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EVALUATION OF THE MARKET STRUCTURE APPROACH AS AN ORIENTATION TO RESEARCH IN AGRICULTURE AND ITS APPLICATION TO THE HONOLULU WHOLESALE PRODUCE MARKET

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE UNIVERSITY OF HAWAI'I IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY
IN
AGRICULTURAL ECONOMICS
JUNE 1969

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EVALUATION OF THE MARKET STRUCTURE APPROACH AS AN ORIENTATION TO RESEARCH IN AGRICULTURE AND ITS APPLICATION TO THE HONOLULU WHOLESALE PRODUCE MARKET

by Ernesto C. Lucas

A dissertation submitted to the Graduate Division of the University of Hawaii in partial fulfillment of the requirements for the degree of Doctor of Philosophy

ABSTRACT

The objectives of this study are (1) to evaluate the market structure approach as an orientation to research in agricultural marketing, and (2) to determine its applicability to the problems of the Honolulu wholesale produce market.

The market structure approach is one of several methods of analysis in the study of agricultural markets. It is based on the assumption that the structure of the market determines the conduct of firms and performance of the industry. Accordingly, a study embracing this assumption necessarily involves a three step process which include (1) determination and measurement of structural variables which theory and experience suggest as relevant to performance, (2) relating the structural elements with observed elements of market conduct and performance, and (3) testing the significance of observed and theoretical relationships.

However, because of the qualitative nature of the data relating to elements of market structure, conduct and performance, and the complexity of the relationships involved, mathematical methods of
specifying relationships and statistical methods of testing significance of relationships implied in the theory or observed in practice are not applicable. For this reason, the steps involved and the assumptions upon which they are based are important only as a framework of analysis, useful in suggesting the variables to be examined and the kind of relationship to be explored.

Consequently, the conclusions reached about cause and effect relations are only inferences drawn mostly from the judgment of the investigator regarding patterns of relationships he detects based on the data, his experience and his intimate knowledge of the market. Inherently, the conclusions derived reflect the philosophy and persuasion of the investigator.

Using the market structure approach in the economic analysis of the Honolulu wholesale produce market, conclusions regarding relationships of structure, conduct and performance can be summarized as follows:

1. The Honolulu wholesale produce market can be classified, depending upon the definition used, as atomistic to moderately concentrated oligopoly.

2. The prevailing structure of the market and the demand elasticity of the commodities suggest that effective price competition prevails.

3. Because of the atomistic structure of the market, widespread operational inefficiency prevails in firms operating in sub-optimal scale and firms operating at excess capacity, especially among the fringe of small wholesalers. The implications of
this inefficiency are two fold: (1) the average cost of wholesaling is high, and (2) firms operating individually can not meet the procurement policy of bigger retailers and institutional markets regarding the volume, quality and regularity of supply.

4. Inability to meet the procurement policies of retailers along with the increased efficiency in surface transportation have caused increase in direct marketing. The shift towards direct marketing has significant implications for both the production and wholesaling side of the produce industry. First, the increased efficiency in transportation permits importing from the mainland cheaply and easily, providing a more effective competition between mainland and local producers. Second, the shift towards direct marketing has decreased the volume of business passing through the wholesale produce market causing widespread under-utilization of labor and facilities.
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CHAPTER I
INTRODUCTION

The Problem

The Honolulu wholesale produce market has long been criticized as inefficient. Peters, in his studies of the cost of distribution, margin, pricing and shrinkage of certain fresh fruits and vegetables, found that the cost of distribution is high, that the rate of spoilage and shrinkage is high, that prices are "sticky" and the spread between the farm and retail prices is wide. Foytik, in his studies of the demand characteristics of fresh fruits and vegetables, was unable to explain the major causes of wholesale price variation using the market supply and income of consumers as explanatory variables.

These studies were successful in describing the forms of inefficiency using different methods of market analysis. Whereas Peters used the institutional and functional approaches to reveal the operational or technological inefficiency, Foytik used the analytical approach to describe the pricing or economic inefficiency of the market. These


studies, however, have not been able to define the causes of, and sug-
gest remedial measures for the observed inefficiency. This defect is
inherent in the method of analysis used in their studies.

The functional approach is a method used in classifying the differ-
ent marketing processes into component functions such as the physical,
exchange and facilitating functions.\(^5\) It is a very convenient method
of classifying the various marketing tasks neatly into different sub-
functions. To a certain extent, it is also useful in evaluating the
marketing costs.

The institutional approach is a method of classifying the different
middlemen and agencies involved in the marketing processes.\(^6\) It con-
siders the nature and characteristics of the various middlemen and
agencies such as the merchant, agent and speculative middlemen, process-
ing firms, and facilitating organizations. Studying the manner in
which these institutions compete or coordinate their methods of trading
and marketing practices provides an indication of how well the marketing
system performs. Its chief function, however, is to provide a conven-
ient framework for classifying the different institutions involved in
the marketing system.

The analytical approach concentrates on the analysis of prices.\(^7\)
It operates on the assumption that the price reflects how well the
market performs when compared against a model. The model normally used

\(^5\) For additional discussion, see R. Kohls, *Marketing of Agricultural
Products*, p. 22.


\(^7\) G. Shepherd, *Marketing Farm Products*, p. 15.
as a benchmark for comparison is the perfect market.

The functional and institutional approaches are criticized primarily for their taxonomic character, useful in classifying the marketing functions and the institutions involved in the marketing process, but inadequate in defining the causes of the problems and incapable of providing solutions to marketing problems. These approaches are nothing more than "systems of hooks, hangers and shelves... devised to organize our thoughts and ideas about the marketing system."8

The criticisms against the analytical approach center around the restrictive assumptions of the perfect market model. The model assumes product homogeneity, large number of firms, free entry and exit, and perfect knowledge. When these assumptions do not hold, i.e., when there are reasons to believe that products are not homogeneous but differentiated, when firms are few and interdependent, when entry or exit of firms is difficult or blockaded, the validity of the analytical approach breaks down. The prices determined by the intersection of industry demand and supply functions lose much of their value as a reflection of the nature of overall economic activity. When this happens, it is to the structure of the industry that we have to turn for the explanation of business behavior, prices and quantities.

Objectives of the Study

Because of the inadequacy of the different methods which have been used to study the Honolulu wholesale produce market, an alternative method called the industry study or market structure approach is proposed. The objectives of this study are:

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8R. Kohls, op. cit., p. 20.
1. to evaluate market structure analysis as an orientation to research in agricultural markets, and
2. to evaluate the performance of the Honolulu wholesale produce market using the market structure approach.

Plan of Work

This study is divided into two main parts. Part I deals with objective 1, the evaluation of the market structure analysis as an orientation to research in agricultural markets. Part I is further subdivided into five chapters. Chapter II deals with the importance, history, and development of market structure analysis. Chapters III, IV and V deal with the elements of market structure, market conduct, and market performance, respectively. Chapter VI considers the different methods of evaluating market performance. Chapter VII explores the difficulties involved and alternative approaches in market structure research.

Part II is an economic analysis of the Honolulu wholesale produce market using the market structure approach. Chapter VIII deals with the justification of the market structure approach to the study of the Honolulu produce market, and Chapter IX deals with the description of the Honolulu produce market. Chapters X, XI, and XII deal with the structure, conduct, and pricing practices of the Honolulu wholesale produce market, respectively. Chapter XIII deals with the performance of the market. Chapter XIV summarizes and concludes the study.
PART I

EVALUATION OF THE MARKET STRUCTURE APPROACH AS AN ORIENTATION TO RESEARCH IN AGRICULTURAL MARKETING
CHAPTER II
IMPORTANCE, ORIGIN AND DEVELOPMENT, HYPOTHESES
AND METHODS OF MARKET STRUCTURE ANALYSIS

Importance

Market structure analysis or industry study is particularly applicable to the study of markets or industries. First, its pragmatic approach is especially useful in suggesting solutions to important marketing problems. Second, it provides a happy medium between studying the industry as an aggregate of firms, ignoring the diversity of individual firms that compose it, and studying the firms one by one, which may lead the investigator to mistake the trees for the forest. Third, it deals with real life industries using the methods and concept of price theory. It has therefore a solid theoretical foundation upon which the framework of analysis is established. Fourth, most economic data are based on the concept of market or industry. Statistics are collected on an industry basis, firms plan and act in terms of industry and evaluate themselves in relation to other firms in the industry, trade associations and other interest groups operate on an industry basis, and public policies are determined largely in terms of industries.

Origin and Development of Market Structure Analysis

Prior to 1920, theories of pure competition and pure monopoly had supplied little basis for effective empirical study of market performance. Edward H. Chamberlin's works in the area of monopolistic

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competition and Joan Robinson's in imperfect competition, both published in 1933, opened a new direction in the theoretical and empirical orientation of economic analysis. These models pointed a new way of looking at the oligopoly theory in that they have the advantage of being more determinate than other oligopoly theories and more realistic than the models of pure competition and pure monopoly.

From these models emerged a taxonomic approach to the study of market structure which contained two analytical strands. Fellner stressed the formation of conjectures by market rivals and their interaction in the bargaining process, and Bain focused upon the result of the environmental condition or structure of the market that can perceptibly affect the decisions of the member firms. It was the latter line of approach which supplied the basis for an important area of research in the applied field of industrial organization. According to Bain, the field of industrial organization was:

Sired by the price theory and institutional approach to the industrial economy including that of marketing and descriptive studies of prices and profit... The offspring is distinctive in character, exhibiting as it grew, the capacity to erase barriers between theoretical and institutional studies of markets to blend them in an organized empirical investigation which has definite theoretical orientation and is related by a full blown set of hypotheses capable of elaborating the theories which are its parents.

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The empirical investigations in industrial organization are called industry studies by industrial economists and are better known by agricultural economists as market structure analyses.

Empirical research in the field of industrial organization is not new to agriculture. In fact, the works of Cassels\textsuperscript{14} even predate the works of Robinson and Chamberlin. The market structure studies they knew then involved studies on channels of distribution, geographic boundary of markets, supply area and historical changes in physical and market characteristics. Also, discussions of monopoly influences were along the lines of structural analysis as we know it at present, emphasizing the taxonomic structure of the market.

Until recently, research in this area was almost completely neglected. Many factors led to this neglect. These include (1) World War II, which changed the nature of the problem, (2) initial emphasis on marketing efficiency after the war, (3) difficulty in obtaining empirical data, (4) greater attractiveness of new and sophisticated theoretical tools applicable to other areas, and (5) controversial nature of research in industrial organization.

The sudden interest in market power, bargaining, price discrimination, predatory and exclusionary tactics, vertical integration and contract farming have brought industrial organization back to the forefront of agricultural economic research.

The amount of research involving market structure approach was

estimated by Bressler for the year 1964. He showed that there were about 473 professional man-years in market structure research, 40% of which were undertaken by the United States Department of Agriculture, and 60% by the State Agricultural Experiment Stations. In 1963, Clodius and Mueller listed over 200 publications on the theory and practice of market structure analysis. The latest and most controversial of studies using the market structure approach are the studies concerning eight food industry groups conducted by the National Commission on Food Marketing (NCFM) published in June, 1966. Fourteen other agricultural industry studies using the market structure approach were published in 1968.

Hypotheses

The disposition of economists to classify markets according to their structural attributes clearly reflects the belief that such structural differences are likely to be associated with significant differences in their performance. This belief is supported by contemporary price theory. Given the structural information about a market, such as the concentration of firms, price theory proceeds to deduce from each category of


17 A commission created by the U.S. Congress in 1964 to study marketing practices in the United States.

market structure, the reaction of firms to basic changes in demand and costs, to determine their price, output, product and the magnitude of selling costs, the kind of competition, and the kind of performance which that structure and conduct brings about. For example, let us consider the cases of pure competition, pure monopoly and oligopoly.

In a purely competitive market whose structure is characterized by many sellers and low concentration, insignificant barrier to entry, and homogeneous product, the conduct of the firm, by axiomatic reasoning, is that the individual firm (1) has no price policy, the price being determined by the market for the firm; (2) has no product policy, since the products are assumed to be homogeneous or undifferentiated from other products of competing firms; (3) does not practice predatory, exclusionary or coercive policies, since the firm is small, insignificant, and without influence in the market or to other sellers.

On the other hand, the monopolist characterized as a single seller, selling a highly differentiated product, and protected by a high barrier to entry, has wide power in setting its policies. It has (1) a distinct price and product policy consistent with its profit maximization, (2) a sales promotion policy designed to increase demand and to stimulate sales, and (3) has no predatory, coercive or exclusionary practices since it has no competitor by assumption, and potential competition is discouraged by strengthening its barrier to entry.

In oligopoly, where there are few sellers and where each seller is significant in the market, mutual interdependence results. Like the monopolist, each seller has its own price, product and sales promotion policies, as well as predatory, exclusionary, coercive and collusive
practices. The extent to which it can pursue its individual policies is constrained only by the impact of these policies on other oligopolists. This mutual interdependence leads them to collude, resulting in a price-output relation akin to that of a monopolist, or to compete in a manner similar to that of pure competition.

These axiomatic cause-effect relations of price theory are the basis of a series of hypotheses which are the foundation of market structure analysis. These hypotheses are summarized by Moore and Walsh and are stated briefly as follows:

1. The more even the size distribution of firms is in the market, the more difficult it is for any one firm to dominate the market, or coerce its rivals to follow a price and/or product policy.
2. The more firms there are in the market, the less interdependence among firms exists, and the more difficult it is for them to coordinate or collude.
3. The greater the difference in the design, quality, and customer acceptance of products, the more difficult it is for sellers to find a mutually acceptable price level or price differential among their products.
4. The easier it is for a firm to enter the market, the less likely it is for the firms in the market to maximize their joint profit without attracting new firms.

19 Ibid., p. xv.
Methods

Market structure analysis employs many concepts from price theory, but it generally classifies them broadly under the heading of market structure, conduct and performance. It generally recognizes the axiomatic cause-effect relations running from market structure to conduct to performance. Put differently, market structure analysis rests on the assumption that the structure of the market determines in large part20 the competitive conduct of firms, which in turn generates certain patterns of performance. Theoretically, Mueller21 suggested the steps involved in market structure analysis as follows:

1. Measurement of the various structural variables which economic theory and industrial experience suggest as relevant to conduct and performance of firms, including concentration of firms, condition of entry, degree of product differentiation and other structural elements such as geographical location of buyers and sellers, growth of the demand of the commodity, and government regulations affecting firm conduct and industry performance.

2. Measurement of conduct variables and evaluation of competitive practices regarding price policy, product policy, sales promotion policy, and exclusionary, predatory and coercive practices engaged in by buyers and sellers.

20 This statement does not imply that structure is the sole determinant of performance. It implies that structure is sufficiently important to make the difference on how performance will emerge given other determinants such as institutional and technological factors.

3. Measurement of performance variables which includes size and utilization of firms, product and process progressiveness, price flexibility, promotional costs and profit.

4. Specification of inter-relationships and test of hypothetical relationships between market structure and market performance or market conduct and market performance.

In order to understand the problems and difficulties involved in market structure analysis, the remaining chapters of Part I will examine the different elements of market structure, conduct and performance, consider the different criteria in evaluating market performance and discuss the difficulties and alternative approaches of market structure analysis.
CHAPTER III
ELEMENTS OF MARKET STRUCTURE

The belief, supported by price theory and industrial experience, that the structure of the market determines the competitive behavior and performance of the industry makes it imperative that the first step in market structure analysis is the determination and measurement of the bases or elements of market structure, conduct and performance. This chapter deals with the specification, and measurements of the different elements of market structure.

The three basic elements of market structure are concentration, product differentiation, and condition of entry. Although the importance of these elements vary from one industry to another, they are basic to all industries in the sense that they make the difference in how the firms compete and how well the industry performs. Other structural elements which are customarily included are geographical location of the market, technological factors, institutional factors, legal factors, price elasticity of demand and growth in demand. These are not as important as the basic elements in that they can not provide a meaningful relation since each industry provides a unique structural relation in each case.

Concentration

Concentration is defined by Morgan\textsuperscript{22} as the inequality inherent in an array. Among business firms, it is fundamentally a measure of the

inequality in the distribution of assets, income, employment or sales. Concentration is customarily measured in terms of a ratio or index, estimated by arranging the firms in decreasing size and expressing the inequality in terms of percentage. Thus if one takes sales as a measure of size, the concentration index is the sum of the sales of the biggest n firms, where n is usually 4, 8, or 20 firms, in the industry, divided by the total industry sales, times 100. In this study, the concentration index of the biggest 4, 8 or 20 firms is indicated as C₄, C₈ and C₂₀ respectively.

Concentration is significant in that it shows the concentration of ownership or the distribution of business wealth and income by firms; the degree of concentration or control of decision making power, distribution of economic power or control of economic activity; and determines the character of competition in the industry. According to Adelman, concentration is a measure of the share of the largest 4, 8, and 20 firms selling a particular product in a particular market at a particular time, and hence an indication of the extent of oligopoly, and a measure of the size of the largest units regardless of the nature of competition or degree of oligopoly implied.

Because of the economic power implied in concentration, a concentrated industry is held to be inconsistent with the democratic ideal of wider dispersion of income, and inconsistent with equality of power and

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23 Bain, op. cit., p. 4.

wealth among economic units in an industry.

**Theories and Forces Affecting Concentration**

Traditional economic theories offer no explanation on the causes of concentration except that absolute size is a function of technology and factor cost, while number of firms in the industry is a function of market size.

According to Morgan\(^{25}\) there are non-economic and socio-economic theories of concentration. Non-economic theory argues that the innovating entrepreneur and technological progress are necessary and sufficient conditions for concentration and development. Socio-economic theory emphasizes that the size and distribution of firms are explained by the quality of entrepreneurship, availability of labor, and the demographic features of the population.

Currently, in the field of industrial organization, several factors are recognized as affecting concentration in the industry. These factors are classified by Bain\(^{26}\) as (1) technological considerations towards the attainment of economies of scale, (2) economic considerations toward the attainment of other economies, (3) condition of entry, and (4) other factors such as desire to restrict competition in the form of merger, monopolization of resources, and financial considerations.

On the other hand, there are forces which tend to oppose concentration in the industry. These include legal considerations, enterprise sovereignty, and market growth consideration.

\(^{25}\) Morgan, *op. cit.* , p. 1338.

\(^{26}\) Bain, *op. cit.*, p. 182.
Where economies of scale prevail, pursuit of lower unit cost of production causes firms to expand their size at least to a level called the minimum optimal scale, or the scale of the firm at which further expansion will not result in further reduction in unit cost. The size of the minimum optimal scale in relation to the size of the market determines the number of firms that can efficiently supply the market. If the market is large in relation to the minimum optimal scale, the smaller is the percentage share of firm operating at minimum optimal scale and the greater the number of firms that would be required to supply the market efficiently, and thus the market becomes less concentrated. Conversely, the bigger the minimum optimal scale in relation to the market, the less the number of firms required to supply the market efficiently and therefore the industry would be more concentrated.

The inferences that can be drawn from the above could be summarized as follows:

1. expressing the firm's scale as percentage of the total industry output indicates the efficient size of firm and the number of efficient size firms to supply the market efficiently, and,

2. comparing the scale of plant in an industry with the minimum optimal scale indicates whether plants and firms are of efficient sizes or whether or not the existing pattern of concentration is consistent with reasonable efficiency.

Other economies which tend to promote concentration include economies of large scale management, economies of large scale distribution, economies of large scale promotion, pecuniary economies of large scale buying such as price discount, and economies of vertical integration.
Like the economies of scale, these economies have also their own minimum optimal point beyond which further expansion will not reduce their unit costs.

Economies of vertical integration occur when technological and complementary processes can be brought together in a single firm. The economies result from improved coordination of the rates of output by placing them under one management, resulting in the reduction of intermediate inventories, elimination of expenses in purchase and sale transactions, and elimination of profit of intermediate middlemen associated with each transaction.

Other determinants of concentration include desire to restrict competition in order to increase profit, desire to impose barrier to entry which is necessary to maintain concentration, prevalence of brand loyalties to established products and absolute cost advantage of established firms secured through patent rights or monopolization of strategic resources.

On the other hand, there are forces which tend to oppose industry concentration. These are: inability to secure sufficient market and/or supply, merger prohibited by law, merger terms not acceptable to both parties, loss of valuable identity without compensating advantage in cost reduction, secular growth of market inherent in widespread economic activity and inability to secure sufficient capital for expansion.

Causes of Concentration in Food Marketing in U.S.

Economists in general agree on the factors which influence the increasing rate of concentration among food marketing firms. The National
Commission on Food Marketing\textsuperscript{27} argues that the economies of scale and other economies explain most of the growing concentration of the food marketing industries. The United States Department of Agriculture\textsuperscript{28} has reported that increased concentration has resulted chiefly from new technology in production and management. These two are related. Advances in technology and innovation have caused the installation of bigger and newer equipment which operates at lower unit costs and often produces products of better quality.

However, in their attempts to reduce costs, some firms expand to the extent that they force other firms out of business, particularly those firms which lack the capital and managerial skill to adopt the innovations and the economies that are inherent with expansion. Moreover, excess capacity occurs as a result of the modernization of old buildings. Also, inadequate and uncertain raw materials make competition more difficult for the smaller and older firms. These firms which can not stand competition with the more efficient ones have the tendency to shut down rather than modernize.

\textbf{Concentration and Competition in the Food Marketing Industries}

The National Commission on Food Marketing\textsuperscript{29} has reported that food marketing industries are unnecessarily concentrated. The Commission believes that a majority of medium size firms are as efficient as the largest firms, and replacing these with bigger ones in an effort to attain efficiency in advertising and sales promotion, distribution, and

\textsuperscript{27}NCFM, \textit{Food From Farmers to Consumers}, p. 93.

\textsuperscript{28}MED, ERS, USDA, \textit{Agricultural Markets in Change}, p. 12.

\textsuperscript{29}National Commission on Food Marketing, \textit{op. cit.}, p. 94.
supply acquisition will not yield a corresponding value in social gains to the public and therefore this is not a persuasive reason to justify high concentration in the food industry. The effect of this concentration on competition is summarized in the Commission's report as follows:

High concentration in the food industry is undesirable because it weakens competition as a self-regulating device by which the activities of business firms are directed toward the welfare of the public at large. When a few large firms dominate a field, they frequently forbear from competing actively by price; competition by advertising, sales promotion, and other selling efforts almost always increases, and the market power inescapably at the disposal of such firms may be used to impose onerous terms upon suppliers and customers.\(^{30}\)

In the same report the Commission stated the ideal market structure upon which competition should prevail.

Competition requires competitors. It works best when the number of competitors is sufficiently large to impose mutual restraints on each other with the result that their collective activities are guided along the path consistent with the public interest. The numbers, sizes and types of firms, profoundly affect the competitive environment in which each operate.\(^{31}\)

**Concentration as a Measure of Competition**

The inverse relation between competition and concentration is generally accepted among economists. It is believed that the more concentrated a market is, the less competitive it becomes. However, to impute directly the strength of competition from the concentration index is erroneous for several reasons:

1. the value of the concentration index is almost entirely determined by how the industry is defined,

2. the index measures the concentration of a few big firms, and

\(^{30}\)Ibid.

3. the index fails to recognize substitutability among commodities.

Commenting on the first, the NCFM\textsuperscript{32} indicated that the most serious qualification related to the concentration index as a measure of competition relates to the definition of the market. Where the market is defined too broadly, the index is low and the imputed competition is understated. Conversely, when the market is defined too narrowly, the concentration is high and competition is overstated. Therefore, the determinant of the usefulness of the concentration index is a case by case matter involving the consideration of many qualitative factors.

In the second case, measuring concentration as an index of market power in the hands of the largest firms is obviously inadmissible. To treat the largest firms as a unit which the concentration index $C_4$, $C_8$ or $C_{20}$ implies, is erroneous unless it has already been demonstrated that they in fact act as a unit, effectively collude, tacitly or overtly.\textsuperscript{33} This can not be established or assumed from the concentration index.

Mason\textsuperscript{34} and Markham\textsuperscript{35} criticized the measurement of competition in terms of the concentration index alone. They point out that competition is more qualitative than it is quantitative, and consequently, statistics alone in the form of concentration index can not tell the whole story about the competitive nature of the market.

\textsuperscript{32} Ibid.

\textsuperscript{33} See NCFM, Food From Farmers to Consumers, p. 137.

\textsuperscript{34} E. Mason, Economic Concentration and Monopoly Power, p. 368.

Product Differentiation

Nature of Product Differentiation

Product differentiation refers to the extent to which buyers differentiate, distinguish or have specific preference among the products of various sellers. Usually, the basis for product differentiation is a distinguishing mark, which makes the product quite different from another. This attribute is not necessarily built into the product. In fact, it can be due to the condition of sale, location of sale and the service that goes with the sale. The differentiation can be real, as in the case of quality and/or design differences, or it can be fancied, as in the case of false advertising claims, false labelling and false packaging.

Technically, differentiation is reflected in the elasticity of demand for the commodity. An undifferentiated product has a relatively elastic demand indicating the existence of acceptable substitutes. The cross elasticity of demand of the product with respect to a substitute is high when customers can easily substitute one for the other with slight changes in their relative prices. This has important implications on the pricing of substitutable products in that although competing firms have some degree of monopoly in their product, and consequently their price, their ability to maximize their profit in the manner of the monopolist is constrained by the threat of consumers moving away from them when their price becomes out of line.

Sources of Differentiation and Their Implications on the Nature of Competition

The type of differentiation determines to a large extent the nature of competition in the market. For example, where differentiation does
not exist, as in the case of homogeneous products, price competition seems to be the most common dimension of competition. Where differentiation is based on brand or trade mark difference, advertising and sales promotion seem to be the most pervasive form of competition. However, where products are differentiated by their design or package used, research and development and periodic changes in packaging seem to be the most important dimension of competition. Where customer service is the key to product differentiation, integration of distributive facilities becomes an important dimension of competition.

According to Caves,\textsuperscript{36} when products fill not only technical functions but also different sorts of personal needs or uses, psychic or physical, buyers tend to have different preferences for the product. Therefore, these products could be successfully differentiated in any form and competition can be in almost any dimension of price, advertising and promotion, research and development, monopolization or exclusive ownership of outlets. A case in point is the automobile industry in the United States.

