

AN ABSTRACT OF THE THESIS OF

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Title AN INTEGRATION OF MARKET STRUCTURE THEORY AND
DECISION MAKING IN SELECTED AGRICULTURAL INDUSTRIES

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This research was designed to test the applicability of commonly accepted market structure theory to firm behavior within agricultural processing industries. The research was primarily concerned with testing the influence of relative firm size on discretionary management decisions. Statements from economic theory concerning structural influences on behavior comprised the hypotheses. Three firms of differing relative size in each of five industries provided data indicating actual behavior.

The size variable in market structure (measured by industry concentration) was approached using a reagency approach identifying concentration by the relative size of the firm whose behavior is influenced. This is contrasted with the commonly used algorismic approach (which emphasizes the number of firms in the industry) and physiognomic approach (emphasizing the proportion of industry output handled by a given absolute number of the industry's largest firms).

The ratio of actual to quoted prices was inversely correlated with concentration as hypothesized from decreasing demand elasticity. However, evidence was not consistent enough to warrant great confidence in the conclusion. The ratio of firm output to that which would result with alternative competitive selling markets did not show the hypothesized inverse relationship with concentration. Inter-firm dissimilarity of hierarchy of factors which limit output (including structure of the selling market) appeared responsible.

The ratio of actual investment to hypothetical competitive investment did not decrease with increased concentration as hypothesized. Frequency of technical innovation failed to vary directly with concentration and flexibility of investment failed to vary inversely with concentration, as hypothesized. The three investment hypotheses were based on theoretical decreasing investment security with concentration.

The hypothesized positive correlation between relative promotional expenditures and concentration due to lower cross elasticity of demand was observed, although a similar relationship for product differentiation was not evident.

The hypothesized influence of concentration was observed in only one of the eight included decisions, but concentration was observed to influence behavior in other ways. Small firms frequently were price leaders, particularly for downward price changes. A

dissimilarity was noted between medium firms' decisions and the more similar small and large firms' decisions, particularly relating to investment per unit of output, proportional unused capacity, preference of working capital to fixed investment, and relative costs of product differentiation and non-promotional selling costs.

In summary, market structure, measured by the reagency approach, influenced behavior as hypothesized in only two of the eight analyzed decisions. The pricing process was influenced by concentration more strongly than was price level. Also, medium sized firms' behavior shows more consistency than trends over continua of firm sizes.

Five alternate hypotheses are suggested for further study: (1) Minimum prices (reflecting minimized per unit costs plus minimum profits) vary inversely with concentration. (2) Small firms exercise downward price leadership in industries of heterogeneous firm size. (3) Ratios of actual to competitive output vary inversely with industry concentration within groups of firms encountering similar hierarchies of constraints. (4) Firms which expand output have less discretion for further relative expansion than those which refused comparable past opportunities. (5) Medium sized firms' philosophies are more growth oriented than those of larger or smaller firms.

AN INTEGRATION OF MARKET STRUCTURE THEORY
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AN INTEGRATION OF MARKET STRUCTURE THEORY AND DECISION MAKING IN SELECTED AGRICULTURAL INDUSTRIES

CHAPTER 1

INTRODUCTION

Problem

Neo-classical theory asserts firms are bound by the sum of the marketing decisions of their competitors under conditions of pure competition. A monopolist is relatively free to make his own marketing decisions. Joan Robinson (1934), in discussing "imperfect competition", Edward H. Chamberlin (1939), with "monopolistic competition", and others insert a market structure in which firms' decisions have measurable impacts on competitors' decisions. These theorists all assume that profit maximization is the prime objective of the firm.

Many economists have abandoned this assumption. R. A. Lester (1946, 1947) conducted research which he believes substantiates the use of principles other than profit maximization by entrepreneurs in determining the firms' level of output and employment. John von Neumann and Oskar Morgenstern (1947) have proposed a minimax theorem (minimization of maximum losses) in a two-person game as an illustration of a philosophy whereby firms do not aim primarily to

maximize profit. Robert L. Heilbroner (1962) and Tibor Scitovsky (1952) in separate works have cited the separation of ownership and management as basic to the apparent departure from management practices inaugurated to maximize firm profits. William J. Baumol (1959) has suggested that firms may seek to maximize total revenue with a minimum profit constraint. He has also noted that ordinary decisions are rarely met by prompt aggressive counter moves, although he does not deny that such moves might maximize profits. These theorists exemplify a growing number who depart from the maximization of firm profits as the primary goal in the operation of the firms.

That this departure is made possible by variations in market structure is implied in the assumption of profit maximization as a necessary part of firm operation in pure competition theory and in the above authors' use of non purely competitive models. If structural variation is a causal factor, a difference in market structure between industries may be accompanied by a predictable ordinal difference in goals which a firm can hold, in decisions which it can make, and consequently in the factors which it must consider in making decisions.

Thus, market structure differences may influence decision making. However, we have to date no comprehensive theory combining market structure and decision making which adequately

describes firm behavior. Such a theory would be of value to (1) firms by describing the behavior of the market context within which they operate, and (2) public agencies by describing the interrelationships within the markets which they serve and regulate.

Oliver E. Williamson (1964) has recently published research concerning the relationship of discretionary decision making to market structure. He studied firms which handled a large proportion of their respective industries' output and observed alterations in discretionary decisions when the firm was subjected to economic stress. He compared these results with what he assumed would be the situation in competitive industries. No firms in industries of moderate or low concentration were tested.

Many popular market structure theories transcend taxonomy with explicit or implicit behavioral allusions. Such explicit assumptions are exemplified by the following from Nicholls, 1941, p. 7:

it is assumed that each dominant firm will learn by experience to recognize that his rival's policy depends upon his own,... While it is recognized that uncertainty on such questions may render the result indeterminate, concrete examples drawn from actual processing industries are presented to support the view that 'live and let live' replaces price competition among a few dominant firms in the real world, with uncertainties at least partially eliminated by various market conventions.

Explicit behavioral statements are common: "...each oligopolist... must assume that any price change he makes will set in course

retaliatory...price changes by his rivals." (Bain, 1948, p. 181).

The literature includes frequent implications that market structure determines behavior. An example from Bain, 1948, p. 54:

In a large proportion of all of our industrial markets there is 'fewness of sellers' in this sense. Either the entire output of an industry is controlled by six, seven, ten, or a dozen firms, or the bulk of the industry's output (say from 60 to 90 percent) is controlled by a few large firms, while the remaining output is spread among 20 or 30 'small fry'. In either event, the market structure is dominantly oligopolistic, in that the leading pricing decisions are made by a few large firms the individual demands for whose products are closely interdependent.

This sort of quasi-behavioral market structure theory attempts to determine and predict managerial behavior from logical analysis of industry parameters. Prediction of what firms will do is formulated from a study of factors which determine what firms can do. The error which most severely threatens the credibility of these theories is the assumption stemming from the concept of the economic man-- that what can be done will be done, that when entrepreneurs can make profits or secure sales they will do so. Managerial decisions may be influenced by factors other than the drive to earn profits and the limits on quantity of profits available or how they may be obtained.

Market structure or decision making theorists to date have not analyzed whether there exists gradations of changes in actual entrepreneurial decisions over the continuum of market structures. The research reported in this thesis is a pioneering effort to conduct a search for empirical evidence of accepted theory's conformance to or

contradiction with the real world. It is highly possible that the final conclusions will only serve to raise serious questions concerning the applicability of existent theory to agricultural processing industries. It may be that evidence can be aggregated for the formulation of new hypotheses for further research. Or the results may comply with traditional theory, empirically confirming (with a limited degree of confidence) the applicability of this theory to agricultural processing.

Objectives

The general objective of this work is to analyze the relevance of market concentration to firm decision making.¹ The project is founded on testing the hypothesis that

At different levels of industrial concentration, significant differences exist in the nature and types of economic decisions, with fewer relevant decisions and decision-making opportunities in less concentrated industries and significantly more discretionary opportunities with greater industry concentration.

The specific objectives of this research are to evaluate the predictability of:

¹"If we wish to view concentration as a structural determinant of competition, it is the degree of concentration within each group of competing firms which will presumably be the strategic influence, and we naturally inquire about the degree of concentration with individual industries." (Bain, 1959, p. 109).

1. company objectives and the general goal of decisions
2. key decisions
3. peculiarities and identifying characteristics of decisions
4. alternatives available
5. alternative selected in several decisions, and
6. basis for selecting said alternative

from knowledge of

7. the market structure in which the firm operates.

A comparison will be made between these research findings and the currently accepted theoretical norm applicable to each structure. A market structure oriented explanation of managerial decision making will be formulated to the extent possible from data analyzed.

Since the influence of market structure on managerial decision making has never satisfactorily been empirically tested, the validity of traditional theory in explaining actual business practices will be of primary importance. In addition to being subject to the same influences as managers in manufacturing,² managers of agricultural processing firms may also be influenced significantly by the distinctive characteristics of the product per se (i. e., perishability; seasonal production; variable quality, size, appearance, etc.; or

²Various writers have suggested that salary, security, status, power, prestige, social service, and/or professional excellence are prime influential factors on managerial decision making. See the summary in Williamson, 1964, p. 30.

susceptibility of total output level to exogenous variables such as weather). Thus the specific applicability of the theory to agricultural industries will also be tested.

Summary

This chapter presents the problem to which the research is addressed and the objectives which it is designed to fulfill.

The theoretical model, hypotheses, and procedure employed comprise chapter two. Chapter three includes the data sources and research methodology. Chapters four through six present the research results related to price and output, investment security, and demand control, respectively. Other significant findings are presented in chapter seven. Chapter eight is a summary of the results and conclusions. Chapter nine presents further implications of the findings.

CHAPTER 2

THE THEORETICAL MODEL AND ITS IMPLICATIONS

The research proposed in Chapter 1 is designed to determine how managerial decision making is influenced by the departure of the structure of a market from pure competition. In research dealing with such behavioral variables, a primary difficulty of measurement is encountered, particularly with regard to market structures. This chapter includes a discussion of the progress of market structure theory, the approaches to market structure, and the measurement of market structure. On the basis of these concepts, the eight specific hypotheses of this research effort are developed and the research procedure is designed, as delineated in the closing section of the chapter.

The General Theory of Imperfect Competition and Market Structure

Pure Competition

Pure competition, as described by the Neo-classical economists, is based on the following assumptions: (1) There are many buyers and sellers in the market, such that (2) no firm in the market has sufficient market power to exert a measurable influence on the demands faced by his competitors. (3) There are no legal or other barriers to prevent firms from entering or leaving the industry.

(4) The industry produces a homogeneous product, i. e., there is no differentiation between the products of various producers. (5) Potential and actual participants in the market are sufficiently well informed to take advantage of the opportunities available to them. (6) The entrepreneur is assumed to act with profit maximization as his goal.

Firms dealing in a market characterized by these conditions will face a demand curve which is essentially horizontal at a level equal to the firms' minimum long run average total costs. Firm output, as determined by the intersection of marginal cost and marginal revenue curves, will be coincident with that level at which average total costs are minimum in the long run.

Departures from Pure Competition

Since all markets are not purely competitive in character, particularly with regard to firm numbers, a theory of monopoly was formulated to describe the non purely competitive elements in markets. Firms operating in such a market will commonly face a demand curve which slopes downward to the right. Since such firms maintain complete control over industry prices, they are free to exploit this slope to maximize their own benefit. The natural result would be production at a level representing the intersection of the marginal cost and marginal revenue curves, with price equal to the

level of average revenue = demand at that level of output. Because of the difference in slope of the revenue curves, monopoly output would be less and prices higher than for a firm operating under conditions of pure competition.

Joan Robinson (1934) recognized the differentiating characteristics of this monopoly theory but identified the primary difference as the unit of control rather than the firm's reactions to its environment. Thus, she believed the theory of pure competition is of primary value in describing firm behavior under most conditions and monopoly is only a special case.

Chamberlin (1939) identified monopoly as something other than an extension or special case of pure competition. He considers monopoly to be the more important, more applicable theory of the two and pure competition to be the special case. He analyzed the area between these two extremes and identified the structure of markets characterized by such conditions as monopolistically competitive. In this type of situation, firms compete with one another for available trade (represented by a sloping demand curve faced by each firm) until each firm's average revenue curve is tangent to the ATC curve (as with pure competition but not at the minimum point of the latter). Thus, prices under monopolistic competition will be higher and industry output lower than would be the case under pure competition, though not necessarily so much so as with monopoly. The basic

concepts of the economic man and marginal analysis of the Neo-classical economists continue to be integral assumptions of the analysis.

R. A. Lester (1946, 1947) interrogated managerial personnel of manufacturing firms concerning their reactions to wage rate changes. From his analysis he concluded that firms do not determine their level of labor utilization by the marginal cost of this labor. This conclusion was used to dispute the belief that marginality serves as a guiding principle in determining level of labor utilization. He thus refuted profit maximization as a realistically descriptive principle. Adjustments such as better management and increased sales were most frequently offered by respondents as adjustments to changed labor costs in preference to the profit maximizing adjustments of changed level of labor utilization.

Von Neumann and Morgenstern (1947) recognized that decision making commonly takes place under uncertainty and that accurate planning for ex post profit maximization is impossible. From their analysis of managerial utility as exemplified by a two-person game, they concluded that entrepreneurs may rather seek to minimize maximum losses.

Profit maximization by firms is also disputed by Scitovsky (1952). He suggests that, by separating the entrepreneur's income into profits and wages, the entrepreneur may maximize his own

profit though not necessarily his wages or total income, or the profit of the firm. His necessary sacrifice of leisure becomes increasingly more costly to him in terms of utility as his expenditure of managerial labor increases. Thus, although the principle of the economic man may apply to the operating philosophy of the entrepreneur, it does not result in profit maximization for the firm.

Baumol (1959) has suggested that firms may not restrict output for the sake of exploiting the sloping demand curve to obtain the profit maximizing price. He indicates that, because of the positive utility obtained by management through expanding sales levels, firms are likely to maximize sales, subject to some minimum profit constraint, a sine qua non for continued existence. Baumol's theory would leave relative output essentially unrelated to industry concentration.

Heilbroner (1962) has assumed that the basic business motive is making money. However, he notes that in the modern corporation those in positions of responsibility for firm management do not necessarily make more money for themselves when firm profits increase. The separation of ownership and management generally leaves management balancing various private interests in behalf of firm longevity.

Williamson's (1964) work has served to further substantiate firm's use of principles other than profit maximization to guide expenditures which were not intended or expected to be economically profitable. These costs were rather incurred for some primarily

non-economic reason. Since these costs are not profitably incurred, they are not acceptable to profit maximizing firms.

Cause for Concern with Imperfect Competition

The theories of pure competition and monopoly are predicated on assumptions of firm numbers and market shares which are not representative of most of the real business world. If these two characteristics are relevant to firm behavior and if an integration of the two theories does not suffice to explain the behavior of firms in the intervening categories, a theory is needed which adequately describes behavior of these firms. This need is the precipitating force for much of imperfect competition theory and particularly for this thesis.

Market Structure and Industry Concentration

Assumption: Comparability of Market and Industry

Market structure is measured here by industry concentration. However, "market" and "industry" are not assumed to be synonymous.³ Rather, an industry is defined here to be firms performing similar services and/or producing a similar product (but one significantly different from the products of all other firms). A market is defined as a group of buyers and sellers dealing in a given product, with direct competition among buyers and among sellers.

³Robinson (1958, p. 8) has stated that "industries, as such, have no identity. They are simply a classification of firms which may for the moment be convenient."

The confusion of market structure with industry concentration has recently been discussed by Smith and Dahl (1965, p. 446). They believe that an "entire industry can be one side of...a market, but this is rarely the case. Instead groups of firms within an industry may be competitively distinct from one another because they operate in different buyer and seller markets....Clearly, the behavior of firms is more conditioned by the market in which they operate than by their operational similarity with other firms."⁴

Because of the geographic concentration of the industries selected (see p. 46f, below) and the apparent homogeneity of products sold by these primary processors, most firms in each industry sell in very similar markets. The procurement market could be similarly described. Thus, Smith and Dahl's reservations, though logically consistent, do not reflect on the methodology employed in this specific research because of the peculiar industry characteristics on which their criticism is based. This should not be construed to mean that the writer accepts the statement by Seaver (1964, p. 125, as cited by Ghosh, 1966, p. 751) "...an industry and a market are one and the same thing."

In this analysis, the primary emphasis is on the structure of two separate markets -- the buying side of the market in

⁴See also a criticism of this article in Ghosh, 1966, p. 751-753 and the authors' response in Smith and Dahl, 1966, p. 753f.

which raw agricultural products pass from the producers to the initial processors and the selling side of the market in which products pass from these initial processors to the secondary processors, wholesalers, retailers, or consumers. Structural influence, as reflected by market power, is not necessarily the same for a given firm in the two markets in which it operates. Agricultural processors are usually more prominent in the buying market than the selling market. Thus, they have more market power in the former, *ceteris paribus*⁵

Goal: Identification of Structural Determinants

We seek to identify structural determinants in two markets. That is, what are the "characteristics of the organization of a market which seem to influence strategically the nature of competition and pricing within the market" (Bain, 1948, p. 7), the "significant internal features of the market setting... that affect the conduct of firms" (Clodius and Mueller, 1961, p. 516)? It is intended that this research will help determine if certain market concentration characteristics are actually structural factors in the sense that they

⁵ Mutatis mutandis, firms do not always sell in the same market as the other firms with which they compete in the procurement market. Although their purchase offer may not differ significantly from that of other firms buying the same raw product in the same market, the products which they sell may be specialty items, for example, which compete only slightly if at all with those of most other processors of the same raw product.

influence firm behavior and, if so, what is the nature of this influence.

Approaches to Structure

The primary task of market structure research as it has potential value for behavioral micro-economic theory is to identify the exogenous variables. Detailed analysis of the types and magnitudes of managerial influences can be profitably delayed until this identification has attained a moderate level of accuracy.

Three divergent definitional criteria of market structures are used by various economists. These areas may be identified as algorismic, physiognomic, and reagency.

The algorismic approach is used by many traditional market structure theorists to make crude behavioral implications from mere assumption concerning the number of firms in an industry. In an industry consisting of only a few firms, all are assumed to be large and each is assumed to possess significant, recognized market power. If an industry is composed of many firms, all are assumed to be of atomistic relative size and to possess insignificant market power. These implications necessarily further require an assumption of essential homogeneity of firm size. This approach has been severely criticized by economists.

The physiognomic approach to market structure has received

wide-spread attention in recent industrial studies.⁶ The underlying assumption is that behavior within the industry is determined by the proportion of the industry output handled by a given absolute number of the presumably more powerful firms in the industry. The largest four, eight, twenty, or other number of firms⁷ are considered, by virtue of their relative position in the industry, to possess more market power than any other group of the same number of firms in the same industries. The possession of this power is considered ipso facto indicative of the exercise of this power. Thus, knowledge of the proportion of industry output handled by an arbitrary, absolute number of presumably influential firms is credited with indicating firm behavior.

The algorismic and physiognomic approaches are rejected by this writer because they deal only indirectly, if at all, with industry variables which are vitally related to firm behavior. It is

⁶For example, see U. S. Federal Trade Commission, 1962, p. 8, and 1965, p. 65f.

⁷In addition to the shortcomings of use of this approach in behavioral work as are cited in the text, reliance on a given cardinal number of firms as a key influence completely overlooks the relative proportion of the total number of firms (thus, the number of competing, colluding, or cooperating managements) represented by these supposedly influential firms. If the constant, absolute number were replaced with a constant proportion of the firms in the industry, the influence of the degree of heterogeneity of firm size would not be overlooked.

unacceptable to assume that any phenomenon will influence all firms in a given industry in a comparable manner and to a similar degree. Investigations based on these approaches may provide valuable descriptive results. However, the behavioral implications may be unfounded and misleading.

The reagency approach to market structure research is more realistic in that it takes into account "characteristics of the organization of the market" which may well directly influence discretion in managerial decision making and directly or indirectly influence firm behavior itself. This approach seeks to study firm behavior by investigation of the relative place in the industry held by the influenced firm. That is structure is a behavioral variable⁸ and must be oriented about the relationship of a specific firm to its influential environment rather than about general industry characteristics.

The effective differences between the three approaches are these:

1. The first and third approaches consider the impact of relative concentration of output within the entire remainder of the industry, while the second includes only a few of the larger firms, and
2. The first and second assume a given industry characteristic

⁸ See definitions of market structure, p. 15.

will affect all firms alike (by assuming all firms are in an identical relative position and by ignoring whether the affected firm is one of the four largest, respectively) while the third approach recognizes a difference of impact on firms in different relative positions.

In brief, the algorismic approach considers the relationship of the influenced firm to the remainder of the industry but does so by noting the number of firms in the industry and assuming them to be of effectively equal size. Because of this assumption, a given industry characteristic can then be expected to influence all firms alike.

The physiognomic approach centers attention on the impact of the relative concentration of industry output within a specific number of the larger firms but, similar to the algorismic approach, assumes the selected market characteristic to have a comparable influence on all firms in the industry.

The reagency approach is designed to detect firm susceptibility to exogenous influence by noting the potential impact of the entire remainder of the industry (similar to the algorismic approach but without the unrealism innate in assuming all firms to be of effectively equal size). It also recognizes the differential impact of a given market characteristic on various firms in the industry (unlike either of the other approaches).

The emphases of the three approaches are compared in Figure 1.

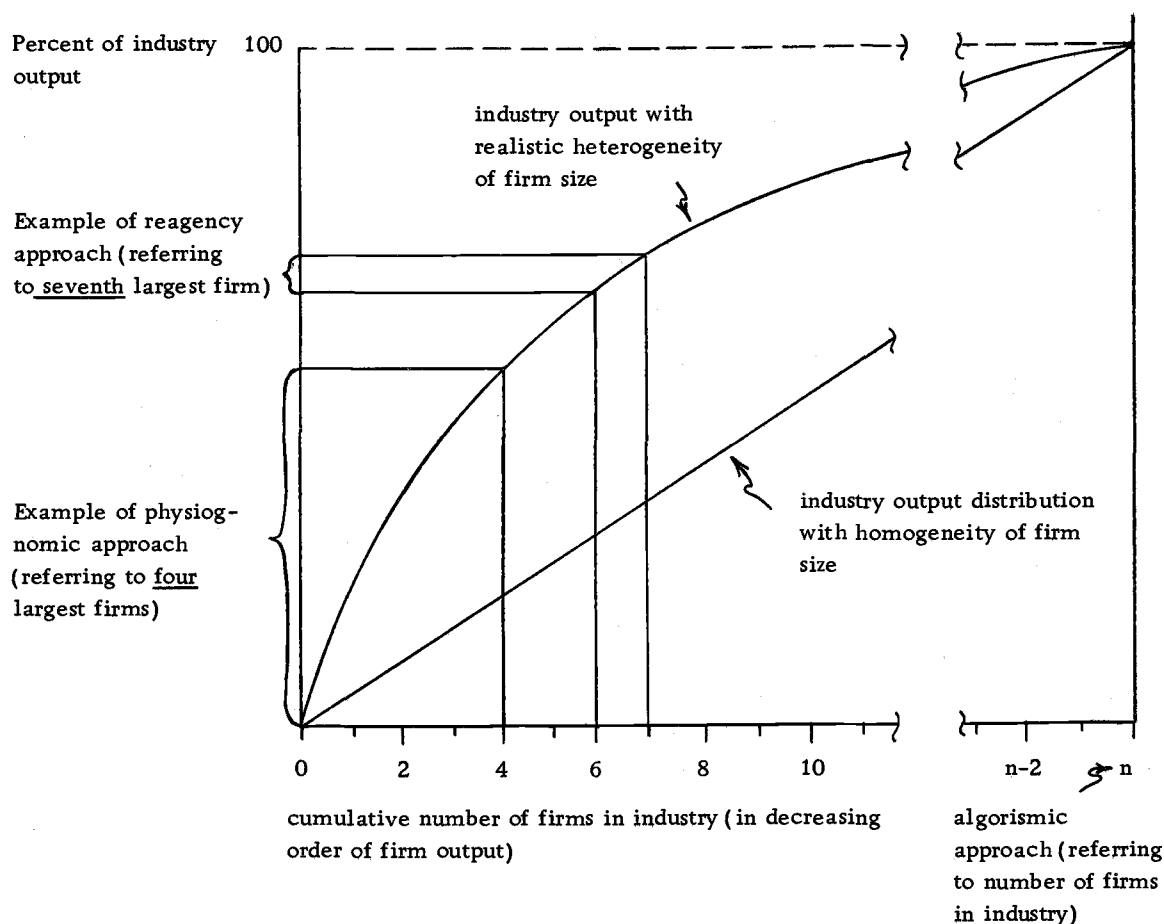


Figure 1. Industry characteristics emphasized by various approaches to industry concentration.

These approaches to market structure have all been predicated on the primary relevance of concentration of industry output among part of the firms within the industry. The importance of degrees of product differentiation (physical or merely by image) should not be discounted. If the product of a firm is significantly differentiated from competing products (i. e., if the cross elasticities of demand are low), this firm will be less subject to market power granted the

other firms in the industry by concentration. Similarly, this firm will have less influence on other firms. If an industry is homogeneous with regard to firm size, both individual market power possessed and susceptibility to power held by other firms will be inversely related to the degree of effective product differentiation.⁹ If the industry is heterogeneous with regard to firm size and products of the industry are differentiated, resultant market power of firms in the industry will be some weighted function of both variables.

A third variable which must be included in a consideration of market structure¹⁰ is the presence of economic profits. Theoretical pure competition precludes the opportunity to price above cost including minimum profit necessary to keep firms in the industry, i.e., it precludes the availability of excess profits. If research is conducted

⁹ Notice that product differentiation serves to grant to the firm benefits of independence (comparable to increased relative firm size via decreased susceptibility to competitive actions of other firms) but at the same time limits the impact of the firm's decisions on its competitors (as would be the case with decreased relative size). Thus, differentiation cannot be said to have a predictable impact on the profit implications of market power without knowledge of further details of the market relationships between demands for the differentiated product and those against which it competes.

¹⁰ The variables of product differentiation and excess profits are not included as exogenous variables in this study since it is not designed to be a complete study of market structure. Rather, the single exogenous variable which is hypothesized to be the most "influential characteristic" is considered by analyzing its behavioral impact.

regarding relative market power rather than proximity of markets to theoretical purely competitive conditions, firm cost structures are not assumed identical. Thus, the existence of supra-marginal firms (therefore, profitability conditions at any point in time) is less relevant to market structure identification.

Development of Specific Hypotheses Tested

Within the theoretical model described, this research is designed to analyze the relationship of decision making to market structure while defining the latter apart from firm behavior. Since the definition of oligopoly involves interdependence between firms,¹¹ the hypotheses as delineated below relate various marketing decisions to industry concentration, since this is proposed above to indicate structure exclusive of behavior.

Market Price; Firm Output

According to the Neo-classical economists, firms selling under conditions of pure competition will operate at an output level coincident with minimum long run average total cost, since the horizontal

¹¹ As an example, Samuelson (1958, p. 488) says of oligopoly, "Each firm is taught the lesson that other firms will not stand idly by while it cuts its prices; rather they too will cut their prices, so that everyone will end up worse off."

marginal revenue = average revenue = demand curve intersects the marginal cost = supply curve at that point. As the structure of a market shifts from pure competition toward monopoly, the firm demand curve would normally assume a negative slope approaching that of the industry as a whole.

If (1) industry concentration is generally characterized by an increased slope of the firm demand curve, and (2) competition necessarily limits a given firm to a product demand represented by a demand curve tangent to the firm's long run average total cost curve, this tangency will be higher and to the left on the cost curve of the firm in the more concentrated situation. Thus, industry concentration promotes lower firm outputs and higher prices.

Scitovsky (1952), Baumol (1959), and Heilbroner (1962), among others, have disputed this relationship. They deny that firms are necessarily operated to maximize profits. They thus indicate that actual price and output levels are not primarily determined by the structural factors which determine maximum available profits.

These recent theorists may offer qualifications which should be imposed upon the profit maximization theories of economists such as Robinson (1934) and Chamberlin (1939). However, these qualifications apply solely to the non purely competitive segment of the business world. Although these qualifications may affect the cardinal differences between price-output decisions of firms operating in this

segment and those in the purely competitive segment, the ordinal relationship is likely unchanged. It is therefore hypothesized that (1) market price varies directly with the level of industry concentration, while (2) the level of firm output varies inversely with concentration, *ceteris paribus*. Thus, the quoted market price of the products sold by the firms in the study would be expected to be higher under more concentrated marketing conditions, as shown in Figure 2. Similarly, the ratio of actual output to the output which the firm would produce under essentially competitive conditions,¹² *ceteris paribus*, would be expected to decrease from unity as industry concentration increased (see Figure 3). Chamberlin (1939, p. 77) makes the concise, relevant, theoretical statement that "... the effect of monopoly elements on the individual's adjustment... is characteristically to render his price higher and his scale of production smaller than under pure competition. This is the result of the sloping demand curve, as compared with the perfectly horizontal one of pure competition. "

¹² The term, "essentially competitive conditions", is utilized here to mean conditions of (1) unlimited potential sales at the current price (i. e., testing the effect of a consideration of a downward sloping demand curve) and, further, under conditions of (2) extreme price competition (i. e., testing position of present operating level on average total cost curve available to that firm).

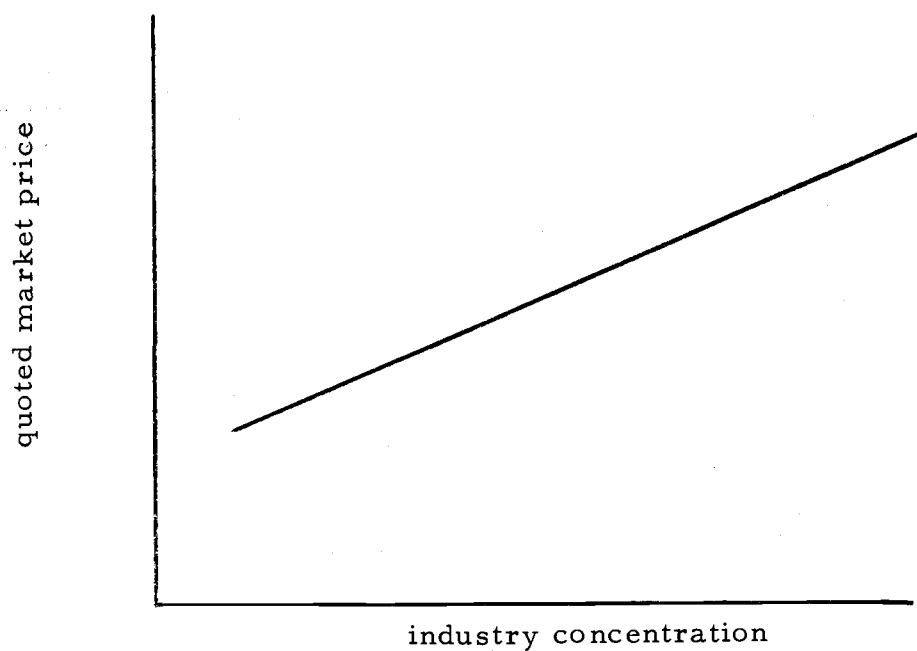


Figure 2. Hypothesized relationship of quoted market price to industry concentration.

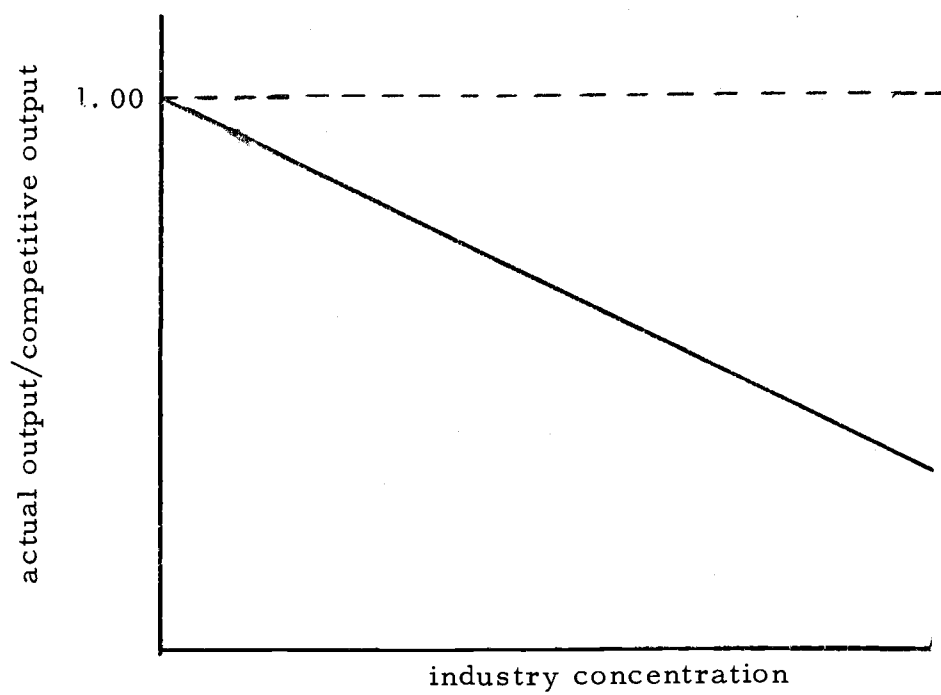


Figure 3. Hypothesized relationship of firm output to industry concentration.

Price Concessions

Price concessions per se are not discussed extensively in market structure theory. However, behavioral implications of many structure theories dealing with market prices embody ipso facto implications involving discretion to allow price concessions. The assumption of the economic man implies that such discretion will be exercised when profitable. Thus, theories relating market structure to discretion to allow price concessions imply a relationship between market structure and concessions allowed.

Essentially, measurement of price concessions involves the exercised discretion of the seller to separate the demand curves of the various buyers, which is available only to firms in relatively monopolistic situations. It has been noted above (p. 24) that prices are expected to be higher with more concentrated market conditions, ceteris paribus. If firms operating under these various conditions are expected to face comparable costs, firms charging higher prices will incur discretion to allow greater concessions. This comparison is borne out by the fact that firms selling in purely competitive markets have no such discretion.

It is thus hypothesized that the degree to which (3) price concessions are utilized varies directly with industry concentration. The proportion of the quoted market price which will be foregone as

a concession will be larger in the more concentrated market setting and the ratio of actual to quoted price will decrease, as indicated in Figure 4.

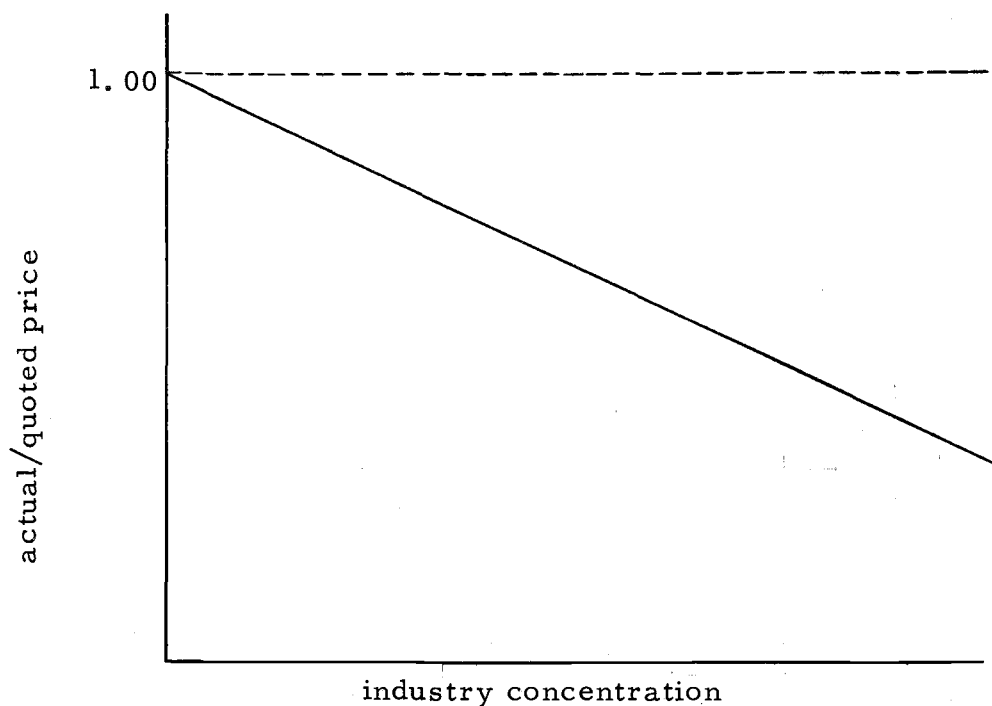


Figure 4. Hypothesized relationship of price concessions to industry concentration.

This relationship may be inferred from a statement by Robinson (1934, p. 201) that "...on the whole it is more likely that the introduction of price discrimination will increase output [at a given average price] than that it will reduce it." The reduction of price to some customers below that charged others is a price concession to

the customers buying at the lower price.¹³ According to classical theory, purely competitive firms do not have discretionary power to decrease prices in the long run, *ceteris paribus*, because price is equal to minimum average total cost. Similarly, a higher price could not be charged to some customers because, under conditions of homogeneous product and perfect knowledge, no sales would result at any price above the industry minimum. Also, price concessions may alternatively be viewed as increased costs, which are likewise unacceptable to competitive firms because of the price-cost relationship assumed under pure competition.

Investment Level

Implications of market structure theory on firm behavior relating to investment policy are largely outgrowths of the dependence of output on structure. As output is restricted with increased market concentration, investment is expected to be less, also, *ceteris paribus*.

However, investment level is not necessarily perfectly

¹³ This rationale has been further explained by Mueller and Garoian (1960, p. 25), "...the fact that some buyers represented large accounts would tend to encourage some sellers to give them special discounts." The relationship of concentration to discounts then becomes a function of the relationship of concentration to factors which allow firms to grant the discounts.

correlated with level of output. Market structure may influence the position of a firm's operation on that firm's average total cost curve, in addition to the position of the curve itself. The former variable denotes the firm's utilization of the capital equipment in which investment has already been made while only the latter indicates a change of the investment level per se.

E. A. G. Robinson (1958) suggested that

When an element of monopoly is present, ... maximum profit [a behavioral assumption acceptable to Robinson] may be made by charging a price at which the firm does not sell enough to exhaust full economies of scale. (p. 11)

If a manufacturer is to be fined every time that he produces too much, it is natural that he should take great trouble to see that he does not turn out so much that he will get punished. ... Where there is perfect competition, ... each manufacturer turns out as much as he profitably can; (p. 89)

... entrepreneurs may be less willing than is desirable to invest as much as is needed... when the penalties of excessive investment are heavy and the rewards of insufficient investment are great. (p. 154f)

Robinson thus relates his agreement with Chamberlin's theory concerning firm output to the impact of structure on investment level.

Thus, (4) the level of investment is hypothesized to vary inversely with industry concentration, ceteris paribus. As with output, the ratio of actual to hypothetical competitive investment is expected to decrease from unity with increased concentration (see Figure 5).

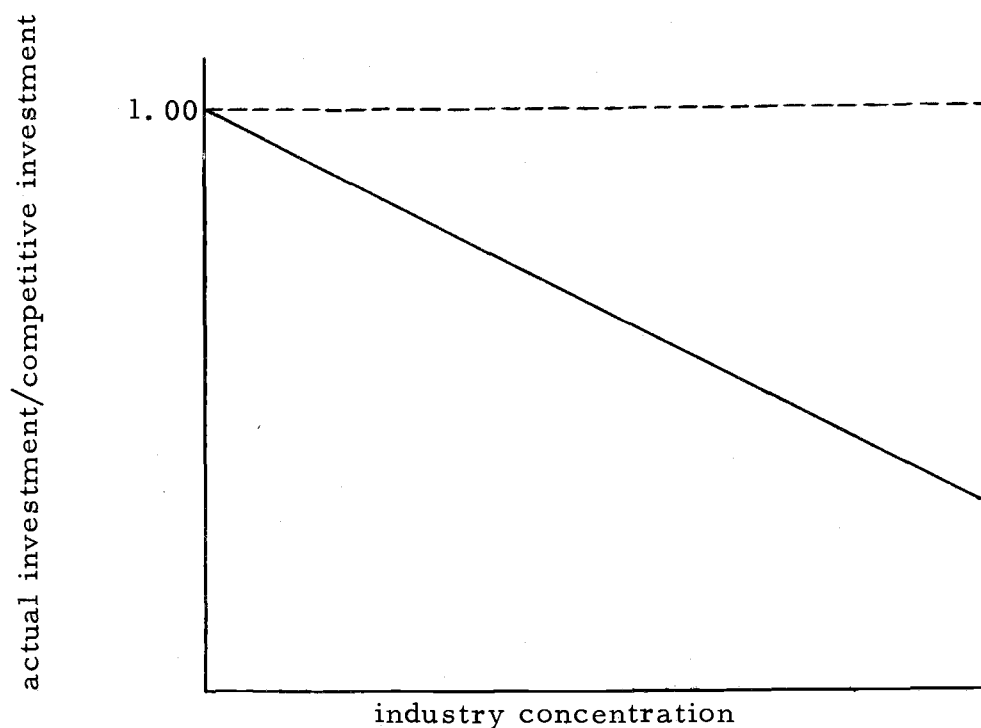


Figure 5. Hypothesized relationship of firm investment level to industry concentration.

Frequency of Technical Innovation

Economic theorists are divided concerning the relationship of market structure to frequency of technical innovation. This is directly related to a disagreement on the issue of market structure and investment security. The downward slope of the demand curve faced in a more concentrated market situation imposes an element of insecurity by setting limits on the quantity that can be sold at given prices. (A firm selling in a purely competitive market does not encounter such a limit.) Concurrently, however, the more concentrated situation is characterized by product variability, demand control, and various other efforts employed by sellers to differentiate their firms

and products. These characteristics may promote investment security by reducing the susceptibility of a firm's sales to competitive aggression. Bain (1948) has summarized his opinion of the relative impact of these two opposing influences of concentration when he states that the tendency for monopolies to "... be slower in changing techniques than competitive industries... is offset by reduced uncertainty regarding monopolistic investment, or by knowledge of techniques gained by large-scale research..." (p. 160). A "...monopolist may have a more secure market than a competitor, and thus feel that investments are less risky; also, he may have larger profits to spend on research, and thus become acquainted with new investment opportunities more rapidly than would small competitors" (p. 167). Thus, it is hypothesized that (5) the frequency of technical innovation¹⁴ varies directly with the level of industry concentration. This innovation is considered to be indicated by the relative state of physical depreciation or economic obsolescence¹⁵ of various pieces of

¹⁴ If production processes are standard between firms, comparison of the number of steps firms take to make similar technical changes (i. e., the "roundaboutness" of innovation) might provide important qualifications to the conclusions otherwise reached.

