

ABSTRACT

THE DETERMINATION OF PRICE BY NEGOTIATION IN AGRICULTURAL MARKETS

by David Hollingsworth Spaeth

It is the objective of the dissertation to form a simulation model of the exchange of property and the processes of bargaining and negotiation.

The attainment of this objective is implemented by construction of the model, the demonstration of the generality of its application, and the approach to the demonstration of its simulative properties. Considerable attention is also given to the semantics of current economic terminology.

The model is built on a cybernetic hypothesis of human behavior. This hypothesis is advanced in the form of the TOTE unit proposed by Miller, Galanter, and Pribram in their book Plans and the Structure of Behavior (New York: Henry Holt, 1960). This form is extended and modified for the purpose of building the model of exchange process.

The concept of the plan is explicated and extended to include not only the control of a sequence of activity, but also plans selection processes and plans formation processes.

The principal derivative of the TOTE form is a model of human behavior based on a hierarchy of plans.

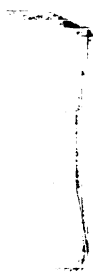
Using the postulates of the behavioral model, the exchange hierarchy is defined. Bargaining and negotiation are described in formal terms.

The exchange hierarchy is expanded and demonstrated to be equally applicable to the case where the participant in exchange is a group of agricultural producers. The formation of price offers is described in terms of the behavioral model. The sequence control, plans selection, and information processes are identified in the plans hierarchy that is the shared plan to determine the terms for exchange of an agricultural commodity.

The demonstration of the simulative properties of the model is approached by developing the real world referents for the substantive terms of the formal model. These referents are identified in verbal and printed statements of bargaining associations, bargaining association executives, and representatives of processing firms.

The cybernetic hypothesis and the associated concepts of plans and plans hierarchy are demonstrated as a valid basis for the formation of a theoretical model that simulates the behavior associated with the exchange of property.

This model does not view the process of bargaining as an aberration of the perfect market idealization, nor does it employ the restrictive assumptions of the perfect competition model. On the other hand, the perfect competition model is demonstrated to be a special case of



the general model where the conditions defining the stationary state obtain.

Price agreement is postulated to be the result of the successive revision of current estimates of the future consequences to non-agreement. It is further demonstrated under the model that price is the joint resultant of the plans for valuation of property as executed by the individual economic actor or group of individuals acting as a single person, under rules for economic conflict which are defined by execution of the shared plan that controls the political process.

Price determination is viewed as a function of the expectations that are embodied in plans. It is asserted that past costs of production bear on present price determination only via the mechanism of present expectations about the future consequences of agreement to exchange at a given price. Price is asserted to function as an allocative mechanism via the reaction to the de facto distribution of revenues after the exchange has been consummated.

Procedures are suggested for identifying the referents for the substantive terms of the model in a specific bargaining situation.



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PREFACE

The reader will quickly discover that this dissertation is not an extensive empirical description of bargains, bargainers, or bargaining associations. Neither is it intended to be a manual of how to bargain. The intent is to construct a way of talking about the determination of price by means of the social process that is negotiation. This objective is sought along two lines. First, a model is advanced to serve as the framework for the interpretation of observed phenomena in the market. Second, considerable attention is given to the semantics or word-object relationship, of the economic terminology that is used in the analysis of market behavior.

A further purpose of this dissertation is to describe price determination in a manner that does not view its context, bargaining, to be a deviation from the perfect competition model. This is not in any sense meant to be a criticism or refutation of the idealization that is the perfect market. On the contrary, there is agreement. In demonstrating this agreement by examining a portion of the economic terminology used to explain marketing phenomena, new meaning can be given to interpretation of economic data, and substance given to some ill-defined words. It is also demonstrated that the model of bargaining developed in this dissertation forms a meeting point for the statements and analysis by the classical economist, the neo-Keynesian, the

institutionalist, and the businessman.

The model developed in the following pages is designed to simulate the so-called "real world." Hence, the use of examples from various industries is not intended as empirical "proof," nor has it been tacked on as an afterthought to prove a point of argument. The citing of a limited number of examples is intended to demonstrate isomorphism between the model and overt phenomena. Since the primary concern is simulation, effort is made to find empirical demonstration of the assumptions as well as the model itself.

Much as paintings of a single subject vary with the painter, word pictures vary with the writer. Just as one painting does not preclude the existence of other graphic simulations of the same object, the approach of this thesis does not preclude the use of other models to explain the same data. The value of this particular approach, which is basically inductive, can only be assessed when the model that is formed in this way is refined and put to work as a deductive system.

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THE DETERMINATION OF PRICE BY NEGOTIATION IN AGRICULTURAL MARKETS

CHAPTER I

INTRODUCTION

The determination of price by negotiations is a part of a more general process called bargaining. Negotiation has been referred to in economic literature as that "higgling" in the market which leads to unique association of price with a quantity of specific goods or services for the purpose of exchange. This bargaining, with its higgling, is a time-honored procedure for establishing the terms for exchange of property between individual human beings. This procedure has been extended to multi-person collective or cooperative bargaining, first, over terms of employment, now, for the terms for trade of agricultural commodities.

There is no need here to review the history of the development of cooperative bargaining in agriculture. The literature in the field is extensive and growing (1). It is important, however, to note that cooperative bargaining in agricultural markets has become a major

(1) See Peter Helmberger, "Cooperative Bargaining in Agriculture," unpublished thesis for degree of Ph. D., University of California, 1960, for an extensive description of the past history and current status of agricultural cooperative bargaining associations.

topic for discussion in the formation and implementation of national policy with regard to the various problems that have been identified with the agricultural sector of the U. S. economy. As a positive reaction to the hypothesis that imbalances in "marketing power" are responsible for undesirably low incomes among farmers, the American Farm Bureau has formed the American Agricultural Marketing Association. Robert E. Braden, Field Services Director of the newly formed Michigan Agricultural Cooperative Marketing Association, has advanced this statement of Farm Bureau policy:

Farm Bureau recognizes the necessity of organized farm marketing power to maintain financially independent, family type farms. As the world's largest and most influential farm organization, Farm Bureau is putting all its energies and finances behind this voluntary program. It has long been a Farm Bureau basic belief that farmers can do a better job for themselves, than someone else can do for them (2).

Taking a different view of the relationship between cooperative bargaining and government policy, former Secretary of Agriculture Henry Wallace has stated:

In the late twenties I evolved the phrase, "The farmers are entitled to the moral, legal, and economic equivalent of what the tariff and corporate form of organization give to industry and labor unions give to labor." This meant government action. In some way farmers must get equivalence of bargaining power.

(2) Robert E. Braden, "The Organization of the Michigan Agricultural Cooperative Marketing Association," mimeo, Michigan Farm Bureau Services, Lansing, Michigan, 1961.



Cooperatives are good, but they are not enough in days when most of the farmers' sales are to huge corporations and most of their purchases are directly or indirectly from great corporations (3).

There are now more than 325 cooperatives of the bargaining type (4). Increasing numbers of persons in and out of these associations and in both private and public agencies are being called upon to supply data and operational advice to these bargaining associations.

THE PROBLEM

Two problems that arise from this increasing public discussion of bargaining and marketing power are dealt with in this dissertation. First, there is the problem of trying to assess the intended meaning for phrases such as, "full market value," "fair price," or "market power." These phrases, and others like them, are highly subjective; hence the intended meaning is primarily contingent on the user. On the other hand, these kinds of phrases appear as substantives in statements of organization goals. As such, they may be presumed to be related to stable points in the complex basis for decision making that underlies the execution of the group plans to bargain cooperatively.

(3) Henry A. Wallace, "Equality of Bargaining Power," Better Farming Methods (from the Benjamin Hibbard Memorial Lecture at the University of Wisconsin, March, 1961), Aug. 1961, p. 14.

(4) Kenneth J. Samuels, "Bargaining Activities in Other Commodities," Proceedings, 5th Annual Conference on Fruit and Vegetable Cooperatives, Jan. 7, 8, 1961, mimeo, Farmer Cooperative Service, Washington 25, D. C.

The second problem is that of explaining the relationship between this social process of bargaining and price determination in the theoretical sense. Is there some kind of order in this confusion of interpersonal reaction and interaction that is bargaining? The science of economics is an old one, developed by eminently intelligent men who looked at the world around them and made logically consistent inferences about the nature of the economic activity they saw. They formed theories about the formation of price and the establishment of the values of commodities and human services. These theories have been called right, wrong, valid, or unrealistic. "Rightness" or "wrongness," however, are not properties of theories, nor is realism a necessary property of theories. Theories are valid or invalid depending solely on their internal logical consistency. It is a basic premise of this dissertation that there should be a link between static economic theory, as currently expounded, and alternative models for interpretation of human economic behavior since there is a common basis in the overt human behavior that furnishes the data for inferences. This thought is not pursued to the extent of reviewing all of economic theory in relationship to the model developed in this dissertation, but it is the basic approach in dealing with the concepts of supply, demand, cost, and profit maximization.

There is a further gain in probing the semantics of economic terminology. As theories gain wider and wider acceptance, their

terminology becomes the means for communication between researchers. The interpretation of human economic behavior is the subject of several theories, both in and out of economics. To the extent that this economic behavior is the common basis for these theories, probing the semantics of terminology should facilitate communications between groups of researchers. Further, the person who survives in the business world also interprets human behavior, forms his own system of inferences as a basis for his decisions, and uses the terminology of economics rather freely. Improvement in communications between the professional economists of various schools of thought and the business community, including farmers, is of particular importance. Hence, the intended meanings of the words in the bargaining context as used by producers and their representatives will also receive attention.

A further problem that arises out of the relationship between the social process of bargaining and price determination is the matter of the theoretical determinacy of price in a situation where the ex-changers have some control over price by variation of the quantity or specifications of the property exchanged. This is the "oligopoly problem," or the problem of price determination under perfect or monopolistic competition that is the subject matter of the writings of



Robinson, Chamberlain, and Fellner (5). Fellner observed that prices were agreed upon, and in many cases displayed considerable stability. His explanation, however, leaves such concepts as the sanctions imposed on affluence, toughness, retaliatory power, and the costs of stalemate, to be further explained and formally defined (6).

APPROACH AND PURPOSE

This dissertation approaches the problem of interpreting the on-going phenomena of bargaining and negotiations by starting from postulates about the form of the behavior of human beings in general-- first, as individuals aware of their group membership, then as groups of individuals.

Although it is essential that the internal logical consistency of the model be maintained, the prime objective is simulation (7). This is basically an inductive procedure, apart from but not unrelated to subsequent use of such a model as a deductive system. Although such

(5) Edward H. Chamberlain, The Theory of Monopolistic Competition. London: Oxford University Press, 1947; Joan Robinson, Economics of Imperfect Competition. London: The Macmillan Co., 1948; and William Fellner, Competition Among the Few. New York: Alfred Knopf, 1949.

(6) These phrases approximate Fellner's four "factors" to which he attributes de facto determinacy in the real world. Fellner, op. cit.

(7) For a discussion of simulation models as models of dynamic process see William H. Starbuck, "Testing Case Descriptive Models," Behavioral Science, VI, 3, July 1961, pp. 194-195.

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simulation models are "realistic," their evaluation must be based on their explanatory and predictive power as deductive systems.

In summary to this point, and more specifically, it is the purpose of this thesis to:

1. Describe the process of bargaining, its component negotiations, and the context in which these take place in agricultural markets. This description is implemented by the use of a formal model adopted from the fields of psychology and cybernetics with particular emphasis on the semantics of the substantive phrases used in the model.
2. Relate price determination by negotiation to price determination in the theoretical sense.
3. Demonstrate, in a limited way, the use of case descriptive materials in the formation of simulation models, and in association with this, explore the semantics of some current economic terminology.