In the area of food manufacturing, differentiation seems to be in the form of trade mark and brand differences for each type of food item. As a result, competition is confined mostly to television, magazine and newspaper advertising, and to a limited extent, packaging. In the area of food retailing, service differentiation is practiced and the competitive strategy involves the use of trading stamps, offering price discounts, air conditioning, motivational music, special sales,

\textsuperscript{36}R. E. Caves, \textit{American Industry: Structure, Conduct and Performance}, p. 20.
wide parking spaces and convenient and wide shopping aisles. When widely adopted, these provide useful services to the public.

Product Differentiation and Market Structure

Product differentiation tends to increase the barrier to entry or make entry more difficult to potential entrants. For a new product to be accepted in the market, it should be sufficiently differentiated and able to compete in quality and cost with established substitutes. The initial cost of introducing the product in terms of extensive promotion constitutes a high barrier to entry. Therefore, product differentiation to the extent that it increases the barrier to entry is considered an important element of market structure.

Condition of Entry

Nature and Definition of the Barrier to Entry

Condition of entry refers to the advantages of established sellers over potential entrants. According to Bain, these advantages can be measured numerically as the largest percentage at which established sellers can elevate their prices above the minimum or competitive average cost without inducing entry of new firms into the industry. Caves measured these advantages as the difference between the average cost and the highest price which will just fail to tempt new firms in the industry. However, in cases where the barrier is low, as when established firms have no substantial advantages over potential entrants, the barrier can not be measured in the manner suggested above, but can be indicated by

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37 Bain, op. cit., p. 337.
38 Caves, op. cit., p. 20.
the high rate of turnover of firms in the industry.

Conceptually, price as a measure of the barrier to entry has several defects. First, there is a spurious accuracy imputed when the barrier is measured in numerical scale as suggested by Bain, when the entire analysis rests on the judgment of the investigator using such measures of size as substantial, moderate, slight and low. Second, there are formidable problems associated with the measurement or the determination of the price at which potential entrants are induced to enter into the market.

Types of Barriers to Entry

The more important barriers to entry include (1) product differentiation, (2) scale advantage of established firms, and (3) absolute cost advantages.

Product differentiation advantages include the accumulated preferences of buyers for established brands, control of superior product design, company reputation, high quality of products and favored systems of distribution. It is therefore a leading medium used by established firms to gain and hold preferred market positions. To the extent that a seller can convince a customer that his product is distinctly different from and in some respects superior to other brands, he has an element of monopoly in its sale. For a potential entrant to overcome this barrier, he has to differentiate his product from the established brand, offer a product at least equal in quality at a price equal to or lower than those of the established products. A widescale promotion program might also be needed to introduce the new product to potential customers. This continues until the product has developed a favorable
reputation in the market and sufficient customers have been established.

If a plant or firm needs to supply only a very small percentage of the market to be reasonably efficient, economies of scale provide no deterrent to entry. If, however, a firm must supply a significant proportion of industry output to be efficient, entry at efficient scale would reduce price and induce unfavorable reaction from established firms. On the other hand, entry at sub-optimal level will give the established firms significant cost advantage. Whether the firm should (a) build a plant sufficient to attain the minimum optimal scale and depress industry price, or (b) build a sub-optimal plant and suffer a cost disadvantage seems to be dictated by the elasticity of demand for the commodity. If the demand for the commodity is elastic, that is, a one percent increase in supply brings about a less than one percent decrease in price then (a) seems to be preferable to (b). If the demand is inelastic, then the latter alternative seems to be more rational.

Absolute cost advantage covers anything which makes the production cost curve of a new firm lie above that of the established firms. This is different from that of the scale disadvantage of the new firm in that the new firm faces higher cost at any level of output, because established firms have many advantages which an entrant does not have. These advantages include valuable know-how in production and distribution, access to limited raw materials, financial advantages in the form of bigger reserves, better credit rating, more equity to put up as collateral, and better access to money markets.
Other Elements of Market Structure

Other factors that are considered to exert influence on the nature of competition in the industry are (1) elasticity of demand and (2) geographical location of markets.

Elasticity of Demand

It can be demonstrated that the elasticity of demand together with the share of the leader firm (or any firm for that matter) determines to what extent the leader firm can influence the price in the market.

Assume:

\[ Q_1 = \text{market supply at initial equilibrium position}, \]
\[ X = \text{share of the leader firm of supply } Q_1, \]
\[ \frac{X}{Q_1} = S, \text{ or the market share of the leader firm}. \]

The same relation could be stated as \[ X = SQ_1, \]
\[ E = \text{elasticity of demand for the commodity}, \]
\[ C = \text{proportionality factor, an arbitrary figure assumed to represent a percentage change in the share of the leader firm}. \]

Now suppose that the market is in equilibrium at \( Q_1 \), and the leader firm contemplates to increase its share of the market \( S \) by a factor \( C \) and wonders how this change will affect the market price on the assumption that his competitors continue to supply the market at the same level as before.

After the anticipated change in the share of the leader firm, the market supply will be in a new equilibrium position \( Q_2 \), and stated in an equation form below as:

\[ Q_2 = Q_1 + CSQ_1 \]  \hspace{1cm} (1)

The above equation means that the new equilibrium position \( Q_2 \) is
equal to the old equilibrium position $Q_1$ plus the increase in the share of the leader firm by an amount equal to $CSQ_1$. Taking the arc elasticity formula as:

$$E = \frac{Q_2 - Q_1}{(Q_2 + Q_1)/2} \frac{P_2 - P_1}{(P_2 + P_1)/2}$$

and using it to estimate the percentage change in market price as a result of the change in the market share of the leader firm, equation (2) can be transposed into:

$$\frac{P_2 - P_1}{(P_2 + P_1)/2} = \frac{Q_2 - Q_1}{(Q_2 + Q_1)/2} \frac{E}{E}$$

$$= \frac{Q_2 - Q_1}{Q_2 + Q_1}$$

$$= \frac{2(Q_2 - Q_1)}{E(Q_2 + Q_1)}$$

Substituting $Q_2$ in equation (3) with equation (1), equation (3) can be written as:

$$\frac{P_2 - P_1}{(P_1 + P_1)/2} = \frac{2(Q_1 + CSQ_1) - Q_1}{E(Q_1 + CSQ_1) + Q_1}$$

$$= \frac{2(CSQ_1)}{E(2Q_1 + CSQ_1)}$$

$$= \frac{2CSQ_1}{EQ_1(2 + CS)}$$

$$= \frac{2CS}{E(2+CS)}$$

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Equation (4) shows that the percentage change in price depends not only on the market share of the leader firms, but also in the elasticity of demand for the commodity $E$.

The elasticity has two implications to market structure. First, elastic demand tends to encourage independent action of firms even if the structure is quite concentrated. This is because a one percent increase in the share of the leader firm will result in less than one percent decrease in prices. If the price influence of one firm declines with increased elasticity of demand, there is little incentive for collusive agreement to restrict output and increase price. If collusive agreement has already been set up, violations of this agreement are difficult to detect.

Second, the elastic demand tends to lower the barrier to entry and those who succeed in entering the market are more disposed to operate at least at the level of the minimum optimal scale.

**Geographic Location of the Market**

The degree of competitive interaction among geographically separated markets is limited by the cost of transportation. For example, a single isolated firm can exploit customers to the limit of the cost of bringing additional supply or substitute produce. Therefore, it is conceivable that changes in transportation costs influence competition in local markets as much as changes in concentration of firms.

When transportation cost is reduced, geographic overlap between markets increases, and so does competition. For example, the introduction of containerized shipping, where uniform size pallets, lift vans and the like are involved, enables the reduction in costs of transportation and therefore increases competition among markets.
CHAPTER IV

ELEMENTS OF MARKET CONDUCT

In market structure analysis, competition is technically called market conduct, or, more precisely, it refers to the behavior or strategy of firms in adapting or adjusting to the market in which they buy or sell. It is equivalent in a general way to the firms' marketing policies which include price policy, product policy, sales promotion policy, and predatory, exclusionary and coercive practices.

Elements of market conduct are important in market structure analysis because they are believed to link systematically with the elements of market structure and performance. For example, in atomistic industry characterized by low concentration, insignificant barrier to entry, and homogeneous product, market conduct by axiomatic reasoning is that a firm in the industry has no policy of its own, because (1) the price is not determined by the firm but by the market, (2) the firm has no product policy since products are assumed to be homogeneous, (3) the firm consequently has no sale promotion policy, and (4) the firm does not practice predatory, exclusionary or coercive tactics because it is insignificant and without influence in the market or to other firms. In terms of market performance, the atomistic structure, exhibiting the above structural and conduct elements, is a model of efficiency in resource allocation, equitable income distribution among factors, and maintenance of normal profit in the long run.

On the other hand, a monopolistic industry, where there is only one seller, selling a highly differentiated product, and where entry is blockaded; the monopolist has great power in setting his price, product,
sales promotion, and coercive or exclusionary policies. Guided by profit maximization, the monopolist sets his price higher, and his output smaller than that which would prevail under pure competition. His sales promotion policies and product policies are used only to stimulate sales or increase the demand. He does not practice predatory and exclusionary conduct because he is assumed not to have any competitor.

In terms of performance, the monopolist is likely to raise price by restricting output, and consequently, profit beyond the normal level prevails. Also, inefficient allocation of resources and inequitable income distribution among factors would result.

In an oligopolistic industry where firms are few, each firm is significant in the industry. The impact of each other's action is felt by rivals and, consequently, mutual interdependence among firms result. With mutual interdependence, it is almost impossible to predict the performance pattern that emerges from a given structure. Therefore, performance can not be predicted from the study of structure alone. In oligopolistic industry, the conduct of firms can not provide a clear cut relation between structure and performance of firms in the industry.

Price or Output Policy

Logically, price and output policies are interdependent since, in a given situation, determination of selling price implies a unique determination of output sold, and vice versa. The practice of setting price and leaving output to be determined by the market demand at that price is far more common in industrial markets than is setting output and letting demand determine the price. The reasons for this are that sellers find it less risky to gamble on how much they can sell at a price than
on what price they can get at a given output, and also, disruptive variations in price due to market imperfection are minimized.

On the other hand, the alternative policy of determining output and letting price take care of itself is found most usually in atomistic industries in which an individual seller finds a well publicized market price which is not influenced by the amount he offers for sale. This going and generally known market price may result from the operation of a highly organized central market or from the domination of a market by a few large firms who determine and announce a selling price.

Two things are involved in price policy: (1) the principles of price determination, and (2) methods of price setting.

The principles of price determination refer to whether the firms in the industry strive for independent profit maximization, joint profit maximization, and fair or customary profit rate. The methods of price setting refer to the specific ways of determining prices consistent with the above principles. These methods include cost-plus pricing, marginal pricing, basing point pricing and leadership pricing. These principles and methods are discussed immediately below.

Joint profit maximization is attempted by firms in an industry of few firms where complete collusion is possible, such that all prices and output of all firms are so determined and coordinated that the aggregate profits of individual firms combine to make the industry profit maximum.

Independent profit maximization is secured in markets where there is a large number of sellers and where each one is likely to supply only an insignificant portion of the market so that the effect of one firm on market price is negligible.

Complete independence implies that each seller avoids consultation
or agreement with his rivals. In making his decision, he takes no account of possible reaction of rivals. In other words, price or output decisions are determined by the sellers unilaterally without engaging in prior consultation with, or entering into a kind of agreement with other sellers. However, he observes what others have done and sets his price in response to the competitive adjustments of other sellers. A process of competitive adjustment is then generated, leading to the determination of competitive market price. Generally, firms set their price by initially following the price in the market and adjusting it in accordance with market conditions.

Hybrid profit maximization results where concentration and interdependence are high but not strong enough to impose an automatic and full joint profit maximization. This is especially true in conditions of imperfect collusion through cost-plus pricing imposed and maintained by a leader firm.

Fair profit pricing is the principle followed by either the atomistic or oligopolistic industries where complete collusion is impossible to attain. The method of setting price is cost-plus pricing. The magnitude of the markup is said to be consistent with a fair, satisfactory, or customary rate of return. This principle is inherently vague and ambiguous; consequently, conduct and performance are not susceptible to analytical methods and explanation.

The method of adding a profit margin, either as a percentage of cost or an absolute markup abandons the principle of profit maximization. Some authors argue that this method may in fact be a systematic application of the profit maximization principle, especially when the margin applied varies with varying market conditions. If sellers in an
industry, through their price leader, add a certain margin to cost in arriving at a price, it becomes a long run joint profit maximization.\textsuperscript{39} The level of the margin, of course, is conditioned by the barrier to entry.

Leadership pricing is another widely accepted explanation of the pricing behavior of concentrated industries. Leadership in setting the price for the industry is provided by either the dominant or barometric firm.

The dominant firm or partial monopolist leadership arises when the industry is composed of one large firm and a number of smaller ones, the former selling a high enough percentage of the total output to influence the price. Naturally, the role of price making falls within this firm because each follower firm regards its demand elastic at the price set by the dominant firm. Under this condition, the follower firm behaves as though it is in a competitive industry. The dominant firm charges the price it chooses, presumably one which maximizes its profit by equating its marginal costs and marginal revenue.

Since the dominant firm sets the price, the followers' best possible response is to equate their marginal cost with whatever price the dominant firm chooses.

From this, it is possible to conclude that leadership pricing arises not as a method to circumvent competition but as an inevitable consequence of the industry structure. Here, the only obvious remedy is to destroy the dominant or monopoly power of the leader firm if the

\textsuperscript{39} Bain, \textit{op. cit.}, p. 293.
political and economic conditions permit.

The behavior of the barometric firm is different from the dominant firm in that it commands adherence of other firms to its price only because its price reflects market condition more accurately than the rest. The barometric firm has no market power which it can impose upon other firms. For the most part, the barometric price leader does nothing more than indicate the price, a price which will eventually be set by forces of competition in the market.

Product and Sales Promotion Policies

Product policy refers to the decisions of firms regarding the design and quality of the product, extent and frequency of product variations, or changes through time. Sales promotion policy refers to the decisions of firms regarding the amount of sales promotion, and the allocation of effort or expenses to different promotional devices. Both policies are complementary.

Product differentiation provides sellers a means by which they can compete with one another without resorting to price competition. The extent they make use of this, the product variation actually engaged in, and the selling costs they incur become a pattern of market conduct. The majority of the industries seem to move towards product competition rather than price.

Exclusionary, Predatory and Coercive Practices

The ability of a firm to exercise exclusionary, predatory and coercive practices depends upon its market power. Market power is the ability to influence prices and other terms of trade in a way favorable to a business firm. It may be gained through a firm's strong position
or through the weaknesses of his competitors or of those with whom he deals.

There are several theories relating to the sources of market power. In the area of food retailing, Cochrane showed that the mere size of chain stores as purchasers of farm products gives them oligopsonistic power to insist on high standards of quality and strict regularity of supply from their suppliers. The NCFM argues that the strong market power of retailers originates through their control of the consumers (consumer proximity theory) and the diversity of the commodities they handle. Even small retailers can acquire some degree of market power when suppliers are operating in excess capacity and are struggling for sales outlet at any price above their direct costs. An exercise of this power in the fresh vegetable industry is indicated by (1) the ability of retailers to obtain supply on account, and (2) widespread rejection of fresh fruits and vegetables by retailers.

Price cutting is one of the most notorious coercive activities of sellers. This device is used to weaken, tame, or eliminate market rivals by driving the price down to unprofitable levels. This a firm can do when it has an absolute cost advantage, greater financial reserves or other sources of profit.

The economic significance of these practices is that they promote concentration, increase the barriers to entry, lessen competition and worsen the allocation of resources. The oligopolistic practice of


41 NCFM, op. cit., p. 99.
price cutting may result in price rigidity and prevent market prices from performing their allocative functions.
CHAPTER V
ELEMENTS OF MARKET PERFORMANCE

In the last two chapters, the elements of market structure and conduct have been studied in the belief that these elements are systematically associated with market performance. Market structure and conduct, therefore, are significant only to the extent of their association with performance. In fact they are considered only in terms of the performance to which they lead.

Definition of Market Performance

In the economy, as a whole, three aspects of performance are generally recognized: (1) performance of enterprises as buyers of factors of production, (2) internal performance in organizing factors of production in the productive processes, and (3) performance of sellers in the market.

Performance of sellers in the market is interpreted by different authors differently. For example, Bain defines performance as the strategic end results of market adjustments made by buyers and sellers to the effective demand. Bressler defines it as the real impact of structure and conduct, measured in terms of such variables as prices, costs and volume of output. According to Clodius and Mueller

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performance means the economic results that flow from the industry as an aggregate of firms. Lastly, Sosnick\textsuperscript{45} sees performance as the attribute of production and exchange in a segment of the economy that directly influences the welfare of the participants and society. Qualifying Bain's definition, Sosnick argues that these attributes represent some, but not all of the results of the participants' adjustments to expected demand and supply opportunities in the market.

Like the definition, the elements of market performance to be emphasized differ by different authors. Bain considers five elements of market performance which include efficiency, profit, cost of sales promotion, character of the product, and progressiveness. Mason\textsuperscript{46} includes continuous product and process improvement, downward adjustment in price as a result of reduction in cost, concentration of production units in the most efficient size required for most efficient operation, efficient adjustment of capacity to output, and avoidance of waste in resources in selling activities. Williams and Stout\textsuperscript{47} classify performance into two broad categories, (1) physical or operational performance, which refers to the input and output relation in marketing, and (2) pricing performance, or performance in establishing price and value which guide resource allocation, allocation of goods among consumers, balance demand and supply, and allocate payments among factors of production.


\textsuperscript{46} E. Mason, Economic Concentration and Monopoly Problem, p. 352.

\textsuperscript{47} W. F. Williams and T. Stout, The Economics of the Livestock Meat Industry, p. 120.
Caves\textsuperscript{48} classified performance in terms of the whole economy, including efficiency in resource allocation, full employment of resources, progressiveness, and equitable distribution of income.

In practice, the performance elements suggested by Bain are generally accepted. Even so, not all of the aspects he considers important are included in empirical studies, for the reason that data relating to these aspects are difficult to obtain, or that their bases are mostly qualitative and not amenable to meaningful economic analysis.

In this study, the following elements will be emphasized: (1) efficiency, (2) profit rate of the industry, (3) progressiveness, and (4) other dimensions of performance which include promotional costs and price flexibility.

**Efficiency**

**Dimensions of Efficiency**

Marketing efficiency can be classified into operational and pricing efficiency. Operational efficiency refers to the efficiency of firms in the industry in providing for form, time and place utilities to farm products through assembling, processing, storing, transporting, and similar operations. Pricing efficiency refers to the efficiency of the marketing system in the allocation of commodities among buyers, and returns among sellers, through the various mechanisms of exchange so as to give expression to consumers' preferences that will serve as an effective guide to the use of resources in both production and marketing.

\textsuperscript{48} R. Caves, \textit{op. cit.}, p. 96.
Operational Efficiency

The two most important aspects of operational efficiency emphasized in market structure analysis are the scale economies of plants and the utilization of labor, equipment and facilities. Efficiency evaluation of scale is measured in terms of how closely the scale of plants approaches the lowest attainable cost or the minimum point of the long run average cost curve of the industry.

When plants are smaller than necessary to realize potential economies, expanding plant size will increase efficiency. If the plant capacity is excessive, and utilization of plant is low, breaking down production units into smaller sizes will reduce cost regardless of the optimality of plant size.

In practice, the long run average cost curve of an industry is estimated and the plant scale is expressed as a percentage or ratio of a hypothetical plant operating at the minimum optimal segment of the industry cost curve. Deviation of the size of the plant from the size of the hypothetical plant indicates inefficiency, the magnitude of which varies directly with the deviation.

This view of evaluating efficiency in terms of scale and utilization is criticized as too narrow by several investigators. The main criticism is that efficiency of operation implies not only the scale and utilization of plant, but also, according to Sosnick, the location of plant at cost minimizing sites, attainment of highest production function, control of input and output inventories, regularity of operation, 49 Sosnick, op. cit., p. 82.
utilization of by products, appropriate diversification, decentralization, minimum billing and collection costs, avoidance of duplication, and equalization of marginal costs among plants.

These aspects, according to Fletcher, can not be ignored in specifying the lowest cost organization of an industry, especially when the firms cross-ship homogeneous products, or enter into each others territory, when route duplication occurs, and when unnecessary and frequent pick-up and delivery are made to or from the same location.

Due to the complexity of all the things to be considered, Sosnick insists that the average cost curve of the industry can not be determined and, consequently, the minimum optimal scale as a basis or a norm upon which to judge efficiency can not be specified. He argues that a workable norm should specify merely that no real cost persists, that is clearly unnecessary.

**Pricing Efficiency**

Pricing efficiency can only be evaluated in terms of the perfect market model. This model accepts the law of one price, i.e., that one single price prevails at one point in time, in space, and for a homogeneous product, allowing for variation of prices among spatially separated markets only to the extent of the cost of transporting one commodity from one market to another, or the variation of price from one period to another only to the extent of the cost of keeping the commodity, and lastly, it allows for variation in price of different grades and

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51 Sosnick, op. cit., p. 98.
qualities of the same product only to the magnitude of the cost of transforming the product from one grade to another or from one quality to another.

Inefficiency in pricing occurs when price difference between spatially separated markets is greater than the transportation cost, when price difference between two periods is greater than the cost of keeping the product, or when the price difference between two grades is greater than the cost of transforming one grade to another.

Because of the difficulties involved in evaluating marketing efficiency, French commented that "economists have yet to develop an integrated set of theories, concepts, methods, and data that are adequate for the construction of a workable framework for quantitative evaluation of the efficiency of the marketing system."\(^5^2\)

Progressiveness and Innovation

**Definition and Types of Progressiveness**

Technological progress comes through the adoption of innovation. Innovation is defined as the discovery and effective application of new ideas to a product, method, or organization. It is an invention that finds its way or application into the economic system. It is a combination of research, market promotion, and market use.

Different types of innovation include techniques of production that cut costs, introduction of new products or services, and changes in business organization and structure.

Progressiveness and Market Structure

Different authorities have different ideas about the relationship of progressiveness and market structure. There are those who claim that a monopolistic market or industry is more progressive than a competitive one. Schumpeter\(^53\) believes that some degree of monopoly is important in order to bring about massive innovation. Caves\(^54\) believes that the level of concentration is associated with the level of progress, but the direction of causation could not be determined. He maintains that a monopolist, being more sure of his market, is subject to less uncertainty and is likely to maintain a more stable rate of investment. Bird,\(^55\) is more explicit about the relationship of market structure and innovation. He claims that monopoly and innovation are interrelated in that innovation may open the road to monopoly, and the pursuit of monopoly profit in turn is an incentive to innovate. Bain,\(^56\) on the other hand, feels that different firms react differently to innovation, depending upon the market structure in which they operate. He contends that since firms innovate to increase profit, they innovate only when there is time for them to exploit profit derived from innovation before the innovation is adopted by others. When a monopolist is protected from other firms, he is likely to innovate since the time lag is longer, barrier to entry is higher, and he is legally protected by patents.

\(^{53}\) J. Schumpeter, *Capitalism, Socialism and Democracy*, p. 82.

\(^{54}\) R. Caves, *op. cit.*, p. 95.


\(^{56}\) Bain, *op. cit.*, p. 352.
The opposing view was expressed effectively by Knight\textsuperscript{57} who believes that a freely competitive organization tends to place every productive resource in the productive system where it can make the greatest possible contribution to the total product. Others believe that the force of competition induces firms to innovate in a way which the monopolist never bothers to do. Another argument supporting the competitive cause of innovation is that innovation, which is for the most part introduction of a new product or process, requires the establishment of new firms, and high barrier to entry seems to shut off this form of progress. Therefore, one may expect low barrier to hasten technological change in the industry.

Clark\textsuperscript{58} stresses competition as a necessary ingredient for innovation. According to him, innovation results in profit, or lowers the cost of production and causes a reduction in the price. The existence of profit brings about competition from other firms to adopt the innovation or the superior method which is now diffused in the economy.

From these arguments, the relationship of market structure and progressiveness is inconclusive. The tools of economic theory are not helpful in establishing a precise causal relation between progressiveness and market structure.

**Evaluation of Progressiveness**

The difficulty in evaluating progressiveness is that appropriate


standards are not obvious and are much more complex than the usual approach of evaluating efficiency by synthesizing the cost curve of plants and firms. According to Bain,\textsuperscript{59} progressiveness can be evaluated only by the rapidity with which firms adopt available technological and organizational innovations, even if there is no way of comparing the actual against the potential rate of adoption. Sosnick\textsuperscript{60} believes that an industry is progressive if it is not plagued by misinvestment, suppression of innovation, inadequate diffusion of innovation and failure to arrange a minimum of research.

**Progressiveness in Agricultural Marketing**

The food industry has been and remains progressive in most respects, specifically in the dimension of increased decentralization, vertical integration, expansion in procurement and distribution, fewer and larger plants, increased diversification and improved quality of products.

In the food industry, there has been increased activity in direct buying and decline in central markets. It appears that this trend is motivated by costs and revenue considerations. Direct buying results in lower transport costs and reduces commission and handling fees. Several changes in the industry appear to have contributed to this change. First, there have been changes in transportation which reduce the cost of delivering directly to the smaller and scattered buyers. This in turn is due to the development of larger and more powerful motor trucks, improved highways, and reduced freight rate structure. Second, there has been growth in the size of buyers and sellers which makes it more

\textsuperscript{59}Bain, *op. cit.*, p. 395.

\textsuperscript{60}Sosnick, *op. cit.*, p. 92-95.
economical for them to deal with each other directly. Third, there has been improved market information through the use of State-Federal Market Reporting Service, and improved government standards and improved communication that keep buyers better informed regarding market conditions. This results in the reduction of the risks involved in long distance transactions and the need for face to face contact between buyers and sellers. Fourth, there has been increased consumer demand for supply of high quality products as reflected in the demand of retailers.

Sometimes, direct buying progresses into vertical integration. This trend is motivated by the same cost and revenue considerations as in direct marketing. Vertical integration enables the integrated firm to reduce transfer costs, capture profit at the market level where it is being integrated, reduce the risk of price changes and remain assured of the quality and quantity of supply.