¹⁵ It should be borne in mind that with most manufacturing firms only part of the change in demand which results in economic obsolescence of equipment prior to physical depreciation is due to factors exogenous to the firm. Advertising and dynamic obsolescence are involved. This is less relevant to demand for products which are relatively standard over time such as most agricultural products.

equipment when the firms disposed of them.¹⁶ The hypothesis thus suggests that the ratio of actual disposal age of this equipment to that age at which it would no longer be economically productive would decrease with increased concentration (Figure 6).

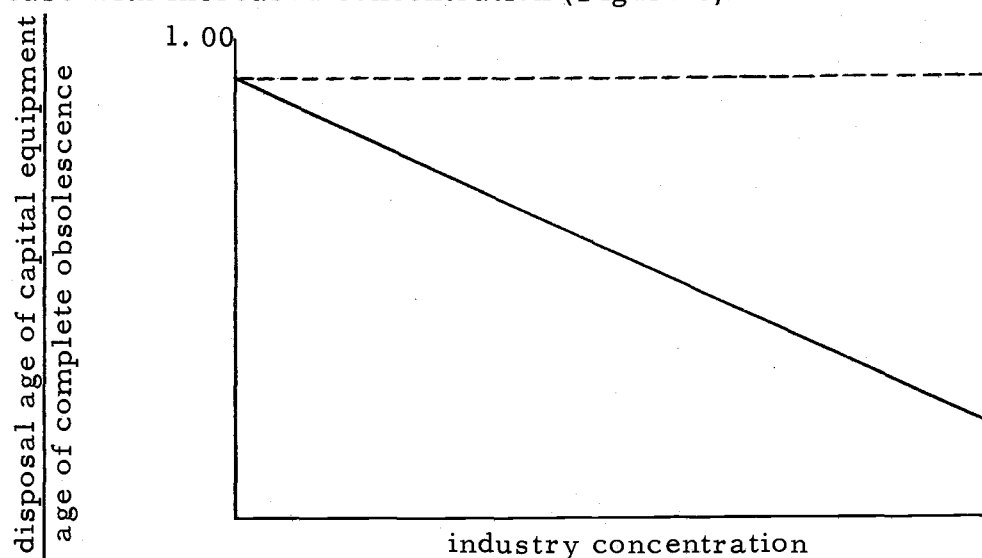


Figure 6. Hypothesized relationship of frequency of technical innovation to industry concentration.

Flexibility of Investment

The various factors involving investment security which were shown above to relate market structure to frequency of technical innovation similarly influence the planning for flexibility of investment.

¹⁶ Notice that timing of some technical innovations is dictated more by the decision to expand output rather than to change technical production procedures. Also, innovations may be inaugurated to change the form of the product or to change only the method of production. The former would tend to accompany concentrated industries while the latter would be more prevalent with competitive industries. (See quotations from Bain, 1948, on p. 31, above.) The former of these two hypotheses is tested in part as Physical Product Differentiation, below. The latter is not tested here.

Since economic theorists give evidence of no consensus of opinion which relates market concentration to investment security, the position taken in this thesis is that of Bain (1948), i. e., that concentration and investment security are positively correlated. With reference to the impact on frequency of technical innovation, he says that the demand curve of the "... seller in pure competition... is much less stable than that of the monopolist.... [It] shifts... in response to any shift either in the industry demand curve or in the volume of market supply. By contrast, the monopolist's demand curve changes only with shifts in the industry demand schedule..." (p. 48). It is thus hypothesized that (6) the flexibility of investment varies inversely with the level of industry concentration. This flexibility is considered to be adequately indicated by the ratio¹⁷ of actual ATC¹⁸ to the hypothetical ATC which would apply if all flexibility provisions were ignored in investment planning. The hypothesized relationship of this measure to industry concentration is shown in Figure 7.

¹⁷ If output is assumed unchanged without flexibility provisions, this ratio could be written in terms of total rather than per unit costs. However, such a change in total costs may well induce a change in firm output.

It might also prove valuable to separate average variable cost (AVC) and average fixed cost (AFC) to determine the extent to which the flexibility of a fixed investment affects the level of variable costs.

¹⁸ Costs are preferred to prices here to avoid the potentially misleading influence of varying profit rates.

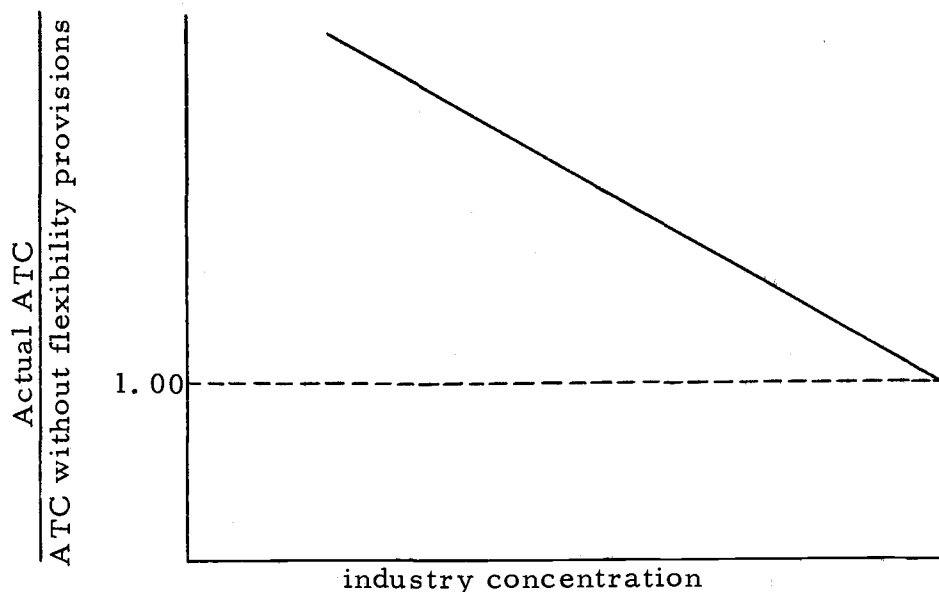


Figure 7. Hypothesized relationship of investment flexibility to industry concentration.

Physioal Product Differentiation: Advertising and Promotion

Product homogeneity throughout an industry is an integral assumption with pure competition. As the structure of markets differs from pure competition, firms possess more discretion to differentiate their products from those of competitors by physical alteration of the product¹⁹ or by altering the image of the specific manufacturer's

¹⁹ Product differentiation includes such expenses as unnecessary packaging expenses, services, variety of product quantities offered for sale (product divisibility), and quality expenditures specifically identified with the producer's name. Quality expenditures which change the identity of the product were excluded, e. g., to make a fancy product out of a common one, or to upgrade without distinct change in identification. Firms may also differ in whether they emphasize similarities to or differences from other firms' innovations. The former would be theoretically expected with competition while theory would attribute the latter to imperfections of competition.

product in the minds of the prospective consumers. An increase in the non purely competitive character of the market gives to firms independence of control over the demand for their specific product. Firms operating under such conditions have the freedom to (and will logically seek to) shift the demand curve for their product to the right (i. e. , increase demand) and rotate it clockwise (i.e. , decrease elasticity).

Because of the definitional absence of discretion for physical or image differentiation of product with pure competition, economists are in general agreement that such differentiation increases with increasing monopolistic position within an industry over some range of market structures.

Bain (1948) writes that "...most [differentiated oligopolies] attempt to avoid consistent employment of price changes or price competition as a mode of rivalry, and to emphasize non-price rivalry in the form of product variation, advertising, and other sales promotion... " (p. 200f). This would be impossible with pure competition. It is assumed that the proportion of ATC spent on physical product differentiation and advertising and promotion reflects the influence of concentration on these expenditures. It is thus hypothesized that relative expenditures for (7) physical product differentiation and (8) advertising and promotion vary directly with the level of industry concentration, as shown in Figures 8 and 9, respectively.

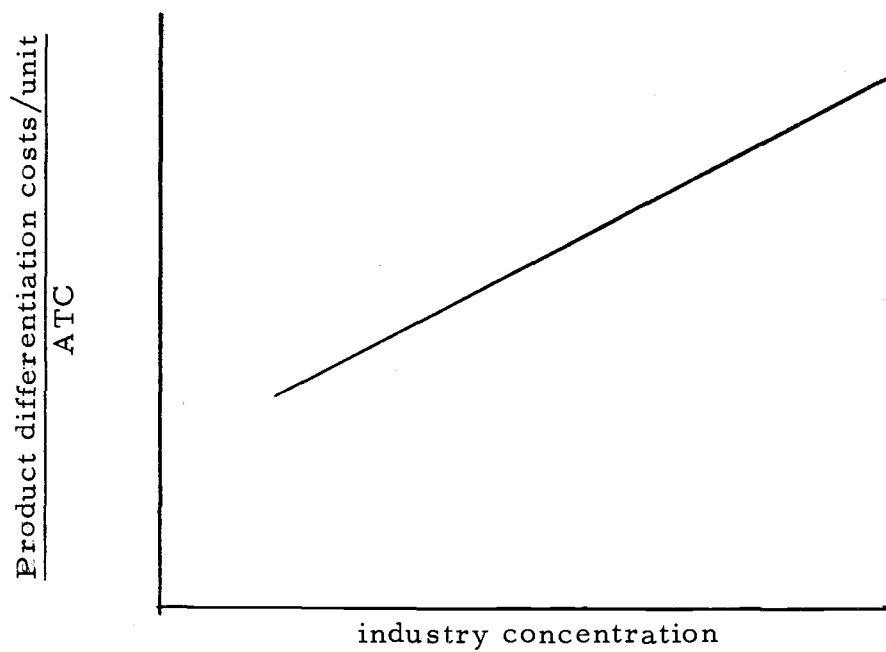


Figure 8. Hypothesized relationship of physical product differentiation to industry concentration.

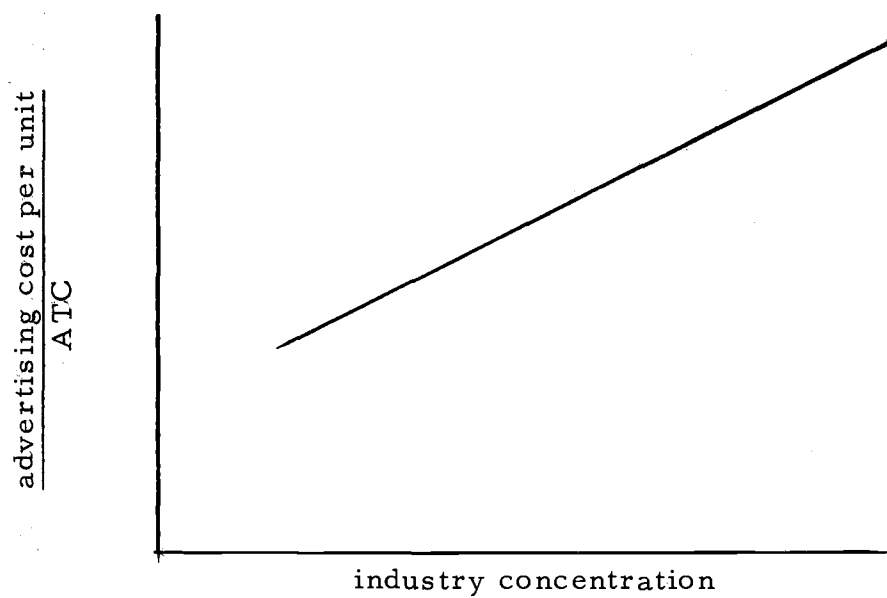


Figure 9. Hypothesized relationship of advertising and promotion costs to industry concentration.

Interrelationships between Hypotheses

These hypotheses are all closely related either to product price, investment security, or independence of product demand.

(1) Increased price is closely related to (2) decreased output by the sloping demand curve. Price increases also allow the discretion to provide (3) sales concessions. Chamberlin's statement (p. 24) provides the theoretical basis for these three.

(4) Decreased investment level reflects freedom to choose output level. This security also promotes (5) increased frequency of technical innovation and (6) decreased investment flexibility. Bain's statement (p. 41) shows the reasoning common for all three.

The power to influence cross-elasticities of demand as allowed by concentration provides the rationale for (7) increased product differentiation and (8) increased advertising and promotion.

Summary

This chapter has discussed some of the major changes which market structure has undergone. The approaches to market structure used by various economists and the measurement of market structure were reviewed. From these were developed the hypotheses on which is founded the research presented in the following four chapters.

CHAPTER 3

DATA SOURCES AND METHODOLOGY

Measures of Industry Concentration

We will test the predictability of (1) the alternative selected in several decisions and (2) the basis for selecting said alternative from (3) knowledge of the market structure in which the firm operates. Since we cannot include the interdependence implicit in the definition of oligopoly as part of the criterion for defining market structure, our analysis of differences between structures shall be carried out on basis of differences in industry concentration.

Among the various measures of concentration which might have been used are: relative value of total assets held by each of the firms, total amount of labor or other input factors utilized, population or geographic area served, total productive capacity, percent of capacity operation, conditions of entry and exit, and proportion of industry sales. The first of these--total assets--was rejected because this might misleadingly include variations in capital intensity of production and in the extent of vertical integration among industries. Level of utilization of variable input factors similarly might be unduly dependent upon variations in how intensively the various factors are utilized, thus reflecting only relative factor use but not inter-firm

comparison of market dominance. Population or geographic area served was considered impractical because both of these ignore market sharing and heterogeneity of demand.

Total productive capacity, while representing potential contribution to total industry output, would only compare in research value to relative output measures if market power were dependent on absolute size (a questionable assumption) and if all firms were operating at full capacity (a doubtful premise). The reasons for below capacity output may or may not be relevant to market power. Thus, the total productive capacity was not considered the most meaningful measure of concentration. Proportion of capacity operation and conditions of entry and exit are not suitable because, in defining concentration, they include factors which implicitly involve inter-firm dependence. Since we are testing for dependence as an endogenous variable, we cannot include dependence-caused factors to define our exogenous variable.

We have selected proportion of industry sales as our measure of industry concentration since it best reflects relative market power (our hypothesized basis for inter-firm dependence in decision making), but avoids decision implications of theoretical market structure.

Analytical Procedure

Market structure as measured by industry concentration serves as the exogenous variable. Managerial decisions comprise the endogenous variables. Since the basic principle of the study is the applicability of traditional market structure theory to the real world of agricultural processing, several specific, generally accepted theoretical statements concerning the impact of structure on specific management decisions are used as the hypotheses. Tests of these hypotheses take the form of (1) ordinal comparisons between the quantitative results of each decision for the three firms within each tested industry, and (2) a note of the inter-industry consistency of these ordinal comparisons.

The mentioned theoretical statements frequently take the form of comparisons of the result of the decision under purely competitive conditions with that under conditions of some other structure. Thus, to test the impact of concentration on such a variable, the hypothetical result of the opportunity to make the same decision under competitive conditions must be determined and compared with the result of the decision as it was made under actual conditions. The two must then be related (usually as a ratio) and an ordinal comparison of ratios is made between firms within each industry. A final

check is made for inter-industry consistency in these ordinal comparisons.

Determination of the results of decisions made under hypothetical competitive conditions was approached by setting up arbitrary conditions representing infinitely elastic demand, full cost pricing, and other conditions of pure competition. The interviewee was then asked to identify and provide substantial evidence for the response of the firm, if any, to these assumed structural changes.

In testing a firm's reactions to competitive conditions, the prices which the firm received during the current year were arbitrarily used to represent competitive prices. This is recognized to be improbable in many industries. However, under conditions of pure competition, all firms would be marginal in the long run. All sub-marginal firms would be forced from the industry. Under long-run equilibrium conditions, a marginal firm can be assumed to be charging a marginal price (i. e., its minimum price, the competitive price). However, that firm, if operating under conditions other than pure competition, may not produce the quantity of output it would under competitive conditions because of the difficulty in finding buyers and/or the price impact of the change in total industry output.

A prime consideration of a (competitive) price take is the quantity of output which will be allowed by limiting factors other than the impact of firm output on price. Since we are retaining the

assumptions of imperfect knowledge and non-comparable cost opportunities which form important breaches between theoretical pure competition and the real world, the difference between marginal and supra-marginal is largely one of firm identity. If we subject a firm to competitive selling conditions, the level of output will likely be limited by the structure of the market in which the raw product is procured, by the capital market, or by some non-profit-oriented decision made without reference to structure.

This study, then, is designed to make several comparisons between actual market conditions and hypothetical pure competition in those same markets, e. g., do firms in more concentrated situations (i. e., relatively large firms) actually restrict levels of output to a smaller percentage of their alternate competitive output for the sake of the favorable impact on price and income? Thus, ratios of the following values to those actually existing are calculated and compared: (1) the value of the investment necessary for the competitive level of production, (2) the average total cost which the firm would incur if it made no provision for precautionary flexibility, and (3) the age at which the firm's buildings, vehicles, and production machinery would reach complete economic obsolescence.

The influence of industry concentration on each of the analyzed decisions was studied by use of the following measures:

<u>decision</u>	<u>measure</u>
product price	quoted market price
firm output	$\frac{\text{actual output}}{\text{hypothetical competitive output}}$
price concessions	$\frac{\text{actual price (net of all concessions)}}{\text{quoted market price}}$
investment level	$\frac{\text{actual investment level}}{\text{hypothetical competitive investment level}}$
frequency of technical innovation	$\frac{\text{disposal age}}{\text{age of complete obsolescence}}$
investment flexibility	$\frac{\text{actual ATC}}{\text{hypothetical ATC without flexibility provisions}}$
physical product differentiation	$\frac{\text{product differentiation costs/unit}}{\text{ATC}}$
advertising and promotion	$\frac{\text{promotion costs/unit}}{\text{ATC}}$

The object of this research is to determine the influence of market structure on decision making. However, we make no claim of relating cardinally described variations in market structure to quantified influences on decisions. The measures of concentration with which structure is identified are only partial indicators of the theoretical structural context. The economic variables which are identified with influence on decisions are the result of many more factors than the single influence with which we deal here. Thus, the analysis shall not deal with statistical prediction of the relevant economic variables. Rather, by statistical inference, we will deal with

the description of the impact on decision making as inferred from the quantified indicators.

Hypothetical Conditions

It has been noted above that analysis of some of the decisions requires knowledge of quantitative measures which may have never been calculated or recorded. Some examples of these are:

<u>decision</u>	<u>measure</u>
firm output	$\frac{\text{actual output}}{\text{hypothetical competitive output}}$
investment level	$\frac{\text{actual investment level}}{\text{hypothetical competitive investment level}}$
investment flexibility	$\frac{\text{actual ATC}}{\text{hypothetical ATC without flexibility provisions}}$
frequency of technical innovation	$\frac{\text{disposal age}}{\text{age of complete obsolescence}}$

The denominators in the first three of these measures represent quantities which would exist presumably only under hypothetical competitive conditions, so data collection for these denominators is impossible. Since direct, objective interviews are useless in this regard, an indirect approach is utilized by collecting data which serve to indicate the relevant structural influence without requiring those interviewed to make the necessary conjectural considerations. For instance, if a firm which is actually a strong oligopoly sold

instead in a purely competitive industry, the primary change would be the lack of a price impact or other market-oriented limitation on the level of firm output.²⁰ A change in investment would be associated with this output change because of

1. the need for greater plant capacity to increase output, and
2. investment security with infinitely elastic demand.

Interviewing to identify these quantities was designed to determine the effect of the removal of each constraint theoretically imposed by non-competitive market conditions. Impact of the aggregate difference in structure is calculated by summing conjecturally effective limitations imposed by the various restraints. Further objectivity and accuracy are added by careful scrutiny of evidence offered to support interviewees' statements concerning impact of non-competitive market characteristics.

Precautionary flexibility provisions were identified by investigating results of specific decisions involving consideration of future uncertainty. Again, rationality of answers was evaluated from evidence offered to substantiate these answers.

Difficulties in identifying ages of equipment at complete obsolescence in comparing obsolescence of dissimilar pieces of

²⁰ The relationship of structure to profit level is discussed on p. 21f and 40f.

equipment preclude absolute measurement of relative obsolescence.

However, interfirm comparisons can be made.

The Population: Agricultural Processing Industries

The analysis is designed to study all domestic agricultural processing industries. The population from which the sample was taken is thus composed of all firms in the United States which conduct the initial processing of agricultural products after they leave the farm. In some instances this processing may be done at the farm in the case of producer-processors. For some products it may simply take the form of grading and packing, with such storage as is necessary to adapt shipment rates to conditions of product demand. Agricultural industries from which the sample was drawn include producers of food and fiber products, products from plant and animal sources, products with widely differing year to year production variation, products with brief, intensive "harvest" periods and those which are "collected" essentially year round (and some for which the period of "procurement" is entirely at the discretion of the producer), and products with widely differing degrees of perishability.

Selection of the Sample

In order to select a sample of industries within which firms possessed significantly differing degrees of potential market power

(i. e., the larger firms handled significant proportions of the output of their respective industry totals), industries were selected in which (1) the product is highly perishable and remains essentially so until consumed, or in which (2) there is some degree of national concentration, since industries selling an easily preserved, easily transported product face essentially a national market.²¹ In dealing with the highly perishable product, we need only deal on a local market basis because concentration within that market is the market concentration which is relevant to firm behavior. By contrast, the industry in which a less perishable product is produced will only offer examples of varying levels of concentration if national concentration exists.

If the general managerial attitude within a firm is to be detected, many approaches must be made to various facets of the firm's business operation. Care must be taken to evaluate the evidence given for each answer to assure that the question was understood and the answer is consistent. To evaluate the total influence of such a general industrial parameter as market structure on another general phenomenon such as the whole of managerial decision making, certain

²¹ We will thus attempt to circumvent difficulties noted in Adams, 1961, p. 545, where he states "... it is difficult to define an 'industry', and high concentration in one industry may not be very significant if its product competes actively with that of another industry (i. e., where the cross-elasticity of demand is high)..."

precautions are mandatory. Careful identification of the structural characteristics of a given market must be made (i. e., what are the characteristics of that specific market which influence the conduct of firms therein?) Also, a complete study of the resultant decisions must be carried out (i. e., which decisions would be different if the market structure were different? How would they differ?) These requirements necessitate intensive study of each firm included in the sample, and thus limit practical sample size.

This research deals with three firms in each of five agricultural handling and processing industries. Since these industries contain between 15 and 61 firms, the sampling proportion from these industries is between .20 and .049. These firms are considered to be representative of three levels of relative size within their respective industries.²² Since the study is designed to determine

²² It was alternatively proposed at one stage of the project to study three "industries" producing each of several products--one "industry" characterized by each of three levels of concentration for each product. An example would be the egg handlers in three widely separated population centers, one of which was supplied almost entirely by a massive firm, another by a dozen or so firms of moderate size, and a third by many small handlers, none of which controlled a significant proportion of that specific industry. A sample of this nature would be very difficult to obtain, however. It would also bring into the analysis many other unwanted inter-industry variables.

Such criterion of product and industry selection was predicated on the definition of industry concentration according to some characteristic of the industry as a whole, assuming concentration comparably influences the behavior of all firms within that industry. This writer has rejected this homogeneity of concentration influence for use in a behavioral study.

the impact of differences in market structure on managerial decisions, no attempt is being made to identify specific behavioral reactions to any one structure. The results will take the form of the impact of changes in behavior associated with ordinal changes in concentration. Consequently, no definition need be attempted for any given structure or concentration level.

Representativeness of the Sample

Because of the necessary depth of the analysis conducted with each firm and the limitations of time and funds, the project was conducted with a relatively small sample of industries and of firms within sampled industries. Conditions underlying the assumption that the firms and industries are representative of the groups from which they were selected must be kept in mind with reference to the confidence which can be placed in the results.

Non-response may have influenced the representative character of the sample. All complete non-response (refusal to cooperate) came from firms which were considered potential contributors as examples of medium sized firms. Relative non-response (limited cooperation) came primarily from this same group of firms. The medium sized firms which were included in the study are described more completely elsewhere (p. 103f) as aggressive, growth-oriented, dynamic firms. This business philosophy is cited as a possible

reason for their position in the industries and other identifying characteristics of their conduct. It may be also that this drive for growth accounts for their hesitance to discuss the nature of their decisions on key matters. Thus, the sample may be biased to include an undue share of less dynamic firms in the industries studied.

Firms were selected within each industry solely to study interfirm differences which are due to relative size differences.²³ The smallest firm from each industry, for example, was not chosen to typify firms which would be classified as small in an absolute sense. Rather, it was selected so that differences between its decisions and those of the middle sized firm in the sample might indicate the relationship, if any, of the decisions to relative firm size.

Although sampling was conducted on the basis of relative firm size only, firms included in the study are still characterized by a specific absolute size. If absolute size is a significant factor in any phase of decision making, a study of differences between firms as delineated according to relative size would erroneously appear to explain the endogenous variable. For example, if the capital market bases its analysis of the profitability and risk of dealing with a processing firm on the absolute size of the firm rather than its estimate of market power as indicated by relative size within the industry, the

²³ See also paragraph 2, p. 46.

influence of the capital constraint may be a function of the absolute size rather than the relative size of the firm. However, because a change in absolute size is also a similar change in relative size within a given industry, an analysis based on the latter would detect the results of the former. A type II error would result.

Because sampling of firms was designed to obtain firms controlling widely different proportions of the market in which they sell, industries selected are those within which there is a broad range of relative firm sizes. No industries were analyzed which are essentially homogenous with respect to firm size--no monopolistically competitive industries in the sense that no single firm has any significant degree of influence on market price, and no uniform strong oligopolies in which every firm has a significant, comparable influence on market price. If there are any agricultural processing industries which are essentially homogeneous with respect to firm size, the influence of firms of significantly different relative sizes would be totally absent. If firms are influenced by the relative sizes of other specific firms in the industry, this influence is not considered in the analysis. A conclusion would be drawn from analysis of industries of heterogeneous firm size that the influential structural factor is the proportion of the industry handled by the given firm. Thus, the influence would be identified as a result of the proportion of the industry output handled by the aggregate remainder of

the industry without regard to the taxonomic details of that remainder. However, the true influence would be some function (e. g. , a logarithmic function) of the size of each influential firm as a proportion of the size of the influenced firm.

Sampling industries to include significant variability of relative firm size necessarily also produced a sample which was largely composed of industries with significant geographic concentration. Although products handled by the processing firms included in the study are produced in a production area 850 miles long within the three Pacific Coast states, there was no analysis of any firm in these industries outside this area (though many exist) and no analysis of an industry in any other area. If structural influences differ between areas because of interaction of local conditions with certain structural variables, the sample as limited by research resources would be peculiarly representative of only this one area.

A somewhat serendipitous discovery which was made in analyzing the data adds to the confidence with which concentration²⁴ may be considered to reflect influential structural variables. This discovery is the comparability of the firms' demand curves as perceived by the managers of the respective firms.

Each manager identified expected selling prices for several

⁸
i. e. , concentration as used as a basis for sampling. See p. 48f.

alternate levels of output relevant to other questions. These price-quantity relationships combine to form a locus of points describing the manager's impression of demand faced by the firm and thus managerial discretion as it will likely influence firm behavior. In all industries and over most ranges of proportional changes in output the large firm was represented as facing less elastic demand than the intermediate sized firm, which in turn faced a less elastic demand than the small firm. The only exceptions were instances in which more than just the small firm was considered to face an infinitely elastic demand over some range of output. Such a consistency should also add to the acceptability of the sampled firms as representative of their relative industry positions.

Data Collection

Data were obtained by depth interview and analysis of financial and other internal records. The interviews were recorded on tape in their entirety when this was acceptable with those interviewed. Respondents normally were the presidents, general managers, or marketing managers of the firms involved. Particular caution was exercised in interviews to circumvent limitations imposed on availability of information by the interviewees' lack of awareness of the basis for their own decisions or their lack of willingness to share what they do know. Thus, conclusions must be drawn by inference

from evidence such as resultant decisions and reactions to similar, hypothetical or historical problem situations. When practical, supplemental information was obtained from public relations publications of companies involved, from periodic reports of the companies and commodity marketing organizations involved, and from public organizations interested in the marketing procedures of the various firms.

The Questionnaire

The questionnaire, as comprises the Appendix of this thesis, served as a primary guide for the approach utilized in the data collection.

Procuring those portions of the data which existed as recorded figures in firm files frequently involved extraction of these figures by the firms' secretaries or by the interviewer. This approach was used to obtain the price and output data, for example. (See Section I, p. 228. Note also the explanation of this collection process below, p. 58ff.)

Other portions of the data existed as absolute physical or financial quantities but were not in a form which was meaningful to the secretaries or interviewer without the direct assistance of the manager with each figure. Data collection in such cases generally involved identification of the quantity sought by the interviewer and a careful attempt by the manager to supply the object of the

search. Examples of such data would be that related to most of Section II, p. 229, Sections VI and VII, p. 235ff, and lesser parts of intervening sections.

The remaining relevant data were obtained by direct, personal interview of the manager by this writer. The bulk of Sections III-V, p. 230f, is a case in point. Frequently, probing of a given area went far beyond the questions as delineated by the questionnaire *per se*. Many unwritten questions were added to clarify any areas of ambiguity or areas in which supporting evidence which was offered was of questionable reliability.

Testing Philosophy

This research was approached through a careful, thorough analysis of certain aspects of the behavior of a small number of firms. Thus, the general business attitude of these few firms was identified with a moderate degree of accuracy. As explained above (p. 49ff), the significance of acceptance or rejection of any given hypothesis must be recognized to reflect the degree to which each (carefully described) firm is representative of the industry of which it is a part, as well as representative of firms in similar relative output positions in that industry.

Statistically delineated acceptance or rejection of a given hypothesis would thus be of questionable reliability because the

firms tested may not be representative of their respective industries or their relative positions therein. An alternate method of interpreting and utilizing the findings was employed. Where the data did not substantiate the hypothesis or where evidence offered to support a given answer by the respondent appeared to be of questionable applicability, possible alternate hypotheses were sought which would concur with the data. Since the entire study is a primordial effort in the research area of empirically testing traditional market structure theory (p. 205), its primary benefits may be in the form of guidelines for further research rather than directly applicable, behavioral norms. That is, the research is basic as opposed to applied. If alternate hypotheses result from the research, they are supported by the data collected and, if logically consistent, are potentially as valuable for further research or more so than existent theory. Caution must be exercised to avoid misuse of these results. They are offered only as empirically suggested hypotheses, not final conclusions.

Summary

This chapter has discussed the population and the sample drawn from it, and the acquisition and application of the data. The following chapter, the first of four which present results of the research, deals with observations concerning price and output considerations.

CHAPTER 4

EMPIRICAL AND RELATED THEORETICAL OBSERVATIONS
RELATING PRICE AND OUTPUT CONSIDERATIONS
TO INDUSTRY CONCENTRATION

The theoretical model described in chapter two was employed to test the hypotheses delineated there. This chapter presents the results of tests of the first three hypotheses. Research dealing with selling prices is presented first, followed by complementary evidence from analysis of profit rates and pricing discretion. Theoretical implications of these findings are presented next. Results of research concerning price discounts and firm output conclude the chapter.

Much of the data relevant to these tests is confidential. Thus, some data must be presented in index form and industries can only be identified by number. These numbers do not indicate relevant orderings such as type of product or alphabetical listings of products.

Selling Price

Product prices were hypothesized to vary directly with concentration since elasticity of demand faced by a firm (hence, profitability of output expansion) varies inversely with relative firm size. Thus, analysis relating price to concentration was conducted using the re-agency approach. Prices were compared when two or more sampled firms sold a similar product within a brief period of days.

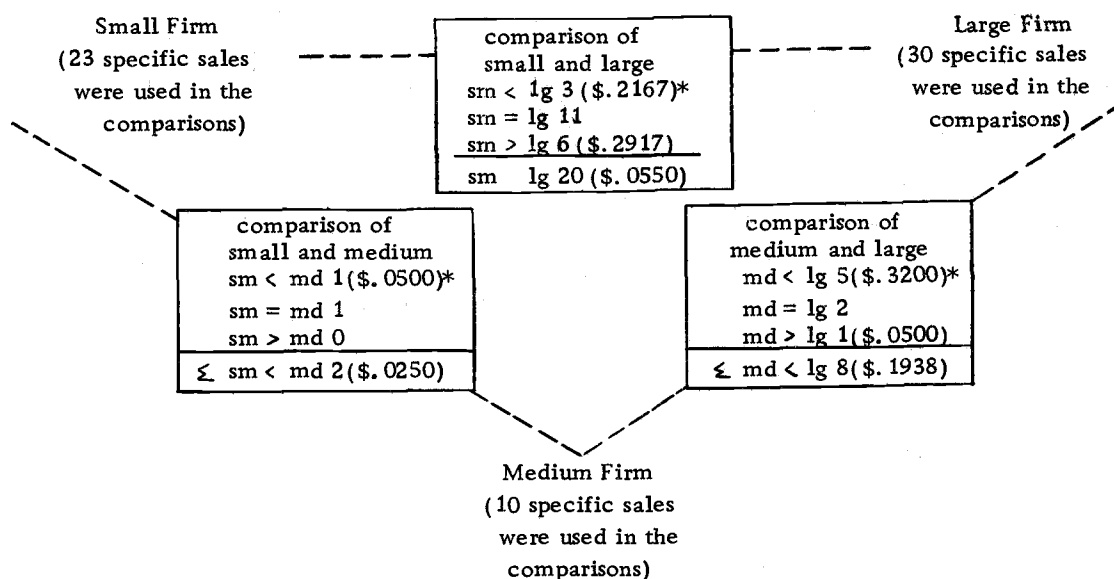
Industry I Prices

Information concerning sales made by the small firm in Industry I was obtained by a sampling of 70 of the year's sales invoices by this writer. A sample of 36 sales drawn from sales summary reports by the firm's secretaries provided information concerning the medium firm's sales. A sample consisting of 194 sales made on Wednesdays was collected from the large firm's weekly sales summary sheets. From these aggregations, 23 specific sales made by the small firm, 10 by the medium firm, and 30 by the large firm were used in the comparisons. These comparisons are summarized in Table 1.

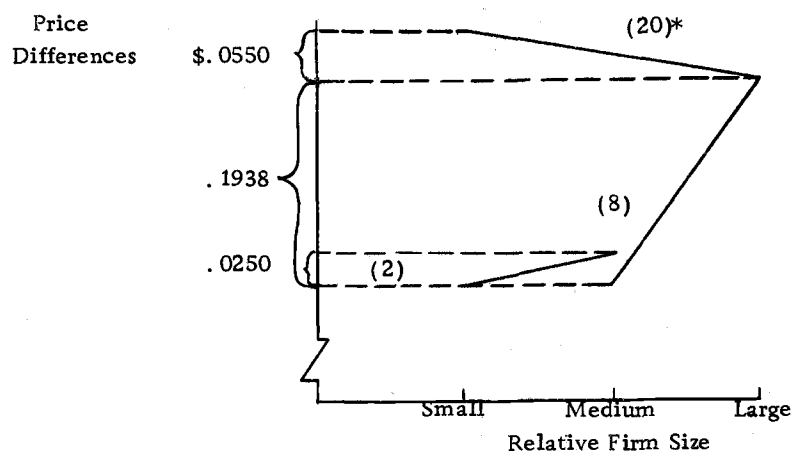
The data allow only two comparisons between the small and medium firms' prices. One shows the small firm received \$.0500 per unit less. In the other comparison, prices were equal. Available data thus show the small firm received an average of \$.0250 per unit less than the medium firm. Minimum price differences and changes in the industry are \$.05, less than 1.5 percent of the selling price.

Twenty comparisons were made between the sales of the small and large firms. Three of these comparisons indicated that the small firm received an average of \$.2167 per unit less than the large firm. Eleven comparisons showed the prices to be equal for the two firms. Six comparisons indicated that the small firm received an average of \$.2917 more per unit than the large firm. Twenty available comparisons thus indicate that the small firm received an average of

Table 1. A comparison of relative selling prices: Industry I--
most recent full crop year.



*Whole numbers indicate number of comparisons showing each ordinal result. Values in parentheses show average absolute price difference.



*Number of sales comparisons on which conclusion is based.

Figure 10. A comparison of relative selling prices: Industry I--
most recent full crop year.

\$. 0550 per unit more than the large firm.

Five comparisons between the specific sales of the medium and large firms indicated that the medium sized firm received an average of \$. 3200 less than the large firm. Two comparisons showed the two firms received equal prices. One comparison showed that the medium firm received \$. 0500 more than the large firm. A total of eight comparisons thus indicated that the medium firm received an average of \$. 1938 less than the large firm.

In summary, nine comparisons indicated that price increased with increased firm size. Fourteen comparisons showed no differences in the prices received by the different sized firms. Seven comparisons indicated that prices decreased with increased firm size. Comparisons between specific firms indicated that the small firm received an average of \$. 0550 per unit more than the large firm, which in turn received an average of \$. 1938 per unit more than the medium firm, as shown in Figure 10. These conclusions are the result of 20 and 8 comparisons, respectively, and are contradicted by two comparisons showing the price for the medium firm to exceed that for the small firm by an average of \$0. 250 per unit.

Industry II Prices

The relevant product in Industry II is regularly offered for sale at a listed price without daily variations. A given sale normally

involves a contract for product delivery over a period of time. A published price list was obtained from the large and medium firms in Industry II. Comparable information concerning present price for each product and date of most recent change in each price for the small firm was obtained by interview with the manager. Table 2 and Figure 11 show that the medium and large firms' prices are equal but average 1.1127 times those of the small firm.

Industry III Prices

Firms in Industry III follow a practice of constant prices for each grade and type of product throughout the season. Season prices for each grade of product were quoted from firm records by the managers of the respective firms. All prices were revealed to be constant between firms, as shown in Table 3 and Figure 12. This inter-firm price consistency may be explained by the fact that the industry sells an essentially homogeneous product and is characterized by price leadership by a large firm and partially blockaded entry as exercised through exclusive terms of sale and procurement control. There was no evidence of tacit or overt collusion in this industry. The data thus show no correlation of prices with relative firm size.

Industry IV Prices

A complete listing of sales dates, quantities, and prices

Table 2. A comparison of relative selling prices: Industry II--
most recent full crop year.

Small Firm	Medium Firm	Large Firm
1.0000 *	1.1127	1.1127

* Prices are stated as indices, with the price for the small firm arbitrarily set at 1.0000.

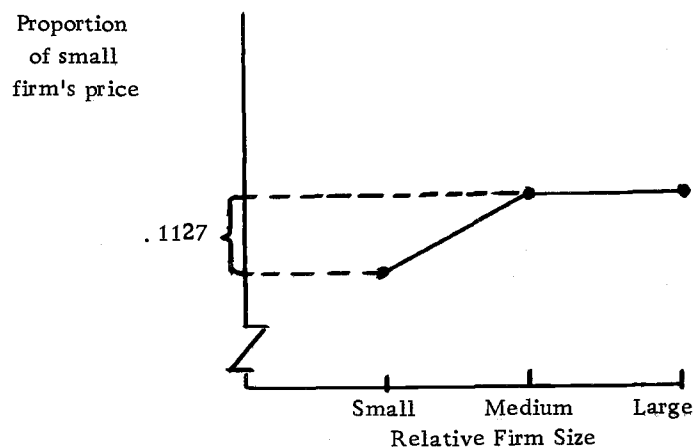


Figure 11. A comparison of relative selling prices: Industry II--
most recent full crop year.

Table 3. A comparison of relative selling prices: Industry III -- most recent full crop year.

Grade [*]	Small Firm	Medium Firm	Large Firm
A	1.00 ^{**}	1.00	1.00
B	1.00	1.00	----
C	.86	.86	.86
D	.71	.71	.71
E	.57	.57	.57
F	.43	----	.43

* Grades are assigned arbitrarily to place various "products" in order of price and bear no relationship to the type of grading system used in the industry.

** Prices are stated as indices, with the price for the highest grade arbitrarily selected to equal 1.00.

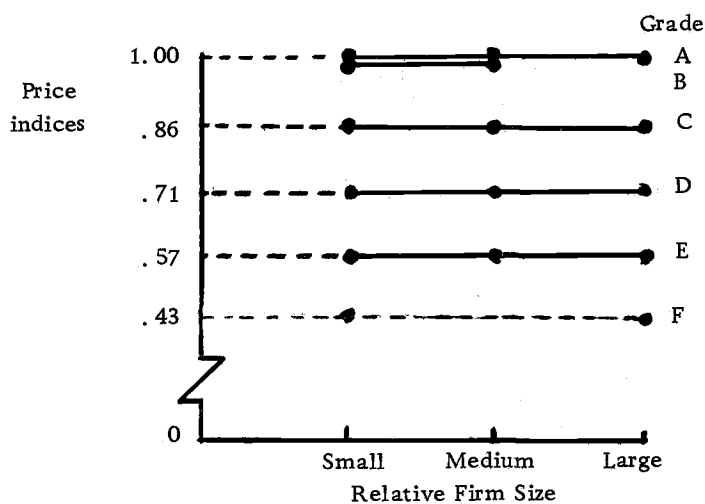


Figure 12. A comparison of relative selling prices: Industry III-- most recent full crop year.

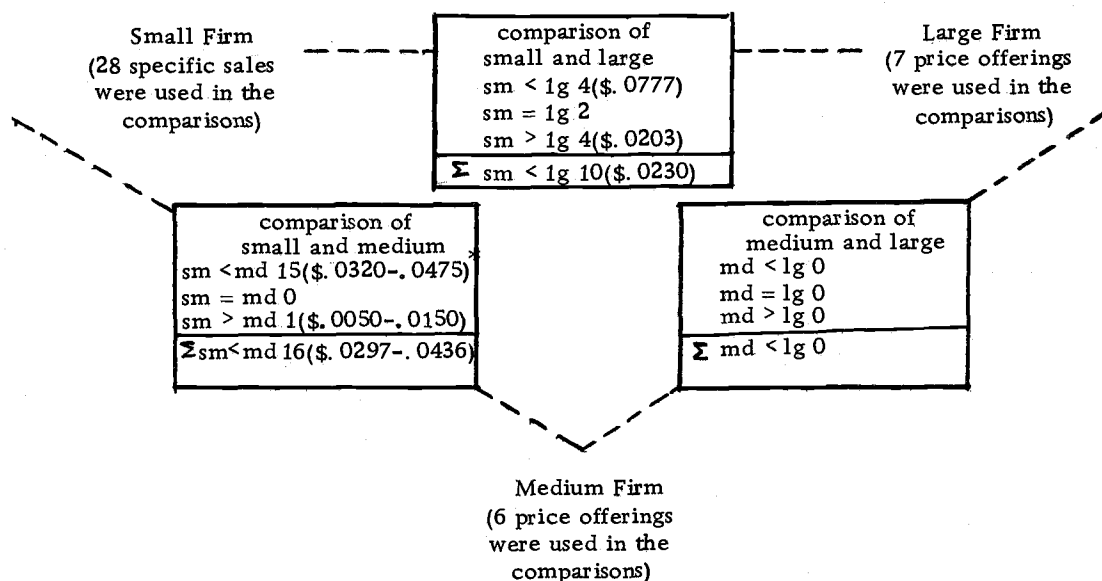
during the most recent full crop year was obtained by this writer from 53 sales invoices of the small firm in Industry IV. Nineteen price ranges utilized by the medium sized firm during the season were identified in personal interview with the manager. A complete list of the 19 relevant product prices was supplied by the manager of the large firm.