BARGAINING AND NEGOTIATION

The word bargaining, as it is used here, refers to the process of attempting to reach agreement on terms for the exchange of property. Bargaining is subordinate to, or a means for achieving, the exchange of property. Property is defined within the legal framework in which the exchange takes place. To differentiate the word



bargaining as it is used here from the term "bargaining transaction" used by Commons(8)and, to avoid undue emphasis on the legal aspects of property, it is assumed that property is defined. It is also assumed that price means a ratio of exchange in which the numerator is money.

The word negotiation refers to the exchange of messages that is part of bargaining and a means for eliciting counteroffers. The difference that is being made here between bargaining and negotiation is a matter of the hierarchical organization of human behavior that is postulated in Chapter II. It is sufficient for the moment to state that bargaining is interpreted as the general process of seeking agreement of the terms for exchange and includes cases of non-negotiated exchange and the unilateral setting of terms. Negotiations is interpreted to include among counteroffers, ultimatums and take-it-or-leave-it offers (9).

The interpretation of bargaining as the general case of reaching or attempting to reach agreement is a different point of orientation than the usual view of bargaining as an aberration of the perfect market

(8) John R. Commons, The Economics of Collective Action. New York: The Macmillan Co., 1950, p. 44.

(9) The inclusion of non-variation of repeated offers, and ultimatums in the definition of negotiations is at variance with common usage. The refusal to yield on a given variable in the terms package usually designates that variable as being "non-negotiable." This inclusion is made, however, to avoid dealing with the problem of ultimatums that, in retrospect, are not so ultimate.

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idealization. The most general case of attempting to reach agreement on the terms for trade is exemplified by an auction in an unorganized market, such as a rural auction of used household furnishings. In this context, the perfect market appears as the special case where the assumptions of perfect knowledge, fixed preferences and institutions, and homogeneous product obtain.

PROCESS, PLAN, AND PERSON

A basic statement for explanation in this dissertation is that bargaining is part of a social process in which two persons converge on a single point of communicative contact with the plans and authority to exchange property.

This statement is not at variance with the statement by Commons that there are five parties which are participants in the "bargaining transaction" (10). Commons talks about two actual participants, two potential participants, and the sovereignty imposed by the fifth representing the general public. The two persons in the initial statement above, are Commons' actual participants. Sovereignty has already been accounted for in part by assuming that property has been defined. It will be seen that this assumption can be dropped and the assertion made that the definition of property is the result of group

(10) Commons, op. cit., p. 50.



plans to stabilize the environment as executed by the political group-- the government. The two potential participants to the bargaining transaction are represented in the model of this dissertation by not only competitors, as Commons asserts, but by the next most feasible alternative to exchange with this particular opponent. This may mean exchange with a competitor to the other person faced in the market. It may mean abandonment of the decision to exchange.

Referring again to the initial statement of this section describing bargaining, a convenient vehicle for the discussion of bargaining and its context is development of meanings for the words process, plan and person, which occur in the statement. The concept of the plan and the postulates formed from it are the subject matter of Chapters II and III. Person is tentatively designated as the participant in exchange. Chapter IV is devoted to developing the case where the person is a group of individuals faced with the task of behaving as if they are a single economic actor. That is, they are faced with the task of forming a single unambiguous offer which can be accepted by the other person.

The development of a meaning for the word process does not contribute directly to the formal description of bargaining. It does, however, indicate the nature of the job faced by the describer. The word process, as it is in this dissertation, refers to the following concept described by Berlo:



If we accept the concept of process, we view events and relationships as dynamic, on-going, ever-changing, continuous. When we label something as a process, we also mean that it does not have a beginning, an end, a fixed sequence of events. It is not static, at rest. It is moving. The ingredients within a process interact; each affects all of the others (11).

Bargaining is a process. The task facing the describer is to break this amorphous on-going event into segments and attach labels to these segments in order that this process can become the subject of discussion and orderly inquiry.

The so-called "real world" is also a process, perhaps the most comprehensive process with physical overt evidence of its existence. It too is on-going, ever-changing, without a beginning and an end, and composed of interdependent and interacting parts. About all one can say is, that things in the real world "happen" in sequence. Human decision makers, via sensory apparatus, sense this real world. The human mind seems capable of inferring cause from observing sequences and building systems of "what causes what," or, private theories about the nature of the environment within which the individual must exist and survive. Using this ever increasing private theoretical system as the frame of reference, new experiences are interpreted which are classed as "facts" and which further alter the private world of "what causes what." These are necessary functions for survival.

(11) David K. Berlo, The Process of Communication. New York: Holt, Rinehart, and Winston, Inc., 1960, pp. 23-28.



Bargaining is a process involving interaction between human decision makers. Part of the data to each is the interpretation of the overt behavior of the others. They interact. Just how each person in exchange interprets (makes inferences from) the behavior of the other has a profound influence on the course of negotiations. This description of bargaining as a process indicates the meaning intended when the word "dynamic" is applied to the bargaining model that follows. Dated variables or sequences through segmented time are not sufficient to warrant the use of the adjective dynamic. The economic actors must interact as each uses the acts of others as a basis for his own actions.

The use of the concept of process and the idea that each element of the behavioral system called "bargaining" interacts with all of the other elements, raises the question of whether or not there is any determinacy in the system. To put it another way, since there is some determinacy in interpersonal reaction (bargains are concluded and exchanges made), how can a theoretical system describe a process with its indeterminacy and still account for points of stability and the degree of certainty that does exist? To put it in still other terms, if a system of three elements was set in motion with the behavior of each contingent on the behavior of the other two, how would one go about describing the approach of these elements to a particular spatial configuration?

The concept that is used to explain one such configuration, agreement on price, is the plan to bargain. The solution to the bargain is not apparent with 100% certainty to the persons who are participating, but the need to exchange forces these economic actors to choose a specific course of action. Once embarked upon, this course of action may or may not be revisable in the face of change in the on-going environment. Some parts of the plan of action may not be spelled out until certain information becomes available. This course of action, the plan, is the basic unit that is used for the description of process. Plans occupy time, and they involve learning. The basic assertion is simply that in the face of the complex interaction which is the real world as sensed by the individual, people form plans on the basis of the inferences about cause, and the data available at the time. In other words, even though the individual cannot analyze all of the consequences of a specific course of action, survival dictates that he must choose some course of action. Some plans are to act as individuals. Some plans are formed by groups, that is, they are shared plans to achieve group goals. It is asserted that the determinacy that is observed in the real world arises because the pressure to predict and plan engenders participation in shared plans to stabilize parts of the real world. It will be demonstrated that these shared plans can be derived from postulates about the nature of individual behavior.

The notion that price formation is the "discovery" of some pre-determined point of supply and demand equilibrium is rejected in its naive form. The process of bargaining itself is price determining. This does not mean that there is no stability or there is no point of orientation in the environment to serve as a basis for price formation. The question is clarified by consideration of possible meanings for the word equilibrium in the dynamic context. First, there is equilibrium that would be achieved in a world where all expectations are met. All plans are coordinated, fully specified from the beginning, and successfully executed without revision. This is the stationary state cited by Hicks(12). Second, there is equilibrium in the sense of a limiting position in the case of recurrent plans. Constant correction of errors in each repetition would yield accuracy and predictability approaching that of the stationary state. It can be hypothesized that the presence of recurrent production plans carried on by many uncoordinated firms in agriculture has tended to make propositions derived from static economic theory look realistic and appropriate when applied to interpretation of economic behavior in agriculture.

(12) J. R. Hicks, Value and Capital. London: Oxford University Press, 1939, p. 117.

Third, there is the situation where a steady state is maintained because any deviation from this state is met by reaction to restore it. This is the concept of homeostasis and the appropriate meaning for equilibrium in describing the process of bargaining. An example of homeostasis in economic behavior is cited by Boulding:

We thus visualize a firm as a "homeostatic" process by which a certain structure of variables is maintained. At the simplest level we suppose there is "homeostasis" of the balance sheet; on this assumption any change in the balance sheet variables will evoke counteracting behavior.

. . . This theory does not, of course, carry us very far, as we have to ask first what determines the balance sheet that is maintained, and secondly we have to account for the changes in the balance sheet, both in over-all growth and in composition (13).

Homeostasis, when related to human behavior, is interpreted as steady state that is purposefully maintained. It is necessary to assume that decision has preceeded action. It is also necessary, as Boulding indicates, to explain the underlying purpose for the maintenance of the steady state, and the mechanism for change. This explanation is advanced in the following chapters.

THE PLAN TO BARGAIN

The usual purpose for description in economic analysis is to implement explanation. It is the usual purpose of explanation to

(13) Kenneth E. Boulding, "The Present Position of the Theory of the Firm," Linear Programming and the Theory of the Firm. (Boulding, K. E. and Spivey, W. A. Eds.). New York: Macmillan Co., 1960, p. 13.

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implement prediction and control. It is a reasonable assertion that, apart from the desire to engage in economic conflict per se, if the point of final agreement in a bargaining situation could be accurately predicted by both sides from the initial information, negotiation would be precluded as a means to reach agreement on the terms for trade. There would be no need to bargain in order to reach agreement. In the absence of such certainty, and if an agreeable set of terms is not indicated among the data or facts in the exchange environment, the means to achieve price agreement is the plan to bargain. This plan to bargain combines the world of facts, as seen by the bargainer, with his private theory about "what causes what," to form a specific course of action. The formation of this specific course of action may involve selecting a single sequence or plan from a finite set of plans, the purpose of each being to reach agreement on the terms for trade. Negotiation is said to follow as a part of the plan to bargain if the person decides to attempt to elicit a counteroffer.

The approach to prediction of the course of negotiations and the nature of the ultimate solution is made from two directions. First, the environment is examined for limits to the range of acceptable negotiated offers for each person. Second, the behavior of the negotiating person is examined to locate points of stability that furnish the basis for rejection, acceptance, and formation of offers.

THE ORGANIZATION OF THE DISSERTATION

Chapter II, as indicated above, advances the postulates about individual and group behavior. The result of this is to describe the nature and property of plans. The plan is the central concept permitting the use of the word dynamic as descriptive of the model that is advanced in this dissertation.

Chapter III describes the formal model of bargaining that is based on the postulates of Chapter II.

Chapter IV describes the shared plan to bargain cooperatively as executed by a group of individuals. The text deals with the internal communications and decision processes within the group that leads to the formation of the single offer. The shared plan, in effect, is a model for the political processes which reconcile the multiple interests within the group.

Chapter V reports the statements made in both interviews and in publications by persons responsible for bargaining for primarily producer groups. The purpose of the chapter is to demonstrate referents for the substantive terms in the formal model that is built in the preceding chapters.

Chapter VI summarizes the major hypotheses of the dissertation and explores the implications of these hypotheses.

Chapter VII makes specific suggestions as to procedures for identifying the referents for the substantive terms of the model in a specific bargaining situation and the testing of hypotheses that may be deduced from the formal structure of the model.

CHAPTER II

PLANS

An essential problem in moving from the consideration of static to the consideration of dynamic models of price determination is in moving from the description of the conditions under which price equilibrium will obtain to the description of attainment of a price.

Parsons has commented on the work of Commons stating:

In his investigations into "reasonable value," Commons concentrated upon the analysis of court decisions, but his purpose was even broader than the study of his legal theories of valuation. He was searching for a laboratory in which to study the operation of the human will, upon the most difficult problem in social thought--the achievement of joint valuations and agreements for action in situations involving genuine conflicts of interest (14).