Another important development in marketing is the expansion of procurement and distribution areas of handlers, processors, and retailers. This is possibly due to the improvements in truck transportation, refrigeration, bulk-handling, and the adoption of lightweight containers.

Still another development is increased diversification in products. The reasons for this are that it permits firms to take advantage of additional opportunities, spread risk, and utilize marketing facilities more fully.

Improved quality of products is also noticeable: increased freshness in eggs, produce and milk, and increased variety of processed meat and dried and processed fruits. This was due to the need to satisfy higher health and grade standards and the desire to increase sales by
attracting new and keeping old customers.

The National Commission on Food Marketing has pointed out that these changes have left in their wake a number of firms that no longer have a place in the food marketing industry because they are too small for efficient operation, because plants and equipment are poorly located or because changes in marketing channels have left them stranded.

Profit

Definition and Significance

Profit is the share of enterprise income going to the enterprise owner, over and above all costs. It is estimated by multiplying the excess of price over the average cost times the quantity, and expressing the result as a percentage of sales, investment or equity.

The notion of normal profit rate as a sign of efficient resource allocation lies at the heart of the analysis. If entrepreneurs make wrong guesses about the allocation of their resources, their cost may run ahead of their revenue, resulting in a net loss, or their revenue may run ahead of their cost, resulting in a profit over and above the normal rate.

It is believed that if resources are efficiently allocated, the rate of return over the long run will approximate a normal rate which is assumed to be in the magnitude of 5% to 6%. This represents the opportunity costs of capital, or the minimum rate which it could earn in other uses.

Normal rate of return is a necessary condition for maintaining production over a period of time. Beyond the normal rate, profit is justifiable in the short run only if it is due to windfalls caused by errors.
in short run planning which lead one to overestimate the cost and underestimate the demand, payments or risk rewards for those who are willing to venture the risk, and reward for innovation.

Monopolistic profit caused by inducing artificial scarcity through output restriction is bad because it is not necessary for the performance of any useful economic function. It biases the distribution of income and causes the distortion of allocation of resources.

Chronic losses can be attributed to such factors as redundant capacity caused by declining demand and immobility of resources, over-supply of new and small enterprises, and failure of general price and market mechanism to function efficiently. If the price and market mechanism functions efficiently, profit or loss provides a "therapeutic effect to reward the efficient and punish the inefficient and as a device to correct the imbalance of demand and supply."

The use of profit as an indication of efficiency in resource allocation is criticized by Fletcher on the grounds that the concept of profit used by accountants is not the same thing which economists would wish to use in evaluating economics of resource allocation. However, he points out that the former concept of profit can be used to approximate the latter by imputing appropriate interest returns on equity, reflecting the risks involved in the industry and the opportunity costs for shareholders. All of these imputations involve judgmental values of the economist.

\[61\] Bain, op. cit., p. 363.

Sosnick\textsuperscript{63} on the other hand, believes that prolonged high or low profit is not necessarily an indication of malallocation of resources. Profit derived from invention and protected by patents is a justifiable profit over the length of the protection period in the same way as lower profit may be acceptable provided there are those who are willing to take lower rates on unsound investments. He argues that the malallocation of resources occurs only if the low rate of return reflects ignorance, stupidity, or captivity of the investor.

**Relationship of Profit to Structure**

There is conflicting evidence on the relationship of structure and profit rate of the industry. Theoretically, it can be argued that concentration allows an industry to garner some monopolistic profit, especially if the industry is protected by a high barrier to entry, allowing profits to be enjoyed by firms without fear of immediate retaliation from potential entrants. This view is supported by Bain.\textsuperscript{64} He has found that there is a tendency of industries with concentration of \(C_8 = 70\) to have a higher profit rate than industries of lower concentration. He has pointed out, however, that consistent relationship between profit rate and industry concentration is difficult to establish.

**Profit Rate of the Food Industry**

The National Commission on Food Marketing\textsuperscript{65} reported that the profit rate of the food industry in 1964 appeared in line with profit rate in

\textsuperscript{63}Sosnick, *op. cit.*, p. 92.


\textsuperscript{65}NCFM, *op. cit.*, p. 94.
the economy at large. Corporate profits after taxes averaged 11.4% on equity in all private manufacturing industries, 11.3% on non-durable goods, and 9.8% on the manufacture of food and kindred products. Large industrial corporations made 12.1%; retail food chains, 12.5%; manufacturing, 12.5%; and public utilities, 10.7%.

Profit in certain grocery lines are well above average,66 large enough to indicate high barrier to entry and substantial ability to administer prices.

Selling Costs

Definition and Nature of Selling Costs

Selling cost is the expenditure incurred in order to stimulate the volume of business in two general ways: (1) informing the potential buyers of the availability and characteristics of the commodity, and (2) inducing or persuading potential customers to buy. To achieve this, advertising attempts to build up a monopolistic position with respect to some special set of attributes that set the particular product apart from all other products. That is advertising seeks to implant a notion of uniqueness in the mind of the potential customer by changing the position, images and characteristics of the product.

This selling cost is undertaken individually or in groups, individually when the product of one firm is sufficiently differentiated from the products of other firms, and in groups or on an industry wide basis when the product is more or less homogeneous.

66 Profit for breakfast cereal manufacturer in 1964 was 19% of net worth. See NCFM, p. 67.
Justification of Selling Costs

The informational type of selling cost is justified on the ground that it makes markets more competitive than they would be otherwise. The persuasive type of advertising, which aims at changing our preference patterns by making us believe in statements which are scientifically unverifiable or false is a waste of resources from the general welfare point of view.

Evaluation of Selling Costs

In practice, selling costs are measured or expressed as percent of total costs or total revenue. Although no specific magnitude or percentage is applicable to all industries or commodities, a certain modicum for informational purposes is essential to the making of effective marketing.

In evaluating advertising, Sosnick\(^67\) disagrees with the establishment of a norm on a percentage basis. He argues that advertising however small, is not justifiable when it is persuasive in nature. Instead, he suggests that advertising should be analyzed from a benefit-cost approach rather than the conventional ratio analysis.

Selling Cost in Food Industries

The NCFM\(^68\) estimated that food corporations spent about $2177 million for advertising in 1964, and retailers spent an additional amount of $600 million for trading stamps. When these amounts were added to the production, processing and distribution costs, the cost of the product at the retail level would naturally go up by the same

\(^67\)Sosnick, op. cit., p. 94.

\(^68\)NCFM, op. cit., p. 92.
magnitude, and advertising cost becomes a substantial part of the total food bill.

**Price Flexibility**

Price flexibility is considered as (1) a phenomenon of price behavior under different market structures, and (2) a relationship between price change and price determining variables. These aspects of price flexibility are termed by Mason⁶⁹ as theoretical and statistical aspects.

The statistical concept is illustrated by the works of Gardiner G. Means when he analyzed industrial prices under different market structures in terms of frequency distribution and amplitude of price changes, rate of change between high and low points, and time lag between turning points of price trends. The result according to Neal⁷⁰ implies that prices prevailing under pure competition will always be flexible in the sense that such prices will change frequently, and that inflexible prices defined in terms of frequency of change must be due to administrative control. Infrequency of change in price is therefore a criterion of monopolistic competition since price can not be held constant for a period of time without administrative control.

This is supported by Markham⁷¹ in his theory of dominant leadership pricing, in which the dominant leader firm behaves similarly to a pure monopolist. They both presumably have control of their supply and consequently their prices.

⁷⁰ A. Neal, *Industrial Concentration and Price Inflexibility*, p. 27.
⁷¹ J. W. Markham, *op. cit.*, p. 177.
The theoretical concept of price flexibility refers to the percentage change in price due to one percent change in the price determining variable, usually the quantity. The coefficient of simple flexibility is equal to the reciprocal of the elasticity of demand.

Mason\textsuperscript{72} evaluates the flexibility in terms of the changes in demand and supply. He argues that if the demand and supply of a commodity change, but the price has not changed, then there is an evidence of inflexibility. However, if the demand and supply have not changed, then the unchanged price is not an evidence of inflexibility.

Although Bain\textsuperscript{73} concedes that price flexibility in terms of Mason's definition is undoubtedly an aspect of market performance, he argues that the flexibility by itself is not useful in evaluating market performance as such because there is no theoretical standard which suggests what degree of price flexibility is most satisfactory from the social standpoint.

\textsuperscript{72}E. Mason, \textit{op. cit.}, p. 111.

\textsuperscript{73}Bain, \textit{op. cit.}, p. 403.
CHAPTER VI

EVALUATION OF MARKET PERFORMANCE

Even with recent advances in economic theory, collection of data, and method of analysis, evaluation of market performance remains one of the most difficult problems of market structure analysis. There seems to be no consensus among economists as to the norm upon which actual markets should be evaluated. Moore and Walsh and Nelson favor the evaluation of markets and industries based on arbitrary and judgmental standards for each of the elements of market structure, conduct and performance. Hassler favors the perfect market model, and Markham is more disposed to use a certain set of standards of workable competition as a model for evaluation.

This section deals with the methods of evaluating market performance based upon the above models.

The Perfect Market Model

The evaluation of pricing efficiency as given by Hassler involves the measurement of the differences between actual prices and the value

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implied by the standard, in this case the perfect market price; and the application of reasonable decision rules which enables the researchers to specify what type of results is acceptable and what type is unaccept­able performance. Using these basic steps, Hassler78 outlines the procedures involved in evaluating the pricing efficiency of the market in the dimensions of space, time and form.

In a perfect market model, the price difference between two markets should be equal to the transportation cost, the price difference between two time periods should be equal to the cost of keeping the commodity, and the price difference between grades or quality of product should be equal to the cost of transforming one grade or quality to another.

In appraising the price difference between two spatially separated markets, he suggests the use of market demand and supply functions or the source and destination requirements for both markets. Using the demand and supply functions and adapting them into an inter-regional competition analysis, as in the example given by Farris,79 or taking the supply and destination requirements of two markets and adapting these into a series of linear programming solutions, one can arrive at a price standard consistent with the perfect market model. Actual values can be compared with these optimal values and performance judgment rendered.

In evaluating the operational efficiency of the market, the perfect market model depends on the average cost function of the firm consistent with the economies of scale, state of technology, and a relatively high

78 Hassler, op. cit., pp. 82-117.
level of utilization. Where cost is high due to inability of firms to attain economies of scale, integration of currently separated firms or plants should be considered to improve plant economies of utilization. Industry wide magnitude of efficiency should be approximated by expanding the scope of the investigation. When the magnitude is excessively large, improvement possibilities might lie with changes in market structure and market control.

Moore and Walsh Model

Moore and Walsh,\(^{80}\) recognizing the inadequacy of the perfect market model as a basis for normative appraisal of markets, have tried to formulate explicit criteria of adequacy or optimality of markets. They consider a market to be adequate if its actual performance is not extremely detrimental to the general material welfare, nor moderately detrimental with respect to several firms. A market is defined as optimum if its actual market structure, conduct and performance are as favorable in all respects as unavoidable circumstances permit. According to this method, the criteria of adequacy of structure, conduct and performance of the market is given as follows:

I. Structure:
1. large number of firms; no more no less than plant scale economies and competition requires,
2. size of firms or concentration no greater than plant scale economies and competition requires,
3. vertical integration no more or less than efficiency and competition require, and
4. entry as free as the nature of the industry permits.

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II. Conduct:
1. no unfair, exclusionary, predatory, or coercive tactics
2. no misleading sales promotion,
3. no tacit or expressed price collusion,
4. no shielding of inefficient firms, and
5. no pricing practice which discourages uniform high quality and uniform seasonal output.

III. Performance:
1. operations efficient with respect to procurement, plant utilization, plant scale and distribution,
2. reasonable promotion expense,
3. product quality conforming with consumer interests,
4. attention to opportunities for better production techniques,
5. output consistent with optimum allocation of resources, and
6. profit at a level which rewards investment, efficiency, and innovation but not at excessive rates.

Nelson's Model

A similar method of evaluating market performance is presented by Nelson. This method involves listing the different dimensions of the market performance and establishing norms for each. He defines dimension as a mechanism of operational measurements whereas a norm is a basis for judgmental evaluation. The performance elements, dimensions and norms are given in Table I.

Workable Competition

Workable competition defies definition even in the presence of agreed upon standards of workability in the political, social and economic sense. These standards of workability differ by economists.

Clark presents too much emphasis upon the rivalry of selling units and the free option of buyers to buy from rival sellers what may be

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<th>Elements of Performance</th>
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| 1. Production efficiency | 1. Data from several establishments can be synthesized to show optimum scale.  
2. Current operation will furnish the extent of utilization with respect to optimum scale. | 1. Movement towards optimum scale is evidence of adequate performance. |
| 2. Technological progress | 1. Same as production efficiency.  
2. Data to show capital expenditure for new equipment. | 1. Adoption of new techniques along with expenditures for new equipment. |
<p>| 3. Product | 1. Individual product testing and consumer panel evaluation. | 1. Norm is difficult if not impossible to establish. Brand differences should reflect real difference. |
| 4. Profit rate | 1. Data on current return on equity can be used. | 1. Norm can be the going bank interest rate. |
| 5. Output restriction | 1. Data is available only through industry contact. This is difficult to obtain if not impossible. | 1. There is no consensus on operational norm. |
| 6. Exchange efficiency | 1. Data on grading, inspection, market information, cross hauls and price flexibility. | 1. Norm in this instance is the perfect market. |</p>
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<th>Elements of Performance</th>
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<td>7. Promotional costs</td>
<td>1. Data on sales promotion can be obtained from the IRS, Printers' Ink, and Advertising Age.</td>
<td>1. Advertising is justified only when demand is generated which causes greater capacity utilization and attainment of economies of scale.</td>
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regarded as the same product. The specific nature of competition depends on a large number of conditions; so many, in fact that the number of mathematically possible combinations may run to several hundreds, which suggests that every industry in some way is different from another at one time or from itself at other times.

Edwards defines workable competition largely on structural dimensions as: (1) there should be a considerable number of firms selling closely related products in each important market area, (2) no trader should be big enough to become the leader, (3) traders must be responsive to incentives of profit and loss, (4) matters of commercial policy must be decided by each firm, separately without agreement with rivals, (5) there should be no barrier to entry for potential entrants except those created by the fact that others are already there, (6) access of traders to each other must not be impaired except by obstacle not deliberately introduced, such as distance, or ignorance of available alternatives, and (7) there should be no substantial preferential status within the market for any important trader on the basis of law, commercial alliance, or politics.

The defects of these structural norms are that they neglect the dynamic forces that shape industry development, and, even with static definition, competition in an industry may be considered workable even if it is evident that public policy might be directed towards making the industry more competitive.

Because of these defects and the vagueness associated with the

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appraisal of workability, Markham offers an alternative concept of workable competition which involves an appraisal of an industry's overall performance against the background of possible remedial action. An industry, according to this concept, is workably competitive when "after examining the structure of the dynamic forces that shape their behavior, there is no clearly indicated change that can be affected through public policy measures that would result in greater social gains than social losses."\textsuperscript{84}

Defects of the Different Methods of Evaluating Performance

The perfect market model is especially appealing where efficiency is involved, if we define efficiency to mean allocation of resources in accordance with some stated objectives. Mathematical programming has proven very useful in obtaining cost minimizing output, and maximizing output among plants, firms industry and even the economy. Along this line, the type of procedure would prescribe expansion along the long run average cost function when plants are smaller than necessary to realize economies of scale. If plant capacity is excessive, reduction of the number of firms or concentration is recommended. But these are only some aspects of efficiency. They are by no means inclusive. Others which a purely competitive model fails to recognize or include are questions of technological innovation, industry and market growth, stability in terms of entry and exit, and distribution of income between industry sectors.

The models of Walsh, Moore and Nelson are vague and qualitative in nature, and for the most part involve the personal judgment of the investigator. This can vary from one investigator to another, each one having his own standards of performance. Therefore, no single standard seems to apply to all.

Therefore, we can conclude that an absolute standard of performance seems no more in market structure models (Moore and Walsh, and Nelson) than a perfectly competitive or workable competition model. This is because the question of performance is multi-dimensional, involving much more than pricing and operational efficiency. A comprehensive evaluation of a market or industry must consider all the features before a final judgment on performance can be rendered.
CHAPTER VII

DIFFICULTIES AND ALTERNATIVE APPROACHES TO MARKET STRUCTURE ANALYSIS

There are several difficulties involved in market structure analysis. Clodius and Mueller\textsuperscript{85} classify these difficulties into the following broad categories: (1) hypotheses and tests of hypotheses, (2) use of personal judgment in the use of methods and evaluation of results (3) obtaining reliable information, especially from oligopolistic industries, (4) difficulty of "pinning down" internal decision making processes in a firm, and (5) lack of standard analytical methods. These difficulties are discussed immediately below.

Difficulties Involved in the Formulation of Hypotheses

All aspects of market structure analysis rest on the assumption that the structure of an industry determines in large part the competitive conduct of firms, which in turn generates certain forms of industrial performance. But while market structure theory posits certain causal relationships, much of this theory is still untested empirically. The difficulty of verifying and testing hypothetical relationships is due to the following causes: (1) empirical measurements of conduct and performance are vague, (2) the theory, even when definite, is by nature qualitative, (3) empirical measurement of market structure is not accurate, (4) prediction in price theory, which market structure analysis takes as hypotheses, are for the most part assumptions. These

\textsuperscript{85} Clodius and Mueller, \textit{op. cit.}, p. 521.
assumptions can be accurate, inaccurate, or plain wrong, and can either be accepted or rejected when tested against factual industrial cases.

Another difficulty is the hypothesized flow of causation. Markham argues that "neither the inductive nor the deductive method has yet linked a specific market performance pattern with a specific set of structural indexes." Seaver believes that every market attribute is influenced by other market attributes and the chain of causation becomes circular and endless. Although, Williams and Stout basically agree with the flow of causation implied in the hypotheses, they have pointed out that there are certain elements of markets that in one context are considered structural or organizational while in other behavioral or conduct. For instance, at one point in time, horizontal integration is a structural attribute; through time, the same is considered a competitive device. They have also pointed out the possibility of reverse flow of effect, as in the case of low profits or prolonged inefficiency causing exit of inefficient firms or high profits inducing entry of new firms. These cause alteration in the number and concentration of firms and consequently the structure of the industry.

Markham is especially critical of the nature of competition inferred from the structure of the market. He argues that in comparing competitive and oligopolistic industries, the important distinction is

89Markham, op. cit., p. 309.
not that there is more or less competition but rather that the type of competition is different. Those who do not recognize this tend to equate competition with aggressive use of price and reason that oligopolists compete less, and those who equate it with aggressive pursuit of profit reason that they compete more.

Because of the inability of the theory to be tested empirically, Markham rejects the basic hypothesis. He believes that the explanation of changes may have been due to the nonstructural and probably immeasurable developments in American enterprises, such as adaptation to changes in economic institutions and technological advances which have largely been a product of economic policy.

Ideally, we would like to make an analytical chain from structure to conduct to performance. We would then be able to predict what alternative performance would result from particular changes in structure. However, because of the problems cited above, we can neither accept nor reject the hypotheses until our analytical apparatus, our methods and our data become adequate to the task of providing such correlation in actual markets. As it is now, we can neither predict market performance from structure nor tell from structure how competitive the market is.

In our inability to test the hypothesis, or prove it in a scientific manner, we must accept in faith the proposition that competitive markets substantially improve the efficiency of resource use and income distribution, and that there is a substantial element of guesswork involved in forming judgment on performance based on the evidence of market

90 Ibid.
structure. Such elements of faith and guesswork are the inevitable results of our inadequate theory.

Difficulties Involved in the Methods of Analysis

There is no specific method of market structure analysis. It consists primarily of collecting easily available data of some possible historical, technological and economic significance in a more or less mosaic form, classifying these data into structural, conduct and performance elements; relating them according to the hypotheses provided by price theory; using judgment based on faith and guesswork to bridge the gap where the theory and evidence are inadequate, and taking care that the parts add up to a consistent and meaningful whole.

This method of analysis is criticized as being taxonomic and static by most economists. It is taxonomic in the sense that most of the work on market structure analysis has not gone beyond the classification of markets according to their structure. Very little research has done to demonstrate precisely the functional relationship of structure, conduct and performance which the theory hypothesizes. The taxonomic nature of analysis is therefore an inevitable consequence of the inability of the hypotheses to be tested empirically.

It is static in the sense that the theory does not recognize the dynamics of structure and its impact on market performance. This is because of its preoccupation with structure as an explanation of the performance of industries. It ignores demand and supply considerations, and de-emphasizes the role of prices.
Norms and Benchmark for Comparison

All works in the field of market organization are based on comparison and contrast with competitive models. Any measure of actual market performance is always evaluated in terms of the competitive or perfect market model as benchmark. This is because of the assumed superiority of the competitive model in terms of its efficiency in resource allocation, equity in income distribution, absence of wasteful advertising, and absence of profits beyond the normal level.

The competitive or perfect model is criticized as being unrealistic and unattainable, and also that closer approximation to it may lead to worse performance. This is because firms in competitive markets are plagued with such difficulties as operating at sub-optimal scale, poor management, capital shortages, inability to conduct exploration, research and development, dispersion and individuality of traders, immobile excess capacity, chronic distress and unfair price practices.

Fletcher\(^9\) also criticizes the use of the perfect market as a standard of comparison in that the discrepancy between actual market and the model, although measurable, can not be evaluated because the model does not indicate how much discrepancy should exist to allow for acceptable performance. This, it seems, remains a matter of personal judgment. Further, the perfect market model does not indicate the causes of the deviation, or possible alternative action which can be taken to change the situation. The primary value of the perfect market model is to identify questionable price performance if such is suspected in actual

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Personal Judgment

Success of a market structure study depends to a large degree on the skill of the economist to make informed judgment. Judgment enters in the choice of the initial problem, the selection of the factors to be investigated, the techniques of measurement involved, determination of the effects of the barriers, policy implications to be drawn, and whether a variable is determined or determining. Consequently, an investigator is faced with conflicting views and persuasions. This is because there are as many theoretical and philosophical approaches as there are market structure analysts. Research solutions under this setting would likely come in the form of consensus rather than proof in the scientific sense.

Alternative Approaches

Because of the above difficulties, alternative formulations of hypotheses and methodological approaches have been suggested by Moore and Judge and Brinegar.

Hypotheses

Moore's hypotheses are similar to those of the traditional approach of market structure analysis except that the flow of causation starts from conduct directly to performance or indirectly via market structure.

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These alternative hypotheses argue that the major changes in the organization of agricultural marketing are the results of market conduct of firms in an effort to maximize their joint revenue or individual profits, and that these structural changes result in improved performance.

This modified view is stated as follows:

1. that most of the observable changes in market organization have been made by firms in an effort to cut their costs and increase their revenue,

2. that the changes are made economically feasible and in response to innovations and developments within and outside of the industry, and

3. that the changes have for the most part resulted in improved market performance.

He admits however, that the above hypotheses can not be tested in the usual manner, and that the test of these hypotheses is limited to showing a motive and presenting circumstantial evidence. It is consistent with the nature of market structure research that hypotheses can not be proven unless one is able to examine the inside of the decision maker involved as well as his accounts. The alleged motive in this case is profit, and the circumstantial evidence is the changes in agricultural marketing.

As proof of the above, he has pointed out that the major innovations and developments contributing to changes in the marketing of agricultural products have been technological developments in transportation, processing, organizational arrangements of firms, and communication.

Direct consequence of these changes are significant improvements
in product quality and variety and the reduction in product costs which is somewhat mitigated by increased cost in product differentiation and advertising. The indirect effects are increased concentration and increased absolute barrier to entry, but these again are somewhat compensated by increased competition through wider procurement and distribution areas, development of new products and tendency to diversify.

**Methods of Analysis**

The method of analysis proposed by Judge and Brinegar in the study of market structure and its relationship to market conduct and performance are summarized briefly in the following steps:

1. Partition agriculture into meaningful industries and set up an input-output table showing the interdependence of one industry on another. The rationale here is that industries with high degree of interdependence affect the performance of one another and should be studied for causal relationships.

2. Performance of highly interdependent industries should be studied in the area of price determination and reflection of price rigidities over time, space and form, profit margin, freight rates, dumping, resource allocation, income distribution and growth.

3. Having identified the problem area as indicated by dimensions in 2, the industry is then evaluated in terms of the competitive model as a criterion.

4. In prescribing solutions, consistent with the competitive model, an inter-regional activity analysis can indicate the optimum prices, factor rents, regional output for each commodity,
5. These theoretical results will then be compared with the actual and the magnitude of departure specified. The problem can be narrowed down by investigating why departures exist, and what alternative could be used to narrow the differences.

6. Where description of the evolution of the industry structure is required, a finite Markov chain and the input-output model offer possible approaches. The former can show how certain structure attributes of the industry have changed over time, while the latter can show quantitatively how industries are related to one another in production, providing a summary view of industry structure.
PART II

AN ECONOMIC ANALYSIS OF THE HONOLULU WHOLESALE PRODUCE MARKET: A STRUCTURAL APPROACH
CHAPTER VIII

JUSTIFICATION OF THE MARKET STRUCTURE APPROACH TO THE STUDY OF THE HONOLULU WHOLESALE PRODUCE MARKET

The impression one gets from the discussion of the difficulties involved in market structure analysis is that it has a limited applicability to the Honolulu wholesale produce market or to any other market in general. A relevant question would then be: Why would one choose a market structure approach when alternative and less controversial methods such as the institutional, functional and analytical approaches could be used just as well?

Unfortunately, one can not determine whether one method is just as good as, inferior to, or superior to, another unless all of these methods have been used by equally skillful economists in the same market at the same time. Even if all of these conditions are met, the advantages of one method over another would still be difficult to evaluate because each method has a different set of assumptions, uses different data and employs different analytical procedures and techniques. For this reason, one approach can not be compared with others nor can several approaches be evaluated in terms of a common standard.

