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It was the purpose of this thesis to evaluate the ruling of a federal district court in Michigan in 1968 that the 1961 vertical merger between Ford Motor Company and the Electric Autolite Company violated the Clayton Act. Additional objectives were to analyze the spark plug industry using the industrial organization framework of market structure, conduct and performance and to assess the weight of vertical integration and potential competition in the merger.

It was concluded that the court's analysis was essentially correct and that the Ford-Autolite merger was anticompetitive. It was also concluded that the spark plug industry is heavily concentrated with very high barriers to entry.

THE AUTOLITE CASE: AN ECONOMIC ANALYSIS OF A VERTICAL MERGER AND POTENTIAL COMPETITION

by

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I. AN INTRODUCTION

The Facts

On April 12, 1961, the Ford Motor Company purchased the following assets from the Electric Autolite Company of Toledo, Ohio:

1. Autolite's only spark plug plant in the United States;
2. One of its six battery plants;
3. The Autolite trade name and trademark; and
4. All patent and license agreements covering the manufacture of spark plugs and batteries.

In addition, Ford obtained limited distribution rights in the form of Autolite's nationwide franchises. These included distributors, jobbers, and dealers which were involved in the sales of automotive replacement parts; it also included the sales organization that served these accounts. Finally, a written agreement was contracted between the two firms calling for Autolite to furnish certain spark plugs, batteries, and ignition parts to Ford for a period not exceeding three years from the date of purchase.

In November of the same year the Antitrust Division of the Justice Department of the United States instituted civil proceedings against Ford, charging it with a violation of the Clayton Act. More specifically, the suit stated that the Ford-Autolite merger was an acquisition tending substantially to lessen competition and to create a monopoly in the production, sales, and distribution of spark plugs,

batteries, ignition parts, and automobiles in direct violation of Section 7 of the Clayton Act.

After an extensive trial before the United States District Court for the Eastern District of Michigan, the Court dismissed the charge pertaining to the markets of ignition parts and automobiles. However, it found violations with respect to the markets of spark plugs and batteries. Ford chose not to contest the judgment concerning batteries.

On December 18, 1970, almost nine years after the suit was filed, the district court entered its final judgment. Not only was Ford ordered to divest itself of the Electric Autolite spark plug facilities, but it also was enjoined from producing spark plugs for ten years.[1]

Ford appealed to the Supreme Court in February of 1971. The case was argued before the Court in November of 1971, and at the time of this writing, the opinion of the Supreme Court is yet to be handed down.

The Purpose

The Ford-Autolite merger was one that occurred in a heavily concentrated industry approaching oligopolistic proportions. Because vertical integration in the real world generally occurs in the broad range of structural situations between the polar extremes of perfect competition and monopoly, one economist has suggested that the proper

approach in evaluating such integration should be empirical, rather than theoretical. When analyzing and evaluating vertical integration in this setting the economist should "evaluate the structure of the markets in which integration occurs and then determine how the integration may affect the structure and behavior of the industries involved."[2] However, while an empirical approach is certainly necessary a theoretical analysis is mandatory to interpret the facts. This thesis will make use of both approaches.

The purpose of this thesis is to attempt to evaluate the Ford-Autolite merger in accordance with these guidelines. It will focus on the spark plug industry only; batteries will be excluded. Our format will be the traditional framework of industrial organization analysis--structure, conduct, and performance dimensions. Moreover, we will direct attention to the public policy issues of the merger. Will forbidding the merger increase (result in better) market performance? Will a divestiture ruling result in a more competitive spark plug market? These questions lie at the heart of the Ford-Autolite merger. Not only will we be seeking answers to these questions but, we also will be concerned with the public policy questions raised by the merger. Specifically, the economies of vertical integration and the market power abuses of vertical integration will be analyzed.

An analysis of the Ford-Autolite merger is important to the economist in several respects. Perhaps the most important is that

it is a true vertical merger. Most mergers that have occurred and which have been prosecuted under the Clayton Act heretofore have had both horizontal and vertical dimensions. Secondly, this merger may produce a landmark decision from the new Supreme Court that is presently made up of four appointees of President Nixon. The Burger Court's performance to date has shown a rightward move in civil, racial, and criminal issues to the extent that the Warren Court can now at some distance be viewed as an historical anomaly. The question is: Will the Ford-Autolite decision tell us how the Burger Court will stand on antitrust?

In summary, then, the significance of the forthcoming decision is fourfold:

1. It will help to clarify the Burger Court's position on antitrust.
2. It may clarify fully whether or not Section 7 of the Clayton Act applies to vertical as well as horizontal mergers.
3. It will shed light on the so-called doctrine of potential competition and its significance in Section 7 cases.
4. It may set a legal precedent for true or purely vertical mergers.

The format of this thesis is simple and straightforward. Chapter II deals with vertical integration in general. It directs attention to the different kinds of vertical integration as well as to its motivations and its measurement. In addition it introduces and discusses the potential competition doctrine. Chapter III is a presentation of an economic analysis of the spark plug industry using the

industrial organization framework. The analysis of the Ford-Autolite merger is the subject of Chapter IV. Public policy questions are also considered. Lastly, the final chapter consists of a discussion of Ford's alternatives before the merger and the summary and conclusions of the thesis.

II. VERTICAL INTEGRATION AND POTENTIAL COMPETITION

Vertical integration occurs via ownership or contract.[3] In the case of ownership, it may be the result of either internal growth or direct acquisition. The Ford-Autolite case involves vertical integration by means of direct acquisition, i.e., a vertical merger. Both forms of vertical integration are important and deserve adequate discussion. In this chapter it will be useful to devote a section to a general discussion of vertical integration and a section to the notion of potential competition. Since the Ford-Autolite merger concerns the automobile industry, we will also present a discussion of vertical integration with reference to the automotive industry. Moreover, we will attempt to point out the implications of the Ford-Autolite merger. Finally, the antitrust laws pertaining to vertical integration will also be examined in this chapter.

Vertical Integration

The Functions of a Firm

In order to understand fully the economic phenomenon of vertical integration, it is useful to take a look at the firm itself. If we consider the typical firm as purchasing inputs, combining these inputs and producing output, then, owing to the complex nature of the production process, the firm will be involved in a series of

production processes or functions. Professor Stigler describes these processes in this fashion:

> The firm is usually viewed as purchasing a series of inputs, from which it obtains one or more salable products, the quantities of which are related to the quantities of the inputs by a production function. For our purpose it is better to view the firm as engaging in a series of distinct operations: purchasing and storing materials; transforming materials into semifinished products and semifinished products into finished products; storing and selling the outputs; extending credit to buyers; etc. That is, we partition the firm not among the markets in which it buys inputs but among the functions or processes which constitute the scope of its activity.[4]

Stigler's description explains the basic activities of the firm. With these in mind the next step is to define vertical integration.

Definitions

The degree of vertical integration existing within a typical firm is described by the extent to which these functions and production processes mentioned by Stigler are performed within the firm. If these different functions or stages of production are viewed as a continuous stream of economic activity, originating with the raw materials stage and proceeding downstream to the ultimate consumer, then the economic system can be coordinated and synchronized either by the market process (the price mechanism in a private enterprise economy) or by vertical integration. A firm that performs all of the processes connected with a particular final product or service is completely vertically integrated. Thus, vertical integration is a description of the internal structure of a firm. It is a preemption or supersession

of the price mechanism, which is caused by a firm performing at least two successive stages of production which could be performed by two independent business firms.[5]

An example will help to illustrate vertical integration. A loaf of bread goes through several stages of production before it reaches a consumer--the farmer grows the grain, the miller grinds it, the baker performs his contribution and the grocer markets the final loaf. From the earth to the final consumer it has passed through four productive units which have processed the good. If a firm were to integrate itself vertically in the production of bread, it would perform all four of these functions.

Vertical integration is usually divided into forward and backward integration. The former refers to downstream integration or the ownership by a firm of succeeding stages of production, i.e., it is a movement in the direction of the ultimate user of the final product or service. On the other hand, backward integration involves a movement in terms of ownership upstream to preceding stages of production in the direction of the supplier. In the words of one economist:

> Backward vertical integration exists if the unit which initiated the vertical integration is closer to the ultimate consumer than any other unit . . . forward vertical integration exists if the unit which initiated the vertical integration is further away from the ultimate consumer than any other unit.[6]

It is also useful to take the analysis one step further and differentiate between complete and partial integration. If we consider any two successive functions, partial vertical integration refers

to the extent to which a firm may continue to utilize the market as a source of supplies or as an outlet for disposal of part of its output. In the example above, a partially integrated firm might continue to purchase wheat from the farmer while performing the three successive stages itself or it might perform the first three and use the market for distribution purposes. In contrast, a firm that is totally integrated vertically has within it the whole supply source or outlet system.

Having discussed the firm's functions and also having defined vertical integration, we now turn to a consideration of the reasons for vertical integration.

Motivations

The motivations and reasons for vertical integration are numerous. Probably the most common and obvious motive is to reduce costs. A classic example is provided by the steel industry where the need to combine technological complementary production processes is of primary importance in cost reduction. Integration of diverse furnace with rolling mill operations eliminates the need for separate reheating steps. In such instances economies of vertical integration can be realized, and in this case integration permits considerable savings in the total fuel requirement for heating the pig iron and steel.

The elimination of certain costs of using the market can also be achieved by vertical integration. Intermediate profit payments (included in the price of intermediate goods), sales promotion

activities and inventory costs can all be eliminated or reduced by vertical integration. Other motivations include the fear of future price increase of raw materials, the desire for protection against losses and the fear of inadequate supply. In the words of Scherer:

> . . . Upstream integration, for example, can ensure that supplies of raw materials will be available in time of shortage and protect the firm from a price squeeze by monopolistic suppliers. Downstream integration gives the firm greater control over its markets, lessening the probability, among other things, of foreclosure (being shut out from the market) by powerful buyers or middlemen.[7]

It is also possible to realize economies in situations involving non-complementary processes. Economies in these instances can be attributed to functional efficiency or unified control by management over a sequence of operations. Bringing different stages under the supervision of one management leads to efficiency of the physical processes by eliminating unnecessary handling and making the flow of goods more regular.

Scherer also mentions certain adverse uses of vertical integration:

> . . . Firms integrated vertically may keep raw materials out of rival hands, or foreclose markets to rivals, or establish a vertical price structure (relating raw material to intermediate and end product prices) which squeezes profit margins of the less integrated competitor. Integration may also affect pricing behavior in more subtle ways, e.g., by complicating price decisions to such an extent that rigidity ensues, or by increasing overhead costs (through the internalization of costs which would have been fully variable, if incurred by independent materials suppliers) and hence altering the integrated firm's susceptibility to local or general business downturns.[8]

Other adverse results from vertical integration include the semisqueeze and the supplying of nonintegrated competitors on unequal terms, that is, price discrimination.

Before moving to a consideration of the measurement of vertical integration, it should be emphasized that the adverse effects of vertical integration, and other effects too, are judged here in terms of partial equilibrium since a general equilibrium theory of monopoly does not exist.

Measurement

Why do we need to measure vertical integration? The answer is twofold. First, we want to quantify market structure--the dimension under consideration in the Ford-Autolite merger. Secondly, we need it to understand the extent to which the merger changed the structure of the spark plug market.

Vertical integration is an important dimension of market structure. Other things being equal, the effect of a vertical merger is to raise the extent of vertical integration in the market. It is important to measure the extent of vertical integration in order to assess the structural impact of the merger. A number of different methods for measuring it have been suggested. All of these indexes use a microeconomic approach and attempt to measure the number and significance of vertically related stages performed by a firm operating in a particular industry. Probably the most common index is the ratio of value added to the sales of a particular firm. The rationale of such

an index is that the magnitude of the ratio is a function of the number of successive stages in the production stream that are performed by a firm. Using Professor Adelman's example, consider three disintegrated firms.[9] Firm A produces raw materials, firm B is the fabricator, and the distributor is firm C. Each firm contributes an equal amount to the total value of the final product. The value added-to-sales ratio for firms A, B, and C respectively is 1.0, .5, and .33; the degree of vertical integration in this example declines progressively from the original to the final stage. There is clearly a bias toward the original stage because the closer a firm is to the raw material end of the production stream, the higher is its value added-to-sales ratio. In this case the index reflects the stage in the productive process which is being measured, rather than the degree of vertical integration. Thus, the index is virtually useless when comparing firms in different industries. To a lesser extent when intra-industry comparisons are made this same weakness prevails unless the two firms under comparison are at the same productive stage. Moreover, if the index is used to compare two firms performing identical production operations, then the firm with greater profits will show a higher index of integration since value added includes the profits of the firm.[10] The remedy for this profit bias is to calculate the profits of the firm and subtract them from value added.

An alternate measure of the degree of vertical integration has been advanced in the form of the ratio of the value of inventory to

sales. Needham's observations about this index are:

> . . . The notion that increases in this index indicate a larger number of successive stages performed by the firm rests upon the implicit assumption that the greater the number of stages performed, the greater will be the level of the firm's total inventory. Vertical integration which enables a firm to economize on stocks will invalidate this line of reasoning and result in a smaller value of the index the larger the number of stages performed. Like the ratio of value added to sales, the ratio of inventory to sales will be affected by differential rates of change in inventory and final product prices respectively. Such changes will change the index even though the number of stages, and physical characteristics of the firm's operations, remain unchanged.[11]

Another measurement technique is an index that shows the degree to which a firm performing any particular stage of production is dependent upon markets for purchasing the required inputs for that stage or for the disposal of the output of that stage.[12] A requirement of this index is separate measures of the degree of backward and forward integration for each stage of production performed by a firm. Needham discusses the advantages of this type of index:

> An advantage of this type of measure is that either value or quantity data may be employed and the ratios are invariant to price level changes since both numerator and denominator of the value ratios involve use of the same price. Most of the problems arising out of the use of such measures are likely to revolve around the definition of a stage in the productive process. Much of industry involves two or more successive stages in production which might theoretically be split among two or more producers. However, attention is generally focused upon those situations in which successive stages of production controlled by a single managerial supervision are also, or were previously, performed by separate firms.[13]

All of these indexes are similar in that they employ different methods to measure the same thing. While it would be informative to

have vertical integration in the automobile industry measured in all of these various ways, only the value added-to-sales ratio is available. Recently Robert Crandall attempted to measure the vertical structure of the automobile industry using this concept. His results are presented in Table 1.

TABLE 1

VA/S FOR THE BIG THREE ASSEMBLERS

Year	G. M.	Ford	Chrysler
1946	.474	.394	N.A.
1947	.470	.370	.288
1948	.465	.352	.287
1949	.481	.358	N.A.
1950	.515	.384	.306
1951	.484	.379	.254
1952	.500	.401	.301
1953	.459	.373	.249
1954	.474	.382	.340
1955	.500	.413	.353
1956	.487	.388	.338
1957	.479	.367	.355
1958	.464	.348	.333
1959	.492	.437	.333
1960	.486	.471	.319
1961	.499	.410	.340
1962	.527	.416	.379
1963	.522	.409	.380
1964	.525	.399	.386
1965	.522	.404	.373

N.A.--all data not available
Source: Robert Crandall, "Vertical Integration and the Market for Repair Parts in the United States Automobile Industry," Journal of Industrial Economics, March 1968, p. 216.

The evidence in the table indicates that General Motors is and has been in recent times the most integrated automobile firm in the

industry. Next comes Ford and then Chrysler. Crandall interprets the trends shown in Table 1 as follows:

> . . . The data for 1946 and 1947 reflect artificially low output which resulted from reconversion problems and labor boycotts. Since firms had to meet high fixed costs, this would result in larger VA/S for those years. There is a continual increase in the ratios for the Big Three from 1948 through 1962, allowing a tentative conclusion that firms had been increasing their self-sufficiency in inputs to the assembly process. The slight decline in 1962-63 is undoubtedly a reflection of record levels of output which have forced assemblers to increase their dependence upon suppliers in the short run. Whether there will be further investment upstream by assemblers in order to restore the self sufficiency of the early 1960s cannot be foretold at this time.[14]

Table 1 shows that the value added-to-sales ratio for Ford decreased from .471 to .410 during 1961 and increased from .410 to .416 during 1962. How much, if any, do these changes reflect the merger of Ford and Electric Autolite in 1961? For all practical purposes the index remained unchanged during the year in question. Perhaps the value added-to-sales ratio is a useless measure of vertical integration. Certainly it is not sufficiently sensitive to inform us of the structural consequences of the Ford-Autolite merger.

Potential Competition

The competitive consequences of vertical acquisitions can be analyzed in terms of a consideration of the direct effects of vertical integration and in terms of the removal of potential entrants.[15] The effects of vertical integration have already been mentioned. Earlier, we discussed various adverse uses of vertical integration--

extension of market power, price squeezing, foreclosure, and structural changes. The removal of potential entrants, on the other hand, involves the potential competition doctrine. It consists of viewing customers and suppliers as likely potential entrants into related stages of production and examining whether or not a particular merger will eliminate an important potential entrant into the market under consideration. This approach is particularly relevant to this thesis since the Ford-Autolite merger was attacked by the Justice Department on these grounds.