The key phrase for discussion here is "the operation of the human will," and its association with "the achievement of joint valuations and agreements for action." This search for a link between awareness or knowledge and action is not confined to theories of valuation. Miller, Galanter, and Pribram cite the absence of psychological theory that deals with the human will stating, in criticism of the cognitive theorist:

It is so transparently clear to them (the cognitive theorists) that if a hungry rat knows where to find food--if he has a cognitive map with the food-box located on it--he will go

(14) Kenneth H. Parson, "Introduction" to John R. Commons, Economics of Collective Action, op. cit., p. 10.

there and eat. What more is there to explain? The answer, of course, is that a great deal is left to be explained. The gap from knowledge to action looks smaller than the gap from stimulus to action--yet the gap is still there, still indefinitely large (15).

The variation on this problem that is of relevance to the determination of price is the leap from the collective and individual knowledge of market conditions, to the formation of the offers that are the pre-conditions for the consummation of the exchange of property.

To fill this gap between knowledge and action, Miller et al. propose the plan:

. . . any hierarchical process in the organism that can control the order in which a sequence of operations is to be performed (16).

It is a basic postulate of this dissertation that bargaining is such a controlled sequence, which aggregates "knowledge" into a sequential action for the purpose of reaching agreement on the terms for exchange of property. This definition of the plan requires the explanation of the phrase "hierarchical process." The appropriate approach to this explanation is to consider the basic behavioral unit called the TOTE that is proposed by Miller and his colleagues.

(15) G. A. Miller, E. Galanter and K. H. Pribram, Plans and the Structure of Behavior. New York: Henry Holt and Co., 1960, p. 9.

(16) Miller et al., op. cit., p. 16.

THE TOTE

The name TOTE refers to the sequence Test-Operate-Test-Exit. This is a basic unit of behavior that is proposed to replace the traditional reflex arc concept that underlies stimulus-response theories of human behavior.

Any theory of human behavior either at the human or animal level must explain the reaction of the organism to its environment. Behavior that takes no cognizance of the environment leads almost certainly to the destruction of the organism. The body of psychological theory, which is identified as the stimulus-response school, usually describes the neural structure of the organism as being linear. The chain of elements called the "reflex arc" consists of: stimulus-receptor-afferent nerve-connective fibers-efferent nerve-effector-response. The feedback control on behavior is implemented by an assumed, but relatively unstructured, concept called "re-enforcement." This re-enforcement embraces the explanation of the association of particular stimuli with particular responses. The explanation of how these associations are established, extinguished, and changed, plus the explanation of why a broad range of stimuli can elicit similar response, and vice versa, has led to the postulate of the organism as the intervening variable between the stimulus and the response. It is postulated that there is an intervening organism that "takes account of"

the stimulus and selects the correct response. This of course leaves for explanation the nature of the intervening organism. This "little black box" is called the locus of "meaning" by Osgood who attempts to structure it by factor analysis (17).

Miller and his colleagues assert that evidence from a number of sources indicates that a more appropriate description of the mechanism of behavior than the reflex arc can be found in a cybernetic or feedback controlled unit analogous to an information processing unit in an electronic computer.

The cybernetic behavioral sequence occurs in this order (18):

1. A stimulus is received such that a comparison in the Test phase of the behavioral unit indicates a discrepancy between the present state of affairs and another state that is desired. This discrepancy, called incongruity, leads to the passing of control to the Operate phase of the behavioral unit.
2. An activity sequence of subordinate TOTE's is executed for the purpose of eliminating the incongruity. When this

(17) C. E. Osgood, G. J. Suci and P. H. Tannenbaum, The Measurement of Meaning. Urbana: University of Illinois Press, 1957, see Chapters 1 and 2.

(18) The TOTE unit is borrowed from Miller, Galanter, and Pribram and extended for use in this dissertation. This, however, does not imply that these extensions would meet with their approval. The postulation of separate learning and plans selection hierarchies are only suggested in their text. See Miller et al., op. cit., p. 18 and footnote, p. 37.

sequence has been completed, the control passes back to the Test phase of the unit which has received information concerning changes in the state of the organism, then,

3. the Test is repeated. If incongruity is still present, the control passes to Operate and the sequence is repeated. If incongruity is not detected, then an Exit is made from the unit. That is to say, the control passes to the next TOTE unit.

This is the basic form proposed by Miller et al. and it is overly simple, as they recognize. The extension and modification of this basic TOTE may be pursued by posing three questions. First, what happens if the attainment of the complete elimination of all incongruity is impossible by any known operation? To answer this it is necessary to propose criteria for Exit, or stop rules on the performance of this particular TOTE. To avoid a cumbersome system of stop rules to cover any and all contingencies, it is proposed as a modification of the third step above that when the control returns to the Test phase, the following three alternatives are possible.

3. The Test is repeated; then:

(a) if incongruity still exists, control passes back to the Operate phase and a sequence is performed to eliminate the incongruity, if such a sequence exists.

(b) if incongruity still exists and no sequence exists which

will eliminate the incongruity, then Exit from the TOTE.

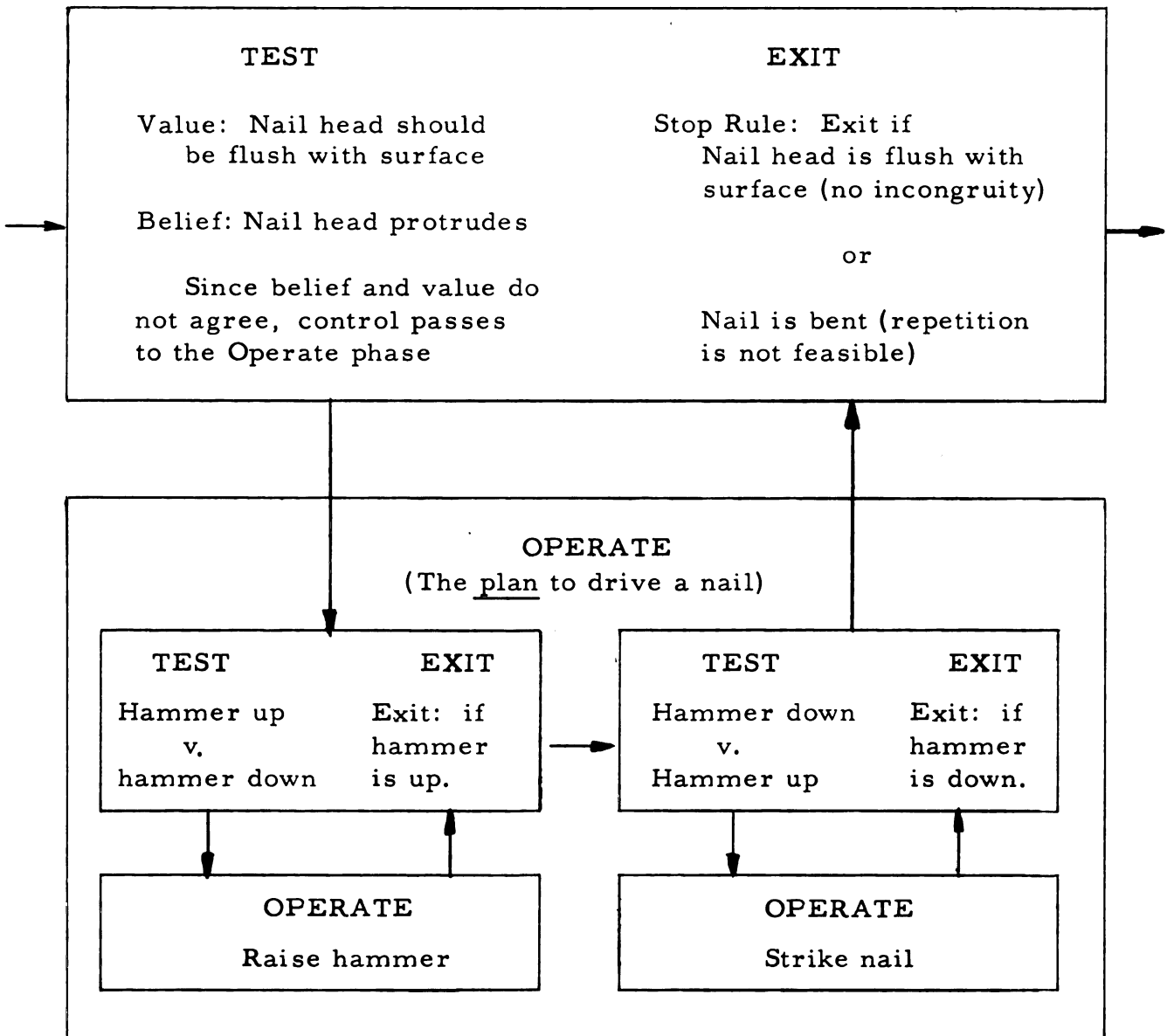
In other words, the TOTE is abandoned for lack of feasible sequence.

(c) if no incongruity is detected then Exit from the TOTE.

A TOTE of this form is represented schematically in Figure 1.

It is seen, then, that the stop rule is contingent on the non-existence of incongruity, or, some sort of test applied to sequences indicating that no sequence exists that can be expected to eliminate the incongruity. This introduction of expectations into the scheme is involved in the second question that needs to be answered in order to render the TOTE useable for explanation. This question is whether or not only one sequence is associated with the operation phase of a TOTE. It is proposed that the Operate phase contains a list of alternative sequences and that there is a selection of one of them on the basis of expected capacity to eliminate incongruity.

To phrase this a little differently, when control passes to the Test phase of a TOTE there is an immediate resort to a choice process in which the attempt to eliminate incongruity is repeated, abandoned as unfeasible, or, is unnecessary if the Test indicates that no incongruity is present. This implies the presence of a choice mechanism and the existence of some procedure for establishing the feasibility of alternative plans. The most obvious rule is to consider maximum expected



(How the nail is struck or the hammer is raised is postulated to be under the control of even more molecular TOTE's (not shown) in the Operate phases of the TOTE's "Raise hammer" and "Strike nail".)

FIGURE 1

Schematic Representation of the "TOTE" - "Drive Nail"

incongruity reduction to be the criterion for choice. This follows the form of the non-additive subjective expected utility maximization (NASEU) models proposed by Edwards (19). This model is appropriate for other reasons that are cited later in this chapter.

The third question related to extension of the TOTE is, what is the nature of the mechanism by which the knowledge of the current status of the organism is modified to indicate the results of the Operation? The implication is made in the very simplest form of the TOTE that all of the change is the result of the Operation sequence. If this model is to simulate human behavior, this need not be true. The elimination of the incongruity could be implemented by:

1. execution of a successful sequence.
2. a shift in the specifications of the desired state.
3. a shift in the status quo arising from circumstances or actions not related to the activity of the individual.
4. some combination of the above three bases for change.

It is proposed that in addition to the sequential passing of control, and a choice procedure, that there is an information-processing activity that bears on the change in the "knowledge" of "what is," "what should

(19) Ward Edwards, "Measurement of Utility and Subjective Probability," Psychological Scaling: Theory and Applications (Gulliksen, Harold Messick, Samuel, Eds.). New York: John Wiley and Sons, Inc., 1960, pp. 109-127.

be, " and "what can be" in the Test phase of the TOTE unit. This shift in "knowledge" can quite reasonably be called learning.

