closer to the finished product are owned by the same company.

three companies, French, Fletcher, and Port Huron, do not have other divisions or subsidiaries that supply them, in part, with the necessary raw materials or provide preliminary processing, but rather they transact on the open market. All companies are integrated downstream with the possible exception of Fletcher and French. These companies are privately held, therefore estimates were made as to their production processes.

There are eight active woodpulp mills in the state, and all are integrated with paper making and converting facilities. There are also three other pulp mills in the state that do not use roundwood as an input. Brown Company has a secondary fiber mill in Kalamazoo, that uses recycled waste materials as a substitute for virgin woodpulp. In 1975 this facility produced approximately 15,000 tons of pulp. Georgia-Pacific has a deinking pulp facility in Kalamazoo that produces 80 tons per day. Finally, Simpson Lee has a pulp mill in Vicksburg that uses rags as a raw material.

Ten companies own timber resources nationally, as well as internationally. International Paper Company considers itself to be the largest private timberland owner in the world. Also it is second only to the Federal Government in terms of single organization ownership of timber acreage in the United States. Three companies, Abitibi, Packaging Corporation, and Hoerner-Waldorf own timberlands in Michigan (Table 10). Kimberly-Clark used to own substantial acreage in the Upper Peninsula and Northern Wisconsin, but sold the land in July 1976 to Champion International. Nine companies are integrated with chemical divisions including Georgia-Pacific, International, Kimberly-Clark, Jim Walter, Philip Morris, Tenneco, Mead, Mobil Corporation, and SCM/Allied.

TABLE 10.--TIMBER OWNERSHIP--1975.

Company	Total Timber Ownership (acres)	In Michigan
Abitibi Corp.	23,000,000	34,000[a]
Brown Co.	520,000	-
Escanaba Paper Co.	1,435,000[b]	87,000
Georgia-Pacific Corp.	6,000,000	
Hoerner-Waldorf Corp.	300,000	33,000
International Paper Co.	8,500,000	-
Kimberly-Clark Corp.	4,787,000[c]	374,000
Packaging Corp. of America	541,000	138,000
Pioneer Paper Stock Co.	744,000	-
S.D. Warren Co.	3,300,000	-

SOURCE: Form 10-K Reports to Securities and Exchange Commissions; Annual Reports of respective companies; and Pulp & Paper, January 1976; State Journal, July 15, 1976.

[a]Ray Pfiefer, Michigan Dept. of Natural Resources estimated Abitibi owned between 30,000 and 38,000 acres in the Upper Peninsula.

[b]Timberlands owned or controlled by Mead, plus 50 percent of timberlands owned by Georgia Kraft and British Columbia Forest Products.

[c]In July 1976 Kimberly Clark sold 374,000 acres in the Upper Peninsula and northern Wisconsin to Champion International, which proposed a merger with Hoerner-Waldorf in December 1976.

While many companies have timber supplies, chemical divisions, and pulp operations, they usually do not totally supply their own production. In most instances, a company will supply 25-30 percent of its own pulpwood needs and buy the rest on the open market. For example, Brown Company obtains 25 percent of its pulpwood needs from its controlled lands, and 75 percent from local suppliers and other timber sources. It has the capacity to provide 35 percent of its needs.[10]

[10]Brown Company, Form 10-K. All of the estimates of resource use were obtained from the companies' Form 10-K.

Mead Corporation uses approximately 20 percent of its own timberlands for its needs, but all pulp at the Escanaba mill is produced internally, with excess being sold on the open market. Georgia-Pacific obtains approximately 50 percent of its timber requirements from its own reserves and purchases the rest on the open market. Scott Paper produces its own pulp, buys on the open market, and sells a portion of its supply to other companies.

> Although the Company has sufficient pulp manufacturing capacity to supply essentially all of its domestic pulp requirements, it usually acquires pulp from, and sells a portion of its own production of pulp to other persons.[11]

Kimberly-Clark produces approximately 60 percent of its own needs and purchases the rest on the market.

Diversification

All companies in the state except Fletcher and French are members of diversified corporations. Companies were classified in Table 11 into groups of differing diversification based on the number of product lines and the researcher's subjective judgment. The extent of diversification ranges from very low, as in the case of Port Huron, to very high, as in the case of Jim Walter Corporation. The type of diversification also varies significantly. Jim Walter Corporation is involved in gas and oil, minerals, chemicals, pipe products, sugar, stone and concrete, retail stores, finance and credit, as well as wood and paper products. Philip Morris, Inc. has five operating companies that produce cigaretts, beer, paper products, and land and housing development and sales, and consumer products.

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[11]Scott Paper Company, Form 10-K.

TABLE 11.--DIVERSIFICATION BASED ON NUMBER OF PRODUCT LINES, 1975.

Low Diversification		Medium Diversification		High Diversification	
Company	# of Product Groups	Company	# of Product Groups	Company	# of Product Groups
Abitibi Corp.	6	Brown Co.	8	Gulf & Western Indus.	9
Dennison Manufacturing	5	Georgia-Pacific Corp.	8	International Paper Co.	12
Hoerner-Waldorf Corp.	5	Field Enterprises	7	Jim Walter Corp.	14
James River Paper Co.	4	Proctor & Gamble	7	Kimberly-Clark Corp.	9
Menasha Corp.	4	SCM/Allied Paper Co.	7	Mead Corp.	10
Port Huron Paper Co.	1			Mobil Corp.	10
Scott Paper Co.	5			Philip Morris, Inc.	10
				Tenneco	10

SOURCE: Form 10-K Report to Securities and Exchange Commission; and Annual Reports.

NOTE: Fletcher and French were not considered diversified. Information concerning Simpson Lee and Watervliet was not available.

Four paper companies are also involved in gas and oil operations, including Jim Walter, International, Mobil Corporation, and Tenneco. Tenneco, Philip Morris and Brown are involved in land development and sales. Four companies are involved with financing credit, including International, Tenneco, Mobil, and Gulf and Western Industries. Jim Walter and Brown are involved in stone, concrete, and other building supplies. Proctor & Gamble and SCM/Allied are involved in food production.

Diversification for each company is different in terms of product mix. Oftentimes pulp and paper plays a significant role in the corporation's financial success, as in the case of Abitibi or International Paper. At other times the percentage of total sales generated from pulp and paper production is relatively small, as in the case of Tenneco (7 percent). A summary of each company's activities can be found in Appendix 1.

Differentiation

The pulp and paper industry does not produce just one homogeneous product. Inasmuch as the industry is really a number of industries grouped together, there are literally hundreds of markets to which they sell. "In spite of much striving for uniformity, paper is heterogeneous in structure and properties to a greater or less degree."[12] There are thousands of different paper grades, some varying only slightly in character, and others varying greatly. These differences are determined by the application of standard tests that evaluate the performance, nature, and general properties of paper.

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[12]Britt, p. 443.