Comparisons of Industry IV prices (Table 4) were conducted similar to those for Industry I. The comparisons were based on 28 specific sales by the small firm, six price ranges offered by the medium firm, and seven price offerings by the large firm.

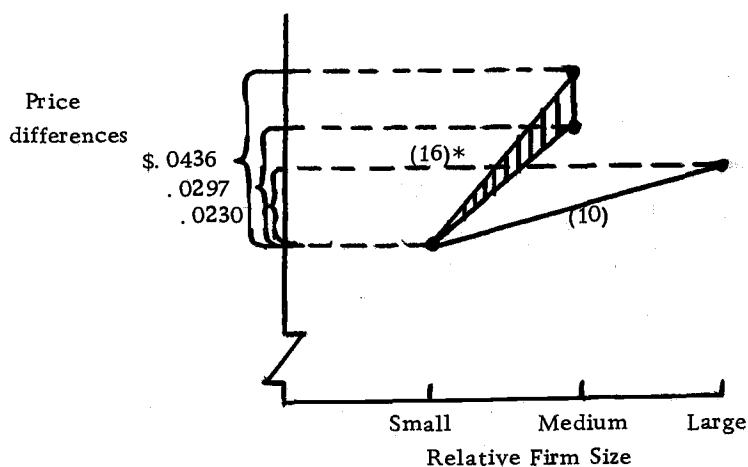
Sixteen comparisons were made between specific sales by the small firm and relevant price range offered by the medium sized firm. Fifteen of these comparisons indicate that the small firm received from \$.0320 to \$.0475 per unit less than the medium sized firm. A price difference of \$.0320 generally represents between five and ten percent of the selling prices. The minimum price difference is \$.0025. No comparisons indicate that the small firm price was within the relevant price range offered by the medium firm. One comparison indicates that the small firm received from \$.0050 to \$.0150 more than the medium firm. The average of all 16 comparisons shows the small firm to receive from \$.0297 to \$.0436 less than the medium sized firm (Figure 13).

Ten comparisons were conducted between the specific sales of

Table 4. A comparison of relative selling prices: Industry IV--
most recent full crop year.



* Whole numbers indicate number of comparisons showing each given ordinal result. Values in parentheses indicate average absolute price difference.



*Number of sales comparisons on which conclusion is based.

Figure 13. A comparison of relative selling prices: Industry IV--
most recent full crop year.

the small firm and the season price offerings of the large firm. Four of these comparisons show the small firm to receive an average of \$.0777 less than the large firm. Two comparisons indicate that prices for the two firms are equal. Four comparisons show the small firm to receive \$.0203 more than the large firm. The net result of the ten comparisons indicates that the small firm receives an average of \$.0230 less than the large firm.

The data, as made available to this writer, allowed no direct comparisons between the season price offerings of the medium and large firms. Much of this problem is based on differences in grading criteria used by the two firms and in terminology used to identify a given grade or quality of product. Such questionable comparisons were excluded from the analysis.

The net result of the comparisons shows the small firm to receive an average of \$.0297 to \$.0436 less than the medium sized firm and \$.0230 less than the large firm. Prices increased with relative firm size in 19 comparisons but decreased in five comparisons. Two comparisons showed no price difference.

Industry V Prices

Data related to a sample of 42 sales were drawn from firm records by a secretary in the small firm in Industry V. A similar sample of 21 sales was drawn by the secretaries in the medium sized

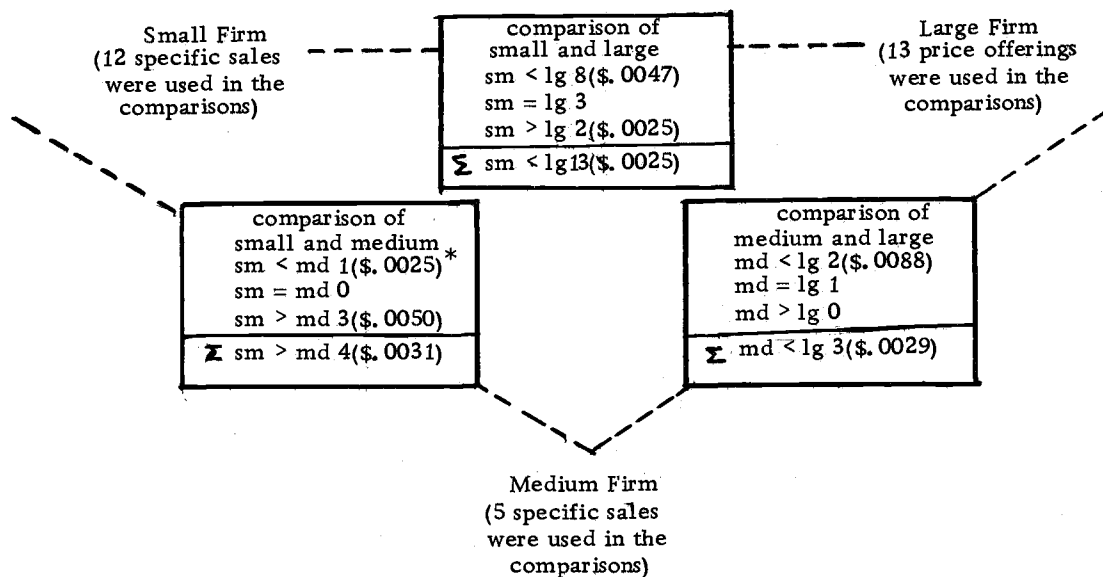
firm. Managerial personnel of the large firm provided data concerning a sample of 44 sales to substantiate their statements concerning product prices.

Industry V price comparisons were comparable to those for Industries I and IV. Twelve specific sales made by the small firm, five specific sales by the medium sized firm, and thirteen price offerings by the large firm were used in the comparisons (Table 5).

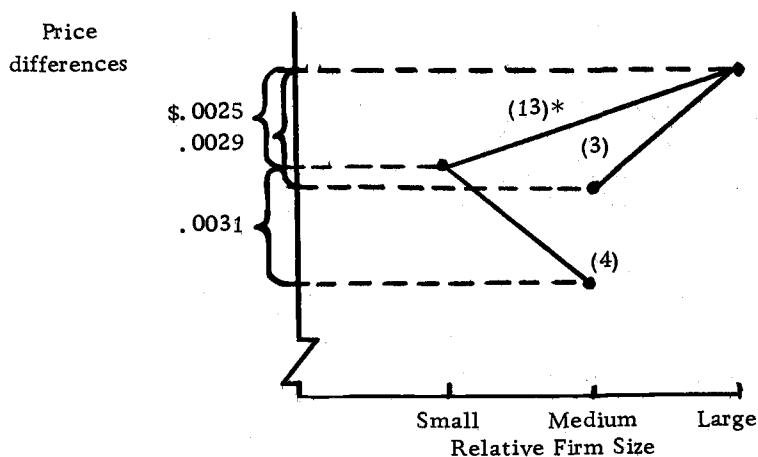
One comparison indicates that the small firm received \$.0025 per unit less than the medium sized firm. Such a price difference is equal to the minimum price difference in the industry and represents approximately 1.5 percent of the selling price. No comparisons show the small and medium sized firms to receive equal prices. Three comparisons indicate that the small firm received an average of \$.0050 per unit more than the medium sized firm. The net result of the four comparisons show the small firm to receive an average of \$.0031 more than the medium sized firms.

Eight comparisons show the small firm to receive an average of \$.0047 less than the large firm. Three comparisons indicate no difference in the prices received by the two firms. Two comparisons show the small firm received an average of \$.0025 more than the large firms. The net result of the 13 comparisons indicates that the

Table 5. A comparison of relative selling prices: Industry V--
most recent full crop year.



* Whole numbers indicate number of comparisons showing each given ordinal result. Values in parentheses indicate average absolute price difference.



*Number of sales comparisons on which conclusion is based.

Figure 14. A comparison of relative selling prices: Industry V--
most recent crop year.

small firm received an average of \$. 0025 less than the large firm.

The medium sized firm received \$. 0088 less than the large firm in two comparisons. No comparisons show the reverse relationship. One comparison shows equal prices for the two firms. The three comparisons thus indicate the medium firm received an average of \$. 0029 less than the large firm.

In sum, 11 comparisons indicate prices increased with increased relative firm size. Four comparisons show prices to be equal between firms of differing relative size. Five comparisons indicate prices decreased with increasing firm size.

The small firm's prices averaged \$. 0025 below those of the large firm (Figure 14). The medium sized firm received lower average prices than either of the other firms--\$. 0031 per unit less than the small firm and \$. 0029 less than the large firm.

Summary of Industry Price Observations

In Industry I the small firm charged the highest prices, followed by the large and medium firms in that order. The medium and large firms in Industry II charged equal prices which exceeded those of the small firm. Prices were constant throughout Industry III. Industry IV firms ranked medium, large, and small in order of decreasing price, while Industry V firms ranked large, small, and medium. Thus, relative firm size and price level vary inversely in four inter-firm

intra-industry comparisons, vary directly in seven, and are uncorrelated in four. Thus, the data support the hypothesis.²⁵

Profit Rates and Pricing Discretion

Profit rates and estimated discretion to vary prices were analyzed to help explain the price findings. Discretion is used here to mean the opportunity to instigate specific actions and sustain the impact of other firms' reactions while maintaining at least minimum acceptable profits. Firms might take such actions to eliminate competition, increase market share, or obtain the trade of preferred customers.

Profit per unit, as identified by firm managers, increased with relative firm size in Industry I, from an absolute loss for the small firm to a positive profit for the medium firm and a greater positive profit computed for the large firm from price and cost comparisons between the medium and large firms (Table 6).

²⁵ This finding does not agree with that of Mueller and Garoian (1960, p. 25), where they state, "If only the market concentration variable of market structure is considered, economic theory suggests that manufacturers would have significantly greater bargaining power in selling than would retailers in buying. The relatively high degree of concentration among sellers of many products would be conducive to non-competitive behavior in selling; and the relatively low concentration and large number of retailers, which tends to encourage competitive behavior in buying, would prevent a situation approximating bilateral oligopoly from arising. Hence, many manufacturers would have the potential ability to charge non-competitive prices and retailers would be forced to accept them."

Table 6. Realized pre-tax profits per unit of output--most recent full crop year.

Industry	Firm Size		
	Small	Medium	Large
I	< 0	1.00 ^a	> medium firm ^b
II	1.0000	.0643	.9913
III ^c	1.0000	1.0237	1.5367
IV	1.00	1.20	2.15
V	0 ^d	1.00	< 0

^aThe profit rate for the smallest firm in each industry which has a positive profit is assigned the arbitrary index of 1.00. Other indices within each industry are computed accordingly.

^bThe positive differences between the prices of the large and medium firms exceeded the positive difference between the average total costs for the two firms.

^cConclusions relating to profits for firms in Industry III were necessarily drawn from figures including profits and raw material costs because sales are handled through cooperatives or on a consignment basis.

^dThe zero profit figure was computed from average price and average total cost figures.

The profit rates were almost equal for the small and large firms in Industry II. The profit indices for the two were 1.0000 and .9913, respectively. However, the index of .0643 for the medium firm was far below either of the other two firms.

Industry III profit relationships are inferred from data

reflecting raw material procurement costs and profit combined because of the cooperative and consignment natures of product sales in the industry. The small, medium, and large firms showed indices of 1.0000, 1.0237, and 1.5367, respectively. As with Industry I, per unit profits increase in this industry with each increase in firm size.

Profit rates increase with each increase in firm size in Industry IV, although the increase from an index of 1.00 for the small firm to one of 1.20 for the medium sized firm is notably less than the increase from this 1.20 to 2.15 with the large firm.

Profits in Industry V show an increase from a value of zero for the small firm (as computed from stated average selling price and ATC figures) to a positive quantity for the medium sized firm. However, the large firm is operating now on a basis which essentially shows an annual loss by standards of business operation of most other firms in the industry.

In summary, profit rates are generally shown to increase as relative firm size increases within the industries analyzed (Figure 15). The only two firms which contradict this trend are the small firm in Industry II and the large firm in Industry V.

In a consideration of pricing practices (as opposed to just price levels), mathematical profit rates may fail to indicate volitional implications of discretionary opportunities as managers view them. An

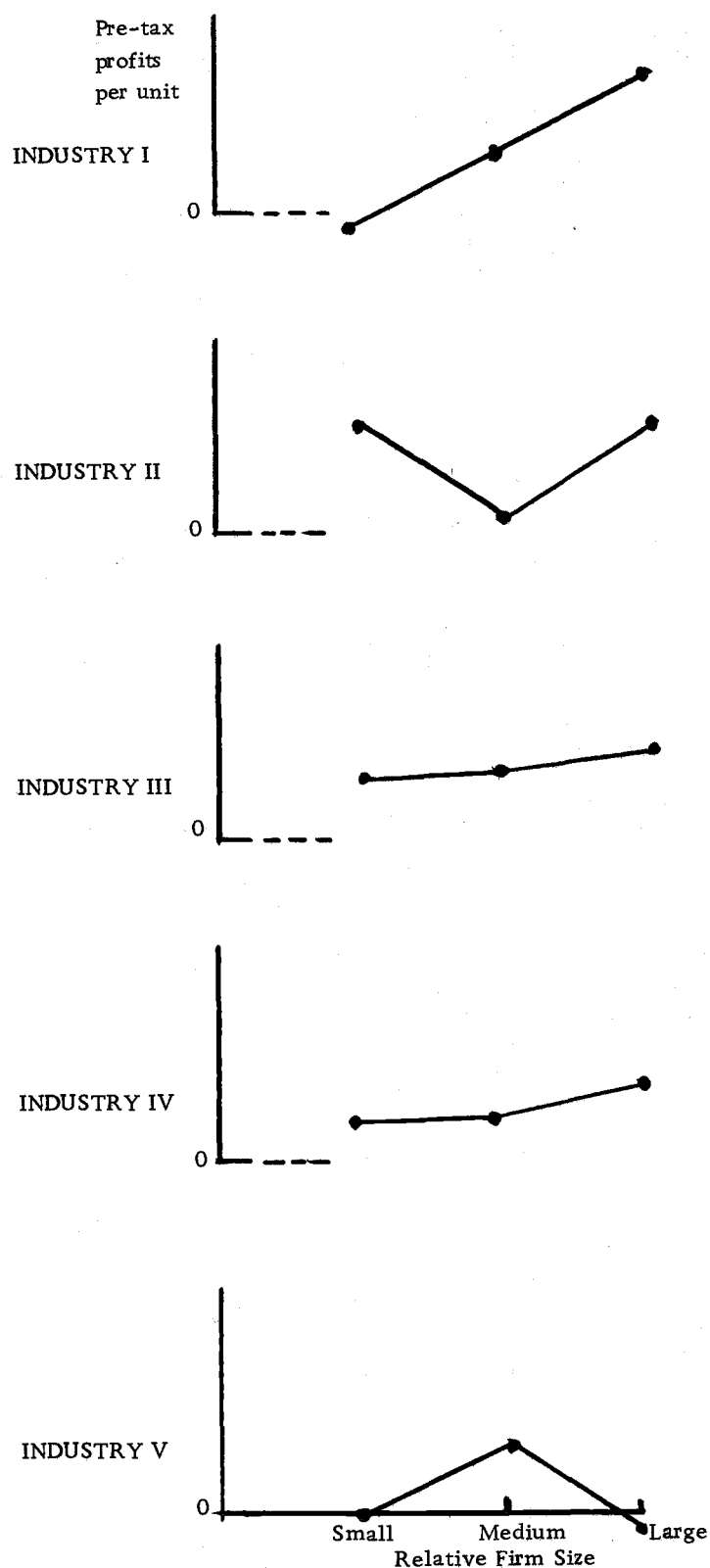


Figure 15. Realized pre-tax profits per unit of output.-- most recent full crop year.

analysis of such opportunities would add nothing to the analysis if all managers held the same standards concerning pricing goals and discretion for their firms. However, since this is doubtful, managers were also questioned concerning estimates of their discretion to change their average prices (questions 2 and 3, p. 231). The results for discretion to reduce prices are shown in Table 7.

Table 7. Manager's estimates of their discretion to reduce average price--most recent full crop year.

Industry \ Firm Size	Firm Size		
	Small	Medium	Large
I	1.00 ^{a, b}	0	2.00
II	0	< 0 ^c	1.00
III	1.00	2.50	3.50
IV	0	1.00	2.00
V	0	-1.00 ^d	0

^aThe amount by which a firm can reduce its price without precipitating an unacceptable profit reduction is recorded as a discretion index. An index of 1.00 is arbitrarily assigned to the smallest firm in each industry showing a cardinal, non-zero discretion.

^bThis positive figure is contradictory with the appropriate profit figure in Table 6.

^cThe appropriate positive profit rate in Table 6 is considered sub-minimal in light of the firm's standards of satisfactory return on invested capital.

^dThe negative figure denotes prices are presently considered by management to be below long run minimum.

The positive index of discretion to reduce average price given by the manager of the small firm in Industry I contradicts the more objective profit consideration above. The manager of the medium sized firm indicated no awareness of discretion to make price decreases as described. The discretion index for the large firm was twice that given for the small firm.

The small firm in Industry II was indicated to have no discretion to reduce prices. The medium sized firm's discretion to do so was identified only as negative, i. e., current selling prices were below the long run minimum price, *ceteris paribus*. This reflects the low profit rate (by evident standards of the industry) for this firm, as shown above. The large firm was shown to have a positive index of downward pricing discretion.

Positive indices of 1.00, 2.50, and 3.50 are shown for the small, medium, and large firms, respectively, in Industry III. Thus, downward pricing discretion increases consistently with increased firm size.

The small firm in Industry IV was identified as having no downward pricing discretion. The medium firm and large firms showed indices of 1.00 and 2.00, respectively. As with Industry III, discretion to reduce prices increases with an increase in firm size.

No firm in Industry V was indicated to possess discretion to reduce selling prices. The small and large firms considered present

prices to be minimal. (These prices result in an evident absence of profit for the small firm and in an absolute loss for the large firm, as indicated above.) The medium sized firm, although making an absolute profit, was indicated to be presently selling at prices below the minimum, as indicated by the negative discretion index.

In summary, only two small firms (Industries I and III) and two medium firms (Industries III and IV) considered present prices above minimum while four large firms did so (all except Industry V). In all industries, the signed difference between present and minimum prices (i. e., downward pricing discretion) for the large firms was larger than that for the medium and equal to or larger than that for the small firms (Figure 16).

Neither prices nor costs quoted to this writer indicated the medium sized firms are utilizing price competition or incurring inordinate total costs. However, the lack of awareness of latitude for price decreases without incurring absolute losses indicates those interviewed believed their firms operate on smaller margins, presumably for the sake of growth within their respective industries. This is borne out by the fact that, in the three industries where the difference between present and minimum price is non-positive for the medium firms, this signed difference is exceeded by the appropriate figure for both the small and large firms. This further substantiates the proposal that the operating philosophy of these firms

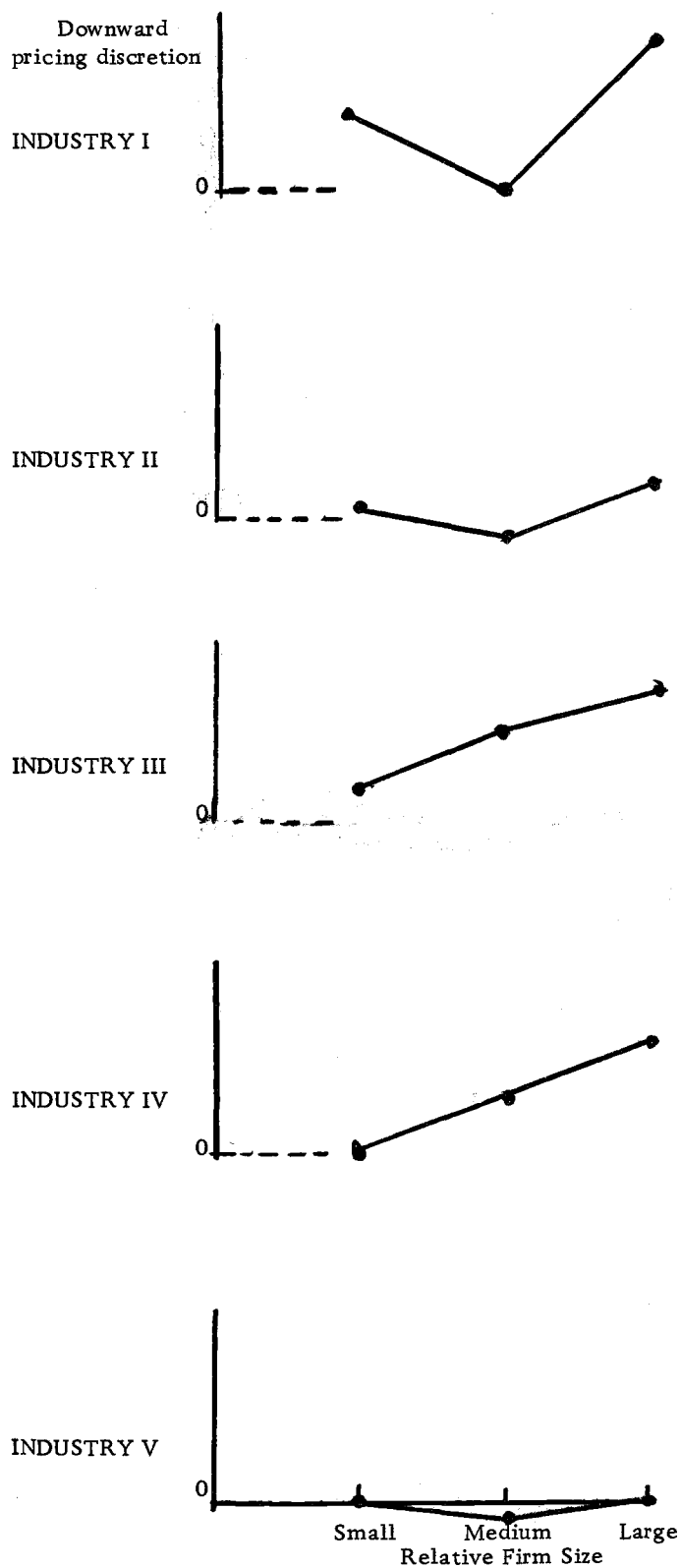


Figure 16. Managers' estimates of their discretion to reduce average prices--most recent full crop year.

is primarily a function of an exogenous variable other than their position in a continuum of firms ranked according to their relative size within the industry. (See p. 103f).

Williamson (1964) cited emoluments and dispensable staff as expenditures which firms cut during economic stress. He said such cuts are evidence of discretionary expenditures by large firms, while he assumed that small (competitive) firms would be unable to make such expenditures. If large firms do incur such expenses, high downward pricing discretion with high ATC may be realistic, although responses concerning the former did not reflect *ceteris paribus* conditions because of the influence of available cost economies. An attempt was made to avoid such considerations by assuming "no change from present cost conditions". This apparently was interpreted to mean no change in cost opportunities rather than actual costs.

If firms visualize the demand they face to be sufficiently less elastic than their ATC at current output levels (which would increase net revenue with a decrease in output), they may seek to increase prices and absorb the necessary decreases in quantity demanded. This applies to firms with significant degrees of product differentiation or control of large proportions of their industries' output. According to Table 8, only four of the fifteen firms were considered to possess upward pricing discretion. The medium firms

in Industries I and III and the small and large firms in Industry II were considered by their managers to be pricing below the maximum level at which the firms would continue to receive at least minimum acceptable profits. Indices for the small and large firms mentioned are 1.00 and .79, respectively. No consistency of relationship is thus noted between firm size and relative discretion to increase prices. Neither is discretion to increase selling prices related to discretion to reduce them, as shown by a comparison of Tables 7 and 8. The four firms showing discretion to increase prices show indices of discretion for price reduction which are the largest (the large firm in Industry II), smallest (the medium firm in Industry I), and between the two (the small firm in Industry II and the medium firm in Industry III) in their respective industries.

Table 8. Managers' estimates of their discretion to increase average price--most recent full crop year.

Firm Size Industry			
	Small	Medium	Large
I	0	1.00 ^a	0
II	1.00	0	.79
III	0	1.00	0
IV	0	0	0
V	0	0	0

^a The smallest firm showing non-zero discretion in each industry is arbitrarily assigned an index of 1.00 and others in the industry given proportional indices.

Realized profit rates and, to a lesser degree, identified discretion to reduce prices are positively correlated with concentration. Identified discretion to increase prices is not. Thus, identified minimum prices for the firms involved are negatively correlated with concentration. Actual prices are positively correlated with concentration. Maximum prices are uncorrelated with concentration. Evidently concentration influences both downward pricing discretion and actual relative price level. Since these do not vary together, it would appear that recognized discretion is not always utilized.

A Note on Price Determination

In addition to the correlation between industry concentration and price level, concentration may be further related to pricing in that it influences the mechanics of the managerial process of price setting. This influence may be manifest in a leader-follower relationship, without necessary reference to predictable correlations between industry concentration and the prices charged by firms at each relative concentration level. The effect would thus appear primarily as the identity of the firm which exercises the discretion to change or maintain prices (i. e., in specifics of the industry process), in contradistinction to the price level established by the various firms (i. e., the final result).

Empirical Observations

In two out of the five industries, managers of both small and large firms stated that the small firms exercise industry price leadership for price decreases. The phenomenon is not merely a barometric indication of mutual reactions to exogenous precipitating factors. Rather the larger firms are peculiarly susceptible to conditions created by price decreases inaugurated by their small competitors.²⁶ The large firms are not in a position to profit so much as the small firms by inaugurating price decreases. Neither does the advantage of price decreases for the small firms obtain with price increases.

Firms in one of these industries (Industry II) sell a differentiated product while firms in the other industry (Industry V) sell a product which is relatively homogeneous. In one of the remaining

²⁶ The question might be justifiably raised whether a large firm could develop a pricing strategy of restricting sales until the small firms cleared their stocks at their preferred lower price, and then raising its price. However, this consideration is more relevant to manufacturing than agricultural processing. In the latter, there appears to be very little sales restriction per se. This particular practice could be unfortunate for the large firms because many buyers contract for the year's supply at a somewhat predictable time of the crop year. To restrict sales during this period would cause these firms to accumulate stocks which might not move at the later, higher price. To restrict sales at another time of the year might prove to be of little total benefit.

industries (Industry III, in which firms produce an essentially homogeneous product), isolated historical actions by a small firm and reactions by larger firms provide evidence that firms in the industry are aware that the small firms hold discretion to exercise downward price leadership. The two industries in which there is no evidence of small-firm downward price leadership (Industries I and IV) are characterized by definite product differentiation on the part of some or all of the firms in the industry.

Price leadership as exercised by larger firms (including "medium sized" firms in conjunction with the "large" firms, in some industries) is most noticeable in the form of setting the season opening price for the industry. This was true to a significant degree in all industries manifesting markedly seasonal production, i. e., industries in which price determination is likely to be carried out on a primarily seasonal basis. No evidence was observed to indicate the small firms act as actual price leaders in inaugurating increases in industry selling prices. Upward price changes were attempted by small firms in some instances. However, these increases were only inaugurated when the managers of these firms believed that demand was increasing (or was higher than was reflected by current prices in the light of desired rates of product disposal by the industry). Thus, if this market analysis was correct, larger firms would soon be raising their prices, also. If the large firms did not similarly

increase prices, the small firms considered their actions unwarranted or premature and rescinded the increase. Such leadership is thus barometric and unrelated to industry position.

Theoretical Price Leadership

Price stability has been attributed to the kinked demand curve (Sweezy, 1952), which explains price stability by the intersection of the supply curve with the gap in the marginal revenue curve coincident with a kink in the demand curve. Thus, there exists a range of variability of the marginal cost-supply curve which will affect only profits but not selling price or quantity sold. For such conditions to obtain, products within the industry must be ready substitutes for one another such that price differences precipitate shifts of purchases, i. e., products are not markedly differentiated.

Theoretically, product differentiation would be expected to allow for price variability within an industry.²⁷ This degree of pricing discretion would encourage the firm in a more prominent industry position to restrict output and charge higher prices, *ceteris paribus*. The atomistic firm which faces highly elastic demand would be expected to ignore its influence, if any, on industry

²⁷ In reality, almost all agricultural products are differentiated to some degree, as indicated by the existence of buyer preferences for dealing with certain processors.

price level. Such a firm would be more likely to seek to expand output, *ceteris paribus*, than would a firm facing a more steeply sloping demand curve.

If we consider competitive opportunities available to a firm, the industry price will appear to be a result of the firm's consideration of not only (1) the demand for its own product and thus the direct impact of its own pricing decisions, but also (2) the demand for the products of the industry as a whole. Discretion to exercise independence in product pricing must be qualified by consideration of resultant reactions on the part of others in the industry. If a firm exercises strong price leadership, it will operate essentially as a monopoly with only partial control over industry output (comparable to the control over firm output held by many agricultural producers).

The advantage which would accrue to a relatively large firm by increasing selling price because of the "concentration" of the industry would depend on the proportion of the total industry output handled by this firm and the degree of control it exercised over the output of other firms in the industry. This latter control may be exercised in many ways. It is normally profitable for a firm to blockade entry into (*i. e.*, expansion within) the industry by controlling output of competing firms. Such output control measures are doubly beneficial to the firm in that they enable the firm to thereby restrict industry

output. This could be accomplished in several ways. Various forms of non-price competition in the selling market such as all-or-none deals and various services would serve this purpose. Price or non-price competition in the procurement market such that the large firm obtains a larger share of the principal raw material would similarly limit the quantity which competing firms could sell. This is particularly true in agricultural processing because of the relative importance of the prime raw material. Such blockaded entry activity was indicated in discussions with managers in three industries.

The primary relevance of the inelasticity of demand to the benefits of such blockading involves the resultant opportunity to restrict the entry of the raw material into the "primary" market. This is possible by product destruction or irreversible diversion into a market with a more elastic demand. This was not observed, however.

Price Leadership by Large Firms

Firm price histories show that the large firms' price leadership is followed by most firms in one industry. This firm's price decision would thus reflect consideration of (1) the expected rate of product disposal by the industry, and (2) the relationship of this firm's expected volume to the firm's cost structure.

If the large firm does not expect other firms to follow its price decisions, as is true to varying degrees in four of the five industries,

the lack of control over industry price (indicating the firm's inability to restrict industry output for the sake of obtaining a higher selling price) will result in lower prices and larger quantities sold by both the firm and the industry.

Each industry includes some firms which are notably smaller than the "large" firms but which are not atomistic in size. These firms also face a downward sloping demand curve. If they face a demand which has an elasticity greater than unity and greater than that for the large firms, they will find it profitable to charge a lower price than the large firms, *ceteris paribus*, because they would need a smaller price decrease to bring about a comparable increase in relative output.

If differences in relative firm size precipitate a segregation of selling markets (e. g., grocery retailing), the large firms would theoretically charge higher prices and willingly make the necessary output cutbacks imposed on them by the slope of the demand curve they face. This necessarily assumes that product differentiation, broadly defined, acts as a barrier to substitution from the other markets.

However, when all sizes of firms sell in the same market, it is logical to expect the large firms to be influential in setting selling prices because of their control of a greater proportion of industry output. It would be futile for them to set their prices at a level which

would result in sales at profit maximizing prices, *ceteris paribus*.

They will prefer prices which maximize prices under *mutatis mutandis* conditions, insofar as the firm has identified these conditions.

Price Leadership by Small Firms

Without product differentiation (i. e., with unhindered substitution of one firm's product for another's) there will be only one industry price at a time. All firms will face a proportionate share of the industry demand curve, i. e., a firm changing its price will absorb its share of the impact of the resultant industry price change on quantity demanded of the industry. Thus, if the changes in quantity demanded impose no cost-related alterations on the conditions of entry and exit faced by the firms so that no firm's market share will be affected by entry or exit of other firms, all firms will face demand curves of elasticities equal to one another and to that faced by the industry as a whole. The resulting price will be that at which all firms in the industry can sell at least the quantities they desire--i. e., the price desired by the firms which would seek to expand level of output (the firms which would seek to decrease prices).

Inter-firm differences in aspirations regarding relative output level will reflect the differences in cost structures for the various

firms. The firms which would gain most by price decreases would be the firms most likely to increase profits by increasing output and gross revenue because of a greater relative divergence of ATC and demand curves. If all firms are assumed to face somewhat comparable long-run ATC curves which are convex to the origin (though not necessarily upward bending), these curves will have a greater downward slope at the level of output applicable to small firms than at the level applicable to larger firms in the same industry. Conditions of technology in agricultural processing and characteristics of demand for agricultural products would suggest that the costs at very low and very high levels of production are greater than the prices which buyers will pay. Thus, the net revenue curve (resulting from the ATC and demand curves described) would be positive at an identifiable maximum and minimum level of output. Net revenue under these conditions would be expected to increase more rapidly over ranges of production relevant to the smaller firms than those applicable to larger firms in the same industry.

Although the analysis dealt with no firm which produced a literally undifferentiated product, no small or medium firms were observed which did not seek to expand absolute and relative output level. One large firm specifically avoided further relative growth and another sought absolute growth only if available under special cost conditions. The former of these considerations appears

unrelated to this discussion; the latter is at least an example of the described cost impact on reactions to demand.

The price set by the large firm in an industry of heterogeneous firm sizes may initially tend toward that which will maximize the firm's net revenue but which will result in a level of output less than that which the firm would produce if selling in a purely competitive market (see Output, below). If the small firms in the industry would be hurt by following this price increase (because they believe they face a more elastic demand or because their current level of output imposes on them an average total cost of equal or lesser elasticity than the demand curve), they will bid the price down. The large firms then must similarly reduce their prices to maintain their share of industry sales.

This type of interaction between firms indicates that upward price leadership will be exercised by those standing to gain most by industry price rises (the larger firms) and downward price leadership by those standing to gain most thereby (the smaller firms). Because a given market demand situation is usually characterized by (maximum) quantities which will be purchased at various prices, the firm seeking to reduce price in a time of conflicting attempted price changes will be the firm which sells the product. The large firms' efforts to reduce output to increase price are countered by the lower price of the smaller firms. (The latter will seek to

restrict their level of output by a smaller proportion than the large firms, if at all). The large firms' only defense is to control their competitors' levels of output so that they might profit by control of the industry output, as described above.

In brief, some firms may seek to increase selling prices because this increases net revenue from the result and decreased quantity sold, i. e., because of the relative inelasticity of demand. However, so long as the price is high enough to restrict output of some firms below what they believe to be their profit maximizing level, these firms will bid the price down (though not necessarily to a purely competitive level).

If product differentiation is sufficient in the industry to maintain a noticeable price differential, the large firms can defend themselves to some degree against the potential downward price leadership of the small firms. Such differentiation will separate the demands for the product of the two processors to some extent, although the small firm will not necessarily produce the lower quality product. With differentiated products, the large firms may find it more profitable to allow the small firm to cut his price and take some of their business due to the price differential rather than to compete actively on the selling price basis and suffer severe losses while driving the small firm from the industry. The costs to the large firm of forcing this exit may be greater than the losses from continued

competition with these "more powerful" forces. Such a consideration had been made in at least one industry analyzed.

Summary on Price Determination

Market structure, as delineated by the reagency approach, may influence product price. Without product differentiation (which actually exists to some degree throughout the bulk of agricultural processing), cost considerations would encourage the small firms to maintain a stronger preference for the output effect of lower prices, *ceteris paribus*. This requires an assumption that produce homogeneity produces a market situation whereby all firms in an industry face demands of identical elasticity. Market structure thus may determine or influence the process by which a single industry price is set.

Where product differentiation is present, the separation of the demand curves faced by the firms allows price differentials. Since cross elasticity of demand is still significantly greater than zero, a price change by one firm will not be without impact on other firms. For a comparable quality product, the small firm will tend to charge a lower price while a relatively large firm will be more likely to prefer a higher price, assuming the firms face comparable cost situations.

Price Discounts

Listed or originally offered prices are often reduced for the sake of making a particular sale. Some of these discounts are determined by and granted on the basis of cost savings incurred in the particular transaction, e. g., the per unit savings in handling, transportation, and bookkeeping costs with large sales. Other discounts are made without reference to cost savings peculiar to the specific sale or type of sales, but are implemented specifically to effect a desired sale. This research is concerned with the latter type of discount. It was hypothesized that the ratio of actual to quoted price would decrease (from unity) as industry concentration increased.

Extensive questioning was conducted to quantify any difference between quoted and actual market prices and to determine which of these differences are independent of cost savings incurred in making the particular sale (see columns 4 through 8 under "Section I, seller" in the Appendix, p. 228). The existence of price discounts was difficult to determine because of the nature of the purposes for which the price discounts were allowed and the potential disadvantage of revealing such information. Many differences exist between basic

quoted market price and the actual average per unit price at which the transaction is finally consummated, but most of these which were identified to the writer are computed to represent savings in costs incurred by the seller. Hypothetically, the non-cost related discounts will be allowed by the larger firms because the less elastic demand which they face permits them to price significantly above costs. Also, the less like pure competition a market becomes, the more the firms operating therein will take advantage of opportunities for product differentiation and demand segregation. In contrast, a purely competitive market would be characterized by quoted and actual prices equal to minimum ATC. Actual price cannot be below this in the long run and, if actual and quoted price are not equal in such a market, the latter is meaningless since the former is constant and industry-wide.

Only one of the five industries was characterized by the hypothesized trend. Another industry showed the reverse trend. No firm in the samples from the remaining three industries gave evidence of any non-cost related discounts. The hypothesis is therefore rejected.

Arbitration between buyers and sellers as a means of determining final price was more common among small processors than

large. If this difference between initial offer (knowingly open to arbitration) and final price is considered to be a price concession (as defined to be a difference between actual and quoted price), the hypothesis should still be rejected. At least three out of five industries offer evidence (arbitration by small processors) for the acceptance of an alternative hypothesis that this price ratio increases (toward unity) with increasing concentration. Two possible explanations are evident. (1) An increase in relative market power would be expected to yield a decrease in arbitration involved in setting the firms' selling price. Also, (2) the large firms generally make many sales each day and are prevented by the Federal Trade Commission regulations from segregating their market according to demand elasticities by charging different prices to different customers. The smaller firms, because of their relatively few sales per day, can identify such a practice as a simple price change--a legal practice. A carefully timed price change would be less effective for large firms because of the less specific effect on gross revenue.

Firm Output

Empirical Observations

It was hypothesized that the ratio of actual/competitive output would decrease with increased concentration (i. e., would be equal to

unity under highly competitive conditions but would become smaller as concentration enhanced the profitability of restricting output below the competitive level). The denominator in this ratio was determined by assuming away any price impact the firm's output decisions now have within the industry, i. e., by denying the existence of a downward slope for the demand curve faced by the firm (see lines 1 and 2, columns 2 and 5, "Section III--Buyer and Seller", in the Appendix, p. 230). Price level was assumed to be equal to the present, as discussed elsewhere (p. 40f). Careful discussion was conducted to assure the reliable and comprehensive character of considerations made by managers in identifying their firms' levels of output under competitive selling conditions. Intra-industry differences in the resultant ratios were related to differences in relative firm size.

Table 9 ratios show the relationship between current output and the output levels which firms would produce if their actions had no price impact. The small firm in Industry I is now producing only .32 of the output which it would under competitive selling conditions. Neither the medium or large firm would alter output level if confronted with an essentially competitive selling market.

All three firms in Industry II are producing approximately half of what they could profitably produce and sell under competitive conditions. The ratios for the three firms do show a slight upward trend, however: .48, .50, and .54 for the small, medium, and large

firms, respectively.

Table 9. Ratios of actual output to that which would result if firms faced competitive selling markets.

Industry	Firm Size		
	Small	Medium	Large
I	.32	1.00	1.00
II	.48	.50	.54
III	1.00	1.00	1.00
IV	.35	1.00	.67
V	.50	.83	.67

All firms in the sample from Industry III are considered to be producing at a level such as would be the case under competitive selling conditions. That is, a firm in the sample would derive no measurable advantage from such an alternative selling situation. All firms showed present/competitive output ratios of 1.00.

Firms in the sample from Industry IV showed no marked consistency or trend in this output ratio. The ratio was .35, 1.00, and .67 for the small, medium, and large firms, respectively.

The sample from Industry V showed little more consistency than that for Industry IV. Industry V firms reported output ratios of .50, .83, and .67, in order of increasing firm size.

It can be seen from these results that the hypothesized consistent decrease in the ratio with increased relative firm size was

not in evidence in the data (see Figure 17). To the contrary, in four out of five industries the ratio was larger for the medium and large firms than for the small firms. In the fifth industry it was the same (all three firms are evidently now operating at the level at which they would produce under selling conditions of pure competition). There was no inter-industry consistency between the ratio for the medium firms and that for the large firms.

A priori, the output ratio was expected to vary inversely with concentration. However, a downward sloping demand curve indicates a negative correlation between price and output. As indicated above (p. 69f), price level is generally positively correlated with concentration. Thus, the relevant output ratio would be expected to be negatively correlated with concentration. Variations in the output ratio might further relate to concentration if the association involved non-price factors, although no such relation was detected.

