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MARKET STRUCTURE ANALYSIS AND RESEARCH

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The purpose of this paper is to briefly discuss the major aspects of market structure analysis and to exemplify its empirical application by citing some recent research efforts.

INTRODUCTION

Economists are generally aware of the definitional problems associated with such terms as "market" and "industry." The expressed and more frequently implied meanings of these words have varied from one research report and textbook to the next. These semantic difficulties more recently have been compounded by such expressions as "market structure," "industry structure," and the special use of the term "structure" by econometricians.

These latter words have been used increasingly in recent years, especially in the titles of research projects. But despite the current "rash" of market structure studies, little writing space has been devoted to explaining what such "structural" research involves. It has become imperative that a review of market structure analysis be made in light of this varied terminology.

Structure

In popular parlance "structure" means the arrangement or interrelation of parts is dominated by the general character of the whole. In a physical sense the idea is clear in terms of the structure of a building, a molecule, or, perhaps, a set of production processes. As a part of the analytical machinery in economic theory and research, however, the clarity of its meaning sometimes becomes obscured.

The "general character" of a market is defined by the presence of the forces of supply and demand in a state of interaction. 1/ A generalized definition of a market cannot be tied to a physical or geographic area. Nor can it be described solely in terms of the institutions it involves or the functions each of these perform. The unifying feature of all markets is that the "forces of supply and demand are at work." The interaction of these forces result in certain types of market behavior, the simplest aspect of which is overt price determination or discovery.

That the market forces of supply and demand vary in their nature from one market to the next is empirically obvious and is demonstrated theoretically by elasticity measures and price behavior under various market conditions. The conditions, elements, or factors in the market that define or "structure" the market forces of supply and demand are the units of inquiry in market structure analysis.

These "structural elements" are many but can be summarily categorized into four major groups or types: (1) technical, (2) organizational, (3) motivational, and (4) institutional. Consider each of these in turn.

Technical Elements

Change in "technology" usually refers to changes in how inputs are combined in production, the discovery of new inputs or outputs, or the order and organi-

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1/ A more elaborate definition of a market is given by Cochrane as: "Some sphere, or space, where (a) the forces of demand and supply are at work, (b) to determine or modify price, (c) as the ownership of some quantity of a good or service is transferred, and (d) certain physical and institutional arrangements may be in evidence." (Cochrane, W. W., "The Market as a Unit of Inquiry in Agricultural Economic Research," J.F.E. 39 (1): 21-39, February, 1957). This definition, however, begs a meaning of "sphere" or "space" and an explanation of what is meant by "certain physical and institutional arrangements."

zation of production operations. These changes cause changes in the configuration of the supply function by redefining the technical parameters or coefficients of the "technical production function" of the firm.

Technical relationships also exist between firms and groups of firms. The output of some firms serve as inputs to other firms. The technical relationship between firms that are vertically-related in this input-output sense can be aggregated to provide a vertically-oriented "production function" for a marketing system.

Just as supply relationships are defined largely by the technical production functions, demand relationships are structured by (1) utility functions and (2) marginal revenue products in economic theory. The technical parameters of the utility function change as the "state of consumer tastes and preferences" change. Marginal physical products, expressing demands at other than the consumer level, change technically in reponse to both technology and consumer tastes. Such changes in the utility function or marginal physical product, of course, cause changes in the demand relationship.

The technical aspects of supply and demand serve as parameters that set limits to the nature of these market forces. They "structure" these forces and are important units of inquiry in market structure analysis. 2/

2/ Some writers prefer to limit the number of structural elements by omitting the analysis of the technical on the grounds that these elements are, with slight modifications by the pricing of inputs, the supply and demand relations themselves (Cochrane, Ibid.). Yet the comprehensiveness of their definition of "structural element" denies them this privilege: "By structural element is meant some characteristic, consideration, or condition in a market which influences the behavior of firms in the market, and thus, the performance of the market."

Organizational Elements

Those elements called organization form three primary subgroups: intra-firm organization, inter-firm (both vertical and horizontal) organization, and spatial organization.

Intra-firm organization refers to the nature, vertical relationship and extent, ordering, and output magnitude of the productive operations peformed by the firm. The tasks that attend this productive effort (accounting, quality control, etc.) and the nature of management and capital also serve as structural element that influence the nature of the firm's supply and demand functions and affect its conduct in its input and output markets.

Inter-firm organization has both a vertical and horizontal dimension. The horizontal and vertical organization of firms surrounding any one-firm in the marketing system largely influences the nature of the supply and demand relations for the firm as well as for the entire vertical and horizontal complex of firms related to it.

The spatial organization of firms also serves as structural influences in the marketing system and influences firm and "industry" supply and demand relationships.

Motivational Elements

While economic analysis normally assumes profit maximization as the key motivating force in productive activity, a great deal of empirical and theoretical opposition has arisen to counter this assumption. The various arguments and alternative motives that have been offered are beyond the scope of this discussion, but it should be recognized that the goals of firms are not simple and singular.

Market structure analysis studies the manifestation of these motivational elements in terms of how firms compete as they do: by varying their prices and

their products; by attempting to influence the technical demand restraints they face through advertising and various selling techniques; by providing themselves with research facilities so as to influence their technical production function; by colluding with or restricting the activities of other firms through the exercise of market power. In short, market "practices" become a part of market structure analysis in terms of their motivational origins and their effect on the market forces of supply and demand.

Institutional Elements

Structural elements of the market that are called "institutional" refer to (1) the level and application of knowledge, (2) uncertainty elements, and (3) legal and social restraints.

The existing state of technical or cultural knowledge is not evenly spread over all productive or consumption units. Some firms use outmoded production processes while others gain innovational profits by "keeping-up" on technological advances. Market structure analysis recognizes a disparity between the discovery and application of new technologies and recognizes disparital variations and cultural changes in the application of knowledge that defines the technical aspects of demand. Knowledge levels and the rate of application of new knowledge also pervade motivational elements. The knowledge and use of competitive and negotiative practices in the market place varies as the level of knowlege of these practices vary. The means of competition and negotiation are developed as situations arise and the development of new means or the new application of old means to marketing problems varies between markets as the knowledge of these means vary.

Uncertainty elements are also considered by market structure in terms of the indeterminancy of future prices, future market practices of competing and vertically related firms, and "acts of God." These indeterminancies affect pricing

and production policies, the internal organization of firms, and generally help to "structure" the market under consideration by influencing supply and demand.

Legal restraints and social mores pervade most of the previous categories of structural elements. Technologies and tastes and preferences are limited in their scope to that which is for the "social good." The development of contraceptives that sterilize the booming Indian population, of machines that replace human labor, of the use of child labor, of the conservation of resources, of the limitations placed on the use of such aphrodisiacs as morphine and opium, of the use of colored oleomargine in Minnesota; these represent a partial list of legal and social restraints on the technical elements of structure. Trading "rules" concerning market-place practices, the fair trade laws, the advocation of greed (free enterprise) and cooperation as motivational goals by governmental legislation serve to modify and limit the motivational elements of market structure. Anti-trust legislation to control, prohibit, and create monopoly power and to "police" competition by requiring standardized products and freedom of entry, demonstrate the legal and social forces that react with organizational elements. Legislation dealing with market information (news, outlook, etc.), communication (grading), location (rate regulation, import duties), uncertainty (forward prices for agriculture) all suggest the extent of government and social participation in the market. That such institutional elements majorly affect supply and demand and the "structure" of the market cannot be denied.