Brett classified paper into seven basic categories. These categories are determined by use and include:

(1) Papers primarily for printing, illustrations, writing and drawing, including cover stock, envelopes, and labels.
(2) Papers primarily used for wrapping, enclosing, protecting, scaling and carrying other materials.
(3) Papers for absorbing, wiping, cleaning and filtering.
(4) Papers and paperboard used for construction materials.
(5) Paper used as carrying medium for other functional material such as carbon and photosensitive paper.
(6) Paper used for decoration.
(7) Miscellaneous uses such as condenser paper, insulation paper.[13]

Each of these categories contains a variety of subcategories.[14] Each of the Michigan mills produce primarily one or two classes of paper as indicated by Table 12.

The application of tests is a significant part of determining differentiation for a number of reasons.[15] Important properties of different paper grades are not absolutes, but, rather, they are dependent upon methods and instruments used. Secondly, precision in testing is dependent upon statistical considerations. Sample size and the number of tests performed significantly affects the reliability of paper testing. Finally, diversity of uses and widespread nature of the industry has led to almost limitless numbers of test methods. Almost all paper manufacturers have devised their own tests and, consequently, only a few are

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[13] Ibid.

[14] Britt provides examples of each of the product groups. Some of the representative items include: 1) album, bond, book, cover, drawing, envelopes, labels, text, writing; 2) bags, sacks, boxes, cartons, kraft wrapping, waterproof and waxed paper; 3) blotter, diaper liners, facial tissue, napkins, toilet tissue, towels; 4) building paper and board; 5) carbon, photosensitive paper; 6) creped streamer paper; and 7) condenser, electrical insulation, twisting paper.

[15] Ibid., p. 443.

TABLE 12.--MAJOR PAPER CLASSES AND COMPANIES THAT PRINCIPALLY PRODUCE THEM.

Printing	Newsprint and Wrapping	Absorbing	Paperboard Construction	Carrying Medium	Miscellaneous
Brown Co.	Manistigue	Charmin Paper	Abitibi Corp.	Brown Co.	Dunn Paper Co.
Escanaba Paper Co.	Port Huron	Kimberly-Clark	Celotex	Dunn Paper Co.	
French Paper Co.		Rochester	Hoerner-Waldorf	Plainwell	
Fletcher			Menascha	Port Huron	
Georgia-Pacific			Packaging Corp.		
Kimberly-Clark					
SCM/Allied					
S.D. Warren					
Watervliet					
Simpson Lee					

SOURCE: Lockwood's Directory to the Paper and Allied Trades, 1976.

universally adopted and recognized. Companies, therefore, create and apply their own testing methods, and thus, differentiate their product according to the results of those methods.

Products are also differentiated by price, quality, service and advertising.[16] The objective of advertising is to differentiate by trade name, watermark, and finish. The amount of product differentiation varies within the industry. Pulp, newsprint, wrapping and bag papers are often sold to the buyer without brand names.[17] But differentiation is more important in book, writing, and sanitary products, which constitutes the majority of Michigan production. Brand names appear to be particularly important for Charmin Paper Products (Proctor & Gamble), Georgia-Pacific, Kimberly-Clark, Scott Paper. See Appendix 2 for more details.

Barriers to Entry

There are three basic categories of entry barriers in the pulp and paper industry. The first barrier includes advantages provided by economies of large scale. Ray Pfeifer from the Forestry Division of the Michigan Department of Natural Resources indicated that companies have to be large in order to make profits.[18] Weiss estimated minimum efficient scale (MES) of mills producing printing paper to be 567 tons per day.[19] According to Table 13 which indicates daily rates of

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[16]Gregory, p. 127; and The Mead Corporation, Form 10-K.

[17]Guthrie, p. 110.

[18]Ray Pfeifer, Forestry Division of the Michigan Department of Natural Resources; interviewed on February 2, 1977.

[19]Leonard W. Weiss, "Optimal Plant Size and the Extent of Suboptimal Capacity," in Essays on Industrial Organization in Honor of Joe S. Bain, edited by Robert T. Masson and P. David Qualls, (Cambridge: Ballinger Publishing Company, 1976).

TABLE 13.--DAILY RATES OF PRODUCTION--1976.

Company	Tons/Day
Abitibi Corp.	400
Brown Co.	400
Celotex Corp.	270
Charmin Paper Co.	n.a.
Dunn Paper Co.	105
Escanaba Paper Co.	600
Fletcher Paper Co.	65
French Paper Co.	65
Georgia-Pacific Corp.	425
Hoerner-Waldorf Corp.	500
International Paper Co.	n.a.
Kimberly-Clark Corp.	78
Manistique Pulp & Paper Co.	150
Menasha Corp.	360
Packaging Corp. of America	625
Pioneer Paper Stock Co.	n.a.
Plainwell Paper Co., Inc.	180
Port Huron Paper Co.	175
Rochester Paper Co.	20
SCM/Allied Paper Co.	100
S.D. Warren Co.	350
Simpson Lee Paper Co.	100
Watervliet Paper Co.	130

SOURCE: Lockwood's Directory of Paper and the Allied Trades, 1976, (New York: Lockwood Publishing Company, Inc. 1976).

n.a.-information not available.

production, none of the paper mills even approach this range. J. Stanford Smith, Chairman of the Board of International Paper Co., indicated that operating rates in paper manufacturing had to be maintained at comparatively high levels in order to keep the industry in an acceptable financial position.[20] Papermaking requires continuous, seven-day operation, and only operating rates above 90 percent of capacity will provide an acceptable return on investment on new equipment.

The second barrier consists of gains accrued by established firms as a result of absolute cost advantages. Absolute cost barriers include the high cost of capital and availability of raw materials. Paper making is highly capital intensive. Approximately 5.6 percent of current dollar shipments is for new investment.[21] There has also been a sharp escalation in the cost of new mills. International Paper estimates that the cost of building a new 600 ton/day fine pulp and paper mill has more than tripled in the ten years from 1965 to 1975, to $225 million.[22] In comparison, the capital investment required in other industries includes: a new cement plant--$50-100 million, a new fruit and vegetable processing plant--$100,000-3 million, an integrated bauxite-alumina-aluminum operation--$150 million.[23] In Michigan alone, pulp and paper companies spent $34,570,000 on production expenditures in 1976.

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[20] J. Stanford Smith, "The Economics of Papermaking," A Report Submitted to the Council on Wage and Price Stability, Washington, D.C., May 18, 1976.

[21] Ibid., p. 2. [22] Ibid., p. 7.

[23] The Economic Impact of Pollution Control: A Summary of Recent Studies, prepared for the Council on Environmental Quality, Dept. of Commerce, and Environmental Protection Agency, March 1972, pp. 79, 116, 173.

Difficulty in obtaining a sufficient timber supply on terms of equal to established firms also acts as a cost barrier. Le Master noted five reasons why potential entrants are disadvantaged.[24] First, even if an entrant can establish itself in a timber market it is still at a disadvantage when compared to the established firm that owns its own reserves because the established firm can pass up high priced timber sales. The non-timber owner is forced to buy at the high price in order to operate.