To clarify the TOTE concept in the form that has been proposed above, it is necessary to affix some labels. Perhaps the most difficult of the notions is that of incongruity. It is postulated that a part of the information held in the Test phase of a TOTE is the organized perception of "what is" (20). This shall be called the belief system; the system of "facts" held by the individual. It is further postulated that in juxtaposition to this belief system is a value system containing the notions held by the individual about "what should be." These are the actual and potential goals for the individual. Incongruity can then be defined as that internal state of the organism that arises when corresponding elements of the belief and value system differ. As Miller et al. imply, this incongruity can arise from the need for nutrients (belief; don't have v. value; should have) in the cellular structure, or, can arise at the broadest social level (the Mayor is a Democrat, v. we should have Republican Mayor) (21). The belief system as defined

(20) The belief system that is postulated is closely related to the Image as proposed by Boulding. It includes such "facts" as the present estimate of future states. It is the sum total of all organized information or knowledge held by the individual. See Kenneth E. Boulding, The Image. Ann Arbor: University of Michigan Press, 1956.

(21) Miller et al., op. cit., p. 82.

herein does not necessarily imply mental process in the ordinary sense. It is the more general "is" side of all postulated Test phases of TOTE's.

Similarly, the value system is considered in its broadest sense as the "should be" side of all Test phases.

To this point, the Operate phase has been simply called a "sequence." It is now postulated that such a sequence is a sequence of subordinate TOTE units. A sequence of subordinate TOTE's contained in a TOTE operate phase, that is directed toward a specific goal, is called a plan. To specify a particular plan, one must indicate the purpose for which it is selected to be executed and the anticipated time span or length of run. It may be seen then that plans contain TOTE's as units of behavior, and that a plan is contained in the operation phase of a TOTE. This "larger" TOTE may in turn be a unit in some larger or higher ordered plan, and so on up to the longest run and most comprehensive of plans and TOTE's. This is the meaning of "hierarchical process" that appears in the definition of the plan.

A more concrete example will illustrate the notion of the TOTE hierarchy. Suppose that the largest or highest ordered TOTE that is to be considered is the very generalized behavior directed toward a Mr. Jones occupying the role of farmer. He knows from experience

what he should do to fill the role. He also knows that he lives on a farm, and the consequences of doing nothing (present estimate of a future state). To fulfill the role he executes the plan to farm for the coming year. Which farming plan he chooses is contingent on his knowledge of the farm and other assets and inputs at his disposal. Say that Jones knows that he has an orchard and in response to the value "should earn income" he chooses to operate the orchard. As soon as the orchard enterprise is included in his annual farm plan, he embarks upon a sequence of operations, one of which is to sell the crop. When the time comes such that he "should" exchange the crop for money, he selects a plan designed to achieve that end. Among the TOTE's in the sequence of the plan to exchange the crop, say apples, for money, is the TOTE whose value system specifies that apples should be exchanged at the rate of \$3.00 per bushel for a specific grade. The purpose of this TOTE is to reach agreement on price. The value is the price Jones thinks he should get, the belief, or fact, is the price that he is faced with when the sequence to exchange apples for money has proceeded to the point where Jones receives the first information on the price that he can accept for his apples. Suppose now that the market price is \$2.50. The resultant incongruity then leads to one of three actions. He can revise his value about the price he "should get." He can infer that he cannot reach price agreement,

turn around and go home or to another market, or, he can choose a plan to elicit another offer. This last alternative means the selection of a plan to negotiate, that is, elicit a counteroffer. The plan to negotiate is a sequence of TOTE's which include seeking out a buyer, manipulating the context of negotiations, and in particular, a unit directed at making an offer. Even further, there are the subordinate TOTE's related to how the offer is made down the hierarchy to the physiology of the speech organs.

The hierarchy is evident in the above example. It is also evident that since both plans and TOTE's are designated by their purpose and time span or horizon, that TOTE's can be designated by their plans. The discussion to follow will use the convention of speaking of plans and the reader need only keep in mind that the motivator behind the execution of the plan is the belief v. value discrepancy of the TOTE. The TOTE will be mentioned where necessary to clarify a point in the bargaining model. As an example of the procedure for using the word plan; the plan to sell the 1962 output of Jones' Orchard, includes the sub-plan to reach price agreement with a buyer, which may include the sub-plan to negotiate. The sales plan itself is a part of a larger plan to implement the farm income, which in turn is a sub-plan with respect to the long range goals of the Jones family. To repeat, to talk about a plan it is

necessary to specify the goal or purpose and the time horizon. This is the procedure for segmenting and labelling the amorphous process -- the plan.

As an initial statement, plans are asserted to have the following properties:

1. They include sequences of sub-plans.
2. They require a time period for execution.
3. They are based on expected outcomes.
4. They are executed for a purpose.
5. They can be abandoned or revised.
6. They are related to other plans by hierarchical organization.

It is convenient to talk about levels in a plans hierarchy associating, in general, the longer time horizon with the higher ordered plan. It follows from the postulate that the passing of control from Test to Operate involves a selection of a plan from a finite set of plans, and that at each level the decision maker is faced with choice of plans. This means that plans are revisable at any point where more than one feasible sub-plan exists.

Parallel to the exercise of control with respect to plan selection and sequence per se, is the flow of information that guides this control. There is not only information that has been developed by inference and interpretation of past events, but also the application of the same



mental processes to on-going events. As an example, driving a car involves past knowledge of which roads lead to where, accumulated driving skills, and the on-going assessment of traffic and traffic signals. In the bargaining situation, the course of negotiations is affected by knowledge of the factors bearing on the alternatives open to both parties, knowledge of past bargaining sequences, and the current evaluation of the on-going negotiations.

A convenient way to describe these simultaneous processes of sequencing, plans selection, and information processing is to designate them as concurrently operating plans systems or programs. These are labelled for subsequent discussion as the Main Activity Program (MAP), the Plans Selection Program (PSP), and the Learning Program (LP), respectively. Behavior described in hierarchical form can be represented by a list of instructions, for example:

1. Sell the 1962 crop (MAP)
 - a. Estimate the quantity and quality to be sold (LP)
 - b. Find out what buyer A is offering (LP)
 - c. Decide on one of the following (PSP)
 - i. Accept A's offer
 - ii. Make a counteroffer to A
 - iii. Abandon the exchange with A and approach buyer B

A prototype, on paper, of a bargaining situation would be a set of instructions listing all possible contingencies and the rules for making choices at each point where such choice is necessary during negotiation. Each of the programs (PSP, MAP and LP) bears on the plans

hierarchy at all levels. Each of these programs are plans hierarchies themselves. That is, there are plans for selecting plans, and plans for acquiring and processing information as well as the MAP hierarchy. It is seen in Chapter IV where the person executing a plan to bargain is perhaps a 16,000 member bargaining cooperative, that these separate functions can be identified.

TIME

The author has asserted that the model of bargaining to be developed is dynamic. The basic unit that is proposed is an extended TOTE of the Miller form. A sequence of these units is called the plan. It has been stated that identification of a plan requires specification of both the purpose and the time horizon. It has been stated that the execution of plans occupies an interval of time. It has also been asserted that the basis, in part, for plans selection is expectation. Obviously time is involved in the very fabric of the model.

The very important point to grasp is that there are two different kinds or aspects of time involved. One of these is current time, that is, the "edge of becoming." The second aspect of time is the segmented time which people use to plan, to coordinate motion, and to record historical events (22).

(22) For an extensive and intriguing treatment of these two aspects of time in various cultures, see Edward T. Hall, The Silent Language. New York: Doubleday, 1959.

Very simply, current time is the perception of the present from point to point in chronological time. This is a dimensionless point on a chronological time scale. For the individual, however, at each point in current time, there is the perception of past and future time. In relation to behavior, planning is based on present estimates of future events which, in turn, are based on inferences held at the present time from events in past time. The plan therefore is the concept that ties the past to the future via the state of expectations. Perhaps the closest approach to the kind of behavior that exists in the absence of a segmented time scale is observed in the culture of some southwestern American Indians. In this culture, time is viewed as the "edge of becoming" and the planning function at higher levels is simply delegated to the appearance of seasonal or accidental events (23).

This concept of two different aspects of time is the basis for the revisability of plans. At each point in time, the person is faced with a choice of plans based on present estimates of future events. As the individual moves from point to point through current time, these estimates change upon receipt of information, that is, the person learns, then revises and fills in his plans as a result of interpreting on-going events in the light of his past experiences.

(23) Ibid.

This view of time was forced to the attention of the author when the attempt was made to represent offers and counteroffers in the market on a Cartesian coordinate system in the price-time plane. In essence, the problem is one of representing on the plane, both the "time track" of offers as they appear and converge in successful negotiations, and, the present estimate of future possible time tracks that the negotiator uses to select present counteroffers. The first is an overt phenomena, the time scale can be either units of chronological time or numbers of offers. The second is a segmented time that involves present estimates of the future costs or gains to non-agreement as a function of time. This second kind of time is essentially involved in the static model that is used as a basis for decision in a dynamic real world. Once again the proposition emerges that even though the "real world" is indeterminate and means and ends are interrelated, the necessity for decision and planning forces the use of determinate static systems as decision models. For this reason, among others, the study of static models is relevant to interpretation of human behavior. To illustrate, if a businessman assumes that his price determining activity is "discovery" of some predetermined point such as would be set by the "iron law of supply and demand," this behavior will reflect this assumption on his part. One would expect somewhat different behavior from a businessman who assumed

that his price "discovery" activities in themselves were price setting. It could be hypothesized that he would become more aggressive.

PLAN FEASIBILITY AND THE "VALUE" OF PLANS

It is the purpose of plans execution to eliminate incongruity. Since plans can be based on expectations for elimination of incongruity with probability of less than 1. that it will be achieved, it is permissible to talk about incongruity reduction. Plan feasibility is assumed to be based on an ordering of plans with regard to the estimated potential for incongruity reduction. This ordering is postulated to arise from a subjective prediction about the degree of incongruity reduction times the subjective probability of executing the plan as intended or viewed at the time the plan is selected.

Using the concept of incongruity in this way extends it beyond its original intended by Miller et al., but the extension is not as distorting as it may seem at first. It is granted that subjective probability is inaccessible data, and that the measurement of incongruity poses the same problems that have plagued utility analysis. It is proposed, however, that this problem be evaded. To be sure, if one simply calls minimization of incongruity a transform of maximization of utility, one recognizes that the model of plan feasibility and plans selection is of the Edwards NASEU form (24). The evasion is

(24) Ward Edwards, op. cit. (NASEU = non-additive subjective expected utility maximization).

perpetrated by two tactics. First, it is assumed that any plan that is selected is the most feasible. That is, the plan which is selected bears maximal potential for incongruity reduction as estimated by the person at the time of plan selection. Thus, all behavior is assumed to be rational. Rationality itself stands for a concept that implies some measuring stick of rationality. In this discussion the measuring stick, within certain limits, has been removed, hence, within these limits the term rational is inappropriate. The term "satisficing" used by Simon (25) is also not appropriate since any decision that falls short of some maximizing criterion is identifiable only in the presence of this criterion. Further, it may be assumed that if a person does not consider all possible alternatives, or use all available information and makes a decision that appears to be only "good enough" rather than "best," he is maximizing some set of values that includes minimization of the costs of decision making and information processing.

The second tactic for avoiding the problem of measuring utility in the form of incongruity reduction is to consider the value (of the product of incongruity reduction times probability of intended plan execution) at its extremes. At one extreme would be the situation

(25) Herbert A. Simon, Models of Man: Social and Rational. New York: John Wiley and Sons, 1957.

where the probability of execution as planned, would approach 1. but the value of the incongruity reduction would be a net value of zero.