The so-called doctrine of potential competition is a relatively new tool of the antitrust enforcement agencies which can be used to prevent or to dissolve different kinds of mergers--horizontal, vertical, and conglomerate. It has been used primarily in the prosecution of conglomerate mergers. Essentially, it states that such mergers violate Section 7 of the Clayton Act as amended, if they reduce potential competition (the emphasis is on potential as opposed to actual). Although the courts have not ruled unambiguously that mergers which tend substantially to lessen potential competition are illegal, they have implied that such is this case. The history of the doctrine in the context of these actual court cases is reviewed in a later chapter. Here, it is sufficient to emphasize that the doctrine involves mergers among potential competitors or mergers in which the participating firms, in the process of their growth, would logically extend their operations into the same markets. Such operations may

include the production of a new product or entering a new market area with a product that one of the firms already produces.

We have emphasized the distinction between potential and actual competition. Such a distinction is crucial and merits elaboration. The economic distinction between mergers among potential competitors and mergers among actual competitors is a matter of timing and the probability of anticompetitive consequences. Markham best describes this difference:

> . . . The merger of two actual competitors may substantially injure competition in existence today, while the merger of two potential competitors may substantially injure the competition expected to materialize tomorrow. However, since all that potentially exists today may not actually come about tomorrow, the probability that the merger of two potential competitors will substantially injure competition ceteris paribus is not as high as it is in the case of the merger of two actual competitors. But it is emphasized that the economic difference here is not fundamental but a matter of degree.[16]

Unfortunately, Markham only hints at the basic underlying issue of the doctrine of potential competition, that of the theory of limit pricing. Specifically, it is Professor Bain's hypothesis that potential competitors may be just as important in pricing and output decisions as actual competitors. This theory is discussed fully in the fourth chapter.

Thus, the economic rationale of the doctrine of potential competition, although the courts have not stated it as such, rests upon the theory of limit pricing. It is also evident that heretofore, the courts have not made a clearcut ruling on the potential competition doctrine. No court decision to the writer's knowledge has focused

unambiguously on this question of potential competition. Thus, the forthcoming ruling on the Ford-Autolite merger by the Supreme Court will constitute an important landmark in antitrust litigation. This is the significant feature of this thesis.

Crandall's measure of vertical integration in the automobile industry provided us with a quantitative picture of the industry as it is today. However, we need a more complete picture--one that reveals what fields of production the automobile producers are engaged in.

Vertical Integration in the Automotive Industry

The Ford-Autolite merger involved two firms--one, a member of the automobile industry proper, and the other, a part of the automotive parts industry. The question is, then, what is the extent of vertical integration in these two industries?

Currently there are four major producers of automobiles in the United States--General Motors, Ford, Chrysler, and American Motors, the first three commonly referred to as the "Big Three" and the latter representing the only surviving "independent."[17] These four firms rank respectively in terms of sales as the first, third, seventh, and one hundred tenth largest industrial corporations in the United States economy.[18] Over ninety-nine per cent of the passenger cars produced in the United States are manufactured by these four firms; the Big Three alone accounts for over ninety per cent of total domestic output.[19] According to state motor vehicle registration records for

the calendar year 1967, General Motors was the dominant seller in the market accounting for almost fifty per cent of sales. However, it should be emphasized that the market here refers to a combination of domestic and imported automobiles. Ford was next with approximately twenty-two per cent of sales, followed by Chrysler and American Motors which held approximately sixteen and three per cent respectively.[20] These figures show that the automobile industry is a classic case of a tight oligopoly.

Previously, the extent of vertical integration in the automobile industry as measured by the value added-to-sales index was pointed out. In theory, one would think that an automobile producer might be primarily an assembler of parts originating with outside suppliers but more than likely designed by the assembler himself. Such is not the case. Not only are the current producers of automobiles assemblers, but they are also engaged in the production of component parts. The extent of their integration is revealed by their assembly facilities as well as their stamping, casting, and machining facilities. All four firms also employ their own designers as well as develop and test their own models. With the exception of American Motors they cast their own engine blocks and cylinder heads and make their own automatic transmissions. Moreover, they also own facilities for making glass, upholstery, steel, batteries, and, of course, spark plugs.[21]

Vertical integration by the auto assemblers into full automobile production and into the manufacture of automobile component

parts manifests itself clearly. Of the following fields of production there is a clear pattern for the Big Three to produce some or all of their requirements, given some variation over time as technology and supplier bids change:

1. engines, transmissions, casting, stampings: all three
2. valves, gears, clutches: all three
3. wheels: all three
4. brakes: all three
5. manual and power steering: all three
6. plastics and upholstery: GM and Ford
7. carburetors: GM and Ford
8. frames: Ford (GM made part of its requirements until recently; Chrysler's unitized construction does not require frames)
9. air pollution control equipment: GM and Ford
10. electrical equipment: all three (Autolite's former plants are included in Ford's facilities.)[22]

Automobile producers have not always manufactured these component parts; when the industry was in its infancy, the majority of the firms specialized in assembly alone. They were particularly reluctant to produce their own parts because the capital requirements involved heavy fixed costs. However, as the firms grew in size either by internal expansion or merger or sometimes by both methods, parts were made for use in the vehicles. General Motors currently produces more of its major components than any of its rivals and it has held this lead for decades despite the fact that Ford possesses a steel mill

and a glass plant. The gap has been partially closed by Chrysler and Ford's backward integration. Ford's acquisitions of Autolite probably helped to some extent. In 1966, only forty-seven per cent of every General Motors sales dollar went to suppliers, compared to fifty-six and eight tenths per cent for Ford and fifty-eight and four tenths per cent for Chrysler.[23] American Motors is much less integrated and has a smaller volume and more limited capital resources than the other producers.

What benefits do these automobile firms derive from vertical integration? What were the motivations that influenced them to integrate?[24] The motives for vertical integration in the automobile industry can be conveniently separated into several groups: (1) those yielding real economies; (2) those yielding pecuniary economies; and (3) those which can be fitted into either class.

Probably the most beneficial motive of these automobile producers for vertical integration can be classified under group (3). Economies of joint production and the need for unified coordination and control play a decisive role in influencing backward integration. Consider the final assembly process in automobile production with all the separate assembly stations at different locations in the plant. If separate and independent firms handled each station in their own plants, the shipping costs would be exorbitant and the coordination problem would be difficult. Backward integration reduces these shipping costs and makes the coordination problem less complex.

Moreover, the advantages of unified coordination and control extend beyond "in-house" production. Designing, producing, testing, and modifying an automobile requires a great deal of coordination, a job that necessitates competent management. All automobile components, especially the engine, transmission, frame, body, and brakes, must sustain good performance with each other and it is management's responsibility to see that these conditions are met as well as ensuring that these components are in their right place at the right time and in the correct quantities. Moreover, if the goal of the automobile firm is to emphasize product differentiation and the uniqueness of one's own product, close coordination and control is required to design and develop nonstandardized components. One economist, who studied the automobile industry, observes:

> In such situations, coordination and control on an in-house basis is simply easier than the arm's length negotiations that take place between independent companies. If a company wants to design a new car that will require a new engine (which, in turn, may require new manufacturing techniques), it feels more confident that the problems of developing the engine and integrating it with the body will be given full attention and solved in time if the efforts are all in-house. A customer company is never quite sure that its suppliers' goals and its own goals are closely enough attuned. It is never entirely certain that the supplier will not at some point say, "Sorry, but we can't supply that item." Substitutes cannot always be found instantly; new tooling cannot be obtained overnight. Even matters such as scheduling meetings to coordinate projects are easier in-house than at arm's length.[25]

Thus, we see that uncertainty is also an influencing factor; auto producers will integrate backward to ensure the future supply and delivery of components, especially those which have uncertain

technical characteristics. This motive can also be classified under group (3).

One postwar development in the automobile industry helps to illustrate this uncertainty of future supply of components as an influencing factor for integration. In 1946, when the demand for automobiles was extremely intense, Kaiser-Frazer entered into a contract with Continental Motors to supply it with automobile engines. The relationship was entirely unsatisfactory and Continental was continually slow in delivering engines; the result was that Kaiser took over the operations of the engine plant.[26]

Henry Ford's motivations for building the Rouge--an industrial complex that includes not only an assembly plant but a steel mill and a glass plant among other units--were numerous, but one significant factor was the pursuit of coordination and control.[27] The essence of the Rouge operations according to Ford himself was the control of raw materials, the control of their transportation to and from the plant, space for all necessary units and a close interrelationship among such units. Ford had witnessed during World War I the scarcity of essential raw materials--steel frames, malleable iron, steel for springs and engines, leather, and glass. All of these items more than doubled in price. Control of raw materials and a self-sufficient Rouge became a prime objective for him.[28]

Another motive for vertical integration in the automobile industry, classified under group (2), is to enter a potentially profitable area that has not yet been exploited. One example would be to

integrate into parts production and sell the parts in the replacement market, or to integrate so as to reap greater profits from complementary goods in consumption. Crandall has developed the latter example into a full-fledged argument for vertical integration.[29] Since automobiles and automobile parts are complementary goods, an oligopolist can control his profits by charging relatively less for automobiles (in order to generate demand) and more for replacement parts. Such a price policy allows the oligopolist to maximize his profits by means of price discrimination. The combined profits are greater than if prices for automobiles and for parts were set independently.

The avoidance of strikes in suppliers plants or the control over the collective bargaining arrangement may also result in the decision to integrate. Actually this motive could be a submotive of the pursuit for coordination and control. The larger the size of the investment in operating facilities, the greater may be the anguish and frustration as production lines are halted because of an outside strike. Substitutes are not always instantly available and the best recourse may be the manufacture of the items themselves. From 1946 to 1948 supplier strikes repeatedly disrupted production lines, the consequences of which appear to have been backward integration by automobile firms into items like plastics, upholstery, and electronic components.[30] Partial integration was the result. In 1959, Chrysler decided to build its own glass plant after a 135 day strike at Chrysler's only glass supplier, Pittsburgh Plate Glass.

Tapered or partial integration is common in the automobile industry. Even though Ford has its own steel mill, it still purchases fifty per cent of its requirements from outside sources. Chrysler buys fifty per cent of its glass requirements.[31]

What effect does vertical integration have on the structure and conduct of the automobile industry? One obvious structural effect is the raising of the already high barriers to entry. For an efficient, viable producer of automobiles, it is estimated that a capital investment of one billion dollars is required as a prerequisite for entry into the stages of stamping, casting, machining, assembly, and design and development. Fifty million dollars are required for just a single final assembly plant.[32] The internal advantages of coordination and control rule out the possibility of a number of separate assemblers, engine builders, foundries, and stamping plants comprising a non-integrated automobile industry, with the lower barriers to entry for each process serving as a check on each segment's behavior.

Nonintegrated producers face a smaller selection among suppliers whenever integrated firms control most of the components markets. They also are confronted with greater risks of failure of supply or of monopolistic exploitation. Prospective entrants are also faced with a similar situation. Integration may also increase the automobile firms' monopoly power in the replacement market.

Summary

This chapter has focused on the nature of vertical integration in general and on vertical integration in the automotive industry in particular. The potential competition doctrine was briefly introduced to provide background information concerning the Justice Department's suit against the Ford-Electric Autolite merger--a direct asset acquisition by Ford of a potential spark plug supplier.

III. THE SPARK PLUG INDUSTRY

In this chapter the spark plug industry is analyzed within the traditional framework of the study of industrial organization. We begin by considering the market structure of the spark plug industry and then turn to market conduct and market performance.

Market Structure

Introduction

A spark plug is a relatively inexpensive but vital part of an internal combustion engine. It is not purchased in and for itself but solely to obtain proper operation of the engine. It is installed at the factory as original equipment by the engine or automobile producer and is replaced, on the average, about five times during the life of the engine.[33] Usually, such a service is performed by a mechanic during an engine tune-up. The basic function of a spark plug is to provide a spark to ignite the air-fuel mixture in the combustion chamber of the engine. Its physical description is that it consists of two electrodes encased in a steel shell, overlayed for about half its length by a ceramic insulator. At the bottom is a gap, calipered in hundredths of an inch or millimeters, that separates the two electrodes. The exterior of the shell is threaded above the bottom so it can be screwed into each cylinder chamber of the engine. When the unit is properly inserted into the combustion chamber of each

cylinder, the side electrode functions as a ground by being in contact with the engine block; the central electrode receives the electrical current from the generator. As soon as the electricity arrives at the tip or bottom, it jumps the gap to ground and produces a spark which in turn ignites the air-fuel mixture.

Historical Background

Spark plug production has existed in the United States for over half a century, and its growth has loosely followed that of the automobile industry. Presently, in an automobile-oriented society, spark plugs are one of the top volume automotive parts lines. Historically, they have been consumed in greater quantities for repairing motor vehicles rather than for installation as original equipment. Thus, the replacement demand for spark plugs has far exceeded the demand for original-equipment spark plugs. This trend has encouraged spark plug producers to concentrate their efforts on the replacement market rather than the original-equipment market.

The 1963 Census data confirmed the historical pattern mentioned above. Out of a total of five hundred twenty-nine million spark plugs produced in the United States during that year, sixty-five million were sold in the original-equipment market while the majority of the remainder went to the replacement market.[34] In comparison, in 1947 unit sales in the original-equipment market amounted to almost forty million while approximately two hundred twenty-one million units were sold in the replacement market.[35] These figures reveal that the ratio

of replacement sales to total sales in 1947 was .85; in 1963 it was .88. In addition, the ratio of 1963 replacement sales to 1947 replacement sales was two hundred ten per cent in comparison to a ratio of one hundred sixty-three per cent for 1963 original-equipment sales to 1947 original-equipment sales. These ratios indicate that the replacement market is clearly more important than the original-equipment market.

In addition to motor vehicle applications, there is also a large volume of sales of spark plugs for non-automotive uses. Although spark plug producers do not produce solely for the automotive market, it is the most important market for the majority of them.

The present day spark plug industry began to emerge in the United States economy during the period from 1910 to 1936. R. A. Stranahan founded the Champion Ignition Company in Boston in 1907.[36] Two years later, General Motors acquired the manufacturing assets of the firm except for its trade name.[37] Since that time, General Motors has produced its own spark plugs under its own label. It also supplied all of the spark plug requirements of Chrysler until 1936.

The Champion firm continued to produce spark plugs under the Champion label after the acquisition by General Motors. It was the sole supplier of spark plugs to Ford for more than fifty years. This relationship ended when Ford, in 1961, acquired the spark plug facilities of Champion's smaller competitor, Electric Autolite.[38]

A manufacturer of various electrical equipment, Electric Autolite entered spark plug production in 1936 at the request of and with the assured patronage of Chrysler. At the time of the acquisition by Ford, Electric Autolite was third in percentage share of the spark plug market. It accounted for approximately fifteen per cent of domestic spark plug production; this compared to fifty per cent for Champion and thirty per cent for General Motors.[39]

In the late 1950s, Electric Autolite was losing favor at Chrysler and feared it would be left with a fixed-volume plant and no customer large enough to support it.[40] Consequently, the firm approached Ford in order to obtain its spark plug business; the result was the Ford-Autolite merger.

To summarize, the evolution of the spark plug industry has been closely tied to the production of automobiles. At no time prior to 1961 was less than ninety-six per cent of domestic spark plug output attributable to Champion, General Motors, and Electric Autolite.[41] Today, General Motors leads the United States' one hundred largest industrial corporations while Champion ranks three hundred forty-seventh.[42] After 1961, the dominant firms in the industry were Champion, General Motors, and Ford. Presently, Ford ranks third among the one hundred largest domestic corporations.[43] Before Electric Autolite's advent, Champion and General Motors virtually shared the market; they were responsible for over ninety per cent of domestic output with Champion in the lead. Ford acquired Electric Autolite in 1961,

and it currently holds the third position in terms of market shares behind Champion and General Motors. On balance, the only significant producers of spark plugs have been closely associated with the production of automobiles.

With reference to Ford, we noted in the second chapter that it is a highly integrated automobile producer, second only to General Motors. Also noted was the fact that it manufactures a substantial portion of many of its requirements, although it began production solely as an assembler.[44] Among the components in the electrical system of Ford vehicles, spark plugs and batteries are two items that were not produced by Ford prior to the Ford-Autolite merger.[45] These components were purchased from outside suppliers. Today, however, Ford produces most of the parts that comprise the ignition system of its vehicles.

In order to provide background information necessary to an understanding of the industry, the events that preceded Ford's acquisition of Electric Autolite's spark plug and battery facilities must be considered. These follow.

Preacquisition Events

In 1911, Champion adopted the practice, now common in the spark plug industry, of selling original-equipment spark plugs to automobile producers at approximately the cost of labor and materials.[46] In the early period of the Champion-Ford relationship, Champion's price to Ford reflected only these inputs; the result was that the price was

often as much as ten cents per plug below total unit cost.[47] This "six-cent price" offered by Champion for original-equipment spark plugs remained stable through the years despite substantial increases in production costs. In 1960, Champion still supplied Ford with these plugs at $.0588--a price that was then approximately one third "the cost of manufacture."[48] It must be assumed, then, that although the six-cent price does not presently represent the marginal cost of producing spark plugs for Ford, it may have been equal to it in the early period of the relationship between Ford and Champion. If we imagine the replacement cost to be fixed, then, this equality must have been true because any price greater than $.0588 would have more than likely encouraged Ford to integrate into spark plug production itself.