Influence of Hierarchy of Limitational Factors

The rejection of the hypothesis may discredit the methodology involved in the test rather than reflect on the theory behind the hypothesis. The original hypothesis and test overlooked the possibility that firms are not all subject to the same restraints in the same order of importance (Table 10). Thus, removal of the price impact

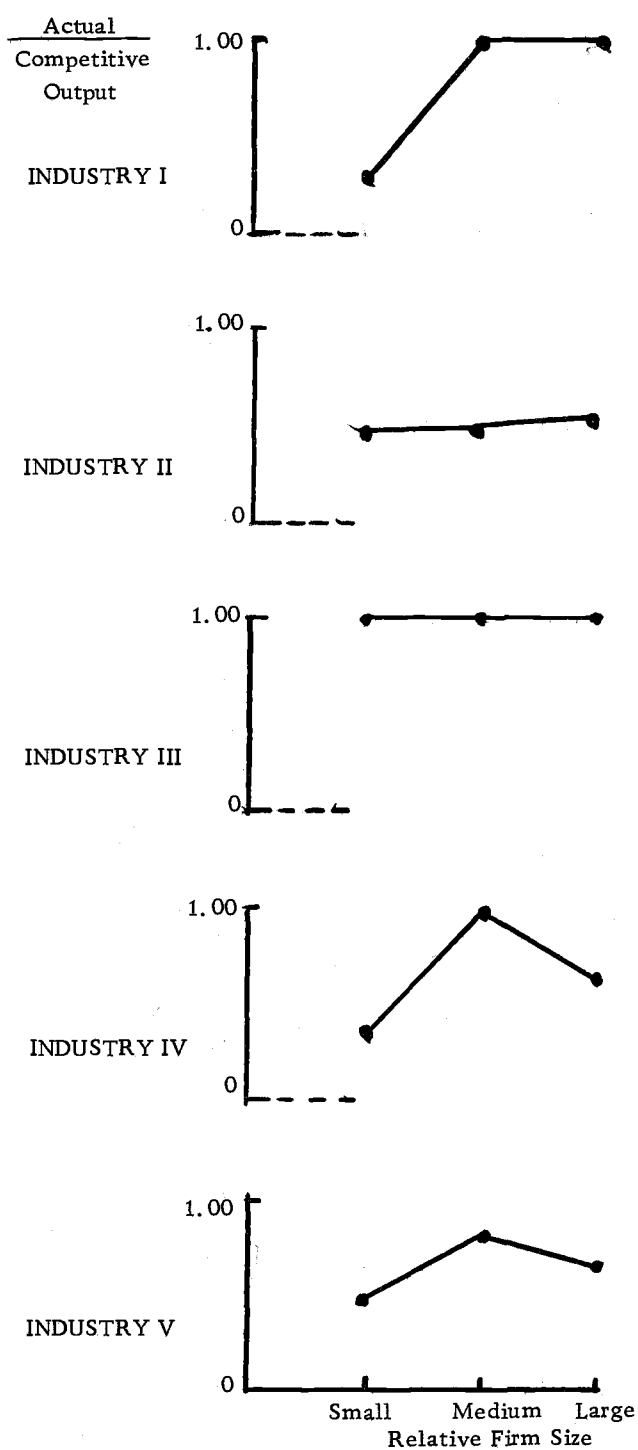


Figure 17. Ratios of actual output to that which would result if firms faced competitive selling markets.

constraint on quantity of output may have no influence on the output level of some firms but may subject the output of others to some other important constraint.

Table 10. Limitations on output level in order of restriction as perceived by managers.^a

Industry \ Firm Size	Firm Size		
	Small	Medium	Large
I	S, D, C	B, C, S	B, F, S
II	S, C	S, B	S, B
III	B, S	B, S	B, F, S
IV	S, B, C	D, B, C, S	S, B, D, F
V	S, B, C	C, S, B	S, B

^aS = selling market, D = personal, non-economic decision, C = capital, B = procurement (buying) market, and F = current plant facilities (an important short-run consideration, but one which doesn't necessarily reflect a long-run capital limitation).

If the concentration levels are noted to be low with the non-influenced firms but high with those which are subjected to other constraints, the test is not misleading. However, if severity of the restriction imposed by new output constraints to which firms are

subjected is unrelated to market position, firms' reactions to removal of a given constraint will not indicate the total concentration impact. Nor will it allow impact comparisons between concentration levels. Constraints such as those related to concentration in the selling market serve as an example.

For 8 of the 15 firms in the sample, demand elasticity is considered by management to be the primary limitation on output expansion. The supply or procurement market is considered the primary limitation for five firms. Capital restriction appears as a primary limitational factor only for one firm, and appears in a secondary position only twice. Capital as a limitational factor does not appear significant at all to managers of the large firms.

We can eliminate Industry III from this phase of the analysis, because it has been previously identified as one behaving in a competitive manner even though large differences in firm size exist. In the remaining four industries, demand factors are considered primary restrictive elements in all four of the small sized firms. The procurement market appears as the second most limitational factor in two of the four small firms. There is no consistent order in limitations among the medium sized firms. Demand factors appear primary limitational factors in three of the four large firms, while

procurement markets appear in a secondary position for three firms and primary in one large firm. From this evidence, it appears that small and large firms face similar orders of limitational factors on output expansion, while no consistency appears among factors for the medium sized firms.

The evidence suggests that additional research is warranted on the hierarchy of factors affecting output expansion.

The hypothesis, taken literally, infers that the second most restrictive factor (assuming selling market to be most restrictive) becomes limitational at a higher relative level of output for the small (competitive) firm than for the large (oligopolistic) firm. The data indicate that the second most restrictive factor generally allows less proportional expansion for the medium and large firms than the small, as shown in Figure 17. However, the identity of the second (third, etc.) most restrictive factors show no correlation with concentration; hence, the data fail to support the hypothesis.

The original hypothesis could better be tested on firms subject to other comparable restrictive forces. These would include primarily the raw material procurement market and capital market, and secondarily the markets in which other inputs are obtained.

Influence of Past Utilization of Discretion to Expand

Since actual examples of theoretical pure competition are scarce, caution must be exercised in generalizing from near likenesses. Among factors differentiating the two are unavailability of identical cost structures for firms and variability of the human element in the management resource. Because of the inconsistent geographical distribution of some resources and the technologically competitive or complementary nature of others actual cost structures or minimal available cost structures differ between firms without apparent reference to firm size or market structure. Because of the variable human element in management, utilization of discretionary opportunities (i. e., differences between actual and available costs) may also differ widely between firms without reference to structure.

The current relative size of the large firms may be a result of their having taken advantage of discretionary opportunities available to many or all firms in the industry in the past. If this is true and if this expansion of output level has not been accompanied by a comparable increase in discretion for further expansion (within a given period of time), their efforts to restrict output to obtain a higher price may be irrelevant to their actual level of output. This irrelevance would be the case especially if other restricting factors discouraged the firm from exploiting the elasticity of the demand it

faces (an assumption implicit in a behavioral analysis of market structure). For instance, some exogenous factor may hold prices for the bulk of the industry above that desired by the large firm. In such a situation, large firms would not necessarily have small actual/competitive output ratios.

If the large firms are large because they have taken advantage of expansion opportunities similarly available to the small firms and if in doing so their actions have caused less than proportional extension of the further opportunities available to the firm within a given period of time, the large firms would be expected to have less proportional discretion to expand than would the small firms. This is in agreement with the findings of this investigation. If such a principle describes the real world, results of this research reflect past reactions to discretion of firm size rather than concentration influences.

Distinctive Characteristics of the Medium Sized Firms

Higher ratios of actual to competitive output for the medium than small firms substantiate this alternate hypothesis of increasing output ratios (assuming present output represents reactions to past expansion opportunities available throughout the industry). Higher ratios for the medium than the large firms for two industries and equal for two more do not.

All of the firms considered as medium sized in the total sample

are peculiarly rapidly growing, aggressively managed firms showing distinct managerial concern about absolute and relative growth in their respective industries. If a qualification describing such peculiarities of this one group is superimposed upon the hypothesis relating output ratios to past discretion exercised, a description is formulated which is in accordance with the data: The output ratio generally increases with increased concentration and the ratio for the medium sized firms is somewhat higher than would generally be described by the upward trend alone. Thus, concentration would be a result of two separate phases of managerial decisions (which may be true, whether as described or not), but not the hypothesized cause for certain decisions.

Relative Unused Capacity

One firm in Industry IV was operating at an output level above reasonably economic capacity. All other firms averaged outputs far below their plant capacities²⁸ (Table 11 and Figure 18). The extent to which the difference between capacity and output is a provision for output variability was tested by comparing capacity with peak annual output in the last ten years. In this test, only two firms

²⁸ Annual capacity considerations included limitations imposed on plant utilization by relevant biological, economic, and technological factors (e. g., annual production cycles, product perishability, and seasonality of demand).

failed to indicate they have ample capacity (the firm averaging an output level above capacity and the large firm in Industry III with capacity/ten year peak output ratios of .82 and .96, respectively; see Table 12 and Figure 19). A third firm (the large firm in Industry IV) showed a ratio of 1.00 and only two others (the medium and large firms in Industry I with ratios of 1.02 and 1.07, respectively) had outputs within the past ten years that reduced unused capacity to less than ten percent of used capacity.

Table 11. Current plant capacity as a proportion of present average annual output.*

Industry \ Firm Size	Firm Size		
	Small	Medium	Large
I	2.00	1.22	1.39
II	3.00	1.59	1.85
III	2.50	2.00	1.50
IV	2.13	.82	1.39
V	2.38	1.28	1.25

* Present average annual output was computed from firms' current proportion of total industry output and apparent current average industry output as determined by recent trends and fluctuations.

Only in Industry III is the unused capacity of the medium sized firm (as a proportion of average annual output) notably greater than that of another firm in the sample. In that one industry a regular

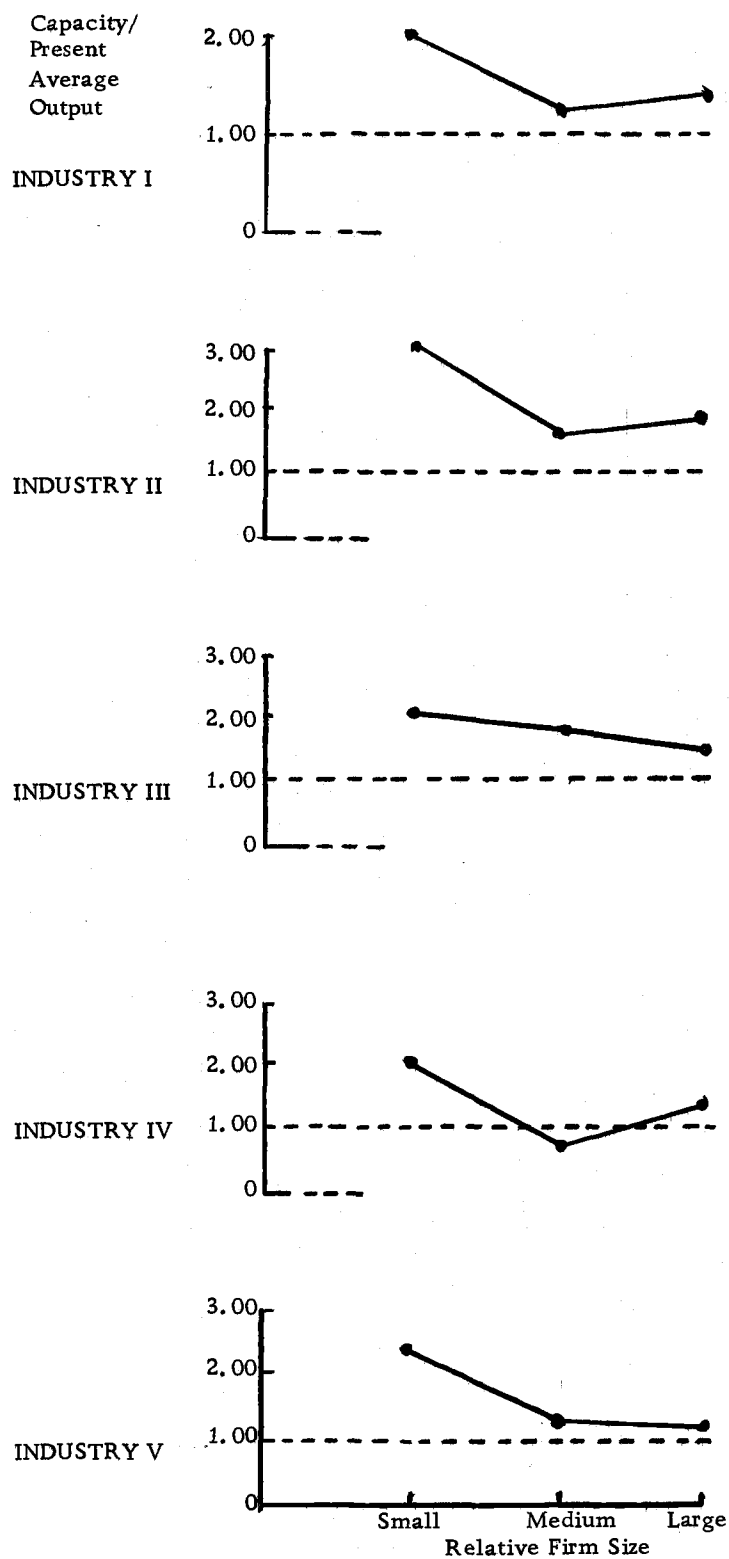


Figure 18. Current plant capacity as a proportion of present average annual output.

Capacity/
10 yr. High

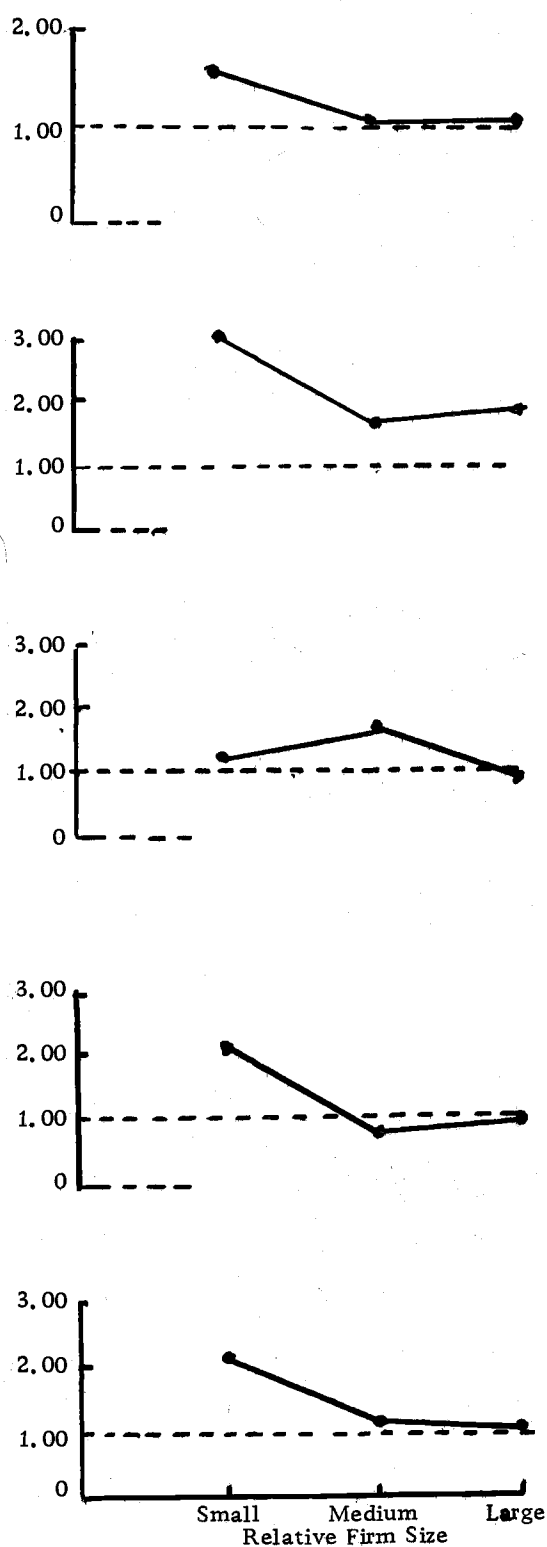


Figure 19. Current plant capacity as a proportion of maximum annual output, most recent ten full crop years.

decrease in relative excess capacity is noted with increased firm size--i. e., the relative over-capacity of the small firm (1.50 times average annual output) exceeds that of the medium firm (1.00) by the same amount as that of the medium firm exceeds the .50 figure for the large firm. In all industries, the small firm's capacity as a proportion of current average output is at least 150 percent of that for the medium or large firms in the respective industries.

Table 12. Current plant capacity as a proportion of maximum annual output--most recent ten full crop years.

Industry	Firm Size		
	Small	Medium	Large
I	1.56	1.02	1.07
II	3.00	1.59	1.81
III	1.25	1.65	.96
IV	2.13	.82	1.00
V	2.16	1.28	1.14

A peculiarly large unused capacity for the small firms would result if minimum economic or technological factors in processing or storing would force firms of still smaller capacities to operate at a high point on the left end of a sharply upward turning long run average cost curve. However, the degree of overcapacity possessed by the small firms bears no apparent relationship to whether the firm has successfully operated at lesser rates of output (four of the

small firms had done so) or whether the individual interviewed believed the firm could survive if forced to reduce its relative and absolute level of output (all of the small firms were believed capable of incurring a ten percent loss of output; four of the five could absorb a 50 percent reduction). Apparently this excess capacity is not a necessary result of the small absolute size of these firms, for there is an abundance of still smaller firms in these industries which are apparently economically successful²⁹ as evidenced by their continued survival. Either (1) this unused capacity is essentially costless, (2) increased (used or unused) capacity becomes more costly per unit of output as firm size increases, or (3) variable costs incurred by firms of larger size, thus prohibiting these firms from incurring average fixed costs comparable to those incurred by smaller firms while competing against these smaller firms in the selling market at comparable prices. The first of these three explanations appears doubtful in most cases. The second and third would reflect compensating changes in fixed and variable costs over the range of concentration under consideration.

In all industries, the medium sized firms compete with

²⁹ Firms sampled to represent relatively small firms ranged from third smallest in one industry to the median firm in another.

firms which have higher average costs--both "fixed" and variable.³⁰

Thus, the low unused capacity is not a reaction to competitive pressures in the absence of available variable cost economies. Apparently these firms are peculiarly medium-sized firms in some sense relating to absolute size, although they were sampled only to represent a relative size within a three firm sample.³¹

³⁰ It is also true that the medium sized firms are competing with firms having lower investment per unit in three industries (Industries I, III, and IV; See Table 28 and Figure 32), lower average variable costs in all five industries (Table 30 and Figure 34), and lower average total costs in four industries (all except Industry I; See Table 29 and Figure 33). Thus, the medium sized firms have not been shown to be peculiarly efficient, as was noted by the U. S. Temporary National Economic Committee (1941, p. 14): "In the 233 combined tests, large size, whether represented by a corporation, a plant, a group of corporations, or a group of plants, showed the lowest cost or the highest rate of return on invested capital in only 25 tests. In these combined tests, medium size made the best showing in 128 tests and small size in 80 tests. Thus, large size was most efficient, as efficiency is here measured, in approximately 11 percent of the total tests, medium size was most efficient in approximately 55 percent of the tests, and small size was most efficient in approximately 34 percent of the tests." The U.S. National Commission on Food Marketing (1966, p. 95f) has also cited the ample relative efficiency of the medium sized firms: "...medium-sized firms commonly are, or can be, about as efficient in processing or physical distribution as the largest firms.... Little social gain in these respects is realized by replacing such firms by larger ones.... The food industry can have both high efficiency and reasonably low levels of concentration in national and regional markets."

³¹ The medium firms are two and one-half to ten times the size of the small firms, according to output. The large firms produce two to six and one-half times the average annual output of the medium firms.

Distinctive characteristics of the medium sized firms' business philosophy reveal a more plausible reason for their low relative excess capacity. These firms all show a growth consciousness above average for the sampled firms. They have recent histories of rapid growth, although a few small and large firms do, also. Evidently, the medium sized firms use their productive capacity more fully than other firms in their growth efforts.

Summary

This chapter has presented the empirical data related to price and output considerations. Alternate or complementary hypotheses have been described relating to price leadership, dissimilarity of hierarchies of factors influencing output, impact of varying past utilization of discretion, and peculiarities of managerial practice for the medium sized firms. The following chapter carries the analysis further by presenting an investigation of tests of hypotheses related to investment security.

CHAPTER 5

EMPIRICAL AND RELATED THEORETICAL OBSERVATIONS
RELATING INVESTMENT SECURITY TO
INDUSTRY CONCENTRATION

The model applied to price and output hypotheses in chapter four was also applied to hypotheses involving investment security. This chapter presents the specific results related to investment level, frequency of technical innovation, and investment flexibility.

Investment Level

It was hypothesized that the ratio of actual investment level to that level which would be incurred under competitive conditions³² would decrease from unity as industry concentration increased. This relationship was analyzed by comparing line 1 to line 2 in column 3 of the portion of the Appendix reproduced on page 230. The figure on line 2 was the final result of careful scrutiny of evidence offered to substantiate the appropriateness of the output level under discussion and the associated level of investment.) The data,

³² The actual/competitive ratio is a mathematical measure designed to show the relationship between the present total investment level of a firm to that level which the firm would incur if it faced a selling market which was characterized by an infinitely elastic demand.

as summarized in Table 13 and Figure 20, favor rejection of the hypothesized.

Table 13. Ratios of actual investment levels to those which would result if firms faced competitive selling markets.

Industry \ Firm Size			
	Small	Medium	Large
I	.29	1.00	1.00
II	1.00	1.00	.98
III	1.00	1.00	.70
IV	.69	1.00	.93
V	1.00	.97	1.00

Unused capacity should correlate with expansion if selling market and capital, respectively, are the most limitational factors. This is so because unused capacity refers to position of operation on the SRAC curve while expansion deals with position of the SRAC curve on the LRAC curve. If the output ratios are as hypothesized, position of SRAC curve will correlate with position of operation on that curve. Firms operating on SRAC curves farther to the right on the LRAC curve will operate higher and to the left on the respective SRAC curves, because they face a more steeply sloping demand curve. However, although selling market is the primary

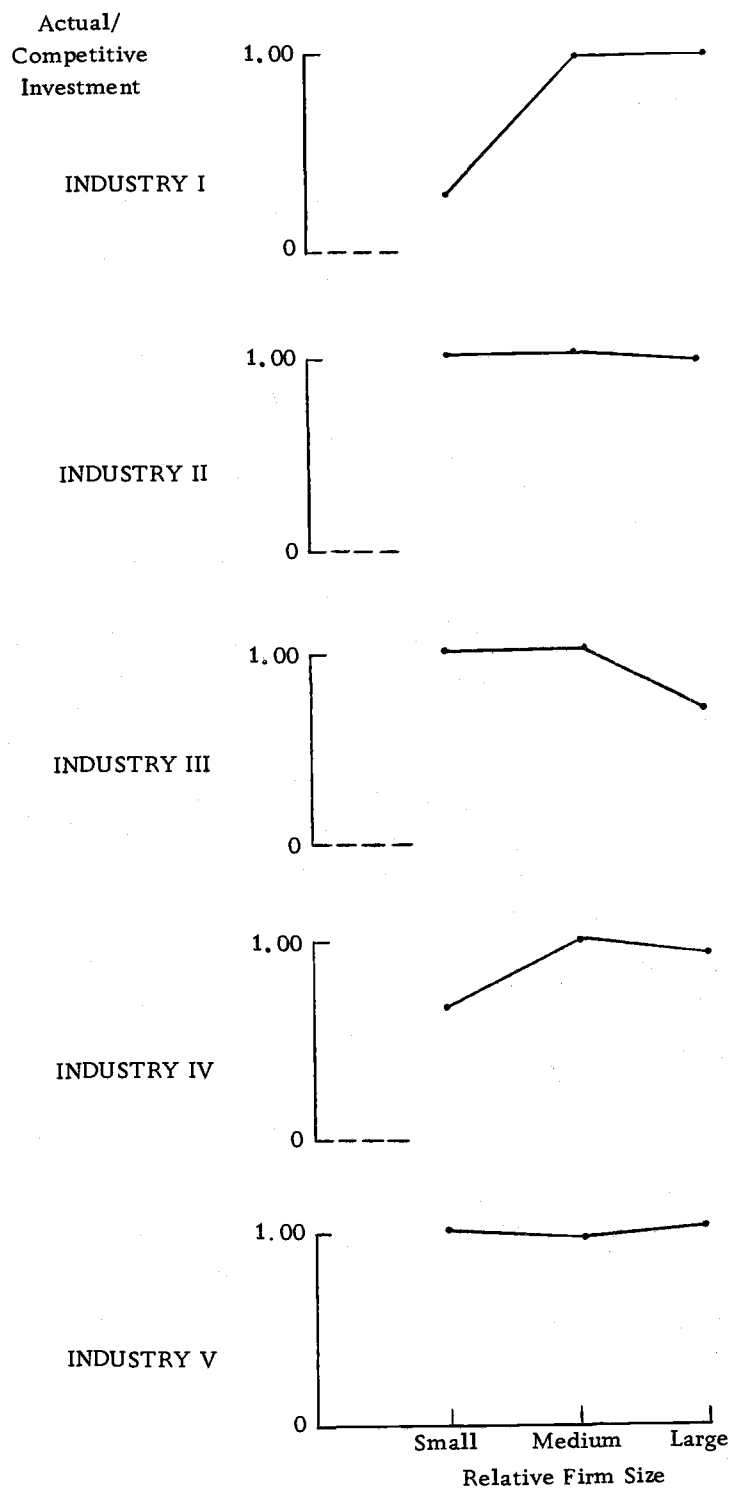


Figure 20. Ratios of actual investment levels to those which would result if firms faced competitive selling markets.

limitational factor for eight of the fifteen firms, capital has a major impact for only three.

Output and Investment as Related to Structure of the Procurement Market

Procurement market is a limiting factor to three small firms, but the most limitation for only one (See Table 10). That firm is in the industry in which all three firms cited the procurement market as the primary output constraint. All medium and large firms noted the procurement market as an output restriction, but only three medium and two large firms considered it more restrictive than selling. In four industries, medium and large firms ranked selling and procurement markets in the same order. Thus, identity of output constraints and ordinal severity of limitation imposed by procurement market are approximately as consistent within industries (across concentration lines) as within concentration levels (across industry lines).

If relative firm size reflects a behavioral identification of concentration levels, the above consideration would encourage a hypotheses that actual/competitive procurement price would vary inversely with firm size. Similarly, the ratio of actual/competitive quantity procured would decrease from unity. Nine of the fifteen managers indicated they would not alter output level if they faced a competitive procurement market, *ceteris paribus*. (See Table 14

and Figure 21, which summarize the data obtained on line 7, column 2, of the questionnaire on p. 230.) These managers all consider selling market more restrictive than procurement. Half of the other six firms are from one industry (Industry III), as noted above. In three industries, the same market is more limitational for all three firms. That is, the selling market is more limitational than the procurement market for all three firms in Industries II and V. The reverse is true in Industry III. Evidently, identity of the more limitational market is unrelated to relative size.

Table 14. Ratios of actual output levels to those which would result if firms faced competitive procurement markets.

Industry \ Firm Size			
	Small	Medium	Large
I	1.00	.77	.82
II	1.00	1.00	1.00
III	.13	.60	.91
IV	.42	1.00	1.00
V	1.00	1.00	1.00

As noted above, investment changes are not necessarily proportional to output changes. This is further substantiated by changes in the procurement market, as determined from data obtained on line 7, column 3, of the questionnaire on p. 230.

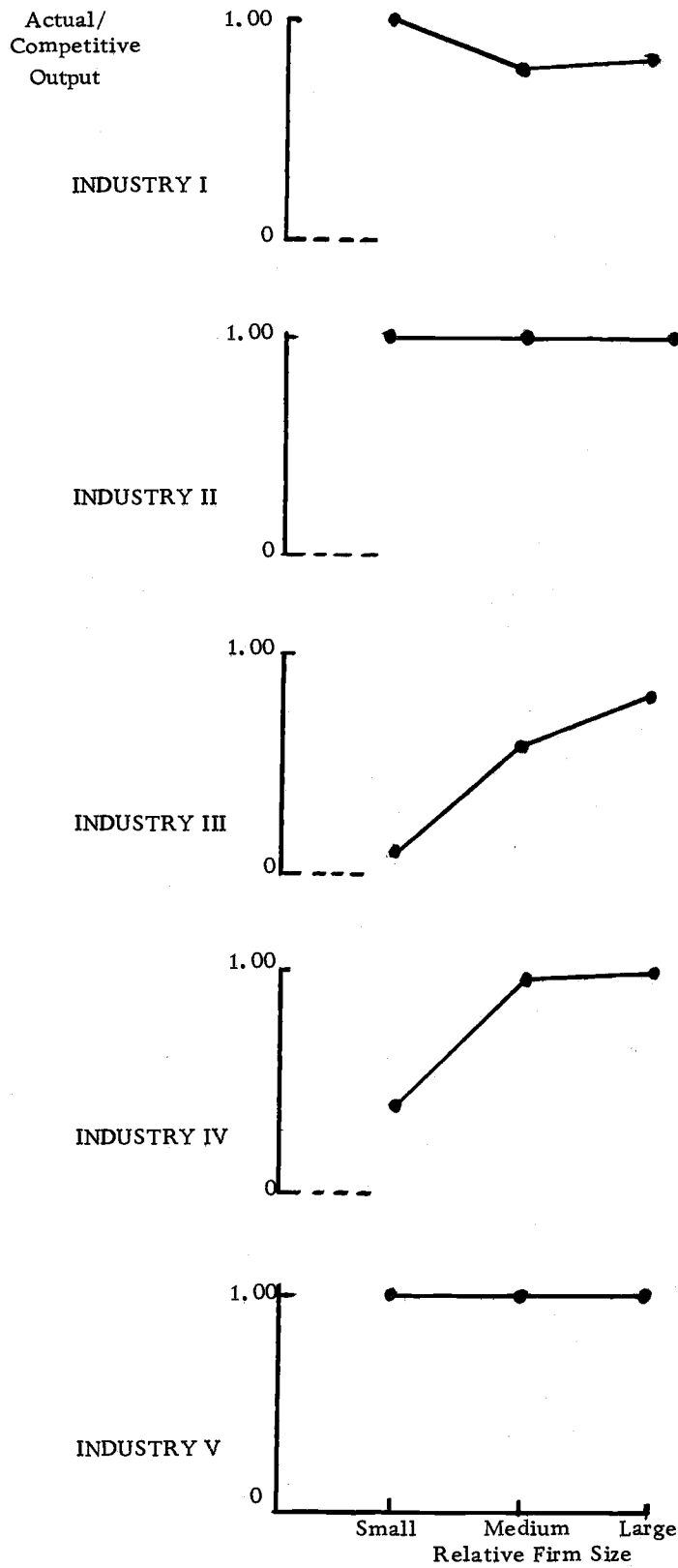


Figure 21. Ratios of actual output levels to those which would result if firms faced competitive procurement markets.

(Compare Table 9 and Figure 17 with Table 14 and Figure 21; also Table 13 and Figure 20 with Table 15 and Figure 22.) Generally, relative investment changes are smaller than output changes.

Analysis of investment changes related to structure of the procurement market revealed relationships generally comparable to those with firm output, but changes are of a smaller magnitude, as was true with changes in the selling market. As with output, the importance of market power to managerial decision making in the procurement market is influenced more by the relative restriction imposed by other factors in the influence hierarchy than by the degree of industry concentration per se.

Table 15. Ratios of actual investment levels to those which would result if firms faced competitive procurement markets.

Industry	Firm Size		
	Small	Medium	Large
I	1.00	.98	.47
II	1.00	1.00	1.00
III	.40	.97	1.00
IV	.73	1.00	1.00
V	1.00	1.00	1.00

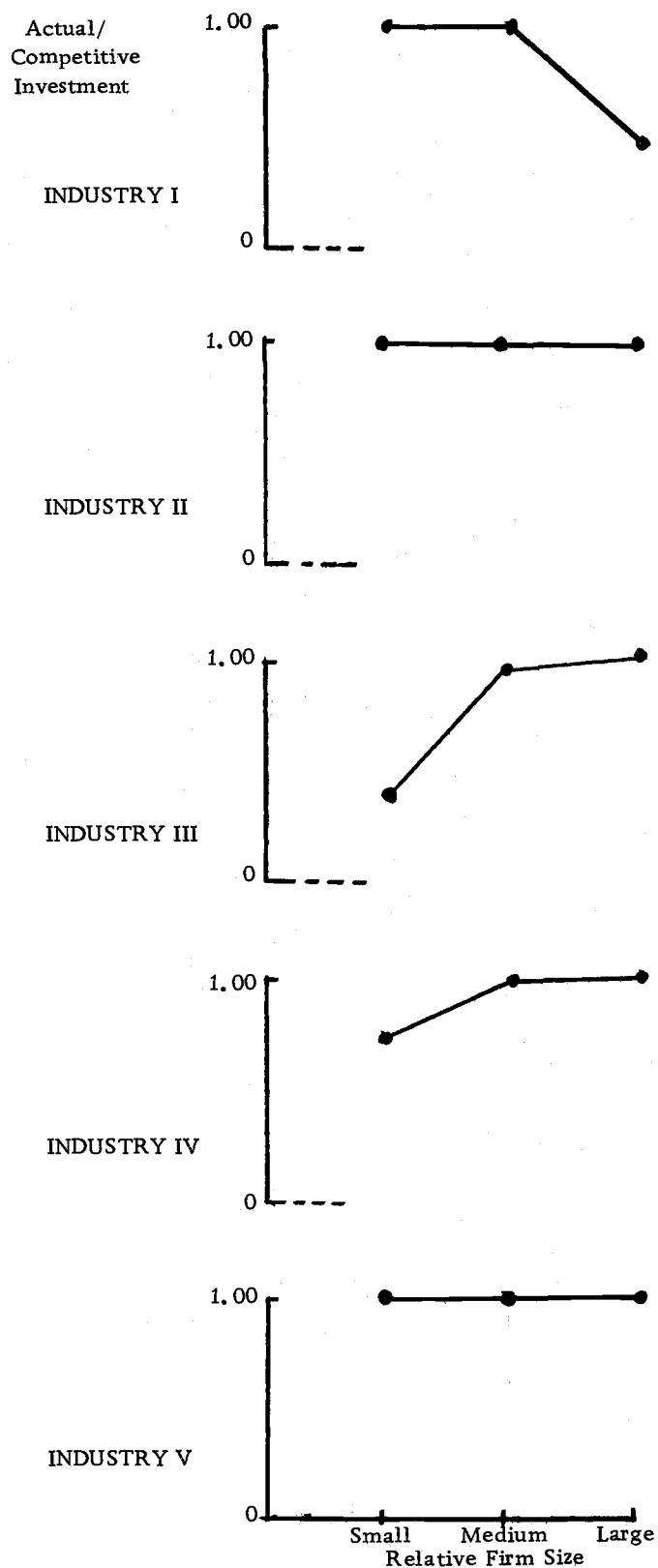


Figure 22. Ratios of actual investment levels to those which would result if firms faced competitive procurement markets.

Physiognomic and Algorismic Approaches
to Output and Investment

Tests based on the physiognomic or algorismic approaches to concentration require that all the firms included from each industry be treated as a single sampling unit. Thus, the total sample size is five. Because of the relative rather than absolute nature of the various measures of managerial decisions as they contribute to research of this nature, the cardinal values of these measures are not of primary importance. Ordinal relationships will amply represent the data to test for agreement of the data with the hypotheses, since the latter are stated solely in relative terms. Thus, rank order comparisons were selected for the various considerations of output and investment as related to these two approaches to industry concentration.

According to the physiognomic approach the industries assume the order of I, II, IV, III, V when ranked according to increasing concentration, as determined by the proportion of total industry output handled by the four largest firms in each industry (Table 17). These proportions were 39, 68, 75, 79, and 80 percent, respectively.

The relevant hypotheses state that the ratios of actual to competitive output and investment would decrease from unity as concentration increases (i. e., that the positive difference between the actual and competitive values would increase). Sampling was carried out

solely for the sake of obtaining three firms of widely differing sizes within the five industries. Analyses using the data obtained as described but based on the physiognomic and algorismic approaches require an assumption that each three-firm sample satisfactorily represents all firms in its respective industry. It is further assumed that the simple arithmetic mean of the relevant ratios for the firms in a given industry best represents the relative ratio level of firms throughout that industry. These means are recorded in Table 16.

Table 16. Industry mean values of output and investment ratios^{*}
(relating present quantities to those which would result
if firms dealt in competitive markets.)

Industry	I	II	III	IV	V
Selling market:					
a/c ^{**} output	.77	.51	1.00	.67	.67
a/c investment	.76	.99	.90	.87	.99
Procurement market:					
a/c output	.86	1.00	.55	.81	1.00
a/c investment	.82	1.00	.79	.91	1.00

^{*} Ratios for each industry are simple arithmetic means of similar ratios given for individual firms in Tables 9, 13, 14 and 15.

^{**} a/c = actual/competitive.

Table 17. Rank order tests of hypotheses relating output and investment ratios to concentration (as delineated by algorismic and physiognomic approaches).

	Physiognomic Approach	Algorismic Approach
Bases for measuring concentration	Proportion of industry output handled by four largest firms	Number of firms in the industry
Description of Industries I through V, respectively, according to above bases	39-68-79-75-80	61-15-34-43-21
Hypothesized ranking of industries by actual/competitive ratios (small to large)	I-II-IV-III-V (1-2-3-4-5)*	I-IV-III-V-II (1-2-3-4-5)
Emperical ranking of industries by actual/competitive ratios (small to large)		
Selling market:		
a/c** output	III-I-IV=V-II (4-1-3=5-2)	III-I-IV=V-II (3-1-2=4-5)
a/c investment	II=V-III-IV-I (2=5-4-3-1)	II=V-III-IV-I (5=4-3-2-1)
Procurement market:		
a/c output	II=V-I-IV-III (2=5-1-3-4)	II=V-I-IV-III (4=5-1-2-3)
a/c investment	II=V-IV-I-III (2=5-3-1-4)	II=V-IV-I-III (4=5-2-1-3)

* Arabic sequences are inserted to facilitate comparisons between hypothesized and emperical rankings. Hypothesized rankings are arbitrarily recorded as 1-2-3-4-5 for the same reason. Arabic numerals do not indicate comparable Roman numerals used for industry identification.

** a/c = actual/competitive.

The most notable correlation between the data (aggregated as described for the physiognomic approach) and the hypotheses is with investment as related to concentration changes in the selling market (see Table 17). The industries assumed an order of II=V, III, IV, I. Thus, the original order of 1,2,3,4,5 is to be compared to 2=5,4,3,1.

The general failure of the data to substantiate the hypotheses may be partially explained by empirical findings noted above. A prime reason for anticipating a correlation between concentration level and investment level has been identified as the security of investing for the sake of producing a desired level of output (See the quote by Bain, 1948, under Flexibility of Investment, p. 41). Relative output level is not correlated with concentration, as measured by this approach. Note also that the correlation is negative. A possible explanation (though also related to output) is offered in the section on output (p. 102f).

According to the algorismic approach to industry concentration, the industries are ranked I, IV, III, V, II according to increasing concentration, as determined by total numbers of firms of 61, 43, 32, 21, and 15, respectively.

As with the physiognomic approach, the investment ratios related to considerations of concentration in the selling market show the greatest correlation with the concentration of the various industries. This correlation is also negative, with the ranking of

5=4, 3, 2, 1 as compared to a hypothesized order of 1, 2, 3, 4, 5.

Only one industry (Industry III, which ranked 3 in number of firms) was out of the position necessary for both a positive correlation of output ratios with consideration of changes in the selling market (where the ranking was 3, 1, 2=4, 5 vs. the hypothesized 1, 2, 3, 4, 5) and a negative correlation of investment ratios considering changes in the procurement market (with an order of 5=4, 2, 1, 3 vs. the hypothesized 1, 2, 3, 4, 5).

Because of (1) the small total number of sampled industries and small number of firms from each sampled industry, (2) the mixture of positive and negative correlations between rankings which would logically be expected to produce comparable rankings, and (3) the absence of notable results with output ratios in instances where investment ratio results were most marked, this research offers little evidence to encourage preference for the physiognomic or algorismic approaches to industry concentration over the re-agency approach as a reliable guide to the behavioral influences of market structure.

Frequency of Technical Innovation

The ratio of the actual disposal age of various pieces of capital equipment to the age at which this equipment would be economically obsolete was hypothesized to decrease with increased concentration.

Because of the problems inherent in weighting widely differing types of pieces of equipment and the possibility of different attitudes regarding disposal of major buildings (e. g.) as compared to small processing machines, three separate analyses were conducted--one each for buildings, vehicles, and machines.

Only nine of the fifteen firms in the study had disposed of buildings under management comparable to the present, as shown in Table 18. This table is a summary of the relationship between data obtained on lines 5 and 6 in Section II of the questionnaire as shown on p. 229. The values recorded there were subjected to careful cross-examination concerning inter-firm comparability of considerations regarding what constitutes complete obsolescence (e. g. , number of hours of what type of use renders the average fork lift completely obsolete?) Because of the limited number of observations, further analysis pertaining to frequency of innovations in processing buildings has been foregone.