Second, the non-timber owner is at a substantial tax disadvantage to the timber owner because of the effects of Sec. 631(a) of the Internal Revenue Code. Effects of this law will be discussed under the section on barriers caused by government regulation. Third, it is difficult to obtain large tracts of timberland. Most large tracts are already owned by large, established firms. Fourth, timberland has become increasingly expensive. "Rising timberland prices have encouraged some [security] analysts to believe the cost of entering the paper industry is prohibitively high."[25] Stumpage prices have increased 3-fold in the last 20 years, but many large, established firms acquired land years earlier at much cheaper prices. Finally, a new entrant into a timber shed will be viewed as a "collective adversary" by established firms. A new entrant will cause an increase in timber costs, thus reducing an established firm's opportunity for profit. It is possible to discourage entry by overbidding at timber sales, accepting short term losses in order to forestall long term entrance.

Companies have controlled timber supplies not only through ownership, but also through long-term contracting with private landowners.

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[25] Ibid., p. 143.

Contracts of 10-20 years for the sale of timber effectively lessen available supply.

The third source of entry barriers is government regulation. Government, as it is used here, includes legal and political institutions. There are a number of ways in which government intervention acts as a barrier. As noted previously, Sec. 631(a) of the Internal Revenue Code gives established firms a decided advantage over new entrants.

The timber-owning company that uses its own timber in manufacturing is allowed, for federal income tax purposes, to record log sales to itself at the prevailing market price. The company is taxed 25 percent on the difference between fair market value and the cost of providing the logs, rather than at the corporate rate of 48 percent, normally assessed for ordinary income. This policy allows timber owners to treat differences between "fair market value" of cut timber and its cost as a capital gain even when the timber is not sold, but rather transferred to another division of the same company.[26]

Another government regulation that effectually acts as an entry barrier is the cost of pollution abatement equipment. Pollution control has become a major cost for pulp and paper companies. Expenditures have risen to the point where money spent on pollution control is equal to money invested in plant expansion. Table 14 demonstrates the large sums of money expended nationwide for pollution control.

> ...Merely to meet present requirements, a full one third of Crown Zellebach's scarce capital will be spent on environmental control projects this year... This puts a real squeeze on our ability to maintain facilities in competitive conditions.[27]

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[26] Ibid., p. 44. [27] C. R. Dahl, p. 90.

TABLE 14.--POLLUTION ABATEMENT EXPENDITURES.

Company	Dollars Spent	Year
Abitibi Corp.	5,600,000	1975
Brown Co.	4,900,000	1975
Celotex Corp.	4,000,000	1976
Charmin Paper Products Co.	14,000,000	1976
Dunn Paper Co.	300,000	1975
Escanaba Paper Co.	11,600,000[a]	1975
Fletcher Paper Co.	n.a.	n.a.
French Paper Co.	n.a.	n.a.
Georgia-Pacific Corp.	13,000,000	1975
Hoerner-Waldorf Corp.	9,200,000	1975
International Paper Co.	26,000,000	1976
Kimberly-Clark Corp.	10,000,000	1974
Manistique Pulp & Paper Co.	n.a.	n.a.
Menasha Corp.	1,700,000	1975
Packaging Corp. of America	5,700,000	1976
Pioneer Paper Stock Co.	2,200,000	1975
Plainwell Paper Co., Inc.	801,000	1975
Port Huron Paper Co.	n.a.	n.a.
Rochester Paper Co.	81,429[b]	1976
SCM/Allied Paper Co.	375,000	1975
S.D. Warren Co.	14,606,666[c]	1975
Simpson Lee Paper Co.	n.a.	n.a.
Watervliet Paper Co.	n.a.	n.a.

SOURCE: Form 10-K Report to the Securities & Exchange Commission and annual reports of respective companies.

n.a.--not available.

[a]Estimated average based on $58,000,000 expenditure spent over 5 years.

[b]Estimated average based on $570,000 expenditure to be amortized over 7 years.

[c]Estimated average based on $88,000,000 expenditure spent over 6 years.

Pollution control is expensive because it is essentially an add-on process. Often, marginal mills are shut down, and these might have continued to operate except for the cost of compliance with Federal and state regulation. Alvin Huss, Chairman of Hoerner-Waldorf estimated that, "from 1967 to 1972, eight machines or about one million tons of production, were shut down."[28]

In addition, government regulation often inadvertenly blocks new entrants, with better pollution control equipment, by refusing them licenses. Assume a river has reached its assimulative capacity because of the established mills already operating and polluting in it. The government can refuse any new permits because the river has reached its capacity, despite the fact that the new operators have better technological processes than existing ones. Courts have also given existing companies advantages by a number of decisions they have handed down. In the past, courts have often fined paper companies involved in class action suits, rather than enforce injunctive relief. This essentially allowed pulp and paper companies to "buy" prescriptive rights to pollute. While this might suggest that there is an active market for the right to pollute, no evidence was found to support this idea.

Product differentiation may also act as an entry barrier, although it does not appear to be as important as the other sources of barriers.

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[28]Dan Cordtz, "Papermakers Have a Surprise for Their Customers: the Shortage Will Get Worse," Fortune, April 1974, p. 129.

CHAPTER V

LINKAGES BETWEEN STRUCTURE AND CONDUCT

Once structure has been delineated it becomes possible to examine conduct within an industry. Certain structural characteristics facilitate certain behavior, although the connection between these characteristics is not always causal nor absolute. Analyzing data previously presented leads to some evaluation of expected or observed conduct concerning competition over space.

Analysis of the Data

The twenty-three pulp and paper companies are overwhelmingly controlled by large, diversified corporations. Most of these companies have headquarters outside of the state, and ownership is in the hands of thousands of stockholders. This means profits are, at least in part, distributed outside the state; representing a leakage of income. Although corporations still pay a business tax in Michigan, dividends miss being taxed by the state for personal income. Decisions concerning management of an operation are made by a technostructure, housed outside of the state. This is significant because the people of Michigan potentially have less influence in the manner in which their resources are used.[1]

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[1] Ralph Nader, May 1974, as noted in the introduction to The Paper Plantation, William C. Osborn, (New York: Grossman Publishers, 1974), p. x.

A complex corporate structure exists with most corporations. Subsidiaries and divisions tend to obscure true ownership and control. Although ownership information is accessible to the public, the majority of Americans probably never concern themselves with obtaining it. Consequently, people's fear of "big business" and "mega-corporations" is carefully reduced, and citizens and government are less likely to become suspicious of potential collusive action. Subsidiaries and divisions also provide a means of transferring earnings between business lines. Thus, if a subsidiary or division buys raw materials from another division of the company, profits can easily be distributed between the two companies. This is perhaps important if the divisions operate in two different states, with different tax rates.

Theoretically thousands of stockholders own the voting power in deciding management decisions. In truth, though, most corporations experience little consolidated voting effort. With the exception of privately owned corporations, and those companies that indicated shareholders with more than 10 percent of the stock, corporations appear to exhibit management control.