Why did Ford obtain original-equipment spark plugs at a price less than marginal cost? The answer is twofold. First, automotive-component suppliers will offer price concessions on original equipment to automobile producers in order to prevent them from integrating backward and entering their markets. Crandall discusses this behavior in his dissertation concerning vertical integration in the United States automobile industry. He emphasizes that supplier losses from original-equipment sales are less than the potential losses which would be encountered upon the entry of automobile producers into the spark plug market.[49] Secondly, spark plug producers have a vested interest in what is commonly referred to in the automobile industry as the "OE tie" (original-equipment tie). This refers to the

propensity of mechanics and owners to replace spark plugs with the same brand that was originally tailored to the engine and installed by the automobile producer. The primary reinforcement of mechanics' fear that serious damage may follow from the failure to use the OE brand is promotional literature originating with automobile producers' emphasis on the use of "genuine parts." It is clear that the OE tie is a psychological phenomenon and is not technically necessary. Normally all active brands of spark plugs appear on a full line of automobiles of every variety and they function well in all automobiles.[50]

A preference on the part of automobile dealers, mechanics, and owners for original equipment is highly valuable to spark plug producers in terms of the advertising advantages that adhere to the appearance of their trade names on original-equipment spark plugs. Although a certain percentage of owners are aware of the brand of spark plugs in their automobiles, the real brand choosers today are the mechanics.[51] This is in sharp contrast to the buying patterns in the early part of the twentieth century, when the automobile industry was in its infancy. Self-repair was prevalent then, and the owner normally performed the necessary maintenance himself.

Champion's replacement business began operations after the success of its original-equipment business. By 1924 its sales comprised about eighty per cent of the original-equipment spark plugs used in the automobile industry. In 1925, its position began to decline, and by 1946 its sales of thirty-three million spark plugs to automobile

producers for original-equipment and replacement uses amounted to approximately one-sixth of its total volume. The remainder consisted of sales to the replacement market through other channels.[52]

Champion's lucrative replacement sales led Ford to an investigation of increasing its share of the replacement market. A Ford study revealed a steady growth pattern in the replacement market. It also indicated that total sales in that market extended into the billions of dollars.[53] The stability of the market made it attractive as a potential source of profits. Replacement-market sales have historically been characterized by less volatility in the context of the business cycle as compared to sales in the new car market. In good years, replacement sales grow with new car registrations, while in off years there is less of a decline because of the necessity for owners to continue to make repairs in order to ensure a longer lasting automobile.

Ford's observations had long shown a declining share of the replacement market. The facts revealed that its replacement market share had not kept pace with its portion of the automobile market. Sales to the replacement market through its franchised dealers had declined substantially over a period of time primarily because of a change in the service habits of the automobile owning public. Automobile owners shifted their tune-up and minor repair business from the franchised dealers to various other retail outlets--gasoline stations, independent garages, and automobile specialty shops.[54]

A sizeable portion of the maintenance business of Ford's franchisers was lost to these outlets. Moreover, these franchisers were not an effective source of supply for repair parts, because most retail outlets found it more convenient and economical to obtain these parts from the major channels of distribution serving the replacement market. A Ford-conducted survey in 1960 indicated that the volume of all servicing done by franchisers dropped from twenty-eight per cent to sixteen per cent in 1952, while the share attributable to gasoline stations increased from thirty-four per cent to forty-seven per cent. The licensees' portion of minor mechanical repair work declined during the eight year period from thirty-nine to twenty-four per cent. Retail gasoline outlets absorbed almost all of this difference.[55] Although this trend could not be reversed, Ford felt it could minimize its losses if it could obtain production profits on various components moving through these distribution channels. In addition, Ford knew that in order to increase its share of the replacement market, it had to offer parts applicable to all makes of automobiles rather than to Ford models exclusively.

Ford arrived at the conclusion that in order to increase significantly its participation in the replacement market it must:[56]

1. Offer a complete line of high volume service parts which fit competitive makes of automobiles as well as Ford vehicles.
2. Establish a nationwide distribution organization oriented toward this market.
3. Have a nationally recognized brand name.

Since spark plugs and batteries are high volume service items and are able to function well in all automobiles, these components could effectively satisfy the first requirement. However, the second and third requirements stimulated Ford, in 1960, to explore the prospects of upstream integration into the production of spark plugs and batteries. Ford's study forecast optimistic possibilities with respect to spark plugs. (Prospects for battery production were highly discouraging. The study pegged future earnings from battery operations at five and one-half per cent of capital employed, an estimate which was considerably lower than the company norm of fifteen per cent for new investments.) The prospects of expansion in the spark plug market were considerably brighter; on the basis of a five per cent penetration of the replacement market, it predicted a long term after tax yield on capital of twenty-four and three tenths per cent.[57] This favorable estimate resulted in a recommendation to build a plant with a potential capacity of fifty-two million units.[58] However, the proposal was tabled before it ever reached the desks of top management because of negotiations for the Electric Autolite facilities.

These negotiations were precipitated by certain events that occurred at Electric Autolite in the late fifties. By then Electric Autolite was a large supplier of automotive parts; its sales totalled approximately two hundred twenty million dollars, and its assets amounted to about one hundred fifty million dollars.[59] In addition, it owned "Autolite," a nationally recognized brand name, together

with an established nationwide distribution organization. It also had had the Chrysler original-equipment spark plug account since 1941. Other components supplied to Chrysler were batteries, auto instruments, die castings, and cable and fractional horsepower motors. Although American Motors, International Harvester, and others continued to purchase components from Electric Autolite, Chrysler was clearly its reason for existence.[60]

Chrysler's ordering, in 1956, of batteries from Electric Autolite's competitors caused a turn-around. By 1960, these rivals were supplying more than two-thirds of Chrysler's requirements. Also, Chrysler had begun to formulate plans for upstream integration into distributors, generators, starters, and voltage regulators--all of which had been obtained previously from Electric Autolite.[61] In addition, Electric Autolite's management was worried that Chrysler's phaseout of these electrical items would be extended to include spark plugs.[62] Economies of scale in the Fostoria plant, Autolite's primary spark plug producing facility, depended on an original-equipment customer; chronic excess capacity in the Fostoria plant would threaten the firm's long term profit position and possibly even its survival. Electric Autolite knew that in addition to Chrysler, General Motors produced its own spark plugs and Ford had been buying exclusively from Champion for half a century. Although American Motors purchased from Electric Autolite, it could not be considered to be a significant buyer. The trade name Autolite had been raised to

prominence by a multi-million dollar investment in advertising, and management realized that due to the structure of the industry it could become nearly worthless with respect to spark plugs if Electric Autolite lost the Chrysler account. Moreover, replacement spark plugs had always been carried on inventories of replacement-market distributors because of their original-equipment status. With the deterioration in the original-equipment market, it was inevitable that Electric Autolite would suffer commensurate losses in the replacement market.

Thus, the Autolite management's final decision was to search out new customers. Because of the structure of the automobile market, Electric Autolite's choice was Ford, the one remaining nonintegrated producer with a significant output. Early in 1960, Autolite approached Ford. This eventually resulted in an agreement whereby Ford, in exchange for twenty-eight million dollars, would receive the spark plug facility at Fostoria, together with the Autolite trade name plus one of six operating battery installations at Owosso, Michigan, and the services of a few personnel, in addition to limited distribution rights.[63]

Entry and Exits

There have been several firms which have left the spark plug industry. Not much information is available concerning these exits, but a few basic facts are available.[64] Few firms except Electric Autolite ventured into spark plug production after Champion and General Motors divided the market. None of the firms that did enter

ever surpassed the two per cent market share level. Firestone Tire and Rubber Company, a dominant seller in the tire industry, merchandised "Firestone" replacement spark plugs for thirty-five years before it left the industry in 1964. Although it owned some eight hundred accessory stores and successfully wholesaled other items to more than fifty thousand shops and gasoline stations, it never succeeded in obtaining a significant share of the market. Economies of scale and the OE tie, no doubt, played a critical role in its demise. Goodyear Tire and Rubber Company, the largest firm in the tire industry, produced spark plugs for only three years. Globe Union, a fabricator which had barely one per cent of total domestic shipments, withdrew in 1960. In 1966, the firms in the industry which did not have substantial new-car association consisted of the following:[65]

1. "Atlas"--sponsored by Standard Oil Company--one and four-tenths per cent of all service establishments.
2. "Prestolite" and "Allstate" of Sears, Roebuck and Company--one and two-tenths per cent each of all service establishments.
3. "Riverside" of Montgomery Ward--six-tenths of one per cent of all service establishments.

Several dozen other outlets belonging chiefly to hardware and discount chains and farm implement firms attained a combined total of two and four-tenths per cent. Most of the productions for the above listed firms is performed by Eltra and General Battery and Ceramic.

Present Seller Concentration

The spark plug industry is clearly characterized by an oligopolistic market structure. Using Professor Bain's system of classifying

industries according to seller concentration, the industry manifests a very high degree of concentration.[66] Owing to the extent of vertical integration and conglomerateness, exact measures of market shares are not possible; however, estimates are available. The number and size distribution of firms selling in the spark plug market in 1964 is shown in Table 2.[67]

TABLE 2

SIZE DISTRIBUTION OF SELLERS IN SPARK PLUG INDUSTRY--1964

Spark Plug Producing Firms	Approximate Percentage Share of Spark Plugs Produced in the United States in 1964
Champion	40.0
General Motors	40.0
Ford	26.5
(First 3 Firms)	(96.5)
Eltra	1.2
(First 4 Firms)	(97.7)
Other Firms	2.3
Total	100.0

Source: In the Supreme Court of the United States, October Term, 1970, Motion of the United States to Affirm, Ford Motor Company v. United States, pp. 7-8.

Table 2 shows that the three largest sellers of spark plugs accounted for more than ninety-five per cent of total industry shipments in 1964. In addition, it shows that the first four firms were responsible for approximately ninety-seven per cent of domestic shipments. General Motors and Ford not only enjoy a dominant position in the field of spark plug production, but they also hold comfortable positions in the automobile industry as well.[68] Moreover, they produce

broad lines of automotive parts. Of the leaders in the spark plug market, Champion is the only independent which has concentrated entirely on the production and sale of spark plugs.[69] Eltra is shown in the table as the fourth member of the industry. It combined with the leftover portion of the Ford-Autolite merger, and in 1962, it began producing and selling spark plugs under the Prestolite trade name. Table 2 also reveals that there is a competitive fringe of sellers in the spark plug industry ("other firms"). Kahn noted in 1947 that approximately forty firms comprised the industry at that time--ten of those produced complete spark plugs.[70] Hansen and Smith in 1951 also calculated the total number to be forty.[71] However, a later source put the count at twenty-two as of 1971.[72] Although it is not possible to resolve these inconsistencies, it is known that only the three dominant firms listed in Table 2 sell in both the original-equipment and replacement markets. In contrast, the competitive fringe sells only in the replacement market; its members also produce and sell other automotive items.[73] They either assemble spark plugs from parts supplied by other firms or they market complete spark plugs purchased from other producers, using their own brand names.

In summary, the structure of the spark plug industry following the Ford-Autolite merger remained virtually the same as it was prior to 1961. The only change that occurred was the Ford take-over of Electric Autolite's position, the net result being the addition of Eltra to the industry. Presently, there are three dominant producers

of spark plugs in the United States--the only difference is that two of these firms rather than one are automobile producers. On balance, the industry is very highly concentrated; the first four firms account for approximately ninety-seven per cent of domestic production.

Buyer Concentration

Another dimension of market structure that should be considered in our analysis is buyer concentration, the correlative to seller concentration on the buyer side of the market. Buyer concentration refers to the number and size distribution of the buyers who make up the market.[74] It is of major importance as a dimension of the structure of the spark plug market, because it helps to explain its pricing patterns. That price is less than marginal cost is attributed to buyer concentration. In order to visualize buyer concentration in the spark plug market, the reader must be fully cognizant of the two submarkets through which automotive parts in general and spark plugs in particular pass en route to the final consumer: (1) the original-equipment market and (2) the replacement market. Casual reference was previously made to these submarkets. The discussion below is intended to inform the reader more thoroughly.

The Original-Equipment Market.--Spark plugs used for automotive purposes move through either of these submarkets dependent upon the type of buyer. The original-equipment market includes direct, large volume transactions between automobile and spark plug producers, either for installation at assembly plants or for shipment to

franchisers to be used in their service departments.

The original-equipment spark plug submarket is unique because it is an excellent example of a bilateral oligopoly in which bargaining power takes on great significance. The three major producers sell to three large buyers and one small buyer. On the sellers' side of the market there exists an oligopoly--Champion, General Motors, and Ford; on the buyers' side there exists an oligopsony--General Motors, Ford, Chrysler, and American Motors. To be precise, the market exemplifies a bilateral monopoly because General Motors and Ford sell essentially to themselves, and American Motors' purchases are so small that it cannot be considered to be an influential buyer. Thus, the net result is that Champion is the seller and Chrysler is the buyer. The pricing structure of the market today stems from an earlier time period when the major sellers were not vertically integrated and there was a genuine bilateral oligopoly.

The price elasticity of demand facing individual spark plug producers is relatively elastic. In effect, the relatively elastic demand curve facing the typical spark plug producer places the typical spark plug buyer--the automobile producer--in a superior bargaining position. It enables him to push effectively the price of original-equipment spark plugs below marginal cost. How is this possible? It is possible for a number of reasons. First, automobile producers do not recognize any significant degree of product differentiation in original-equipment spark plugs. Secondly, the OE tie acts as a

bargaining tool for automobile producers because spark plug producers have historically required the original-equipment market in order to have profitable sales in the replacement market. Moreover, automobile producers are potential entrants into the spark plug market and, as such, are able to extract price concessions from sellers.[75] Finally, the fear of excess capacity on the part of independent spark plug sellers contributes to the bargaining strength of automobile producers.

In spite of these lopsided bargaining advantages, supplier-customer relationships in the original-equipment market remained stable until 1961, the year of the Ford-Autolite merger. The stability over time of these relationships can be attributed to the price remaining below marginal cost, thus effectively forestalling entry.

To sum up, the essential feature of the original-equipment market is that it is a bilateral oligopoly, and bargaining power plays a crucial role in its pricing structure. Price is indeterminant. Original-equipment spark plug prices have remained less than marginal cost through time primarily because of the bargaining power of automobile producers. The advantages of product promotion that spark plug producers obtain from original-equipment sales have led to profitable sales in the replacement market. This feature has enabled spark plug producers to offset their losses in the original-equipment market.

The Replacement Market.--The replacement market is different from the original-equipment market because it is characterized by the existence of a variety of mass distributors, which sell automotive

parts in general. While only the dominant sellers supply the original-equipment market, all of the spark plug producers sell to the replacement market. The major sellers share among themselves the majority of the replacement market; the smaller firms share the remaining portion.[76]

Replacement spark plugs can be divided into two general categories according to the type of label they bear: (1) the spark plug producer's label, and (2) the private label. The producer's label carries the trade name of the producer or supplier of the spark plug. Examples of this type are Champion, AC (General Motors), Prestolite (Eltra), and Autolite (now owned by Ford). On the other hand, private label spark plugs carry the label of the distributor, as, for example, Allstate, Atlas, and Riverside. The purchasers of these private label spark plugs usually assume all of the distribution functions. They also promote these spark plugs in their own advertising campaigns.