Market Structure Analysis

The structural analysis of a market involves the investigation of these structural elements: (1) technical, (2) motivational, (3) organizational, and (4) institutional. The investigation is directed at how these elements influence

supply and demand and thus alter market behavior. Such analysis does not attempt to study the effects of all of these elements simultaneously; this is beyond mere human capacities.

Instead, some studies segment, for example, the changing technical aspects of the supply function for a commodity and trace the effects of these changes in supply on the performance of a geographically contained market at one or more vertical levels. Such research, placing emphasis on the technical elements, is characteristic of certain supply adjustment models presently used by econometricians. In general, the econometric "structure" is limited to the technical and motivational (behavioral) elements of market structure.

Other studies may be limited geographically to a single vertical level market in which changes in the organizational elements are studied in reference to market conduct. Such research as this is frequently what some writers would refer to as the crux of market structure research. It concentrates on changes in intra and inter-firm organization in space as this influences supply and demand, and resulting market conduct.

Regardless of the interpretation or definitional emphasis, which structural elements are to be considered in any market structure study depend upon, in addition to the usual geographical, fund, and personnel limitations imposed by administrative considerations, the interest and a priori knowledge possessed by the researcher.

Certain structural elements may influence the performance of a particular market in a very small degree and can be assumed as constant for the investigation. Only after the study has progressed do many elements "crop up" as being of greater importance than originally believed. Because of this, most market structure studies require a degree of flexibility that is uncommon to many project

outlines. A study that begins to consider the effects of changing technologies on the performance of a market, may later require the study of changes in the supply relation that are caused by inter-firm organizational changes.

That these elements react with one another in the "structuring" of the market forces of supply and demand is apparent. The nature of these reactions and their relation to market behavior are not so readily apparent.

Preliminary to a discussion of these market structure relationships, however, it is necessary to consider briefly the vertical and horizontal dimensions of marketing activity.

II. MARKET DIMENSIONS

The structural parameters of a firm, market, and marketing system are two-dimensional in nature: vertical and horizontal. The vertical dimension of a firm or group of firms is expressed in terms of the number, order, and nature of the productive operations performed. The vertical dimension of a market and a marketing system is manifested in the vertical (input-output) relationships between firms and between firms and households. The horizontal dimension of a firm is expressed by its output and this dimension for a market is found in the competitive relationships between firms producing similar outputs or buying similar inputs.

Vertical Dimension

Study of the vertical dimension of the marketing system is not new to agricultural marketing research. The technical aspects of market structure have been investigated by various "approaches" (commodity, institutional, functional) used to describe the marketing of farm products. In simplest form, these descriptive research studies specified the commodity or commodity group to be considered and then proceeded to describe the firms involved in terms of the marketing functions they perform.

This process of "scientific description" in research is not without merit. It provides the researcher a means by which to classify extremely complex data into comprehensible form. But it only provides information for one structural aspect of the marketing system, the physical or technical inter-relationships involved in supplying the commodity to the consumer. While primarily limited to the technical structure of the marketing system, however, this type of research goes beyond conventional economic theory by treating the vertical dimension of the firm, market, and marketing system.

Traditionally, the theory of the firm simplifies productive activity by holding the vertical dimension constant. This received comment and treatment by Stigler several years ago in an explanation of vertical integration and disintegration. 3/ He partitioned the firm not in terms of its inputs, but as an agent in a series of distinct operations. Each of these operations performed by the firm has an attendant cost associated with it which depends upon the rate of output of that operation and its relationship to preceeding, vertically-related processes. The cost associated with the operation may be an increasing, decreasing, or constant function of its rate of output.

The peculiar relationship of the cost functions of all the operations performed by the firm partially explains the phenomenon of vertical integration and disintegration (specialization). Although some of the processes (operations) performed by the firm may exhibit increasing returns, the firm may fail to expand output because it is restrained by processes with rising average costs. Once these "restraining" processes become significantly large a new firm may assume them, allowing the original firm to specialize in the remaining processes. Thus, the horizontal expansion of a firm is limited by the peculiar cost relationship of the operations it performs and by the significance of its "restraining" processes.

Circumvention of restraints of other than process costs are also important. The nature of management appeared to Blaich as the major determinant of vertical and horizontal industry growth. 4/ Blaich provided a conceptual framework to use in the analysis of vertical integration by considering those processes related in

3/ Stigler, George, "The Division of Labor is Limited by the Extent of the Market," J.F.E. 59 (3): 185-93, June 1951.
4/ Blaich, O.P., "The Theory of Vertical Structures With an Application to Hog Production," (Unpublished manuscript, University of Minnesota, 1961.)

production by virtue of product flow as variables in firm decision-making. Thus the firm not only considers changes in output, but changes in vertical dimension as well in responding to the demand and supply situation it faces. Blaich concentrated on vertical changes in response to supply relationships in contrast with the famous Chamberlinian analysis.[5/]

These theoretical treatments of the vertical dimension of firm activity have their analytical counterparts in the modern linear programming techniques used in production research. The linear programming technique not only allows analysis of the vertically-linked operations performed by the firm, but also provides a means by which multi-product activity can be analyzed.

A more aggregated empirical analysis of intermediate processes provides an operational framework for market analysis by specifying the technical input-output relationships between related firms. In the Blaich analysis, such a cluster of vertically related firms, defined by the ultimate consumer product to which each firm segment contributes, can be referred to as an "industry-cluster."

In Leontief's studies of inter-industry relationships, the macro aspects of such relationships are demonstrated.[6/] His system possesses the circularity attributes of total economic activity by virtue of his definitions. The circularity of this input-output system is gained by segmenting this grand array of production and consumption into firm "sectors". Even the household is rationalized as a firm for analytical purposes-- the household receives inputs in the form of consumer goods and provides outputs in terms of labor, management, and resource allocations.

5/ Chamberlin, Edward H., The Theory of Monopolistic Competition, Harvard Press, Cambridge, Massachusetts, 1933.

6/ Leontief, Wassily, et. al., Studies in the Structure of the American Economy, Oxford University Press, New York, 1953. Also see earlier works by Leontief concerned with period analysis of the industrial structure of the economy.

Leontief segmented the economy into the familiar household, business, government, and foreign sectors provided by national income accounting. Breakdowns within the business sector follow the industrial classification codes of the Bureau of the Census.