To do a thorough job of studying all of the aspects of a market, a balanced approach involving the functional, institutional, analytical and structural approaches is preferable to one single approach. In the study of the Honolulu wholesale produce market, the structural approach is a necessary complement to the functional-institutional studies of Peters and the analytical studies of Foytik. This present study aims to examine the other aspects of the market ignored by Peters and Foytik,
or view the same aspects from a different orientation. Inherently, the results of this study may either supplement, substantiate, refute, contradict or challenge the conclusions already established by the previous studies.

Specifically, the justifications for undertaking a study of the Honolulu wholesale produce market using a structural approach arise from:

1. failure of other studies to examine important aspects of the market,
2. inability of other studies to determine the nature of competition and its effect on market efficiency,
3. unavailability of data regarding the Honolulu wholesale produce market, and
4. inability to compare the Honolulu market based on the existing studies with similar markets on the mainland.

The above problems justify a study of the market from a different orientation. Detailed discussion of these problems follows.

Previous Studies Fail to Examine Important Aspects of the Market

The institutional and functional studies by Peters are excellent reports dealing with the classification of wholesalers, their functions, and the efficiency with which they distribute produce in the city of Honolulu. His recommendations include strengthening of wholesalers' cooperatives as a means of achieving "countervailing power" to the growing concentration of retailers. He fails to show, however, the effect of combining wholesalers into bigger cooperative units on the nature of competition, bargaining power, and the operational efficiency of firms.
Also, the studies of Foytik involving the analytical approach have not considered prices in the mainland markets as independent variables in the explanation of prices in Honolulu.

**Competitiveness of the Market Has Been Assumed**

The two studies have not seriously considered the question of competition besides acknowledging the growing concentration of retailers and shifting away of the produce marketing system from centralized operation to decentralized marketing system. They have implicitly assumed a condition of pure competition when they failed to consider the behavior of price under obviously oligopolistic markets. Although this assumption may well be true, failure to consider the question of competition leaves a nagging doubt and suspicion among consumers and wholesalers alike that prices are not as much a function of demand and supply in the competitive sense as it is a function of price administration by a monopolist or a group of oligopolists. The inability of market supply and consumers' income to account for a large percentage in the variation of market prices may well lend validity to this suspicion.

**Data Relating to the Honolulu Wholesale Produce Market Are Difficult to Obtain**

Except for wholesale prices and market supply of certain commodities, there has been practically no published data relating to the Honolulu wholesale produce market. One of the purposes of this study is to gather sufficient information which may be useful in objectively describing and evaluating the market.

In the course of the study, several very important data were obtained from various sources. First, the volume of business of almost all of the wholesalers in terms of dollar sales and commodities handled were
made available by the State of Hawaii Department of Taxation, State of Hawaii Department of Regulatory Services, and the State of Hawaii Department of Agriculture. These data were needed to construct the concentration index of the retail and wholesale produce market as well as guide in evaluating the profitability of corporate wholesale produce firms, which are in turn important indicators of the nature of competition in the market.

Data on the specific commodities handled by each firm were obtained from the Young Brothers Ltd. and the Matson Navigation Company through their ship manifests which along with the information obtained on a survey of about 60 percent of the wholesale produce firms provided the data for the construction of market channels for the different produce commodities in Honolulu. Data on other aspects of the market such as the competitive and marketing practices of firms were obtained by personal interview of the managers of leading wholesale produce firms.

Inability to Compare the Honolulu Market with Other Markets on the Basis of Existing Studies

This study was formulated at about the same time and along the same line as the study of the National Commission on Food Marketing. Since both studies have practically the same objectives and the same orientation and have employed the same analytical methods using the same set of data, this study was able to make a valid comparison between the Honolulu market and other markets in the mainland or the United States market in general.
CHAPTER IX

DESCRIPTION OF THE HONOLULU PRODUCE MARKET

A description of the economic and geographical settings, their implications to the agricultural production and marketing, and some recent changes in the Honolulu food industry are discussed briefly below as an introduction to the structural analysis of the market.

Geographical and Economic Settings and Their Implications to Production and Marketing

The State of Hawaii lies along the eastern half of the Pacific Ocean, about 2,400 miles off the California coast. It is made up of a chain of seven islands extending 390 miles in a north-south direction and separated from one another by channels. The total land area is about 6,400 square miles of which approximately 1.4 million acres are agricultural lands.

Presently, 315,000 acres are under cultivation, located mostly in slopes leading upward from the sea and in saddle areas between mountains.

Climatically, Hawaii has a sub-tropical climate. It has a continuous summer-like temperature which is relatively constant from one season to another. Rainfall varies depending in large part upon the elevation and exposure to the trade winds.

Land is principally of volcanic origin and much of the area is mountainous and rough.

The relative concentration of agricultural production in the other islands, and population in Oahu, where the Honolulu market is situated, has a marked effect on the production and marketing of locally produce commodities. The implications of these are as follows:
1. There are production problems associated with semi-tropical climate, the rugged topography and volcanic nature of the soil.

2. Produce farming and marketing operations are costly for the following reasons: (a) most vegetable farms are small, prohibiting the introduction of cost reducing machinery possible in large scale operation, (b) farm inputs such as fertilizer, insecticide, farm machinery and equipments, gasoline and feeds are imported and (c) most farm output are shipped from the neighbor islands to Honolulu.

3. The relatively higher costs of production and marketing in Hawaii place the local farmers in a weak competitive position with mainland producers.

4. The State's geographical segmentation and population distribution makes it difficult to divert surplus or to replenish deficit areas rapidly.

5. The isolation of the Honolulu market from the producing areas does not permit direct flow of produce from the farm to retail outlets. Consequently, the marketing chain is necessarily multi-stage. Feedback of information from the market to the farm is inefficient, making production and marketing improperly coordinated.

Recent Changes in the Honolulu Food Industry

The Wholesale Produce Industry

As early as the pre-war years, the Honolulu produce market was crowded with numerous small operators. The coming of World War II led
to the dissolution of these firms and in its place, the Hawaii Produce Market was organized under the sponsorship of the Office of Food Administration. This was necessary because the economy of the then Territory of Hawaii was subject to various controls governing practically all phases of production and marketing. As a means of coordinating production and marketing, the system proved to be effective. Through the association, it was possible to plan production to meet market requirements. It was also possible to exercise control over the quality and quantity of produce delivered in the market at a given time.

After the war, when the various controls were lifted, and the existence of government supervised marketing institutions seemed inappropriate, the Hawaii Produce Market was dissolved. Membership of the defunct organization re-organized themselves into separate business units assuming different legal forms. They immediately sought and established business connections with fruits and vegetables suppliers on the other islands and on the mainland. The basic producer-wholesaler relation thus developed after the war seems to have been carried up to this day.

Presently, the Honolulu wholesale produce market is composed of several small firms and a few big ones, each one differing in size and in the form of legal organization. Of the fifty-two wholesale produce dealers in 1964, twenty-two firms were corporations, twenty-one were single proprietorship, eight were partnership and one was a cooperative.

In 1964, forty-four firms reported an aggregate sales of $16,667,000 or a mean sale of $378,000 each, ranging from a low of $10,000 to a high of $1,259,000. The average capital investment was
estimated at $108,000 about one-third of which was in the form of equity capital.

Generally, the profit rate of firms in the industry was low, averaging one-third of a cent per dollar of sale, or 1.6 cents per dollar of investment or 4.6 cents per dollar of equity capital.

Organizationally, these firms were separate business units. No evidence of formal integration or any kind of organizational combination existed among them. Except for produce cooperatively marketed, no sales or purchase contract binds producers to wholesalers or wholesalers to retailers.94

All of the wholesalers were located within the city of Honolulu. Most of them are concentrated in two locations; the Iwilei and the Ala Moana Produce Centers.95 Twenty-three firms are housed in the former and twelve in the latter. The rest, together with ten produce import firms and shipper agents, are located at different places within the city.

These two market centers are about one and a half miles apart, and neither is conveniently located with respect to the Honolulu Harbor from where the wholesalers pick up their daily supply of produce from the mainland and from the other islands. They are, however, easily accessible to the two most important fresh fish, meat and produce public markets in Honolulu.

94 Except in some cases where the Army and the Air Force contract their purchase of some commodities.

95 The Ala Moana Center was razed to the ground by fire on July, 1966, but since then it has been completely rebuilt.
The Retail Grocery Industry

Prior to World War II, the retail grocery industry was characterized by small stores that were in most cases operated by a family with a minimum of hired help. A principal determinant of success was the diligence and the personality of the operators rather than the introduction of innovation that would lead to more efficient operations.

The war years did not change the existing pattern of retailing so much as it increased the volume for those already in business. Material and manpower shortages checked the increase in the number of stores despite the increase in the volume per store.

Decline of the traditional retailing came when the supermarket was introduced to Hawaii in 1948. Chain and independent local and national supermarkets appeared. Discount houses including grocery and supermarket departments among their list of businesses came as early as 1958. Since then, the volume of grocery business for the traditional family type stores has constantly declined in favor of the supermarket. The reasons for this are:

1. Increased convenience and efficiency in family transportation has taken place.

2. Large scale retailing cost is less per unit of sale due to:
   (a) reduction in the purchase price of goods associated with bulk buying, (b) higher volume of business handled per person, (c) more efficient use of warehouse and store spaces and (d) more effective use of advertising outlay.

3. Store layout is made more attractive and convenient for customers.

Although there is no evidence to show the difference in prices
between small retail units and supermarkets, it is safe to assume that prices charged in supermarkets reflect the reduction in costs associated with the economies cited above.

It is not likely however, that the small retail stores will completely vanish in the Honolulu retail industry. Although the volume of business of these stores have gone down substantially, a few of the more efficient ones have profitable operations, especially those that are conveniently located in residential areas and are available through long hours of daily operations. A few can sell at prices lower than that of the supermarkets due to lower overhead costs and economies associated with cooperative buying and advertising.

In 1954, there were about 700\(^\text{96}\) retail grocery firms in the Territory of Hawaii, with total sales of $95,000,000. The biggest fourteen firms sold approximately $28,000,000; the second biggest group of thirty-six firms sold $15,000,000; and the remaining six hundred thirty-five firms sold $39,000,000.

In 1964, there were about 200\(^\text{97}\) retail grocery firms in Honolulu with a retail business of approximately $113,000,000; with the biggest fourteen firms selling $79,000,000 or 69% and the remaining one hundred and eight-five firms selling the remainder or 31% of the total retail trade. The above figures indicate increased concentration in the retail industry over the ten year period of 1954-1964.

\(^{96}\) Bureau of Census, *Census of Business*, 1954.

\(^{97}\) Department of Taxation, State of Hawaii, 1964.
The Fresh Produce Industry in Hawaii

Importance

The market supply of each of the approximately thirty-three kinds of fresh fruits and vegetables sold in Honolulu has been increasing constantly over the last ten years. In 1965, total supply of these commodities was estimated at 129 million pounds, an increase of approximately 22 million pounds or over twenty percent more than that of 1955.

Of this produce, only tomato, head lettuce, head cabbage, cucumber, papaya and banana are of significant economic importance individually in terms of local production, market supply, value of marketings and acreage devoted to each. Taken together, they constitute sixty-five percent of local production, sixty-one percent of the total acreage devoted to fruits and vegetables, thirty-seven percent of the total market supply (tonnage) and about fifty-eight percent of the total value of marketings in the Honolulu market. See Table II.

Changing Relative Importance of the Different Sources of Supply

Historical records of shipments show changing relative importance of the different sources of supply of produce in the Honolulu market. For the six commodities considered together, the pattern shows an increasing volume of supply coming from the mainland and from the neighbor islands, and a corresponding decrease from the island of Oahu. This is true for both the absolute and percentage changes. For example, in 1955, about 7.3% were imported from the mainland, 58.7% from Oahu, and 34.0% from the other islands. In 1965, total supply for the same crops showed 17.9% from the mainland, 18.7% from Oahu, and 63.3% from the neighbor islands. See Table III.
<table>
<thead>
<tr>
<th>PRODUCE</th>
<th>1955</th>
<th></th>
<th></th>
<th>1960</th>
<th></th>
<th></th>
<th>1965</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Acres</td>
<td>Prod'n.</td>
<td>Value</td>
<td>Acres</td>
<td>Prod'n.</td>
<td>Value</td>
<td>Acres</td>
<td>Prod'n.</td>
<td>Value</td>
</tr>
<tr>
<td>Tomato</td>
<td>576</td>
<td>6970</td>
<td>981</td>
<td>305</td>
<td>5170</td>
<td>705</td>
<td>300</td>
<td>6400</td>
<td>300</td>
</tr>
<tr>
<td>H. Lettuce</td>
<td>337</td>
<td>3760</td>
<td>397</td>
<td>281</td>
<td>3450</td>
<td>336</td>
<td>490</td>
<td>5800</td>
<td>490</td>
</tr>
<tr>
<td>H. Cabbage</td>
<td>472</td>
<td>9425</td>
<td>403</td>
<td>449</td>
<td>8499</td>
<td>325</td>
<td>480</td>
<td>9600</td>
<td>480</td>
</tr>
<tr>
<td>Papaya</td>
<td>401</td>
<td>9180</td>
<td>708</td>
<td>512</td>
<td>12025</td>
<td>743</td>
<td>780</td>
<td>21711</td>
<td>780</td>
</tr>
<tr>
<td>Banana</td>
<td>869</td>
<td>6835</td>
<td>473</td>
<td>867</td>
<td>6890</td>
<td>471</td>
<td>940</td>
<td>7245</td>
<td>940</td>
</tr>
<tr>
<td>Cucumber</td>
<td>300</td>
<td>3665</td>
<td>397</td>
<td>218</td>
<td>3340</td>
<td>347</td>
<td>200</td>
<td>3900</td>
<td>200</td>
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<tr>
<td>TOTAL</td>
<td>2955</td>
<td>39835</td>
<td>3359</td>
<td>2633</td>
<td>39370</td>
<td>2927</td>
<td>3190</td>
<td>54645</td>
<td>3190</td>
</tr>
</tbody>
</table>

### TABLE III: HONOLULU MARKET SUPPLY OF SELECTED PRODUCE
BY SOURCES, 1955, 1960 and 1965
IN 1000 POUNDS

<table>
<thead>
<tr>
<th>PRODUCE</th>
<th>1955</th>
<th></th>
<th></th>
<th>1960</th>
<th></th>
<th></th>
<th>1965</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Main-</td>
<td>Oahu</td>
<td>Other</td>
<td>TOTAL</td>
<td>Main-</td>
<td>Oahu</td>
<td>Other</td>
<td>TOTAL</td>
<td>Main-</td>
<td>Oahu</td>
<td>Other</td>
<td>TOTAL</td>
</tr>
<tr>
<td>Tomato</td>
<td>676</td>
<td>3295</td>
<td>2324</td>
<td>6296</td>
<td>2207</td>
<td>1145</td>
<td>2995</td>
<td>6176</td>
<td>2765</td>
<td>580</td>
<td>4367</td>
<td>7706</td>
</tr>
<tr>
<td>Lettuce</td>
<td>1784</td>
<td>1191</td>
<td>1638</td>
<td>4613</td>
<td>3112</td>
<td>1560</td>
<td>1164</td>
<td>5836</td>
<td>4715</td>
<td>1254</td>
<td>2536</td>
<td>8505</td>
</tr>
<tr>
<td>Cabbage</td>
<td>70</td>
<td>615</td>
<td>6006</td>
<td>6691</td>
<td>77</td>
<td>235</td>
<td>6660</td>
<td>6972</td>
<td>619</td>
<td>30</td>
<td>7570</td>
<td>8219</td>
</tr>
<tr>
<td>Cucumber</td>
<td>16</td>
<td>1895</td>
<td>1017</td>
<td>2928</td>
<td>4</td>
<td>1220</td>
<td>1363</td>
<td>2587</td>
<td>77</td>
<td>965</td>
<td>1993</td>
<td>3035</td>
</tr>
<tr>
<td>Papaya</td>
<td>7200</td>
<td>584</td>
<td>7784</td>
<td>4920</td>
<td>4475</td>
<td>9395</td>
<td>2600</td>
<td>10416</td>
<td>13016</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banana</td>
<td>6160</td>
<td>217</td>
<td>6377</td>
<td>4775</td>
<td>1396</td>
<td>6170</td>
<td>273</td>
<td>3380</td>
<td>2981</td>
<td>6645</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>2546</td>
<td>20357</td>
<td>11780</td>
<td>34685</td>
<td>5400</td>
<td>13885</td>
<td>8449</td>
<td>8809</td>
<td>29853</td>
<td>47126</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are two main reasons for the shift thus observed. First, increasing urbanization of Oahu, especially around the city of Honolulu, has shifted a large proportion of agricultural lands into housing developments. This has in turn raised the value of adjacent areas and consequently, alternative use of these lands became more attractive than agricultural purposes. The agricultural land areas of ten years ago are now slowly being phased out of production. The people who used to farm these lands are either transferred to other trades or go to the other islands where land for agricultural purposes is relatively cheaper. Second, the introduction of the supermarket along with the use of refrigerated containers in the inter-island and Hawaii-mainland produce trade enable the bigger retail firms to buy fresh produce directly from the mainland and neighbor islands producers as conveniently as they can from the island of Oahu.

**Monthly Fluctuations in Wholesale Prices**

Wholesale price of the crops considered in this study behave erratically within short periods of time. These observed fluctuations persist even after allowing for changes in price caused by changes in the level of market supply. The magnitude and direction of these changes differ by crops.

For tomato, the price is highest in the month of February when it reaches a level of 21.3 cents per pound or approximately 3.0 cents (16.6%) above the annual average price of 19.2 cents per pound. From this level, price declines to a level of 15.2 cents per pound in the month of September, about 4.0 cents (21.0%) below the annual mean.

For head lettuce, price is highest in the month of January when
it reaches a peak of 15.0 cents per pound. Thereafter, price declines somewhat, and reaches a minimum of 12.6 cents per pound in the month of August.

The highest price of head cabbage occurs in the month of January when it reaches a level of 8.6 cents per pound or approximately 2.3 cents (36.5%) above the annual mean price of 6.2 cents per pound. Lowest price occurs in the month of June when it declines to a low of 3.8 cents or 2.3 cents (39.0%) below the annual average.

The highest price of cucumber occurs in the month of February when the price reaches a level of 20.2 cents per pound, or 4.5 cents (31.0%) above the annual average of 15.5 cents per pound. Thereafter, the price declines to a minimum of 12.9 cents per pound in the month of July, equivalent to 2.6 cents (16.8%) below the annual average price.

Papaya and banana wholesale prices show very little monthly fluctuations within the year. Price levels between high and low periods rarely differ by more than one cent.

When monthly prices are expressed as percentages of their means, two different seasons become apparent, (1) the period from November through April when prices are generally above the mean, and (2) the period from May to October when prices are generally below the mean.

On top of the monthly fluctuations in prices, a secular increase was observed at a rate of approximately .5 cents per year for all crops except papaya which increased approximately .2 cents per year. See Table IV.

**Monthly Fluctuations in Supply**

For tomato, supply is highest in the month of August when it reaches a level of 625,000 pounds or about 61,000 pounds (10.8%) higher
### TABLE IV: MONTHLY AND LONG TERM CHANGES IN WHOLESALE PRICES OF SELECTED PRODUCE IN THE HONOLULU MARKET, AVERAGE, 1958-1965

<table>
<thead>
<tr>
<th>Produce</th>
<th>Mean Price</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>Jul</th>
<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Price Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato</td>
<td>19.2</td>
<td>+1.5</td>
<td>+3.1</td>
<td>+2.7</td>
<td>+1.0</td>
<td>-.2</td>
<td>-.5</td>
<td>-1.6</td>
<td>-3.0</td>
<td>-4.0</td>
<td>-2.6</td>
<td>+ .7</td>
<td>+1.7</td>
<td>3.65</td>
</tr>
<tr>
<td>Lettuce</td>
<td>14.4</td>
<td>+1.2</td>
<td>+0.0</td>
<td>-.2</td>
<td>+ .1</td>
<td>-.4</td>
<td>+ .3</td>
<td>+ .2</td>
<td>-1.7</td>
<td>- .5</td>
<td>- .2</td>
<td>+ .8</td>
<td>+ .6</td>
<td>3.16</td>
</tr>
<tr>
<td>Cabbage</td>
<td>6.2</td>
<td>+2.3</td>
<td>+1.1</td>
<td>+ .6</td>
<td>-1.4</td>
<td>-1.4</td>
<td>-2.4</td>
<td>- .4</td>
<td>-1.0</td>
<td>-1.1</td>
<td>- .6</td>
<td>+ .5</td>
<td>+1.2</td>
<td>3.44</td>
</tr>
<tr>
<td>Cucumber</td>
<td>15.5</td>
<td>+1.3</td>
<td>+4.8</td>
<td>+3.6</td>
<td>+ .2</td>
<td>- .9</td>
<td>-1.9</td>
<td>-2.6</td>
<td>-1.7</td>
<td>+ .7</td>
<td>-1.1</td>
<td>+ .5</td>
<td>+ .3</td>
<td>3.80</td>
</tr>
<tr>
<td>Papaya</td>
<td>8.0</td>
<td>- .3</td>
<td>- .1</td>
<td>+ .4</td>
<td>+ .8</td>
<td>+1.0</td>
<td>- .2</td>
<td>- .6</td>
<td>- .6</td>
<td>0.0</td>
<td>+ .7</td>
<td>- .5</td>
<td>- .7</td>
<td>1.45</td>
</tr>
<tr>
<td>Banana</td>
<td>8.6</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>3.30</td>
</tr>
</tbody>
</table>

Source: From estimates of monthly demand functions allowing for shifts in the intercept of the regression. Estimated demand functions of the above commodities are not included in this paper.
than the monthly average supply of 564,000 pounds. Thereafter, supply declines to a low of 466,000 pounds in February or approximately 100,000 pounds (17.5%) below the monthly average supply.

The supplies of head cabbage and head lettuce are relatively stable. They tend to oscillate fairly close to their mean supply of 414,000 pounds per month for head lettuce and 615,000 pounds per month for head cabbage.

The supplies of papaya and banana show violent fluctuations from one month to another. For banana, supply is generally highest in the month of October when it reaches a peak of 721,000 pounds, a level equal to 145,000 pounds (25.7%) above the mean supply of 576,000 pounds per month. From this, the supply declines until it reaches a low of about 451,000 pounds in August or about 125,000 pounds (21.7%) below the mean supply. There seems to be two peak months for papaya. Supply is highest in the months of June and October, when supply in both months reach a level of 1,206,000 pounds or (16.8%) above the mean supply of 948,000 pounds. Supply is lowest in the months of February and August, the former reaching a low of 796,000 pounds and the latter 892,000 pounds.

A long term increase in the supply of each of these commodities was observed. The supply of tomato has increased at the average of 14,800 pounds per year; head lettuce 22,100 pounds, head cabbage, 20,600 pounds; papaya, 30,000 pounds; and banana, 19,300 pounds. See Table V.

Market Channels

Trade channels, channels of distribution, and marketing channels are synonymous term which refer to the "flows" extending from the
TABLE V: MONTHLY AND LONG TERM CHANGES IN SUPPLY
OF SELECTED PRODUCE IN THE HONOLULU MARKET, AVERAGE, 1958-1965

<table>
<thead>
<tr>
<th>PRODUCE</th>
<th>Mean Supply in 1000 lbs</th>
<th>Deviations of Monthly Supply from the Mean in 1000 lbs</th>
<th>Annual Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato</td>
<td>534</td>
<td>-47 -98 +21 -62 -1 -17 +59 +61 +49 +48 -7 00 15</td>
<td></td>
</tr>
<tr>
<td>Lettuce</td>
<td>414</td>
<td>-15 -24 -11 -43 +36 +34 -42 +14 +20 -24 +53 -16 22</td>
<td></td>
</tr>
<tr>
<td>Cabbage</td>
<td>616</td>
<td>+27 +13 +64 -7 +14 -13 -13 -75 +31 +9 -36 -14 21</td>
<td></td>
</tr>
<tr>
<td>Papaya</td>
<td>948</td>
<td>-110 +152 -147 -77 +147 +158 +97 -65 -25 +159 +16 -63 30</td>
<td></td>
</tr>
</tbody>
</table>

Source: From the monthly supply patterns of selected produce estimated by the author but not included in this report.
producer to the consumer, or they may be thought of as the combination of, and sequence of agencies through which one or more of the marketing flows move. In its most complicated form, the channel includes all combinations and sequences of all the agencies used in moving the produce from the producer to the consumer, possibly with an indication of the quantitative importance of each agency. It may apply to a whole class or type of goods, to a company, a trade or an industry. Market channel could be presented in either the diagramatic or tabular form.

This section deals with an examination of the marketing channels presented in tabular form for each of the six major commodities.

Sources of Supply

Mainland supply to Honolulu is about 62% of head lettuce, 27% of tomato, 5% of head cabbage and none of papaya, banana and cucumber.

The island of Hawaii produces and ships almost all kinds of fresh produce found in the Honolulu market. It is suited especially for the production of papaya, tomato and cucumber of which it supplies 81% of papaya, 42% of tomato, and 41% of cucumber requirements of the Honolulu market. To a lesser extent, it also produces banana, head lettuce and head cabbage.

The island of Maui specializes in the production of head cabbage of which it supplies about 84% of the total market supply in Honolulu. Also, it produces a small quantity of tomato, and with Kauai, produces head lettuce and papaya.

Presently, Kauai is not a major supplier of fresh fruits and vegetables. Cucumber is the only crop of significance that Kauai produces for the Honolulu market.
Oahu produces a little of almost everything. It is the biggest supplier of banana and second only to Hawaii in the production of cucumber and papaya. Also, it produces a small quantity of head lettuce and tomato, but none of head cabbage. See Table VI.

**Wholesale Middlemen**

There are two types of wholesale middlemen in the Honolulu market; the merchant wholesalers and the receiver-jobbers. The former procure directly from shippers or producers or indirectly from receiver-jobbers. They clean, trim, grade, repack and deliver the produce to the different outlets, and from these services they derive much of their revenue, hence they are called service wholesalers. The receiver-jobbers are those who primarily receive the bulk of produce, job them into smaller units and distribute them to service wholesalers who can not procure supply directly from mainland or other island sources. In this capacity, they are considered receiver-jobbers for the merchant wholesaler or marketing agents of shippers or producers depending upon whose interest they represent.