Ties among competing firms and other large corporations also represent a significant concentration of power. The joint ownership between Mead and Scott of the Brunswick Pulp and Paper Company represents an interesting quirk in a supposedly competitive environment. It seems this situation represents, if nothing else, a potentially easy opportunity for collusive behavior. Direct and indirect ties with financial intermediaries represents a significant trend. Stockholdings of financial intermediaries are becoming increasingly important in today's

corporate scene. Oftentimes financial institutions have the power to vote shares held in trust, and thus have the power to influence management decisions. "That this power is in the hands of a relatively few trust officers clearly reduces the independence of firms which at first glance appear free of any unified control."[2] The six cases of indirect interlocking directorates indicate potential for collusive behavior in pricing and output decisions. Mead found collusive behavior to be widespread in the lumber industry, which he described as an oligopsonistic market structure.[3] Links between market leaders lends support to a theory of oligopolistic behavior and price leadership.

Not only are there significant ties among competing firms, but there are also ties with other large corporations outside of the pulp and paper industry. Large corporate management seems to rest in the hands of a few. The names of the same large corporations continue to appear on different boards of directors. As noted previously, names from some of the largest corporations in the country such as Morgan Trust Company, Campbell Soup, U.S. Steel, A.T. & T., and I.B.M. were on several pulp and paper boards.

It is also interesting to note the political ties that paper companies have. In addition to George McGhee, former Under Secretary of State for Political Affairs (director on the board of Mobil and Proctor & Gamble), the new Secretary of Housing and Urban Development, Patricia Roberts Harris, was previously a director of Scott Paper

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[2]Scherer, p. 4.

[3]Walter J. Mead, Competition and Oligopsony in the Douglas Fir Lumber Industry, (Berkeley: University of California Press, 1966).

Company. Scott also notes that, "... six Scott directors have been selected to serve in cabinet-level positions in the past twenty-five years."[4] Large corporations are often the training ground for high government positions.

The significance of this discussion of ownership and control is that resource ownership is a source of economic and political power. It is important that one understands who controls resources because that tells us who potentially has power. Economic and political power provide opportunities for certain types of industrial conduct. Oftentimes resource ownership, and thus power, appears dispersed, but if ownership patterns, corporate structures, and interlocking ties are examined one finds that this is often not the case.

Concentration in sales ranges from relatively low to moderate in the pulp and paper industry as compared with C_4 ratios in other industries (passenger cars C_4=99, chewing gum C_4=90, cigarettes C_4=80, and typewriters C_4=76).[5] Be careful not to assume this necessarily means a competitive atmosphere exists. These ratios are based on national figures, representing national markets. Fine paper has a national market, but lower grades of paper have a more regional market. These ratios also do not reflect concentration in resource markets. Consequently, the national concentration ratio for a particular product could be low, masking the fact that perhaps only a few companies control a large percent of the raw materials and labor. Concentration in resource ownership provides an effective barrier to entry, and consequent reduction of competition.

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[4]Scott Paper Company, Annual Report, 1976. [5]Scherer, p. 55.

Concentration in employment is also significant because it represents market and political power. If a company controls a large percentage of a city or country's labor force, this provides a powerful economic bargaining tool, especially with local government. If a company controls people's jobs and provides a tax base for a locality, chances are local government will do all that is possible to keep that firm satisfied with their location. This opens the door for misuse of resources or noncompetitive behavior, and perhaps collusion between firms and local governmental officials. Pulp and paper companies show significant concentration of employment, particularly in the small towns of Watervliet, Vicksburg, Plainwell, and Munising. Additionally, pulp and paper companies employ a significant portion of the labor force of Delta and Schoolcraft Counties.

While only eight companies are integrated at the mill site, the majority of companies are corporately integrated. "Vertical integration is a significant dimension of industry structure because control over market outlets or over raw materials can provide market power."[6] Most raw material-owning companies supply part of their needs of timber, chemicals, etc., and buy the rest on the open market. This gives these firms significant bargaining power in relation to suppliers. Until a price is offered that meets with their objectives, companies can rely more heavily on their own supplies.

> ...the nonintegrated paper mills, depending on market pulp, were in a poor competitive position. For while the price for their grades, mainly writing and printing, were moving downward, they were paying record high prices [in 1975] for market pulp.[7]

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[6]Lloyd C. Ireland, "Do Giants Control Timber-based Industries in North America?", Forest Industries 103(9) (August 1976): 22-23.

[7]James P. Hanson, "Midwest Production," Pulp & Paper, June 1976, p. 42.

In addition, ownership of timber supplies provides tax advantages, as can be seen with Section 631(c) of the Internal Revenue Code.

Integration of pulp and paper mills provides tremendous economies in the technological process. By integrating a company can avoid the expense of lapping and drying the pulp. Economies of this type are greatest with newsprint and wrapping papers that are made in large quantities and only use one or two kinds of pulp. There are fewer economies with higher grades of paper because they require a more varied mix of pulp. An integrated firm can also increase the utilization of resources and thus increase its economic value.

> An integrated firm can channel logs from company timberlands into their optimum economic utilization, thus enabling one manager to claim that 'if stumpage is worth $20 per thousand board feet to a nonintegrated company, my company can get $40 of value per thousand board feet with full integration.'"[8]

What then is the effect of vertical integration? Lloyd C. Irland, a forest economist from Yale, claims that the survival of independent, non-integrated companies indicates that real cost advantages of vertical integration are not large in the forest products industry.[9] It appears the greatest advantages of integration for pulp and paper companies lies in the reduction of risk and uncertainty in the supply of raw materials and in distribution, and tax advantages gained.

It appears that companies diversify for a number of reasons. First, the demand for paper and lumber products often moves in opposite directions.[10] Thus, firms hope to stabilize profits by diversification

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[8]Walter J. Mead, Mergers and Economic Concentration in the Douglas-Fir Industry, Pacific Northwest Forest and Range Experiment Station, USDA Forest Service Research Paper PNW-9, Portland, p. 24.

[9]Irland, p. 22.

[10]Ibid.

into both areas. Second, diversified firms often can achieve greater raw material utilization, or "closer utilization" as Walter Mead called it.[11] As timber supplies and oil have become increasingly scarce, companies have been forced to more efficiently use resources. They need to either get more products from a given quantity of resource, or else increase the production of the primary products from a given quantity of a resource. Often, due to the technological process, diversification is the only possible solution to efficient use.

Diversification also is a means of breaking into new markets. Mead Corporation indicates that their paperboard group, "...typifies the corporations' policy of investing in areas where we have or can attain market leadership and a good return on investment."[12]

Most companies studied were diversified within the forest products sector. This seems to indicate a desire for greater resource utilization and the stabilization of profits.

As noted previously, the desire to differentiate is greater in oligopolistic markets in which a firm stands to gain a greater proportion of the market if it can successfully differentiate products. This appears to be the case with high grades of paper. In more atomistic markets, sellers gain little by advertising and brand name differentiation, as seen in the case of pulp and low grades of paper.

The height of entry barriers, or how effective barriers are in prohibiting entry, does not lend itself to quantitative measurement. Even Joe Bain, in his pioneering work on entry barriers, estimated relative heights of barriers based on intuitive judgement.[13] None of the

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[11] LeMaster, p. 87.

[12] The Mead Corporation, Annual Report, 1975, p. 3.