Using these empirically-oriented classifications, he proceeded to trace commodity and resource-flows by means of input-output analysis. In simplest form, a defined industrial segment is measured in terms of the inputs it uses and the outputs it produces, all based on current market prices. With such information for each industry it is possible to estimate how industries are related in production. These relationships can be expressed either in dollars or by coefficients that represent the percentage of an industry's output that can be apportioned to or accounted for the dollar-value of the inputs provided it by other industries. These percentages or fractions are referred to as "coefficients of interdependence." Presented in matrix form, where the industries are listed both in row and column classifications as industries of <u>origin</u> and industries of <u>use</u>, the coefficients estimate supply interrelationships between industries and serve as gross industrial production function coefficients related vertically and horizontally. Such a matrix, and the series of technical production functions it represents, provides a summary view of the <u>industrial structure</u> of the American economy. Provided these coefficients do not change significantly over time, such a system establishes a basic economic planning mechanism whereby desired output levels in one segment of the economy can be considered in terms of their impact on other sectors.

Such analysis as this, of course, is now employed in studies of commodity-oriented segments of the national and regional economies, and has been more recently combined with programming and transportation models to provide capacity, output, and locational treatments of industrial and regional segments of the national economy under specified market conditions.

Studies involving the estimation and description of technical supply relationships, whether specified in terms of functions, firms, commodities, industries, and/or location are studies in industry structure. As such, they are important to an intelligent understanding of the nature of any part of the economy. They are particularly important as antecedents to market structure studies.

The Horizontal Dimension

The horizontal dimension of firm and industry activity is its output, the counterpart of its vertical dimension. The conventional theory of the firm holds the vertical dimension constant as it discusses optimum output levels under specified market conditions.

The optimum output level for a firm is limited first to a range of possible outputs by the technical aspects of supply and demand. The final output level decided upon by the firm within this range is conditioned by the markets in which it participates. The firm operates in two markets: as a demander of inputs and as a supplier of output. Its activity in the input market places restraints upon the extent of its output by adding prices or market value to the inputs used in production. Its participation in the output market prices its output. This price information concerning inputs and output, coupled with a motive of profit maximization, provides a determinant output solution for the firm under certain market conditions.

The conduct of firms in the market, and resulting price behavior, is conditioned by the actions of other firms. These firms are related either vertically by virtue of input-output flows or horizontally by virtue of producing the same output and using the same inputs. The horizontal relationship of firms, "competition," represents a force in the market that influences price behavior and and thus affects the horizontal dimension of firm activity.

Classical economic theory defines an industry as a competing group of firms, horizontally related by producing the same or similar outputs and using the same inputs in similar productive operations.

In earlier considerations, the firm was assumed to be one of a large number of such like firms, all related horizontally by virtue of a similar output. This output was appraised for this classification not by the physical characteristics it possessed, but in terms of the buyer's response to it--demand. Demand was considered a relation aggregated for all firms at any one vertical level for a single and distinct product (the industry). Although this aggregated relation possessed a down-ward slope, the individual firm in such an industry considered the demand he faced as a constant function of the rate of his output. The output he produced, when placed on the market, was so small that it had only a negligible effect on the price established by total industry output. Other simplifying assumptions concerning geography, information, uncertainty, and motivation provide a logical base for a simple and rigorous analysis of firm and industry output.

The industry was also viewed in early analysis as a monopoly, containing only one firm. The assumptions that served as simplifications in the industry of many firms were more empirically valid in the case of monopoly. That a monopoly would possess more knowledge and fewer uncertainties with respect to prices and its market and that it would be contained geographically is realistic. The monopolist faced the aggregate, down-sloping demand curve, but price and output is determinant in his case by marginal analysis.

The horizontal array of similar process units in terms of total output could be split into a very large number analytically, or could be considered in "lump" form as a monopoly. The unique feature of such limiting cases was that stable, determinant answers could be obtained concerning the equilibrium price and output

of the firm and industry, both in short and long-run situations. Although it is possible to bask in the light of this magnificent superstructure of economic logic, some theorists became dissatisfied with the extremity of these cases, especially where attempts were made to apply the analysis of either case to "industries" of the real world. Unsatisfactory results provided the basis for developments in theory applicable to cases "in between" these extremes.

The earliest of these considerations was the case of duopoly, where two firms provide the output of the industry. Obviously, the monopolist did not have to consider what rival firms would do when he changed his output for he had no rivals. The firm in perfect competition also failed to consider the actions of competing firms because any change in his output would only negligibly affect the price of the product and this effect would be spread even thinner over the vast number of firms in the industry. While the monopolist was omnipotent and the perfect competitor was helpless, the existence of two firms presented the problem to either firm of what the reaction of the other firm would be <u>if</u> he changed his output (thus changing the price).

This "reflected affect," or analytical recognition of power relationships between firms, served as a thorn in the previously pure and completely determinant theory of the firm. Now the firm not only had to consider, in determining his output, the price or demand relation and his costs of producing a vertically stable product, but also was faced with what other firms on his horizontal level might do if he chose any output level. The problem was attacked by assuming various amounts and kinds of knowledge held by the duopolist participants. Edgeworth and Cournot assumed that either quantity or price response would be known by the opposing parties. Under such conditions determinate solutions could be attained by "reaction curve" analysis. Under other assumptions, solutions

were largely indeterminate, but they provided explanations of such phenomenon as the rigid pricing policies of some oligopolists from consideration of "kindred demand" relationships.

The first thorn invited others. Chamberlin pointed out that not only did the monopoly-perfect competition cases present extremes that were unjustified by empirical evidence, thus causing analysis using them to be weak and incomplete if not down-right wrong, but he also attacked the assumption of a distinct, homogeneous product as being valid. Though implying the importance of the vertical dimension, his basic concern was with the relationship between firms where the products were slightly different. Thus, Chamberlin created, by considering products which were imperfectly related in terms of the demand they faced, a problem of defining what an industry is in the horizontal sense. Since previous theory assumed only homogeneous products, should firms with products that are slightly different be considered as in the same industry?

Chamberlin argued that such firms should be considered as a group and should be called "monopolistic competitors" for if each firm has a distinctly different product and the output of it is under its control in terms of a downward sloping demand, the firm has rivals who produce similar, but slightly different products, it finds itself in competition with them in terms of some kind of "generalized" demand by consumers. Thus each firm is a monopolist with respect to its product but finds itself in competition with other firms due to the substitution relationship of its product with the products of other firms.

Using this "nature of the product" variation in firms and their output as the key element in his analysis, Chamberlin segments the horizontal array of firms and products in a different manner. In addition to the cases of pure competition, oligopoly, and monopoly where the product is distinctly the same (homogeneous)

in the eyes of the buyers, new groups are added to the horizontal spectrum in terms of their products being substitutes for one another, again, in the eyes of the buyer. It was Triffin, Chamberlin's student, that furthered the discussion of the horizontal dimension of industry activity by considering the problem of "market delineation."