Only the small firm in Industry V had not disposed of any vehicles recently (Table 19 and Figure 23). Ratios for the other 14 firms bear a connotation similar to that for buildings described above. Since none of these disposals resulted from business reductions by the firms, essentially all were thus part of a replacement process. In some instances, the replacement was a separate transaction and/or may have involved a significant change in capacity or design

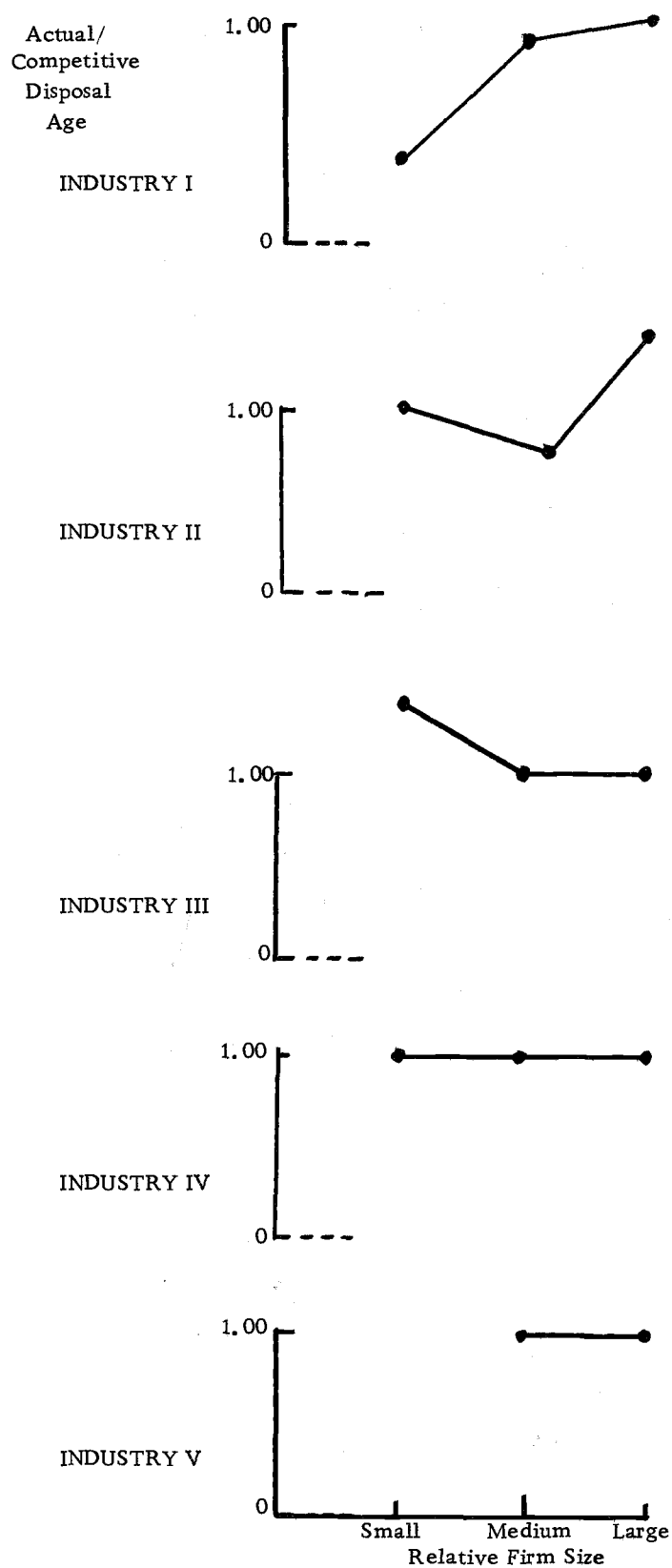


Figure 23. Relative obsolescence of vehicles at disposal.

of the vehicle.

Table 18. Relative obsolescence of buildings at disposal.

Industry	Firm Size		
	Small	Medium	Large
I	(0)*	< 1**(2)	(0)
II	. 87(1)	. 63(2)	(0)
III	1. 00(2)	(0)	. 45(3)*** 9. 00(1)
IV	(0)	(0)	1. 53(3)
V	. 47(1)	"very small" (1)	1. 73(3)

* Numbers in parentheses indicate number of disposals included.

** Ratios were calculated which represent the disposal age of each building as a proportion of the age at which that building would be completely economically obsolete. Ratios recorded here represent the average of such ratios for each firm.

*** The two are listed separately because of the inordinate divergence.

Several consistencies can be noted in the available disposal ratios for vehicles. In three of the four industries in which small firms had disposed vehicles, the ratio for the large firms was equal to or larger than that for the small firms. In all five industries, the ratio for the large firms was larger than that for the intermediate sized firms. It is thus evident that the large firms in this study retain their vehicles until a more advanced state of obsolescence is

attained than is the case with firms in either of the other size groups.

Table 19. Relative obsolescence of vehicles at disposal.

Industry	Firm Size		
	Small	Medium	Large
I	. 38(1)*	. 94(3)	1. 00(3)
II	1. 00(1)	. 74(3)	1. 41(8)
III	1. 41(1)	< 1. 00(2)	1. 00(1)
IV	1. 00(1)	< 1. 00(4)	1. 00(8)
V	(0)	< 1. 00(>2)	1. 00(5)

* Ratios were calculated which represent the disposal age of each vehicle as a proportion of the age at which that vehicle would be completely economically obsolete. Ratios recorded here represent the average of such ratios for each firm. Numbers in parentheses indicate number of disposals included.

The disposal ratio is equal to or greater than unity for the large firms in all cases. The irregular upward trend toward the large firms' ratio is not consistently toward unity or from unity

upward. Thus, no comprehensive statement can be made concerning the absolute value of the other firms' ratios (e. g., the difference between the ratios for the large firms and those of the other firms cannot be attributed to degree of detail or accuracy in record keeping). Also, since the ratios for the large firms show no more consistent proximity to unity than for the other firms, the discretion to operate uneconomical equipment allowed by higher profit rates or economies of scale must be discounted as explanatory. (The large firms were indicated to have higher profit rates in four of the five industries but only one industry showed significant average total cost economies of scale.) The larger ratios for the large firms contradict the rationale of the original hypothesis since such ratios indicate that the larger firms do not evidently dispose of vehicles before they are obsolete for the sake of corporate image or through the use of precautionary rules of thumb.

In all five industries, the ratio for the intermediate sized firms is equal to or less than unity, indicating that this group consistently disposes of their vehicles when or before complete economic obsolescence is reached. Vehicle disposal before obsolescence would not generally complement the description of these businesses as progressive, growth-minded firms which manifest fewer corporate emoluments such as excess capacity if "economically premature" vehicle replacement is also an emolument. Cost conscious, growth

minded firms would thus be expected to exchange equipment only when necessary for the sake of optimal use of available funds. However, if more frequent vehicle exchange is a means of attaining a growth-promoting image, the low ratios may add to the evidence identifying the peculiarities of managerial practices which these firms manifest.

In four out of five industries, the disposal ratio for machines for the small firms is smaller than for the large (Table 20 and Figure 24). In all industries, the ratio for the medium firms is equal to or smaller than that for the large firms. As with vehicles, the disposal ratios for machines indicate that the large firms retain their capital equipment longer in relation to its economic disposal date than the other firms and the hypothesis of more frequent technical innovation is rejected.

It is noteworthy that the disposal ratios for the small firms' machinery are less than unity in four of the industries. Although this is not so consistently true with buildings (two industries) and vehicles (one industry), the prevalence as noted here has valuable theoretical implications. Contrary to the original hypothesis, these small firms may be quicker to adopt new technology, either because of competitive pressures or because they aspire to use this means to aggressively compete by differentiating their products and appurtenant services. In some of the sampled industries, the small firms

were frequently characterized as the innovators.

Table 20. Relative obsolescence of machinery at disposal.

Industry	Firm Size		
	Small	Medium	Large
I	.73(9)*	.67(2)	1.00(2)
II	.20(1)	1.19(5)	1.20(3)
III	2.10(6)	1.10(2)	1.94(2)
IV	"very small" (3)	1.00(2)	1.00(2)
V	.61(2)	"very small" (2)	.94(37)

* Ratios were calculated which represent the disposal age of each machine as a proportion of the age at which that machine would be completely economically obsolete. Ratios recorded here represent the average of such ratios for each firm. Numbers in parentheses indicate number of disposals included.

The character of these ratios might also indicate that the management of these firms is generally less articulate in their decision making concerning selection of equipment appropriate for the relevant needs. More frequent disposals would thus reflect an attempt to adapt to an unfavorable condition created by previous decisions. Such decisions should have been reflected in the shorter age of complete economic obsolescence because of the low returns from poorly adapted equipment, although professional pride on the managers' part may have precluded such an admission. The only two evident cases where disposals resulted from impractical

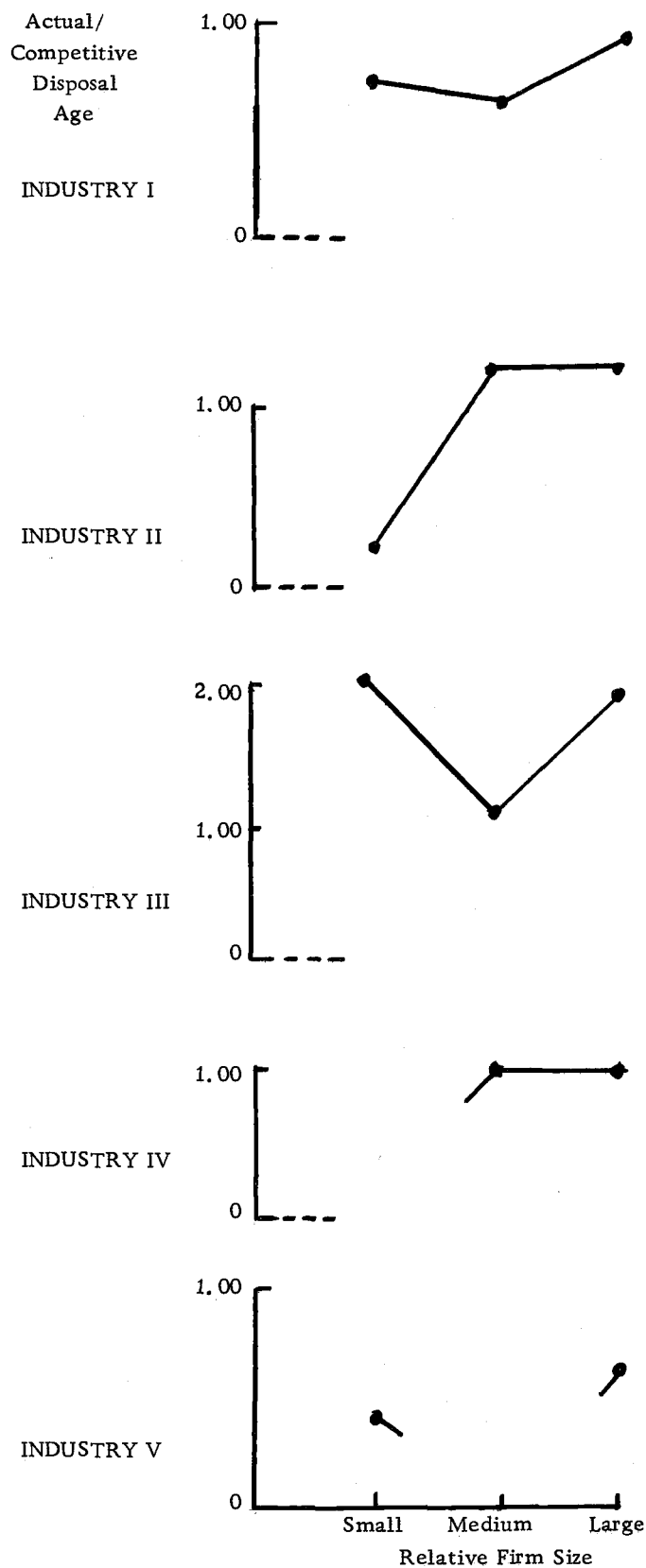


Figure 24. Relative obsolescence of machinery at disposal.

purchases were reported by firms not included in this group.

Flexibility of Investment

The ratio of actual average total cost to hypothetical average total cost without flexibility considerations was hypothesized to decrease toward unity as concentration increased. It is assumed that the smaller firms will need more flexibility because of their lesser control over industry behavior and their greater susceptibility to the vagaries of the remainder of the industry.

Identification of flexibility costs was made from line 6, columns 3 and 4, Section III, of the questionnaire, as shown on p. 230. As with the other questions discussed above, initial answers and supporting evidence were subjected to careful scrutiny to assure rationality and completeness of contributing considerations.

Ten year histories of annual output levels showed noteworthy year-to-year output variability for many of the firms but managers generally denied that this significantly influenced per unit costs of processing. Only two of the fifteen firms in the study indicated any intentional provision for flexibility in output level from year to year. Others recognized certain cost adjustments which might be made if they were allowed to operate without the month-to-month variability common to a large proportion of agricultural production. This was more true with agricultural plant products than animal products,

because of the greater seasonality of "production". The flexibility which was reported is primarily a consideration of (1) supply rather than demand (changes in production of raw product rather than the hypothesized variations in produce demand), and (2) quantity rather than quality (periodic output variability resulting from changes in raw product supply as opposed to competitively necessitated changes in product design or characteristics). Thus, flexibility costs as they have been incurred are not related to factors of industry concentration and would not be expected to show a correlation with concentration, even if the type of flexibility costs considered in the original hypothesis did show such a correlation when they exist.

The data revealed that adaptation to a necessarily variable rate of output primarily takes the form of variable intensity of utilization of equipment which the firm owns rather than increased capital costs to allow for larger output years. The excess capacity cited above (p. 104ff) was not acquired primarily for the sake of flexibility in output level. Rather factors such as the lumpy character of in-plant machinery, etc., are responsible for significant flexibility in output level with a plant designed to handle the firm's annual average output. In peak years, economies which are realized by reduction of average fixed costs are partially balanced by increased average variable costs through payment of overtime wages, use of less skilled labor, and production of a lower quality product. Thus, increased

investment for the sake of adapting to peak outputs is not necessarily an economic answer to the need for flexibility since such increases do not necessarily incur compensating variable cost economies. Further, needs for quantitative flexibility are not related to industry concentration.

While flexibility is a very necessary consideration in much of agricultural processing, it appears to be much less costly than originally anticipated. This is because the hypothesized bases for needs for flexibility are relatively minor in comparison to those actually considered by the firms. Economically advisable changes in products or processes are evidently slow enough over time that relevant alterations in investment can be and are made primarily as a part of necessary changes resulting from long-term growth.

Summary

This chapter has presented the results of analyses related to investment security. The peculiarities of the medium sized firms' management philosophy has again been evident. Complementary implications of structure of the procurement market have been noted. Comparisons between the various approaches to market structure have been included where valuable. The following chapter completes the presentation of analysis of the eight hypotheses by dealing with observations related to demand control.

CHAPTER 6

EMPIRICAL AND RELATED THEORETICAL OBSERVATIONS
RELATING DEMAND CONTROL TO
INDUSTRY CONCENTRATION

The model applied to hypotheses in preceeding chapters was also used with various aspects of demand control. Results related to product differentiation, and advertising and promotion follow.

Product Differentiation: Advertising and Promotion

Product differentiation, and advertising and promotion as proportions of ATC were expected to increase with concentration.

Total Firm Expenditures

Product differentiation data³³ do not show the total of such costs to increase with concentration, as would be expected from per unit hypotheses. (See Table 21 and Figure 25, which summarize the data obtained in the sellers' portion of Section VI of the questionnaire shown on p. 235.) Of the

³³ Higher such costs do not imply more attention to differentiation or a more differentiated product. Some differentiating efforts (e. g. , managerial attitude) are essentially costless and costs for others (e. g. , package variation) cannot be identified.

15 inter-firm, intra-industry comparisons which can be made, only eight indicate an increase in total product differentiation costs with increased relative firm size. However, the ten comparisons involving a medium sized firm show that only two firms (the small firm in Industry II and the large firm in Industry III) incur smaller total differentiation costs than the medium firms in the respective industries.

Table 21. Intra-industry comparison of firms' total expenditures for product differentiation.

Industry \ Firm Size	Firm Size		
	Small	Medium	Large
I	1.00*	.58	4.07
II	1.00	22.14	315.97
III	4.32	1.00	0
IV	2.46	1.00	1.18
V	1.00	0	42.97

* Because of the confidential nature of the actual dollar amounts involved, expenditures are shown here in index form. The smallest positive amount within the sample from each industry is assigned an index of 1.00. Others within that industry are proportional.

A trend of increasing total expenditures for advertising and promotion³⁴ with increasing relative firm size is observed

³⁴ The term, advertising and promotion, is utilized here to denote efforts to change the image of the product in the mind of the consumer (i.e., non-physical product differentiation).

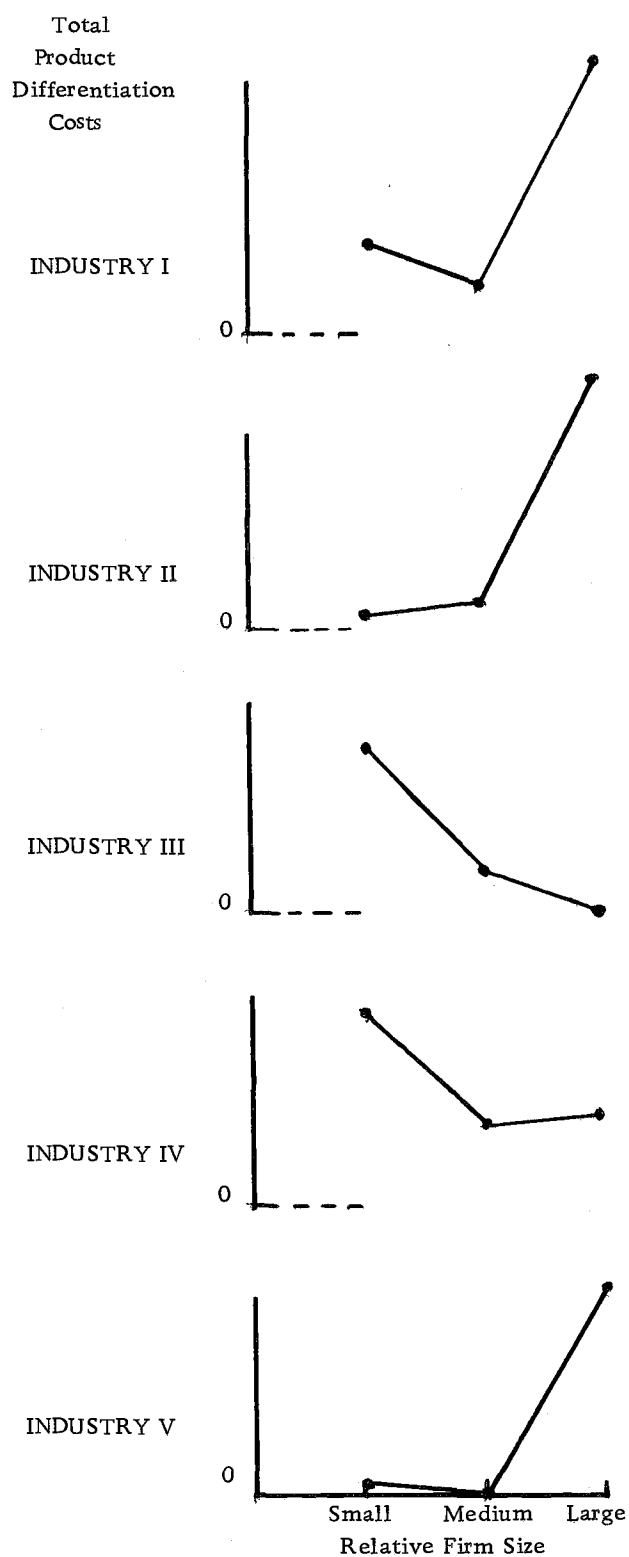


Figure 25. Intra-industry comparison of firms' total expenditures for product differentiation.

throughout the sample, except for the Industry I comparison of small and medium firms. (See Table 22 and Figure 26, which summarize data from the portion of the questionnaire shown on p. 237.)

Table 22. Intra-industry comparison of firms' total expenditures for advertising and promotion.

Industry	Firm Size		
	Small	Medium	Large
I	1.44*	1.00	5.00
II	0	1.00	4.08
III	0	1.00	67.20
IV	0	1.00	152.94
V	1.00	31.04	322.45

* Because of the confidential nature of the actual dollar amounts involved, expenditures are shown here in index form. The smallest positive amount within the sample from each industry is assigned an index of 1.00. Others within that industry are proportional.

Expenditures Per Unit of Output

Computation of average cost per unit removes the influence of absolute size. Nine inter-firm comparisons show decreases in differentiation costs while six show increases with concentration (Table 23 and Figure 27). Again, relative firm size appears to have no consistent relationship to such expenditures. Seven of the ten comparisons involving medium firms indicate that these firms incur lower differentiation costs.

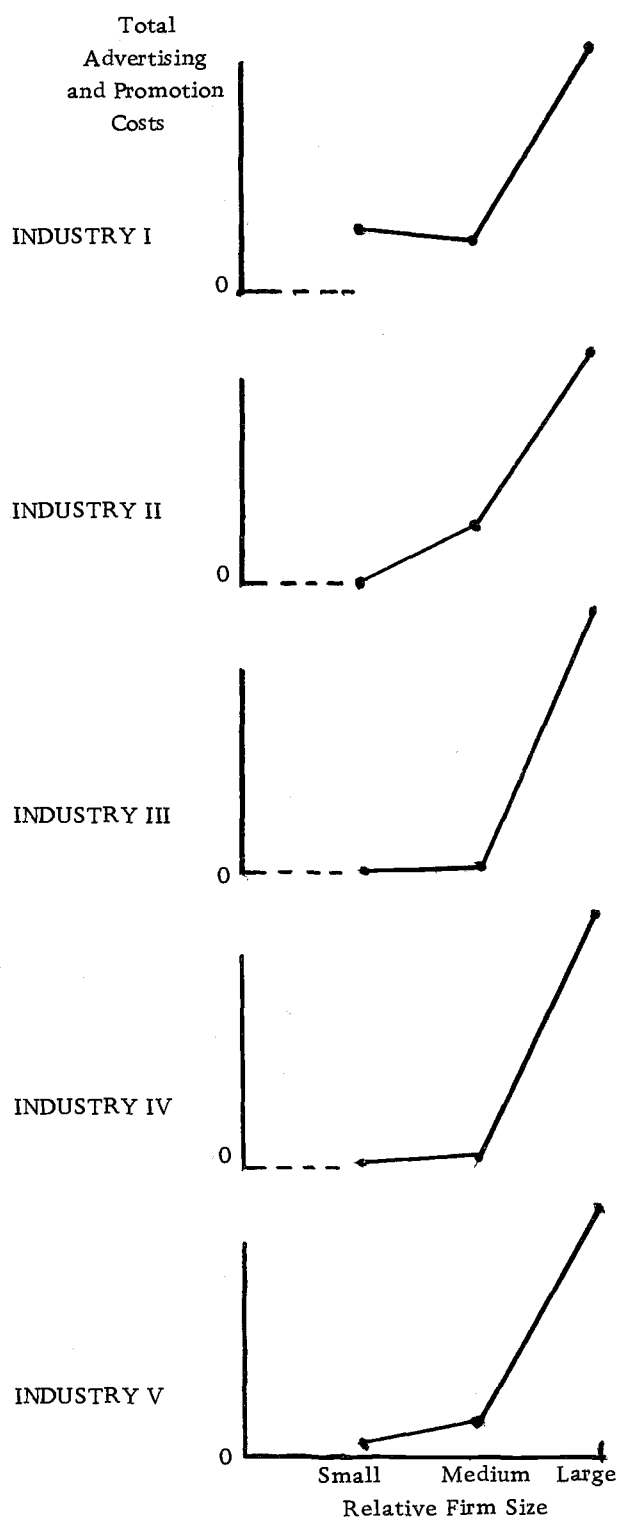


Figure 26. Intra-industry comparison of firms' total expenditures for advertising and promotion.

Table 23. Product differentiation costs per unit.

Industry	Firm Size		
	Small	Medium	Large
I	\$.10	\$.041	\$.062
II	.003	.008	.027
III	< .001	→ 0	0
IV	6.68	.74	.19
V	2.71	0	6.42

As with total advertising and promotion costs, per unit expenditures in this category also generally increase with increased relative firm size (Table 24 and Figure 28). Exceptions are noted only throughout Industry I and between the medium and large firms in Industry II, i.e., four comparisons out of a total of fifteen show decreases.

Table 24. Advertising and promotion costs per unit.

Industry	Firm Size		
	Small	Medium	Large
I	\$.035	\$.015	\$ < .011
II	0	.05	.027
III	0	<.001	.002
IV	0	.706	24.15
V	.25	1.40	5.00

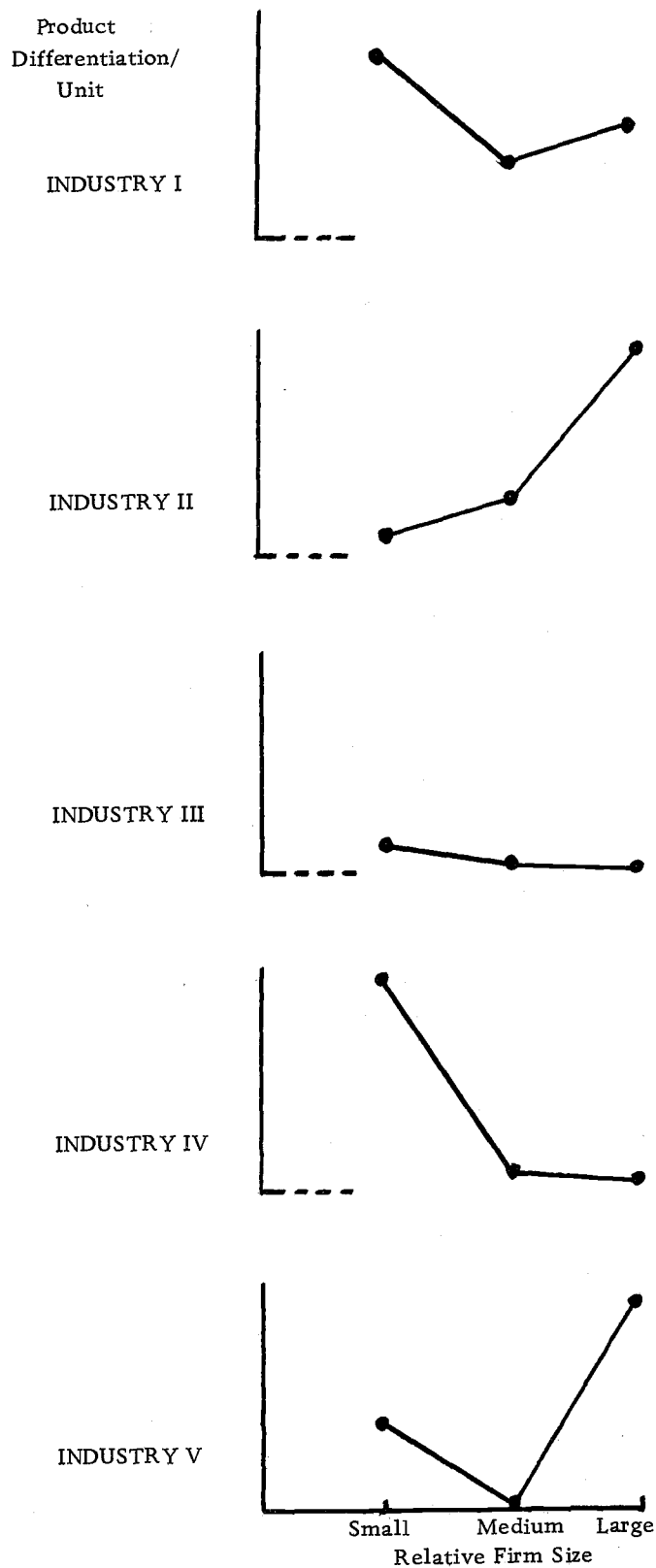


Figure 27. Product differentiation costs per unit.

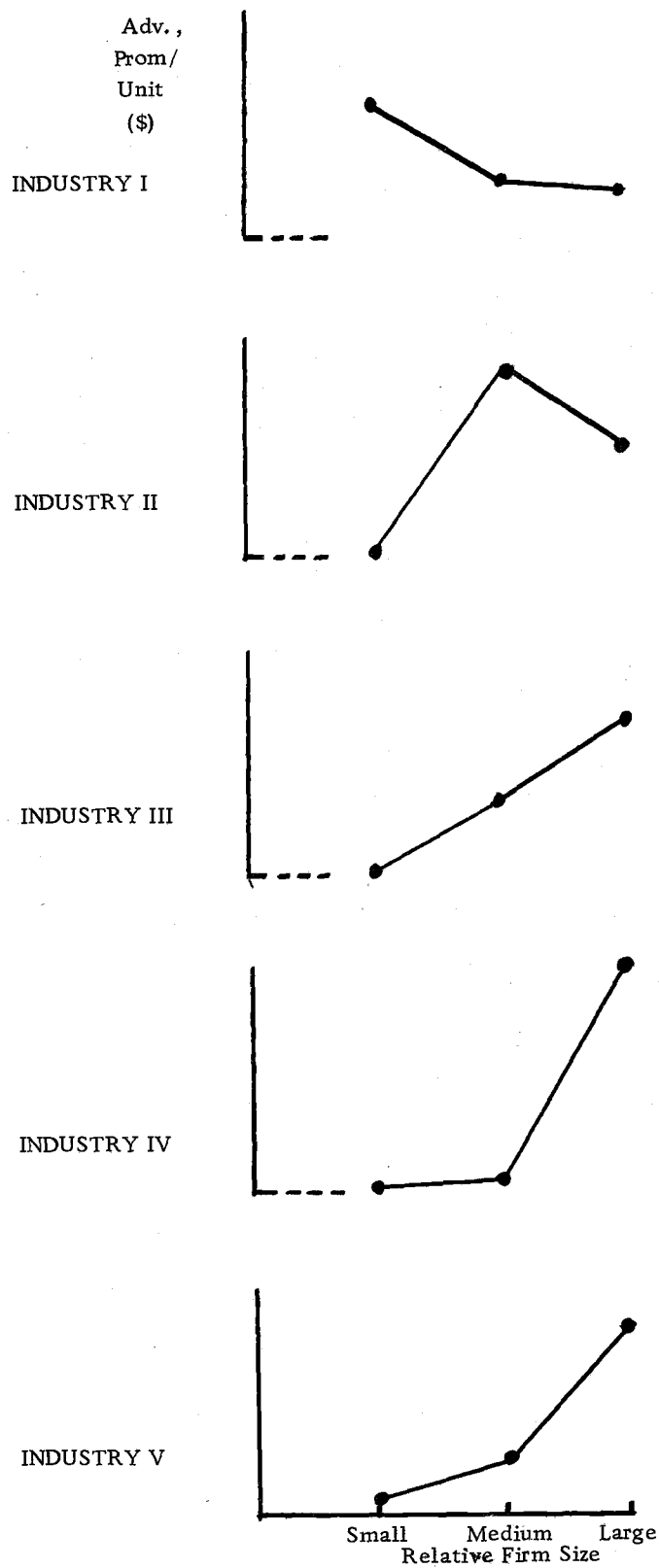


Figure 28. Advertising and promotion cost per unit.

Per Unit Expenditures as Proportions of ATC

Computation of these costs as proportions of ATC would show changes in the balance between these and other costs. Inter-firm differences in such a balance may indicate a variation in firms' evaluation of these expenditures as compared to other costs. A higher proportion of ATC going for product differentiation, for example, would indicate that the firm considers differentiation to be more profitable than the aggregate alternate expenditure, contrary to the apparent standards of other firms in the industry.

The data utilized in this test do not indicate that the proportion of total costs is markedly preferable to per unit costs for measuring the influence of relative firm size on these costs. A change in the consistency of the evidence is found only in the comparison of the small and medium firms in Industry II for product differentiation (Table 25 and Figure 29) and the comparison of the medium and large firms in the same industry for advertising and promotion (Table 26 and Figure 30). In both of these instances, a comparison of the relevant costs as proportions of ATC shows equal proportions for the two firms, while comparison of per unit costs shows unequal costs.

Summary

Product differentiation costs are not consistently correlated with relative firm size. Thus, the hypothesis is rejected. However,

Table 25. Relative product differentiation costs (product differentiation costs per unit/average total costs).

Industry \ Firm Size	Firm Size		
	Small	Medium	Large
I	.05	.02	.03
II	.02	.02	.07
III	.006	.001	0
IV	.08	< .005	.001
V	.04	0	.08

Table 26. Relative advertising and promotion costs (advertising and promotion costs per unit/average total costs).

Industry \ Firm Size	Firm Size		
	Small	Medium	Large
I	.02	.01	.006
II	0	.07	.07
III	0	.002	.03
IV	0	< .005	.13
V	.004	.02	.06

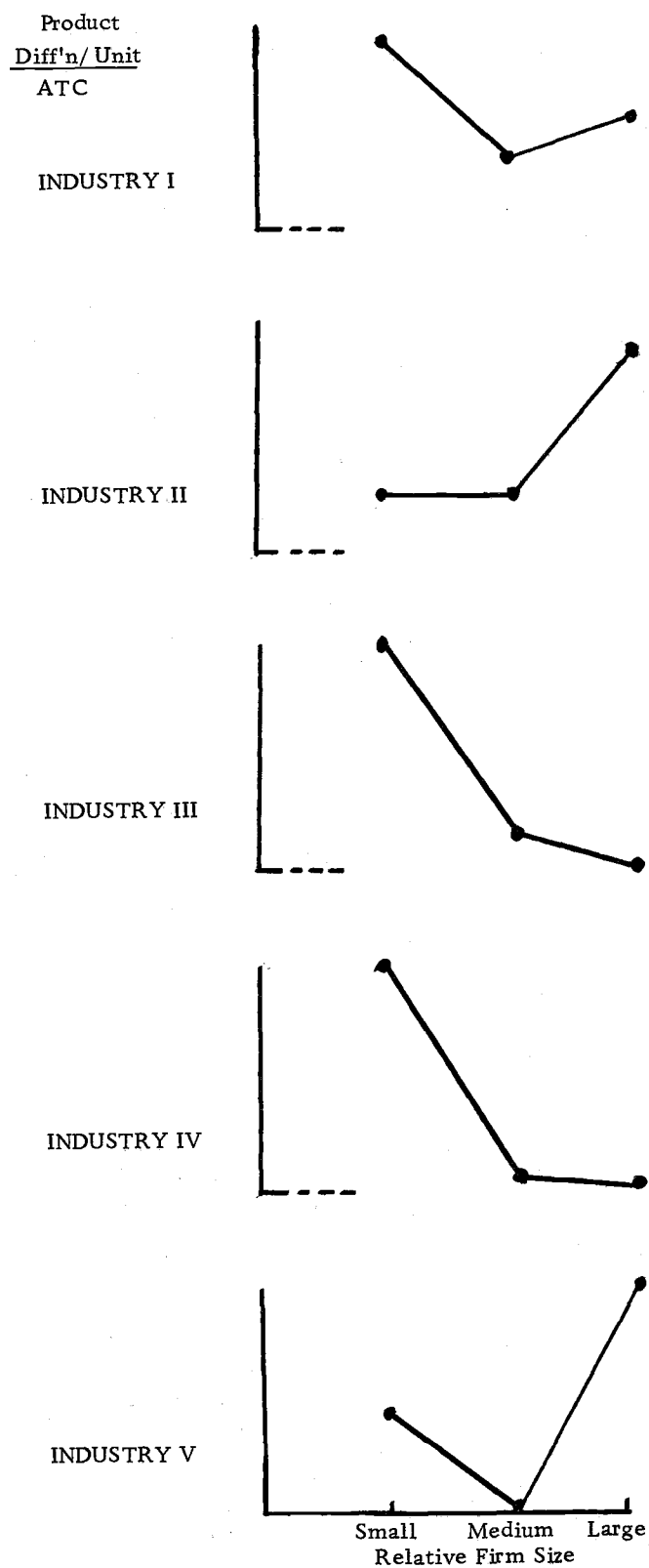


Figure 29. Relative product differentiation costs.

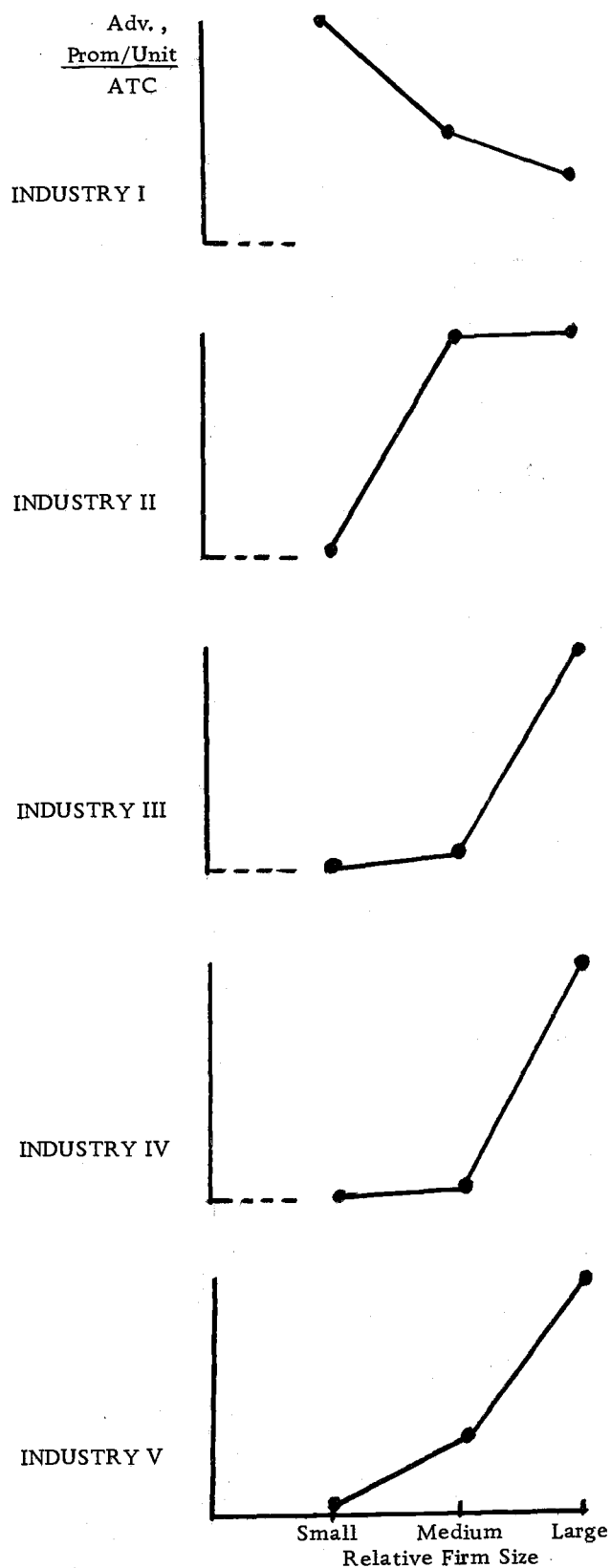


Figure 30. Relative advertising and promotion costs.

consideration of the ten intra-industry comparisons involving medium sized firms shows at least two but no more than three firms incur lower product differentiation costs, whether these costs are measured by total annual expenditures, costs per unit of output, or costs as a proportion of total costs. These results would not be obtained if the medium sized firms were utilizing product differentiation as a part of their intensive drive for growth. The consistency of the results as they do appear indicates rather that firms within this dynamic, growth-conscious group consistently de-emphasize product differentiation expenditures, relative to the other firms, and have successfully attempted to rapidly improve their relative position in the industry through aggressive, non-physically differentiating marketing practices.³⁵

Fourteen comparisons of total promotion costs support the hypothesis. Eleven comparisons of similar costs on a per unit basis or on basis of proportion of ATC do so. The hypothesis is accepted.

This chapter and the two preceeding it present the findings of the research related to the eight hypotheses. Other observations made during this investigation are discussed in the chapter to follow.

³⁵ Evidence is offered elsewhere (p. 69f) that these firms do not utilize price cutting more than their competitors.

CHAPTER 7

EMPIRICAL AND RELATED THEORETICAL OBSERVATIONS
RELATING NON-HYPOTHESIZED BUSINESS PRACTICES
TO INDUSTRY CONCENTRATION

The tests reported in three previous chapters allowed other valuable observations. The more important of these are reported below.

Processing CostsInter-firm Comparisons

Current value of total investment increased with firm output (contra the comparison of small and medium firms in Industry I; Table 27 and Figure 31). However, per unit investment³⁶ dropped from small to medium firm in four industries (Table 28 and Figure 32), indicating scale economies of more extensive³⁷ capital equipment use linked with the growth oriented management philosophy noted with these firms.

³⁶ Investment per unit is used in the discussion of fixed costs to avoid the misleading influences of arbitrary depreciation rates and peculiar availability of cooperatives' fixed capital funds. Investment per unit was calculated by dividing total relevant investment (line 1, column 3, section III, p. 230) by present average output (line 1, column 2).

³⁷ Extensive use concerns amount of product processed. Capital intensity of production is not correlated with investment (p. 162).

Table 27. Relative value of firms' total current investment.

Industry \ Firm Size	Firm Size		
	Small	Medium	Large
I	1.00 [*]	.75	2.6667
II	1.00	2.1857	31.0429
III	1.00	1.6765	4.2059
IV	1.00	13.75	168.75
V	1.00	4.5045	45.0450

* Investment for the small firm in each industry is arbitrarily assigned an index of 1.00. Indices for medium and large firms are proportional.

Table 28. Relative investment per unit of output, present average rates of production.

Industry \ Firm Size	Firm Size		
	Small	Medium	Large
I	4.21 [*]	2.20	1.00
II	3.67	1.00	4.17
III	3.33	2.23	1.00
IV	1.00	2.26	5.91
V	1.32	1.00	3.13

* Because of the confidential nature of this information, investment rates are assigned index numbers for presentation here. The lowest investment per unit within each industry is arbitrarily assigned an index of 1.00.

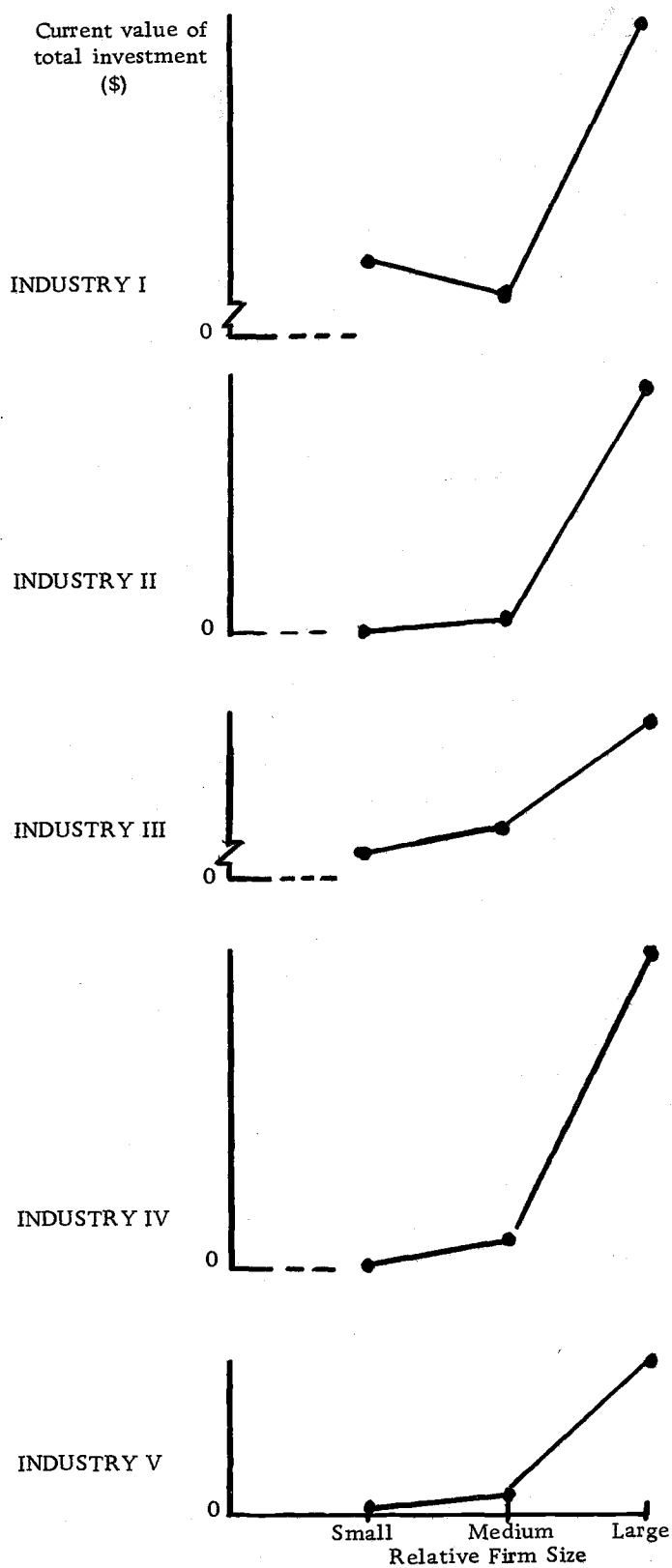


Figure 31. Relative value of firms' total current investment.