The extent of the jobbing operations within the wholesale level was estimated for the six produce items. About one-third of the total supply of tomato, cucumber and papaya is jobbed, with the jobbing heavily concentrated in the firm which handles the biggest producer accounts. In this position this firm becomes a leader, because it can directly control the supply of the smaller firms who must depend upon it for their business.

To a limited extent, jobbing is practiced for head lettuce, papaya and banana. For head lettuce, the majority of the supply from the
<table>
<thead>
<tr>
<th>PRODUCE</th>
<th>Qty.in 1000 lbs</th>
<th>Sources</th>
<th>Middlemen</th>
<th>Outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato</td>
<td>6937</td>
<td>27</td>
<td>42</td>
<td>15</td>
</tr>
<tr>
<td>Lettuce</td>
<td>7973</td>
<td>62</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Cabbage</td>
<td>6334</td>
<td>5</td>
<td>10</td>
<td>84</td>
</tr>
<tr>
<td>Papaya</td>
<td>19282</td>
<td>81</td>
<td>1</td>
<td>18</td>
</tr>
<tr>
<td>Banana</td>
<td>6342</td>
<td>90</td>
<td>15</td>
<td>55</td>
</tr>
<tr>
<td>Cucumber</td>
<td>3085</td>
<td>41</td>
<td>25</td>
<td>34</td>
</tr>
</tbody>
</table>

*Including export from Honolulu to the mainland.

Sources: Matson Navigation Co. and Young Brothers Ltd.,
Weekly reports of wholesalers to the Hawaii State Department of Agriculture, and
Survey of forty-four wholesale produce firms in Honolulu in 1964.
mainland is shipped directly to the bigger supermarkets bypassing the wholesalers. This way, opportunity for jobbing is minimized. For papaya, the supply is concentrated in two dominant firms of about equal size, with the rest diffused to several merchants. Jobbing is not normally practiced for supply from the island of Oahu, such as banana and papaya.

A large percentage of supply from the mainland bypasses the Honolulu wholesale market. About 6% of tomato, 31% of head lettuce and 2% of head cabbage are shipped directly from the mainland to the bigger supermarkets in Honolulu. This is not true for crops of Hawaiian origin such as papaya, banana, and head cabbage where practically all are channeled first to the wholesalers and then to various retailers and institutional outlets.

Outlets

There are five major outlets for wholesalers in Honolulu: (1) the supermarkets, (2) small retail grocery stores, (3) institutions including cafeteria, hospitals, hotels and restaurants, (4) armed services including the Army, Navy, and Air Force, and (5) other outlets including truck peddlers, processors, exporters and specialized fruit and vegetable stores.

Of the produce considered in this study, about 58% was sold to retail stores; 46% of which was sold through the supermarkets and 12% to small retail grocery stores. Institutions and Armed Services account for 19% each, and the remaining 4% was sold to other outlets. See Table VI.
CHAPTER X

STRUCTURE OF THE HONOLULU WHOLESALE PRODUCE MARKET

The definition of the market affects materially the estimate of the number and concentration of firms and the implied nature of competition. For this reason, it is important that the market be defined precisely before any attempt at analysis is undertaken.

A market is defined as a closely interrelated group of buyers and sellers. On the sellers' side, it is co-extensive with the definition of the industry. By this association, market structure and industry structure are similar in meaning, and therefore, the definition of the market also applies as a definition of the industry. Industry in turn can be defined in terms of a census or theoretical meaning, depending upon the nature of the problem for which the definition is intended. For purposes of industrial classification or sectoral analysis of the economy, the census definition is normally used and industry is defined as a branch of trade which produces a similar product, employs similar resources, or has a good deal in common in terms of product or process. Examples of this would be the retail or wholesale grocery trade, or the diversified agriculture industry in Hawaii. A theoretical industry or market can be defined as the producers of a group of products considered by buyers to be close substitutes and which are relatively distant to all other products outside of the industry. Here, one would normally speak of the tomato, lettuce or cabbage industry.

Following a census definition, the Hawaii produce industry is
defined as that segment of the State's diversified agriculture\textsuperscript{98} principally concerned with the production and marketing of fresh fruits and vegetables. This includes each of the commodity markets viewed as theoretical industries. Because of the strategic location of the wholesale sector with respect to the producers and retailers, this study is focused specifically on the fresh fruits and vegetables wholesalers. In this study, we refer to this as the wholesale fresh produce industry.

This chapter deals with the structure of the wholesale fresh produce industry. The structural elements considered and known to affect the conduct and performance of firms are: (1) number and concentration of firms, (2) barriers to entry, (3) product differentiation, (4) geographical location, and (5) elasticity of demand.

Number and Concentration of Firms

The number and concentration of firms in an industry, summarized in a concentration index, reflects the structure of the market, e. g. atomistic, oligopolistic or monopolistic. In this study, the number and concentration index of the wholesale and retail markets defined in the census sense was developed from the annual gross sales of firms for the year 1964.\textsuperscript{99} Similar indexes were estimated for the tomato, head lettuce, head cabbage, papaya, cucumber and banana industries from tonnage handled by firms for these commodities.\textsuperscript{100} See Table VII.

\textsuperscript{98}Diversified agriculture include all agricultural production and marketing except pineapple and sugar.

\textsuperscript{99}Estimated from tax returns of retail and wholesale firms for the year 1964.

\textsuperscript{100}Estimated from ship manifests of the Matson Navigation Co. and Young Bros. Ltd., 1964.
TABLE VII: NUMBER AND CONCENTRATION OF FIRMS IN SELECTED INDUSTRIES IN HONOLULU, 1964

<table>
<thead>
<tr>
<th>Concentration Measure</th>
<th>Concentration Index and Number of Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Retail</td>
</tr>
<tr>
<td>C₁</td>
<td>25</td>
</tr>
<tr>
<td>C₄</td>
<td>40</td>
</tr>
<tr>
<td>C₈</td>
<td>58</td>
</tr>
<tr>
<td>Total Number of Firms</td>
<td>196</td>
</tr>
</tbody>
</table>

Source: Estimated from annual tax returns of grocery stores in Honolulu for the year 1964, annual tax returns of wholesale produce dealers for 1964, and from ship manifests of the Matson Navigation Co. and the Young Brothers Ltd., 1964.
According to the Bain\textsuperscript{101} system of classification, an industry is highly concentrated if $C_4 \geq 75$; moderately concentrated if $C_4 = 50-75$; slightly concentrated if $C_4 = 25-50$; and atomistic if $C_4 \leq 25$. Caves\textsuperscript{102} classified oligopoly into three categories as follows: Type I if $C_8 = 50$; Type II if $C_8 = 33-50$; and unconcentrated if $C_8 \leq 33$.

Using the Bain system to classify the type of oligopoly prevailing in the Honolulu market, it is apparent that:

1. None of the industries, however, defined, is highly concentrated.
2. The tomato, head cabbage, cucumber and papaya industries are moderately concentrated, the retail grocery industry, and the head lettuce and banana industries are slightly concentrated.
3. The wholesale produce industry, according to the census definition, is considered atomistic.

Using Caves' system of classification, we can conclude that the retail grocery, tomato, head cabbage, cucumber, papaya, and banana industries are classified as Type I oligopoly, whereas the wholesale produce and the head lettuce industries are considered Type II oligopoly.

In spite of the difficulties involved in imputing the nature of competition directly from the concentration index, some guidelines have been established to indicate that a certain level of concentration is legally unacceptable or economically restrictive to the exercise of competition. For example, Hiemstra\textsuperscript{103} in reviewing the Supreme Court

\begin{itemize}
  \item \textsuperscript{101}Bain, \textit{op. cit.}, p. 124.
  \item \textsuperscript{102}Caves, \textit{op. cit.}, p. 11.
\end{itemize}
The decision regarding the Case of the Philadelphia Bank against the United States stated that the "Court came close to specifying that a certain percentage constitutes by itself a threat to competition." The Court decision implied that $C_1 \geq 30$ constituted that threat. Apparently, this decision is based on Kaysen and Turner\(^{104}\) and Stigler\(^{105}\) who suggested that $C_1 \geq 20$ is an evidence of unlawful concentration. Markham\(^{106}\) on the other hand suggested $C \geq 25$ to constitute undue concentration. The National Commission on Food Marketing\(^{107}\) considers $C_4 \geq 50$ as undesirable because such concentration level tends to substantially weaken competition.

The remaining part of this chapter will consider other elements of market structure, which include barriers to entry, product differentiation, elasticity of demand, and geographical location of the market. All of these are believed to influence the nature of competition, and also to affect the observed concentration.

**Barriers to Entry**

The Honolulu wholesale produce market has traditionally been crowded with small size firms. In 1954, there were 75 dealers, there were 55 in 1960, and in 1964 the Hawaii State Department of Agriculture licensed 52 wholesale produce dealers in the Honolulu area. The reason

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\(^{106}\) J. W. Markham, "A Merger Policy under the New Section 7; A Six Year Appraisal," (cited by Hiemstra).

\(^{107}\) A summary report of the National Commission on Food Marketing, *Food from the Farm to the Consumer*, June 1966, p. 93.
for the decline in the number of firms may be due to one or a combina-
tion of the following barriers to entry: (1) absolute cost advantage 
of established firms over potential entrants, (2) economies of scale, 
and (3) social barriers to entry.

**Absolute Cost Advantage**

Absolute cost advantage may be found in the control of superior 
production or distribution techniques or in the monopolization of re-
sources, sources of supply, or market outlets.

Available evidence suggests that established firms do not have 
exclusive control of advanced production or distribution techniques to 
allow them absolute cost advantage over potential entrants. First, 
the very nature of the industry does not allow development and control 
of sophisticated techniques of production and distribution, as no 
specialized skill and equipment is involved in the performance of the 
various wholesaling operations. Second, even if development of 
specialized productive or distributive equipment were possible, and 
patent were granted to the developer, the cost of undertaking such a re-
search and development program may be prohibitive in the light of the 
present scale of operations. And third, there is no evidence to show 
that most of the material and handling equipment now used, the techniques 
employed in the trade and the skill and management know-how are any more 
available to the established firms than to the potential entrants.

There is however, absolute cost advantage of established firms in 
terms of monopolization of supply and to a certain extent the distribu-
tive outlets. It is difficult for new firms to acquire sufficient 
volume of business without competing directly with established firms,
a task especially difficult for new firms on account of the consignment method of produce procurement. This method, however informal, has created a strong sense of loyalty among producers and wholesalers and among wholesalers and retailers. It is considered a breach of trade conduct to openly compete with established firms for suppliers' as well as customers' accounts. A potential entrant therefore is not likely to muster sufficient supply or attract enough customers to make his operation economically feasible. As a result, entry into the wholesale produce business involves entering into the production stage first, or procuring produce from uncommitted growers or purchasing directly from the farm. The former involves additional investment and risk above and beyond that for wholesaling operations only, and the latter, while it might assure an adequate supply has the disadvantage of shifting most of the risk of marketing from the producer to the wholesaler. This risk is avoided in the consignment method of produce procurement.

The prevalence of informal procurement arrangements by consignment reduces the likelihood of entering firms being able to assure themselves of an adequate supply for a long enough time to justify investment of capital to the scale attained by existing firms. Formal contracts tied to producer financing may bring about such assurance of supply, but this again increases the financial cost disadvantage of potential entrants.

In summary, it appears that the potential entrant to the industry is likely to find it difficult to procure adequate supply without either producing a part of it, engaging in substantial grower financing, or purchasing the produce outright. Any of these procedures require a
substantial increase in the capital requirements over and above those
required for facilities only.

Financial Advantage

Financial statement analysis of twenty-two corporate wholesale pro-
duce firms in Honolulu in 1964 showed an average capital investment of
$108,000 of which $37,000 or 34% is equity capital. These figures imply
that for a potential entrant to compete effectively with established
firms, he has to put up capital of at least the same magnitude and
provide a collateral thereof equivalent to the equity capital of the es-
tablished firms. These financial requirements for initial operation
alone seem to deter entry of new firms into the wholesale produce
business.

Social Barriers to Entry

The number of firms in an industry is as much a function of the
condition of entry as it is a function of the condition of exit.

Most of those engaged in the wholesale produce business in Honolulu
are of Japanese origin. As is natural for most oriental businessmen,
they observe a time honored tradition of family succession in business.
The present generation of wholesalers are either second or third genera-
tion, their businesses handed down to them by their fathers or grand-
fathers. The oldest firm included in the survey had been in operation
for forty-two years. The average years of operation of the sample
firms was estimated at twenty-eight years.

Evidence gathered suggests that although some of these firms are
not profitable as business concerns, they are not generally in the red.
Although return to investment for most is certainly below the level of
opportunity costs, their persistence to carry on is indicative of the limited opportunities for the capital already invested to be diverted to alternative uses. The same is true for management and labor in the industry. The "trapped" capital and labor in the industry is in a way a barrier to entry of potentially more efficient firms. This also explains the perpetuation of the relatively small scale, numerous wholesale produce firms.

**Scale Economies**

Scale advantage of established firms as a barrier to entry is important only if the output at the minimum optimal scale is a significant part of the industry output. Where the average cost curve or the planning curve of the industry is characterized by a narrow decreasing cost segment followed by a wide constant cost or horizontal segment, economies of scale are not a significant barrier to entry. Of the fifty-two firms whose financial statements were analyzed, not one reached an output big enough to be considered significant in relation to the industry output. The six biggest firms, based on their gross revenue, sold an average of six percent of the produce handled by the total industry, the second biggest eighteen firms sold an average of three percent, and the remaining twenty-eight firms sold on the average less than one percent of the total industry sales. Evidence on the economies of produce distribution will be discussed further in subsequent chapters.

**Product Differentiation**

The identification of produce according to sources is an important factor in product differentiation. The degree of product differentiation may be altered or emphasized by the individual wholesaler by any one
of the following: (1) grade of produce, (2) method of packing, and (3) establishment and publicizing of brand names.

Grading and inspection is an established procedure for all produce passing through the Honolulu wholesale produce market. This is done in accordance with the State of Hawaii established grades for locally produced crops and also in accordance with the U.S. standard grade classification for crops imported from the mainland.

The use of the standard system of classification such as the U.S. and Hawaii grades lead to lines of differentiation among products of different origins. Where produce is packed mainly to meet the minimum standard of grade specification, the result would be greater uniformity within grades. However, in some cases where the tolerance limit allowable is wide, considerable differentiation occurs.

The methods or procedures used by wholesalers in sorting, cleaning, trimming, and packaging products are identical in most cases. Containers used in packing product into consumer units are identical with respect to size, shape, and material used. They differ only in the label used, indicating the name of the company, the place of business, telephone number, and the grade and origin of the produce.

Elasticity of Demand

The elasticity of demand of the commodity affects the structure of the industry only when economies of scale are a significant barrier to entry. If the demand for the commodity is elastic, firms are likely to operate at a scale that would take advantage of available economies of scale. However, if the demand for the commodity is inelastic, firms are better off to operate at sub-optimal scale and suffer a cost
disadvantage from established firms. Operating at a scale that takes advantage of the economies would likely cause price to go down and retaliatory action of established firms may result.

From this consideration, the observed economies and the elasticity of demand for the more important produce items in the industry suggest a more competitive than monopolistic form of oligopoly. The relatively high elasticity of the produce items along with the low economies of scale suggest a fairly easy entry into the industry.

These factors seem to support the observed relationship between industry concentration and price elasticity of selected commodities in the individual commodity industries. When the elasticity of demand is plotted against the concentration indexes of the commodity industries, a scatter diagram suggests an inverse relation which means that the higher the demand elasticity of the commodity, the less concentrated the commodity industry becomes. See Table VIII.

Geographical Location of the Market

The location of the market is an important element of market structure as it affects the competitive interaction among spatially separated markets through the cost of transportation. Changes in transportation cost influence competition in the sense that when transportation cost is reduced, geographic overlap between markets is increased and so is competition among them.

This structural element is particularly significant in Honolulu. Lt. Governor Thomas P. Gill pointed out that price for food in

<table>
<thead>
<tr>
<th>Commodities</th>
<th>Price-Quantity Relations(^a)</th>
<th>Mean Price Qty. in cents per lb.</th>
<th>Mean Qty. in 1000 lbs.</th>
<th>Price Flexibility</th>
<th>Price Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a</td>
<td>b</td>
<td>(R^2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tomato</td>
<td>21.9390</td>
<td>-.00913</td>
<td>1.2079</td>
<td>.4655</td>
<td>20.7</td>
</tr>
<tr>
<td>Head Lettuce</td>
<td>15.6827</td>
<td>-.00105</td>
<td>.8720</td>
<td>.3796</td>
<td>15.5</td>
</tr>
<tr>
<td>Head Cabbage</td>
<td>12.5537</td>
<td>-.03862</td>
<td>5.1668</td>
<td>.3569</td>
<td>6.7</td>
</tr>
<tr>
<td>Papaya</td>
<td>13.8000</td>
<td>-.01778</td>
<td>1.0246</td>
<td>.3941</td>
<td>9.0</td>
</tr>
</tbody>
</table>

\(^a\)If the price-quantity relation is given as \(P = a - bQ\), where \(P\) is the price in cents, \(Q\) is the quantity in 1000 lbs., \(a\) and \(b\) are intercept and slope of the regression line respectively, the price flexibility is estimated as:

\[
F = \frac{dP}{dQ} \cdot \frac{Q}{P} = b \cdot \frac{Q}{P}
\]

If elasticity is defined as the reciprocal of the price flexibility then, elasticity can be estimated as:

\[
E = \frac{1}{b(Q/P)} = \frac{P}{bQ}
\]

Source: The above figures were estimated from weekly reports of the Hawaii State-Federal Market News Service. Computational work was done at the Hawaii Statistical and Computing Center.
<table>
<thead>
<tr>
<th>Commodities</th>
<th>Price-Quantity Relations $^a$</th>
<th>Mean Price</th>
<th>Mean Qty. in 1000 lbs.</th>
<th>Price Flexibility</th>
<th>Price Elasticity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$a$</td>
<td>$b$</td>
<td>$t$ ratio</td>
<td>$R^2$</td>
<td>in cents per lb.</td>
</tr>
<tr>
<td>Cucumber</td>
<td>27.0872</td>
<td>-0.19694</td>
<td>9.4137</td>
<td>0.5426</td>
<td>16.8</td>
</tr>
<tr>
<td>Banana</td>
<td>9.6533</td>
<td>-0.00277</td>
<td>1.1908</td>
<td>0.4311</td>
<td>9.3</td>
</tr>
</tbody>
</table>
Hawaii "regardless of where it is produced or at what cost, is basically determined by the price of that food in the mainland plus the cost of bringing it to Hawaii." He referred to these costs as the "price umbrella" under which local producers operate. He implied that if this price umbrella shrinks, shipment from the mainland increases, competition between local and mainland produce increases and local farmers are likely to be unable eventually to compete.

There are reasons to believe that improvement in transportation has caused this price umbrella to shrink, putting local farmers in a less advantageous competitive position relative to mainland producers, by offering less and less protection to local farmers and providing greater opportunities for mainland sellers to capture an increasing percentage of the Honolulu produce market. The introduction of containerized shipping, use of uniform pallets, use of lift vans and such enable the integration of water and land transportation cheaply and easily. Shipments can be loaded in trucks in the field, transported via railroad, or motor trucks, then surface vessels and finally delivered to local wholesalers to directly to retail chain stores without additional handling. The whole process reduces labor costs, theft and damages in handling and the time required for delivery.

The immediate effects of these changes is that they have decreased cost and increased competition between the mainland and local producers. Whether or not these direct consequences also alter the degree of monopoly or the size of the food marketing bill is not certain.
CHAPTER XI

CONDUCT OF FIRMS IN THE INDUSTRY: OPERATIONAL, PRICING AND COMPETITIVE PRACTICES

Conduct is the pattern of behavior which firms follow in adapting or adjusting to the market in which they buy or sell. It is defined as the composite of acts and practices of sellers in arriving at and coordinating the several decisions as to what price, output and other policies firms in the industry must follow.

This chapter deals with the procurement, distribution and pricing practices of firms in the Honolulu wholesale produce market. The data were generated from (1) first hand observation of the writer while employed in the Hawaii Produce Company\(^{109}\) in January, 1967, (2) survey of twenty-eight wholesale produce firms, (3) revenue data of wholesale produce dealers from tax returns filed to and made available by the Hawaii State Department of Taxation, and (4) ship manifests of the Young Brothers Ltd., and the Matson Navigation Company for the year 1964.

This chapter is divided into five parts: (1) description of the Hawaii Produce Company, (2) operational practices of firms including methods of produce procurement and distribution, (3) pricing practices, (4) competitive practices, and (5) discussion of market power of the bigger retailers and wholesalers.

The Hawaii Produce Company

The Hawaii Produce Company is located in the Iwilei Produce Center in Honolulu. Presently, it occupies an area of about 7,500 square feet,\(^{109}\)

\(^{109}\) This is a hypothetical name of a true company.
fifty percent of which is used for freezer facilities. The remaining fifty percent is used as a packing shed, office space, storage space for re-usable containers and truck maneuvering area.

The company owns several flatbed delivery trucks of different sizes, three fork lift machines, fifteen hand trucks and three office machines including a calculator, adding machine and a typewriter.

All of the partners are regular employees of the company; one manager, one secretary and three delivery salesmen. In addition, they maintain four to five hired help working on all kinds of jobs relating to produce wholesaling which include hauling produce from the pier, packing produce into various packages conforming to customer specifications, delivering produce to the different outlets, and performing janitorial services within the store area.

In 1964, the company was one of the largest wholesale firms in the State. Its sale represented about 5% of the total produce sales in the industry for that year.

Methods of Produce Procurement

Produce Procurement from the Mainland

Produce from the mainland such as tomato, head lettuce, oranges, potatoes, onions, apples, pears and others are procured mainly through Honolulu based commission salesmen of produce shippers on the mainland. At present, there are about ten of them operating in Honolulu, representing about thirty-six produce shippers located mostly in the Western States. These salesmen are found almost daily soliciting orders from the different wholesalers in both the Iwilei and Ala Moana Produce Centers. The Hawaii Produce Company places its orders about ten times
a month, ninety-five percent of which are through a regular salesman representing one of the biggest wholesale produce firms in California. At the time the order is placed, the quantity and the quality of the produce purchased is specified upon which the price is negotiated, using f.o.b. West Coast price as a base. Two to three weeks later, the produce arrives, in refrigerated container vans either delivered in the company's warehouse by a private trucking firm or picked up by the company from the pier. The latter is true when several companies share space in the same container van.

**Procurement from Local Sources**

Local produce is procured in two ways. For that produce procured from the other islands, the procurement is usually negotiated through long distance telephone call about three to five days in advance. Because the produce is usually procured on consignment basis, the quantity and quality of the produce is usually not specified and the price does not enter as a variable in the process of negotiation. This telephone call is made only to confirm a rather personal or implied agreement that has existed and been maintained through the years between the producer and the wholesaler, that the latter would sell the produce of the former on consignment. The long years of the producer and the wholesaler doing business together has made this transaction customary.

About three to five days later, the produce arrives in Honolulu. The Young Brothers Ltd. through which most of the inter-island produce trade is transported would then telephone the consignee informing him of the arrival of the commodity, the weight of the produce and the freight charge. Immediately, the wholesaler sends for the produce, paying the
freight charge as he carts away the produce from pier to the warehouse.

For produce grown on the island of Oahu, the usual practice is for the farmers to load their produce and peddle it around to the bigger supermarkets or to produce centers in Honolulu. The farmers are either paid cash on delivery, paid a few days later, or in some cases paid only after the produce is sold, in much the same way as if the produce was consigned.

Procurement from Other Wholesalers

Another common way of produce procurement is the process of trading among wholesalers themselves. For the Hawaii Produce Company, practically all of its head cabbage and papaya supply are procured through this method. It is not uncommon for three to five different wholesalers to deliver to the company's warehouse the same type of head cabbage at least three to four times a week. Also, it is not uncommon for the Hawaii Produce Company to sell tomatoes and head lettuce to several other wholesalers in the area.

In this connection, it is an accepted practice among wholesalers to "shop around" early in the morning to fill up customers' orders for immediate delivery. Very often, a preferred customer will order a particular line of produce which at the moment the wholesaler does not have, the wholesaler will then borrow or buy from his next door neighbor only the quantity he lacks to fill up the order. These small orders of different commodities range from five to fifty pounds. For this type of purchase, the Hawaii Produce Company is billed on Fridays for about fifteen to twenty purchases made during the week.

Since the practice of trading among wholesalers is widespread, there
must be some convincing reasons for this. First, there are a few small wholesalers who do not wish to establish contact directly with producers in Hawaii or shippers in the mainland. These wholesalers normally procure their supply of produce through the bigger wholesale dealers in Honolulu or through the Honolulu based marketing cooperatives of farmers in the other islands. Their revenue comes from the extra services they render in the sale of the produce, and this could be quite high because the costs of these services are normally higher than those of the average wholesalers. This difference is so maintained by an implicit agreement between the trading wholesalers that one will not undercut the other in their sales to retail or institutional outlets thereby guaranteeing a certain amount of profit for the buying wholesaler.

Secondly, smaller wholesalers do not have the necessary capital for the purchase of additional warehouse. In a situation such as this, the smaller wholesaler either rents extra space from other wholesalers or has to buy the produce outright from the wholesaler and sell it immediately to customers. This enables him to avoid the cost of keeping or storing the commodity.

Thirdly, small wholesalers buying their supply from bigger ones can avoid spoilage loss. Buying from other wholesalers eliminates this loss as they buy only the amount necessary to fill up current purchase orders. This has the disadvantage that the wholesaler might not be able to secure sufficient supply when the demand for the commodity is high.

Whatever the reasons for this type of trading, it implies an additional stage of the marketing chain which tends to duplicate the services offered by more efficient wholesalers. For firms engaged in this type
of operation alone, the economic justification of their existence is dubious.

Product Distribution

Produce distribution to different market outlets is very erratic and unpredictable, so erratic that often, methodical inventory management is almost impossible. This is true even when a large percentage of the wholesalers' sales (85% for the Hawaii Produce Company and 80% average for the industry) are sold to regular customers.