Usually the demand relation is expressed with the following variables included:

$$Q_{d_i} = f\ (P_i,\ P_{s_j},\ P_{c_j},\ Y,\ T).$$

This reads: (the quantity demanded of the product of firm i) (is a function of) (the price of the product of firm i), (the prices of substitute products of firm j), (the prices of complimentary products of firms j), (the level of income of the demanders), and (the tastes and preferences of these demanders). Normally we are concerned with the relationship of Q_{d_i} and P_i holding all other variables constant. This gives us our normal demand curve and from it we derive the price elasticity of demand. By considering the relationship between Q_{d_i} and Y, of course, we are able to derive the income elasticity of demand.

In a similar manner, the relationship between Q_{d_i} and P_{s_i} can be considered holding all other variables (plus p_i) constant. This is the cross demand relationship. It describes how the quantity demanded of the product of firm i would change in response to changes in the price of substitute products of firms j. The elasticity coeficcient of this relationship would indicate the degree of demand substitution between the product of firm i and the product of any firm j: if a price change by the firm j(either increase or decrease) had a very large effect on the quantity demanded of the product of firm i then these products must be close substitutes; if no effect results, the products must be unrelated. Any coefficient between zero and infinity indicates that the products are imperfectly related as substitutes and measures the degree of that relationship.

The analytical measuring device allowed Triffin to separate out various market situations in line with the Chamberlin analysis. He labelled those firms producing products which were perfect substitutes (cross-demand elasticity coefficient equaled infinity) as being in "homogeneous competition" and those firms whose products were imperfect substitutes (cross-demand elasticity coefficient ranged from more than zero to infinity) as being in "heterogeneous competition." Where coefficients of zero were recorded, the firms were not competing productwise and were labelled "unrelated."

It was apparent to Triffin that such a taxonomy using the nature of the product as a criteria was not enough to approximate real world phenomena. The effect of a price change by one firm on another also depended upon the relative size of the firms involved and the power relations existing between them. Where a large and a small firm were producing products that were perfect substitutes, a price decrease by a small firm may not effectively change the quantity demanded of the product of the large firm simply because the small firm could not supply the market alone. To consider the effectiveness of price changes introduced one further step in logic and a new measuring device.

The cross-demand relationship suggests the change in the quantity-demanded resulting from a change in the price of a substitute product of firm j. Whereas the nature of product competition is revealed by cross-demand, the effectiveness of that competition is revealed by cross-sales. Cross-sales provided a measure of the power relationship between firms, once product competition was accounted for. Where the cross-sales elasticity coefficient approached zero, i.e., a price change by firm j had a negligible affect on the quantity sold by firm i, it was concluded that "atomistic" power relations existed; where the elasticity

was significantly different from zero, a strong power relationship existed between the firm.

Combining cross-demand and cross-sales coefficient information it becomes possible to delineate a series of market situations using (1) the nature of the product and (2) power relationships as criteria. 7/

Triffin also provided a similar pair of measuring devices for input market situations. The method of classification received further analytical refinement by Fellner (who considered the firm's affect on the group as a totality and vice versa), but since the time of Triffin no major theoretical additions have been made.

7/ The following table, partially derived from the Triffin analysis, suggests the usage of these elasticity coefficients to classify various market situations (E_{cd} = cross demand; E_{cs} = cross sales):

E_{cd} $\leftrightarrow$ ij	E_{cs} $\rightarrow$ ij	E_{cs} $\leftarrow$ ij	Market Situation
∞	0	0	Pure Competition
∞	0	+	Pure Competition With Dominance
∞	+	0	(or Partial Oligopoly)
∞	+	+	Pure Oligopoly
+	0	0	Monopolistic Competition
+	0	+	Monopolistic Competition with Dominance
+	+	0	(or Partial Differentiated Oligopoly)
+	+	+	Differentiated Oligopoly
0	0	0	Monopoly
0	+ or 0	0 or +	(No economic meaning)
-			(complimentarity exists)

Papandreou has utilized this system of market classification to consider legal influences on economic activity and Cochrane and others have pondered its application to agricultural economic research. 8/

The horizontal dimension of industry and firm activity, segmented by those theorists in terms of the commodity and power relationships, has received major theoretical treatment for many years. The analyses relevant for conditions of perfectly competitive, oligopolistic, monopolistically competitive, monopolistic, and other market situations fill modern theory texts and are beyond the scope of this discussion.

To this point, this discussion has demonstrated some of the developments in theory in the vertical and horizontal dimension of economic activity. This is both a prelude and a part of the discussion of "market structure analysis."

8/ It has been argued appropriately that the Triffin delineation is operationally unworkable (Williams, Willard F., "Structural Changes in the Meat Wholesaling Industry," J.F.E. 40 (2): 315-29, May, 1958). This is true if one attempts to empirically formalize the abstract measures employed by Triffin. Use of the concepts of substitution and power relationships in market delineation, however, can be made useful in research efforts. Demonstrated use of these concepts is made in Nelson, Ralph, "The Nature of Competition Among South Dakota Dairy Manufacturing Plants," (Unpublished Ph.D. Dissertation, University of Minnesota, December 1960), and Andrews, Richard, "A Study of the Sweet Corn Industry in the Midwest Farm Economy," (Minnesota Agricultural Experiment Station Technical Bulletin 232.)

III. MARKET STRUCTURE ANALYSIS

Market structure analysis differs from market structure theory. By "market structure theory" most writers appear to have in mind that body of economic theory that deals with market situations other than perfect competition. These theoretical treatments are useful in market structure analysis, but their application is limited by how closely the assumptions of these models approximate the study at hand.

Market structure analysis is research oriented. It studies market behavior and the structural elements in the market in an attempt to formalize a predictive device empirically. This analysis draws from economic theory by considering the ceterus parabus features of theoretical models as units of inquiry. The structural assumptions of the perfectly competitive model, for example, serve to suggest the scope of market structure analysis.

The Structurally Perfect Market

The theoretical model of perfect competition specifies the following market structure:

1. Technical Elements

The "state of technology" is assumed to be a static force while each firm uses the same and best available production techniques. Because each firm uses the same set of production processes involving the same inputs and produces a good or service that is the same as the output of other firms in the industry, each firm has a production function that is identical to that of every other firm in the group. Due to this identity, the total output of the horizontally-defined industry can be represented by the sum of the outputs of the firms and this total output can be related to the simple sums of each input that enters into the firm's function. The technical production function of the industry is the simple sum of the production functions of the firms that compose the industry.

It is apparent that variations in the technical production functions by firms in the industry would create aggregation problems if summed to the industry, for it would involve the summation of inputs and outputs of different technical processes, i.e., similar inputs combined in different ways to produce a similar output, when summed, create an industry production function that may importantly mistake the production function of any one firm in the industry. This illusory or "averaged" production function for the industry does not create analytical difficulties in research unless it is estimated and then considered as a basic parameter to extensive research of the supply relationship and used later to serve as a parameter in related research. This aggregation problem is well-recognized in some current regional research efforts. Further problems in estimating and aggregating production-functions include simplifying techniques where multi-product firms are investigated. The statement of these difficulties serve to remind the researcher of the inherent limitations of empirically aggregated supply functions, but also suggest a fruitful area of market structure study - the changes in the supply relation as a result of changing technologies and the application of these technologies non-uniformly by firms in an industry.