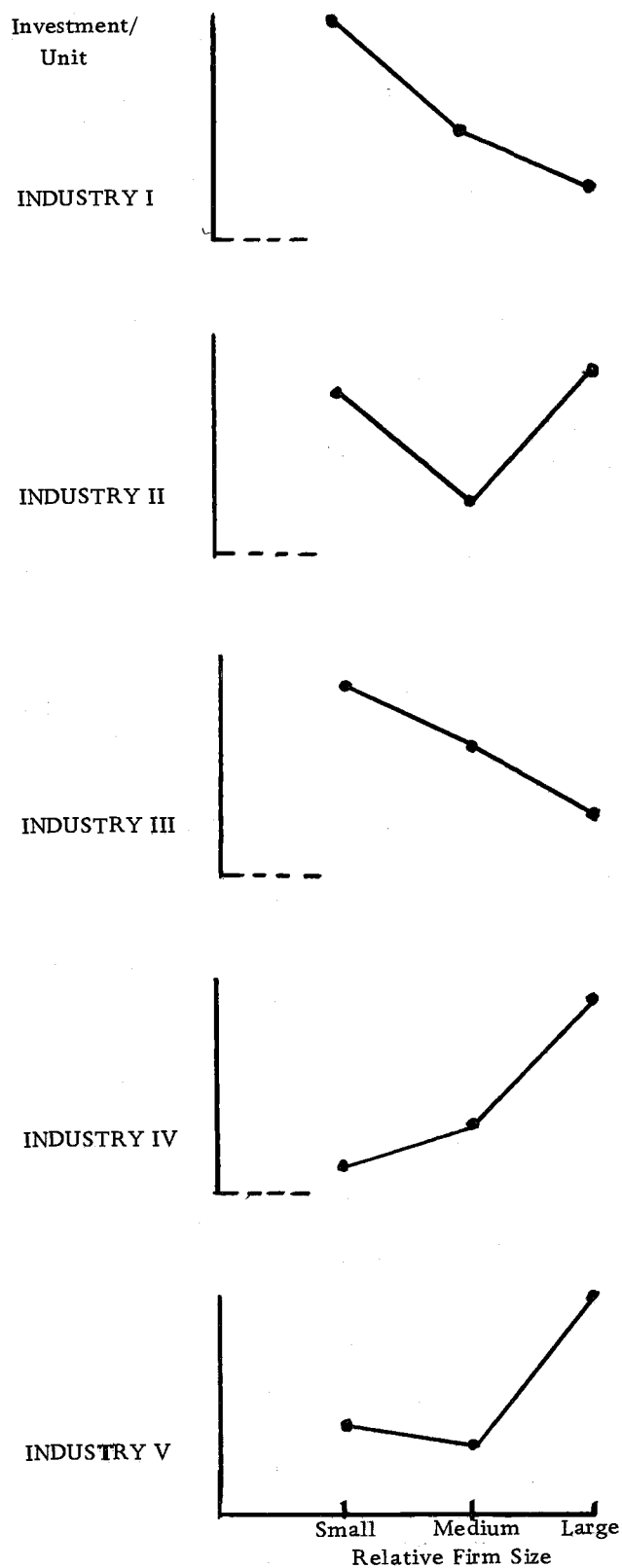


Figure 32. Relative investment per unit of output, present average rates of production.

There was no consistency of relationship between the investment per unit for the large firms and those of either of the other two groups. There was no consistency of relationship between the average total costs (Table 29 and Figure 33) of the small and medium firms. Thus, the lower investment per unit for the medium firms does not necessarily indicate a lower cost but merely a lower capital intensity of the firms' production (See Table 33, p. 166, and Figure 37, p. 165)--in particular, a fuller use of the available facilities than the small firms. This is in accordance with the findings of greater proportional over-capacity and lower actual/competitive output levels for the small firms.

In all three industries in which diseconomies of scale in investment per unit were noted for the large firms as compared to the small and medium firms, diseconomies in non-capital costs were also incurred from small to medium to large (i. e., average variable costs for the large firm exceeded those for the medium firm which in turn exceeded those for the small firm; see Table 30 and Figure 34). In both industries in which investment per unit of output was smaller for the large firms than for the other firms, apparent economies of scale in non-capital costs were also noted (i. e., average variable costs for the large firms were less than for the medium firms and those for the medium firms less than for the small firms).

Table 29. Relative average total costs (exclusive of raw product costs) identified by managers--most recent full crop year.

Firm Size Industry			
	Small	Medium	Large
I	1.03*	1.00	1.06
II	1.00	2.83	3.33
III	2.25	1.25	1.00
IV	1.00	1.07	1.34
V	1.00	1.04	1.13

Table 30. Relative average variable costs, exclusive of raw product costs--most recent full crop year.

Firm Size Industry			
	Small	Medium	Large
I	1.37*	1.17	1.00
II	1.00	2.30	4.15
III	4.52	3.92	1.00
IV	1.00	1.76	2.34
V	1.00	1.32	2.37

* Because of the confidential nature of this information, cost figures are assigned index numbers for presentation here. The lowest average variable cost within each industry sample is arbitrarily assigned an index of 1.00.

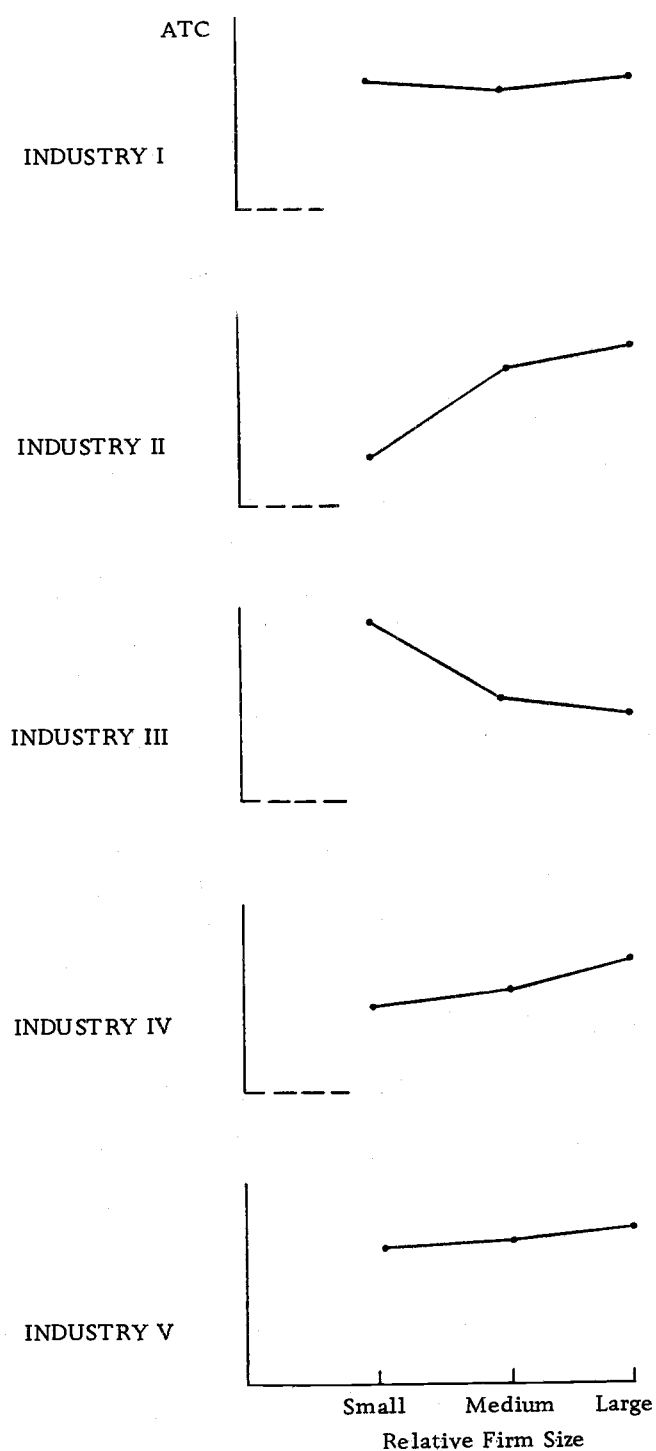


Figure 33. Relative average total costs (exclusive of raw product costs) identified by managers--most recent full crop year.

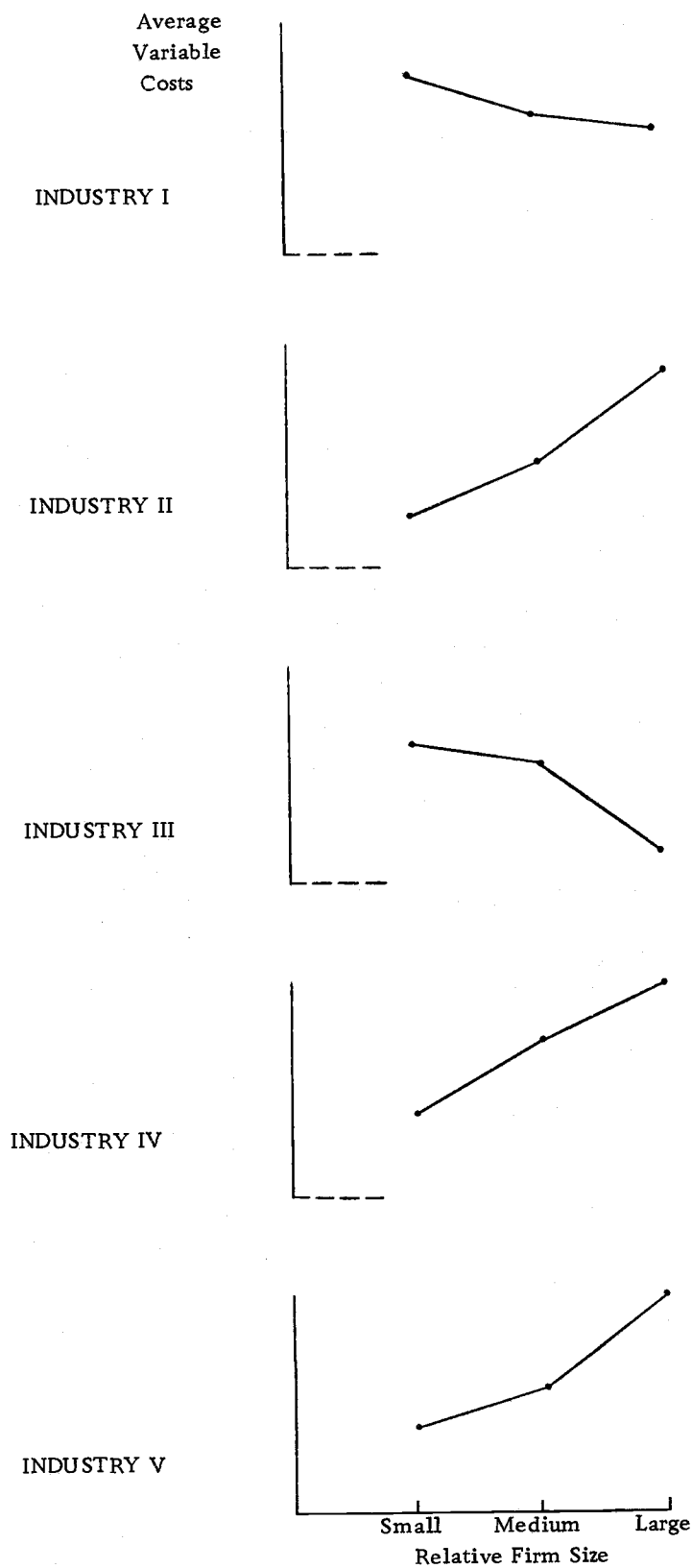


Figure 34. Relative average variable costs, exclusive of raw product costs--most recent full crop year.

With the exception of one two-firm comparison in one industry, ATC (Table 29 and Figure 33) showed inter-firm relationships similar to AVC. Apparently, scale is an important cost consideration but no general statement can be made concerning economies or diseconomies.

This observation of reinforcing economies or diseconomies of scale in both fixed and variable costs over most ranges of output for all industries also precludes the use of variable cost conditions to explain the peculiar relative excess capacity situation of the medium sized firms.³⁸

The trend of investment per unit for other firms in the respective industries does not extend to the large firms. This fact may re-emphasize the medium firms' philosophy or it may indicate that the large firms are beyond the range where such an extrapolation can apply, i. e., that further economies of scale are not available in the range of production represented by the large firms. These apparent diseconomies may be due in part to the higher relative unused capacity for the large firms as compared to that for the medium firms.³⁹

³⁸ The medium sized firm had essentially as low relative unused capacity as any other firm in four of the industries and was intermediate between the others in the fifth industry. See p. 105f.

³⁹ Relative excess capacity was discussed above, p. 104ff.

These considerations are based on inter-firm comparisons of present levels of various costs or relative levels of various costs at a single alternate output level. A few points on the cost curves as viewed by managers can be derived from the quantities noted in columns 2 through 4 on page 230. A prime value of these curves is in inter-firm comparison of anticipated relative cost levels at various alternate levels of output.

Only one firm (the large firm in Industry I) failed to see definite economies in use of equipment with some specific increase in output (Table 31 and Figure 35). ("Fixed costs", as the term is used here, include any new equipment which would be purchased for the sake of expanded production.) In three out of five industries, relative "AFC" at various relative levels of production were essentially identical for the nine firms. Two firms in a fourth industry showed comparable similarities. The industry showing no similarities included the firm which saw no economies of expansion capital and equipment utilization.

Within each of these industries, there is a distinct, consistent proportional increase in AFC with each comparable proportional decrease in level of output. Similarly, in all cases there is a comparable proportional decrease in AFC relative to the present with each comparable proportional increase in output. These findings would indicate that the relative economies or diseconomies facing

Table 31. Impact of changed output on fixed costs (computed as investment/unit as proportion of present investment/unit).

Firm Size Industry		Small				Medium			Large							
I	Proportion of Present Output	.50	1.00	1.25	3.11	.50	1.00	1.31	.50	1.00	1.21					
	Proportion of Present Investment per unit	1.00	1.00	.87	1.12	1.96	1.00	.79	1.37	1.00	1.02					
II	Proportion of Present Output	.50	.65	1.00	1.30	2.08	.50	1.00	2.00	.75	1.00	1.85				
	Proportion of Present Investment per unit	2.00	1.58	1.00	.77	.48	2.00	1.00	.50	1.26	1.00	.56				
III	Proportion of Present Output	.50	1.00	7.50			.50	1.00	3.00	5.00	.70	.75	.79	1.00	1.10	1.55
	Proportion of Present Investment per unit	2.00	1.00	.33			2.00	1.00	.57	.35	1.13	1.33	1.27	1.00	.91	.99
IV	Proportion of Present Output	.50	.64	1.00	2.36	2.86	.60	1.00			.75	.90	1.00	1.50	3.00	
	Proportion of Present Investment per unit	2.00	1.56	1.00	.58	.53	1.52	1.00			1.33	1.11	1.00	.66	.41	
V	Proportion of Present Output	.50	1.00	1.05	2.00		.60	1.00	1.20				1.00	1.50		
	Proportion of Present Investment per unit	2.00	1.00	.95	.50		1.67	1.00	.86				1.00	.67		

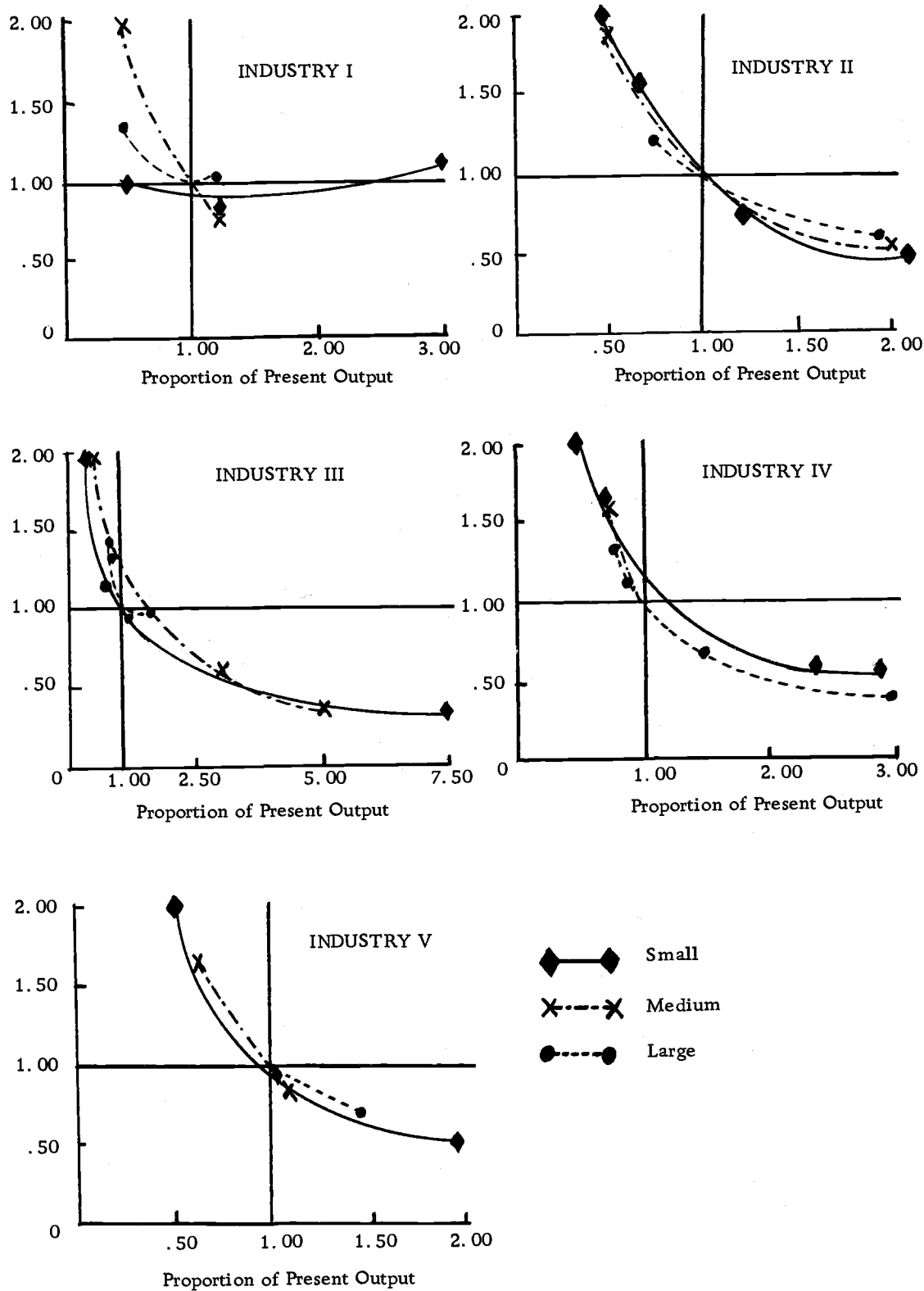


Figure 35. Impact of changed output on fixed costs
 (computed as $\frac{\text{investment per unit}}{\text{present investment per unit}}$).

the firm which alters its output level bear a strong intra-industry similarity without reference to relative sizes of firms. Thus, a search for the primary factors which differentiate between firms according to available economies in investment utilization should be oriented around inter-industry differences rather than inter-concentration level differences.

Intra-firm Comparisons

The existence of economies of scale was also studied on a more limited basis by analysis of the costs of various changes in output level available to the individual firms. Questions were asked throughout the analysis which were designed to identify the firms' reactions to various changes in the selling market and raw product procurement market. These reactions were primarily identified by changes in output level. For each alternate level of output, the relevant level of investment and variable costs was identified. Since these hypothetical market conditions did not impose changes in investment per unit or non-raw product variable costs, the results may also be used to analyze the influence of changes in output level

on cost structures of the firms involved.

Table 32 and Figure 36 present data concerning alternate levels of average variable costs anticipated with changes in output level, as obtained in columns 2 and 4, p. 230. Nine of the fifteen firms identified specify higher levels of output at which they could realize economies of scale in variable costs. One of the six which did identify AVC economies (the medium sized firm in Industry IV) had supplied no cost figures for higher levels of output. Another (the small firm in Industry V) indicated that outputs of 105 percent and 200 percent were available with average variable costs equal to those presently being incurred. The remaining four firms (the medium and large firms in Industries I and IV) could expand production only at the expense of efficiency in non-capital expenditures.

Comparison of the current levels of capital intensity of production (AFC/ATC) for the various firms revealed no consistency of trend with changes in relative firm size (Table 33 and Figure 37). However, ten out of eleven firms offering usable data on increased output gave evidence that the capital intensity of production of their specific firm would decrease (and, ipso facto, the proportion included in AVC would increase) at some higher level of production.

Table 32. Average variable costs with alternate levels of output (computed as proportions of present AVC).

<div>Firm Size Industry</div>		Small				Medium				Large						
I	Prop'n of Present Output	.50	1.00	1.25	3.13	.50	1.00	1.31		.50	1.00	1.21				
	Prop'n of Present AVC	1.23	1.00	.97	1.03	1.31	1.00	1.02		2.18	1.00	1.73				
II	Prop'n of Present Output	.50	.60	1.00	1.30	2.08	.50	1.00	2.00		.75	1.00	1.85			
	Prop'n of Present AVC	.86	.77	1.00	.86	.70	1.50	1.00	.55		1.00	1.00	.75			
III	Prop'n of Present Output	.50	1.00	7.50			.50	1.00	3.00	5.00	.70	.75	.79	1.00	1.10	1.55
	Prop'n of Present AVC	.27	1.00	.45			1.11	1.00	.92	.86	1.00	1.00	.91	1.00	1.00	.73
IV	Prop'n of Present Output	.50	.64	1.00	2.36	2.86	.60	1.00			.75	.90	1.00	1.50	3.00	
	Prop'n of Present AVC	1.25	1.18	1.00	.89	1.00	1.25	1.00			1.07	1.02	1.00	.80	.70	
V	Prop'n of Present Output	.50	1.00	1.05	2.00		.60	1.00	1.20				1.00	1.50		
	Prop'n of Present AVC	1.03	1.00	1.00	1.00		.98	1.00	1.07				1.00	1.01		

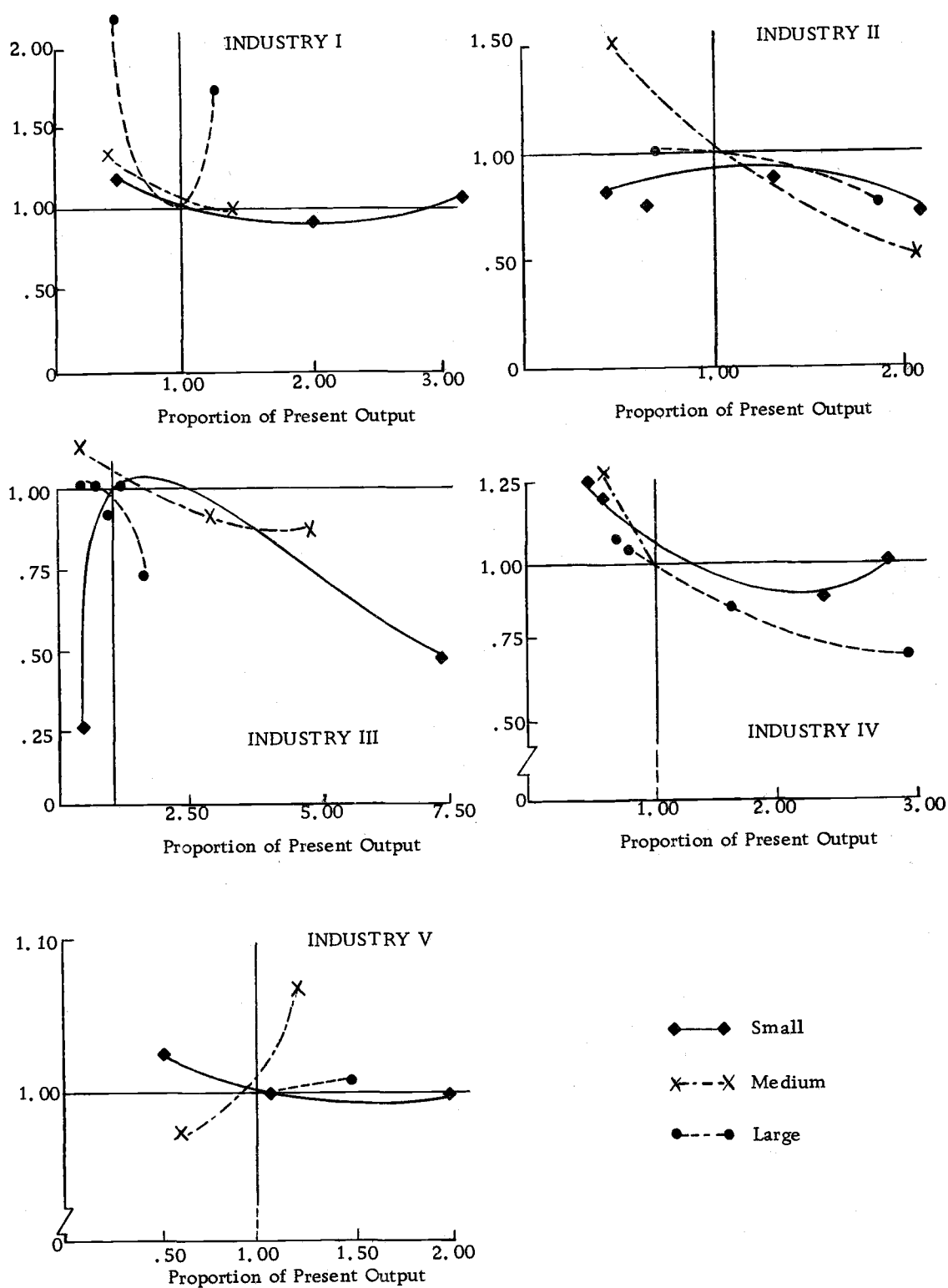


Figure 36. Average variable costs with alternate levels of output (computed as proportions of present average variable costs).

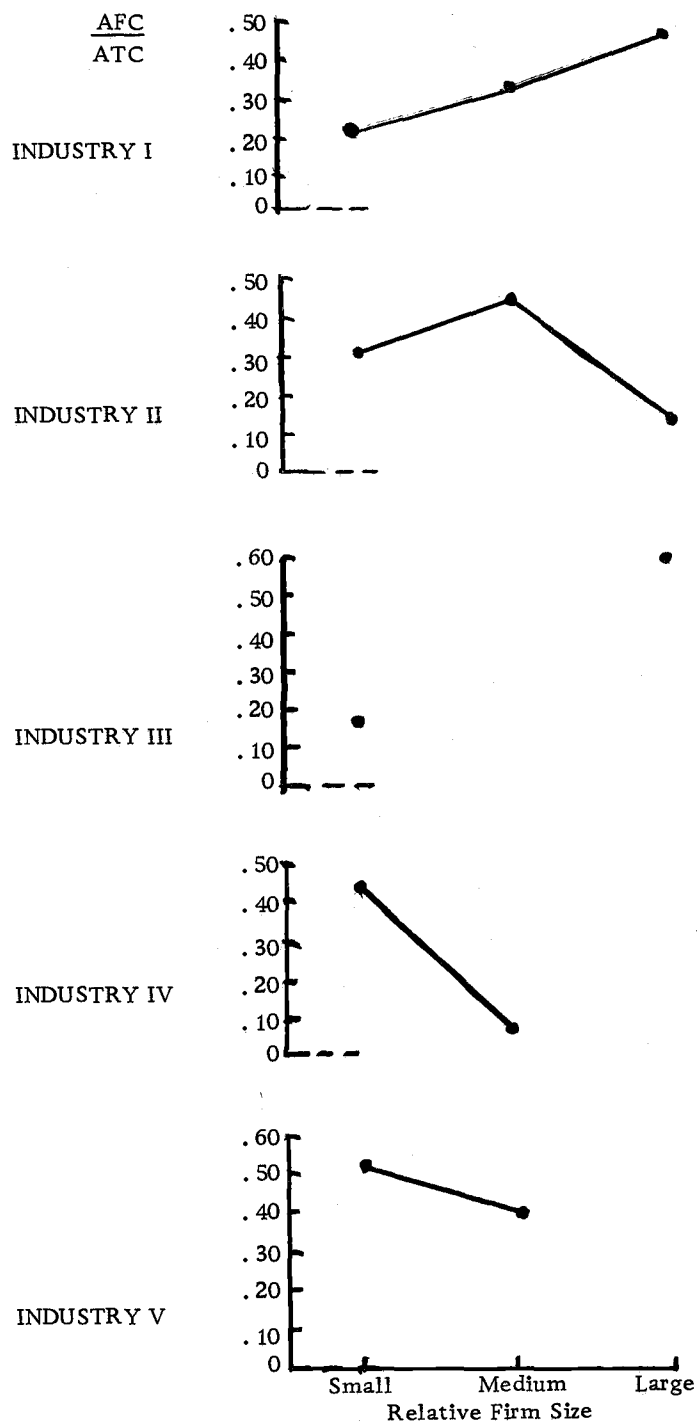


Figure 37. Inter-firm comparison of present levels of capital intensity of production.

Table 33. Inter-firm comparison of present levels of capital intensity of production (AFC/ATC).

Industry	Firm Size		
	Small	Medium	Large
I	.23	.32	.45
II	.31	.44	.135
III	.17		.59
IV	.43	.06	
V	.52	.40	

Table 34 and Figure 38 summarize these findings. The collection of the data is described above (p. 161f) in the discussion of Table 32, which is composed of part of the same data. Trends can be more readily identified in Table 35 and Figure 39, which show the fixed cost portion of the previous table and graph in relative terms (i.e., fixed costs are expressed in terms of proportions of the present fixed cost for each firm). Only two of these 11 firms (the small firm in Industry I and the large firm in Industry III) failed to show consistent decreases in capital intensity of production with each proposed output increase. If the capital intensity of production decreases, the firms must either incur economies of scale in average total costs (Table 36 and Figure 40) or diseconomies of scale in average variable costs (Table 32 and Figure 36).

A comparison of relative investment per unit at various relative

Table 34. Capital intensity of production at various relative levels of output (AFC/ATC:AVC/ATC).

Firm Size Industry		Small				Medium			Large			
I	Prop'n of Present Output	.50	1.00	1.25	3.13	.50	1.00	1.31	.50	1.00	1.21	
	$\frac{AFC}{ATC} : \frac{AVC}{ATC}$	19:81	23:77	21:79	34:76	41:59	32:68	27:63	34:66	45:55	46:54	
II	Prop'n of Present Output	.50	.65	1.00	1.30	2.08	.50	1.00	2.00	.75	1.00	1.85
	$\frac{AFC}{ATC} : \frac{AVC}{ATC}$	51:49	47:53	31:69	29:71	25:75	50:50	44:56	41:59	16:84	14:86	10:90
III	Prop'n of Present Output	.50	1.00	7.50					.70	.75	.79	1.00 1.10 1.55
	$\frac{AFC}{ATC} : \frac{AVC}{ATC}$	15:85	17:83	13:87					62:38	66:34	61:39	59:41 57:43 66:34
IV	Prop'n of Present Output	.50	.64	1.00	2.36	2.86	.60	1.00				
	$\frac{AFC}{ATC} : \frac{AVC}{ATC}$	55:45	50:50	43:57	33:67	29:71	7:93	6:94				
V	Prop'n of Present Output	.50	1.00	1.05	2.00		.60	1.00	1.20			
	$\frac{AFC}{ATC} : \frac{AVC}{ATC}$	68:32	52:48	51:49	35:65		53:47	40:60	35:65			

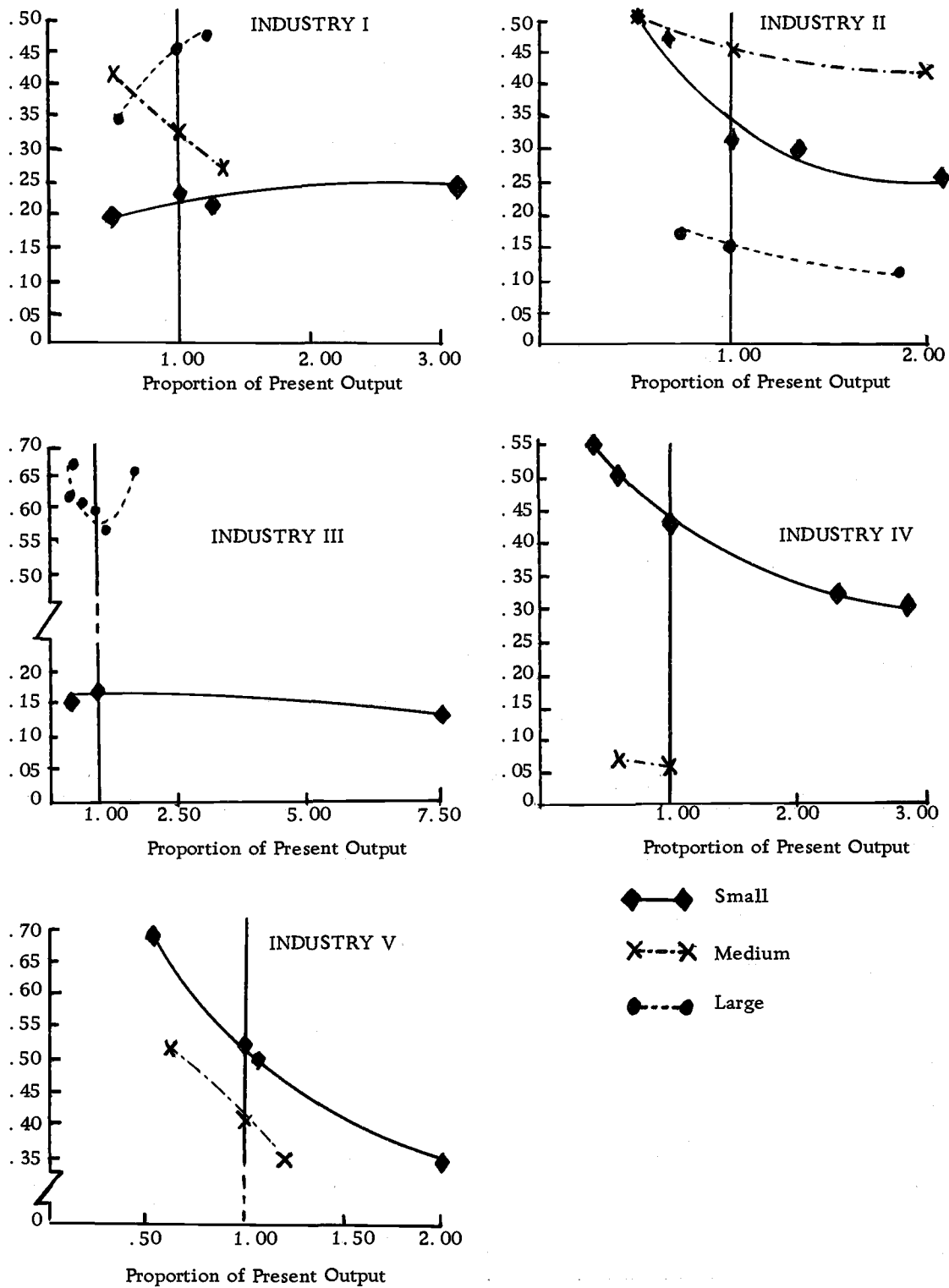


Figure 38. Capital intensity of production at various relative levels of output
(computed as AFC/ATC^*).

*Similar graphs are not included for a comparable measure of variable costs, since all such lines will be just the inverse of those above.

Table 35. Relative capital intensity of production at various relative levels of output.

Firm Size Industry		Small				Medium			Large			
I	Prop'n of Present Output	.50	1.00	1.25	3.13	.50	1.00	1.31	.50	1.00	1.21	
	Prop'n of Present AFC/ATC	.83	1.00	.91	1.04	1.28	1.00	.84	.76	1.00	1.02	
II	Prop'n of Present Output	.50	.65	1.00	1.30	2.08	.50	1.00	2.00	.75	1.00	1.85
	Prop'n of Present AFC/ATC	1.65	1.52	1.00	.94	.81	1.14	1.00	.93	1.19	1.00	.74
III	Prop'n of Present Output	.50	1.00	7.50					.70	.75	.79	1.00 1.10 1.55
	Prop'n of Present AFC/ATC	.88	1.00	.76					1.05	1.12	1.03	1.00 .97 1.12
IV	Prop'n of Present Output	.50	.64	1.00	2.36	2.86	.60	1.00				
	Prop'n of Present AFC/ATC	1.28	1.16	1.00	.77	.67	1.17	1.00				
V	Prop'n of Present Output	.50	1.00	1.05	2.00		.60	1.00	1.20			
	Prop'n of Present AFC/ATC	1.31	1.00	.98	.88		1.33	1.00	.67			

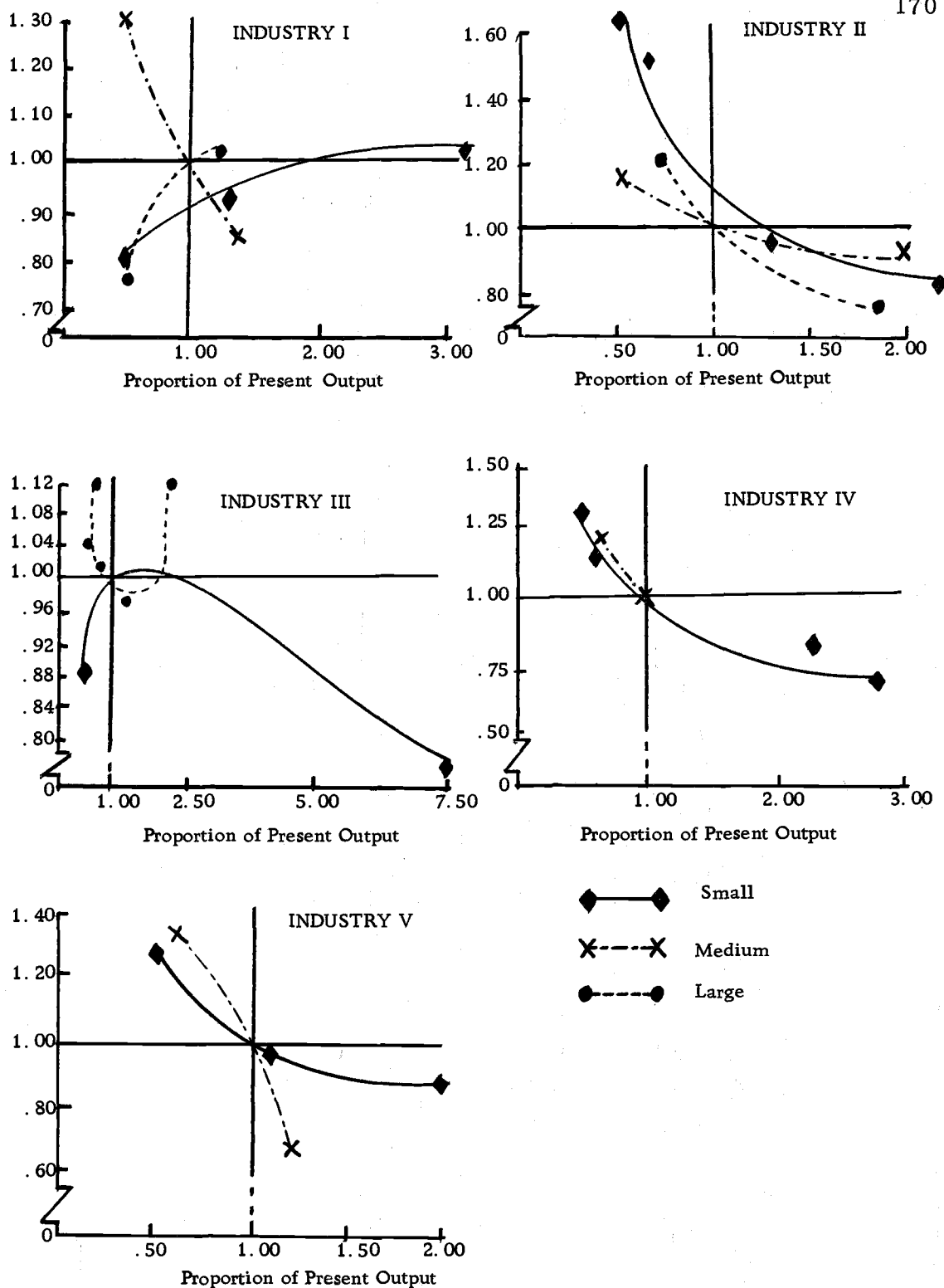
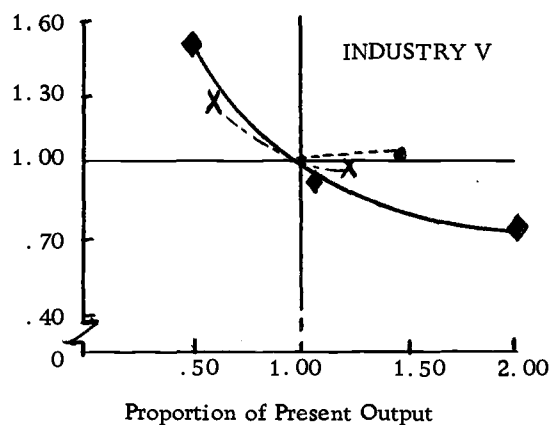
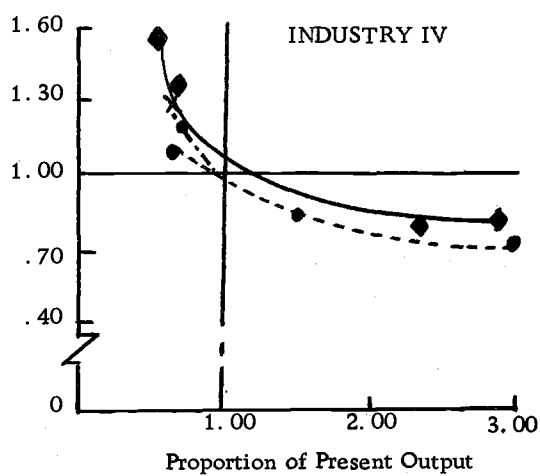
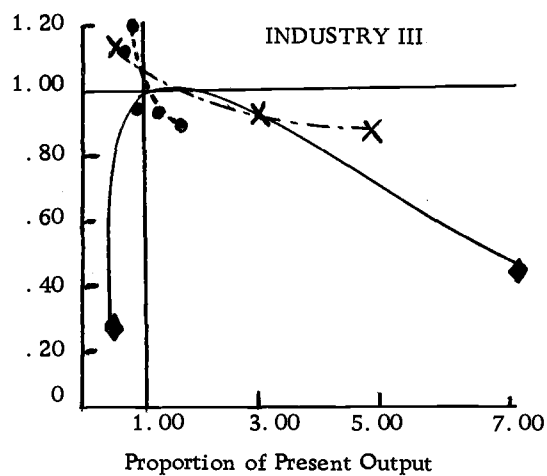
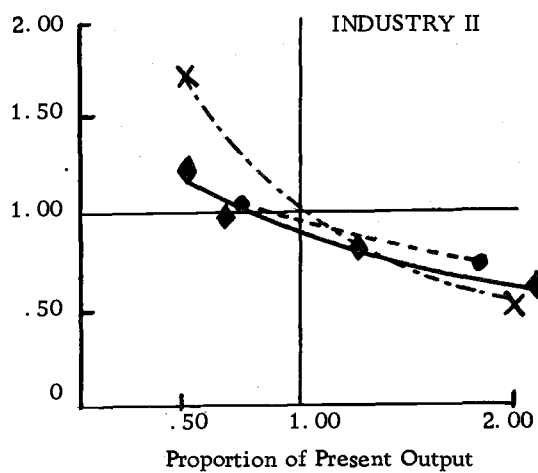
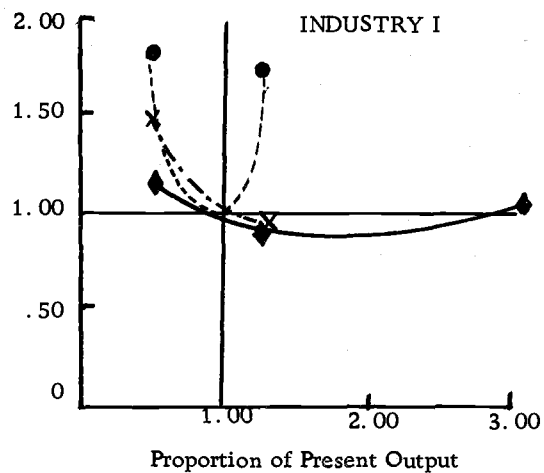


Figure 39. Relative capital intensity of production at various relative levels of output
(computed as $\frac{AFC/ATC}{\text{Present } AFC/ATC}^*$)

*Similar graphs are not included for a comparable measure of variable costs, since all such lines will be just the inverse of those above.