[13] Joe S. Bain, Barriers to New Competition, (Cambridge: Harvard

Michigan mills achieved the estimated minimum efficient scale (MES). This is possibly explained by the fact that when these mills were originally built, they were operating at the MES, and will continue to operate as long as they can cover variable costs, despite changes that have increased the MES. There are perhaps numerous other explanations for this occurrence, but one observation might be that price competition was relatively unimportant. If price competition was vigorous, firms operating at less than optimal scale would be forced from the market. Weiss estimated the percent increase in average costs when mills were operated at 50 percent of MES.[14] The weighted average of both printing paper and unbleached kraft indicated only a 11 percent increase in average costs when plants were operated at less than maximum efficiency. This supports a theory that a large capital investment is initially required, which acts as a barrier to entry. But after a firm becomes established, operation at the MES is not necessary to compete effectively in the market.

Each new plant built at the MES tremendously increases the capacity in the market, thus potentially deflating the price of paper. Because of this, it seems plausible that established firms would want to impede entry in a market that already operates much of the time with excess capacity.

Initial capital investment appears to be a relatively important barrier. In 1956 Bain classified capital requirements above $100 million

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University Press, 1956), p. 169.

[14]Weiss, "Optimal Plant Size and the Extent of Suboptimal Capacity," p. 124.

as "very large."[15] Adjusting this figure to 1972 prices indicates capital requirements of approximately $250 million would be considered very large.[16] Certainly an investment of $225 million for a pulp mill would qualify as large, if not very large.

Ability to obtain the necessary capital investment and ownership of strategic resources provide formidable barriers to entry. It is true that other large corporations may have the necessary access to financial markets to acquire a toe-hold acquisition in the industry. But this merely indicates the economic power and advantages that large corporations have over the individual entrepreneur. Concentration of resource ownership may have an undersirable effect on competition; more so than concentration of resources in other manufacturing sectors.[17] New plants can be built in other manufacturing industries, thus increasing competition. But, increasing competition in timber ownership can only be accomplished if land is shifted from another use to timber production. To do so requires a considerable amount of time. It also forces the firm to compete with large firms in other lines of economic activity. In contrast, the trend in land use has usually been from timber production to other uses, such as urban development, housing, etc. Timberland is also immobile, and the cost of transporting logs geographically restricts the area of competition.[18] Firms that can

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[15] Bain, Barriers to New Competition, pp. 158-9.

[16] There was approximately 120 percent change in the index for commercial and factory building between 1955 and 1975. The index was based on 1967=100, and adjusting $100 million for inflation gives approximately $250 million in 1975.

[17] Mead, Mergers and Economic Concentration, p. 34.

[18] Ibid., p. 35.

effectively compete for timber are those that are located close to the sale of timber. Consequently, if private land holdings around a Federal timber area are concentrated, competition will be severly reduced.[19]

While it is true that firms owning timber supplies suffer an opportunity cost by not selling their timber on the market, the more important factor is that these firms realize that selling their timber would depress the price. They use their supplies to keep the price of timber up, thus their bargaining power is increased. Keeping the price of timber up also increases the value of their timber stocks, thus adding to the company's worth. Owning timber becomes an effective pricing strategy.

Government regulations, on the other hand, are not natural entry barriers, but are rather a result of political power. Their ability to prohibit entry is a direct reflection of whose interests count. Tax laws act as direct subsidies for established timber-owning firms. Ability to obtain a license to operate on a body of water is also subject to the political process. The degree of regulation and enforcement of pollution standards is also a reflection of whose interests count. If they are not enforced, established firms have effectively received a subsidy. Even if standards are enforced, the costs for pollution abatement are essentially "add on," thus increasing the already high cost of capital investment.

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[19] Ibid.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The study consisted of an examination of twenty-three pulp and paper companies in Michigan. The industry is dominated by large corporate ownership. The various companies in the state are, for the most part, subsidiaries or divisions of larger companies. Companies differentiate their products by brand names, watermarks, and service. There are absolute cost barriers that principally prohibit entry into the industry.

Conclusions

Companies compete in Michigan primarily for raw materials and pulp. Each company has some degree of bargaining advantage for raw materials. The small number of firms, indirect interlocking ties, and political control influences entry barriers. Thus these structural elements facilitate cooperative behavior. How much cooperation exists can not be definitively stated, but history and present antitrust suits indicate that the industry has at times operated collusively.[1]

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[1] Guthrie, p. 112; Brown, Mead, Georgia-Pacific, Hoerner-Waldorf, International, Mobil, Scott, and Tenneco were all involved in various antitrust cases ranging from alleged price fixing in the folding carton industry and gypsum board industry, to alleged conspiricy to eliminate competition among suppliers of pulpwood.

Gregory described the entire industry nationwide as "... as good an example of oligopoly with a competitive fringe as one can find."[2] This appears, somewhat, to be the case with the industry in Michigan. Although the industry appears oligopolistic, and the structural characteristics provide opportunities for collusion, this does not prove that the industry presently behaves anticompetitively. Examination of structure can note potential anticompetitive situations. Examination of structure can establish who has power, but whether this power is used to influence behavior and performance is a question that can not be answered here.

The ability to assess situations that promote a certain type of behavior can greatly facilitate decision and policy making. Thus, the answers to questions concerning who owns resources, who makes management decisions, what power is derived from integration, diversification, and differentiation, and what prohibits entry into the industry, provide the first step in a comprehensive analysis of the economic impacts of the industry.

Further Research

This study revealed numerous areas for further research. The industry, as studied here, is really a number of different industries, with their own supply and demand characteristics. Categories of paper and pulp should be divided further into classes of high and low grades of paper, as well as the different grades of pulp. Structure in each of these industries could then be studied. Aggregating all of the paper classes probably seriously over or underestimated some markets.

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[2] Gregory, p. 121.

The spatial competition in each of the more finely defined markets should be examined.

Second, an indepth study of behavior in the industry needs to be undertaken. This could include a study of pricing practices and price trends for raw materials, as well as the final product, and also output decisions. Walter Mead outlined a method of studying prices to establish if they are administered or market determined.[3] It involves examining prices over an eight year period, along with production changes. Administrative reaction to weak demand is production curtailments. Market determined prices, on the other hand, will fluctuate with demand. Mead's model provides a possible way to study behavior in the industry.

Third, performance in the industry could be evaluated. There are a number of performance criteria on which they could be evaluated, including welfare effects, technological progress, and harm to the environment. Linkages between structure and performance could be examined more closely. Economic impacts of the industry on the state in terms of income, employment, and taxes can also be evaluated. Tax laws that relate to the forest industry and the advantages that they provide to the pulp and paper industry could be examined further.

Fourth, many people interviewed indicated that competition for fuel and energy would be of the utmost importance in the future. Papermaking is an energy-intensive process, requiring the equivalent of six barrels of oil per ton of paper produced.[4] In light of the recent "energy crisis," it seems that an examination of this would be particularly relevant. In order to correctly assess the true structure of the

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[3]Mead, Mergers and Economic Concentration, p. 74.

[4]International Paper Company, Annual Report, 1976.

industry one must examine structure, conduct, and performance in the market for all the inputs, chemicals, fuel, power, water and labor. This should also include studying the availability of and competition for substitutes.