The supply relation, bounded internally to the firm as a vertically constant relationship, also is technically related to other firms in the vertical dimension by virtue of input-output flow. Modern input-output analysis, of course, serves to define this vertical relationship empirically through the use of "coefficients of interdependence" in a manner similar to the use of production function coefficients in the production theory of the firm. The same aggregation problems attend input-output analysis as do the production functions just discussed. In essence, input-output coefficients merely sum the production

functions of vertically related firms, related by virtue of the inputs supplies or outputs produced. The input-output tables of Leontief's studies represent a highly aggregated production function for the total economic activity of the nation. It possesses the unique feature of complete circularity by virtue of its scope. The additional aggregation problem inherent in input-output analysis includes the use of market prices to serve as a common-denominator in relating inputs to outputs. This problem is also present in many production function studies involving linear programming techniques. Where current market prices are used, the influences of the entire group of market structure elements colors the technical parameters obtained unless all the other structural elements are of minor importance in the analysis. Where the coefficients vary due to changes in market structure elements other than technical supply relations, the meaning of the coefficients becomes drastically obscured and of limited analytical benefit.

The perfectly competitive model assumes tastes and preferences, the technical aspects of demand, autonomous and invariant. These technical parameters are defined by a "utility function." Utility theory, of course, provides through the cardinal (measured) Marshallian approach or by the ordinal (ranking, indifference) Hicksian approach, the logical formulation of such a utility function for an individual. The simple expansion of this formulation to the market place (a group of consumers) runs into the logical difficulties of interpersonal utility comparisons, due to the heterogeneity of cultural knowledge and its application and the unique problem of the marginal utility of money from one person to the next. The conditions of perfect competition, however, idealize the same kind of market utility function that is logically derived for the individual.

The assumption of a down-ward sloping utility function for the market (that facing the perfectly competitive industry) has not been and perhaps cannot be, analyzed empirically without recourse to market prices as a common denominator. Aggregate consumption indexes have been developed (with prices as a base) that show generalized trends in food consumption. But unless these trends are dis-

counted by income and price changes, the empirical specification of tastes and preferences is difficult to measure. Some consumption studies clearly suggest changes in tastes and preferences, but to segregate this change from income, population, and price changes has not been accomplished. This is not to say that rather good demand studies have been and are being made, but to divorce the effect of product prices from the demand function to yield a market utility function is quite another matter.

How changes in tastes and preferences act to modify the demand relation at the consumer level is an element of inquiry in market structure analysis. Technical demand relationships at other than the consumer level can be gained in theory by the derivation of marginal physical product functions. This aspect of demand is normally disregarded in economic analysis under the conditions of perfect competition. The producer deals directly with the consumer, without any "middlemen" in between. Several difficult problems arise in the logic and empirical study of "derived demand." The marginal physical product is an expression of the various values of an input in terms of the amount of the output. The logical difficulty arises in attempting to relegate the product "returns" to the inputs involved in production. Rather strict assumptions have to be made concerning the "market price" of inputs in terms of an "equi-marginal principle" of input substitution, and the residual returns beyond this are "profits," returns to entrepreneurship, or "rents" depending upon the nature of other structural elements of the market. The "technical demand relation"again is intimately bound to market prices and conditions and is logically, as well as empirically, difficult to ascertain. In empirical research these difficulties are greatly oversimplified by merely subtracting the "marketing margin" from a consumer demand schedule to obtain a derived demand at the farm level. The

marketing margin is sub-classified in terms of the inputs inherent as cost constituents. Such an empirical method of obtaining derived demand relationships is very precarious. The effects of a complex series of technical relationships are dismissed from consideration by such analysis. While it is apparent that the demand facing the farmer is indirectly related to consumer demand, the nature of farm level demand may bear elasticities, slope, and non-price elements generated by vertical technicalities that seriously conflict with consumer demand relationships.

2. Motivational Elements

Firm decision-makers pursue the unrelenting goal of profit-maximization and have only price and output decisions to make. The output decisions of the firm are reduced to a simple calculus, (MC = MR = P), and only pricing competition is allowed in the firm's dealings with other firms. Even this competition by price is restricted, disallowing any form of discriminatory pricing. Of course, pricing policies by firms is eliminated by the peculiar organizational features of the model which result in atomistic power relations.

The motivational goals of businessmen appear to emulate profit maximization but a great deal of literature and controversy prevails concerning the existence of other operational goals in short and long-run situations. To study conduct in the market without preconceptions about what motivations prevail is to approach the analysis of a market as a "structuralist." The motivational goals of long-run growth, business survival, and cooperation provide logical alternative operational goals. Continuous profit-maximization in a series of short-run situations may not sum to maximum profits in the longer run period; other operational goals may gain greater long run profits.

Of special concern to the structualist is the market conduct that develops out of these motivations as restricted by other structural elements. The conduct of the firm under perfectly competitive conditions, with profit maximization

as a goal and discrimination disallowed, reduces to mere rote decisions regarding output and no market conduct attributes prevail for the firm. Market price is a parameter to the firm; its market activities limited to "discovering" what the prevailing price is and adjusting its output to this. But while market conduct is passive under perfect competition, it becomes a real and vital unit of inquiry in market structure analysis. Firms may have price policies, may vary its product or advertise to affect the demand it faces, may collude with other firms or engage in price-cutting activities, may attempt to control input quality and stocks by written contracts, or may use coercive power to gain competitive advantages. These various forms of market conduct result from the unique combination of other structural elements that determine certain market conditions. The manipulation of structural elements by government marketing policies so as to cause "desirable" forms of market conduct is the essence of a vast area of monopoly prohibition, control, creation, and that legislation directed at "maintaining competition." 9/

Generally, market conduct cannot be predicted by considering only the organizational elements of the market. Frequently organizational arrangements serve as necessary but not sufficient conditions to determinant market conduct. The assumptions of perfect competition afford a ready example of this. Despite the strict organizational restrictions imposed (plus the remaining conditions) it is still necessary to specifically disallow the existence of discriminatory pricing practices in the market. Market conduct is conditioned by the organizational aspects of a market, but it is not determined by it.

9/ An excellent summary of the theoretical considerations in this area is found in Sasnick, "A Critique of Concepts of Workable Competition," QJE, August, 1958.

3. Organizational Elements

The firm in the perfectly competitive market possesses a simple internal organization. The entrepreneur is both manager, owner, and supplier of capital and performs, as an integral part of his duties, all "housekeeping" tasks necessary to keep the business operating in addition to directing the "line" or production processes of the firm. Problems of input and output stocks are also assumed away.

Deviations from this simple firm in real world situations are obvious. The gross function of entrepreneurship above, is complexly and variously subdivided. Management is frequently separate from ownership; ownership is separate from capital; the management tasks include degrees of decision-making (long-range policy made by the board of directors; short-run, important decisions by top management; routine decisions by management assistants) and a complex internal organization of accounting, warehousing, quality control, personnel, and other management duties. Such complex organizational features of modern "firms" as these have an apparent influence on the nature of the supply function of the firm and the demand it has for inputs. To study the effects of internal business organization on market conduct is another aspect of market structure analysis.