Table 36. Average total costs at various relative levels of output.

Firm Size Industry		Small					Medium				Large					
I	Prop'n of Present Output	.50	1.00	1.25	3.11		.50	1.00	1.31		.50	1.00	1.21			
	Prop'n of Present ATC	1.18	1.00	.94	1.05		1.51	1.00	.95		1.82	1.00	1.74			
II	Prop'n of Present Output	.50	.65	1.00	1.30	2.08	.50	1.00	2.00		.75	1.00	1.85			
	Prop'n of Present ATC	1.21	1.00	1.00	.83	.64	1.71	1.00	.53		1.04	1.00	.72			
III	Prop'n of Present Output	.50	1.00	7.50			.50	1.00	3.00	5.00	.70	.75	.79	1.00	1.10	1.55
	Prop'n of Present ATC	.26	1.00	.43			1.11	1.00	.92	.86	1.08	1.20	.96	1.00	.95	.89
IV	Prop'n of Present Output	.50	.64	1.00	2.36	2.86	.60	1.00			.75	.90	1.00	1.50	3.00	
	Prop'n of Present ATC	1.57	1.34	1.00	.76	.80	1.27	1.00			1.07	1.02	1.00	.80	.70	
V	Prop'n of Present Output	.50	1.00	1.05	2.00		.60	1.00	1.20				1.00	1.50		
	Prop'n of Present ATC	1.54	1.00	.98	.74		1.26	1.00	.99				(AVC) 1.00	1.01		



◆—◆ Small
 ×---× Medium
 ●---● Large

Figure 40. Average total costs at various levels of output (computed as proportion of present ATC).

output levels is shown in Table 31, p. 159, and Figure 35, p. 160.

All three firms in four industries have essentially identical curves showing relative investment per unit of average annual output. This further justifies attributing diseconomies to non-capital expenses.⁴⁰

Information concerning firms' reactions to a 50 percent decrease in industry demand was obtained on line 3, column 2, of Section III of the questionnaire (see page 230) and is summarized in Table 37 and Figure 41. Four firms (including three medium sized firms) were considered capable of continuing production at current levels. Evidently these managers consider the competitive capabilities of their firms, under severe industry stress, to be superior to the bulk of the remainder of the industry such that industry (output) losses would be absorbed by firms other than their own. In the case of firms for which the selling market is not the primary constraint (see Table 10, p. 99), such a possibility may be plausible. This was the case for three of the above four firms. It is less credible for the one firm which cited the selling market as the primary factor in determining present level of output. In either case, the answer is highly subjective. Since the proportionate share of the industry decrease (50 percent) is less in absolute terms for the small firm than the large, a small firm's share of the loss would be more easily absorbed by its

⁴⁰ This implies a necessary assumption that depreciation rates would not be significantly changed with changes in output.

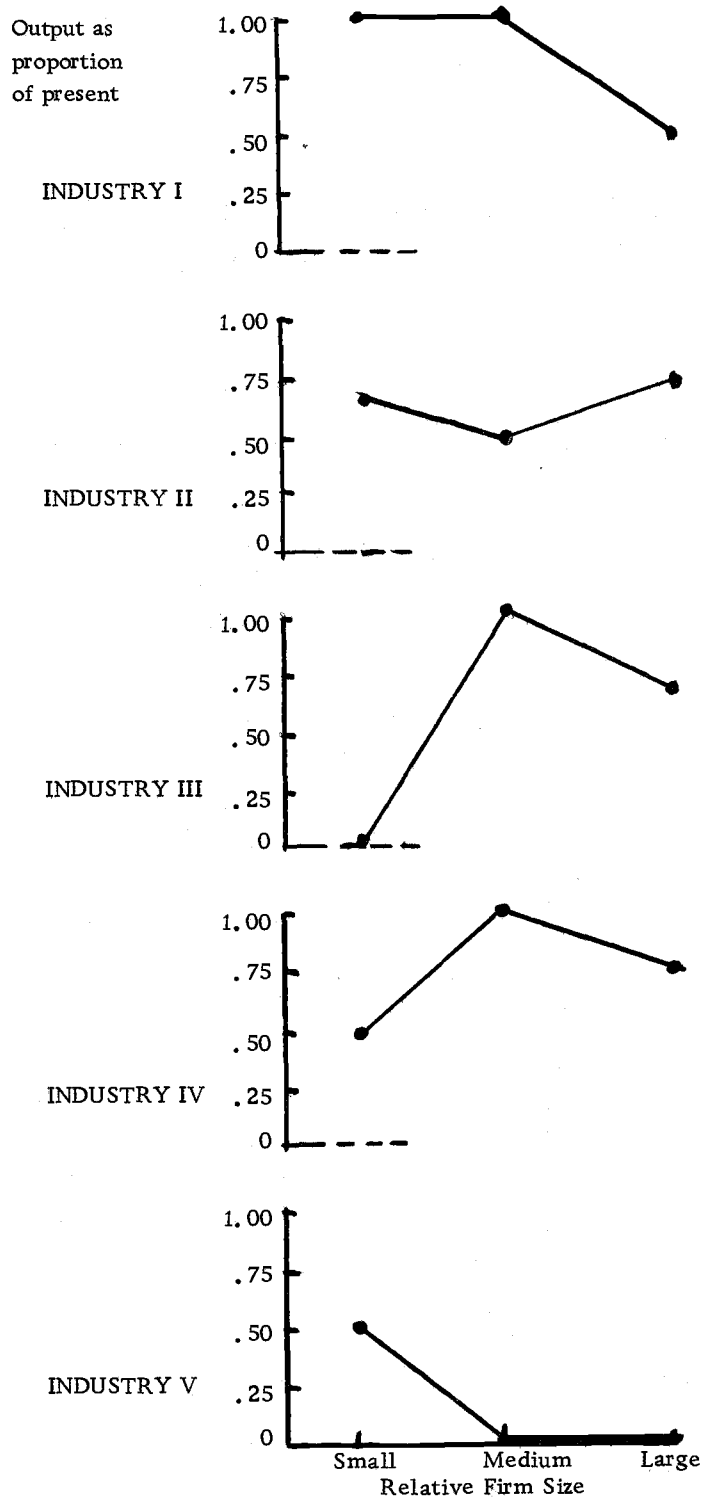


Figure 41. Firm output resulting from 50% reduction in industry demand.

competitors than would a large firm's share, *ceteris paribus*.

Table 37. Firm output resulting from 50 percent reduction in industry demand (computed as proportion of present output).

Industry \ Firm Size			
	Small	Medium	Large
I	1.00	1.00	.50
II	.65	.50	.75
III	0	1.00	.70
IV	.50	1.00	.75
V	.50	0	0

However, three of the firms (the small firm in Industry III and the medium and large firms in Industry V) would be forced out of production. Managers of these firms believe their firms are unable to compete successfully enough to maintain the necessary relative position in the industry. The resultant absolute level of output would be insufficient to enable production at an average cost below present selling price. The remaining eight firms would decrease the volume of their output from 25 to 50 percent. Five of the eight would (or could) make no reduction in investment and would thus be forced to incur higher average fixed costs at this lower level of output. Savings in variable costs were commensurate with the quantity decrease in only one firm. Thus, average variable costs as well as

average fixed costs were generally anticipated to increase with the decrease in output. Only one firm (the small firm in Industry III) noted the availability of total cost savings to be realized by a (forced) decrease in output.⁴¹

Selling Costs

Total selling costs (Table 38 and Figure 42) and selling costs per unit (Table 39 and Figure 43) for the intermediate sized firms exceed those for the small firms in four out of the five industries. Selling costs per unit as a proportion of ATC show similar relationships between small and intermediate firms (Table 40 and Figure 44).

Selling costs per unit for the large firms exceeded those for the medium sized firms in only three industries. The large firms incurred a higher proportion of ATC in the form of selling costs in two industries and an equal proportion in a third industry.

The prominence of the medium firms in an analysis of the selling costs within the industries studied serves to specify part of the emphasis used by these firms in their intensive drive for improved relative position. Since the medium firms do not incur peculiarly

⁴¹ In that case, cessation of much of the current operation would take place and a significant portion of the current activities of the firm would be sub-let on a custom basis to other firms. The interviewee did not believe the firm is of economic scale at present. This is consistent with the consideration that this custom operation would be an economically profitable change.

Table 38. Total non-promotional selling costs incurred by firms--most recent full crop year.

Industry	Firm Size		
	Small	Medium	Large
I	1.00*	.6575	10.1250
II	0	1.00	3.6432
III	1.00	3.1381	13.6192
IV	"very small"	1.00	17.8571
V	1.00	23.6752	40.7694

* Because of the confidential nature of this information, costs are presented as indices. The smallest firm which incurred identifiable selling costs in each industry is arbitrarily assigned an index of 1.00. Indices for other firms within the industries are proportional.

Table 39. Non-promotional selling costs per unit incurred by firms--most recent full crop year.

Industry	Firm Size		
	Small	Medium	Large
I	1.00*	.44	.90
II	0	1.00	1.04
III	1.00	1.26	.97
IV	"very small"	1.00	3.79
V	1.00	3.98	2.14

* Because of the confidential nature of this information, costs are presented as indices. The smallest firm which incurred identifiable selling costs in each industry is arbitrarily assigned an index of 1.00. Indices for other firms within the industries are proportional.

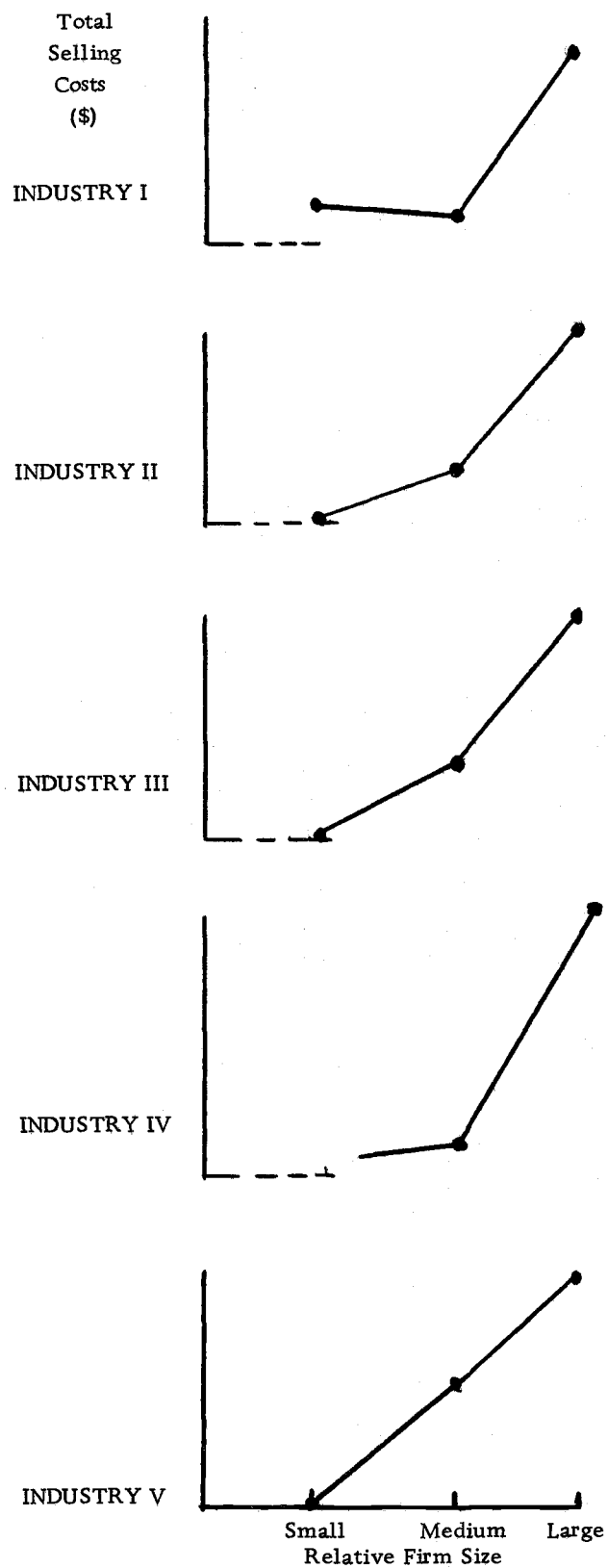


Figure 42.. Total non-promotional selling costs incurred by firms--most recent full crop year.

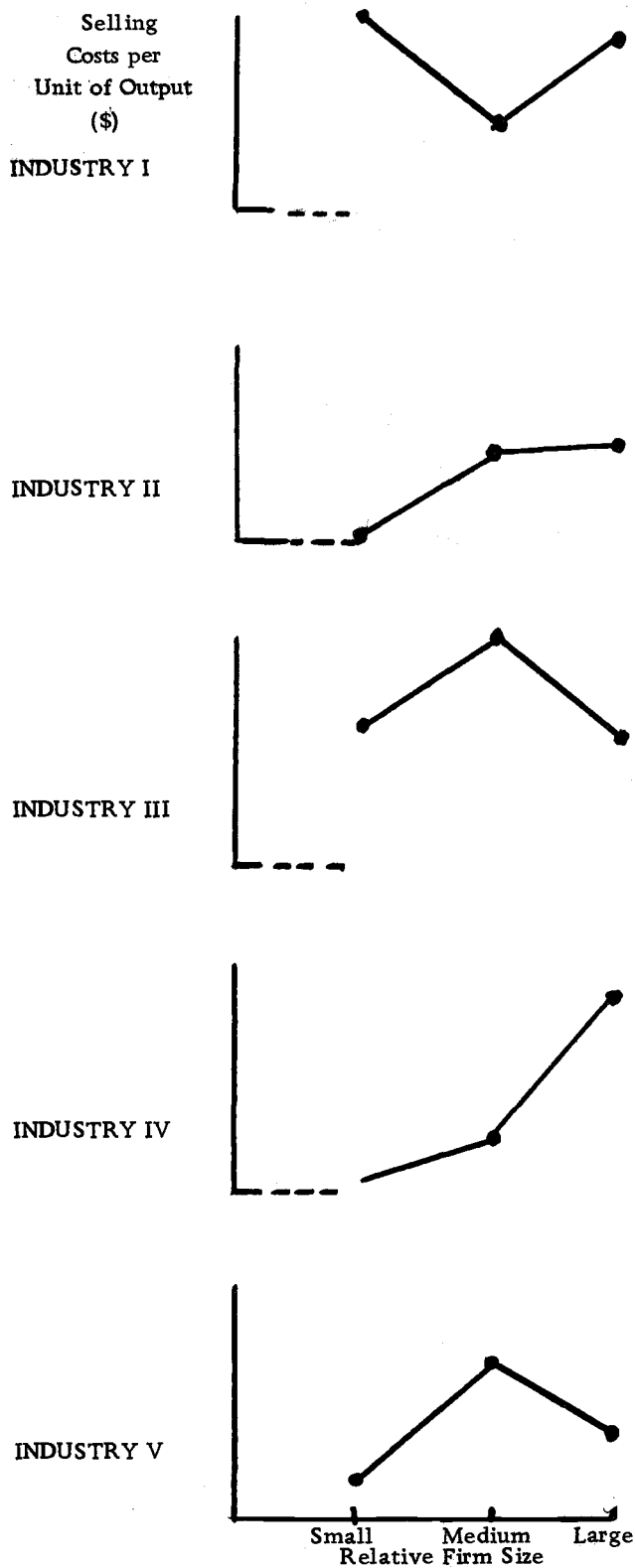


Figure 43. Non-promotional selling costs per unit incurred by firms--most recent full crop year.

high ATC's, the high selling costs are evidently incurred at the sacrifice of some other expenditure (e.g., product differentiation; see p. 148).

Table 40. Non-promotional selling costs as proportion of total costs --most recent full crop year.

Industry	Firm Size		
	Small	Medium	Large
I	.13	.06	.11
II	0	.13	.12
III	.05	.12	.12
IV	"very small"	.05	.17
V	.06	.23	.16

It has been shown (p. 153f) that four of the five industries are characterized by relatively consistent economies or diseconomies of scale within each industry. Thus, the steady ATC trends and the peculiar position of the intermediate size firms in proportional selling costs indicates that small firms in some industries and large firms in others are not minimizing average non-selling costs. However, since these firms are small in some industries and large in others, this study has revealed no consistent relationship of concentration to discretion for reduction of (unspecified) non-selling costs.

Williamson (1964) has cited evidence from manufacturing industries that cost cutting is available to large firms more than to small

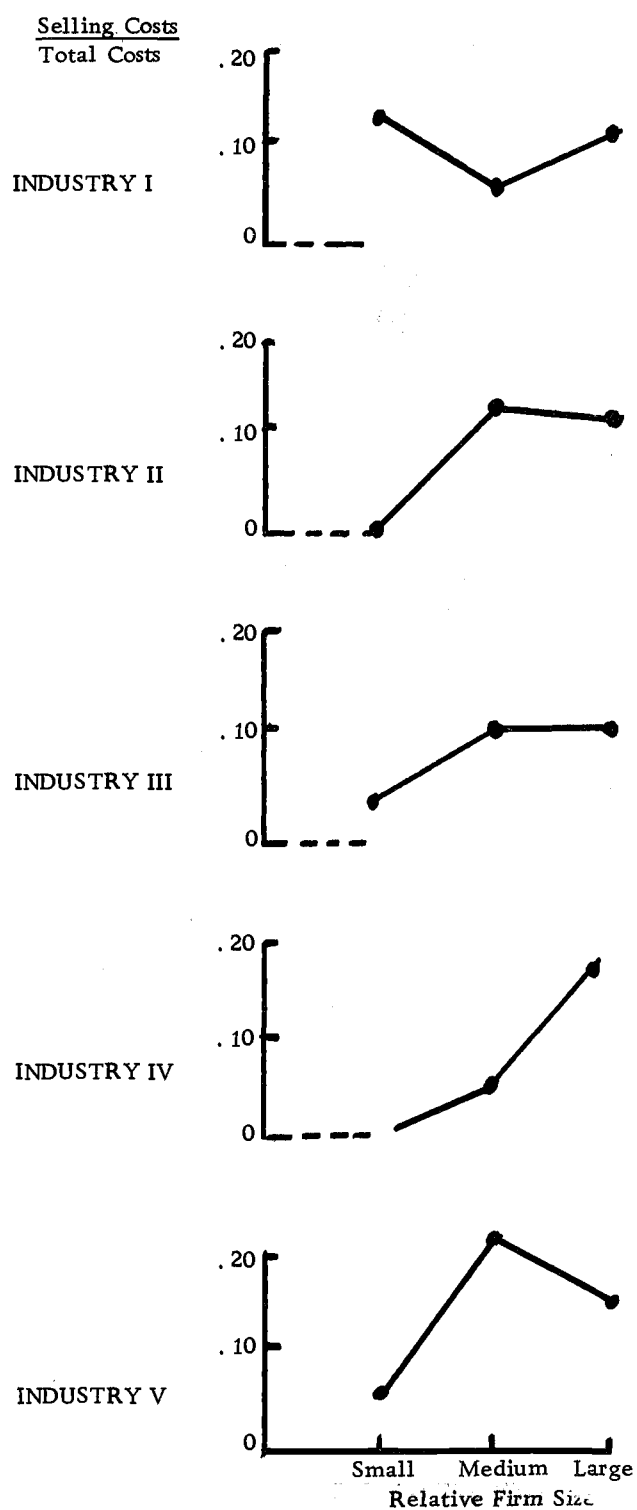


Figure 44. Non-promotional selling costs as proportion of total costs--most recent full crop year.

firms. This study in agricultural processing has found no indication that discretion to cut non-selling or total costs below the present level is consistently correlated with relative firm size. However, the medium sized firms more frequently do exercise this discretion to incur lower non-selling costs and utilize these savings in the form of increased selling costs.

Competitive Actions

Question 8, p. 232 and the questions at the bottom of page 235 to some extent, were designed to identify efforts to secure a product order which might otherwise go to a competitor, i. e., to maintain or expand the firm's share of industry demand.⁴² To determine the net effect of each individual competitive practice on the output level of each firm, a separate inquiry was made to identify the impact on the firm if all firms in the industry were to cease each such competitive practice. Respondents generally saw no mixture of benefits and detriments. That is, no manager envisioned the cessation of one or more competitive actions throughout the industry to be beneficial to his firm while the cessation of some other such action to be detrimental. Thus, the total current effect of all identified competitive

⁴² Among the competitive actions which were mentioned are personal contact with the buyer, bulletins, credit, loan of equipment, services, price competition, packaging, financial assistance to buyers, and advertising allowances.

actions on a firm can accurately be stated as positive or negative.

Firms were almost evenly divided whether industry-wide cessation of all competitive actions would help or hurt them (Table 41).

The inconsistent impact on the intermediate sized firms shows they are not (admittedly) implementing their strong competitive drive by utilizing methods peculiar to their specific firms. Rather, they appear to be utilizing methods relatively common in their respective industries but are not conscious of the relative intensity of utilization or relative success of their use of these methods. Had they identified these competitive actions as the source of their relative growth, they would have consistently expected to be hurt by the cessation of competitive actions on which their success has been predicated. However, those interviewed may have anticipated being able to continue in their overall relative competitive capacity by inaugurating new measures.

Table 41. Impact of cessation of all individual competitive actions within the industries.

Firm Size Industry			
	Small	Medium	Large
I	0	-	+
II	+	+	-
III	+	-	+
IV	0	0	-
V	0	+	-

0 = no impact on industry position

+= anticipated gain

- = anticipated loss

Demand Elasticity

The first parts of questions five and six, p. 231f (concerning the maximum and minimum quantities which could be sold by the firm at present prices) were asked to test for awareness of output restrictions imposed by average total costs. Later parts of these same questions dealt with prices anticipated at each of these maximum and minimum levels of output if the assumption of constant prices were relaxed. The result for each firm is the manager's estimate of the price change, if any, which would result from each of a maximum of two changes from the present output--one increase and one decrease (Table 42 and Figure 45). The three or less price-quantity combinations represent indications of the market conditions faced by that particular firm and, thus, indicate the general character of the manager's impression of the product demand faced by the firm. Demand elasticities as viewed by those interviewed generally decreased with increased relative firm size over any range of relative output.⁴³

The only exceptions were instances where more than one firm in a given industry faced infinitely elastic demands over comparable

⁴³ Although products differ somewhat between firms within each industry, there appears to be no consistency of relationship between relative firm size and identity of firms which produce the most specialized product (see p. 136n, and 139 above) or the product which would be expected to have the least elastic demand.

Table 42. Point elasticities of demand (derived from price-quantity relationships identified by managers).

Industry	Firm Size	Relative Output (minimum)*	Demand Elasticity	Relative Output (present)	Demand Elasticity	Relative Output (maximum)*
I	Small	(.63)	- ∞	(1.00)		
	Medium	(.65)	- 26.26	(1.00)		
	Large	(.11)	- 7.12	(1.00)	- 6.24	(1.39)
II	Small	(.50)	- 17.42	(1.00)	- ∞	(3.00)
	Medium			(1.00)	- 20.00	(1.60)
	Large	(.80)	- 3.95	(1.00)	- 5.00	(1.20)
III	Small	(.90)	- ∞	(1.00)		
	Medium	(.15)	- ∞	(1.00)	- ∞	(3.00)
	Large	(.86)	- 2.00	(1.00)	- 6.45	(1.71)
IV	Small	(.81)	- ∞	(1.00)	- ∞	(1.79)
	Medium	(.59)	- ∞	(1.00)		
	Large	(.75)	- 3.08	(1.00)	- 5.00	(1.25)
V	Small	(.71)	- ∞	(1.00)		
	Medium	(.80)	- ∞	(1.00)	- ∞	(1.08)
	Large	(.88)	- ∞	(1.00)	- ∞	(1.25)

* "Minimum" and "maximum" relate to methods of determination of demand for these specific firms and are not relevant to the elasticities presented here. These relative output levels are included here solely to indicate the ranges of firm output for which the elasticity figures apply.

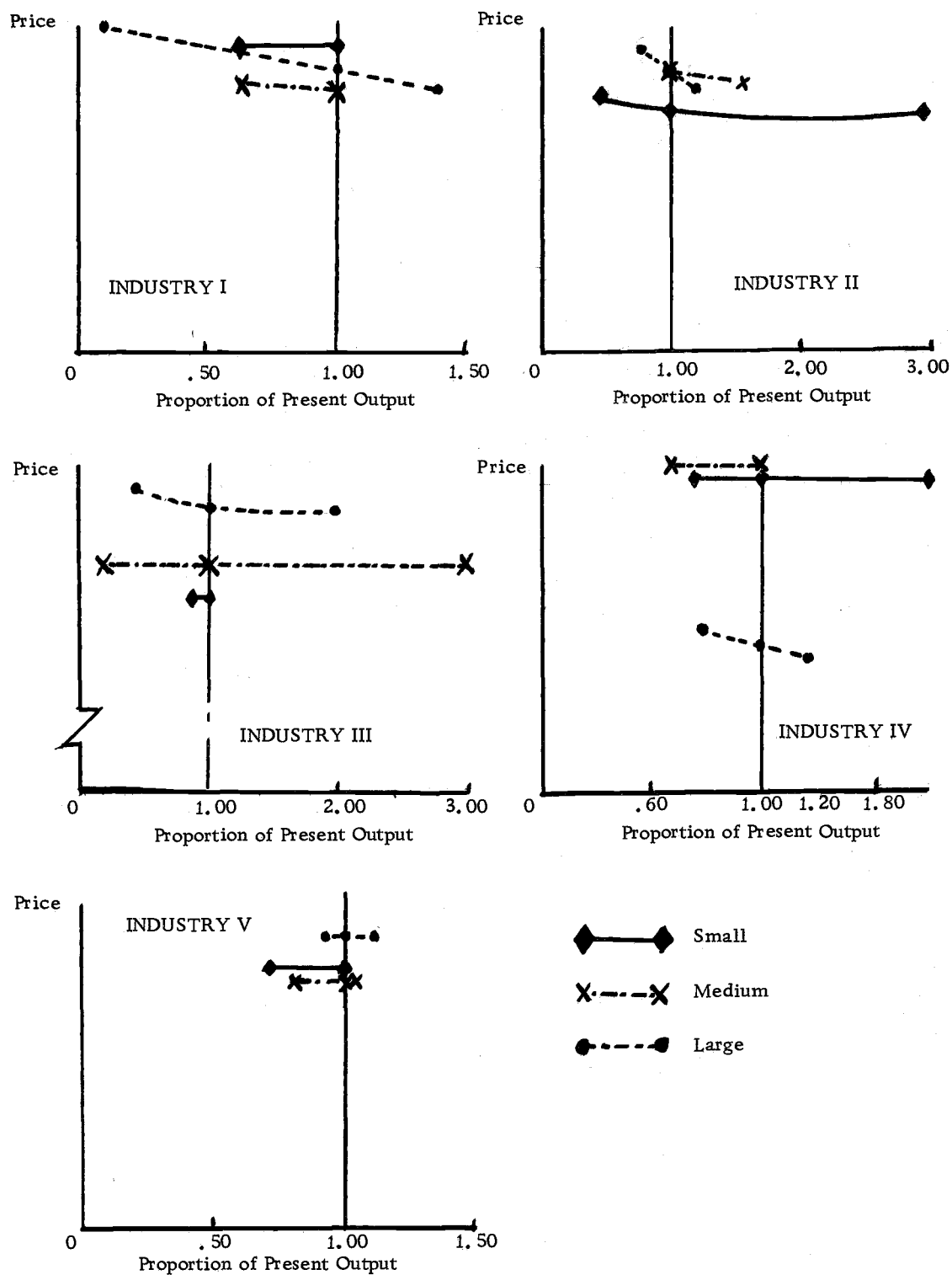


Figure 45. Individual firm demand curves (derived from price-quantity relationships identified by managers).

ranges of relative output. There was no indication of instances in which elasticity of demand increased with an increase in relative firm size.⁴⁴

It has been stated above (p. 137) that the medium sized firms actually incur lower rather than higher product differentiation costs. This trend from small to medium sized firms would be in keeping with the realization that either product differentiation or increased relative size serve to decrease elasticity of demand and give the firm greater pricing discretion within the market. The medium sized firms are evidently benefiting from elasticity implications of relative size and are thus foregoing alternate product differentiation expenditures.

Profits

The impact of severe reductions in industry demand was discussed on p. 173f. In addition, interviewing also involved consideration of the profit impact of milder (ten percent) changes in output level (see question seven, p. 232). The specific alternate output levels were identified for each firm. Potentially relevant cost and price factors were discussed separately and resultant adjustments

⁴⁴I. e., $\Delta\eta/\Delta S \leq 0$, where S = relative firm size. Notice that the statements concerning ordinal magnitude of elasticities deal with the absolute values of the elasticity figures, since the negative sign is ignored.

in original estimates were made.

No consistency is noted in the relationship of relative firm size to profit impact of a ten percent increase in total output (Table 43 and Figure 46). Divergencies ranged from a 15 percent reduction in loss to profit increases ranging from 2 to 65 percent and "less than" 162 percent. Apparently benefits of relative expansion are unrelated to current relative firm size.

Table 43. Anticipated profit at 110% of present output
(calculated as a proportion of present profit).

Firm Size Industry			
	Small	Medium	Large
I	. 85 (loss)	1. 17	1. 02
II	1. 65	1. 13	1. 25
III	1. 11	1. 10	1. 13
IV	1. 27	≥ 1. 10	1. 12
V	1. 10	< 2. 62	1. 10

Nine of the fifteen firms considered the profit impact of a ten percent decrease in output to be the approximate converse of a similar increase (Table 44 and Figure 47). The remaining six answers ranged from "no profit" to "little decrease from the present". Thus, the profit impact of a similar relative decrease in output appears unrelated to industry concentration, comparable to the benefits from a similar relative increase in output.

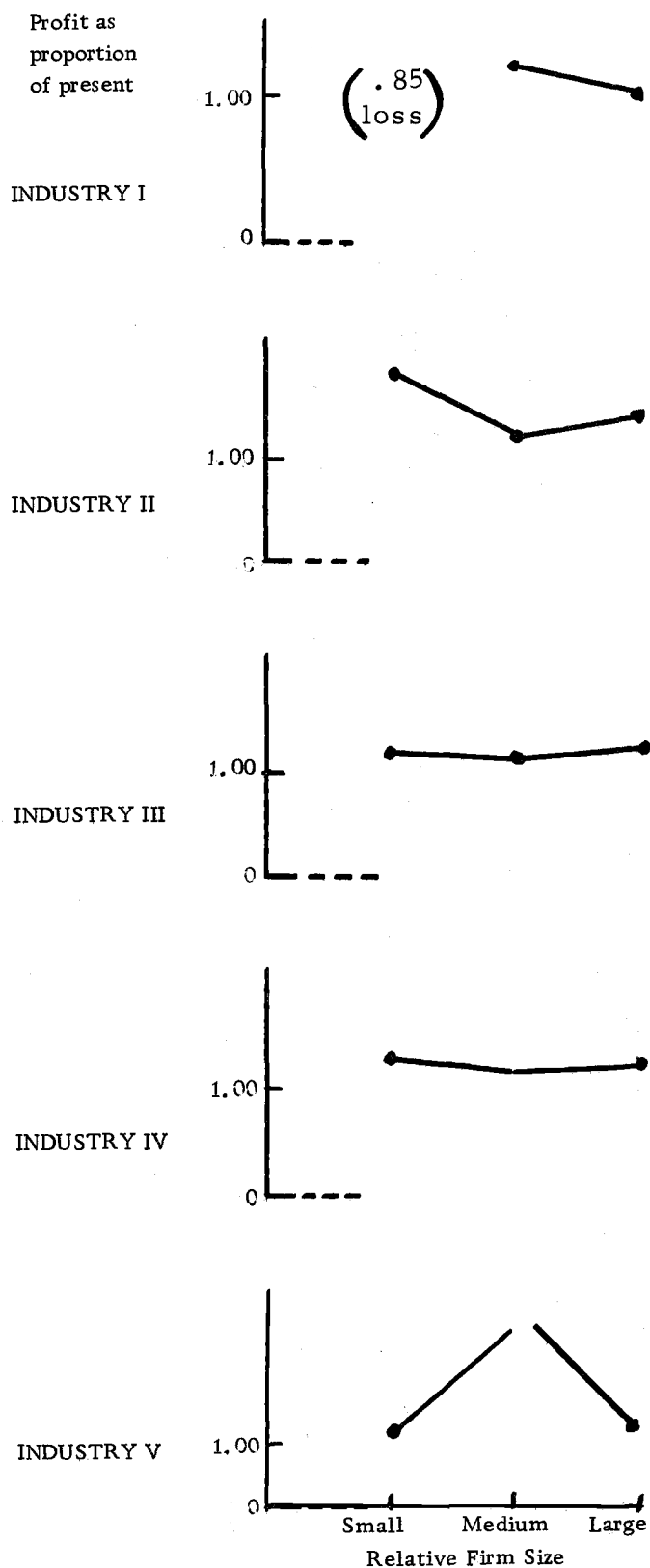


Figure 46. Anticipated profit at 110% of present output (computed as a proportion of present profit).

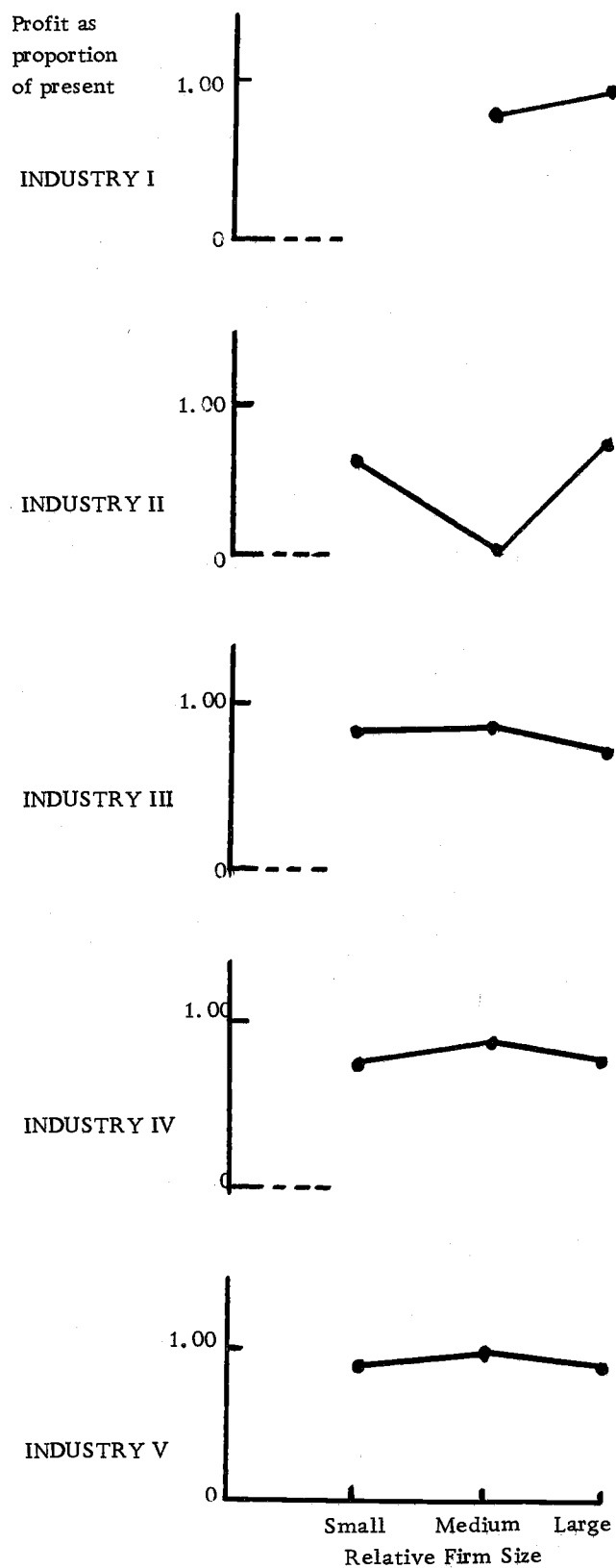


Figure 47. Anticipated profit at 90% of present output (computed as a proportion of present profit).

Table 44. Anticipated profit at 90 percent of present output
(calculated as a proportion of present profit).

Industry	Firm Size		
	Small	Medium	Large
I	*(sic)	.85*	.98*
II	.61*	0	.75
III	.90*	.91*	.88*
IV	.79*	.95	.89*
V	.90*	1.00	.90

* Profit change represents the converse of the impact at a ten percent increase in profit.

Summary

This chapter has included a discussion of inter-firm comparisons of several factors which are more remotely related to the eight hypotheses discussed earlier. Such factors have included processing and selling costs, competitive actions, pricing flexibility, demand elasticity, and profit. A discussion of the implications of these findings followed.

The chapter which follows presents a brief summary of the approach utilized in the research, the findings which resulted, and the conclusions drawn therefrom.

CHAPTER 8

SUMMARY AND CONCLUSIONS

This research was designed to empirically test the applicability of commonly accepted market structure theory to managerial decision making within agricultural processing industries. Thus, the hypotheses took the form of eight statements from economic theory regarding behavioral implications of the structure of markets within which firms operate.

Two approaches to market structure (measured by industry concentration) are utilized in the theory from which the eight hypothetical statements are derived. The approach which infers firm behavior solely from the number of firms in an industry by ignoring heterogeneity of firm size is designated as the algorismic approach. The approach which predicts behavior from the aggregate proportion of total industry output produced by a given absolute number of the largest firms in the industry may be called the physiognomic approach. This approach recognizes heterogeneity of firm size but ignores the possibility that firms of different relative sizes may be influenced in dissimilar manners by the same market.

The apparent necessity to relate behavioral implications to the relative size of the firm whose behavior is influenced has

resulted in the reagency approach to market structure. This approach requires that the behavioral definition of the structure of a given market varies in a given industry with each change in identity of the influenced firm serving as a point of reference.

Because of the importance of the variation in relative firm size, data were obtained from three firms of widely differing relative sizes in five agricultural processing industries. Data collection took the form of (1) tape recorded (when permissible) depth interviews with presidents, general managers, and marketing managers of the firms involved, and (2) analysis of records of the sampled firms and related commodity organizations.

Analysis has been primarily by inter-firm, intra-industry comparisons of the results of various managerial decisions and by inter-industry comparison of the relationships noted within each industry.

Product Price

It was hypothesized that product prices increase with increased concentration, since the elasticity of demand for the output of a firm (hence, the relative profitability of output expansion) is theoretically inversely related to the prominence of the firm in the industry.

Only seven intra-industry, inter-firm comparisons indicate that product prices increase with an increase in relative firm size,

as hypothesized. Four such comparisons indicate that prices vary inversely with changes in relative firm size while the remaining four show prices to be constant with such changes. Thus, the hypothesis may be accepted only with reservations.

Profit rates and managers' estimates of their discretion to reduce prices were analyzed to explain the relationship, if any, of prices and pricing practices to industry concentration. Ten of the fifteen inter-firm comparisons show that profit per unit of output increased with increases in relative firm size. Eleven of fifteen comparisons revealed that managers' estimates of their firms' discretion to reduce prices (without incurring losses which would be prohibitive to the continued operation of the firm) increased with increasing relative firm size.