The demand for private label spark plugs has traditionally been less than the demand for spark plugs bearing producers labels. However, it appears that private label spark plugs are gaining importance:

> . . . forces are now at work within the spark plug market that may lead to its eventual deconcentration by increasing the number of potential customers for a new entrant into the plug manufacturing business and reducing the need for original equipment identification. Yet, at present, these forces are restrained more than they would otherwise be on account of the present oligopolistic structure of the spark plug manufacturing industry. It appears that neither AC nor Autolite sell private label plugs. It is in the self-interest of the OE plug manufacturer to discourage private brand sales and to strengthen the OE tie. To the extent that the spark plug manufacturers are not owned by the auto makers, it seems clear that

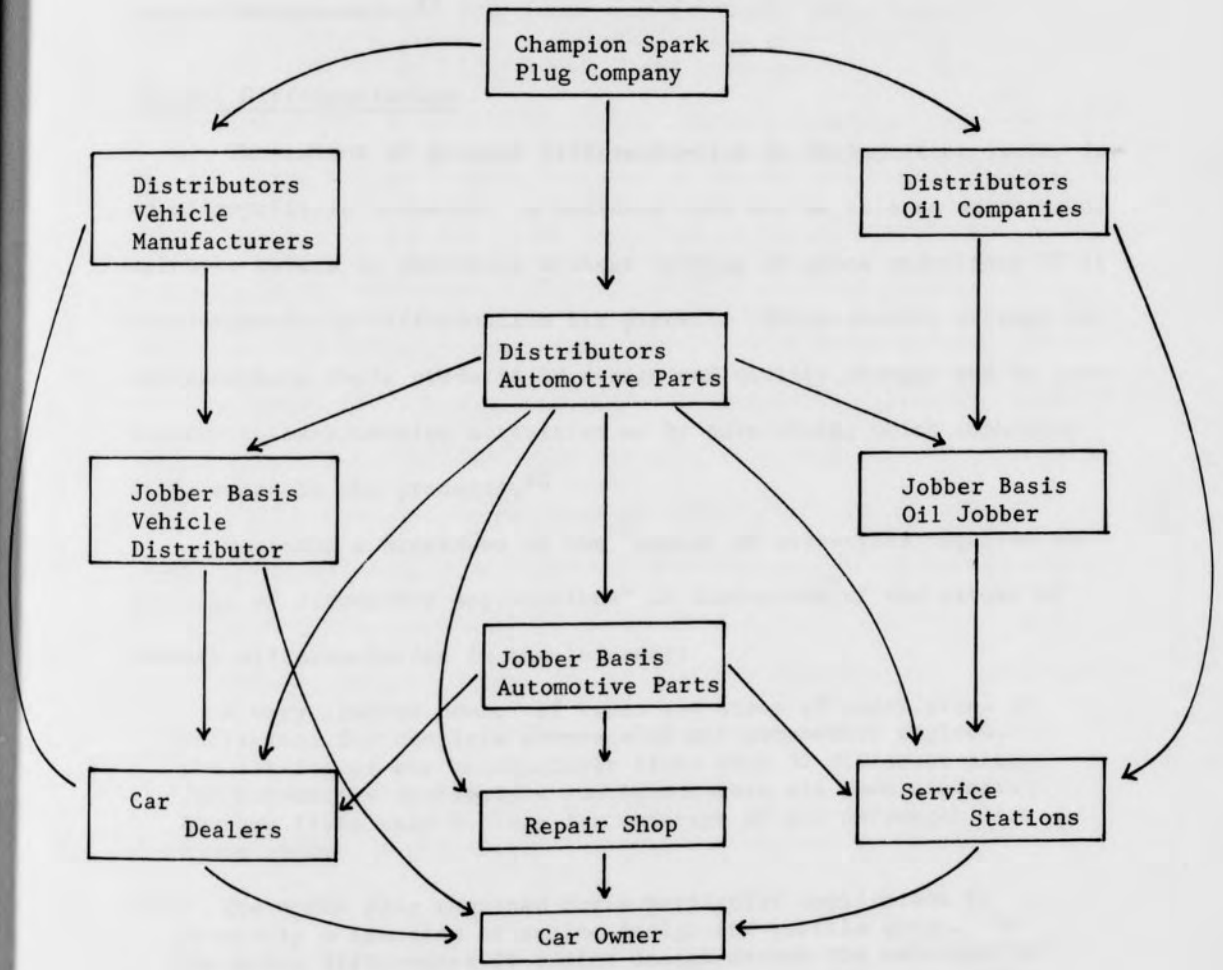
> they will be more favorably disposed toward private brand sales and will compete more vigorously for such sales. Also, the potential entrant continues to have the chance to sell not only the private brand customer but the auto maker as well.[77]

Replacement spark plugs are sold through several different channels of distribution. These channels are shown in Table 3, and it represents the distribution channels of automotive replacement parts in general but large spark plug producers also use these same channels. Although Table 3 mentions Champion only, the other two major suppliers use similar channels. The smaller spark plug firms do not use all channels shown in the table, but, instead, their principal route consists of the automotive distributor-jobber-repair shop channel. As a rule, they do not sell to automobile producers; however, they have a few oil company accounts.[78]

Table 3 can be used to show the relationship between the principal units of the replacement market. The table reveals that direct sales were made primarily to automotive parts distributors, oil companies, and automobile producers. These buyers resell spark plugs to wholesalers and/or jobbers who, in turn, sell to automotive parts retailers, gasoline stations, and franchised dealers. Automotive parts distributors, oil companies, and automobile producers, the table shows, sell directly to retail outlets. In addition, there is cross-selling by automotive parts distributors to oil and vehicle jobbers and to franchised dealers and gasoline stations. Automotive parts jobbers also cross-sell to franchised dealers and gasoline stations.

TABLE 3

MAJOR CHANNELS OF DISTRIBUTION--SPARK PLUGS



Source: Charles N. Davisson, The Marketing of Automotive Parts, Vol. XII, p. 632.

Moreover, although Table 3 does not show it, sales are made by automotive parts distributors to "jobber basis accounts" which include fleet accounts, tire distributors, hardware concerns, chain stores, and marine accounts.[79]

Product Differentiation

The extent of product differentiation is an important factor in an oligopolistic industry. A business firm may be able to attract and maintain buyers or customers without relying on price reductions if it can successfully differentiate its product. Firms usually attempt to differentiate their products by design and quality changes and by persuasive sales-promotion activities or by advertising which emphasize differences in the products.[80]

Davisson's breakdown of the "number of size-types required for coverage of automotive applications" is indicative of the extent of product differentiation in the industry:

> A very limited number of types and sizes of spark plugs is sufficient for complete coverage of all automotive engines. The catalog of one manufacturer lists only 32 different plugs for automotive application and this covers all such engines. Another lists only 8 plugs for coverage of all passenger cars since 1935.
>
> The spark plug required for a particular application is primarily a function of engine design and vehicle usage. In the past, differences in engine design caused the existence of two common sizes of spark plugs--1/2 inch and 7/8 inch. Today the 14 mm. spark plug has been adopted for almost all passenger cars. For heavy duty equipment the 18 mm. plug is most common. Vehicle application tables published by spark plug manufacturers recommend a plug typed for "normal" service only. Also, these tables assume an engine to be in normal mechanical

> condition. "Hotter" plugs are used when service conditions consistently involve extremely low speeds, long periods of idling, start-stop work, governed speeds, or abnormally cold climatic conditions. This is known as light service. "Colder" plugs are used when service conditions consistently involve high speeds, heavy loads, long upgrades, or abnormally hot climatic conditions. This is commonly termed "severe" service. Also different fuels (e.g., natural gas, butane, kerosene) require spark plugs of different heat ranges.[81]

Most spark plugs are fungible. There is complete interchangeability among the spark plug lines of spark plug producers.[82] Each manufacturer produces a line sufficiently broad to service all applications. Each particular size and type of spark plug produced may have wide application and several types may adequately serve a given application.[83] Casual observation reveals that the degree of product differentiation in the spark plug industry can be described as moderate. It is based, not on physical product differences or quality changes, but on original-equipment status and on persuasive advertising which seeks to inject brand awareness and brand loyalty. The reason for the lack of strong product differentiation in the industry is reflected in the nature of spark plugs themselves. There is a great deal of similarity among competing brands in terms of appearance, design, and especially function. Indeed, one spark plug looks much like another.[84]

Physical product differences are commonly exaggerated in advertising claims. Sellers make persistent attempts to persuade buyers of the unique and superior characteristics of fundamentally similar products. Spark plug firms generally promote image features; they

attempt to inject elements of glamour into their advertising with references to speed and racing. Champion, AC, and Autolite spark plugs are relatively well known among consumers because they have had heavy promotion by their manufacturers.[85] In a brand preference study performed by one of the spark plug producers it was revealed that consumers are aware of spark plug brands and have brand preferences. The study involved a survey of people who had recently purchased a new car of a particular make. It asked which brand of spark plugs would be purchased when replacing present spark plugs. Ninety per cent of the respondents specified one of the three leading brands.[86]

Product differentiation in the industry may be declining as evidenced by the growing number of private label brands which are sold primarily on the basis of price and which compete with the name brands of the dominant sellers.[87] For example, Champion presently sells original-equipment spark plugs to Chrysler under Chrysler's private brand name Mopar. The private brand sector of the spark plug market will, as the district court stated, play an important role in the future.[88]

In summary, both advertising and the sale of spark plugs as original equipment represent means by which the dominant sellers of spark plugs attempt to increase product differentiation of replacement spark plugs. The moderate degree of product differentiation existing in the spark plug industry is sufficient to create barriers to the expansion of sales of smaller spark plug firms with lesser known brands.

Condition of Entry

Market structure determines market conduct and performance. The condition of entry is an important structural determinant that helps to influence market conduct and performance. As a prerequisite to an understanding of the condition of entry of new competitors to the spark plug industry let us familiarize ourselves with its definition and measurement.

Professor Bain tells us that the condition of entry "measures the height of the barriers to the entry of new competitors to an industry--of the disadvantages that new sellers face if they try to compete in the industry."[89] He continues in these words:

> . . . the condition of entry refers to the extent to which, in the long run, established firms can elevate their selling prices above the minimal average costs of production and distribution . . . without inducing potential entrants to enter the industry.[90]

The highest selling price, then, that established sellers in an industry can persistently charge without attracting new entry Bain calls the maximum entry-forestalling price. Thus, the condition of entry is quantified "numerically as the percentage by which the maximum entry-forestalling price exceeds the minimum attainable average cost of established firms."[91]

Can we numerically measure the condition of entry in the spark plug industry? Unfortunately, a precise measurement is not possible because the maximum entry-forestalling price is not available, and moreover, no systematic body of data is available that will generate

such a measurement. However, the facts reveal that through the years an entry-forestalling price less than marginal cost has been charged by spark plug suppliers in response to automobile producers' latent threats of entry.[92] Thus, there has not been one successful new entrant to the industry since Autolite's entry in 1936.[93]

Casual observations, based on limited information, concerning the barriers to entry in the spark plug industry can be made. That the market structure falls into Bain's highly concentrated category, typified by a dominance of three or four sellers with a competitive fringe, is indicative of significant barriers to entry. The chief barriers to entry in the industry seem to be: (1) buyer concentration; (2) the OE tie; (3) price discrimination (to be discussed under market conduct); and (4) economies of scale. Spark plug technology plays a minor role. Concerning it, Crandall says, "(Spark plug technology) is alien to that which is primary in the automobile industry, i.e., metal fabrication."[94]

The nature of the spark plug market itself has been instrumental as a barrier to entry. The OE tie has made status as an original-equipment supplier a prerequisite for any appreciable participation in the replacement market. Furthermore, a recoupment in the replacement market is a prerequisite for profitable operations in both markets. The original-equipment market has historically been the main artery to the replacement market. The experiences of Firestone, Goodyear, and Globe Union illustrate the difficulties which a firm

attempting entry into the replacement market only would encounter.[95] The inability to overcome the OE tie resulted in a lack of consumer acceptance of new and consequently unknown spark plugs. This in turn resulted in market shares insufficient to support large scale production. In contrast, General Motors and Champion gained an early advantage in the replacement market by the appearance of their plugs as original equipment on General Motors and Ford cars. Original-equipment status made for continued success for Champion throughout the 1960s even though it lost the Ford account in 1961.[96]

Discriminatory pricing has also been operative as a barrier to entry. The OE tie requires that a firm operate according to a policy of discriminatory pricing to the original-equipment market in order to sell profitably in the replacement market.[97] Thus, the interconnection between the two markets has helped to make a potential entrant follow the established pattern of price differentials.

Not much is available about economies of scale as a barrier to entry because the necessary data is simply nonobtainable. Kahn noted: "The anxiety of the smaller independent automobile manufacturers suggests that there are significant economies of scale, which makes it all the more likely that Ford or Chrysler would not limit themselves to production of plugs for their own use."[98] Bain agrees that scale economies are relatively important in automobile component production.[99] On balance, the interconnection between the original-equipment and replacement markets has necessitated entry into both markets at probably

a larger scale than would be necessary if entry were initiated only into the replacement market.

Summarizing, then, barriers to effective new entry to the spark plug industry seem very high. Large spark plug producers enjoy product differentiation advantages based on participation in the original-equipment market and on consumer advertising. Participation in the original-equipment market carries advantages of prestige and advertising; these work to enhance established sellers' positions in the profitable replacement market. Economies of scale may play a role in preventing entry, although the magnitude of these scale economies is unknown. The difficulty of establishing a distribution network has probably contributed to some extent to the entry barriers in the spark plug industry. The growth of private label sales may play a key role in lowering some of these barriers in the future, but for the present time private label accounts are probably less profitable than others.

Market Conduct

A comprehensive study of the spark plug industry or any industry would be incomplete without an analysis of market conduct. Market conduct is all-inclusive covering every dimension of business policy. It involves the character of pricing policies as well as other related market policies adopted by industry sellers. It also asks the question: What is the extent of interseller and interbuyer coordination? It seeks to ascertain whether there is a pattern of collusion with

respect to price-output decisions in the industry or whether there is independent action and reaction on the part of the sellers. Furthermore, it asks what are the motivations and objectives of the firms in the industry. Does joint-profit maximization exist or is independent maximization of profits the rule? In essence, market conduct includes all acts, practices, and procedures as well as motivations that the sellers in the industry choose in determining business policy.

Owing to the vertical integration of General Motors, the high seller and buyer concentration and the OE tie, the most distinguishing conduct characteristic in the spark plug industry is price discrimination in the original-equipment and replacement markets. The question of coordination does not take on any significance in the original-equipment market; it is of interest only in the replacement market. Price in this market is much greater than the competitive price. Because of the OE tie, the original-equipment seller is able to advance price to an entry-forestalling level. In this case it also has to be a level which protects the market share from encroachment by the competitive fringe. The OE tie acts like price-discrimination in determining the limit price. In essence, a limit pricing behavior model is evident in the spark plug industry.

A Federal Trade Commission decision was responsible for inviting this discriminatory pricing behavior. In proceedings against the major spark plug producers in 1947 and 1948, complaints were issued against Champion, General Motors, and Electric Autolite by the Federal

Trade Commission alleging price discrimination in violation of the Robinson-Patman Act. The trial revealed substantial differentials in the prices charged by these producers for spark plugs directed to the original-equipment market and those sold to the replacement market. Table 4 presents the pricing schedule of Champion as exhibited during the proceedings. It was determined by the trial examiner that the invoice prices to the automobile producers for original use and replacement spark plugs were misleading; instead, he took a weighted average of the two classes and found that Ford was receiving replacement spark plugs from Champion at a price of approximately ten cents below the price charged to Champion's distributors. However, the Commission overruled the trial examiner and concluded that since the two markets were distinct the two prices should not have been averaged.

Thus, the Federal Trade Commission ruling declared that the original-equipment and replacement markets were separate and distinct. This decision was of utmost importance in establishing the institutional and legal characteristics of market conduct in the spark plug industry. Owing to the Robinson-Patman Act, buyers in the original-equipment market must receive approximately uniform original-equipment prices (represented as P_o) and buyers in the replacement market must receive approximately uniform replacement prices (represented as P_r). In effect, the ruling opened the door to massive price discrimination taking the form $P_o/MC_o < P_r/MC_r$. It insured that the market conduct

TABLE 4

PRICES AND DISCOUNTS OF THE CHAMPION SPARK PLUG COMPANY, 1947

Auto Manufacturers		
Ford	Original equipment	6 cents
	Replacement	22
Studebaker, Hudson, Packard	Original equipment	6
	Replacement	24
John Deere Tractor	Original equipment	6
	Replacement	26.1
Regular Automotive Wholesale Distributors		
Invoice		29 cents
Less 10%		26.1
Less 5% on sales to approved wholesalers and jobbers		24.65
Direct Account Distributors (Oil Companies, etc.)		
A. Atlas Supply and Socony-Vacuum:		
Invoice		29 cents
Less 10% and 10%		23.49
B. Others:		
Invoice		29 cents
Less 10%		26.1
Less 5% on sales to approved wholesalers and jobbers (a discount available but seldom used because these buyers did not usually "job" sales to others)		24.65
Distributors' Prices to Accounts of the Following Types:		
Jobber Basis (sales to approved jobber through distributor)		29 cents
"C" Fleet Basis (sales to fleet owners of 500 or more vehicles through distributors)		29
5,000 plug basis (discount eliminated January 1, 1948)		32
Fleet basis (discount eliminated January 1, 1948)		32
Fair Trade price to retailers		36
All prices subject to a 2% cash discount		

Source: Harry Hanson and Marcell Smith, "The Champion Case: What is Competition?" Harvard Business Review, XXIX (May, 1951), p. 90, Exhibit I.

of spark plug sellers and the dominant buyers would result in price discrimination.

The nature of market conduct can be represented by a limit price discrimination model of dynamic long-run profit maximizing behavior. However, because of a lack of data, all that we are able to do is depict a static picture of Champion at a point in time prior to the Ford-Autolite merger. Before 1961 there was a set of prices, P_o, P_r, and P_w, which Champion set in a fashion designed to forestall entry into the market. The price P_w represents the weighted average price of original-use and replacement-use purchases according to the relative frequency of demand charged to Ford: $P_w=P_oQ_o+P_rQ_r/Q_o+Q_r$. Consider Figure 1.