APPENDIX 1

COMPANY SUMMARIES

APPENDIX 1

Company Summaries[a]

ABITIBI CORPORATION

Parent: Abitibi Paper Company, Ltd.
Headquarters: Toronto, Canada

Net Sales (1975): $764,384,000
Employment: 21,000

Business Lines:[b]

55% 1) Newsprint and groundwood specialty paper
26% 2) Fine papers
7% 3) Paperboard, kraft paper and bag
1% 4) Pulp
3% 5) Lumber
10% 6) Building products

Number of Subsidiaries: 19

Business Connections of Directors:
Norcen Energy Resource, Ltd.
Falconbridge Nickle Mines, Ltd.

Of Interest:
In 1974 Abitibi acquired the Price Company, Ltd., which operates as a separate company, but has common directors. Abitibi owns 40% of Mattabi Mines, Ltd.

BROWN COMPANY

Parent: Gulf & Western Industries
Headquarters: Pasadena, California

Net Sales (1975): $400,310,000
Employment: 8,600

Business Lines: (Brown)

80%
1) Pulp
2) Papers
3) Paperboard
4) Packaging materials
5) Towels and tissues
6) Book matches

20%
7) Mining, manufacturing, sale of rock, sand, gravel, and concrete
8) Concrete forming equipment

Business Lines: (Gulf & Western)

1) Consumer products
2) Agricultural products
3) Leisure time products
4) Apparel products
5) Paper
6) Building materials
7) Automotive replacement parts
8) Natural resources
9) Financial services

Number of Subsidiaries: 11

Business Connections of Directors:
Adorada Corporation, Real Estate Developers
Amcord, Inc., cement manufacturers

Of Interest:
In September 1976, Gulf & Western acquired in a private transaction from three of Brown's institutional lenders all of Brown's warrents which entitled the holder to purchase 368,529 shares of Common stock. Subsidiaries of Brown include Industrial Leaseholds, Inc., South Lake Development Corporation, Shattuck Denn Mining Corporation, and L-T Transport, Inc.

CELOTEX CORPORATION

Parent: Jim Walter Corporation
Headquarters: Tampa, Florida

Net Sales (1975): $1,256,333,000
Employment: 23,900

Business Lines:

9% 1) Homebuilding--construction and financing
32% 2) Mineral products--Celotex building materials, quarries, asbestors
3) Fiber products--tuffed carpeting
10% 4) Coal, iron, and chemicals
16% 5) Pipe products
16% 6) Metal products
7) Wood products

3% 8) Stone and concrete
3% 9) Paper group
6% 10) Sugar operations
.4% 11) Gas and oil
1.1% 12) Wedlo retail stores
1.1% 13) Land development
1.1% 14) Savings and loan operations

Number of Subsidiaries: (Celotex) 5
(Jim Walter) 18

Business Connections of Directors:
3M Company
G.D. Searle & Co.
Marathon Manufacturing Co.

Of Interest:
Jim Walter Corporation produces the nation's broadest line of building materials for residential, non-residential, renovation and remodeling construction markets.

CHARMIN PAPER PRODUCTS

Parent: Proctor & Gamble
Headquarters: Cincinnati, Ohio

Net Sales: $6,081,675,000
Employment: 34,000

Business Lines:
41% 1) Laundry and cleaning
29% 2) Personal care products
23% 3) Food
7% 4) Pulp
7% 5) Chemicals
7% 6) Animal feed
12% 7) Institutional and industrial products

Number of Subsidiaries: 17

Business Connections of Directors:
Western & Southern Life Insurance Company
U.S. Steel Corporation
Aluminum Company of America (ALCOA)
Former U.S. Ambassador to Turkey and Germany and Under Secretary of State for Political Affairs
Kennecott Copper Corporation

DUNN PAPER COMPANY

Parent: Dennison Manufacturing Company
Headquarters: Waltham, Massachusetts

Net Sales: $246,522,000
Employment: 7,500

Business Lines:
12% 1) Retail systems--product identifying and price marking systems
40% 2) Stationary products and systems
16% 3) Office systems
17% 4) Industrial systems
15% 5) Technical papers--lightweight tissue, machine glazed paper

Number of Subsidiaries: 9

Business Connections of Directors:
The Boston Company, Inc., investment management
Liberty Mutual Insurance Co.
Bird & Son, building materials
Goldman, Sachs & Co., investment bankers

Of Interest:
In 1976 Dennison acquired The Carter's Ink Company.

ESCANABA PAPER COMPANY

Parent: The Mead Corporation
Headquarters: Dayton, Ohio

Net Sales: $1,244,637,000
Employment: 24,000

Business Lines:
51.2% 1) Paper
51.2% 2) Paperboard
51.2% 3) Pulp
51.2% 4) Lumber
29.7% 5) Distribution--paper products, industrial supplies, school and office products
15.1% 6) Industrial products
3.4% 7) Interiors
.6% 8) Digital systems
.6% 9) Technological lab
.6% 10) Chemical systems

Number of Subsidiaries: 16
Number of Affiliates: 4

Business Connections of Directors:
Armco Steel Company
International Business Machines Corporation (IBM)
Cement Asbestos Product Co.
First National Bank, Birmingham
Miller Anderson & Sherrerd, investment management
Motion Industries, Inc., Birmingham

Of Interest:
Mead jointly owns four companies: British Columbia Forest Product Ltd. (BCFP), Brunswick Pulp and Paper Company, Georgia Kraft, and Northwood Pulp and Timber Ltd. Mead owns 15% of BCFP and 50% of Brunswick. Brunswick also owns 27% of BCFP. Noranda Mine Ltd. owns approximately 28% of BCFP. Mead and Noranda agreed that their direct and indirect ownership of BCFP shares will be equal at an equal cost and they will vote BCFP shares through Northwood Pulp and Timber Ltd. This gives Mead and Noranda majority control over BCFP. Both BCFP and Northwood Pulp are Canadian companies.

FLETCHER PAPER COMPANY[C]

Parent: None
Headquarters: Alpena, Michigan

Employment: 80

Business Lines:
1) Fine grade paper

Of Interest:
Fletcher is a privately held domestic corporation, incorporated in 1928.

FRENCH PAPER COMPANY[C]

Parent: None
Headquarters: Niles, Michigan

Employment: 165

Business Lines:
1) Fine grade paper

Of Interest:
French is a privately held domestic corporation, incorporated in 1935.

GEORGIA-PACIFIC CORPORATION

Parent: Georgia-Pacific Corporation
Headquarters: Portland, Oregon

Net Sales: $2,358,610,000
Employment: 33,500

Business Lines:

63%
1) Plywood specialties
2) Lumber
3) Gypsum
4) Furniture
5) Wood chips

29%
6) Pulp
7) Paper

8% 8) Chemicals

Number of Subsidiaries: 35

Business Connections of Directors:
Dean, School of Business Administration, Emory University
J.N. Cheatham Corporation, private investment corporation
HCF Enterprises, private investment company
FMC Corporation
Blyth Eastman Dillion & Co., Inc.
Wachovia Bank & Trust Company

Of Interest:
In 1975 Georgia-Pacific acquired Exchange Oil & Gas Corp.