A sufficient number of firms prevail in this horizontally-defined industry so that the output of any single firm is but a negligible part of industry output. The demand relation is expressed in aggregate form at the industry level and is exogenous to the industry or any firm composing it. Price is set by the industry supply relation in reaction with the exogenous demand function, which precludes pricing policies by any firm in the industry.

Where the output of the firm is the output of the industry (monopoly) or where only few firms supply this output, output decisions are based on the sloped demand relation aggregate to the industry and, in the case of "fewness," what the other firms output decisions will be in response to the output decision by the firm. The ability of firms to influence each other's decisions by its output and pricing actions indicate the presence of horizontal power relationships in the industry. Because of institutional restrictions to horizontal collusions

on pricing or severe price-cutting activities, other forms of competitive conduct are manifested in markets where "fewness" prevails. Non-price competition in its several forms rears its head.

The demand relation facing an industry, of course, is not distinct from other demand relations in the real world. Goods and services serve, in varying degrees, as substitutes for one another. Homogeneous products are completely substitutable for one another (perfect substitution) but some products are only imperfectly related in this way. The degree of substitution between products serves to decrease or increase the effect that price and output changes by one firm have upon another firm. Thus, power relations lose their intensity as the degree of substitution between products declines. For pure competition, with many firms and homogeneous products prevailing, power relations tend to dissipate considerably. Where many firms prevail producing slightly different products (monopolistic competition), firms gain a degree of market power and have market policies. Where "fewness" prevails, the intensity of power relations present is lessened by product differentiation. Market conduct resulting from inter-firm organizational arrangements on the horizontal level is an important aspect of market structure analysis. Studies of business concentration fall in this class.

Inter-firm organization also involves a vertical dimension. In perfect competition it is assumed that vertically-related firms both on the input and output side are also in perfectly competitive industries. This assumption precludes any form of market negotiation between buyer and seller. Input prices are parameters to the firm that are "given" by input <u>industry</u> prices in the same way as firm output prices are autonomous to the firm. Input specification problems are overcome by the assumption of homogeneous inputs in this market.

The vertical organization of firms serves to modify market conduct in several respects. The existence of other than perfect competition on the buyer and seller sides of the market allow power-relationships across the market manifested coercively and persuasively by lopsided price and product negotiations

and various forms of marketing conduct. Product specification plays an important role in such negotiative relationships and is evidenced in agriculture currently (along with evidence of vertical power relationships) by "control integration." Integration, both vertical and horizontal, cannot be explained as market conduct by the vertical or horizontal organization of firms alone. In varying degrees, all aspects of market structure are important to a full understanding of this conduct in the market.

It is important to note here that "bargaining" (vertical conduct) relationships are not the simple supply and demand forces that result in a price under perfectly competitive conditions. Price, it will be recalled from an earlier section of this discussion, sufficiently summarizes the bargaining relationship only under specified market conditions. It serves this summary role adequately under perfect competition, but once power-relationships, either coercive or persuasive, and complex product specification enter the analysis, money price is not enough to specify the vertical, bargaining relationship.10/ The efforts of Adelman to statistically measure the degree of integration by using price data fails to take this into account. 11/ That price is only one aspect of vertical inter-firm negotiation is amply illustrated by the various provisions of integration contracts that specify the non-price elements of negotiative arrangements.

10/ Supply and demand as market forces have been used in this discussion in their larger sense, taking not only price but other structural features into account.

11/ Adelman, M.A.,"Concept and Statistical Measurement of Vertical Integration," Business Concentration and Price Policy (National Bureau of Economic Research, Special Conference Series No. 5, New York, 1955).

The spatial organization of firms under perfect competition is limited to a point concentration both horizontally and vertically. The representation is a simplified market-place where sales are randomly made such that each firm sells all of his output at a prevailing market price to indifferent buyers that happen along. Such an assumption, of course, denies the existence of vertical and horizontal power relationships resulting from "spatial" competition and negotiation (where a firm is a near-monopolist or monopolist by virtue of location). It also delimits the analysis technically, by not recognizing input concentration and the law of comparative advantage, and by omitting from analysis geographical variations in tastes and preferences.

Elementary location theory considers the geographical problem by the use of location models of varying types. The general lineage of van Thunen-Weber-Losh provided the basis of much of the current work in location theory. The location models developed by these men rested heavily upon supply elements, allowing transport costs, labor costs, and certain agglomerating forces to be variable in the analysis. Hoover and Greehud introduced demand variables, but it was Losh who developed a general equilibrium system of equations built on the Walrasian system but with distance as an additional variable. These earlier analyses lacked in several respects for empirical research (transport rates were considered constant for example) but the many important developments in this area in recent years have made location theory highly research-oriented. The modern writings of Isard and Dunn provide a satisfying picture of the analysis of locational dispersion as it relates to economic activity. The melding of input-output and locational models, both based largely on empirical evidence, provide a unique and fruitful method of analyzing marketing activity. The major thorn in such modern analysis is the necessary acceptance of market conditions of perfect competition or pure monopoly to obtain determinate solutions. Agregation problems are necessarily solved by simplification techniques that distort locational predictions.

An investigation of the spatial organization of an industry or industry-cluster and the effects of changes in this organization upon market forces and market conduct is an important aspect of market structure analysis. Such analysis can, as is the case in the inter-regional livestock marketing adjustment study (NCM-25), consider basic consumption trends, income, population levels and concentration, and price projections of related products to ascertain the consumer level demand relation now and in future years, and to assess this change in terms of past production patterns to suggest important locational and organizational adjustments that will likely develop in response to these changes. That these aspects of market structure be combined with motivational, technical, and institutional considerations is apparent in an analysis of structural adjustment.

4. Institutional Elements

The firm under perfectly competitive market conditions is assumed to possess complete knowledge of prices in both its markets and of the "best" technologies available in its productive effort. It is further assumed that each firm possesses this knowledge equally and applies it equally in its production and marketing conduct.

That knowledge is not perfect or equally dispersed and used is of little surprise to college professors. To study the effects of imperfect knowledge and applications as they influence both supply and demand in the market is still another aspect of market structure analysis. The discovery, dissemination, and application of technical innovations in agriculture clearly demonstrate the "lagged" relationships in knowledge imperfections. The pursuit and "secretly-kept" technologies by marketing firms show knowledge imperfections as a competitive device in market conduct. For demand, of course, much of the current advertising and selling efforts are to keep the consumer misinformed or to provide "one-side-of-the-arguement" information concerning pro-

ducts. As Roger Gray points out, however, "There may be no objection to studying the results of demand manipulation so long as we preserve the right to hold our noses on occasion." To study knowledge levels of consumers and its affect on demand also requires the study of knowledge levels of inputs for input-demanding firms to provide the marketing analyst with an understanding of the elusive empirical concept of derived demand.