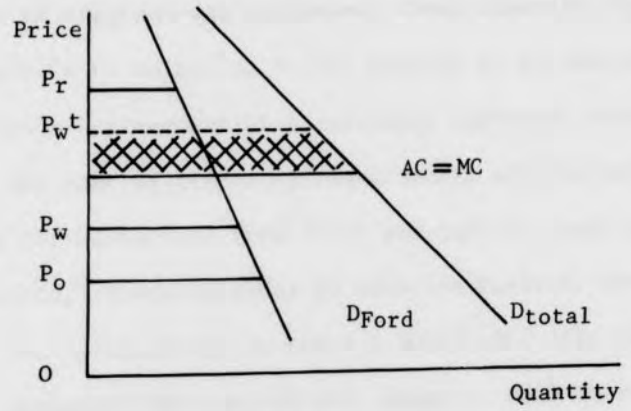


Figure 1

Champion's Static Position

It shows Champion's total demand curve and the demand curve relative to Ford. It shows that Ford received a lower price in the original-equipment market (P_o) relative to the price it received in the

replacement market (P_r). It also shows that the only meaningful price to Ford for spark plugs was P_w. Even though Champion sustained losses in the original-equipment market its overall operations were successful because of the higher P_r. The shaded portion shows the excess profits going to Champion from overall operations including all buyers in the market; P_w^t represents the total weighted average price to all buyers.

The discriminatory pricing of Champion is illustrated in Table 4. Assuming Ford's purchases to be divided equally between the original-equipment market and the replacement market, Table 4 shows that P_w for Ford in 1947 was fourteen cents (.50(.60) + .50(.22)). In the event that Ford increased its purchases of replacement spark plugs at the expense of original-use purchases, then, Champion could continue to maintain P_w=$.14 by adjusting P_o but keeping P_r at the same level. Assume that Ford's replacement plug purchases increased from fifty per cent to sixty per cent of its total requirements and its original-equipment plug purchases fell from fifty per cent to forty per cent of total requirements. Then, in order to maintain P_w=$.14, Champion would have to set P_o equal to two cents (.40x + .60(.22)=.14 and x =.02). The fact that Champion continued to sell plugs to Ford at six cents despite rising costs shows, to a certain extent, that it did moderate original-equipment spark plug prices while increasing replacement spark plug prices. Champion's intent was to sustain a weighted average price at or below marginal cost in order to forestall Ford's potential entry.[100]

The reader may be wondering, in view of the foregoing, why Ford chose to purchase Electric Autolite's spark plug facilities, especially since it could continue to purchase spark plugs at less than marginal cost. In the first part of this thesis we provided one part of the answer. Ford sought to increase its declining share of the lucrative replacement market. Crandall presents an even more interesting answer in his dissertation:

> In the earliest days of the motor-vehicle industry, Ford's demand for spark plugs was primarily for original equipment. In ensuing years, however, Ford and other major assemblers developed very large replacement demand through their dealerships. More recently, Ford and Chrysler have emulated General Motors' policy of developing replacement-parts demand in the non-dealer markets. Thus, Ford's ratio of replacement spark plug purchases to original-equipment purchases should have increased markedly since 1947. It is distinctly possible that Champion, their primary supplier, found it impossible to cope with large disparities in those ratios among assemblers.[101]

Crandall's thoughts are consistent with the discriminatory pricing behavior of Champion previously discussed.

We reach the conclusion, then, that Champion's discriminatory pricing policy was designed to set P_o low enough to deter large-scale entrants such as Ford from entering the market. Moreover, at the same time it set P_r at the maximum entry forestalling level in order to deter small-scale entry (competitive fringe). The competitive fringe was effectively deterred because of the entry barriers we mentioned earlier.

Kahn has formulated a Bain-type, limit-price hypothesis which is crucial for an understanding of market conduct in the spark plug

industry. Crandall used it to explain the limit to backward integration into component manufacture by automobile producers. It suggests a modus operandi for large-scale, vertically integrated firms selling in the spark plug market. The hypothesis as stated by Kahn:

> Assume a monopolist who is threatened with entry by one of his large buyers but is relatively protected against entry by other purchasers and outsiders. It may be to his benefit in such a situation to offer an entry-forestalling discriminatory price to the potential entrant--assuming that he can effectively divide the market--in order to retain his power over price in the rest of the market. He will thus forestall entry by separating out the potential entrant, maintaining or possibly raising the existing price to his other purchasers. In effect, the seller who now lacks sufficient monopoly power over price in the broader market because of the potentiality of entry, retains his power over price in the narrower market by separating out the potential entrant. This hypothesis assumes, of course, a potential entrant who is primarily concerned with receiving its own requirements cheaply and is not interested in obtaining a share of the monopoly profit which can be exacted from the rest of the market, but who on the other hand, if forced to enter, will not limit itself to production of its own needs in order to achieve the necessary economies of production.[102]

We can employ another diagram to aid us in understanding why P_o is lower than P_r.[103] In Figure 2, D_1 and D_2 represent the short-run and long-run demand curves of spark plugs for Champion at a point in time prior to 1961. At price OP_o, Ford purchases quantity OQ of spark plugs for original-equipment use. If Champion were to raise the price to OP_o', Ford would buy quantity OQ' in the short-run. However, in the long-run, demand curve D_2 is relevant and at price OP_o' quantity demanded by Ford would fall to zero. Kahn explains this as follows:

> . . . not only would Champion lose about one-sixth of its sales, but it would face a formidable new rivalry for the other five-sixths, since Ford would have the good will adhering to its

plugs from exclusive use in new cars and from the extensive promotional activity incident of Ford's dealer-service program.[104]

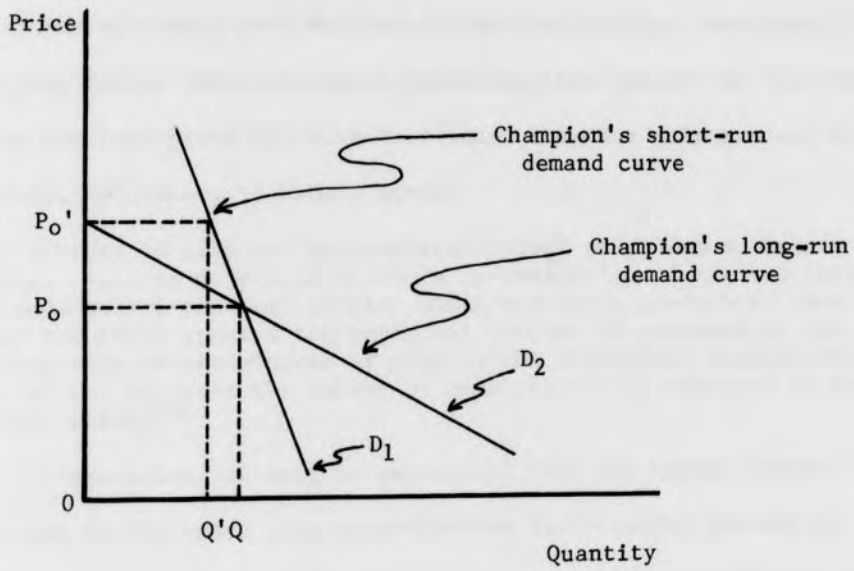


Figure 2

Champion's Short and Long-run Demand Curves

Ford's time adjustment in going from D_1 to D_2 in response to the price increase would take the necessary time period to integrate backward into spark plug production.[105]

In summary, then, Champion's strategy with Ford prior to the Ford-Autolite merger had been to forego maximization of short-run profits in the original-equipment market and sell at or below cost in order to impede Ford from entering the market and sharing in the profitable replacement market. It recouped its losses by boosting prices in the replacement market. In effect, it priced in the replacement market to subsidize operations in the original-equipment market.

Champion's ten year summary seems to indicate that profits were maximized in the long-run. Ford continued to purchase spark plugs from Champion for six cents each because of the cost savings associated with buying rather than internally producing them itself; in the long-run, the six cent price may have been below long-run average cost of production. Moreover, in Kahn's words:

> The ability to give an "entry-forestalling" price (at or below actual cost) to potential entrants is indicative of the existence of substantial monopoly profits which are being protected. For only the price granted the potential entrant is governed by the competition of new sources of supply; the difference between the two prices suggests the amount of monopoly profit embodied in the higher price.[106]

In conclusion, it must be emphasized that the market conduct that occurs in the spark plug industry--the differential pricing of original and replacement equipment--is also found generally in the sale of most automotive parts. Our limit-price hypothesis is not operational without more conclusive data with which to test it. However, the empirical evidence in the industry seems to support the hypothesis; it certainly does not disprove it.

Market Performance

Bain tells us that market performance is the end result of the market conduct of buyers and sellers in an industry. It includes several dimensions: (1) technical efficiency; (2) allocative efficiency; (3) size of selling costs; (4) technological progressiveness; (5) product quality; (6) conservation, and (7) price flexibility.[107]

Unfortunately, since the empirical data of the spark plug industry is scant, we are not in a position to make a qualitative judgment about all of these dimensions of market performance. However, we can evaluate technical efficiency, allocative efficiency, the size of sales promotion costs, and price flexibility.

Technical efficiency refers to the extent to which the industry firms approach or attain optimal economies of scale in production. In addition, it pertains to the extent to which the firms in the industry approximate optimal degrees of vertical integration of successive productive stages.[108] With respect to the former, we can say that there may be significant economies of scale present in the spark plug industry. Kahn hinted at this in his analysis and we referred to it earlier. Ford and General Motors ownership of spark plug facilities guarantees their supply of original-equipment requirements; however, the fact that both firms produce for and sell in the replacement market suggests that economies of scale dictate the replacement market as a technical sine qua non. Moreover, with respect to optimal degrees of vertical integration, the three major sellers of spark plugs are sufficiently vertically integrated to the extent to take advantage of economies of scale.

The size of an industry's output as judged by the relationship of its long-run selling prices to its long-run marginal cost of production is known as allocative efficiency. Profit rates are the best measure of allocative efficiency but, unfortunately there is no

available data on profit rates in the spark plug industry. On the other hand, we can get an idea of industry profit rates by observing the Annual Report of Champion. A ten year review of Champion's financial operations is listed below.

Year	Net Sales*	Net Earnings*	Stockholders' Equity*	Earnings/Shares
1970	$290,169	$29,802	$163,100	$2.39
1969	277,196	27,429	147,870	2.24
1968	253,174	26,186	128,835	2.14
1967	204,681	24,552	116,590	2.01
1966	163,567	21,409	100,082	1.79
1965	139,511	18,961	91,627	1.58
1964	128,617	16,834	85,577	1.40
1963	112,073	15,142	80,911	1.26
1962	102,805	14,533	76,638	1.21
1961	97,372	14,829	73,383	1.23

* Thousands of Dollars

Source: Annual Report of Champion Spark Plug Corporation, 1970, p. 17.

Computing the rate earned on stockholders' equity, we find the following results:

Year	Net Earnings/Stockholders' Equity
1970	18.3
1969	18.5
1968	20.3
1967	21.1
1966	21.4
1965	20.7
1964	19.7
1963	18.7
1962	19.0
1961	20.2

Thus, it can be seen that the overall operations of Champion have been quite successful even after it lost the Ford account in 1961.

That Kahn has pointed out the existence of monopoly rents in the replacement market would indicate Champion's selling price in that market to be excessive. This is true because of the profitability of Champion's overall operations in spite of unprofitable original-equipment sales. Therefore, it would seem that Champion's output is less than optimum, a rate that is associated with a misallocation of resources.

Another aspect of the market performance of the spark plug industry subject to observation is the magnitude of costs incurred for sales promotion. It would probably be safe to conclude that the sales promotion activities of the large spark plug sellers are more of a persuasive rather than an informative nature. The reader is referred to the section on product differentiation for a discussion of this type of advertising. Our general impression is that a substantial portion of all sales promotion costs of the three major sellers in the spark plug industry is socially wasteful in character.[109]

Price uniformity in the spark plug industry has usually been the rule rather than the exception. Kahn has observed that prices are identical:

> In 1947 the three major producers maintained identical prices of $.65 per plug to the consumer, with a special rate of $.59 per plug if purchased in quantities of four or more. Similarly, there were only slight variations in distributor and jobber margins and almost identical prices were quoted on sales to oil companies, car manufacturers, and other direct purchasers. The major producers apparently recognized that price competition would be unwise in the existing competitive situation and emphasized various forms of non-price competition.[110]

In conclusion, our evidence concerning the market performance is scarce. However, our observations on the dimensions of performance that are available lead us to believe that the market performance of the spark plug industry is consistent with the high degree of concentration that is exhibited by the industry.

Summary

We have attempted an analysis of the spark plug industry using the industrial organization framework in order to enable us to evaluate the Ford-Autolite merger in its logical context. Our findings on the major dimensions, especially market structure, will shed light on the district court's ruling in the case. In the fourth chapter we will advance a limit pricing model, the basis of which will rest on the market structure of the spark plug industry and the potential competition doctrine. The market structure, conduct and performance aspects of this chapter will be essential to and understanding of the content of the fourth chapter.

IV. THE FORD-AUTOLITE MERGER

In this chapter we shall be concerned with the district court proceedings against the Ford-Autolite merger, including the arguments of the parties to the suit and the final decision of the court. Public policy toward vertical integration will also be discussed. In addition, we shall present a theoretical model with which we shall use as a basis to analyze the merger.

The Contention of the Parties

The Government's Argument

The government's argument before the district court was basically divided into two parts: (1) argument involving the potential competition doctrine, and (2) argument involving foreclosure theory. Each part is discussed below.

The first part dealt with Ford's position as a potential competitor. It was argued by the government that the effect of Ford's acquisition of Electric Autolite was the removal of a firm from the spark plug market, whose presence as a potential competitor had provided "an incentive to competition." The argument relied heavily on the potential competition doctrine as it was applied in previous antitrust suits. These are also discussed below.

The second part of the government's argument involved the foreclosure of independent spark plug producers from selling to Ford.

The government contended that the merger not only foreclosed actual competitors, but potential spark plug producers were also prevented from selling to Ford. More specifically, it argued that Ford's post-merger position as a vertically-integrated spark plug producer foreclosed the total spark plug market by nine and six-tenths per cent or the amount of its prior industry purchases.[111] Thus, the government contended that existing producers, as well as potential entrants, were denied an opportunity to try to obtain Ford as a purchaser of spark plugs, an incentive which supposedly would have induced other spark plug makers to work a change which would have conceivably led to the deconcentration of a tight oligopolistic industry. Antitrust cases involving foreclosure theory are also discussed below.

Two judicial decrees enunciated by the Supreme Court were cited by the government as having relevance to the Ford-Autolite merger.[112] In U. S. v. Philadelphia National Bank, the Court said that where concentration is already at a high level, even slight increases must be prevented. In Brown Shoe Co. v. U. S., the ruling was that where there is a strong trend toward oligopoly, further tendencies in that direction are to be curbed in their incipiency, whatever the number, or vigor, of remaining competitors.

Ford's Argument

Ford presented an "upward competition" defense to the district court. It contended that the effect of the merger was to make Ford a more effective competitor against General Motors and Champion than

Electric Autolite alone had been. The acquisition, Ford maintained, was justified because it produced more effective competition in the spark plug market.

The District Court's Decision

The district court ruled in favor of the government and held that Ford's acquisition of Electric-Autolite violated Section 7 of the Clayton Act. The decision maintained that the acquisition would have two principal adverse effects upon spark plug competition:[113] (1) the elimination of Ford as a potential entrant in the spark plug market, as well as the "competitive force" that Ford exerted on the market, and (2) an effective raising of the barriers to entry in the spark plug market.