At the other extreme would be a large value for incongruity reduction but the probability of execution as planned would approach zero.

Obviously, the value of the product in each case would approach zero.

Three points emerge, therefore, in the plans selection process with regard to the feasibility of plans. These three points are plainly identifiable in the formal description of the bargaining process, i. e.

1. The overt offer is assumed to be the most feasible plan held by the offerer at the time the offer is made.
2. Since the plan to negotiate is executed to reach agreement on some set of terms not presently existing in the market, the incongruity motivating negotiation is related to the gap between the most feasible offer held by the negotiator and the unsatisfactory terms he is facing. Hence, the terms he is facing may be accepted with a probability of 1, but offer is of zero potential of incongruity reduction.
3. At the other end of the scale, there is a set of terms of some positive potential incongruity reduction beyond which there is zero expectation of successful agreement. This may be called the maximum level of aspirations of the negotiator. The starting bids at an auction may be assumed to approximate this point.

Only the third point above, which involves "aspirations," leaves the matter of measuring internal states of people. It will be demonstrated in the model of bargaining that once the initial offers have appeared in the market, only the first two of the above points need be considered.

It will be assumed later that the sole variable to be negotiated is price. It can be demonstrated that this does not destroy the simulative properties of the model, but the question can be raised as to whether or not this renders feasibility as simply the Marshallian assumption of the constant utility of money. It is not. Quite apart from any argument about the cardinal or ordinal utility of incongruity reduction, the execution of the plan to negotiate requires the expression of underlying preferences on some cardinal and usually equal interval scale. In this case, the scale is expressed in monetary units. In this form, money appears as a code and also in its role as a standard of value. It is interesting to note that in explaining his NASEU decision model, Edwards indicates that if preferences are expressed on a ratio scale (such as money), then the most appropriate position for the true zero is the present financial position of the person who is to express this preference (26). This agrees with the postulate that the plan is based on the present estimate of future

(26) Edwards, op. cit., p. 119.

contingencies or consequences of the contemplated action. It is not suggested that this NASEU model is necessarily the rule used in plans selection. The suggestion is only that this form of decision model has certain properties which recommended its use in conjunction with the notion of the plans for valuation of property.

It is not the intention of the author to generalize on what kinds of decision models are used by what kinds of price offerers, be they optimists, pessimists, rash gamblers, or the most conservative of decision makers in the face of risk. The assertion is that whatever the model, the decision preceding actual behavior was rational, or "best," or "most feasible" at the time the decision was made.

To return to consideration of the unit of behavior concerned with negotiating the terms for exchange of property, assume for the moment, for the sake of simplicity, that price is the only component of the terms package that is variable. It can be postulated quite reasonably that once an offer is present in the market, the following set of alternatives is open to the opposing person:

1. Accept the other person's offer (the offer in the market).
2. Reject the existing offer and try to elicit agreement at another price by making a counteroffer.
3. Reject the offer and abandon the plan to execute agreement with the other person over this quantity of the property.

The formal description of this set is explored in Chapter III, but it will be noted that these three alternatives are of the same form as the criteria for Exit from a TOTE unit. In the above order they are, given an existing offer:

1. If no incongruity (the other person's offer is most feasible), control passes to the next TOTE, e. g. physical transfer of goods.
2. If incongruity still exists (the existing other person's price is not acceptable), either repeat (select) the most feasible counteroffer), or,
3. Abandon the plan (to bargain with this opponent).

The first point, acceptance of the other's offer, can be executed with probability of 1. If there is no incongruity, the control will be passed on from this TOTE unit to bargain to the next TOTE in the plan to exchange. In other words, the plan to achieve price agreement has been successfully executed without selection of a plan to negotiate. Zero incongruity reduction is implied since none was present. This does not imply that this price was considered "fair" or that a better price couldn't have been negotiated. The postulate of the TOTE simply asserts that the value held concerning the maximum feasible price that should exist in the market (the expected market price on which the plan to exchange is based), was the same as the price that existed when the

time came to seek agreement. This may be an entirely different price on which the plan to produce the commodity was based. The difficulty that arises in sorting out the notions of "what is," "what should be," and "what can be," arises from the necessity to sort out the values and beliefs from the plans of varying time horizon and of varying positions in the plans hierarchy. It was noted above, that the value held concerning price in the plan to bargain was dictated by the choice of the maximum feasible plan to exchange. This value may be very different from the most feasible price that will emerge if incongruity in the TOTE to bargain indicates the selection of a plan to bargain in which there is the plan to negotiate. This latter price is formed in the presence of different values, e. g. those which are included in the plan to negotiate vis-a-vis the plan to seek an alternative market.

The second alternative, that of rejection of the existing offer and formation of the counteroffer, yields the overt offer. This is assumed to reflect the most feasible offer selected in the plan to negotiate. It also indicates a revision of the value held in the TOTE to bargain. Repetition of the plan to negotiate is contingent on the revision of the existing offer which may mean revision of the belief (the data, or knowledge of) which is the new offer by the other person.

The third alternative, that of rejecting the existing price and rejecting the plan to negotiate with this particular other person, can

be executed with probability of 1. It will be chosen if it is the most feasible alternative.

If the assumption that the quantity is predetermined is maintained, and more money is preferred to less money by the offerer, and since acceptance of the other's offer and abandonment of the plan to bargain with this particular other person can both be executed with probability of 1., then, it follows that the price represented by each alternative is the measure of relative feasibility between the two alternatives. To illustrate this in simpler and more concrete words, if the buyer likes money, he will agree with the lower priced seller if the alternative to bargaining with seller **X** is to bargain with seller **Y**. The other alternative may be to simply abandon the plan to exchange. In this case, the alternative to exchange will be assumed to have a price equivalent lower than seller **X**. In other words, the buyer put his money back in his pocket and went home. The converse can be described for a seller agreeing with the highest bidding buyer or withdrawing his merchandise from the market.

It is postulated in the formal model of the bargaining process and demonstrated in the case materials that the range of agreement can be represented in the price-time plane on the price axis, between those prices that represent for each person the minimal price beyond which bargaining with an alternative person or abandonment of

exchange is more feasible. The overt offers, however, will fall between the mutual estimates of these minimal valued prices (27). When the alternatives to bargaining for each person are well known to both persons, the agreement will fall between the price equivalents to alternatives to bargaining. The overt offers that appear in this range are assumed to be points of maximum current feasibility and reflect present estimates of the future net cost of non-agreement. The convergence of offers toward agreement is then hypothesized to result from mutual discounting, under uncertainty, of the future net costs of non-agreement from the minimal prices that are acceptable to the other person. It follows that if no such costs are perceived and the maximum acceptable price for the buyer is greater than the minimum acceptable price for the seller, then there will be negotiations but no convergence to agreement. In other words, if there is a range of mutually acceptable prices and price disagreement within that range, costs attached to non-agreement (including foregone income), are required for agreement.

This description of bargaining is basically the same as those cited by Cartter, who simply states that two parties will agree when

(27) The phrase "minimal offer" or "minimal valued price" refers to a minimum price for the seller, a maximum price with respect to a money scale to the buyer, e. g. that the buyer cannot be forced beyond the minimal valued offer posed by the competitor to the seller, means, that the maximum price that a buyer need pay to a given seller is set by a price offer for the same commodity by another seller.

the costs of disagreement exceed the gains to disagreement (28).

The difference between this foregoing description and those that appear in the literature on industrial relations lies in the fact that abandonment of the plan to bargain is seldom a feasible alternative. This would mean the entire work force would quit and find work elsewhere. Also, there is no attempt in this dissertation to generalize about how different negotiators go about calculating the costs of non-agreement, or what they tend to include as components of cost.

PLAN FLEXIBILITY

In proposing the TOTE unit, Miller and his colleagues cite considerable support from the presence of physiological correlates to components of the loop form (29). They postulate that the TOTE hierarchy extends down to the physiological processes that give rise to the incongruity that is sensed as hunger, thirst, cold, heat or other internal states that give rise to behavior related to what are usually called basic needs. This leads to the elementary statement that people do things because they are alive. This implies that aside from suspense in some state of indecision, there is always at least

(28) Allan M. Cartter, The Theory of Wages and Employment. Homewood, Illinois: Richard D. Irwin, Inc., 1959, Ch. 9.

(29) Miller, et al., op.cit., pp. 21-25, and Ch. 14.

one feasible plan. The presence of one or more alternatives along the plan sequence, however, coupled with the characteristic that plans take time to execute, permits plans revision. The degree to which the elements of a plan, the TOTE's, can be permuted or altered is called flexibility. As examples, plans for shopping may be indifferent in value with respect to the order in which the several business firms are visited. On the other hand, farm production plans may be very inflexible since some of the components are fixed sequences of biological activity that can extend over comparatively long periods of time, e. g. planting to harvest, a gestation period. The more flexible that a plans hierarchy is, the more alternatives are open at any given point in the sequence. One measure of flexibility that could be proposed is to count the number of alternative feasible plans at any given point. It is not unreasonable to hypothesize that the intuitive feeling for and the verbalizations concerning "freedom" are in some sense tied up with the flexibility of the plans controlling the behavior of the individual.

BELIEFS AND VALUES

By this time, the reader has recognized that the words belief and value have been defined to a degree of generality that far exceeds their ordinary usage. It would be better, perhaps, if a value were

defined as that which, when placed in juxtaposition with the status quo and organized knowledge, produces incongruity. Nevertheless for the sake of brief labels, and since the TOTE hierarchy is postulated to extend in conceptually homogeneous form from intrapersonal physiological processes to interpersonal shared plans, the two names will be retained at all levels. Incongruity is then defined as the internal state that motivates behavior and that arises from the discrepancy between corresponding elements of the belief and value systems. It follows from the preceding postulates that incongruity can be eliminated by:

1. A shift of values toward stable beliefs.
2. A shift of beliefs toward stable values.
3. A shift of beliefs and values toward some third position of congruence.

As an example, the procedure for eliciting agreement on price may be:

1. Agreement with the other party (the value that is a most feasible price moves toward the belief, the other person's overt offer).
2. Persuade the other person that agreement is possible only on your terms (his offer, a belief to you, toward your value or most feasible price).

3. Agree on some compromise that means a shift in both beliefs and values for both persons.

In using the word values in this sense it is necessary to recognize that the values associated with the shorter termed or lower order plans may be pragmatic, and conflict with those held in association with the higher order plans. This is an outgrowth of the hierarchical form of behavior. As an example, the dissatisfaction over the price one must accept for this year's apple crop does not arise from the discrepancy between beliefs and values in the TOTE unit controlling the exchange of this year's crop. Agreement was reached if the crop was sold and the control passed on to the next TOTE, e. g. unloading. The incongruity in this situation arises from the discrepancy between this price and that incorporated in the plan to produce this year's, or, next year's crop. Given the presence of others in the same state of incongruity, this could lead to the individual's selection of a plan to participate in a shared plan to bargain cooperatively for price of the next crop of apples. The conflict that appears between "what should be" and "what can be" does not define incongruity. This conflict arises from the difference in what is feasible over different time horizons and in different time periods.

The belief system is in essence the sum of organized knowledge held by the individual. It includes the knowledge of values held by

others, perceptions of "what is" and present estimates for possible future events, subject to the imperfections of uncertainty and misinformation. In general, the belief system is the data that is the basis for activity and the choice of plans when placed in contiguity with the value system. To describe the bargaining process in these terms, attention will be directed toward beliefs which include overt offers, estimates of the limits to counteroffers which will not break off negotiations, and present estimates of the future consequences of non-agreement.