As early as 1:00 o'clock in the afternoon the day before to about 9:00 o'clock in the following day, purchase orders from different market outlets are received via telephone. These purchase orders are then typewritten in the company billing pads, showing the type of produce ordered, the quantity of each, the price per unit, the gross value of sales and the appropriate tax. These purchase orders are then handed over to the different delivery salesmen, each one assigned to a particular route and each one responsible for packing the orders according to the customer specifications. After these orders are checked by the manager, they are delivered, and for each delivery completed, the customer signs the invoice certifying to the correctness of the entry. Often, the customer rechecks the weight and inspects the produce for quality and grade. Occasionally, there are cases of rejection of all or a portion of the order on account of unsatisfactory quality.

Pilferage or theft along the route is very seldom if at all. Whenever some orders are noticed missing, the deliveryman reports this immediately by telephone and the manager will then trace the produce to places where delivery has been completed.
Distribution to Retail Grocery Stores and Institutional Outlets

Most of the purchase orders of retail grocery stores, service clubs, hotels and restaurants, schools and industrial cafeterias are so small individually that, normally, it takes about 20-35 orders to fill up a flatbed one-ton truck, taking the driver salesman almost half a day to complete the delivery.

Distribution to Supermarkets

For the bigger chain supermarkets, the method of produce distribution is different. Every morning, the produce manager of the bigger supermarkets would come down to the store or telephone the manager of the Hawaii Produce Company asking him to deliver so much of a specified commodity. These orders are in large quantities and are normally delivered in their original containers. A truckload consists of about three to five commodities, delivered to one or two stores of the chain. Deliveries to supermarkets are usually done after lunch when most of the smaller deliveries are completed.

Deliveries to supermarkets include the services of stacking the produce in their warehouses, pre-packing commodities into consumer units and in some instances arranging the produce in the display shelves.

The Hawaii Produce Company invoices its supermarket sales differently in that they are entered in a different book, and only the quantity and grade of produce delivered are specified. The unit price and total sales, taxes and other entries, that normally appear in regular invoices, are omitted, which suggests that for this company, these deliveries are either a part of their trucking operation, or the price is pre-determined
under a contractual arrangement.

Retail-Wholesale Integration

Because most of the bigger retail markets do not maintain extensive warehousing and freezer facilities, they usually utilize the existing reefer, warehouse, and trucking facilities of bigger wholesale produce dealers. This in a way is a loose form of integration.

This kind of arrangement seems to be beneficial for both parties. On the part of the wholesaler, he derives additional revenue in terms of trucking fees and rental for warehouse space. His trucks, warehouse, and labor resources are more fully utilized. These facilities would otherwise be left partially idle, especially during the periods of low business activity. This in turn implies a reduction in the per unit cost of operation, but more importantly, this kind of arrangement allows the wholesaler to maintain goodwill and allowed almost exclusive account of a retailer.

In the part of the retailer, it saves him the burden of heavy fixed investments for trucks, reefer, and other fixed facilities which would otherwise be indispensable for efficient produce retailing. Instead, he can now use these funds for operating purposes. In addition, the retailer is assured of a steady supply of produce from the wholesaler in addition to that which he procures from other sources.

Pricing

Pricing Mainland Produce

Produce commodities imported from the mainland are priced on the basis of f.o.b. West Coast prices and payment is made immediately to the mainland firm through its Honolulu based agent.
Pricing Produce From Local Sources

Local produce procured through consignment is priced at the wholesale level according to the conditions of supply and demand. The price received by the farmer represents eighty percent of the gross sales (twenty percent being the commission of the sales agent or wholesalers) less freight charges. Payments are remitted two to three weeks after the produce is sold.

Whenever wholesalers feel that the supply is low, price is high, and the chance of making profit is good, the wholesalers offer to purchase produce from the farmers. It is only under these conditions that the title of the produce including the risks involved is transferred from the farmer to the wholesaler.

Pricing Produce From Other Wholesalers

For produce purchased from other wholesalers, the price is based on existing prices to retail and institutional outlets. Usually, a wholesale supplier when selling to other wholesalers charges a price at a level lower than that which he normally charges retail stores. This allows the purchasing wholesaler to realize sufficient margin to cover his cost and presumably a little profit above his cost.

Sales Pricing

When wholesalers were asked about the method they use in setting their price, results of the survey indicate that of the twenty-eight firms interviewed, four firms set their prices by following prices of other wholesalers, twelve firms price their produce by adding about twenty percent markup to the purchase price, eight firms set their price according to the "feel" of the market, and eleven firms follow published
wholesale prices.\footnote{See the Appendix.}

\textbf{Cost-Plus Pricing}

Cost-plus pricing applies only for commodities where the purchase price has been established, such as commodities purchased from the mainland and from other wholesalers. The range of the markup differs by commodities and by firms, the difference reflecting the spoilage rate of the commodity, the risk involved and the services needed of the wholesaler to move the commodity. The average markup (for all commodities and firms) was estimated at about twenty percent of the purchase price of the commodity. This level they believe is sufficient to cover all costs and to provide a margin of profit which is considered to be customary, or fair.

\textbf{Following Quoted Prices}

Another popular way of pricing is through the use of published wholesale prices. Price releases are issued twice weekly and are used extensively by wholesalers and retailers alike. The level is modified by the individual wholesaler according to how he "feels" about the market, upon what he heard on the "grapevine" and upon the extent of services demanded by his customers.

Price haggling is not practiced. As the purchase order is received, the wholesaler quotes the price, and the buyer without bargaining, most often takes the quoted price. The buyer knows from experience that a certain degree of uniformity exists among wholesale prices. Even when the price of a particular wholesaler is higher, the retailer would not
mind paying the additional cost to a loyal and trusted wholesaler who is willing and ready to extend all kinds of services such as making deliveries during holidays.

**Administered Pricing**

Another method of setting price observed especially for those items sold in bulk units is through the use of a price list, circulated in duplicate to management on a 4" x 4" slip of paper, about 2-4 times a week depending on how often the price changes during the week. Price quotations on this list are in terms of bulk units such as dollars per sack of head cabbage, or dollars per carton of apples, etc. One of the regular employees of the Hawaii Produce Company indicated that these prices are centrally determined. If this is so, it is suggestive of the fact that to some extent prices of some commodities are administered or determined by a leader firm or a council of leader firms acting as price leaders (of the barometric type) in the industry. Also, this price list could be prices for certain commodities determined by a group of wholesalers and produce managers of the bigger chain supermarkets.

**Forms of Competition**

Price competition is seldom practiced. Most wholesalers feel that it is not a good practice to undercut other wholesalers. There are however, occasional instances when wholesalers in their effort to salvage or move slow moving stock would trim, repack and clean the produce and price it at reduced prices. In most cases, they would rather "take
the beating" by just dumping the produce.

Non-price Competition

Service competition is fierce in the wholesale produce industry. It is not uncommon to see four to five trucks unload the same types of commodities in the same store at the same time. The reason for this is that the retailer wants to patronize as many wholesalers as possible and in the process, he is assured of a constant supply of the best quality of produce. On the other hand, in order that the wholesaler can maintain the account of the retailer, he can not sell anything less than the best at the form and the time specified by the retailer. For a small wholesaler, it is disastrous to lose the account of a big retailer, but on the part of the retailer, he could easily transfer his account from one wholesaler to another.

In the process of produce distribution among various outlets, it is common among deliverymen to drive together along the same route, at the same time, and unload practically the same commodities for the same store. Considering the effort expended from the time the orders are received, assembled, packaged individually for each customer, and delivered one by one to spatially separated stores, the cost of delivery could become very high in relation to the value of the produce itself.

This seems to be an inevitable consequence of the fierce competition of wholesalers for the retailers' accounts. The retailer can, by virtue of his market power, demand assurance of constant supply of high

111 Dumping is construed here as giving produce away free of charge to hog farmers who are willing to collect the garbage along with the unmarketable produce.
quality at competitive prices. This is attainable only through main-
taining several wholesalers competing for his accounts. This kind of
competition leads to duplication of routes, small unit orders, frequent
deliveries, wholesalers intruding into each others markets, and operat-
ing trucks at less than their optimum capacity.

Market Power of Retailers

Market power is the ability to influence prices and other terms of
trade in a way favorable to the business firm. It is gained through the
firm's strong position or through the weaknesses of those with which
he deals. Retailers in Honolulu are believed to possess such power by
virtue of their size and by virtue of the weaknesses of the wholesalers.
The wholesalers are in most cases operating with excess capacity and
are struggling for sales outlets at any price above their direct costs.

Initially, one would suspect, based on market structure alone,
that some sort of oligopsonistic market model describes the relationship
of the chain supermarkets and produce wholesalers in Honolulu. But such
a model does not seem to fit the facts of the situation for the reason
that the policies of supermarkets are geared towards increased volume
at low prices as a direct avenue for profit maximization. In line
with this policy, the market power of supermarkets grows out of the fact
that each supermarket provides an outlet for numerous suppliers. The
suppliers want to place their products on, and keep them on the store
shelves of such an important outlet. This is a matter of survival for
wholesalers in their competitive bid for outlets. Out of this situation,
the supermarket derives a degree of market power and with this the
supermarket can pursue an independent procurement policy.
In line with the supermarkets' policy of profit maximization through increased volume, their sales strategy is to present to consumers products of the best quality and in assured supply throughout the season. From this sales policy, it follows that their procurement policy must be aimed at acquiring certain and regular supply of products with the desired quality attributes. This procurement policy can be accomplished by getting as many wholesalers as possible to compete for the retailers' accounts. Another method of assuring supply is through vertical integration with a wholesaler, or a producer who can meet the requirements of the retailer regarding the quality and regularity of supply. In Honolulu, there is no one among the wholesalers or the local producers big enough or organizationally capable of meeting this challenge.

Market Power of Leader Firms in Sale of Selected Commodities

The market power of leader firms can be evaluated by the extent to which they can affect the market price of specific commodities. It is here assumed that the leader firm is one who controls a significant portion of the market supply and by manipulating his supply, he can, to a certain extent, also influence the price in the market, presumably to a level consistent with maximization of his profit.

This section deals with the evaluation of the ability of leader firms to influence the price by manipulating his supply of specific commodities in Honolulu. Given the market share $s_{12}$ of the leader firm, the elasticity of demand $E$ for the commodity, and a percentage change

112 This is equivalent to $C_1$ or the concentration index of the biggest firm. We will refer to the biggest firm as the leader even though it may not be acting as a leader.
in the supply $C$ of the leader firm, (assuming that the other wholesalers do not change their supply), one can proceed to determine the effect of this change on the market price of the commodity by using the following formula:

Percentage change in price $= \frac{2CS}{E(2+CS)}$, where

- $C =$ percentage change in the supply of the leader firm,
- $E =$ price elasticity of demand of the commodity, and
- $S =$ market share of the leader firm, in percent of the market.

If we assume that $C = 10$, i.e., the leader firm changes his supply by ten percent of his current volume, the effect of this change on the market price can be estimated by fitting the elasticities and the concentration index of the biggest and assumed to be the leader firm into the above equation. The results for the commodities considered in this study are summarized in Table IX.

Table IX indicates that the leader firm's ability to influence the price of the commodities depends upon his share of the market and upon the elasticity of the commodity he sells. For example, if the demand of the commodity is elastic, and the market share of the leader firm is negligible, the leader firm has very little influence on the market price.

If we take the Supreme Court ruling on the case of the Philadelphia Bank vs. the United States and consider $C = 30$ as a critical level that constitutes undue concentration, then we must conclude that the head cabbage and cucumber industries are unduly concentrated and that

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For derivation of this formula, see page 28 of this report.
TABLE IX: ESTIMATED PERCENTAGE CHANGE IN PRICE CAUSED BY TEN PERCENT CHANGE (C = 10) IN THE SUPPLY OF LEADER FIRMS ON SELECTED INDUSTRIES

<table>
<thead>
<tr>
<th>Industries</th>
<th>C&lt;sup&gt;a&lt;/sup&gt;</th>
<th>S&lt;sup&gt;b&lt;/sup&gt;</th>
<th>E&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Percent Change in Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato</td>
<td>10</td>
<td>.23</td>
<td>16.88</td>
<td>.13</td>
</tr>
<tr>
<td>Head Lettuce</td>
<td>10</td>
<td>.17</td>
<td>127.22</td>
<td>.01</td>
</tr>
<tr>
<td>Head Cabbage</td>
<td>10</td>
<td>.31</td>
<td>1.15</td>
<td>2.65</td>
</tr>
<tr>
<td>Papaya</td>
<td>10</td>
<td>.24</td>
<td>2.17</td>
<td>1.09</td>
</tr>
<tr>
<td>Banana</td>
<td>10</td>
<td>.26</td>
<td>27.30</td>
<td>.09</td>
</tr>
<tr>
<td>Cucumber</td>
<td>10</td>
<td>.32</td>
<td>1.64</td>
<td>1.92</td>
</tr>
</tbody>
</table>

<sup>a</sup>This is an arbitrary amount of change in percent.

<sup>b</sup>This is equivalent to C<sub>1</sub> in Table VII.

<sup>c</sup>Elasticity estimates from Table VIII.
competition in these industries is impaired. However, it could also be shown that this structural concentration is mitigated by the elastic nature of the demand for these commodities. For example, a ten percent change in the supply of the leader firm for head cabbage and cucumber industries (assuming that there is no change in the supply of other firms) causes a 2.65 percent change in the market price for head cabbage and 1.92 percent change in the market price for cucumber, both in the opposite direction. Evidently, the influence of the leader firm on the prices of these commodities does not constitute a threat to competition even though the structure of the industry suggests it to be so.
CHAPTER XII

THEORETICAL AND EMPIRICAL MODELS OF PRICE RELATIONSHIPS BETWEEN HONOLULU AND MAINLAND MARKETS

Theoretical Models

This section deals with the theoretical explanation of what has always been thought of as a "rule of thumb" method of pricing in the Honolulu market: the cost-plus method of setting price. This analysis assumes (1) competitive market structure in Honolulu, (2) horizontal demand curve of Honolulu wholesalers in the mainland market, and (3) vertical supply curve of wholesalers in the Honolulu market. Bases for these assumptions are discussed below.

Competitiveness

There are several reasons why the Honolulu wholesale produce market is considered competitive. First, the concentration index of the market falls within the competitive category of the Bain and Caves system of classification. Where concentration index of commodity markets suggests an oligopolistic structure, the price elasticity of demand of the commodities precludes the leader firm from exerting a significant influence over the market price. Second, produce is sufficiently homogeneous that there is no reason for customers to prefer the produce of one wholesaler over another. Third, financial statements of firms show profit rate which suggests a competitive rate of return.

Perfectly Elastic Demand of Wholesalers in the Mainland

The assumption that the demand curve of Honolulu wholesalers (d) in the mainland market is horizontal is based on the fact that Honolulu is only one of the many markets competing for supply in the mainland...
markets. Since Honolulu wholesalers have to compete for supply with practically hundreds of other wholesalers representing much bigger markets, Honolulu wholesalers can not conceivably affect the market price no matter how much or how little their purchase would be.

Vertical Supply Curve of Honolulu Wholesalers in Honolulu in the Honolulu Market

The assumption that Honolulu wholesalers have a vertical supply curve \((q)\) in Honolulu is based primarily on the fact that the market is isolated from its sources of supply or adjacent markets. This implies that once supply of commodities is landed in Honolulu, wholesalers can not, in the short run, increase supply when price increases, or divert surplus to adjacent markets when the price decreases. In other words, supply in Honolulu is a fixed quantity in the short run, unable to respond to changes in market prices. Also, the high rate of quality deterioration of fresh produce requires that it has to be sold while fresh, regardless of the level of prices in the market.

The analysis will proceed within the framework of these assumptions. It will be shown that the price of imported produce in Honolulu is determined primarily by the demand of Honolulu retailers \((Ph)\) and the vertical supply curve \((q)\) of Honolulu wholesalers. Being competitive, Honolulu wholesalers maximize their profit by supplying the market only at a level consistent with the equality of cost and market price. The cost consists of the purchase price from the mainland plus a transfer cost or the cost of bringing the produce from the mainland to Hawaii. The market price is the price which retailers in Honolulu are willing to pay for different levels of market supply and represented as retailers demand function. Therefore, for wholesalers to maximize their profit,
the following equation should hold:

\[ P_m + C = Ph \]  

where: \( P_m = \) purchase price in the mainland,

\( C = \) transfer cost from the mainland to Hawaii,

\( Ph = a - bq, \) or the wholesale price in Honolulu as defined by the retailers' demand function.

With this definition, we can re-write equation (1) into

\[ P_m + C = a - bq, \]  

and solving for \( q, \) equation (2) becomes

\[ q = a - \frac{(P_m + C)}{b} \]  

It is the \( q \) variable in equation (3) or the supply from the mainland, which wholesalers can vary in order to maintain the equality of cost and price. Using equation (3), it can be shown that Honolulu price varies with changes in demand of retailers in Honolulu, changes in mainland demand and/or supply and the transfer cost.

To demonstrate the relationship of Honolulu price with mainland price, hypothetical values are assigned to the variables that influence market price in Honolulu. See Table X. For purposes of demonstration, a change in the demand of Honolulu wholesalers (\( Ph \)) will be called Case 1, a change in the mainland demand (\( P_m \)) will be called Case 2, a change in the mainland supply (\( Q \)) will be called Case 3, and a change in the transfer cost (\( C \)) will be called Case 4.

Case 1 shows that a constant demand in the mainland \( P_m \) and a constant supply in the mainland \( Q \) brings a market price in the mainland equal to 12.5 cents per pound, which all buyers, including Honolulu wholesalers, must pay for their purchase. See Figure 1A. This purchase
price determines the level of demand (d) of Honolulu wholesalers in the mainland. See Figure 1B. With this price, Honolulu wholesalers proceed to determine, using equation 3, how much they should purchase from the mainland and offer for sale in Honolulu, as the demand of Honolulu retailers increases. See Figure 1C.

For example, with constant demand and supply in the mainland equal to $P_m^2$ and $Q_2$ respectively, Honolulu wholesalers will buy from the mainland the quantity of produce equal to $q_1$ if retailers demand in Honolulu is $P_h^1$, they will purchase from the mainland and offer for sale in Honolulu a supply equal to $q_2$ if the retailers demand increases to $P_h^2$, and finally, they will purchase from the mainland and sell the same to Honolulu a quantity equal to $q_3$ if the retailers' demand increases to $P_h^3$. The competitive nature of the market forces them to sell at a price no more than 17.5 cents per pound, while the purchase price and the transfer costs do not allow them to sell less than 17.5 cents per pound. This equality is maintained by supplying the market only at a level that would clear the market at costs.

Case 2 shows that with a constant supply $Q_2$ in the mainland, facing an increasing demand $P_m^1 - P_m^3$ market price increases. See Figure 2A. This increase in market price causes Honolulu wholesalers to decrease their purchase, and consequently their supply to Honolulu, from $q_1$ to $q_3$. See Figure 2B. This decrease in supply in turn causes an increase in the market price in Honolulu. See Figure 2C.

Case 3 is the reverse of Case 2. An increasing supply in the mainland from $Q_1$ to $Q_3$ on a constant demand $P_m^2$, causes market price in the mainland to decline. See Figure 3A. This causes Honolulu wholesalers to increase their purchase from $q_1$ to $q_3$ which is reflected as an
increase in supply in the Honolulu market two weeks later. See Figure 3B. This in turn brings about a price decline in Honolulu. See Figure 3C.

Case 4 can not be shown graphically. What it implies is that, all other factors remaining constant, an increase in transfer cost from 4 - 6 causes Honolulu wholesalers to decrease their purchase from the mainland and consequently, their supply to Honolulu from 7.2 - 5.5. This in turn causes an increase in price in the Honolulu wholesale produce market.

TABLE X: HYPOTHETICAL VALUES OF FACTORS WHICH INFLUENCE THE MARKET PRICE IN HONOLULU

<table>
<thead>
<tr>
<th>Demand in the Mainland (Pm)</th>
<th>Supply in the Mainland (Q)</th>
<th>Demand of Retailers in Honolulu (Ph)</th>
<th>Transfer Cost (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pm₁ = 20 - 2.5Q</td>
<td>Q₁ = 4</td>
<td>Ph₁ = 30 - 3q</td>
<td>C₁ = 4</td>
</tr>
<tr>
<td>Pm₂ = 25 - 2.5Q</td>
<td>Q₂ = 5</td>
<td>Ph₂ = 35 - 3q</td>
<td>C₂ = 5</td>
</tr>
<tr>
<td>Pm₃ = 30 - 2.5Q</td>
<td>Q₃ = 6</td>
<td>Ph₃ = 40 - 3q</td>
<td>C₃ = 6</td>
</tr>
</tbody>
</table>
Case 1: DEMAND OF RETAILERS IN HONOLULU (Ph) FLUCTUATES WHILE DEMAND IN THE MAINLAND IS CONSTANT AT (Pm2) SUPPLY IN THE MAINLAND IS CONSTANT AT (Q2) AND TRANSFER COST CONSTANT AT (C2)

<table>
<thead>
<tr>
<th>Pm</th>
<th>C</th>
<th>Pm + C</th>
<th>Ph - a1 - bq1</th>
<th>(q_i = \frac{a_i - (Pm + C)}{b})</th>
<th>Ph</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>5</td>
<td>17.5</td>
<td>Ph₁ = 30 - 3q</td>
<td>(q₁ = 4.16)</td>
<td>17.5</td>
</tr>
<tr>
<td>12.5</td>
<td>5</td>
<td>17.5</td>
<td>Ph₂ = 35 - 3q</td>
<td>(q₂ = 5.83)</td>
<td>17.5</td>
</tr>
<tr>
<td>12.5</td>
<td>5</td>
<td>17.5</td>
<td>Ph₃ = 40 - 3q</td>
<td>(q₃ = 7.50)</td>
<td>17.5</td>
</tr>
</tbody>
</table>

Figure 1A: Constant Demand and Supply in the Mainland

Figure 1B: Demand of Honolulu Retailers in the Mainland

Figure 1C: Increasing Demand and Supply in the Honolulu Market
Case 2: DEMAND IN THE MAINLAND (Pm) FLUCTUATES, WHILE
THE DEMAND OF HONOLULU RETAILERS IS CONSTANT
AT (Ph2), SUPPLY IN THE MAINLAND IS CONS-
TANT AT (Q2) AND THE TRANSFER COST
CONSTANT AT (C2)

<table>
<thead>
<tr>
<th>Pm</th>
<th>C</th>
<th>Pm + C</th>
<th>( Pm = A - BQ )</th>
<th>( q_i = \frac{a - (Pm_i + C)}{b} )</th>
<th>Ph</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5</td>
<td>5</td>
<td>12.5</td>
<td>( Pm_1 = 20 - 2.5Q )</td>
<td>7.50</td>
<td>12.5</td>
</tr>
<tr>
<td>12.5</td>
<td></td>
<td>17.5</td>
<td>( Pm_2 = 25 - 2.5Q )</td>
<td>5.83</td>
<td>17.5</td>
</tr>
<tr>
<td>17.5</td>
<td></td>
<td>22.5</td>
<td>( Pm_3 = 30 - 2.5Q )</td>
<td>4.18</td>
<td>22.5</td>
</tr>
</tbody>
</table>

Figure 2A: Constant Supply
with Increasing Demand
in the Mainland

Figure 2B: Decreasing Qty.
Demand of Honolulu
Wholesalers in the
Mainland

Figure 2C: Constant Demand
with Decreasing Supply
in the Honolulu Market
Case 3: SUPPLY IN THE MAINLAND (Q) FLUCTUATES WHILE DEMAND IN THE MAINLAND IS CONSTANT AT \( (P_{m2}) \), DEMAND OF RETAILERS IN HONOLULU IS CONSTANT AT \( (P_{h2}) \) AND TRANSFER COST CONSTANT AT \( (C_2) \)

<table>
<thead>
<tr>
<th>( P_{m1} )</th>
<th>( C )</th>
<th>( P_{m1} + C )</th>
<th>( Q_i )</th>
<th>( q_i = \frac{a - (P_{m1} + C)}{b} )</th>
<th>( Ph )</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.0</td>
<td>5</td>
<td>20.0</td>
<td>4</td>
<td>( q_1 = 5.0 )</td>
<td>20.0</td>
</tr>
<tr>
<td>12.5</td>
<td>5</td>
<td>17.5</td>
<td>5</td>
<td>( q_2 = 5.8 )</td>
<td>17.5</td>
</tr>
<tr>
<td>10.0</td>
<td>5</td>
<td>15.0</td>
<td>6</td>
<td>( q_3 = 6.6 )</td>
<td>15.0</td>
</tr>
</tbody>
</table>

Figure 3A: Constant Demand with Increasing Supply in the Mainland

Figure 3B: Increasing Qty. Demanded by Honolulu Wholesalers in the Mainland

Figure 3C: Constant Demand with Increasing Supply in the Honolulu Market
Case 4: TRANSFER COST \((C_i)\) FLUCTUATES, WHILE DEMAND IN THE MAINLAND IS CONSTANT AT \((P_{m2})\), SUPPLY IN THE MAINLAND IS CONSTANT AT \((Q_2)\), AND DEMAND OF HONOLULU RETAILERS IS CONSTANT AT \((P_{h2})\)

<table>
<thead>
<tr>
<th>(P_m)</th>
<th>(C_i)</th>
<th>(P_m + C_i)</th>
<th>(q_i = \frac{a - (P_m + C_i)}{b})</th>
<th>(P_h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.5</td>
<td>4</td>
<td>16.5</td>
<td>7.17</td>
<td>16.5</td>
</tr>
<tr>
<td>12.5</td>
<td>5</td>
<td>17.5</td>
<td>5.80</td>
<td>17.6</td>
</tr>
<tr>
<td>12.5</td>
<td>6</td>
<td>18.5</td>
<td>5.50</td>
<td>18.5</td>
</tr>
</tbody>
</table>

The above discussion assumes that wholesalers in Honolulu can make accurate predictions about the changes in the demand of Honolulu retailers and changes in mainland prices as bases for estimating the quantity that they should purchase from the mainland for sale in Honolulu markets. If these predictions are wrong, their estimate of supply that clears the market at cost is also wrong resulting in either a profit or loss in the short run. However, the process of competitive adjustments will ultimately bring about an equilibrium in the market where the equality of price to cost is maintained.