The Decision on the Merits

The court concluded that Ford was a potential entrant to the spark plug market and that it was Ford's actual presence at the edge of that market that had a substantial influence on the competitive behavior of the existing spark plug producers. In addition, it found that Ford had been Champion's largest customer, and as such exerted substantial pressures on Champion to compete vigorously for its business. Moreover, it concluded that Ford's influence supposedly carried over into the entire replacement market. This "moderating effect" was supposedly operative because Champion was forced to make concessions to Ford on sales for redistribution to the replacement

market vis-a-vis Ford's constant threat of upstream vertical integration. Ford's influence on Champion was exercised by its large spark plug purchases which forced Champion to exercise pricing restraint in order to avoid the loss of Ford as its predominant customer. Since the Robinson-Patman Act insured Ford's replacement market competitors identical pricing patterns, Champion's spark plug prices to other firms were supposedly depressed below the norm. In turn, Champion's policies strongly influenced other spark plug producers and suppliers because it was the dominant member of the oligopoly and controlled approximately one-half of the market. The court's conclusion was expressed in these words:

> While Ford was able to check any avarice on the part of Champion, there is now no similar counter-balance as to Ford, which will not be disengaged regardless how extravagant its replacement price may become. . . . The ideal is broad competition in all of its ramifications and, where this is in the more atomistic forms seems impossible, the goal is to salvage what remains. Here prior to 1961, defendant helped mollify the evils of oligopoly.[114]

The Potential Competition Doctrine

In its decision, the court followed the precedent which was established in U. S. v. Penn-Olin Chemical Co., 378 U. S. 158 (1964). In the words of the district court:

> An interested firm on the outside has a twofold significance. It may some day go in and set the stage for noticeable deconcentration. While it merely stays near the edge, it is a deterrent to current competitors. . . . This was Ford uniquely, as both a prime candidate to manufacture and the major customer of the dominant member of the oligopoly.[115]

Even though the Justice Department lost the Penn-Olin suit, it is still considered to have established a firm precedent for preventing mergers and joint ventures consummated by potential entrants into oligopolistic markets.[116] The case involved two chemical firms, Pennsalt Chemical Company and Olin Mathieson Chemical Corporation. Pennsalt was an active producer of a paper pulp bleaching agent known as sodium chlorate, operated a plant in Portland, Oregon, and served the local market while Olin Mathieson used sodium chlorate primarily as an intermediate product purchasing it directly from other firms. The suit was initiated after the two firms formed Penn-Olin for the purpose of exploiting the rapidly expanding market in the southeastern part of the United States. Each firm had previously considered entering that market independently in the 1950's. The result of the joint venture was that one year after its formation it controlled twenty-eight per cent of all southeastern United States sodium chlorate production capacity.[117]

The district court ruled against the government on the grounds that competition was not substantially lessened because of the unlikely probability of both firms entering the market independently. The Supreme Court, however, ruled that the district court had used the wrong criteria:

> We believe that the court erred in this regard. Certainly the sole test would not be the probability that both companies would have entered the market. Nor would the consideration be limited to the probability that one entered alone. There still remained for consideration the fact that Penn-Olin eliminated the potential competition of the corporation that

> might have remained at the edge of the market, continually threatening to enter. Just as a merger eliminates actual competition, this joint venture may well foreclose any prospect of competition between Olin and Pennsalt in the relevant sodium chlorate market. The difference, of course, is that the merger's foreclosure is present while the joint venture's is prospective. Nevertheless, "(p)otential competition . . . as a substitute for . . . (actual competition) may restrain producers from overcharging those to whom they sell or underpaying those from whom they buy. . . . Potential competition, insofar as the threat survives (as it would have here in the absence of Penn-Olin), may compensate in part for the imperfection characteristic of actual competition in the great majority of competitive markets." . . . Potential competition cannot be put to a subjective test. It is not "susceptible of a ready and precise answer." . . . The existence of an aggressive, well equipped and well financed corporation engaged in the same or related lines of commerce waiting anxiously to enter an oligopolistic market would be a substantial incentive to competition which cannot be underestimated. Witness the expansion undertaken by Hooker and American Potash as soon as they heard of the interest of Olin Mathieson and of Pennsalt in southeastern territory. This same situation might well have come about had either Olin or Pennsalt entered the relevant market alone and the other remained aloof watching developments.[118]

The case was directed back to the district court, which found again that independent entry by either of the two firms was highly improbable. A second appeal to the Supreme Court guaranteed the continuing existence of Penn-Olin via a four-four division by the judges on overturning the lower court's decision.

In effect, what the district court said about the Ford-Autolite merger was that it posed a significant threat to the competitive structure of the spark plug market in the same fashion as the Penn-Olin joint-venture affected the southeastern sodium chlorate market. Ford's position at the edge of the spark plug market virtually paralleled that of either Pennsalt or Olin if one had entered the sodium

chlorate market and the other had remained on the periphery. The Supreme Court had this to say about the Penn-Olin joint-venture:

> We do not, of course, know for certain what would have happened if the "joint venture" had not materialized. But we do know that Section 7 deals only with probabilities, not certainties. We know that the interest of each company in the project was lively, that one if not both of them would probably have entered that market, and that even if only one had entered at the beginning the presence of the other on the periphery would in all likelihood have been a potent competitive factor.[119]

A somewhat similar situation existed in U. S. v. El Paso Natural Gas Company et al, 376 U. S. 651 (1964), another antitrust case that contributed to the precedent for the potential competition doctrine and invoked by the court in the Ford-Autolite merger. The case involved a merger between El Paso Natural Gas Company, a seller of industrial gas in California, and Pacific Northwest Pipeline Corporation, an outside firm that had extensive natural gas reserves in New Mexico and Western Canada and also was a potential entrant in the California natural gas market. The merger was ruled illegal by the Court in violation of Section 7 of the Clayton Act. The decision was based on the elimination of a substantial potential competitor--Pacific Northwest. The Court considered the relevant criteria to be "the nearness of the absorbed company to (the market), that company's eagerness to enter that market, its resourcefulness. . . ."[120] In this case the Court observed, "We would have to wear blinders not to see that the mere efforts of Pacific Northwest to get into the California market, though unsuccessful, had a powerful influence on

El Paso's business attitudes within the State."[121]

The Penn-Olin and El Paso litigation were considered by many economists to be antitrust cases that involved landmark decisions.[122] It is certain that they were landmark decisions with respect to the potential competition doctrine. Moreover, they were influential in the decision of the district court concerning the Ford-Autolite merger.

Another significant ruling that was handed down by the Supreme Court involving potential competition came in Federal Trade Commission v. Proctor and Gamble Company et al, 87 S Ct 1224, 1230 (1967). Proctor and Gamble, a manufacturer of soap and detergents, led the United States in sales of soaps and detergents at the time of the Federal Trade Commission suit. Chlorox Chemical Company was a dominate firm in the household liquid bleach industry accounting for nearly half of industry sales.[123] Proctor and Gamble's acquisition of Chlorox led to the challenge by the Federal Trade Commission. The Commission and the Circuit Court's findings were reversed by the Supreme Court which dissolved the merger on three grounds: (1) the fact that Proctor and Gamble was the most likely entrant into the household liquid bleach market; (2) the possibility of predatory pricing on the part of Proctor and Gamble; (3) the tendency of the acquisition to raise the barriers to entry by bolstering Chlorox's advertising power.[124] The Court found Proctor and Gamble to be an effective potential competitor: "It is clear that the existence of

Proctor at the edge of the industry exerted considerable influence on the market."[125]

The potential competition doctrine was also used in March of 1969 by the Nixon administration when it initiated its first major antitrust action against conglomerate mergers. The acquisition of Jones and Laughlin Steel Corporation by the conglomerate Ling-Temco-Vought was used as a test case by the Justice Department to determine whether or not Section 7 of the Clayton Act applied to conglomerate mergers as well as those of the horizontal and vertical type. The suit challenged the acquisition on the grounds that Ling-Temco-Vought and Jones and Laughlin were potential, direct competitors in certain lines of business through internal expansion. The case was settled in June, 1970, when a Federal Judge approved a settlement that required Ling-Temco-Vought either to divest itself of Jones and Laughlin or to divest itself of interests in two of its subsidiaries. Ling-Temco-Vought indicated at that time that it planned to keep Jones and Laughlin.[126]

Foreclosure Theory

The anticompetitive effects of foreclosure have been explained in many court cases concerning antitrust violations.[127] They were most clearly stated in the landmark decision of Brown Shoe Co. v. United States, 370 U.S. 294, 323-324, the Supreme Court's only comprehensive decision in reference to vertical mergers. In the Court's own words:

> The primary vice of a vertical merger or other arrangement tying a customer to a supplier is that, by foreclosing the competitors of either party from a segment of the market otherwise open to them, the arrangement may act as a "clog on competition" . . . which "deprive(s) . . . rivals of a fair opportunity to compete." . . . Every extended vertical arrangement by its very nature, for at least a time, denies to competitors of the supplier the opportunity to compete for part or all of the trade of the customer-party to the vertical arrangement. However, the Clayton Act does not render unlawful all such vertical arrangements, but forbids only those whose effect "may be substantially to lessen competition, or to tend to create a monopoly in any line of commerce in any section of the country."[128]

In its decision on the Ford-Autolite merger the district court relied heavily on this precedent of Brown Shoe. That the acquisition was anticompetitive and foreclosed Ford as a purchaser of spark plugs was expressed by the court as follows:

> The last phase of the discussion involves the foreclosure of Ford as a 1960 purchaser for all purposes of almost forty million units or 9.6% of total industry output. Unlike Owosso, Fostoria can fill defendant's entire demand for its traditional assembly and franchise uses as well as for Electric Autolite's old independent distribution channels. In spite of what seems to be a blatant Clayton Act violation according to the teaching of Brown Shoe Co. v. United States, supra, in particular when seen against the background of the exclusion at General Motors, Ford maintains that, practically speaking, the acquisition did not bring about any denial of access to any supplier but Champion--and the Government apparently finds no cause for alarm in Champion's misfortunes--because for decades no firm besides Champion had much hope for any of defendant's business. Ford points to the six-cent concession along with Champion's virtually limitless ability to lower it, which supposedly adds up to barely a possibility that Ford would ever be justified in sacrificing half a century of engineering rapport and Champion's aftermarket support by buying elsewhere. The argument flounders in the stagnation required to keep it afloat. At best, it proves that Ford would not have deviated from its past sourcing in the foreseeable future. However, the horizon in that direction is very close and opaque to new circumstances just beyond.[129]

The court's interpretation of the foreclosure was, then, that the acquisition had no actual anticompetitive effect; the emphasis was

placed on potential foreclosure. The significance of this ruling is that it places potential foreclosure on an equal footing with actual foreclosure. Thus, we see that Brown Shoe is to actual foreclosure as Ford-Autolite is to potential foreclosure. This is a practical extension of the potential competition doctrine into foreclosure theory.

Remedy

The remedy or decision on relief of the merger ordered Ford's divestiture of the Autolite spark plug assets including its trade name. In addition, it contained the following provisions:[130]

1. Ford was enjoined from producing spark plugs in the United States for a period of ten years from the date of divestiture.

2. Ford was ordered to purchase at least one-half of its total annual requirements of spark plugs from the person or firm acquiring the divested Autolite assets, for a period of five years from the date of divestiture. Such spark plugs, the court ordered, are to be labeled with the Autolite name and/or trademark.

3. Ford was enjoined not to "use or market in, or import into, the United States any spark plugs bearing a trade name or trademark owned by or licensed to Ford."

The relief granted, as stated by Chief Judge Freeman, was designed "to eradicate the tendencies of the acquisition to substantially lessen competition in the context of the present market and economic conditions."[131] Thus, to that end, divestiture was ruled to be the most effective remedy:

> It appears to the court that, in view of the structural effects of this acquisition which have been found to be likely to substantially lessen competition in the spark plug industry, the only remedy that will effectively correct the situation is

> that of divestiture. In no other way can the foreclosure of Ford be overcome. The same is true of Ford's pre-1961 impact on the actions of Champion and the other major manufacturers of spark plugs.[132]

In addition, the injunctive provisions were provided by the court to complement the divestiture. Specifically the court said, ". . . certain injunctive provisions are required in order that divestiture may be made effective and to give New Fostoria an opportunity to establish its competitive position."[133]

Public Policy Toward Vertical Integration

Public policy toward vertical integration is embodied in Section 7 of the Clayton Act, as amended by the Celler-Kefauver Act of 1950. It was designed by the legislature to nip monopoly "in the bud." Horizontal, vertical, and conglomerate mergers which may substantially lessen competition or tend to create a monopoly are proscribed by the Act. The legal test in each case is whether the merger may have an adverse effect on competition. Because the Congress through the years has viewed mergers as posing a special threat to competition, the Celler-Kefauver Act was designed to place certain constraints on growth by mergers. It is quite clear, then, that public policy toward vertical integration has consisted of separate standards for evaluating growth achieved by merger than for growth by internal means. It is also clear that this dual set of standards was explicitly and purposefully created in order to deal with these forms of vertical integration.

It is the belief of some economists that vertical integration by internal growth should be illegal. This per se argument is correct in saying that the result is the foreclosure of all outside firms from supplying or buying from the integrated firm, but such a consequence does not merit proscription unless abuse of market power has been clearly established. Vertical integration per se should be illegal only when it serves as a source or carrier of economic power. Kayson and Turner, writing in 1959, noted that this theory of the illegality of per se integration was not justified with respect to antitrust court cases up to that time:

> Only two recent cases involve this proposition in any degree: U. S. v. Yellow Cab (332 U.S. 218(1947) and U. S. v. Columbia Steel (334 U.S. 495(1948)). In the former, in the original decision on the pleadings, some element of monopoly in at least two local cab markets was present. The exclusionary character of the integration, therefore, turned on the monopolization of the local markets for the purchase of cabs by monopolizing taxicab service therein. On the second round, when the case was tried on the merits, no monopoly was found and the case was dismissed. In Columbia Steel the government did advance a per se argument, but it was squarely rejected by the majority of the Court, which went on to find that at neither the rolling level (Columbia) nor the fabricating level (Consolidated) did the acquisition confer significant market power on the U. S. Steel Co. in the western market.[134]

The conduct criteria for evaluating the effect of vertical integration is solidly grounded in economic analysis. If, upon merging with another firm vertically, a firm foreclosed part of a market by raising entry barriers the result would be a reduction in size in the open or remaining portion of the market. This is clearly a market power abuse because two firms have effectively used their positions to

bar outside firms from entry into the market. This raising of the economies-of-scale barriers to entry is called "the percentage effect" by Professor Bain. If the economies of scale in an industry are such that a new entrant must command ten per cent of industry demand, then if half the market were to be foreclosed by vertical mergers, a new entrant must dislodge twenty per cent of the open market from existing firms.[135]

It should be emphasized that in the case of the vertically integrated firm, market power in one stage of production does not necessarily lead to market power in another. A good example to illustrate this point is provided by Mueller.[136] Consider the small farmer who is vertically integrated into apple production and who sells at his own roadside stand to the consumer. That he controls all stages of production and distribution of apples from the orchard to the consumer does not bestow upon him the addition of market power. However, taking Mueller's example one step further, if two different apple farmers possessed market power in separate stages, a vertical merger would produce one unit with market power in more than one stage of production. The result could very well be the enhancement or entrenchment of this market power to an extent that is not available to the non-integrated apple farmer.

Scherer believes there is a virtual per se rule at present in force against all horizontal and vertical mergers between firms with substantial shares of the market; the rule also includes those vertical

mergers likely to foreclose an appreciable share of some market.[137] The divestiture of the Ford-Autolite merger by the district court could be argued as having been attacked on these grounds. Scherer defines virtual as meaning occasional exceptions such as a situation where one firm is on the brink of financial failure or whenever there is difficulty in delineating boundaries of the relevant market. The emphasis here is clearly placed on structure. The precedent for this rule, Scherer explains, was set down in U. S. v. Philadelphia National Bank et al, 374 U.S. 321, 363(1963):

> This intense congressional concern with the trend toward concentration warrants dispensing, in certain cases, with elaborate proof of market structure, market behavior, or probable anticompetitive effects. Specifically, we think that a merger which produces a firm controlling an undue percentage share of the relevant market, and results in a significant increase in the concentration of firms in that market, is so inherently likely to lessen competition substantially that it must be enjoined in the absence of evidence clearly showing that the merger is not likely to have such anticompetitive effects.[138]

There have been several prominent critics of vertical merger policy. Among these are Robert Bork and Ward Bowman, who have used an interference-with-economic-efficiency argument. They attacked Brown Shoe, using this argument. However, they failed to cite any evidence that would justify their conclusion that the merger "promised lower prices."[139] Bork and Bowman's criticism notwithstanding, there are no "natural" safeguards to guarantee that vertical integration will not result in an industry's becoming unnecessarily concentrated and difficult to enter. Such is the role of public policy in general and Section 7 in particular.

The distinction between a dual set of policies toward vertical integration is, to use Mueller's words, "not an anomaly arising from legislative oversight," but to the contrary, "it is rooted in sound economics." He adds, "The important point to grasp in evaluating public policy with respect to growth achieved by vertical mergers is that it short-circuits the 'market'test of growth."[140] Moreover, he goes on to quote Professor Heflebower:

> When a corporation chooses to grow by building it expects to face tests in the market for the product over the years required to establish and develop a new operation. It must fight its way in, that is, compete to succeed, and not buy its way in. I consider this a far better market test, and a more immediately relevant one, than the "market test" involved in a merger for the market for firms is highly imperfect. . . .
>
> Second, in nearly all circumstances, a firm whose acquisition is apt to be challenged has the capacity to grow by building. It has or can get the funds, it has the management capacity, and often already some of the needed market connections.[141]

To sum up, we have a different public policy toward vertical integration by merger than toward integration achieved by internal growth. Such a dichotomy of policy is justifiable because the Congress has viewed the special threat to competition that mergers have displayed. Vertical integration by internal growth is legal so long as it is not accompanied by abuses in market power. We believe the rule of law handed down in Brown Shoe is a good policy. Its effect has been to prevent growth via vertical mergers. In Mueller's words:

> It is true that, as economists, we may never be entirely satisfied that this policy prevented the emergence of high concentration in shoe manufacturing and retailing. But this policy will increase the probability that any substantial industry restructuring which does occur will have passed the market test and will therefore have been rooted in economies of integrated operations rather than in market power.