An integral part of the value system is the terms for trade that are considered necessary in the longer time horizon plans for future production, distribution, and consumption. This is where the concept of homeostasis enters as a point of stability. In a very real sense, past costs of production do not enter as a constraint on the value of the terms of trade that are agreed upon. The cost constraint that is imposed arises from the actions and reactions associated with maintaining the existence of the firms or households involved, and, the maintenance of the role of the negotiator in relation to the firm or other person whom he is representing. The central point of orientation in connecting costs with the constraint on negotiated prices is that part of the value system which is represented by the standard used by the firm or household to assess goal achievement, e. g. the

profit entry in an accounting system, an optimal distribution of an annual crop such as no inter-year carry-over, or, adherence to a household budget. The data in Chapter V will suggest kinds of standards used by negotiators in agricultural markets.

PLANS SELECTION

The Learning Program postulated above bears on the alteration of both beliefs and values as a result of processing the data sensed in the on-going environment. The Plans Selection Program bears on the kind of contingency analysis of alternatives used by the persons in bargaining and is value directed, i. e. given "what is," the plan that is selected is contingent on the specification of the plan requested by the MAP. There are two important ideas that flow from the postulate of a plan-controlled hierarchical PSP.

1. The explanation of habitual behavior.
2. The postulate of behavior intended to stabilize the environment within which decision making takes place.

Habitual behavior may be defined as behavior that is repeated as a result of non-examination of the assumptions upon which the original behavior was based(30).

(30) Fred T. Schreier, Human Motivation. Glencoe, Ill. : The Free Press, 1957, pp. 84-85.

This non-examination of assumptions may be described, in the context of the model above, as the selection from the memory of a single most feasible plan without resort to some higher mental process of judgment or approximation to fit a plan to a given situation. This kind of view of habitual behavior is also found in the description of "programmed behavior" outlined by Simon (31). To use the computer analogy, this kind of behavior is completely "wired in." It may also be postulated that the routine performance of such behavior will not be interrupted as long as the perceptions of the environment stay within rather broadly specified values, e. g. buy one box of soap of brand **X** as long as the price doesn't exceed 35¢. This is the basis for the statement made above that behavior is value directed. That is, it is controlled by the detail of the specifications of the values held. There remains to be formulated the rule for the degree of detail in plans specification (32).

(31) Herbert A. Simon, "The Role of Expectations in an Adaptive or Behavioristic Model," Expectations, Uncertainty and Business Behavior (Mary Jean Bowman Ed.). New York: Social Science Research Council, 1958, p. 49.

(32) In the opinion of the author, the intervening variable that Miller and his colleagues seek to replace, has simply been displaced. By not pursuing a discussion of plans for selecting plans, they did not recognize that the "homunculus" that is the intervening variable is now in the plan selector. What they have succeeded in doing is identifying the unexplained element as that concerned with plan adaptation and innovation. This is equivalent to saying that a computer program requires a human programmer to design it, or at one step removed, a human programmer to design programs to design programs, and so on.

Nor does simulation require that a plan be fully detailed at the time it is selected. A written list of instructions that represent a plan could simply instruct the actor to defer plans selection until a specific type of information is received.

One construct for ordering the "degree of detail" in specifying which plans are to be selected is suggested in the "hierarchy of hypotheses" proposed by Meredith (33).

The explanation of survival in a surprising world is that all surprises are not fatal. Meeting a surprise, the organism finds its immediate hypothesis unfilled. This occasions a state of stress which calls forth a second hypothesis of a somewhat more general character. The organism has an appropriate behavior-pattern grounded in this second hypothesis. If this in turn fails, the surprise is greater, the stress increases, and a further line of reserves is called up, grounded in a still more general hypothesis; and so on. This is not an infinite regress. Sooner or later one or two alternative events must occur: either a valid hypothesis is found and the appropriate reserves are thrown into the battle, or the forces of the organism are strained to the breaking point and it collapses. The "hypothesis of no surprise" may thus be restated: "In the hierarchy of hypotheses a point of validity will be found." This is the condition for survival.

The conflict of interest in bargaining seldom warrants the use of battle reserves, or induces the collapse of the persons, but if the word plan is substituted for "hypothesis" and "a more general hypothesis" is a more comprehensively detailed plan, then the suggestion is, that

(33) G. Patrick Meredith, "The Surprise Function and the Epistemic Theory of Expectations," Expectations, Uncertainty, and Business Behavior, *op. cit.*, p. 75.

plans can be ranked according to some scale of importance related to the severity of the costs involved as a consequence of non-action. It is not unrealistic to expect a person to routinize decision making that normally receives attention when a different area of planning requires the forging of extensive plans or the consequences of error are costly. These notions are parallel to the implication of a cost to decision making (plans selection) associated with the idea of "satisficing behavior" advanced by Simon (34). The author also has attempted to empirically identify the effects of varying levels of decision activity (35).

Further pursuit of the structure of this portion of human behavior is more properly in the realm of psychological investigation but one important postulate that emerges is of importance to the bargaining situation. It is postulated from the structure of the PSP that routinization of behavior is incongruity reducing.

As a corollary to the proposition that routinization of decision making (plans selection) is incongruity reducing, it can be suggested that human institutions are stable social arrangements that are the result of shared plans to simplify the decision making process. The reaction to disruption, often in the form of social sanction, that

(34) Herbert A. Simon, Models of Man, op. cit.

(35) David H. Spaeth, "Relationships Between Role and Self Perceptions, Family Characteristics, Shopping Attitudes, and Food Purchase Behavior," unpublished M. S. thesis, Michigan State University, 1960, pp. 5-8.

maintains this condition of homeostasis is recognized as a factor delimiting the range of activity of the individual group member. The important point of emphasis raised by the postulates of this dissertation is that the institution is purposefully maintained. This makes it important to examine the basis for the purpose before accepting the limits imposed by the institution as given. Not only must one pay attention to the problem that forms the basis for the existence of institutions, but one must also recognize the extent of the constraints that can be exerted on various individuals. As an example, a concerted effort by businessmen in a small town to not "rock the boat" on the local wage levels, can be nullified by a social "out group." The recent decline of fair trade pricing has been implemented by the nullifying activity of non-price competition and the operation of discount houses that are largely beyond the disciplinary efforts of manufacturers who attempt to police their distribution systems. Institutions are controlled by shared plans that can change, that is, can be flexible and revisable.

SHARED PLANS

Mention has been made in a number of places in the prece text of shared plans. Bargaining by a cooperative association composed of agricultural producers is postulated to be an activity executed under

the control of a shared plan. Since shared plans involve more than one individual, the control and information processes within this shared plan involve internal inter-personal communications. Where the plan that controls the individual is being considered, this "internal" communication is largely inaccessible. Quite often, however, the internal communications in a group operating under the control of a shared plan is accessible in a number of forms. The internal communications of a few bargaining cooperatives, as recorded or written down in their published magazines, brochures, and mimeo-form messages, are cited in Chapter IV.

The point raised here is that if the concept of the plan is appropriate to shared plans, the correlates of the PSP, MAP and LP should be identifiable in the group activity and internal communications. It is suggested that the PSP is represented by the policy decision making of administrative officers, the MAP by the coordinating activities of management, and the LP by the internal information flows plus the external public relations and information-gathering activities. In other words, the concept of the plan yields a way of talking about organizations. The internal decision making processes that are postulated for the individual yield a conceptual framework for discussing the aggregation of preferences within an organization into a single unambiguous statement or action, e. g. the single price offer necessary for the exchange of property.

The political process by which conflicting interests and preferences between group members are resolved into single action are in fact a welfare function. This valuation of property is achieved by a combination of individual and shared action from two directions. First, the offer represents the selection of a single course of action or plan from a finite set, and represents the aggregation and resolution of preferences by the person, or group. Second, the system of rules under which internal conflicts within groups are resolved is the result of the shared plan that is the legal framework for resolution of such conflict. This legal framework is defined within the very large shared plan that controls the behavior of a nation, in which the plans selection is implemented by legislative action and/or executive edict and judicial interpretation.

CHAPTER III

THE PLAN TO NEGOTIATE

It is best at this point to define negotiations with respect to the words bargaining and exchange. This may be done by starting with the behavioral unit or TOTE that is the complex of actions called exchange. This behavioral unit or TOTE, "exchange property," employs stop rule criteria in its Test phase. These criteria require, in a simple statement, that if exchange has been successfully executed, the buyer will hold the commodity instead of money. Also, the seller will hold money instead of the commodity that he sold. If control has passed to this TOTE, "exchange property," and the seller has his goods or the buyer his money, the test is not met, incongruity exists, and the control passes to the Operate phase. This Operate phase consists of a series of TOTE's called the plan to exchange. They include all of the activities that must be performed to exchange property. The sequence could include packaging, grading, transport, and the numerous activities associated with marketing services. Among these TOTE's in the plan to exchange is the TOTE "bargain" in which the Test phase compares a price held as a value (that price which is included in the plan to exchange as the expected price on which this plan to exchange was selected) with a price that can actually be

accepted. The stop rule includes the condition that these prices must agree.

This comparison occurs in the Test phase of the TOTE, "bargain." If the market price agrees with expectations, there is no incongruity and the control passes to the next behavioral unit, e. g. , "unload truck," or "pick up merchandise." If the price does not agree with the value held in the Test phase, control passes to the Operate phase of the TOTE "bargain." Following the general form of stop rules, there are then three alternatives.

First, if operation of PSP reports no feasible plan to bargain (achieve price agreement), the plan to bargain is abandoned. Since price agreement is a necessary condition for exchange, the plan to exchange is also abandoned. (Agreement includes the case of agreeing to defer agreement, e. g. , the "no price" delivery, or later agreement according to a price yet to be determined by some rule that is agreed upon.)

If, however, the PSP indicates a feasible plan to bargain, it will be of two forms: either the search among alternative other persons for an agreeable price offer, or, the approach to a particular person for the purpose of eliciting at least one counteroffer. This latter form is the plan to negotiate. It is conceptualized as in the Operate phase of the TOTE "negotiate." The Test for stop rule criteria includes the



comparison of the value, "should receive counteroffer," with sensed data indicating whether or not such a counteroffer was forthcoming. One of the TOTE's in the plan to negotiate is "make offer," which is one primary subject of discussion in this chapter. The transmission by some means of an encoded offer meets the condition for Exit from the TOTE "make offer." A counteroffer is sufficient for Exit from the TOTE "negotiate." The information conveyed by the counteroffer is processed by the LP and fed to the Test phase of the TOTE "bargain." The Test is applied and if the price quoted in the counteroffer agrees with the price held as a value in the Test phase of the TOTE "bargain," at the time this test is made, the control passes to the next TOTE in the plan to exchange.

It is seen, then, that the plan to negotiate is directed at the immediate purpose of eliciting a counteroffer and is executed in a sequence designed to achieve agreement between prices. Negotiation is not the sole means for finding price agreement. One can shop around until the variation in price tags and revision in the price held as the Test value lead to agreement. It follows that a plan to negotiate involves the communicative contact between two particular people, and is indicated by at least one counteroffer.

It also follows from this definition of negotiations that the authority to exchange the property must converge on the negotiators. To

assert the contrary would mean that their verbalizations are meaningless as the actual means to reach agreement on price with the other person. The intended meaning behind the statement that a person is bargaining in "good faith" may be hypothesized to be the assertion that the plan to negotiate was in fact executed for the purpose of eliciting a counteroffer that is intended to reach price agreement. It could be suggested that negotiations be carried on for other purposes, such as deliberate delay or the impact on some third person. It is assumed in this discussion that the negotiations are in good faith, as described above.