HOERNER-WALDORF CORPORATION

Parent: Hoerner-Waldorf Corporation
Headquarters: St. Paul, Minnesota

Net Sales: $441,157,000
Employment: 8,500

Business Lines:
50% 1) Corrugated containers
19% 2) Mill products--paperboard
15% 3) Consumer packaging
10% 4) Grocery, multiwall and shopping bags
6% 5) Lumber and lumber products

Number of Subsidiaries: 5

Business Connections of Directors:
Addressograph-Multigraph
Brown Brothers Harriman & Co., private bankers
Munsingwear, Inc.
Assistant to the President, St. John's University

Of Interest:
In December 1976 Hoerner-Waldorf merged into Champion International Corporation. Auditing disclosed illegal domestic political contributions of approximately $10,000 were made between 1968 and 1976.

INTERNATIONAL PAPER COMPANY

Parent: International Paper Company
Headquarters: New York, New York

Net Sales: $3,080,800,000
Employment: 52,000

Business Lines:

52%
1) Paperboard
2) Paper
3) Pulp

31%
4) Consumer and industrial packaging

17%
5) Wood products
6) Gas and oil
7) Medical and health products
8) Non-woven fabrics
9) Commercial and industrial credit and financing
10) Plastic containers
11) Rice production
12) Second home sites

Number of Subsidiaries: 6

Business Connections of Directors:
Emhart Corporation
American Telephone & Telegraph (AT&T)
Purdue University
Campbell Soup Company
Dun & Bradstreet Company, Inc.

Of Interest:
International is the world's largest private timberland owner, and the world's largest producer of paperboard, pulp, and paper products. Several of the directors were formerly employed by General Electric Co., Western Electric Co., International Telephone & Telegraph. In 1975 International acquired General Crude Oil.

KIMBERLY-CLARK CORPORATION

Parent: Kimberly-Clark Corporation
Headquarters: Neenah, Wisconsin

Net Sales: $1,483,700,000
Employment: 28,847

Business Lines:

60% 1) Consumer and service products
21% 2) Newsprint
21% 3) Pulp
23% 4) Papers and specialty products
1% 5) Transport service
1% 6) Aircraft maintenance and sales
1% 7) Kimfibers
1% 8) Machinery building
1% 9) Insurance

Number of Subsidiaries: 38

Business Connections of Directors:

Bank of Montreal
Citicorp
Citibank N.A.
Marine National Bank of Neenah
First National Bank of Neenah
The Rockerfeller Foundation
Cutler-Hammer, Inc.

Of Interest:

Kimberly-Clark considers itself to be the leading manufacturer and seller of facial tissue and menstrual care products in the world; and it is the second leading world manufacturer and seller of disposable diaper. Kimberly-Clark produces 19.4% of U.S. thin paper production, 11.7% of U.S. newsprint production, and 9.6% of sanitary tissue production.

MANISTIQUE PULP AND PAPER COMPANY[C]

Parent: Field Enterprises, Inc.
Headquarters, Chicago, Illinois

Business Lines:

1) Field Creations, Inc.
2) World Book Encyclopedia
3) World Book Insurance Company
4) Field Newspaper Syndicate--Chicago SunTimes, Chicago Daily News
5) Field Enterprises Charitable Corporation
6) FSC Paper Corporation
7) Field Resources

Of Interest:

Manistique produces primarily newsprint, groundwood, printing.

MENASHA CORPORATION [C]

Parent: Menasha Corporation
Headquarters: Neenah, Wisconsin

Employment: 180

Business Lines:
1) Land and timber
2) Paperboard
3) Containers
4) Plastics

Of Interest:
Menasha is a privately held foreign corporation.

PACKAGING CORPORATION OF AMERICA

Parent: Tenneco, Inc.
Headquarters: Houston, Texas

Net Sales: $5,630,300,000
Employment: 82,000

Business Lines:
26% 1) Integrated oil and gas operations
21% 2) Natural gas transmission
11% 3) Manufacturing and shipbuilding
7% 4) Packaging
6% 5) Chemicals
3% 6) Agriculture and land management
22% 7) Construction
22% 8) Farm equipment
5% 9) Automotive components
1%10) Investment

Number of Subsidiaries: (Packaging Corporation) 15
(Tenneco) 269

Business Connections of Directors:
Cameron Iron Works, Inc.
Smith Barney, Harris Upham & Co., Inc., securities brokers
Southern Pacific Company, transportation
Southwestern Bell Telephone

Of Interest:
In 1976 there was a proposal to merge Anaconda Company into Tenneco.

PIONEER PAPER STOCK

Parent: Mobil Corporation
Headquarters: New York, New York

Net Sales: $22,135,334,000
Employment: 200,000

Business Lines:

82%	1) Natural gas 2) Crude oil 3) Refined petroleum products 4) Transport systems 5) Other energy sources
8%	6) Chemical operations
9%	7) Merchandising 8) Credit
4%	9) Packaging
3%	10) Other

Number of Subsidiaries: 445

Business Connections of Directors:
American Express Company
Bankers Trust
Former Under Secretary of State for Political Affairs
Social Science Research Council
International Business Machines Corporation (IBM)

PLAINWELL PAPER COMPANY, INC.

Parent: Philip Morris, Inc.
Headquarters: New York, New York

Net Sales: $3,642,414,000
Employment: 51,000

Business Lines:

47%	1) Cigarettes
4%	2) Adhesives and liquid coating 3) Textile chemicals 4) Packaging materials 5) Disposible tissue 6) Specialty products 7) Paper
18%	8) Beer production
29%	9) International sales and production
2%	10) Housing development

Number of Subsidiaries: 67

Business Connections of Directors:
Board of Bankers Trust Company
George Comfort & Sons, real estate management
President of Washington and Lee University
IBM World Trade Europe/Middle East/Africa Corporation
Richardson-Merrell, Inc., pharmaceutical manufacturer
Virginia Electric and Power Company
Citibank N.A.

Of Interest:
Philip Morris is the second largest of six major cigarette manufacturers. The Philip Morris subsidiary, Miller Brewing Company, is the third largest United States brewer.

PORT HURON PAPER COMPANY

Parent: None
Headquarters: Port Huron, Michigan

Net Sales: $39,796,000
Employment: 454

Business Lines:
1) Lightweight specialty papers:
72% - one-time carbonizing paper
15% - manifold carbon paper sets
13% - lightweight publication paper
- food packaging papers

Number of Subsidiaries: 1

Business Connections of Directors:
Michigan National Bank

Of Interest:
Five customers account for 60% of the revenues from one-time carbonizing paper (45% of total sales). The U.S. Government accounts for 40% of the sales of manifold carbon paper sets.

ROCHESTER PAPER COMPANY

Parent: James River Corporation
Headquarters: Richmond, Virginia

Net Sales: $41,848,164
Employment: 1,461

Business Lines:
17% 1) Filtration materials
11% 2) Specialty printing and copy papers
37% 3) Specialty industrial and consumer packaging
35% 4) Miscellaneous specialty products

Number of Subsidiaries: 7

Business Connections of Directors:
Southern Bank & Trust Company
Ethyl Corporation
Citicorp Venture Capital Ltd., affiliate of Citibank
ARA Virginia Skyline Company

Of Interest:
Three customers account for 24% of net sales: General Motors Corporation, Avery International Corporation, 3M Company. James River indicated that the loss of any of these customers would have a material effect upon the company.