Some recent studies in decision-making have tested knowledge levels of firm managers in farming and agricultural marketing. The effect on the production decisions of the firm (supply) has been recorded and serve to "structure" individual firm supply functions more realistically. Less empirical work has been done on the effect of knowledge or lack of it on market conduct. This is the inquiry of the market structuralist.

Risk and uncertainty stemming from future price, output, or market conditions that serve as unknowns in business activity are assumptively dismissed in perfect competition theory. The entrepreneur is envisioned as a worry-free automan who is both clairvoyant and all-knowing. The only major decision he is confronted with is how much to produce, but this decision is so routinely determinant that he could readily be replaced by an IBM machine in our modern world.

Most elements of risk can be discounted probabilistically, and, given enough "events," can be transferred to speculators. Some risk elements, of course, cannot be so transferred and serve to modify production and marketing decisions considerably. For those risks that can be transferred by various methods (insurance, F.O.B. pricing, futures trading) the firm and market supply function is affected by the addition of this cost item. The study of the effects of risk on supply, and resultantly on market conduct, is a structural element in market analysis.

Uncertainty cannot be discounted probabilistically. In terms of market conduct, uncertainty is presently considered in oligopoly decision theory by game theory. The uniqueness of this approach to the solution of uncertainty

problems provides optimism for the theoretical snarl imposed by power-relationships in the market. This analytical approach assumes various degrees of knowledge concerning outcomes or what alternative moves can be made by competing oligopolists. Under specified motivational elements (Minimal, maximal, etc.) solutions of optimum strategies can be obtained. The application of this theory to the vertical relationships of firms should also provide an important logical base for market negotiation. To study the effects of uncertainty upon market conduct is to study one segment of market structure analysis.

Legal and social restraints are minimized under perfect competition to the simple role of providing "law and order", the protection of property rights, and the enforcement of contracts. The prohibition of discriminatory prices and the restriction of entry and exit to and from the industry are separate from the role of government to regulate, prohibit, or encourage these activities of market conduct.

Law pervades and influences all of the market structure elements discussed to this point. It restrains the technical elements by prohibiting the use of technologies that serve to produce or regulate (through sanitation, grades, standards) "undesirable" goods and services and prohibits or regulates the consumption of them, thus affecting consumer tastes and preferences. Laws dealing with the prohibition of certain market practices and governmental assumption of the market conduct of firms (rate regulation), the encouragement of cooperation and competition as motives to market conduct, and the "price-leader activities" of government as a purchaser of goods and services and as a large marketing firm that "purchases" farm products all serve to indicate the intimate role of government in the area of market motivation. Legislation that deals with the provisions of credit, the guarantee of prices or income, and the granting of franchises (public utilities, incorporation laws) provide important influences on intra-firm organization. Anti-trust legisla-

tion to prohibit the formation of monopolies or the exercise of monopoly power; the creation of monopolies via franchise and of countervailing power via cooperatives, labor unions, and marketing orders and agreements; the maintaining of competition by encouraging the development of small businesses; all of this legislation directed at inter-firm organization. The regulation of transport firms and rates so as to minimize locational imperfections, the imposition of import duties to restrict low-priced goods from competing with localized industries, and homesteading laws indicate the influence of government on the spatial organization of marketing activity. The market news services, extension service activities, grading and standardization regulation, and prohibition of certain advertising practices, influence the level and application of knowledge. Government assumes risk-taking by providing insurance and credit loans, and deals in the area of uncertainty by guaranteeing prices and incomes and provides emergency aid during periods of economic crisis brought on by "acts of God."

To study any of these laws as they affect the relevant structural aspects of the market is to perform market structure analysis. Legal influences on marketing activity and conduct have received considerable research emphasis in past years especially at the time the legislation was being reviewed. Attendant theories of "workable competition" have evolved, providing an important bridge between economic theory and economic policy.

Social restraints (customs, tradition) that are not codified into law also "structure" the market. Since law is the enforceable formulation of social custom, many of these social elements are codified. Certain social mores outside the legal framework are important in market structure analysis. Traditional "ways" of doing business (habitual market practices) structure a market

in very important respects. Customary diets (meat and potatoes) serve as institutional limits to demand. Producing a crop merely because it is a family tradition or to carry on a declining business out of reverence to the past are examples of such extra-legal social influences on market conduct. To consider these habits and customs as they influence supply and demand relations in the market is to consider important structural attributes of marketing analysis.

It is, of course, clear that the market structure of perfect competition is not even closely approximated in the modern-day marketing system. Under such conditions it becomes necessary to consider what changes in market behavior result from variations in these structural elements, and conversely how structure is influenced by changes in market conduct. Theoretical treatments of various market situations provide some beginning relationships between market structure and market behavior. The duopoly problem, the Chamberlin and Robinson analyses of imperfect competition, the oligopoly theory of Fellner, and the multitude of subsequent developments provide an important source of hypotheses for market structure analysis.

Major Market Structure Hypotheses

As previously stated, consideration of all the market structure elements in any research effort is beyond human capacities. Instead, market structure has been normally limited to the analysis of certain structural features of the market as they influence market conduct. Traditionally, market structure research has emphasized the organizational elements as they influence market behavior and either considered the remaining structural elements implicitly in the organizational context or dismissed them assumptively.

The organizational elements most frequently considered include: (1) that aspect of intra-firm organization manifested in product differentiation, (2) the

horizontal inter-firm organization of an industry expressed by the number and size of firms, and (3) the spatial organization of the market treated by location theory. These subelements of inquiry, of course, are suggested by the theories of monopolistic competition, oligopoly, and location as being of general significance as determinants of market conduct.12/

To these hypothesis, the reader may urge the addition of others. Included may be condition of entry, the nature and extent of vertical and horizontal integration, the bulkiness or perishability of the product, as well as others.13/

These hypotheses are treated extensively in the sources cited; it would be redundant to restate them here. It is important to recognize that these relationships deal primarily with the organizational elements of market structure, and even further are limited in inter-firm organization.

Even this limitation in scope, however, does not delineate the problem of market structure to determinant form. The analytical rigor that more familiar classical concepts have received from the theoretical ponderings of generations of economists.

But the scope of market structure analysis is not limited singly to the organizational features of the market. The analysis is concerned with under-

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12/ Extensive treatment of market structure analysis is found in terms of these organizational elements in Bain, Joe S., Industrial Organization(Wiley and Sons, New York, 1959), but with only a limited discussion of spatial organization. Application of these elements to classify the market structures of food processing and agricultural supply industries was recently made by Robert F. Lanzillotti (J.F.E. 42(5 1228-47, December, 1960).

13/ For a statement of some other structural hypotheses see Clodius and Mueller, "Market Structure Analysis as an Orientation for Research in Agricultural Economics," J.F.E., 43 (3): 515-553, August, 1961.

standing and explaining the effects of changes of conditions in the market as they influence market conduct. It involves, them in addition to the organizational features of the market, the technical, motivational, and institutional elements outlined previously.