Empirical Models

The theoretical models show that the Honolulu price of imported produce is equal to the purchase price from the mainland plus the transfer cost. This is of course consistent with the cost-plus method of pricing where a wholesaler adds a certain mark-up to the purchase price, presumably equal to the transfer cost.

To verify this hypothesis, weekly wholesale prices of tomato in Honolulu, San Francisco and Los Angeles markets were collected and analyzed. Regression analysis was used to explore relationships between
(1) Honolulu price and San Francisco price lagged two weeks, (2) Honolulu price and Los Angeles price lagged two weeks, and (3) San Francisco price and Los Angeles price. Relationships between quantity imported from the mainland and prices in San Francisco and Los Angeles were also explored.

Table XI shows that the price of tomato in Honolulu is inversely related with market supply $q$, directly related with price in San Francisco lagged two weeks $PSF_{t-2}$, and directly related with price in Los Angeles lagged two weeks $PLA_{t-2}$. The regression coefficient, the $t$ ratio of each of the independent variables and the coefficient of determination ($R^2$) suggest their relative importance in "explaining" price variations of tomato in Honolulu. For example, equations 2-5 show that tomato price in Honolulu ($Ph$) is positively related to price of tomato in San Francisco and Los Angeles. This is explained by the fact that an increase in mainland price (due to either increase in mainland demand or decrease in mainland supply) causes the Honolulu wholesalers to reduce their purchase and consequently their supply in Honolulu. Decrease in supply in Honolulu in turn causes an increase in the market price. These empirical relations are explained theoretically in Case 2 and Case 3 of the preceding section.

The same relationship can also be shown algebraically. If the price in Honolulu is defined by the retailers' demand $Ph = 24.5436 - .03169q$ (Eq. 1), and $q$ or the quantity imported from the mainland is a function of San Francisco price $q = 49.924 - 4.5980PSF_{t-2}$ (Eq. 7), or a function of Los Angeles price $q = 51.8183 - 6.0920 PLA_{t-2}$ (Eq. 8), then, we can show that the relation between Honolulu price and San Francisco price is given by the equation:
Ph = 24.5346 - .03169(49.9240 - 4.5980PSFt-2)

= 22.9525 + .1457PSFt-2

If the same procedure is used to estimate the relationship between Honolulu price and Los Angeles price, the resulting equation is given as:

Ph = 22.8925 + .1931PLAt-2

Perhaps, a more convincing evidence of association between price in Honolulu and price in the mainland is to convert the same price data as percent deviation from their means and regressing the percent price deviations against each other.

The following formula was used to transform the price observations into percent price deviations from the mean.

PDM = (\frac{P_i}{\bar{P}} \times 100) - 100

where:

PDM = price deviation from the mean in percent,

P_i = weekly price observations, 1960-1963,

\bar{P} = weekly mean price, 1960-1963.

The first term in the left hand side of the equation expresses a particular price data as percent of the mean price. From this value one hundred percent is subtracted, which is the percentage equivalent of the mean price. The difference is interpreted as percent price deviation from the mean.

The transformed data developed for the San Francisco, Los Angeles and Honolulu prices were used in a graphic regression analysis with the mean positioned at the (0,0) in an (x,y) coordinate system. This forces a zero intercept of the regression line, and the regression
coefficient $b$ could then be interpreted in the usual sense, i.e., one percent deviation from the mean price of the independent variable causes a $b$ percent deviation from the mean price of the dependent variable.

The results are summarized in equations 9, 10, and 11. Equations 9 and 10 show that a one hundred percent change in San Francisco and Los Angeles prices causes approximately thirty percent change in Honolulu price in the same direction. Equation 11 shows that a one percent price deviation in San Francisco is associated with about one percent change in price in the Los Angeles market.

All of these equations show that there exists a significant positive linear relation between the mainland and Honolulu prices. The regression analysis of raw and transformed data supports this conclusion. These relationships agree with the models developed earlier. What could not be determined from this analysis is the magnitude of the price difference between the Honolulu and mainland markets because prices among these markets are expressed in different units. Also, the transfer cost ($C$) cannot be precisely estimated as it consists of a variety of non-identifiable cost components which include freight charges, cartage from the pier to the store, insurance, spoilage and normal profit.
### TABLE XI: STATISTICAL RELATIONSHIPS AMONG TOMATO WHOLESALE PRICES IN HONOLULU, SAN FRANCISCO AND LOS ANGELES MARKETS, WEEKLY, 1960-1963

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Intercept(^a) of Regression</th>
<th>Regression Coefficients(^b)</th>
<th>(R^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Ph</td>
<td>24.5346</td>
<td>-.03169</td>
<td>.2294</td>
</tr>
<tr>
<td></td>
<td>20.9336</td>
<td>(3.4515)</td>
<td></td>
</tr>
<tr>
<td>2. Ph</td>
<td>13.5414</td>
<td>+1.4831</td>
<td>.3081</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(9.2226)</td>
<td></td>
</tr>
<tr>
<td>3. Ph</td>
<td>13.4763</td>
<td>+1.7926</td>
<td>.2774</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(8.5638)</td>
<td></td>
</tr>
<tr>
<td>4. Ph</td>
<td>18.6336</td>
<td>-.02570</td>
<td>.3941</td>
</tr>
<tr>
<td></td>
<td>16.4119</td>
<td>+1.1955</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.1485)</td>
<td>(7.3296)</td>
</tr>
<tr>
<td>5. Ph</td>
<td>18.5898</td>
<td>-.02450</td>
<td>.3984</td>
</tr>
<tr>
<td></td>
<td>15.8446</td>
<td>+1.4822</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.0124)</td>
<td>(7.4476)</td>
</tr>
<tr>
<td>6. PSF(_t)-2</td>
<td>.9076</td>
<td>+.8997</td>
<td>.5710</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(15.9440)</td>
<td></td>
</tr>
<tr>
<td>7. q</td>
<td>49.9240</td>
<td>-4.5980</td>
<td>.0400</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.8229)</td>
<td></td>
</tr>
<tr>
<td>8. q</td>
<td>51.8183</td>
<td>-6.0920</td>
<td>.0433</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.9404)</td>
<td></td>
</tr>
<tr>
<td>9. Ph</td>
<td></td>
<td>+.3240</td>
<td>.6408</td>
</tr>
<tr>
<td>10. Ph</td>
<td></td>
<td>+.3606</td>
<td>.4735</td>
</tr>
<tr>
<td>11. PSF(_t)-2</td>
<td></td>
<td>+1.0185</td>
<td>.8389</td>
</tr>
</tbody>
</table>

\(^a\)The double intercept in equations 1, 4 & 5 refers to 2 periods of the year, the first includes the months of November to April, and the second, May to October.

\(^b\)All t ratios (figures in parentheses) are significant at .05.
CHAPTER XIII
PERFORMANCE OF THE HONOLULU WHOLESALE
PRODUCE MARKET

Market performance is defined as the composite end results of market adjustments engaged in by buyers and sellers with respect to price, output, and costs, as a consequence of whatever structure and line of conduct they follow. The elements of market performance include (1) pricing efficiency, (2) operational efficiency, (3) profit rate of the industry, and (4) progressiveness or adoption of innovation.

Pricing Efficiency

Pricing efficiency refers to the ability of price to reflect adequately the demand and cost conditions of the market so that it can serve as a guide in determining what and how much to produce. When price in the market cannot be used as a reliable guide by management, or it does not allow a more efficient use of resources, inefficiency in pricing occurs.

Efficiency in Purchase Pricing

The writer observed that the Hawaii Produce Company had a form to accompany payments for consigned produce indicating the name of the consignor, the amount and type of produce received, and the price at which each grade classification has been sold. The practice of informing the producers or consignors the prices at which their products have been sold when widely followed by wholesalers, makes for an efficient pricing system for produce traded on consignment. Even with this, there are still roadblocks to the efficient functioning of prices in the Honolulu market. Even when the transmission of information from the market to the farm is efficient, that is, the price at retail reflects grade
differences adequately and in turn also reflected immediately and accurately at various stages of the marketing chain, there is still some doubt as to whether farmers can adequately respond to the demand they face in the short run. To understand this, let us consider the feedback of information from the market to the farm and the response to it from various suppliers at different stages of the marketing chain.

The feedback of information from the retail to the wholesale level is immediate and direct. In a matter of hours, it is known whether sale is brisk or slow as indicated by repeat orders within the same day. The extent to which wholesalers can respond to this depends on the availability of their supply. Beyond this, they can not immediately acquire additional supply to take advantage of increased demand at the retail level, neither can they divert excess supply to alternative markets when the demand is low.

At the farm level, the response to changes in demand at the wholesale is less automatic, because of the distance that separates the producing areas from the consuming center. Moreover, most farms are of the family type operation and supply adjustment to price changes is limited by the size of the farms. Also, the perishable nature of fresh fruits and vegetables requires that they must be harvested and marketed at the proper age regardless of market conditions, unless they are left unharvested.

All of these factors make it difficult for price to function as a guiding mechanism in determining what and how much to produce.
Efficiency in Sales Pricing

The survey conducted of the twenty-two wholesale produce firms revealed that the most popular method of setting price is the cost-plus pricing. As practiced, wholesalers, at the average, add twenty percent mark-up to the purchase price, or in the case of produce procured on consignment, where purchase price is not determined in advance, the consigned produce is sold at the level of the prevailing market price. The cost-plus method of pricing is popular because it is an easy method. According to the wholesalers, the twenty percent mark-up is sufficient to cover all costs and also provide a margin acceptable to management. Also, this method is believed to reduce the hazards of price cutting since wholesalers add a more or less uniform mark-up to the uniform purchase price.

Operational Efficiency

A firm is said to be operationally efficient when it is able to realize available economies of scale and also when it attains a high degree of plant and equipment utilization. Both of these are important considerations in the cost structure of the firm.

Utilization of Facilities

The degree of facilities utilization varies with seasonality of harvest. In Honolulu, it was observed that higher utilization occurs

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114 For the result of the survey, see the Appendix.

115 At the time the survey was made, almost all of the produce grown on the other islands were sold on consignment. These commodities were sold in the market at the prevailing market price. In the summer of 1967, attempts by farmer cooperatives (such as Mr. Papaya Cooperative) to do away with consignment trading was initiated.
in the months of May to October when greater volume (tonnage) of produce moves into the market. The following table indicates the degree of truck, storage and space utilization by seasons.

**TABLE XII: AVERAGE TRUCK, STORAGE, AND SPACE UTILIZATION OF TWENTY-EIGHT WHOLESALE PRODUCE FIRMS IN HONOLULU, HAWAII, 1965**

<table>
<thead>
<tr>
<th>Season</th>
<th>Truck</th>
<th>Storage</th>
<th>Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>May - September</td>
<td>65</td>
<td>93</td>
<td>88</td>
</tr>
<tr>
<td>October - April</td>
<td>48</td>
<td>67</td>
<td>73</td>
</tr>
</tbody>
</table>

Source: Survey of twenty-eight Honolulu wholesale produce firms, August, 1965.

The above table indicates that the majority of the fleet used for delivery and cartage purposes are under utilized. On the average, only about sixty-five percent of the factory rated capacity of trucks is used during the peak months of May to September and forty-eight percent during the slack months of October to April, respectively.

Considering such factors as the time of delivery which is concentrated in the early morning hours to noon, it is hard to evaluate whether the present degree of truck utilization could be improved further. People in the trucking and produce industries agree that unless customers are amenable to afternoon deliveries, and less frequent calls, produce wholesalers can not extend their routes, operate at longer hours, nor load their trucks to more nearly their actual capacity. It is believed that it is only under these conditions that delivery costs could be reduced to the mutual benefit of customers and wholesalers alike.

Almost all of the managers interviewed felt the need for expanded
reefer and storage facilities in the industry. Survey results indicate that the problem is especially acute during the summer months when all of the existing facilities are filled up to capacity.

The problem of storage arises because most of the institutional and retail outlets do not maintain storage facilities for produce in the same manner that they do for meats. Most of them are willing to pay the additional costs of daily deliveries instead of investing an additional sum for produce storage purposes. The reason for this is that the produce retailers want to avoid spoilage and risk from price fluctuations involved in keeping produce for extended periods. Also, to erect adequate reefer facilities requires a substantial capital outlay, greater than that required for meat for the same value of commodity. The isolation of the Honolulu market from its sources of supply and the consignment method of procuring produce requires maintenance of adequate inventory, which in turn requires substantial storage facilities on the part of the wholesalers. These factors are in large part responsible for the overcrowding of existing storage facilities resulting in a fairly high percentage of spoilage and shrinkage. As a consequence, a glut in the market, causing reduction in prices, results if existing inventory and newly arrived produce can not be stored adequately.

In the area of space utilization, managers of produce firms feel that the space assigned to them is not sufficient for more efficient operation. On the average, one-half of the floor area allotted to each is used as office and storage space. The remaining area is the actual operating space where trimming, cleaning, grading and packing are done. In front is an open space where trucks are loaded and unloaded.
Inadequate operating space is partially remedied by the use of cabinet-like structures and elevated platforms along the walls where empty re-usable boxes are stored.

Intensity of labor utilization varies with the time of the day. Early in the morning, delivery to retail and other outlets occupies most of the drivers, managers and other laborers. After lunch and later in the afternoon, the time is spent mostly delivering produce to supermarkets, hauling produce from the pier and packing orders for delivery during the next day.

No division of labor according to specialized operation has been observed. For example, the proprietor, aside from his regular duties as manager, also helps in loading and delivering the produce. Delivery drivers assigned to certain routes are responsible for packing the orders according to specification of customers. An experienced deliveryman is pretty much on his own.

Economies of Scale

A long run average cost curve or a planning curve may be drawn as an envelope of a series of short run cost curves of a number of firms operating under a theoretically optimum condition in an industry at a given time. By comparing the cost-volume relationship of plants to the planning curve, it is possible to estimate the extent to which plants in the industry are achieving economies of scale.

A planning curve of the sort mentioned above has been derived from a previous study by Peters\textsuperscript{116} of the delivery operations of twelve

\textsuperscript{116}Peters, "Cost of Hauling Produce in the Honolulu Market," p. 11.
produce dealers of varying sizes. The results obtained were fitted into a quadratic and logarithmic average cost functions as follows:

$$AC_m = 0.94860 - 0.0708Q + 0.0015Q^2, \ R^2 = 0.7311$$
$$AC_h = 1.3499 - 0.0198Q + 0.0007Q^2, \ R^2 = 0.8798$$
$$\log AC_m = 0.6429 - 0.6950 \log Q, \ R^2 = 0.8695$$
$$\log AC_h = 2.8362 - 0.8904 \log Q, \ R^2 = 0.8944$$

where:

$AC_m$ = average cost of delivery per mile in cents,
$AC_h$ = average cost of delivery per hour in cents, and
$Q$ = truck load of produce in pounds.

Interpreting the above equations, the first equation shows that the cost of delivering one hundred pounds of produce per mile decreases by seven cents for each one hundred pound increase in the size of the load for the smaller size loads, but the rate of decline decreases progressively with each additional increase in the load. On a per hour basis, the average cost decreases by about two cents per hundred pound increase in the smaller loads, and this rate of decline decreases progressively with each additional increase in the load.

From the logarithmic functions, a general statement can be drawn regarding the behavior of the cost-size relation. On a per mile basis, a hundred percent increase in the load decreases the cost per unit of delivery by approximately seventy percent. On a per hour basis, a hundred percent increase in the load decreases the cost per unit of delivery by eighty-nine percent.
The above results agree with the theoretical definition of an industry average cost curve in the long run. Also, these estimates exhibit a high degree of reliability as shown by the exceptionally high t ratios and fairly high $R^2$ values.

Because the average cost functions developed refer only to the economies of produce distribution, an attempt was made to establish an average cost curve of the entire wholesaling operation by relating the size of firms, measured in terms of assets or gross sales, to the ratio of operating cost to assets or operating cost to gross sales.\textsuperscript{118} If the points are plotted graphically, the picture developed shows no consistent relation between the per unit cost of operation and assets or between per unit cost of operation to the revenue.

These findings suggest that evidence of economies of scale are conflicting. Synthesized cost curves for delivery operation suggest the presence of economies of scale in the industry. Relating the operating cost to sales or operating cost to revenue do not show a consistent pattern.

Profit Rate of the Industry

The economic profit (as differentiated from accounting profit) is one measure of an industry progressiveness. It is the residual over and above all costs in earning the revenue. Arithmetically, it is estimated as follows:

\textsuperscript{118} The Department of Regulatory Services from which the financial data of twenty-two wholesale produce firms were obtained specifically forbids the publication of data or financial ratios of individual corporations. The data can, however, be presented in a summary form as in Table
\[ \pi = (TR - TC) - iV, \]
where: TR = total revenue,
TC = total costs,
i = interest rate used to reflect opportunity costs, set arbitrarily at 5%, and
V = equity capital.

The accounting profit represents the (TR - TC) portion of the equation from where the opportunity costs of equity capital iV is subtracted to yield the economic profit \( \bar{\pi} \).

From the sample of twenty-two financial statements in 1964, total assets were estimated at $2,159,500 of which 35% or $378,885 was equity capital. Total revenue from sales was estimated at $10,897,007 and the total cost of operation and costs of goods sold was $10,826,432, giving an accounting profit of $70,665. The accounting profit adjusted for opportunity costs (\$378,885 \times .05 = \$36,744) gives an economic profit of \$33,921 (\$70,665 - \$36,744 = \$33,921). From the above figures, the following financial indexes are presented.\(^{119}\)

\[ ^{119} \text{The above analysis was followed from J. S. Bain, Industrial Organization, John Wiley \\& Sons, 1959.} \]
TABLE XIII: RATIO ANALYSIS OF FINANCIAL STATEMENTS
OF TWENTY-TWO CORPORATE WHOLESALE
PRODUCE FIRMS IN HONOLULU,
1964

<table>
<thead>
<tr>
<th>Measures of Size</th>
<th>Size of Business (dollars)</th>
<th>Profit Accounting Profit ($70,665)</th>
<th>Econ. Profit ($33,921)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total revenue</td>
<td>$10,897,007</td>
<td>.64</td>
<td>.31</td>
</tr>
<tr>
<td>Total assets</td>
<td>2,159,000</td>
<td>3.27</td>
<td>1.57</td>
</tr>
<tr>
<td>Equity capital</td>
<td>734,885</td>
<td>9.61</td>
<td>4.64</td>
</tr>
</tbody>
</table>

Source: Estimated from financial statements of twenty-two wholesale produce firms in Honolulu, 1964.

From the above table, general conclusion regarding the profitability and productivity of investment in the industry can be summarized as follows:

1. On the basis of accounting profit, the industry earns on the average, a profit of .64 cents per dollar of sales, 3.27 cents per dollar of investment, and 9.61 cents per dollar of equity capital. Adjusting these figures for opportunity costs, the return per dollar of sale becomes .31 cents, which gives a return of 1.57 cents per dollar of assets or 4.64 cents per dollar of equity capital.

2. The implication of these to the cost and pricing in the industry is that wholesalers price their produce above the level needed to just meet their average cost. This is because the accounting profit on equity which is almost ten cents per dollar is greater
than the interest rate on borrowed funds which is set arbitrarily at five cents per dollar. As a result, economic profit is incurred, equivalent to $1,211 for each firm considered in the sample for the year 1964.

Progressiveness

There are two relatively new innovations in the industry which bear significant impact in today's produce wholesaling industry. Although they originated outside of the local industry, both were readily adopted by the majority of the wholesale produce dealers.

Prepackaging Produce Into Consumer Units

Pre-packaging of produce into consumer units is an adjustment made by wholesalers in response to the widespread adoption of the supermarket technique of self service. This undoubtedly involves more expense on the part of the wholesaler who has to pay for the material and the labor used in packaging. This system of merchandising works well for the retailers. They feel that it is easier and more convenient for them to display, handle, price and clean produce packed in consumer units. Also, they feel that produce when properly packed has a longer shelf life and lower spoilage rate, as it is protected from direct handling by customers.

One problem indicated by the wholesalers is the lack of advance commitments of retail outlets to purchase at prices that would justify the additional investments of materials necessary for efficient prepackaging operation. Also, questions on the effect of pre-packaged produce in expanding the demand and increasing growers' and wholesalers' returns remain unanswered.
Introduction of Refrigerated Ship Containers

The second innovation that has a direct and significant impact in the produce wholesale and retail trade is the introduction of refrigerated containers carrying mainland produce. First, it has increased the competitive power of mainland suppliers relative to that of local producers by the reduction in the cost of transportation as a result of reduction in the cost of handling the commodities, decreased spoilage rate and lengthened the shelf life of the produce. This has decreased the cost of procuring produce from the mainland. This reduction in cost enables mainland shippers to control an increasing percentage of the local market for some produce items.

Second, it has altered the channel of distribution from that of a traditional central market type operation to direct marketing system. The introduction of containerized and refrigerated ships has made the importation of produce in big bulk relatively cheap and easy. For this reason, the bigger chain retail stores find it more convenient to acquire supply directly from big suppliers in the West Coast who can assure them regular supply of premium quality produce, an assurance they can not obtain from any one single wholesale dealer in Honolulu. Also, the cost of acquisition is reduced by the amount of the commission charged by the wholesaler in Honolulu. For these reasons, the channel of distribution has been shifting away from the traditional central market type, which the produce wholesalers represent.

The Price Spread

The price spread between successive stages of the marketing chain reflects the costs and profits of the firms involved in marketing the product. Although it tells nothing directly about the efficiency of
the marketing system, it provides a fairly good basis for evaluating the overall performance of the market if by studying the spread, the following questions can be answered:

1. Are the functions necessary?
2. Are these functions efficiently performed?
3. Is the profit rate reasonable?

The price spread was calculated from the demand functions of tomato, head cabbage and papaya for the period 1958-1965 and are presented in Table XV.

For tomato, an average supply of 541,000 pounds per month brings a retail price of 33.4 cents per pound, a wholesale price of 18.8 cents per pound and a farm price of 15.0 cents per pound. If the farm price is expressed as a percent of the retail price, about fifty-five percent is spent on marketing services and only forty-five percent is left as the farmers' share of the consumers' dollar.

For head cabbage, an average supply of 592,000 pounds per month brings a retail price of 11.2 cents per pound, a wholesale price of 6.2 cents and a farm price of 4.9 cents. Expressing the farm price as a percent of retail price, it seems that about fifty-six percent of the consumers' dollar is spent for marketing services, leaving forty-four percent for the farmers.

When the average monthly supply of papaya is 895,000 pounds, the retail price is 12.7 cents per pound, the wholesale price is 8.2 cents per pound, and the farm price is 6.6 cents per pound. The farm to retail price spread is six cents which implies that the farmers' share of the consumers' dollar for the purchase of papaya is a little more than
fifty percent.

Inspection of Table XIV indicates that the retail-wholesale price spreads show positive slopes or widening of the spreads as quantities moving in the market increase. The reason for this is that wholesalers find it difficult to move the produce to retail when the total market supply reaches above average levels. Consequently, wholesalers are forced to lower their price more than that of retailers. This is indicated by the higher negative values of the regression coefficient of the demand functions at wholesale.

Since the demand functions were used to derive the price spreads, there is no way of identifying the profit-cost components of the spread. As a result, we can not evaluate the efficiency of the market in the light of the three questions posed earlier. We can instead compare the relative cost of marketing in Hawaii and in the United States in general, using tomato and head cabbage as bases of comparison. See Table XV.

The farm-retail price spread for U.S. is about thirty cents per pound for tomato and about seven cents per pound for head cabbage. In Hawaii, the farm-retail price spread is eighteen cents for tomato and six cents for head cabbage. In terms of the farmers' share of the consumers' dollar, farmers in Hawaii get about forty-five percent of the consumers' dollar for tomato and forty-four percent for head cabbage. Farmers in U.S. at the average get thirty-five percent for tomato and twenty-nine percent for head cabbage.