ALLIED PAPER, INC.

Parent: SCM Corporation
Headquarters: New York, New York

Net Sales: $1,287,454,000
Employment: 27,000

Business Lines:
26% 1) Coatings and resins
14% 3) Typewriters and appliances
27% 3) Foods
9% 4) Chemicals
13% 5) Paper products
9% 6) Business equipment
3% 7) Other

Number of Subsidiaries: 46

Connections of Business Directors:
Borg-Warner Corporation
Blyth Eastman Dillion & Co., Inc.
First National Bank & Trust Company of Ithaca
International Minerals & Chemicals Corporation
Drexel Burnham & Company, Inc.

Of Interest:
SCM is the largest producer of turpene based chemicals. These chemicals use crude sulphate turpentine as a raw material, which is a by-product of kraft papermaking. SCM and St. Regis Paper Company together operate one of the largest tall oil refining facilities in the world.

S.D. WARREN COMPANY

Parent: Scott Paper Company
Headquarters: Philadelphia, Pennsylvania

Net Sales: $1,191,883,000
Employment: 20,100

Business Lines:
- 65% 1) Packaged paper products
- 22% 2) Printing, publishing, converting
- 7% 3) Forest products
- 7% 4) Pulp
- 6% 5) Other

Number of Subsidiaries: 31

Business Connections of Directors:
- Seattle First National Bank
- Merck & Co., pharmaceuticals
- Federated Department Stores
- Marketing Science Institute
- University of Pennsylvania
- Former U.S. Ambassador to the United Nations
- Campbell Soup Company
- Green Giant Company
- Dead River Company, timberland and distribution of oil products
- J.P. Morgan & Co., Inc.

Of Interest:
Scott Paper considers itself to be the leading domestic producer of paper towels, toilet tissue, paper napkins, and wax paper.

SIMPSON LEE PAPER COMPANY[c]

Parent: Simpson Paper Company
Headquarters: Seattle, Washington

Employment: 350

Business Lines:
1) Fine grade paper

Of Interest:
Simpson Paper Company is a closely held foreign corporation.

WATERVLIET PAPER COMPANY, INC.[c]

Parent: Parsons & Whittemore
Headquarters: New York, New York

Employment: 470

Business Lines:
1) Fine grade paper

Of Interest:
Watervliet Paper Company is a privately held foreign corporation.

Source: Annual Reports (1974, 1975, 1976) and Form 10K's, Report to the Securities and Exchange Commission for the respective companies.

Note: a) Net sales, employment, business lines, number of subsidiaries, and business connections are all in reference to the parent company, except where indicated. Except in the case of Brown Co., and Packaging, information on individual Michigan companies was not available.

b) Percentages refer to the percent of 1975 annual sales contributed by each line of business

c) Information on sales, business lines, business connections, etc. was not available for Fletcher, French, Manistique, Menasha, Simpson Lee, and Watervliet because they are privately held corporations, whose financial data is not available to the public.

APPENDIX 2

BRAND NAME AFFILIATIONS

APPENDIX 2

Brand Name Affiliations

Abitibi Corporation

- Abitibi
- Canada Envelopes
- The Canadian Stationery
- Hilroy Ltd.
- Northern Wood Preservers
- Price-Wilson

Brown Company

- Burgess
- Linweave
- Nibroc
- Paper Maid
- Pert
- Purity

Celotex-Jim Walter Corporation

- Bestal-Steel
- Briggs
- Celotemp
- Celotex
- Everwed
- Georgia Marble
- J.W. Papers
- Jim Walter Homes
- Jim Walter Resources
- Litecraft
- Lorch
- Majestic Carpet
- Walter Land
- Wedlo

Charmin Paper Products-Proctor & Gamble

- Ace
- Ariel
- Bounce
- Bounty
- Camay
- Cascade
- Charmin
- Cheer
- Comet
- Crest
- Crisco
- Downy
- Duncan Hines
- Folger's
- Head & Shoulders
- Ivory Soap
- Jif
- Joy
- Mr. Clean
- Pampers
- Pringles
- Puffs
- Scope
- Spic and Span
- Sure
- Tide
- Zest

Dunn Paper Company-Dennison Manufacturing Company

Carter's
Dennison
Densil
Densilflex
Doret
Meritag
National
PRES-a-ply Seals
Swiftachment

Escanaba-Mead Corporation

Mead Containers
Mead Packaging
Mead Papers
Montag
Sargent
Stanley
Westab

Georgia-Pacific Corporation

Coronet Prints
Coronet
M-D

Hoerner-Waldorf Corporation

5D
Hoerner-Waldorf

International Paper Company

Confil
Davol, Inc.
Dryfil
Facelle
Flushabyes
International Paper
Neofil

Kimberly-Clark Corporation

B-B Brand
Ballet
Blenheim
Classic
Chieftain
Coosapress
Coosaprestige
Coosaprime
Dawn
Delsey
Edsorb
Fallset
Fems
Hi-Dri
Karolton
Kimbies
Kimdry
Kimfole
Kimfone
Kimtowels
Kimwipes
Kleen Bebe
Kleenex
Kotex
Lightdays
Lithowipes
Lys
Neenah
New Freedom
Pancake
Peel & Seel
Popee
Rhinohide
Regio
Resolute
Strip-Tac
Teri
Thoreau
Tiss
Wondersoft
Woodham

Plainwell Paper-Philip Morris

Armstrong
Benson & Hedges 100's
Koch Label
Marlboro
Merit
Miller High Life
Mission Viejo
Nicolet
Parliament
Polymer
Saratoga 120's
Surtech
Virginia Slims

Pioneer Paper Stock-Mobil Corporation

Container Corp. of America
Marcor
Mobil Alaska
Mobil Oil
Montgomery Ward & Co.

Packaging Corporation of America-Tenneco

J.I. Case
Monroe Auto Equipment
Newport News
Tenneco
Tenneco Chemicals
Walker

Port Huron Paper Company

Huron Copysette
Port Huron Papers

SCM/Allied Corporation

Allied Paper
Coffee Magic
Dailey
Dolphin
Durkee
Glidden
Gretchen Grant
Kleinschmidt
Mary Proctor
O & C
Proctor & Schwartz
Proctor-Silex
SCM
Smith-Corona
Spred

S.D. Warren Company-Scott Paper

Arts'n'Flowers
Baby Fresh
Blueline
Confidets
Cottonelle
Cut-Rite
Dura-Weve
Family Scott
Fiesta
Flokote
Heftlon
High-Stretch
Job Squad
Lady Scott
Lady Scott Facial Tissues
Scotkins Napkins
Scott Family Napkins and Placemats
Scotties
ScotTissue
ScotTowels
Soft-n'Pretty
Soft-Weve
Sturdi-Wipes
UtilityWipes
Viva
Viva Napkins
Waldorf
WypAll

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