Marketing Policy

To this point, the terms "conduct," "behavior," and "performance" have been used loosely and synonomously to indicate the actions of firms in the market. This impreciseness may have bothered those readers who are grounded in the recent work in marketing theories of "workable" competition -- the theoretical basis to discussions of the various aspects of marketing policy.

The logic of what has been discussed to this point fits neatly into the terminology used by these theories. "Structure" refers to characteristics which constitute a market's patterns, status, composition; "conduct" refers to characteristics which are enterprises' actions, dealings or tactics; "performance" refers to dimensions which represent the realization of normatively significant economic results; conduct and performance together are called "behavior."

To illustrate these concepts, consider the case of monopolistic competition. The structural attributes have already been mentioned; the conduct of the firms is demonstrated by price, advertising, and product competition; the performance dimension may be resource efficiency. In marketing policy, it may be considered as good to have a high degree of resource efficiency. To modify this performance dimension, product standardization may be imposed by government, thus altering the structure in hopes of changing market performance. This, however, may be a necessary "instrument" to attain resource efficiency, but not a sufficient one. Firms may still advertise and change their products; they may not alter their conduct.

Structural elements can be changed by legislation, but this does not always result in a desired performance dimension. Market conduct can be regulated, but only in a limited manner. To prohibit advertising, for example, would probably not be politically possible.

These ideas from the theories of workable competition serve to point out an important lesson in market structure theory--that market conduct, performance, and behavior are not simply the determinant result of market structure. But it also points up that the theory and application of market structure in research does not have to be considered normatively.

IV. MARKET STRUCTURE RESEARCH

The broad scope indicated by the overview of market structure analysis presented in the previous section would, it might seem leave nary an econonomic stone unturned in research analysis. This is far from the truth. The many factors taken into account by market structure analysis are never investigated thoroughly in simultaneous fashion. Instead only certain aspects of this theory receive research treatment in any one study.

Most frequently, market structure analysts are concerned with (1) explaining a conduct phenomenon in the market or marketing system by analyzing the influence of certain structural elements present. (2) investigating an observed change in structure and assessing its impact on market conduct, (3) studying the effect of one structural element on another as a result of its change, or (4) specifying the present structure of some segment of the marketing system to better understand why or potentially what, market conduct does or can prevail.

The following examples of market structure research in agricultural marketing serve to illustrate this four-point breakdown (above):

(1) Collins, Mueller, and Birch, Grower-Processor Integration in the California Processing Tomato Industry (California Agricultural Experiment Station Bulletin 768, October 1953.)

The stated purpose of this study was to investigate the scope and significance of integration, a market conduct phenomenon. The investigation was delineated to the tomato-canning industry of California because integration existed there and because the industry was not complicated by state and federal marketing programs.

The study was approached structurally, first considering certain aspects of the demand and supply structures for canning tomatoes, then investigation of

the vertical relationship between growers and processors technically (interdependence) and negotiatively in terms of market conduct.

Characteristics of the demand structure analyzed included (1) market outlets, (2) state's output relative to aggregate national demand, (3) trends in per capita consumption of tomatoes, (4) the nature of the processing segment of the industry, and some comments on the nature of the derived demand relation at the grower level.

Characteristics of the supply structure studied involved (1) state production trends relative to national production aggregates in terms of tomato types and major uses of each, (2) the nature of the grower segment of the industry as evidenced by firm numbers and size and horizontal arrangement.

Grower-processor relationships were studied as to (1) the technical and market conditions leading to interdependance between them, (2) the nature and legal basis for such integrated arrangements present, and (3) industry performance, with special respect to pricing policy.

(2) Mueller and Garoian, Changes in the Market Structure of Grocery Retailing (Wisconsin Agricultural Experiment Station Research Report 5, April, 1960.)

This study was undertaken to investigate the major market structure changes in food retailing and the probable impact of these changes on firm behavior and industrial performance.

The market structural elements analyzed included (1) national, regional, and local concentration in markets horizontally in terms of firm number, size, and market share, (2) legal ties and mergers present in this horizontal dimension, and (3) the nature and extent of vertical integration of independent and chain retailers and the entry of grocery wholesalers and manufacturers into retailing activities.

The changes noted in these structural elements (number of firms, market concentration, entry conditions, and product differentiation) were then juridically assessed in terms of their effect on market conduct and industrial performance. The decline in number of firms suggested the possibility of collusive conduct by firms, increased concentration leads to more non-price competition; the size of the firm indicates its "staying power" in price cutting activities. The theory of market structure was used to suggest, then, the probable behavior patterns. This logic was later employed to hypothesize answers to such behavioral activities as vertical integration and private labeling by retailers, the phenomenon of chain manufacturing and attendant "labeling" or brand-name advertising.

(3) Seale, King, and Martin, Vegetable Prices and Market Structure in Southeastern North Carolina (North Carolina Agricultural Experiment Station Technical Bulletin Number 134, August, 1958.)

The objectives of this study were to "determine how well the existing market structure serves the vegetable-producing area" ...and..."to evaluate alternative methods that may improve the vegetable marketing system." The study reviewed recent changes in consumption and production and attempted to assess their impact on the organizational structure of the marketing system for vegetables in this defined geographical area.

The organizational features of vegetable producers were analyzed in terms of the supply relationship and the organizational structure of auction markets were considered as it affected the demand for vegetables at this marketing level. Price analysis at these markets (cucumber, green peppers) revealed considerable price variability and suggested the possibility for organizational changes and changes in market practices.

(4) Andrews, A Study of the Sweet Corn Industry in the Midwest Farm Economy (Minnesota Agricultural Experiment Station Technical Bulletin 232, June, 1959.)

This study comprehensively included the production and processing segments of the sweet corn industry complex located in the midwest. It reviewed current and prospective consumption levels and related this to the production share provided by the Midwest economy. The organizational, motivational, and institutional elements of the market were then analyzed in terms of future demand and supply prospects to project probable future market conduct.

The tools of market delineation were employed to delimit the various vertical level markets in this industrial complex, and the structure characteristics of each level were related to the supply and demand for sweet corn.

These studies suggest only some of the types of market structure research that have been conducted. The variability that can and does exist, is, perhaps, quite large.14/

Although market structure analysis can include all those factors that "structure" a market, it is evidenced by the research conducted that many factors are excluded in practice. Most frequently, only intra and inter-firm organizational elements are considered in relation to market conduct. The number of firms in a horizontally-defined industry, their size in terms of industry output share (concentration ratios), the degree of entry, and the nature of the product (whether differentiated or not) are considered in terms of the market conduct present.

This segment of market structure analysis provides an interesting and informative base upon which various conduct phenomena can be explained, but frequently such research can provide only very generalized explanations. The consideration of additional structural features of the market may provide a framework in which conduct can be better explained and in which structural adjustments can be predicted.

14/ Those marketing projects classed as "market structure" studies receiving federal grant funds at State Experiment Stations numbered 183 in 1960, about one-sixth of the total.