The above results should be interpreted cautiously because they give the impression of efficiency in the market. First, the comparison is not exactly valid because big cities like New York and Chicago get
TABLE XIV: RETAIL, WHOLESALE AND FARM SEASONAL DEMAND
FUNCTIONS AND PRICE SPREAD FUNCTIONS FOR
TOMATO, PAPAYA AND HEAD CABBAGE FOR
THE PERIOD, 1958-1965

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Marketing Stage</th>
<th>Season 1a</th>
<th>Season 2</th>
<th>Intercept</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>a</td>
<td>b</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Tomato</td>
<td>Retail</td>
<td>30.3457</td>
<td>-.0054Q</td>
<td>33.2661</td>
<td>-.0054Q</td>
</tr>
<tr>
<td></td>
<td>Wholesale</td>
<td>24.1371</td>
<td>-.0127Q</td>
<td>27.2571</td>
<td>-.0127Q</td>
</tr>
<tr>
<td></td>
<td>Farm</td>
<td>19.3097</td>
<td>-.0127Q</td>
<td>23.4057</td>
<td>-.0127Q</td>
</tr>
<tr>
<td></td>
<td>R-W Spread</td>
<td>6.2086</td>
<td>+.0073Q</td>
<td>6.0900</td>
<td>+.0073Q</td>
</tr>
<tr>
<td></td>
<td>W-F Spread</td>
<td>4.8274</td>
<td>3.8514</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R-F Spread</td>
<td>11.0360</td>
<td>9.9414</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Cabbage</td>
<td>Retail</td>
<td>16.0620</td>
<td>-.0097Q</td>
<td>17.8472</td>
<td>-.0097Q</td>
</tr>
<tr>
<td></td>
<td>Wholesale</td>
<td>12.7328</td>
<td>-.0120Q</td>
<td>13.9386</td>
<td>-.0120Q</td>
</tr>
<tr>
<td></td>
<td>Farm</td>
<td>10.1861</td>
<td>-.0120Q</td>
<td>11.1509</td>
<td>-.0120Q</td>
</tr>
<tr>
<td></td>
<td>R-W Spread</td>
<td>3.3292</td>
<td>+.0023Q</td>
<td>3.9086</td>
<td>+.0023Q</td>
</tr>
<tr>
<td></td>
<td>W-F Spread</td>
<td>2.5467</td>
<td>2.7877</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R-F Spread</td>
<td>5.8759</td>
<td>6.6963</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Papaya</td>
<td>Retail</td>
<td>15.5571</td>
<td>-.0034Q</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wholesale</td>
<td>10.8868</td>
<td>-.0031Q</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Farm</td>
<td>8.7094</td>
<td>-.0031Q</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R-W Spread</td>
<td>4.6703</td>
<td>+.0003Q</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>W-F Spread</td>
<td>2.1754</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>R-F Spread</td>
<td>6.8457</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

aSeason 1 includes the months of November to April while Season 2 includes the months of May to October.

bSince seasonality has not been observed in Papaya, demand functions did not allow for shifts in demand.
TABLE XV: COMPARATIVE RETAIL AND FARM PRICES AND FARM TO RETAIL PRICE SPREAD FOR TOMATO, AND HEAD CABBAGE IN HAWAII AND U.S. AVERAGE, 1958-1965

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Retail Price</th>
<th>Wholesale Price</th>
<th>Price Spread</th>
<th>Farmers' Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tomato</td>
<td>40.5</td>
<td>33.4</td>
<td>10.7</td>
<td>15.0</td>
</tr>
<tr>
<td>Head Cabbage</td>
<td>9.3</td>
<td>11.9</td>
<td>6.6</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Sources: ERS, Farm-Retail Price Spread for Food Products, ERS 226, USDA, April, 1965. Estimates from Table XIV.
their supply of produce from places as far as California and Florida, a distance of several thousand miles, whereas most of the supply of Honolulu for these crops comes from local sources. Comparing the distance between the producing area and the consuming centers in both cases, it becomes evident that Hawaii marketing costs may not actually be less than that of other major cities in the mainland as the figures imply. Second, the estimating procedures for Hawaii and U.S. farm-retail price spread differ. The difference in procedure may very well account for the difference in the size of the spread. Thirdly, it is possible that the tomatoes and head cabbage grown in Hawaii differ in quality as well as variety from those grown in the mainland. The difference in quality and variety is likely reflected in the prices and the price spread.
CHAPTER XIV

SUMMARY AND CONCLUSIONS

This study deals with the evaluation of the market structure approach as an orientation to research in agricultural marketing and its application to the problems of the Honolulu wholesale produce market.

The market structure approach rests on the assumption that the structure of the market determines the conduct of firms and performance of the industry. In line with this assumption, the method of analysis involves the determination and measurements of the structural variables which economic theory suggests as relevant to performance, relating these structural variables with the observed conduct of firms and performance of the industry, and testing the significance of the relationship if such could be established empirically.

The most important criticism against this approach is that the assumption upon which the entire analysis revolves, i.e. the assumption that the market structure determines the conduct of firms and performance of the industry, can not be precisely established and therefore hypotheses can neither be accepted nor rejected in the conventional sense. There are several reasons for this difficulty. First, the data for the most part are qualitative in nature and analytical techniques of mathematics can not be used to show relationships among variables. Furthermore, tests of hypotheses used in statistics can not be used to test significance of relationships implied in the theory. Second, the flow of causation from market structure to conduct to performance hypothesized in price theory is not always true in actual cases. Circular or even reverse flow of causation is observed in empirical studies.
Third, data on elements of market structure, conduct and performance are difficult to obtain and usually are not in the form amenable for meaningful economic analysis.

Under these conditions, conclusions reached about the market, or explanations of market performance are based mainly on conjectures and inferences about the probable associations with certain structural elements. These conjectures drawn heavily from the personal judgment of the investigator arise from the inability of the theory to specify relationships mathematically or test the implied relationship statistically. Because personal judgment plays a major role in the analysis, including selection of elements to be studied and analytical techniques to be used, the conclusions of the study inherently reflect the philosophy and persuasion of the investigator.

Although the inability to specify and test the relationships in accordance with the hypotheses is undoubtedly an important criticism, it does not seem to be an insurmountable obstacle. In fact, the better studies using the market structure approach do away completely with establishing relationships mathematically and testing the theoretical or observed relationships statistically. Instead, market performance is explained in terms of qualitative and descriptive structural attributes of the market and drawing inferences, based on price theory and experience, about possible relationships of market structure and market performance. But again, the ability to make sound judgments about probable relationships depends pretty much on the depths of the investigator's understanding of the market and less on the theory upon which the analysis is built. The theory in this case is nothing more than an
orientation to research, important only to the extent that it suggests the framework of analysis to be followed and the strategic variables to be considered. For this reason, the approach is criticized as taxonomic, capable of providing a convenient and orderly system of market classification according to structure but inadequate to the more important task of relating or explaining observed performance based on the evidence of structure or whatever.

The second part of the study deals with an economic analysis of the Honolulu wholesale produce market using the market structure approach. Accordingly, the elements of market structure, conduct and performance were examined and possible relationships among the variables considered were inferred, on the basis of price theory and on the personal experience of the writer. The major findings can be summarized as follows:

1. The structure of the Honolulu wholesale produce market differs according to the definition of the market and the system of classification used. For example, if the market is defined in terms of census definition, it is atomistic using Bain's system of classification or unconcentrated oligopoly using Caves' system of classification. If the market for individual commodities is considered, the tomato, head cabbage, papaya and cucumber industries are shown to be moderately concentrated while lettuce, and banana industries are slightly concentrated.

2. The structure of the market might be affected by anyone of the following factors, (a) barriers to entry, (b) product differentiation, (c) elasticity of demand and (d) geographical location of the market. It is suspected that the biggest barrier to
entry and consequently a very important determinant of structure is the inability of potential entrants to muster sufficient supply of high quality of produce regularly from local sources. This is because most of the suppliers are already committed informally to existing wholesalers. It is equally difficult for new entrants to compete for customers' accounts. These difficulties are reflected as absolute cost disadvantage of potential entrants. To a lesser extent, economies of scale are also believed to impose some difficulty to potential entrants, along with such factors as financial and social barriers to entry.

3. Product differentiation, elasticity of demand and geographical location are considered important elements of market structure because they are believed to influence the nature of competition in the market. Product differentiation by origin of produce, e.g. mainland vs. island produce seems to promote non-price competition. Elasticity of demand for the commodities considered allows differences in the prices charged by wholesalers without inducing price wars or retaliatory action. The reduction in transportation cost from the mainland to Hawaii has the effect of increasing competition. These affect the wholesalers and farmers in Honolulu in two ways. First, direct shipment from the mainland to Honolulu retailers can now be undertaken cheaply and easily, causing a decline in the volume passing through the wholesale market. This brings about excess capacity, underutilization of labor and facilities, high unit cost, and generally low profit. Second, produce from the mainland has the effect
of reducing prices in Honolulu to a level profitable to mainland producers but may bring little or no profit to island producers, due to their cost disadvantage.

4. Supplies from local and mainland sources are procured differently. Produce from local sources is procured by consignment whereas produce from the mainland is purchased directly. This requires the wholesaler acquiring supply from both sources to play role of merchant wholesaler for produce procured from the mainland and as a commission salesman for produce procured from local sources. In the former case, his stake is greater because he is bound to loss or make profit out of the operation. In the latter, his revenue is assured in terms of the commission he gets out of selling the farmers' produce.

Purchase price for produce from the mainland is determined on the basis of f.o.b. West Coast prices while produce from local sources is priced on the basis of whatever it brings in the market less twenty percent commission fee. Payments for produce from the mainland are paid immediately when the order is placed, whereas payments for produce from local sources are remitted only two to three weeks after the produce is sold. The wholesale price for mainland produce is determined by adding twenty percent mark-up to the purchase price, to which price for local produce finds its level according to the condition of supply, quality and grade of the produce. Thus, it is evident from this pricing that Honolulu wholesale prices are tied to those of the mainland.
5. Operational inefficiency was observed in the Honolulu wholesale market. Excess capacity in the industry was observed, caused partly by seasonality of supply, but mostly by the declining volume of business passing through the wholesale market as direct marketing became more convenient and cheap. Also, the majority of the firms were too small to attain economies of scale.

6. Progressiveness in the industry occurs mainly in the area of improved transportation and better merchandising practices.

Conclusions

The conclusions of a study should always refer to the objectives to which it has addressed itself to accomplish. In this particular study, the conclusions will therefore deal with the evaluation of the applicability of the market structure approach to the study of the Honolulu wholesale produce market. The evaluation of market performance of the Honolulu wholesale produce market which is the second objective of this study was considered in Chapter XII.

Applicability of the Market Structure Approach to the Study of the Honolulu Market

The market structure approach proceeds by considering all market data on market structure, conduct and performance and, whenever possible attempts to establish relationships among these variables along the guidelines suggested by price theory. An evaluation of the applicability of this method involved consideration of the empirical data and the analytical methods used and comparing them with data and procedural requirements of the theory. In this study, the theoretical requirements regarding the data, analytical methods and relationships among the different variables are set forth in Part I. The empirical data on market
structure, conduct and performance of the Honolulu wholesale produce market, the methods used and the relationships explored are considered in Part II. Evaluation of the applicability of the market structure approach to the study of the Honolulu wholesale produce market therefore involves an evaluation of the extent to which the empirical study in Part II satisfies the theoretical requirements of Part I.

Data Requirements vs. Available Data

Theoretically, in a study of a market using a market structure analysis, data on the more important elements of market structure, conduct and performance are needed. For market structure, the data requirements include: (1) measures of concentration, (2) measures of product differentiation, (3) measures of the condition of entry, (4) price elasticity of demand, and (5) measures of geographical dispersion of competing markets. For market conduct, data regarding (1) price and/or output policy, (2) product and sales promotion policy, (3) competitive, exclusionary, predatory and coercive practices of firms, and (4) marketing practices are required. Required data on market performance include (1) measures of efficiency, (2) progressiveness, (3) profit rate of the industry, (4) selling costs, and (5) price flexibility.

The empirical study was partly successful in generating the data needed in the theory. For example, desired data for the construction of concentration index based on the gross sales and volume of commodity handled were obtained from different government agencies. Data on the elasticity of demand, operational efficiency, profit rate and price flexibility were estimated from published data or derived from previous studies.
The rest of the data needed in the study were difficult to obtain for two reasons: (1) some data can not be quantified or measured in a direct and acceptable way but can be inferred from observable indicators, and (2) some data are confidential in nature and hence are not readily available to the public. For example, measures on the condition of entry can only be inferred from the ability of the established firms to set price at levels which are unprofitable to potential entrants. However, the exact level of this price can not be established or precisely determined by either the established firms or the potential entrants.

Measures of product differentiation are difficult to observe. Sometimes, apparent differences are misleading. Physically, one may think that certain commodities are homogeneous in the sense that no observable physical differences among them exist. However, this is not always true in the economic sense. If one retailer, for any reason, prefers to trade with a particular wholesaler, there is differentiation in the economic sense whether or not the products are physically different. In this case differentiation exists on the basis of some other factors, such as services associated with the sale, and not on the basis of the physical attributes of the commodities. Again this kind of data is difficult to measure and much more difficult to use in economic analysis.

The most difficult set of data to obtain are those relating to conduct and marketing practices of firms. All of the data on pricing, output policies, exclusionary and predatory practices can not be obtained by an "outsider" through examination of financial statements,
casual observations or personal interview. This kind of information is inherently human in nature and only those intimately related to the industry and involved in management decisions can discuss it with certain degree of accuracy. Of course information on how managers react to certain competitive situations has been obtained by a survey, but again the results are mainly academic as the managers interviewed had never experienced conditions similar to those they were asked to react in the survey.

Data on market performance relating to the operational efficiency of firms are conflicting. Average cost curve of produce distribution developed statistically shows that majority of the firms are too small to take advantage of the economies of scale. Average cost curve developed from financial statements developed graphically does not show the existence of economies of scale.

Measures of progressiveness are also conflicting. On one hand, it can be pointed out that wholesaling is more efficient than it used to be because of the improved transportation and improved facilities now available. However, one gets the impression that the industry has not progressed much if one considers the tremendous waste in the allocation of labor, space and capital resources, obsolete buildings, and sloppy inventory and supply management.

Because of these difficulties, applicability of the theory to empirical work in the Honolulu wholesale produce market, or any other market for that matter, is seriously limited.

Theoretical vs. Empirical Relationships Among Structure Conduct and Performance

One of the most serious criticisms against the market structure
approach is the inability of researchers to verify empirically the hypothesized relationships. For example, one can not demonstrate empirically that the market price is lower and the output greater in a competitive industry than it is in an oligopolistic or monopolistic industry.

The writer believes that even if all the data suggested in the theory are available and in the form desired, it would still be difficult to demonstrate these hypotheses empirically.

Various elements of market structure cannot be related in any meaningful way to elements of conduct or to performance. Attempts to relate quantifiable elements of structure to performance such as size of firms and cost of distribution has shown that the bigger firms incur lower costs of distribution than the smaller firms. However, when profit is related to size, no meaningful relationship exists. An attempt to relate the size of firms with the ability to influence market price through control of supply shows that the bigger firms in Honolulu have very little influence on market price, which is contrary to what the theory assumes.

From the examination of the structure and conduct attributes we can infer that the market is sufficiently competitive. From this, it would follow that price mechanism should be efficient in its role of guiding allocation of resources and distribution of income among factors. However, a casual observation of the Honolulu wholesale produce market yields evidence of excess capacity, labor surplus and in some cases over-capitalization.

Because of these problems, the usefulness of the market structure
approach to the study of Honolulu market proved very much less than what was initially claimed to be. The qualitative nature of the data, the difficulty of obtaining the data, and the difficulty of demonstrating relationships empirically limit the usefulness of the theory in empirical work.
APPENDIX A

Table 1: MARKETING PRACTICES OF TWENTY-EIGHT PRODUCE WHOLESALERS IN HONOLULU, AUGUST, 1964<sup>a</sup>

<table>
<thead>
<tr>
<th>Questions Asked</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is this company legally or organizationally integrated with other wholesale firms?</td>
<td></td>
</tr>
<tr>
<td>a. yes</td>
<td>0</td>
</tr>
<tr>
<td>b. no</td>
<td>28</td>
</tr>
<tr>
<td>2. Is this company legally or organizationally integrated with retailers and/or producers?</td>
<td></td>
</tr>
<tr>
<td>a. yes</td>
<td>0</td>
</tr>
<tr>
<td>b. no</td>
<td>28</td>
</tr>
<tr>
<td>3. What do you think about competition for customers:</td>
<td></td>
</tr>
<tr>
<td>a. strong</td>
<td>21</td>
</tr>
<tr>
<td>b. moderately strong</td>
<td>5</td>
</tr>
<tr>
<td>c. weak</td>
<td>0</td>
</tr>
<tr>
<td>4. What percent of your sale go to regular customer?</td>
<td></td>
</tr>
<tr>
<td>a. average</td>
<td>80%</td>
</tr>
<tr>
<td>b. range</td>
<td>50%-100%</td>
</tr>
<tr>
<td>5. Do you have sales contract with retailers?</td>
<td></td>
</tr>
<tr>
<td>a. yes</td>
<td>2&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>b. no</td>
<td>28&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>6. Do your customers:</td>
<td></td>
</tr>
<tr>
<td>a. buy all their produce supplies from you?</td>
<td>3&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>b. buy a part of their supplies from you?</td>
<td>28</td>
</tr>
</tbody>
</table>

<sup>a</sup>The questions below are the same questions asked in a survey conducted on August, 1964.

<sup>b</sup>Only the Air Force and the Navy have written contracts with the bigger wholesalers in Honolulu.

<sup>c</sup>Although there is no written contract between wholesalers and retailers, there seems to be some kind of informal and verbal agreement among them.

<sup>d</sup>These outlets represent the small family type grocery stores.
Table 1: (Continued) MARKETING PRACTICES OF TWENTY-EIGHT PRODUCE WHOLESALERS IN HONOLULU, AUGUST, 1964

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. For prepackaged produce, do you use company labels for advertisement:</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>a. yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Do you package your produce differently from other wholesalers?</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>a. differently</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. not differently</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>9. How do you react to customer competition:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. advertise</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>b. sell at a discount</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>c. offer faster and more efficient service</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>d. sell produce of better quality at the same price</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>e. solicit sales contract from customers</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>f. do nothing</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>10. How do you determine the price you charge?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. ask other wholesalers</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>b. purchase price plus a percentage markup</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>c. &quot;feel&quot; of the market</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>d. haggle with customers</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>e. follow published prices</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11. Do your delivery routes include:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. city only</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>b. rural Oahu only</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>c. city and rural Oahu</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>12. What do you think about competition for supply?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. strong</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>b. moderately strong</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>c. weak</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>13. How do you react to competition for supply?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. bid higher prices</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>b. bulk purchase</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>c. mixed purchase (mix produce, mix quality)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>d. cash purchase</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>e. advance payments or finance producer</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>f. contractual arrangement with producer</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>g. do nothing</td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

Mark up was estimated at twenty percent of the purchase price. This is an average for all commodities and for all firms.
Table 1: (Continued) MARKETING PRACTICES OF TWENTY-EIGHT PRODUCE WHOLESALERS IN HONOLULU, AUGUST, 1964

14. How do you determine the price you pay for supplies?
   a. ask other wholesalers 4
   b. gross sales less commission 10
   c. "feel" of the market 1
   d. follow the quoted price 9
   e. haggle price with suppliers 0

15. What percent of your supplies come from regular supplier?
   a. average 80%
   b. range 50%-100%

16. Where do you obtain your supplies?
   a. local sources only 3
   b. mainland sources only 0
   c. local and mainland sources 25

17. How do you obtain your supplies from the mainland?
   a. through a sales agent 25
   b. directly from the source of supply 0
   c. both 0

18. How do you obtain your supplies from local sources?
   a. through a sales agent 19
   b. direct purchase 20
   c. consignment 8

19. Do you have purchase contract?
   a. yes 5
   b. no 28

\[f\] Commission for consigned produce was estimated at about twenty percent of the gross sales.

\[g\] There is no formal contract in the sense that there is no written instrument obligating the producer to sell to the wholesaler. It is however recognize that there is some kind of informal and verbal contract implied through constant trading.
APPENDIX B

MODEL FOR ESTIMATING THE OPTIMUM SUPPLY OF PRODUCE INTO THE HONOLULU WHOLESALE MARKET UNDER FLUCTUATING DEMAND AND SUPPLY IN THE MAINLAND, FLUCTUATING DEMAND OF RETAILERS IN HONOLULU AND CHANGES IN THE MARKUP OF WHOLESALERS IN HONOLULU

I. Objectives and Data Requirements

This section attempts to construct a model to predict the optimum level of supply wholesalers should bring into the Honolulu market using the following set of information:

1. demand of the commodity in the mainland, \( P_1 = a_1 - b_1 Q \),
2. supply of the commodity in the mainland, \( P_2 = a_2 + b_2 Q \),
3. demand of retailers in Honolulu, \( P_3 = a_3 - b_3 Q \), and
4. pre-determined markup of wholesalers in Honolulu, \( C \).

II. Assumptions

It is assumed that commodities are sold at cost in the Honolulu wholesale produce market. This assumption is based on the observation that wholesalers operate under a condition of pure competition and set the selling price for their products by adding an absolute markup to their purchase price. This markup consists of the cost of transporting the product from the mainland to Hawaii, spoilage loss, cost of selling the product to the different market outlets in Honolulu, and margin representing the return to capital and management.

III. Procedures

Determination of the optimum quantity that clears the Honolulu market involves the following steps: (1) determination of the purchase price by equating the demand and supply functions in the
mainland, (2) determination of the total cost, determined by adding the purchase price to the markup, and (3) determination of the optimum supply by equating the total cost with the demand of retailers in Honolulu and solving for the quantity that clears the market at cost. These steps are outlined briefly below.

1. Determination of the purchase price in the mainland.

Since Honolulu wholesalers represent only an insignificant market for mainland produce, it is conceivable that Honolulu wholesalers can not influence the market price in the mainland regardless of the magnitude of the commodity they offer to purchase. Consequently, the price they have to pay for their purchase is the prevailing market price in the mainland, determined by the intersection of the mainland demand and mainland supply.

\[
\begin{align*}
a_1 - b_1 Q &= a_2 + b_2 Q \\
-b_1 Q - b_2 Q &= a_2 - a_1 \\
(-b_1 - b_2)Q &= a_2 - a_1
\end{align*}
\]

Substituting equation I to either the mainland demand or supply, the purchase price is determined as shown below.

\[
\begin{align*}
p_1 &= a_1 - b_1 \left( \frac{a_2 - a_1}{b_1 - b_2} \right) \text{ or IIA} \\
p_2 &= a_2 + b_2 \left( \frac{a_2 - a_1}{b_1 - b_2} \right) \text{ IIB}
\end{align*}
\]

2. Determination of the total cost of "importing" and selling the produce in the Honolulu market.

The total cost of "importing" produce from the mainland and selling it in Honolulu consists of the purchase price determined
in equations IIA or IIB plus the markup of wholesalers defined as
C. Arithmetically, the total cost (TC) is estimated as follows:

\[ TC = a_1 - b_1 \left( \frac{a_2 - a_1}{b_1 - b_2} \right) + C \]  

or

\[ TC = a_2 + b_2 \left( \frac{a_2 - a_1}{b_1 - b_2} \right) + C \]  

3. Determination of the quantity that clears the market at cost

The quantity that clears the Honolulu market at cost is determined by equating the total cost (IIIA or IIIB) with the demand of retailers in the Honolulu market,

\[ a_3 - b_3 Q = a_1 - b_1 \left( \frac{a_2 - a_1}{b_1 - b_2} \right) + C \]  

or

\[ a_3 - b_3 Q = a_2 + b_2 \left( \frac{a_2 - a_1}{b_1 - b_2} \right) + C \]

and solving for \( Q \).

\[ Q = \frac{a_1 - b_1 \left( \frac{a_2 - a_1}{b_2 - b_2} \right) + C - a_3}{-b_3}, \]  

or

\[ Q = \frac{a_2 + b_2 \left( \frac{a_2 - a_1}{b_1 - b_2} \right) + C - a_3}{-b_3} \]

The \( Q \) estimated from either equation VA or VB is the supply that clears the Honolulu market at cost.

IV. Conclusions

The above equations show that the quantity wholesalers purchase from the mainland and offer for sale in Honolulu depends upon the level of demand and supply in the mainland, the amount of wholesalers' markup, and the level of demand of retailers in Honolulu. Anytime these variables change, the purchase of Honolulu wholesalers
and consequently the amount they offer for sale in Honolulu must also change if the produce is to be sold at cost. Holding other things constant, it can be demonstrated (see the attached table) that:

1. a decrease in mainland demand causes market price in the mainland to decrease, reducing the purchase price paid by Honolulu wholesalers by the same amount and causing them to increase their purchase for sale in Honolulu,

2. a decrease in mainland supply increases market price in the mainland and thus increasing the price paid by Honolulu wholesalers by the same amount and causing them to decrease their purchase for sale in Honolulu,

3. a decrease in the demand of Honolulu retailers implies a decrease in the supply that clears the market at cost, and

4. an increase in the markup causes Honolulu wholesalers to decrease their supply that clears the Honolulu market at cost.
Table I: Hypothetical Examples of Fluctuating Mainland Demand and Supply, Fluctuating Demand of Retailers in Honolulu and Increase in the Markup of Honolulu Wholesalers

<table>
<thead>
<tr>
<th>Mainland Demand</th>
<th>Mainland Supply</th>
<th>Demand of Retailers in Honolulu</th>
<th>Markup C</th>
<th>Total Cost&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Quantity sold at cost&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Price in Honolulu&lt;sup&gt;5&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P_1 = a_1 - b_1 Q )</td>
<td>( P_2 = a_2 + b_2 Q )</td>
<td>( P_3 = a_3 - b_3 Q )</td>
<td></td>
<td>( TC = a_1 - b_1 (\frac{a_2 - a_1}{b_1 - b_2}) + C )</td>
<td>( Q = a_1 - b_1 (\frac{a_2 - a_1}{b_1 - b_2}) + C - a_3 )</td>
<td>( P_3 = a_3 - b_3 Q )</td>
</tr>
<tr>
<td>( P_1 = 30 - 2Q )</td>
<td>( P_2 = 5 + 3Q )</td>
<td>( P_3 = 50 - 4Q )</td>
<td>5</td>
<td>25</td>
<td>6.25</td>
<td>25</td>
</tr>
<tr>
<td>( P_1 = 20 - 2Q )</td>
<td>( P_2 = 5 + 3Q )</td>
<td>( P_3 = 50 - 4Q )</td>
<td>5</td>
<td>15</td>
<td>8.75</td>
<td>15</td>
</tr>
<tr>
<td>( P_1 = 30 - 2Q )</td>
<td>( P_2 = -10 + 3Q )</td>
<td>( P_3 = 50 - 4Q )</td>
<td>5</td>
<td>27</td>
<td>5.75</td>
<td>27</td>
</tr>
<tr>
<td>( P_1 = 30 - 2Q )</td>
<td>( P_2 = 5 + 3Q )</td>
<td>( P_3 = 40 - 4Q )</td>
<td>5</td>
<td>25</td>
<td>3.75</td>
<td>25</td>
</tr>
<tr>
<td>( P_1 = 30 - 2Q )</td>
<td>( P_2 = 5 + 3Q )</td>
<td>( P_3 = 40 - 4Q )</td>
<td>10&lt;sup&gt;f&lt;/sup&gt;</td>
<td>30</td>
<td>5</td>
<td>30</td>
</tr>
</tbody>
</table>

<sup>a</sup> An alternative formula is \( TC = a_2 + b_2 (\frac{a_2 - a_1}{b_1 - b_2}) + C \)

<sup>b</sup> An alternative formula is \( Q = a_2 + b_2 (\frac{a_2 - a_1}{b_1 - b_2}) + C - a_3 \)

<sup>c</sup> Decrease in mainland demand.
<sup>d</sup> Decrease in mainland supply.
<sup>e</sup> Decrease in demand of retailers in Honolulu.
<sup>f</sup> Increase in markup of wholesalers in Honolulu.
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