> Doubtless there will be instances where public policy prohibits mergers which would not seriously injure competition. But industrial history argues persuasively that to err on the side of a too strict antimerger policy is preferable to the reverse. As Professor Heflebower has put it, "the social cost of error from being too easy in merger policy is far more serious and less easily reversed than from being too strict."[142]

An Analysis of the Merger

Ford's acquisition of the Fostoria plant was a successful attempt to enter the lucrative replacement market without first entering the original-equipment market. It was the result of Ford's surmise that it could no longer afford to stay out of the replacement market. Since Electric Autolite was already firmly established as an original-equipment spark plug producer, the acquisition enabled Ford to surmount the main entry barrier at the expense of would be and actual spark plug producers hoping to win Ford as a customer. Had Ford vertically integrated by internal growth rather than by merger, it would not have been subject to an antitrust violation. We will return to this question in the next chapter. Nevertheless, since the Supreme Court has ruled that vertical mergers that tend substantially to lessen competition are illegal, the evidence in the Ford-Autolite merger seems to fit this description. That the merger occurred within the setting of a heavily concentrated industry, similar in many respects to the automobile industry, was, in all probability, the biggest single factor that led to the district court's decision.

We believe the court ruled correctly in rejecting Ford's defense. Although the acquisition did strengthen Ford's competitive position, it did not strengthen competition in the spark plug market. In addition, any possible benefits of a mere rearrangement of market shares among the three dominant sellers in the industry was more than offset by the loss of the effect which Ford exerted on the market as a potential entrant. This will be clearer when viewed in the context of our limit pricing model, which is discussed below.

In regard to the decision on relief, the court's ruling reflected sound economic analysis. The ruling did not stop short of structural changes, as is the case with too many antitrust decisions, but instead attempted to achieve a restoration of the status quo ante. Rather than allowing a situation where the end result would have had the effect of "transmitting the rigidity of the oligopolistic structure of the automobile industry to the spark plug industry," the divestiture decree and the ancillary injunctive provisions were designed to decrease the concentration in the spark plug market and to restore, as much as possible, the competition which existed in the market before the acquisition.[143] In effect, the decree lowered the barriers to entry to the spark plug market and reestablished Ford as a large buyer for ten years, thus putting it again at the edge of the market.

Limit Pricing Model

The most appropriate approach to the Ford-Autolite merger, from an economic frame of reference, is a limit pricing model. When viewed in the context of pricing to deter entry, the district court's argument takes on greater significance and is much more convincing.

By way of introduction, the theory of limit pricing deals with a group of oligopolists who together control a major portion of their industry's output and who may or may not be colluding to maximize joint profits. Their pricing policy has to take into consideration the reactions of active or potential members of the competitive fringe. Thus, if the price is set above the level of fringe producer's unit costs and if barriers to new entry are slight or modest, the competitive fringe expand or enter, whichever the case may be, and the dominant oligopolists' market share will decline accordingly.

Although there is a bevy of literature on the theory of limit pricing, Scherer's explanation is the most succinct and the most explicit:

> The threat of new entry or competitive fringe growth limits the pricing power of a dominant firm or a group of colluding firms unless steep barriers to entry exist. As a rule, the dominant firm or group can maintain market position only by holding prices below a level which yields positive economic profits to fringe members. If the group chooses to restrain their pricing in this way so as to maximize long-run profits, society benefits from the lower prices. If they choose to squeeze the most out of their short-run monopoly position, they must pay the consequences in the form of an eventual fall from power, and the industry will become less concentrated.

> Neither alternative ensures that price will be driven, sooner or later, all the way down to the competitive level. It is possible, under certain conditions, for a dominant firm or collusive oligopoly to exclude new entry while retaining some supra-normal profits. The main questions remaining are, how far above costs can price be held without inducing entry? And upon what does this price-cost margin depend?[144]

Ford's position as a potential entrant at the edge of the spark plug market influenced the group of oligopolists--Champion, General Motors, and Electric Autolite, whose homogeneous product insures that sales are made at identical prices--to forego monopolistic profits for the sake of maintaining an entry-deterring limit price in the replacement market. Since economies of scale are most likely a significant factor, these firms probably earned supra-normal profits through the years. However, their pricing policy obviously consisted of the initially lower but persistent profits from an entry-limiting strategy, rather than the initially higher but eventually lower profits from a short-run maximization strategy.

The relationship between cost advantages and pricing behavior in the industry can be easily characterized by effectively impeded entry. Such a situation exists, according to Bain and Scherer, whenever "the existing dominant group has an advantage over fringe members or potential entrants and finds it preferable to forego short-run profit maximization in order to deter entry."[145] This strategy, more than likely, resulted in a continuing stream of supra-normal profits to the dominant spark plug producers until Ford's entry in 1961.

If we are to follow Scherer's analysis on the theory of limit pricing, then society should have benefited from the lower spark plug

prices that supposedly existed so long as Ford was a potential entrant and threatening entry into the market. This is, no doubt, the position the court took when it made its decision. If this analysis is correct, we should expect the price in the replacement market to rise as a result of the merger. Unfortunately, we do not have the evidence to substantiate such speculation. On balance, our conclusion is that the merger acted as a concentration-increasing force in the spark plug market. What effect it had on the price of spark plugs remains to be seen. We now turn to its effects on structure, conduct, and performance.

Structural, Conduct, and Performance Effects

In terms of the number and size distribution of the sellers of spark plugs in the industry, the post-acquisitional structure saw no major shake-up. The number of sellers increased by one after 1961. Furthermore, Champion lost ten per cent of the market to General Motors. Ford assumed Electric Autolite's market share. The merger increased the concentration in the market. Before 1961, the first three firms controlled approximately ninety-five per cent of the market; after 1961, the first four firms controlled ninety-seven and seven-tenths per cent of the market.[146] However, this difference was slight. It is interesting to note that if Ford had entered the market independently of Electric Autolite, the number of firms would also have increased by one. It is not certain, though, how long Electric Autolite would have lasted before its excess capacity would have

forced it to sell Fostoria at a rock bottom price.

It is extremely difficult to assess the net effects on market conduct of the Ford-Autolite merger, because so little information is available concerning market conduct. Ford's entry into the market made it one of the big three oligopolists, free to assume Electric Autolite's place in pricing strategy. We cannot say for sure whether or not implicit collusion exists in this market. However, we can compare it to the automobile industry where implicit collusion does occur. The pricing pattern in that market has historically been characterized by price leadership-followership and pure oligopolistic interdependence. It is interesting to observe that price uniformity seems to be the rule not only in the automobile market but in the spark plug market as well. In the latter, price consistency on the manufacturing level has prevailed since 1963; and as of January, 1970, manufacturers' spark plug prices to warehouse distributors were as follows: Autolite, $.4234; Champion, $.4181; General Motors (AC), $.4200.[147]

Because there have been no significant manufacturing price differentials on spark plugs after the merger, we can only conclude that the merger had a tendency to intensify non-price competition with particular emphasis on advertising. Historically, all three major spark plug producers have channeled exorbitant amounts of funds into advertising each year. Promotion has consisted primarily of publicity in trade magazines aimed at the wholesaling segment of the

market, but much is also directed toward retailing. Speaking on the subject of publicity, one Electric Autolite sales brochure prepared for presentation to Ford in 1960 explained advertising as follows:

> Reliable surveys continually indicate that only a small percentage of car owners specify a brand when ordering a change in spark plugs. This fact establishes the (franchise) dealer and the service station operator as the actual consumer of spark plugs. However, to sell these outlets, it is essential to convince dealers and owner-operators that the public will accept the brand spark plugs once installed. Accomplishing this requires considerable and effective advertising for public review as well as the merchandising of these advertisements to the trade level.[148]

All available evidence indicates that technical efficiency in the spark plug industry depends upon the existence of an original-equipment customer. The removal of Ford as a potential original-equipment customer available to current and potential spark plug producers indicates insurmountable barriers to entry for potential plug producers vis a vis the fixed number of automobile producers which generate original equipment. This is to say that, if technical efficiency is used as the sole criterion for existence, the spark plug market is, for all practical purposes, closed to potential entrants because of the OE tie. If a spark plug producer were to enter the market, it could not operate at the minimum point on its long run average cost curve without an original-equipment customer. Eltra's position in the market is precarious. The district court had this to say about Eltra's position:

> . . . At present Eltra is reminiscent of the theatrical aspirant waiting in the wings for the star to break a leg, contenting

himself in the meantime with bit parts. It sells to the private brand merchandisers and distributors under "Prestolite" wherever it can, all for 1.2% of domestic shipments in 1964. Because of the meager demand to date, Eltra has not been justified in baking insulators internally; instead, it gets these most sophisticated plug components from Ford. However, its current debilitation is not to suggest that Eltra is beyond redemption. Clearly, it has an aggressive spark plug organization with respected expertise. Ceramic capability is easily within reach whenever revenue warrants the expenditure. Yet, even though Chrysler now considers Eltra an acceptable supplier, the difficulty in dislodging Champion is monumental. Champion's unexcelled promotional campaigns are good for the franchise-dealer replacement trade. In addition, Champion has made a revolutionary concession in agreeing to furnish, starting in 1964, one quarter of Chrysler's assembly requirements under the latter's own "Mopar" brand, but still at six cents each, and, in effect, to subsidize an attempt to gain a foothold for "Mopar" with an eye toward eventually stripping "Champion" of the last vestiges of major new-automobile status. Barring a classic blunder, Champion's tenure seems secure for the near future.[149]

The court's conclusion concerning technical efficiency and Eltra's survival was stated in these words:

> . . . For the moment it is sufficient to observe that the greater the dependence of survival upon original-equipment identification, the more grave the elimination of Ford as a potential entrant from the viewpoint of consumer protection, the ultimate object of antitrust legislation. . . . If any firm could be called meaningless, it would be Eltra. Lacking important new car affiliation, Eltra looks at birth like a pygmy whose growth will be stunted by deficiencies for which no amount of exertion can compensate. It could indefinitely be without this critical backing and, thus, too crippled in the aftermarket to begin to curb Ford's excesses.[150]

In conclusion, the most significant effects of the merger were that it increased the concentration in an already highly concentrated market; it raised the barriers to entry for outside firms; it intensified non-price competition, and it contributed to the trend of price

stability in the industry. In addition, interseller coordination and price leadership-followership policies and colluding policies will no doubt continue to be the norm as long as the industry is comprised of a few dominant producers controlling the majority of the market.

Summary

We have presented in this chapter the Ford-Autolite litigation. We have summarized the arguments of the government and Ford. We have discussed the final decision of the district court and the relevant antitrust cases to the decision. In addition, we have attempted an analysis of the merger in terms of a limit pricing model. Finally, we have concluded with the structural, conduct, and performance effects of the merger.

V. SUMMARY AND CONCLUSIONS

What were the alternatives facing Ford before it purchased the spark plug plant from Electric Autolite? Was growth into the spark plug market by internal means a feasible alternative for Ford? If so, what capital requirements did Ford confront and what were the barriers to entry? Most importantly, what risks were involved and what did Ford stand to gain from vertical integration via internal means rather than by the merger route? These issues are the subject of this chapter. In addition, we shall attempt in this chapter to arrive at a set of logical conclusions concerning the Ford-Autolite merger.

An Overview of Ford's Alternatives

Ford had at its disposal three alternatives concerning spark plug operations:

1. Continue to purchase from Champion at the six-cent price, a price that was some 14 cents less than if sourced inside.[151]
2. Build its own spark plug plant, thereby supplying its own needs for Ford cars as well as selling spark plugs in the replacement market.
3. Merge with an ongoing spark plug concern that had the facilities to supply Ford's needs as well as the capacity to utilize Ford's desire to penetrate the replacement market.

Whatever alternative Ford chose, its basic decision-making criterion can be represented as follows:

$$C = \frac{R_1}{(\overline{1+i})} + \frac{R_2}{(\overline{1+i})^2} + \ldots + \frac{R_n}{(\overline{1+i})^n}$$

This is, of course, the general equation for the present value of a future income stream. C stands for the present value of spark plug operations; i is the rate of return to capital, and R represents future sums of income from spark plug production. R_1, R_2, R_n is subject to a probability distribution with the major aspects of the problem being matters of uncertainty as to quantity of spark plugs to be produced and cancellation of outside contracts.

The evidence introduced in the district court indicated that Ford was pursuing the second option before it merged with Electric Autolite.[152] Although the government could not prove that Ford was on the brink of entering the spark plug market through internal expansion, the probability of entry, based on the government's findings, was indeed high. There were many positive signs mentioned by the government.[153] We have already referred earlier to one--Ford's preliminary study in 1960 which forecast a long-term after-tax yield on capital of twenty-four and three-tenths per cent on the basis of a five per cent penetration of the replacement market.[154] This is especially interesting in light of the fifteen per cent company norm for new investments. Another was the recommendation by the Business Development Office of a fifty-two million unit spark plug plant. That this proposal was not processed in detail by Ford's Integration Committee and was never brought to the attention of either the Executive Committee or the Board of Directors was the direct result of the availability of Fostoria.

We are provided with additional insights by the trial concerning the capital requirements, entry barriers, and risks facing Ford:

> A plug factory would have fit neatly into defendant's designs for augmented component manufacture and distribution, and would have been worthwhile over the long haul. On the other hand, nothing has been said about start-up costs, although the inference is that they would have been heavy because of the lengthy experimentation necessary to arrive at satisfactorily engineered plugs. In addition, industry stocking habits and the six-cent price pointed toward an extraordinary delay before the contemplated facilities would pay off. The unanimous consensus of experienced witnesses was that a minimum of five to eight years would elapse from the point Ford started using the new elements in its cars until enough Ford-plug-equipped automobiles would be on the road to create a real retailer interest in the product. Practically no machine requires a plug change during the initial 18 months of its life, and most do not much before their third anniversaries. Several model years' outputs would have to approach this milestone before their proportion of the whole vehicle population would prompt outlets to inventory the new brand. Only then would a mechanic pick this label for General Motors and Chrysler applications. Meanwhile, of course, defendant would be missing many sales for Ford machines. Few neophytes can expect an onrush of instant acceptance. All must prepare for a few lean seasons at the outset. What complicated the problem at Ford was the unusual arrangement with Champion. In 1960, defendant needed about 16 million assembly plugs; each would have been some 14 cents more expensive if sourced inside rather than to Champion. The aggregate differential, 2.2 million dollars, would have accumulated annually to form a worrisome deficit in itself--let alone when combined with unrecovered start-up outlays--by the time Ford scratched the surface in the aftermarket, and, because the loss would have recurred perpetually, may not have been erased for a number of years thereafter.[155]

The court continues on to mention the possibility of a merger:

> Although he was far from comprehensive in his reasons, Irving Duffy, a recently retired member of both the Integration and Executive Committees as well as of the Board of Directors, stated unequivocally that the six-cent price and the lapse between the beginning of mass production and lucrative volume would have prohibited entry around 1960 other than in a manner in which the interval could have been sharply reduced,

> i.e., by the take-over of an established trade name. Because Mr. Duffy was so conclusory, he must be deemed to have been expressing his personal convictions.[156]

Had Ford known how very tough Section 7 was to become would it have merged with Electric Autolite? Our feeling is that it would not have done so. If there had been more court cases ruling against vertical mergers prior to 1961, Ford probably would have proceeded with the second option even though the spark plug facilities of Electric Autolite had become available.

Summary and Conclusions

This paper has been concerned with: (1) the Ford-Autolite merger of 1961; (2) vertical integration either by internal expansion or by merger; (3) potential competition and the role that it played in the merger; (4) an economic investigation of the major industry involved--the spark plug industry; and (5) public policy toward vertical integration.

Its conclusions are:

1. The spark plug industry is heavily concentrated with only Champion, Ford, and General Motors operating as major sellers. The industry can afford more competition.

2. The Ford-Autolite merger was anticompetitive; it helped to raise the entry barriers to an already highly oligopolistic industry.

3. The district court's analysis was essentially correct although it failed to provide a limit-price argument against the merger.

4. The decision of the district court was correct and divestiture was the proper and the most effective remedy.

Vertical integration affects competition in many ways, e.g., structural effects such as source of economic power, raising entry barriers via foreclosure, control of limited resources, large capital requirements and conduct effects such as price squeezing and discriminatory pricing. Because of these various ways that competition is affected by vertical integration, determination of its effects is a complex empirical task, one that requires economic analysis. With respect to market structure as affected by vertical integration, the appropriate framework for analysis is industrial organization theory--structure, conduct, and performance approach. As Mueller put it: "An especially fertile area for analysis in this regard is empirical inquiry into the ways in which vertical integration may raise various entry barriers, including capital requirements, economies of scale, and product differentiation."[157]

It was precisely this that we attempted in this paper. We attempted to analyze the market structure of spark plugs and how it was affected by the vertical merger of Ford and Electric Autolite.

The district court's decision was solidly grounded according to the legal precedent laid down by the Supreme Court in Brown Shoe. It had the effect of preventing Ford, the second largest automobile producer, and Electric Autolite from growing vertically via the merger route, an effect proscribed by Section 7 of the Clayton Act. We are inclined to agree with Professor Heflebower. The market test of growth was clearly precluded by the Ford-Autolite merger. Ford, as

we pointed out, possessed the capacity and was on the verge of growing by internal means. If antitrust policy is to be effective, the government must prosecute whenever a violation of the law has occurred. Although Fostoria satisfied Ford's entry requirements of establishing a nationwide distribution organization oriented toward the replacement market and of having a nationally recognized brand name, Ford will be hard pressed to vertically integrate itself via internal expansion after the tenth year has elapsed.