With respect to authority, bargaining has been described as an activity involving two actual participants. In other words, it is a necessary condition for the completion of the exchange for some pair of persons to agree on a set of unambiguous terms for the exchange. This is true even if the actual agreement is deferred until after the physical commodity or the legal claim thereto has been transferred. Even the dispensing of a candy bar for coins by a vending machine requires some singular decision authorizing the design of the machine to dispense one bar for a particular set of coins.

This formation of the offer in negotiations and the matter of the location of authority are relatively uncomplicated when the person is a single individual. The reconciliation of conflicting interests in the

group that is executing the shared plan to bargain, and the delegation of the authority to a spokesman are a bit more complex. It is asserted, however, that the basic structure of bargaining and negotiations is the same whether the person is an individual or a cooperative bargaining association. The substantiation of this statement is advanced in Chapter IV.

FURTHER ASSUMPTIONS

Perhaps the most sweeping assumption to be added at this point is that the sole variable that will be allowed to change in the model of negotiations is money price. This assumption is not as restrictive as it may first appear and does not impair the simulative property of the model. Flexibility of description under this assumption is achieved by simply asserting that the price is the last aspect of the terms package that is agreed upon. In a given series of offers and counteroffers, it is assumed that if any aspects of an issue are raised other than price, the settlement of these is followed by agreement on price, even if it be no more than a re-affirmation of a previous price agreement. To illustrate, suppose that during price negotiations on the price of a strawberry crop the issue is raised about who furnishes field crates. In formally interpreting this series of price offers and counteroffers, it is assumed that the price issue is open until the field crate issue is

settled, even if the price at which strawberries are finally sold was agreed upon before the issue about field crates was raised.

By making this prior assumption that all aspects of the exchange except price are settled first, a second assumption follows that all non-price aspects of the terms for trade can be reduced to price equivalents. That is, to use the above illustration, if there is a price which can be offered on the basis of the processor furnishing the crates, then there is another price for each person that is equivalent to this price where the growers furnish their own crates.

Thirdly, it is assumed that if sufficient structure exists in the preference system of the individual or group that is the person to make the overt offer, then maximal or minimal prices exist and are potentially encodable as overt offers. This means that if the person can make an overt offer, then an offer is assumed to exist that is the worst that he will accept, or, the best that he could hope for, and still not abandon the plan to bargain.

It is postulated that the plan to negotiate (which includes the making of an overt offer) is based on present estimates of future conditions. It is corollary to this postulate that price negotiations are based on a quantity that is assumed to be fixed by the offerer. It follows then that the object of bargaining is also the determination of total revenue to be exchanged. It is an assumption of the model

that the quantity of the property is fixed, but this assumption is introduced by way of the postulate that the offerer assumes that it is fixed. This is a minor point in the formal model, but in real world negotiations it is seen that crop estimates can be of central importance and a disruptive factor where weather seriously affects yields. In the usual situation where an agricultural producer group is the price aggressor, the processor cannot be compelled to take a fixed quantity. Hence, the price that is to be agreed upon in advance of a harvest period must be based on preharvest estimates of the quantity to be moved, if a desirable distribution pattern is to be achieved. This matter will be more fully considered with the interpretation of the word supply.

OFFERS

One of the TOTE's that is postulated in the plan to negotiate is the TOTE, "make offer." It has been postulated that the overt offer is the one that is most feasible. It has been assumed that the maximal and minimal offers exist if the overt offer is made. To talk about these offers, it is convenient to fasten symbols on them as follows: (the subscript indicates the number of the offer made in the execution of this particular plan to negotiate, $i = 0$ means prior to overt offers $i = 1, . . . , n$).

- A_i The minimum price considered feasible as an offer by the buyer. It is a maximal valued offer to the buyer, with expected subjective probability of acceptance approaching zero.
- B_i The overt offer to buy, or, the most feasible offer to buy if $i = 0$.
- C_i The maximum price the buyer will pay rather than abandon the plan to negotiate. Probability of execution is 1 and the value for incongruity reduction approaches zero. This is called the minimal valued offer to the buyer.
- D_i The minimum price that the seller will accept rather than abandon the plan to negotiate. Probability of execution is 1. The potential for incongruity reduction in the TOTE "bargain" approaches zero. This is the minimal valued price to the seller.
- S_i The overt offer to sell, or, the most feasible offer if $i = 0$
- E_i The maximum price considered feasible as an offer by the seller. It is the maximal valued price to the seller with potential for incongruity reduction high. The subjective expected probability of execution by seller approaches zero.

A primed symbol indicates that the price is an estimate by the other person, e. g., C_i' is the seller's estimate of the minimal valued possible price to the buyer.

S_i and B_i are the only overt data common to both persons ($i > 0$). A_i , B_0 , C_i , D_i , S_0 , and E_i are values held in the Test phase of the PSP, TOTE that is picking which offers to make. The primed counterparts to these symbols are beliefs formed from market data furnished from the operation of the LP. B_i and S_i are held as values in the Test phase of the TOTE "bargain" to await comparison with offers by the other person. It is the function of the PSP then to select offers and it is true that:

$$A_i \leq B_i \leq C_i \text{ and } D_i \leq S_i \leq E_i$$

There are two periods that may be recognized with respect to a series of offers and counteroffers through "current" time. The first is that time period prior to the first overt offer; the second is the period after the appearance of the first offer in the market. In the pre-overt offer period the selection of the first offer, by one person or the other, is based entirely on estimates. There is no offer in the market by the other person that can serve as a point of reference. It is of prime concern to the first offerer not to make an offer that is less than that which would be most feasible, if the most feasible but as yet un verbalized offer of the other person was overt data in the market.

Once an offer appears in the market, however, the other person has three alternatives facing him, as suggested in the last chapter.

1. Accept the other person's offer.
2. Reject and make a counteroffer.
3. Reject and abandon this plan to negotiate.

These are of the form of the stop rule for the TOTE "bargain" and may now be expressed symbolically.

Exit from TOTE "bargain" if: $B_i = S_i$ or $C_i < D_i'$ or $C_i' < D_i$

These last inequalities symbolize the situation where the buyer's minimal offer (highest price he will pay) is less than the buyer's present estimate of the seller's minimal valued price (the least he will accept), or the seller's estimate of the buyer's minimal valued price is less than the seller's minimal valued price. Note that the primed terms include present estimates of future possible states. To put this stop rule into even simpler language, the plan to negotiate in good faith will be terminated when price agreement is reached or either person assumes that he cannot make an offer that will fall into the range of acceptance of the other person.

The above symbolic statements may now be combined as follows:

$$A_i \leq B_i \leq C_i \text{ and } D_i \leq S_i \leq E_i$$

and continued negotiations require that:

$$D'_i \leq A_i \leq C_i \text{ and } D_i \leq E_i \leq C'_i$$

and price agreement via negotiations requires:

$$B_i = S_i.$$

From these statements, the following two can be made:

$$D_i \leq B_i \leq S_i \leq C_i \text{ and } D'_i \leq B_i \leq S_i \leq C'_i$$

This is saying that the range for price agreement by negotiation falls between the prices that represent the limits within which the plan to negotiate will not be abandoned for lack of a feasible offer, and within the mutual estimates of these limits.

This is not an ambiguous statement. It implies that the limits to the range of price agreement by negotiation can assume four configurations:

$$D'_i \leq C'_i, D'_i \leq C_i, D_i \leq C'_i, \text{ and } D_i \leq C_i.$$

The limit that is operational is the inner pair in the sentence:

$D_i \leq D'_i \leq B_i \leq S_i \leq C'_i \leq C_i$, where $D_i \leq S_i$, and $B_i \leq C_i$ recognizing that:

$$D_i \leq D'_i \leq A_i \text{ and } E_i \leq C'_i \leq C_i.$$

The limiting relation $D'_i \leq C'_i$ represents the range of agreement in the situation where each person is underestimating the minimal

acceptable offer of the other. That is, the seller is basing his offers on the error $C_i' < C_i$, and the buyer is making the error $D_i < D_i'$.

Where $D_i' = C_i'$, each party is approaching the market with estimates such that the best offer that each assumes that he can make is the best offer that the other person assumes that he can make; since:

If $D_i' \leq A_i$ and $E_i \leq C_i'$, and $D_i' = C_i'$, then $A_i = E_i$, but if $D_i' \leq C_i$ and $D_i \leq C_i'$, then $D_i' = D_i = B_i = S_i = C_i = C_i'$ and this coincides with the last configuration of limits above ($D_i \leq C_i$). This also precludes negotiation because any offer that is made by one person is immediately acceptable to the other, meeting the stop rule criteria for the TOTE "bargain," and the plan to negotiate is not executed.

Suppose that the error is made by both parties in the opposite direction, that is, $C_i' > C_i$ and $D_i > D_i'$. The seller assumes that the buyer will pay more than he in fact will, and the buyer assumes that the seller will sell at a lower price than he in fact will. The offers will fail in the range $D_i' < C_i'$, but the acceptances will fail in the range $D_i < C_i$ and the range of agreement is the latter. What will tend to happen is that repeated offers and counteroffers will lead to the convergence of C_i with C_i' and D_i with D_i' at points depending on whether the shift is in the values C_i and D_i or the beliefs C_i' and D_i' or both, under the impact of the LP. This is the assertion that persons learn from the on-going negotiations. Learning implies either deliberate or

unintended teaching. If the teaching is in fact deliberate, then one has the strategies of persuasion that mark real world negotiations.

In the other two symbolic representations of the configuration of limits where only one person is making an error, and the offers are made under conditions where $D_i < D_i' \leq C_i$ or $D_i \leq C_i' < C_i$, any offer by an offer-maker is within the range of agreement. However, the error-maker is denied the possibility of agreement in the more valuable part of the range $(C_i - D_i)$ if he persists in the error. If it is assumed that the activity of negotiations is costless, then the greater potential loss of revenues lies in $D_i < D_i'$ and $C_i' < C_i$. This is true, since, if these inequalities are reversed in the situation where one or both of the persons are making errors, it is the actual range of acceptance based on the most feasible plans alternative to negotiation (C_i and D_i) that is controlling. No portion of the range of actual potential agreement will be excluded as a range of possible offers. This means that the "safe" way to approach negotiations under uncertainty is to make estimates such that $D_i > D_i'$ and $C_i' > C_i$ are virtually assured. This means, assume the other person is not making the best offer that he can. This is a reasonable simulation of the cautious bargainer. The extremely wide differences of initial and final bids are also characteristic of unorganized markets where successive trading on the same merchandise is not present to yield close initial estimates of value. It also

follows that increased information about the nature of the other person's limits of feasibility, held by both persons, tends to reduce the difference between the initial offers. This is true, first, because the conservative strategy of making wide allowances on initial bids is not necessary. Second, the range of prices which forms the limits of actual acceptance narrows as the expected probability of agreement (one of the two factors in feasibility) centers on fewer price offers. The hypothesis that the range of initial bids is reduced by increased mutual information has been empirically demonstrated under controlled conditions by Siegel and Fouraker (36). These experiments will be cited in more detail later in the text.

As a summary statement, it can be said that the limits to the range of prices that can be agreed upon by both persons in negotiation is set by the prices beyond which either person will consider it more feasible to seek agreement with another person, in another way, or abandon this plan to exchange. The range can be further limited if either party makes an error in estimating the limits of feasibility in the other person's plans to negotiate.