Thus, profits per unit of output and managers' estimates of their discretion to reduce prices (without prohibitive losses) are generally positively correlated with industry concentration. From this evidence, it would appear that identified minimum prices for the firms involved are negatively correlated with concentration, although actual and maximum prices are not. If this negative correlation actually exists, it would mean that the difference between price and costs would be positively correlated with concentration, i.e., firm behavior as evidenced in price-cost relationships would be correlated with industry concentration as proposed by Robinson

(1934), Chamberlin (1939), etc. Price-cost data, which are more objective estimates of discretion to inaugurate changes under *mutatis mutandis* conditions, do not indicate such a conclusion, however, unless discretion to reduce costs is also positively correlated with relative firm size.

Firms in three industries supplied evidence that price leadership (particularly with downward price changes) is exercised by the small firms. More rapidly decreasing long run average total costs commonly assumed for such firms would provide evidence from supply considerations that these firms would be more likely to prefer increased output. The more elastic demand curves faced by these firms in the presence of effective product differentiation, *ceteris paribus*, would point to a similar conclusion with a rationale from the demand side of the market. The firm seeking to decrease market price will be the firm to sell the product in a market characterized by conflicting price aspirations by sellers (barring prohibitive non-price competition by other firms). This fact indicates the effectiveness of the efforts to reduce price.

In summary, industry concentration as delineated by the re-agency approach may influence pricing behavior in agricultural processing--not so much by directly determining the price level but rather by determining the process by which prices are set.

Price Discounts

Because of the hypothesized higher prices under more concentrated industry conditions, non-cost related price discounts were expected to be positively correlated with industry concentration. Thus, the ratio of actual/quoted price was hypothesized to vary inversely with concentration.

Little evidence was obtained for the existence of price discounts which are not identified with cost savings incurred in making the particular sale. The few apparent such discounts showed no consistent relation to industry concentration. However, if price determination by arbitration between buyers and sellers is interpreted to be a price discount because the final selling price is below the seller's initial price offer, discounts are indicated to be negatively correlated with concentration in three of the five industries tested. This could be due to the lesser need for arbitration with the increased market power which accompanies prominence within an industry or it could be due to the smaller firms' relative ease and profitability of segregating the demands of various buyers by careful timing of day to day price changes.

Firm Output

Firm output was believed to decrease with industry concentration, *ceteris paribus*. Thus, the hypothesis was proposed that the ratio of firms' actual output to that which would result if these firms faced competitive selling markets would decrease with increased concentration. A comparison of such ratios revealed no such relationship. In four of the industries the ratio was greater for the medium firms than for the small. The ratios for the two firms were equal in the fifth industry. There was no consistency of relationship between the medium and large firms' ratios. The hypothesis is thus rejected. The failure of the data to indicate the hypothesized relationships is in accordance with the failure of the closely related price results to support the relevant hypothesis.

The non-existence of inter-industry similarities of trends may be attributed in part to the hierarchy of factors which limit output level of firms (such as selling market, procurement market, and capital availability). This hierarchy is not constant for all firms within a given industry nor is it correlated with industry concentration. Thus, the removal of a single constraint such as the non-competitive elements of the selling market may not indicate the true total impact of these elements. In particular, the consistency of results obtained for the small firms may be due to the absolute limitation imposed

by the capital market, regardless of the relation of this factor to other constraints.

A second reason that the data do not appear as hypothesized may be that if larger firms are large because they have taken advantage of discretionary opportunities available to all firms in the industry, they may encounter less opportunity than smaller firms for further relative expansion with the removal of a given constraint. Some of the smaller firms face part of the opportunities for relative expansion already utilized by the large firms plus the opportunities still held but not exercised by the latter. If such is the case, a positively correlation between the actual/competitive output ratio and industry concentration might be expected.

Investment Level

Because of the implications of relative inelasticity of demand with increasing concentration, investment level was expected to be inversely correlated with concentration, *ceteris paribus*. The ratio of firms' actual investment level to that which would apply if they operated in a competitive selling market was hypothesized to decrease with increased industry concentration, primarily because of the similar phenomenon associated with firm output. Changes in investment were not expected to be proportional to changes in output because of accompanying changes in investment security, economies

or diseconomies of fixed costs, and possible changes in capital intensity of production in addition to the demand impact on investment level through output level.

Six inter-firm, intra-industry comparisons showed the relevant ratio decreased with increasing relative firm size, while five such comparisons showed the ratio increased and four showed no change. The hypothesis must thus be rejected, as would be expected from the rejection of the output hypothesis.

The medium firms were consistently observed to be especially aggressive and growth oriented in their business practices. They showed recent histories of more rapid growth than the average of the other firms and several measures of the various phases of business activity revealed their peculiarly dynamic approach to competition. Current levels of investment per unit of output were noted to be generally lower for the medium sized firms. However, this was not reflected in average total costs. This may indicate these firms have a higher preference for use of available funds as working capital as opposed to fixed investment than do the smaller or larger firms.

Output and Investment: Algorismic and Physiognomic Approaches

Rank order tests were utilized to evaluate the algorismic and physiognomic approaches to industry concentration for prediction of

the relative values of the output and investment ratios noted above.

(1) Conflicting indications where a high correlation of hypothesized and actual ordering of the industries was noted, and (2) the lack of evidence for an output conclusion where logically dependent investment ratios do correlate with concentration, discourage reliance on these approaches as behavioral guides to concentration measurement.

Frequency of Technical Innovation

The frequency of technical innovation was believed to increase with increased industry concentration. The ratio of the actual disposal age of various pieces of capital equipment to the age at which it would be economically obsolete was hypothesized to vary inversely with industry concentration. Because of problems in weighting various widely differing types of capital equipment, separate analyses were conducted for buildings, vehicles, and machinery.

An insufficient number of buildings was disposed of recently by the firms in the sample to warrant a conclusion.

The disposal ratios for the vehicles and machines of the large firms were generally as great as or greater than those for the other firms. Thus, these firms retain vehicles and machines to a more advanced stage of obsolescence, contrary to the original hypothesis. This ratio was also consistently equal to or greater than unity for these firms, but not for the other firms. Thus, the large firms are

consistently more tardy in their disposal decisions. The ratios for these firms was not consistently closer to unity than ratios for the other firms, dispelling any impression that their disposal decisions are nearer to the economic optimum.

The medium sized firms' ratios were consistently equal to or below unity. This would support the impression of these firms as cost conscious, growth oriented firms only if more frequent vehicle exchange contributes to a growth-promoting image.

The small firms' ratios for machines are generally less than unity, indicating more rapid adaptation of new technology or more frequent replacement necessitated by unwise prior machinery investment.

In summary, a lack of consistency of trend for the relevant ratios between firm sizes within the industries precludes acceptance of the hypothesis.

Flexibility of Investment

The flexibility of firms' investment in capital equipment was generally believed to decrease with increasing concentration. It is assumed that the smaller firms will need more flexibility because of their lesser control over industry behavior and their greater susceptibility to the vagaries of the remainder of the industry. The ratio of actual average total cost to hypothetical average total cost

without flexibility considerations was thus hypothesized to decrease toward unity as concentration increased.

Observed flexibility was attributed very largely to characteristics of the industries' technology selected for other reasons and, though present to significant degrees, apparently was not acquired for reasons related in any way to industry concentration. Since the expected trend was not evident, the hypothesis must be rejected. The flexibility which was reported is primarily a consideration of (1) supply rather than demand (changes in availability of raw product rather than the hypothesized variations in product demand), and (2) quantity rather than quality (periodic output variability resulting from changes in raw product supply as opposed to competitively necessitated changes in product design or characteristics). While flexibility is an important consideration in agricultural processing, it appears to be much less costly than originally anticipated. This is because the hypothesized bases for needs for flexibility are relatively minor in comparison to those actually considered by the firms. Economically advisable changes in products or processes are evidently slow enough over time that relevant alterations in investment can be and are made primarily as a part of changes required for long term growth.

Product Differentiation

Product differentiation was expected to vary directly with industry concentration. Thus, physical product differentiation as a proportion of average total costs was hypothesized to increase with increased industry concentration. This proportion was considered indicative of the relative attention given by the various firms to the differentiation of their products. It was hypothesized to vary as described because of the impact of industry concentration on the ability of a firm to separate the demand for its products from the demand for those of its competitors. The hypothesized trend was not observed in the data and the hypothesis is consequently rejected.

One noteworthy phenomenon was observed in the product differentiation costs, however. The ten inter-firm, intra-industry comparisons involving medium sized firms revealed that in only two cases did the medium sized firms incur higher total differentiation costs than another firm in the respective industry. Computation of these figures on a basis of average costs per unit of output or proportion of total costs showed that at least seven of the ten comparisons similarly emphasized these uncommonly low costs incurred by the medium firms. Evidently firms within this dynamic, growth-conscious group consistently de-emphasize product differentiation expenditures, relative to the other firms. Since these lower costs

are not accompanied by lower total costs for these firms, the medium sized firms appear to sacrifice expenditures for product differentiation in order to implement their drive to rapidly improve their relative position in the industry through aggressively selling a relatively undifferentiated product.

Advertising and Promotion

Similar to physical product differentiation mentioned above, differentiation of the potential buyers' image of firms' products was believed to vary directly with industry concentration. Consequently, the proportion of average total costs devoted to advertising and promotion was hypothesized to increase with increased concentration.

With a single exception, intra-industry, inter-firm comparisons revealed that total expenditures for advertising and promotion increased with relative firm size. Computation of these expenditures on a per unit basis (to remove the influence of absolute size) and as a proportion of total costs (to reveal firms' relative preference for these costs as opposed to alternatives) showed only three comparisons in fifteen in which advertising and promotion costs decreased with increasing firm size. The hypothesis is thus accepted.

Proposed Alternate Hypotheses

Since this research is a pioneering effort, a primary contribution was expected to be alternate hypotheses for further research (p. 5). Results and conclusions summarized above confirm this. Such hypotheses are noted below.

Managers of large firms believe their firms have more discretion to reduce prices, contrary to price and cost evidence. Thus, a hypothesis is proposed that "minimum prices (i.e., minimized per unit costs plus profits which are just sufficient to minimize opportunity costs) vary inversely with concentration."

If small firms have more rapidly decreasing long run ATC and/or more elastic demand, they would prefer lower prices and resultant output expansion, ceteris paribus. Benefit maximizing buyers encourage small firms to lower prices. Three industries gave evidence of downward price leadership by small firms. Thus, further study could test the premise that "small firms exercise downward price leadership in industries of heterogeneous firm size."

Most firms' output was limited mainly by either their procurement or sales market. However, the impact of removal of primary constraints was not correlated with concentration, due in part to

dissimilar hierarchies of factors limiting output. The impact of removing a given constraint and the interaction between constraints should be clarified by testing the hypothesis that "actual/competitive output ratios vary inversely with industry concentration within groups of firms encountering similar hierarchies of constraints. "

The research showed that past use of discretion may reduce discretion for further relative expansion. It is thus hypothesized that "firms which expand output have less discretion for further relative expansion than those which refused comparable past opportunities. "

The distinctive business philosophy of the medium sized firms was prominent in the research. This study emphasized the decision results, not the underlying philosophies. Further study might determine if "medium sized firms' philosophies are more growth oriented than those of larger or smaller firms. " Results obtained, though treating only five medium firms, suggest the following endogenous variables: investment per unit of output, proportional unused capacity, preference of working capital to fixed investment, relative product differentiation costs, and relative non-promotional selling costs.

These alternate hypotheses represent implications of this study's findings for further investigation. The last chapter presents pertinent facts related to (1) value of these results apart from further research, and (2) implications regarding methodology.

CHAPTER 9

FURTHER IMPLICATIONS OF THE STUDY

The research approach, findings, and conclusions have been presented in the first seven chapters and summarized in the eighth. This chapter is designed to present resultant information, valuable apart from further research, and some relevant comments on methodology.

Probable Future Trend of Specific
Influences of Concentration

Only the advertising and promotion hypothesis was accepted. If, as suggested elsewhere,⁴⁵ per unit returns from promotion depend on total such costs, large firms' promotion costs are too high or small firms' too low. The incongruity needn't be consistent among industries.

If it is true that some firms in most agricultural industries are not following discernible guidelines to profitable levels of promotional expenditures and if firms learn of and accept these findings, we might expect significant equalization of total promotional expenditures between firms within given industries. If large firms recognize

⁴⁵ "The largest firms tend to spend greater absolute amounts on advertising than do their smaller competitors, but in so doing they bear lighter burdens and reap greater profits." Mueller, 1964, p. 5.

that they are realizing low and decreasing marginal returns from promotional expenditures, they would be expected to cut back expenditures. However, if small firms are shown to be underspending in promotion, they may make no adjustments. They may be aware that they could profitably spend more in this manner but may consider other uses of funds to be still more profitable. Generally, the capital market is more restrictive on operations of small firms than large. However, if the three out of five industries showing diseconomies of scale show greater cost increases than those represented by promotional expenditures and if prices are constant throughout the industry, the small firms should have funds available to make at least some remedial adjustment in promotional expenditures.

If the firms in the samples are representative of their respective industries, distinct economies or diseconomies of scale are common within agricultural processing industries. If these economies or diseconomies are primarily managerial, firms accepting these findings might, over time, adjust (1) by a cooperative approach to common management of portions of their operations, by complete merger, or by acquisition, in the case of industries characterized by economies of scale; and (2) by formation of semi-independent subunits or departments in industries with diseconomies of scale. If economies and diseconomies are technological, adjustments can be expected in the form of (1) aggregations similar to those mentioned

above or in common ownership and use of higher capacity processing machinery without loss of present firm identities, and (2) replacement of existing machinery, with smaller, more efficient, separate processing lines, etc., as the present equipment wears out.

Agricultural processing has been assumed to be characterized by economies of scale, similar to manufacturing in general. Thus, large firms are presumed to have higher rates of profit and firms in the industry are generally believed to seek absolute growth. However, because of the geographical diversity of supplies of principle input raw materials and the lack of technological or managerial economies of scale (if not the occurrence of diseconomies) in processing, large firms have not always proven to make the highest rates of profit.

Marketing orders and agreements in the markets in which agricultural processors procure their primary raw materials have further enhanced the relative position of the small processor by limiting the market power of the large processor or allowing small processors absolute opportunities or benefits comparable to those available to the large firms. These factors may further discourage future trends toward expansion.

A noteworthy identifying characteristic of a specific (relative) position in the concentration continuum is the peculiar attitude and modus operandi of the intermediate sized firms. Evidently the large

firms have a sense of accomplishment or satisfaction with their relative market position (or have anticipated the threat of anti-trust action, competition, cost restrictions, or countervailing power operating against their further relative expansion). The small firms appear content to remain in their current relative position because of supposed diseconomies or other disadvantages of scale or they believe improvement of their relative position is beyond their control because of unavailability of expansion capital or inability to implement various means of price and non-price competition. In sum, most of the small and large firms failed to show the dynamic, growth-conscious attitude manifest by all the intermediate firms.

The medium firms do show marked growth within their respective industries in recent years, i. e., their efforts to improve their relative position in their respective industries are partially successful. It is beyond the scope of this study to determine at whose expense these gains were made. During this period of expansion by these firms, smaller firms have exited from all of these industries. Larger firms have left some of these industries and have made significant reductions in relative market position in others.

In industries characterized by economies of scale, the competitive actions of these firms can be expected to encourage the exit of small firms and some of the gains of the medium firms will be made in this manner. It is probably less true with increasing cost

industries that medium firms gain from the losses of the large firms because of certain advantages (e. g., capital availability) of large absolute size. In some cases, firms of this intermediate range have overextended their financial capabilities in their intensive drive for growth and have been forced from their industries.

Evidently it is not necessary that the intermediate firms gain at the expense of the industry giants, but the latter are aware of such a possibility. Those interviewed in some of the large firms repeatedly evidenced their awareness of their dependence on the intermediate firms. Leadership of some industries appears to be passing into the hands of a heterogeneous group including the "large" and "medium" firms, each of which maintains a distinctive role in accordance with its relative position in the industry. The present large firms can hold their relative position in some industries, especially in decreasing cost industries or where buyers hold strong processor loyalties due to services peculiarly available from firms of absolute large size. Whether they will duly recognize the apparent limitations to the security of their position as determined particularly by the medium sized firms depends largely on the perspicacity and dynamism of the managements' thinking.

Public Welfare and Policy

The question is frequently asked: "Is concentration within a market deleterious to customer welfare; specifically, does it encourage higher prices for lesser quantities of commodities?" This study has found no evidence that concentration, however measured, encourages business practices contrary to consumer (or general public) welfare for the agricultural marketing industries analyzed. Evidently the net result of combining (1) the concentration effect of increased relative size, and (2) the efficiency effect of increased absolute size is not so injurious as suspected.

In addition to industry price level, intra-industry price variation may also have welfare implications. Because of market imperfections such as product variations unrelated to product quality, variable geographical proximity to buyers, terms of sale, etc., prices can vary considerably within an industry with welfare results which are most likely negative. Even if firms within an industry are all pricing "competitively" in the sense that they are realizing minimal margins, absolute prices will vary widely if there are significant economies or diseconomies of scale over some range of firm sizes in the industry. This study included one industry which appeared to be characterized by approximately constant costs. The lowest average total cost, incurred by the medium sized firm, was

94 percent of the highest average total cost, incurred by the large firm. Three industries manifested increasing costs, i. e., diseconomies of scale. The large firms' average total costs were 333, 134 and 113 percent of the small firms' costs. One industry showed decreasing costs, i. e., economies of scale. The small firm's costs are 225 percent of those of the large firm.

Policy concerned with welfare results of pricing practices must include concern with (1) general industry price levels, and (2) price variation within industries. This study has indicated that no comprehensive statement can be made concerning the latter consideration. Any remedial legislation should deal specifically with economies or diseconomies of scale as may be characteristic of the industry in question.

Firm and Industry Welfare

Maximization of welfare for firms or industries commonly implies maximization of profits for these firms or industries. Since this income is maximized partially at the expense of those from whom firms buy and to whom they sell, firm and industry welfare may conflict with the sum total of welfare in the remainder of the economy. Barring the objection to inter-group comparisons of utility, firm and industry welfare may thus be enhanced at the expense of public welfare in toto.

The comment was made repeatedly by several interviewees "if processors in this industry make money one year, they'll give it away the next. " A lack of inter-firm cooperation within part of the industries is recognized by some to be costly to most firms in the respective industries. Illegal collusion is not suggested. However, the awareness that (1) hesitancy to act competitively (price-wise) is profitable and (2) orders lost by refusing to cut prices are compensated by higher prices on obtained orders, appears to be retained only for brief periods of time. Then, apparently, firms in the industry must periodically prove the contrary false by intensely competitive action. These firms need to mutually recognize that excess ("supra-minimal") profits earned in a given year are not used in the best interests of long run profit when competitively sacrificed in subsequent years.

Far greater inter-firm differences were noted between costs than between selling prices within most of the industries studied. Thus, firms which have been shown to realize economies of either small or large scale have available to them the opportunity to increase total quantities sold by price reductions in excess of those

available to other, less efficient firms in their respective industries. Price cutting below that which other firms can afford has long-run implications transcending immediate cross elasticities of demand. Although low cross elasticities may restrict the rate at which a firm's price cutting will make inroads on the demand for a competitor's product, price cutting which a firm can continue indefinitely and which will maintain a positive cross-elasticity over time with a higher-cost competitor's product will cause serious economic damage to that competitor (assuming cost economies realized by the price cutting firm are not available to the competitor). Thus, the more efficient firms may find that decreased positive profits for a period of time will eventually serve to decrease competition. The net result would be an increased demand for the product of price cutting firm.

If small firms in the three industries showing diseconomies of scale were to cut prices below that available to large firms, they would gain in industry proportion or the large firms would implement compensatory economies. Interviewees in the large firms generally gave no evidence of significant further economies to be realized at

current levels of output.⁴⁶ Thus, if the large firms faced price cutting competition from the lower-cost small firms in the industry, they would be restricted to lower levels of output which they can produce only at average total costs higher than the present. Their minimum price would thus increase, further expanding the price advantage a price-cutting small firm can exercise over its larger competitors.

In industries characterized by diseconomies of scale, the economies incurred by the small firms may be unavailable to the large firms although diseconomies incurred by the large firms may be avoidable by the small firms. Current level and type of investment by the large firms in fixed assets may prohibit profitable output restriction. However, if the diseconomies of scale which are being incurred in the industry are technological in contradistinction to managerial, multiplication of economically optimal scale processing units is available to the small firms. (If this is true, the reason for the now-large firm's failure to take advantage of these economies is irrelevant; the fact that they failed to do so is not.) The small firms

⁴⁶ Only one firm in the total sample (a small firm in the one industry characterized by economies of scale) gave evidence of per unit economies to be realized by output reduction. This was by a radical re-organization of the firm's method of operation, including abandonment of much of the current processing and hiring this done by another firm on a custom basis.

thus possess significantly greater potential power over industry prices.

Downward price leadership (as described on page 80f) appears to be at the discretion of the small firms in three of the five industries. The two of these in which the discretion is exercised are both increasing cost industries. (The third is the single industry in the sample showing economies of scale.) Only one industry was characterized by diseconomies of scale and price leadership by large firms. In such an industry where the small firms' price decreases would be ignored by the large firms, such decreases would be potentially more profitable than if the larger firms normally followed such changes. However, non-price factors may effect considerable buyer resistance to purchasing from the smaller firms. One significant, recurring example is buyer recognition of the advantage of the assurance of the year's entire supply by placing a single order with one firm.

In industries characterized by economies of scale (only one of which was evident in this study), large firms can decrease price and obtain increased sales quantities at the expense of small firms. This can be done more easily than the similar action by the small firms in increasing-cost industries because of normally greater immunity of the large firms to price decreases.⁴⁷ Also, small firms may be less

⁴⁷ More capital per unit of current output is normally available to large firms.

able to compete by some non-price means such as the offering of quantity contracts as mentioned above. Personal service which the small firms can offer but the large firms cannot may compensate to varying degrees.

Suggested Further Study

This study is a primordial effort in the realm of comparison of actual management behavior in agricultural processing with presumably relevant market structure theory. Because of the lack of previous groundwork on which to build, much information and evidence must be collected before any of the findings are of value. The result is a study giving moderate basis for a limited number of basic conclusions plus much evidence for lesser degrees of confidence in other conclusions. Evidence is ample to encourage further investigation of certain problems. Some of the more obvious of these areas are considered below.

A much larger sample of industries and of firms within sampled industries would be necessary to investigate behavioral implications of differences in Lorenz curves (Figures 48 and 49),⁴⁸ as

⁴⁸ Similar measures have also been proposed by O.E. Herfindahl ("the sum of squares of firm sizes, all measured as percentages of total industry size, ... equal to the reciprocal of the number of firms if all firms are of the same size, ... and reaches its maximum value of unity when there is only one firm in the industry") and Gini (a "concentration ratio" which "is a function of the area between the Lorenz curve and the diagonal line the curve would follow if all firms were of equal size"). (National Bureau of Economic Research, 1955, p. 60.)

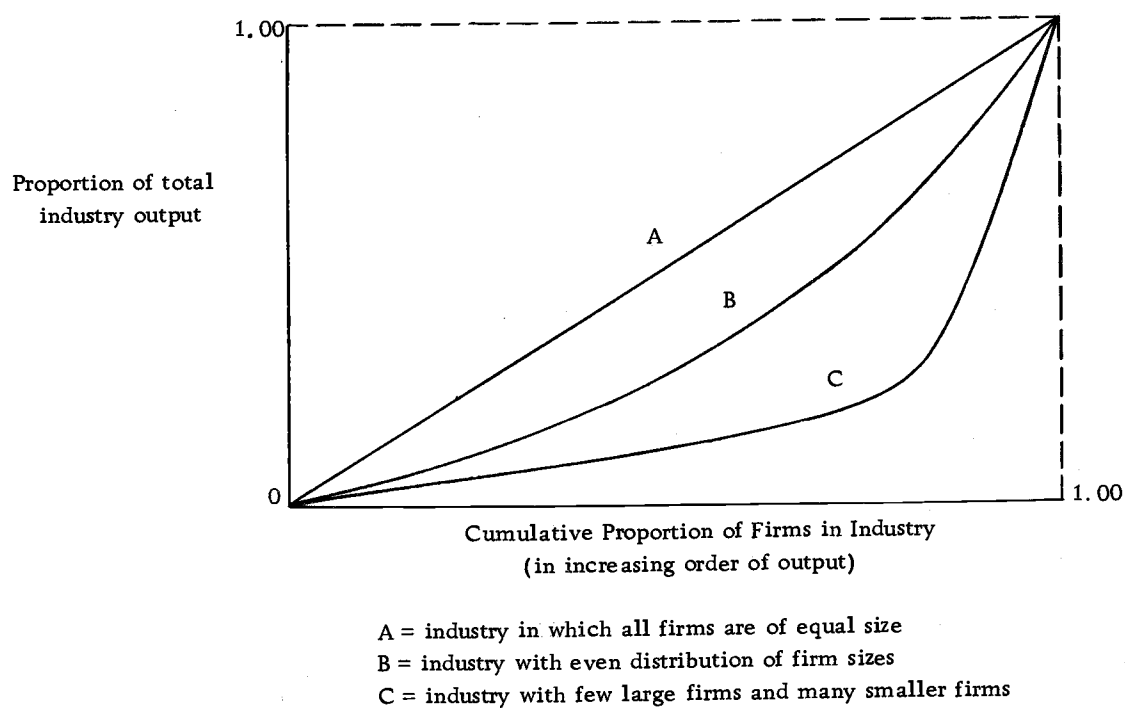


Figure 48. Lorenz curves for industries with various firm size distributions.

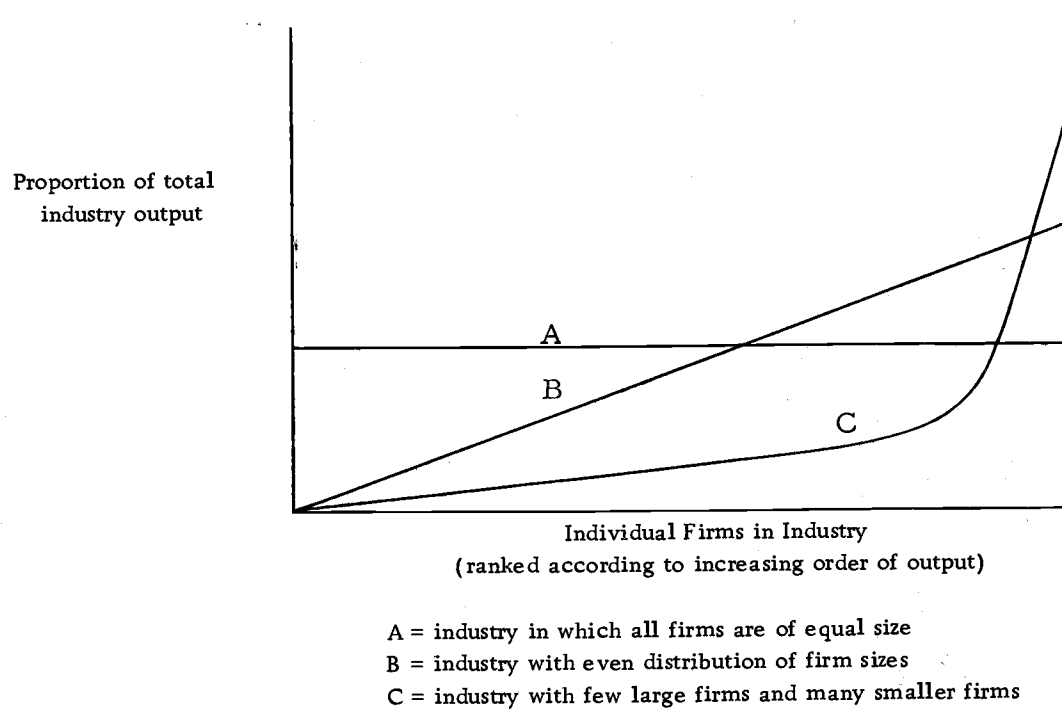


Figure 49. Firm size distributions (associated with Lorenz curves shown in Figure 48).

described by the National Bureau of Economic Research (1955). No one of the measures of industry concentration used in this study amply describes the various taxonomic characteristics of the industries included. A concentration measure embodying the characteristics of each measure used in this study would be more complete in interrelating behavior and concentration. The Lorenz curve, Gini coefficient, or Herfindahl index might fill this need.

Firm organization may determine firm behavior in two important ways: (1) the organization of a firm may profoundly affect that firm's reactions to structural variables; also, (2) the organization of the firms against which a given enterprise competes may represent a meaningful factor in determining the potential impact of exogenous market variables. Firms analyzed in this study included several cooperatives. No industry was represented by a sample composed entirely of cooperatives. All other possible combinations of cooperatives and other corporations were included.

If internal organization affects a firm's reaction to structural variables, a comparison of similar analyses conducted with the two types would be valuable. The scale effect of the trend of cooperatives toward large absolute size has been assumed and behavioral theories

relating to size have been applied.⁴⁹ However, an empirically based differentiation between the behavior of the two types of firms as influenced by the market context is lacking.

The influence of the presence of a cooperative on the behavior of other firms in the industry has been studied briefly elsewhere (Evans, 1951, p. 18-21). However, that work dealt with only one industry. A much broader, inter-industry study would be much more valuable in formulating a comprehensive, accurately descriptive, behavioral theory of market structure.

Relative maturity of the firm as a determining factor of managerial behavior was frequently suggested as a valuable addition to other considerations in the study. Since this was not a structural consideration but might lend its behavioral influence in a different manner within each structure, it was rejected as inapplicable. Serendipitous findings in this study indicate that management's attitude of relative maturity of their respective firms may accompany certain tendencies in firm behavior. It is open to discussion which would contribute more to prediction of behavior: a more objective measurement of firm maturity, or some measurement of this maturity attitude.

Those management personal interviewed in the aggressive,

⁴⁹ Intra-industry uniformity of samples with regard to firm organization was proposed in the research but rejected because of the strong tendency for cooperatives to be the large firm in the industry. Relative firm size was included in the analysis without specific reference to firm organization.

intermediate-sized firms in this study generally considered their firms mature in that they considered the continued security of their position in the industry to be wholly at their discretion. The maturity of these firms as measured by rate of growth, position in the industry, etc., is quite comparable. However, some other firms in the groups of small and large firms also evidenced this aggressive, growth attitude. These firms were far less consistent in measures of firm maturity.

Closely appurtenant to firm maturity as a variable exogenous to firm behavior is the maturity of the managers' experience with the firm (or with firms in general, i. e., the experiential maturity of the managers) and how they acquired their current degree of control over the firms' activities. It has been suggested that the age and experience of the manager may be closely related to the dynamic attitude of the intermediate sized firms. It may profitably be further hypothesized that the owner-managers who inherited the firm will manage differently from those who bought or developed the firm themselves. Similarly, the managers who were promoted through the ranks within the firm may manage differently from those who were hired into or near their present position from outside the firm.

As mentioned in the Introduction, the separation of management and ownership has been cited as an important factor in determining firm behavior. The relative dispersion of ownership as related to

managerial responsibilities is the phenomenon in point. A study of the behavior of family firms and partnerships as compared to that of stock corporations and cooperatives in agricultural processing would help fulfill the need for a more complete explanation of firm behavior.

The intermediate firms, because of their intense competition and consistency of low investment per unit, may also consistently differentiate themselves from other firms in the comparison of current value to original cost of plant and equipment, i. e., relative obsolescence in terms of value rather than age as utilized in the test of frequency of technical innovation, above. If the firms which are most aggressive and are advancing in industry position most rapidly are those which have the lowest current/original value of total capital investment, the other firms (e. g., the larger and smaller firms) would be indicated to be making premature or uneconomic investments at the sacrifice of profits and/or growth within their industries.

Part of the rationale of this study has been the differentiation between behavioral theory as it applies to agricultural processing versus that which applies to non-agricultural manufacturing. The agricultural industries mentioned are generally faced with a periodic supply of a primary raw material, the vast majority of which is processed and sold within a year of initial production. Apparently, the demand for these commodities consistently exceeds the quantities which would be supplied at prices which will pay minimal production

and processing costs in the long run. Thus, the quantity of these raw materials supplied each year averages less than the apparent competitive equilibrium. Other factors differentiating agricultural processing from non-agricultural manufacturing include input and product perishability, highly seasonal raw product availability, inter-seasonal variability of raw product availability, and quality inconsistency. If agricultural processing significantly differs from other types of manufacturing in firm behavior (as this behavior reflects reactions to structural influences), analysis of these differentiating factors would help identify the cause for behavioral differences.

The number and types of firms' outlets and products may also affect market influence. A firm with several sales outlets or selling in several types of markets may be immune to influences of many external forces which cause problems for the one-product, one-market firm. Such analysis would benefit agriculture insofar as it produces bulky, difficult-to-transport products, or fiber and food products with demands unlike most manufactured goods.

Summary

This final chapter has presented implications of the research findings related to the future trend of influences of concentration, welfare of the public, firms, and industries, and methodology for further similar research.

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APPENDIX

QUESTIONNAIRE

SECTION I Buyer

1	2	3	4	5	6	7	8
Specifications of Lot Purch'd.	Date of Purch.	Quantity Purchased	Actual Purchase Price	Quoted Purchase Price	Actual Minus Quoted (4-5)	Amount of (6) due to Cost Saving	Amount of (6) not due to Cost Saving (6-7)
1.							
2.							
3.							
4.							
5.							
6.							
7.							
etc.							

SECTION I Seller

1	2	3	4	5	6	7	8
Specifications of Lot Sold	Date of Sale	Quantity Sold	Quoted Selling Price	Actual Selling Price	Quoted Minus Actual (4-5)	Amount of (6) due to Cost Saving	Amount of (6) not due to Cost Saving (6-7)
1.							
2.							
3.							
4.							
5.							
6.							
7.							
etc.							

SECTION II Total Firm

Note: Complete obsolescence is defined as the condition of a piece of capital equipment such that, given operation and supply costs and product prices, continued operation of that equipment is no longer profitable. Obsolescence thus includes the influence of physical depreciation as well as changes in technology or product demand on equipment productivity.

Consider the pieces of equipment which have been most recently disposed of as indicated (i. e., 3 buildings, 4 vehicles, 5 machines) except those disposals which were made under very unusual circumstances, i. e., circumstances which in no way reflect the firm's standard principles of replacement.

	Buildings			Vehicles				Machines				
	1	2	3	1	2	3	4	1	2	3	4	5
1. Identification												
2. Purchase value												
3. Disposal value												
4. Value at Complete Obsolescence												
5. Disposal Age												
6. Age at Complete Obsolescence												

NOTE: For our purposes we shall consider only those investment costs which are easily separable as being relevant to the handling of the particular product under discussion. This figure should be as complete as convenience permits, though it need not include every contributing investment. Greater emphasis should be given to consistency throughout this section of the analysis than to completeness of any given investment figure.

For the sake of obtaining a meaningful inter-firm comparison, answer the following questions assuming you do not have the opportunity to lease equipment but that it may be purchased on terms actually available. For the sake of internal consistency in our analysis adjust the capital figures--and other cost figures, if necessary--to allow production to remain as close as possible to present levels under these conditions.

1	2	3	4	5
Assume hypothetical changes are expected to be permanent	Total output	Total relevant* capital investment	Total relevant* noncapital expense	Evidence
1. Present				
2. If you could sell an unlimited quantity at this year's prices				
3. If the quantity demanded at this yr's prices dropped to half of present				
4. With severe nonprice competition in the market in which you sell				
5. With severe price competition in the market in which you sell				
6. If your selling dec's included no precautionary provisions				
7. If unlimited quantities were available to you at this year's prices				
8. If the quantity supplied at this yr's prices dropped to half of present				
9. With severe nonprice competition among buyers				
10. With severe price competition among buyers				
11. If your buying dec's included no provisions for precaution concerning your buying market				

*"Relevant" may be interpreted here to mean that which is applicable to the last full season's purchases and sales of the commodity under discussion.

SECTION IV SELLER

As interview begins, refer to graph of prices and quantities sold during the last ten years.

1. Which of the changes in quantities which you offered for sale have been made at a time when there was essentially no recognizable causal change in industry demand? _____

 What was the price effect, if any? _____
 Was this expected? _____. Was it beneficial? _____
 Did this influence any further decisions? _____
 Representative current price _____.

2. Assuming costs, etc., constant at present levels, what is the lowest average price at which you could continue to process and sell for a period of several years? _____ Why? _____
 What evidence do you have to support this? _____
 What are the largest and smallest quantities you could afford to sell at this price? _____
 _____. What evidence do you have? _____
 If you sold at this price, is there any alternate plant capacity or investment level you would prefer to the present? _____. If so, what? _____
 Why? _____
 Have you ever sold at a comparable price in light of the costs prevalent at the time? _____
 Why or why not? _____

3. What is the highest average price you could conceivably obtain for a period of several seasons (under market conditions of the present season?) _____. Why? _____
 What evidence do you have to support this? _____
 What quantity would you likely sell? _____. Why? _____
 What evidence do you have? _____
 Have you ever sold at the highest price you could possibly obtain in the prevailing market? _____
 Why or why not? _____

4. Which of the changes in price have been made at a time when there was essentially no recognizable causal change in demand? _____
 What was the effect on the quantity sold? _____
 Was this expected? _____. Was it beneficial? _____
 Did this influence any further decisions? _____

5. What is the smallest quantity you could profitably produce and sell at current input and product prices and under present conditions? _____. Why? _____

 What evidence do you have to support this? _____
 If you were to limit your sales to this level what price would you likely receive? _____
 Why? _____
 What evidence do you have? _____
 Have your sales ever approximated this quantity? _____
 Why or why not? _____

6. What is the largest quantity you could profitably produce and sell under present conditions? _____
 _____. Why? _____
 What evidence do you have? _____
 What price would you likely receive? _____ What evidence do you have? _____
 _____. Have you ever produced this quantity? _____
 Why or why not? _____
7. What are the output restraints external to the firm which your firm faces? _____
 With your present plant and equipment, what would be your probable output/sales reaction to the removal of all effective restraints on quantity demanded at the current quoted market price? _____

 What evidence can you offer to substantiate this? _____
 What would be the effect of a profit of a 10% increase in quantity sold at the current price? _____

 Why? _____
 What evidence do you have to support this? _____
 What would be the effect on profit of a 10% decrease in quantity sold at the current price? _____

 Why? _____
 What evidence do you have to support this? _____
 Without the above restriction on plant and equipment, what would be your probable output/sales reaction to the removal of all effective restraints on quantity demanded at the current quoted market price? _____
 What evidence do you have? _____
8. What major competitive actions commonly take place in the market in which you sell? _____

 What would be your probable output/sales reaction to the cessation of each of the various effective competitive actions? _____

 What evidence can you offer? _____

BUYER

At this point, refer to graph of prices and quantities purchased during the last ten years.

1. Which of the changes in quantities you have offered to purchase have been made at a time when there was essentially no recognizable causal change in total industry supply? _____

 What was the price effect, if any? _____
 Was this expected? _____. Was it beneficial? _____
 Did this influence any further decisions? _____
2. Assuming selling prices, etc., constant at present levels, what is the highest price which you could continue to pay for this commodity for a period of several years? _____
 Why? _____
 What evidence do you have to support this? _____
 What quantity would you likely buy? _____. Why? _____
 What evidence do you have to support this? _____
 Have you ever paid the highest profitable price, considering costs prevalent at the time? _____
 Why or why not? _____

3. What is the lowest average price at which you could conceivably buy for a period of several seasons (under market conditions of the present season)? _____
 Why? _____
 What evidence do you have to support this? _____
 What quantity would you likely buy? _____. Why? _____
 What evidence do you have? _____
 Have you ever paid the lowest possible price in the prevailing market? _____
 Why or why not? _____
4. Which of the changes in price have been made at a time when there was essentially no recognizable causal change in quantities offered for sale? _____
 What was the effect on the quantity purchased? _____
 Was this expected? _____. Was it beneficial? _____
 Did this influence any further decisions? _____
5. (Refer to the smallest quantity which the firm could profitably purchase and handle at current selling prices and under present conditions.) If you were to limit your purchases to this quantity, what price would you likely pay? _____. Why? _____
 What evidence do you have? _____
 Have you ever purchased only this quantity? (may already have answer) _____
 Why or why not? _____
6. (Refer to the largest quantity the firm could profitably purchase and handle.) What price would you likely pay? _____. Why? _____
 What evidence do you have? _____
 Have you ever purchased this quantity? _____. Why or why not? _____
7. What are the restraints on total quantity purchased as they originate outside the firm? _____

 With your present plant and equipment, what would be your probable input/purchases reaction to the removal of all effective restraints on quantity made available to you at the current quoted market price? _____
 What evidence can you offer to substantiate this? _____
 What would be the profit effect of a 10% increase in quantity purchased in the procurement market as it is available to you? _____. Why? _____
 What evidence do you have to support this? _____
 What would be the profit effect of a 10% decrease in quantity purchased in the procurement market as it is available to you? _____. Why? _____
 What evidence do you have to support this? _____
 Without the above restriction on plant and equipment, what would be your probable input/purchases reaction to the removal of all effective restraints on quantity available to you at the current quoted purchase price? _____
 What evidence do you have? _____
8. What major competitive actions commonly take place in the market in which you purchase this commodity? _____
 What would be your probable input/purchases reaction to the cessation of each of the various effective competitive actions? _____

 What evidence can you offer? _____

SECTION V PERFORMANCE EVALUATION

1. How do you evaluate your firm's performance? _____
 What measure of net profit do you most frequently consider in this evaluation? _____
 What was your profit this year, according to this measure? _____

2. Assuming all market conditions remained as they are except for a decrease in your selling price, what would be your minimum acceptable net profit (as computed above) over a three month period? _____. Why? _____

 What evidence do you have to offer? _____
 What action would you inaugurate if net return fell below this? _____

3. Under the same assumptions, what would be your minimum acceptable net profit if the price decrease extended over a three season period? _____. Why? _____
 What evidence do you have? _____
 What action would you inaugurate if net return fell below this? _____

4. What action would you inaugurate if your net profit fell below the three month minimum noted above due to an increase in your purchase price rather than a decrease in selling price? _____

 Under the same assumptions, what would be your resultant actions if the purchase price increase extended over a three season period? _____

5. What do you consider the highest possible short run net profit (3 month period)? _____
 Why? _____
 What evidence do you have? _____
 How could this be obtained in the market in which you sell? _____
 If you do not follow this course of action, why not? _____

6. What would be your highest possible long run net profit (3 season period)? _____
 Why? _____
 What evidence do you have? _____
 How could this be obtained in the market in which you sell? _____
 If you do not follow this course of action, why not? _____