FOOTNOTES

[1]In The Supreme Court of the United States, October Term, 1970, Jurisdictional Statement, Ford Motor Company v. United States of America and The Electric Autolite Company, Appendix C, pp. 120-122.

[2]Willard F. Mueller, "Public Policy Toward Vertical Mergers," Public Policy Toward Mergers, eds. J. Fred Weston and Sam Peltzman (Pacific Palisades, California: Goodyear Publishing Company, Inc., 1969), p. 155.

[3]Robert H. Bork, "Vertical Integration and Competitive Processes," Ibid., pp. 139-140.

[4]George J. Stigler, "The Division of Labor is Limited by the Extent of the Market," Journal of Political Economy, XXXVII (June, 1951), p. 187.

[5]R. H. Coase, "The Nature of the Firm," American Economic Association Readings in Price Theory, eds. George J. Stigler and Kenneth E. Boulding, Vol. VI, The Series of Republished Articles on Economics (Chicago: Richard D. Irvin, Inc., 1952), p. 334.

[6]Werner Z. Hirsch, "Toward a Definition of Integration," Southern Economic Journal, XVII (October, 1950), pp. 161-162.

[7]F. M. Scherer, Industrial Market Structure and Economic Performance (Chicago: Rand McNally and Company, 1970), p. 70.

[8]Ibid., p. 70.

[9]M. A. Adelman, "Concept and Statistical Measurement of Vertical Integration," Business Concentration and Price Policy, ed. George J. Stigler (Princeton: Princeton University Press, 1955), pp. 281-283.

[10]Douglas Needham, "Vertical Integration," Economic Analysis and Industrial Structure (New York: Holt, Rinehart and Winston, Inc., 1969), pp. 124-125.

[11]Ibid., p. 125.

[12]Ibid., p. 125.

[13]Ibid., pp. 125-126.

[14]Robert Crandall, "Vertical Integration and the Market for Repair Parts in the United States Automobile Industry," Journal of Industrial Economics (March, 1968), pp. 214-215.

[15]William S. Comanor, "Vertical Mergers, Market Powers, and the Antitrust Laws," American Economic Review, LVII (May, 1967), pp. 264-265.

[16]Jesse W. Markham, "Merger Policy Under the New Section 7: A Six-Year Appraisal," Virginia Law Review, XLIII, No. 4 (May, 1957), p. 497.

[17]"Independents" are any other major producers not considered to be members of the Big Three. This classification probably originated from efforts to differentiate the Big Three from one-make firms. See Lawrence J. White, The Automobile Industry Since 1945 (Cambridge, Massachusetts: Harvard University Press, 1971), p. 5.

[18]The Fortune Double 500 Directory of the Largest U.S. Industrial Corporations and the 50 Largest Banks, Life-Insurance, Retailing, Transportation, and Utility Companies, 1971, pp. 4-8.

[19]Robert F. Lanzillotti, "The Automobile Industry," The Structure of American Industry, ed. Walter Adams (3d ed.; New York: The Macmillan Company, 1971), p. 257.

[20]White, op. cit., p. 6.

[21]White, op. cit., p. 82.

[22]White, op. cit., pp. 85-86.

[23]White, op. cit., p. 85.

[24]This discussion is taken from White, op. cit., pp. 77-82.

[25]White, op. cit., p. 78.

[26]White, op. cit., pp. 78-79.

[27]White, op. cit., pp. 77-78.

[28]Allan Nevins and Frank E. Hill, Ford: Expansion and Challenge 1915-1933 (New York: Charles Scribner's Sons, 1957), p. 201.

[29]Crandall, op. cit., pp. 214-215.

[30]White, op. cit., p. 83.

[31]White, op. cit., p. 83.

[32]White, op. cit., p. 87.

[33]Jurisdictional Statement, op. cit., p. 5.

[34]Census of Manufacture, Industry Statistics, MC 63(2) 37 A, p. 18.

[35]Charles N. Davisson, The Marketing of Automotive Parts, Vol. XII Michigan Business Studies (Ann Arbor: Bureau of Business Research, School of Business Administration, University of Michigan, 1954), No. 1, p. 69.

[36]Harry L. Hansen and Marcell N. Smith, "The Champion Case: What Is Competition?" Harvard Business Review, XXIX (May, 1951), p. 89.

[37]Jurisdictional Statement, op. cit., Appendix A, pp. 78-79.

[38]Ibid., p. 79.

[39]At the time of the acquisition, the only other producer of automotive-type plugs of any significance was General Battery and Ceramic Corporation, whose spark plug facilities have since been acquired by Eltra Corporation. The remainder consisted of minor competitors, many of which were merely plug assemblers or boxers. Jurisdictional Statement, op. cit., p. 6.

[40]Jurisdictional Statement, op. cit., Appendix A, pp. 82-84.

[41]Ibid., p. 82.

[42]The Fortune Double Directory, op. cit., pp. 4-16.

[43]Ibid., pp. 4-16.

[44]Paul H. Banner, "Competition in the Automobile Industry" (unpublished Ph.D. dissertation, Harvard University, 1953), p. 71.

[45]In the 1920's it produced batteries for a short period of time.

[46]Stranahan conceived the idea with the objective of generating brand allegiance in the replacement market. At that time the automobile manufacturers did not distribute replacement plugs. It was hoped that a new car owner, who usually did his own repairs and was highly brand conscious, would replace worn out spark plugs with the same brand that was installed at the automobile factory. Also see Hansen and Smith, op. cit., p. 101.

[47]Kahn, op. cit., p. 7.

[48]Jurisdictional Statement, op. cit., Appendix A, p. 79.

[49]Robert Crandall, op. cit., pp. 254-255.

[50]Jurisdictional Statement, op. cit., Appendix A, p. 78.

[51]There is some controversy as to what percentage of owners know what brand of plugs they consume. Crandall cites one estimate in 1965 which stated that 38% of all automobile owners replace their own spark plugs. (Look Automotive Survey, 1965). See Crandall, op. cit., p. 254. Other sources indicated a lower percentage. See Hansen and Smith, op. cit., p. 102.

[52]Hansen and Smith, op. cit., p. 89.

[53]In The Supreme Court of the United States, October Term, 1970, Motion of the United States to Affirm, Ford Motor Company v. United States, p. 3.

[54]Ibid., p. 3.

[55]Jurisdictional Statement, op. cit., Appendix A, p. 82, n. 53.

[56]Motion of the United States to Affirm, op. cit., p. 4.

[57]Jurisdictional Statement, op. cit., Appendix A, p. 89.

[58]Ibid., p. 89.

[59]Motion of the United States to Affirm, op. cit., p. 5.

[60]Jurisdictional Statement, op. cit., p. 5.

[61]By 1960, Autolite's sales of automotive parts to Chrysler declined from a 1957 level of $142.6 million to $57.7 million. See Jurisdictional Statement, op. cit., Appendix A, p. 30.

[62]Another disturbing consideration was that Champion had gone public revealing high rates of return on replacement sales derived from the invaluable promotion Ford had provided for 50 years.

[63]Autolite had been anxious to dispose of several plants producing other electrical items; however, Ford declined to purchase them both because they were too old and because for some time they had been centers of labor unrest. Jurisdictional Statement, op. cit., Appendix A, p. 31.

[64]Ibid., pp. 81-82.

[65]Ibid., p. 81.

[66]Joe S. Bain, Industrial Organization (2d ed.; New York: John Wiley and Sons, Inc., 1968), pp. 137-138.

[67]There is a discrepancy between Table 2 and the information presented previously concerning the market shares of the private brand sellers of spark plugs. The percentage shares of private brand sellers totalled three and two-tenths per cent of "all service establishments"; the shares of "Eltra" and "other firms" in Table 2 total three and five-tenths per cent of U.S. spark plug production. This discrepancy, however, is a minor one. It probably stems from the definition of "all service establishments."

[68]They are also diversified into other manufacturing lines, the most notable being home appliances.

[69]The independent Champion manufactures plugs for approximately 75 different applications, only one of which is automobile. However, Champion plugs destined for the replacement market comprise about 90 per cent of sales, making the automotive market the largest and most important part of their business. See Barrons (New York), July 20, 1970, p. 21, col. 1.

[70]Kahn, op. cit., p. 4.

[71]Hansen and Smith, op. cit., p. 890.

[72]Thomas' Register 1971, Vol. IV, p. 6193.

[73]Two of these firms are Globe-Union and General Battery and Ceramic.

[74]Bain, op. cit., p. 150.

[75]American Motors is an exception since it has never been in a position to initiate production of plugs because automobile output has never been large enough to support the economies of scale associated with plug production.

[76]Davisson, op. cit., pp. 630-631.

[77]Jurisdictional Statement, op. cit., Appendix B, p. 114.

[78]Davisson, op. cit., p. 631.

[79]Kahn, op. cit., p. 5. The reader is referred to Davisson for a complete discussion of these major types of direct accounts supplied by spark plug manufacturers. Davisson, op. cit., pp. 632-641.

[80]Bain, op. cit., pp. 226-228.

[81]Davisson, op. cit., p. 628.

[82]Davisson, op. cit., p. 269.

[83]Ibid., p. 269.

[84]One exception is the Hastings "Shrouded" Aero-Type plug which does not have the ground electrode projecting below the end of the shell. The reason is because of protection from the hot flame sweep of the engine. These plugs are sold on the market at a price premium. See Davisson, op. cit., p. 629.

[85]See: "AC Sparks Back at Champion," Advertising Age, XXXVII (November 28, 1966), 2. "How Autolite Makes a Parts Market Spark," Printers Ink, CCXC (May 28, 1965), 23-24. "Autolite Puts On Ad Sprint To Overtake Leaders," Printers Ink, CCLXXIV (February 24, 1961) 13-14. "How Champion Ads Sell Both Consumers and Dealers," Printers Ink, CCLXV (December 26, 1958), 42-43.

[86]Davisson, op. cit., p. 630.

[87]Private brand spark plugs are sold at $.26 to $.28 each, while original-equipment plugs are sold at approximately $.40 each. See Jurisdictional Statement, op. cit., Appendix B, p. 114.

[88]An executive testified that he thought it would grow substantially during the next ten years because of changes in marketing methods. He stated: "The mass merchandisers are beginning to enter the plug marketing field in force. They not only sell all brands of plugs over the counter, but they are building service bays. In these bays many carry only spark plugs under their own proprietary brand. . . . the share of the spark plug market accounted for by private brand sales of the mass merchandisers will increase from the present 4.4% to 10%, or 85.7 million spark plugs, by 1980 . . . the total private brand portion of the plug market will then represent about 17% of the total replacement spark plug market, or 145 million units." Jurisdictional Statement, op. cit., Appendix B, p. 113.

[89]Bain, op. cit., p. 251.

[90]Ibid., p. 252.

[91]Ibid., p. 253.

[92]We can measure Champion's entry-forestalling price to Ford using the information from Table 4. Denoting Champion's original-equipment price to Ford as P_o and its replacement price to Ford as P_r, the condition of entry for Ford is measured as follows:

If P_o = 1/3 MC, then .06 = 1/3 MC and .18 = MC, and

if P_r = .24, then P_r - MC/MC = .24 - .18/.18 = .33.

[93]See Chapter II. Ford's purchase of Autolite cannot be considered as an entry to the spark plug industry according to the Bain criterion. He says: "New entry as defined is not accomplished if a firm previously not in an industry simply acquires the plant of an already established firm and operates it; that is, the mere change of ownership of existing plant capacity does not constitute new entry. . . ." Bain, op. cit., p. 252, n. 2.

[94]Crandall, op. cit., p. 250.

[95]See Chapter II.

[96]Champion's ten year summary from 1961 to 1970 shows annual increases in sales and earnings. See Annual Report, 1970.

[97]It is interesting to note that Champion's continued success has been, for the most part, derived from profitable replacement sales.

[98]Kahn, op. cit., p. 8, n. 12.

[99]Bain, op. cit., p. 179.

[100]Nelson, op. cit., pp. 2574-2575.

[101]Crandall, op. cit., pp. 256-257.

[102]Kahn, op. cit., pp. 2-3.

[103]Ibid., pp. 7-8.

[104]Ibid., pp. 7-8.

[105]Even after integration, still another critical time factor is involved. See Jurisdictional Statement, op. cit., Appendix A., p. 91.

[106]Kahn, op. cit., p. 8.

[91]Ibid., p. 253.

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[94]Crandall, op. cit., p. 250.

[95]See Chapter II.

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[98]Kahn, op. cit., p. 8, n. 12.

[99]Bain, op. cit., p. 179.

[100]Nelson, op. cit., pp. 2574-2575.

[101]Crandall, op. cit., pp. 256-257.

[102]Kahn, op. cit., pp. 2-3.

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[105]Even after integration, still another critical time factor is involved. See Jurisdictional Statement, op. cit., Appendix A., p. 91.

[106]Kahn, op. cit., p. 8.

[107]Bain, op. cit., pp. 372-376.

[108]Ibid., p. 374.

[109]According to an article written in 1961 ("Autolite Puts On Ad Sprint To Overtake Spark Plug Leaders," n. 57), Champion spends approximately $6 million per year on advertising. If this figure is correct, approximately 6% of Champion's sales revenue is attributed to advertising costs. Such a figure would place Champion's advertising costs in the same category as the cigarette, liquor, and fountain pen industries, and in Bain's sample of 20 industries, only one-fifth had advertising costs that were 5% or more of sales. See Bain, op. cit., p. 415.

[110]Kahn, op. cit., p. 5.

[111]Jurisdictional Statement, op. cit., Appendix A, p. 95.

[112]U.S. v. Philadelphia National Bank, 374 U.S. 321(1963); Brown Shoe Co. v. U.S., 370 U.S. 294, 346(1963).

[113]Motion of the United States to Affirm, op. cit., pp. 8-10.

[114]Jurisdictional Statement, op. cit., Appendix A, p. 88.

[115]Motion of United States to Affirm, op. cit., p. 16.

[116]Scherer, op. cit., p. 483.

[117]Ibid., p. 483.

[118]Irwin M. Stelzer, Selected Antitrust Cases: Landmark Decisions (3d ed.: Homewood, Illinois: Richard D. Irwin, Inc., 1966), pp. 119-120.

[119]Ibid., p. 123.

[120]Summer Marcus, Competition and the Law (Belmont, Calif.: Wadsworth Publishing Co., 1967), p. 43.

[121]Stelzer, op. cit., p. 156.

[122]See Stelzer, op. cit.

[123]Eugene M. Singer, Antitrust Economics: Selected Legal Cases and Economic Models (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1968), p. 268.

[124]Scherer, op. cit., p. 486.

[125]Singer, op. cit., p. 267.

[126]Wall Street Journal (New York), June 11, 1970, p. 4, col. 1.

[127]See United States v. du Pont, 353 U.S., 586; United States Steel Corp. v. Federal Trade Commission, 426 F. 2d 592, 598-605 (C.A. 6); United States v. Kimberly-Clark Corp., 264 F. Supp. 439 (N.D. Calif.); United States v. Standard Oil Co. (N.J.), 253 F. Supp. 196, 224-227 (D. N.J.); United States v. Aluminum Co. of America, 233 F. Supp. 718 (E.D. Mo.), 247 F. Supp. 308 (E.D. Mo.), affirmed per curiam, 382 U.S. 12; United States v. Kennecott Copper Corp., 231 F. Supp. 95, 102-105 (S.D. N.Y.), affirmed per curiam, 381 U.S. 414.

[128]Stelzer, op. cit., p. 83.

[129]Jurisdictional Statement, op. cit., Appendix A, pp. 95-96.

[130]Jurisdictional Statement, op. cit., Appendix C, pp. 120-123.

[131]Jurisdictional Statement, op. cit., Appendix B, p. 108.

[132]Ibid., p. 112.

[133]Ibid., p. 114.

[134]Carl Kayson and Donald F. Turner, Antitrust Policy, An Economic and Legal Analysis (Cambridge: Harvard University Press, 1959), p. 123.

[135]Mueller, op. cit., p. 152.

[136]Ibid., p. 151.

[137]Scherer, op. cit., p. 480.

[138]Ibid., p. 480.

[139]Mueller, op. cit., pp. 162-166.

[140]Ibid., p. 165.

[141]Ibid., pp. 165-166.

[142]Ibid., p. 166.

[143]Jurisdictional Statement, op. cit., Appendix B, p. 108.

[144]Scherer, op. cit., p. 219.

[145]Scherer, op. cit., p. 222.

[146]See Table 2 in Chapter III.

[147]Jurisdictional Statement, op. cit., Appendix B, p. 112.

[148]Jurisdictional Statement, op. cit., Appendix A, p. 83.

[149]Ibid., pp. 84-85.

[150]Ibid., p. 88.

[151]Jurisdictional Statement, op. cit., p. 91.

[152]Ibid., pp. 89-93.

[153]Ibid., pp. 89-93

[154]See Chapter II.

[155]Jurisdictional Statement, op. cit., pp. 90-91.

[156]Ibid., p. 92.

[157]Mueller, op. cit., p. 153.

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