The question can be raised as to why it is implied above that $D_i' < A_i$ and $E_i' < C_i'$, or, why the range of estimates of the limits to

(36) Sidney Siegel and Lawrence E. Fouraker, Bargaining and Group Decision-Making. New York: McGraw-Hill Book Co., 1960.

feasible offers sets outer limits to the prices that are considered the best with regard to incongruity reduction in the over-all plan to produce, but of zero probability of execution. To put this another way, is it not likely that an offer will be made, at least in the early stages of negotiation, that the offerer considers to be unrealistically to his advantage? This point can be sidestepped formally but leads to unobservables when the real world is examined. It can be assumed that any offer that falls outside of the range of mutual estimates of the other person's alternatives to negotiation is not an offer made at the level of the plan to bargain. It can be conceptually identified as a sub-plan that is the operation phase of a TOTE in the plan to negotiate that is not immediately directed at reaching price agreement but at manipulating the environment for subsequent offers. It can be a "softening up" tactic. It can be a high offer that allows the offerer to yield without conveying weakness or it may be intended to avoid triggering charges that he is "not bargaining in good faith." This is a common charge where one side or the other refuses to yield at all. Chapter V will be more concerned with hunting real world counterparts for the substantives in the mode, but an example is cited here of the problem of differentiating between offers to seek immediate agreement and those designed primarily to "teach" or shift the values of the other person. In the milk industry in the Detroit area, there is nearly always

an argument over the impact of Chicago and Toledo milk prices on the Detroit price. The Chicago milkshed in particular is the chief alternative source of milk that is available to Detroit dealers. There are laws on the books that would impose a considerable burden on the inspection system, but presumably there is a Michigan price at which dealers would turn to Chicago for their milk rather than use Michigan milk. This is a referent for the price C_i in the model. Suppose that Michigan Milk Producers Association is the seller, then their estimate of the price at which alternative supplies of milk are available to the Detroit dealers is C_i' . By definition under the model, any price offer by MMPA above C_i' is presumably not aimed at immediate agreement, but possibly made to allow room to yield. This may be true but need not be true. C_i is a dealer held value based on his estimates of the consequences of nonagreement. This estimate includes the knowledge of plans to wage economic warfare above a certain price demand by MMPA. C_i' is an estimate made by MMPA of the dealer's bargaining position. Neither C_i nor C_i' are observables. There can be an honest difference of opinion between the two persons for at least three reasons. First, the bases for computation of the price at which alternative milk may be purchased by the dealer may differ. Neither side is going to publish its precise plans for economic conflict, which may include some pressures that can be exerted on

sellers of milk in Chicago or other areas of potential supply. The second difference of opinion about the price of alternative supplies would arise from differences in the estimates of the impact of the length of any potential conflict on the prices at the alternative source. The purchase of a few days' milk from alternative sources would have different impact than attempting to supply Detroit from an alternative area for six months (37). Also, estimates of the length of time of economic conflict may differ.

The point to be made with regard to the formal model is that since offers made at the level in the TOTE hierarchy which are intended to elicit acceptance with some probability, are indistinguishable from those that are designed primarily to manipulate the context of negotiations, it is assumed that all offers are made in good faith. That is, all offers are within the range of prices bounded by the estimates of the other person's minimal valued prices. Since actual agreement can be achieved only within the limits of the actual minimal offers, it is these prices (C_i and D_i) that bound the range of agreement.

TIME, CONSEQUENCES, AND GAMES

The previous description of the bounds to the range of mutually acceptable prices has tended to intermingle the concepts of "current"

(37) Michigan Milk Messenger, Michigan Milk Producers Association, January 1960.

time, and segmented time that is used in forming plans. This intermingling occurs because both are involved in the Test phase of TOTE units at all levels. It has been stated as a basic premise that people are compelled by the force of incongruity to select specific courses of action in the face of uncertainty. It is on the basis of this premise that the two aspects of time can be kept separate. It is true by postulate that the value held in the Test phase is in large part stipulated by the expectations of higher level plans or TOTE's. As an example, the value held in the plan to bargain at any particular time is dictated by the currently executed plan to exchange. It is equally true that the belief system is based on expectations which involve future time, as interpreted on the framework of inference from sequence of past events. "Current" time is not involved here, but is identified in the Test phase of the TOTE units in the MAP. Current time is the kind of time that is involved in that part of the behavioral program or plans hierarchy that controls sequence per se. Decisions are based on point by point estimates that form the value and belief systems.

It has been postulated that both beliefs and values are based on expectations that form plans and are derived from plans. Value of plans has been defined as the product of the subjective estimate of the probability of a plan being executed as specified at the time of selection times some net utility or expected incongruity reduction. Only three

values are considered in this discussion. These are the zero values at which either the probability of execution or the net expected incongruity reduction approaches zero, and the maximum value that is assumed to be assigned to manifest behavior. Nevertheless, there is an underlying discrete function that assigns values to plans although these values are not observable, nor is a cardinal scale of value or feasibility assumed.

Gathering together the notion of plans value, plans selection from finite sets of plans, two-person negotiation, and a bounded range for price agreement times an assumed fixed quantity, it is possible to interpret the process of negotiation as a zero-sum two person game. The value of the game is the total revenue involved in the difference between the alternatives to negotiation or, $(C_i - D_i)$ times the quantity of property. A table of pay-off values is held by each player. The entries are the plan values and estimates included in the contingency analysis of each player. In the very simplest form, the events that ensue in negotiation can be described as a mutual filling in of a joint pay-off function, each party specifying a transform of total revenue until they agree on a common value. Conceptually, the pay-off function would be represented by columns and rows, the number of each being the number of alternative plans known to each player. Each entry in a row or column would be a value of total revenue that one would expect

as possible agreement if a given plan of action was chosen. The only valid point would be the maximum pay-off to the seller or the minimum pay-off to the buyer representing overt offers since neither party would reasonably offer more than necessary. Using this framework for interpretation, the bargaining can be described as a sequence of plays in which the players approached a saddle point by making successively less valuable moves. The point of agreement could then be accurately called the saddle point in a two person zero-sum game, but the saddle point was determined by mutual exploration of the pay-off function. The columns and rows represent plans to negotiate; the matrix represents the plan to bargain. The perfect knowledge situation, where the pay-off matrix was fully known by both parties, would represent the situation where $C_i' = B_i = S_i = D_i'$ and the persons would proceed directly to the saddle point.

The plan to bargain under uncertainty and imperfect knowledge would be represented by a list of instructions as to how to make each play at each point in current time. The plans or plays selected would embody forward segmented time.

THE PRESSURES TOWARD AGREEMENT

In light of the preceding discussion, there arises the question of why agreement is reached if the prices representing the limits to the

range of possible agreement do not coincide. First, the assertion is made, on the assumption that more is preferred to less, that each person will try to reach agreement at a price most favorable to himself. This means that there will be pressure for B_i to remain in the neighborhood of D_i' and for S_i to remain in the neighborhood of C_i' . It has been assumed that $A_i \geq D_i'$ and $E_i \leq C_i'$; therefore, it may be expected that convergence to agreement will proceed to $B_n = S_n$ from $B_0 = A_0 = D_0'$, and $S_0 = E_0 = C_0'$, in n offers. Once bona fide offers appear in the market, the mutual set of offers $B_1 < S_1$ replaces the bounds C_i and D_i as the limit to the range of feasible counteroffers. It is now postulated that the maximum feasible counteroffer will appear as $B_i < B_{i+1} \leq S_i$ or $B_i \leq S_{i+1} < S_i$ if there is a net cost to delaying agreement. It follows that if no future cost to delay of agreement is estimated at successive points through "current" time at which the counteroffers are picked (plans to offer), and if $B_i < S_i$, then there will be no agreement. To state this another way, the pressure to reach agreement on a single price in the range of possible agreement arises from present estimates of future expected costs of nonagreement or delay for an estimated period of time. In regard to the formal model, then, successive offers in negotiation will represent points of maximum feasible prices that involve discounting from mutual estimates of the other person's minimal valued prices. Since the point of choice is

always current time, the convergence of offers reflects a re-evaluation of future consequences as each offer appears in the market. This is the assertion that each person learns from the on-going negotiation. Since the on-going information is interpreted on the basis of past experiences, the course of negotiations is determined by successive present estimates of future consequences based on past experience (supra, p. 34).

FORMAL RULES FOR REACHING AGREEMENT

Any generalization about the changes in price offers through time is in effect a rule for indicating the procedure for predicting agreement. This particular point has been considered in a study that attempted to examine the nature of bargaining in a controlled environment. Siegel and Fouraker set up experimental bargaining sessions using graduate students as subjects. The value of offers was indicated by profit tables that were derived from linear average revenue curves and assumed cost schedules. The experiments were designed to explore hypotheses about joint selection of quantity, maximization of joint gains under conflict of interest in bilateral monopoly situations, and the division of this gain between the opposing parties (38). They comment on the approach to agreement between the opposing parties as follows:

(38) S. Siegel and L. E. Fouraker, op. cit., p. 90.

The typical pattern of bargaining that emerged was as follows:

1. The subject would open negotiations at a high level, usually his highest level of expectancy.
2. The failure experiences represented by his rival's early bids (which, being at the rival's high level of expectancy, typically involved a negative pay-off to the subject) made it apparent that concessions would have to be made before agreement could be reached.

As negotiations progressed, in the absence of information (of the other's profit table), the succession of bids served to (1) give experience to the subject enabling him to establish the realistic level of aspiration, and, (2) enable the subject to find means by which concessions could be made to the opponent without making offers below the aspiration level. Aspiration levels were modified as negotiations proceeded, although it appears reasonable to suppose that the subjects began bargaining with an a priori minimum level of expectancy (39).

Under the experimental conditions, the costs that fostered the pressure toward agreement were a time limit imposed by the experimenters, which presumably implied that the payment for participation in the experiment would be forfeited if the instructions were not followed. The subjects had the alternative at the beginning of the experiment of choosing a flat rate wage in alternative employment, the offer of which was used to attract the volunteers. The bargainers were paid the amounts of money equivalent to the terms at which they agreed in the bargaining sessions.

The outlines of the model of bargaining are evident in the Siegel

(39) Siegel and Fouraker, op. cit., p. 90.

and Fouraker analysis. The reference to the "failure experiences" and implied learning about "realistic levels" of aspirations indicate that the experimenters were interpreting their data largely on a stimulus-response framework. It is possible, however, to translate this into an interpretation that is based on the cybernetic hypothesis, that is, a TOTE-based theory.

The statement that the bids opened at the "highest level of expectancy," can be represented symbolically by $A_1 = B_1 = D_1'$, and $S_1 = E_1 = C_1'$. The statement that the succession of bids gave experience to the subject enabling him to establish the realistic level of aspiration (in the absence of mutual knowledge of profit tables) is the assertion made above that as negotiations progress there is a tendency for C_i' to approach C_i , and D_i' to approach D_i , and for the prices A_i and E_i to be constrained by these estimates. Symbolically $D_i \leq D_i' = A_i < E_i = C_i' \leq C_i$. Here the "inner" range of prices for agreement is constrained by the estimates. The alternatives to negotiation at prices C_i and D_i could be presumed to exist at the level of zero profits under the conditions of the experiment, since, although negative profits were indicated, they would not in fact have been enforceable. Under these conditions, adamancy at some positive profit level would be expected that would be predicated on the prediction that the same attitude would be held by the opponent. This adamancy has

the effect of establishing C_i and D_i at positive profit levels, and as points which are sought by the mutual probing of limits to agreement by counteroffer.

In the Siegel and Fouraker statement there is also reference to "means by which concessions could be made to the opponent without making offers below the aspirational levels." This statement would imply that at the point of agreement, each person would assume that he had attained the best possible price. This is at variance with the verbalization that, "I could have driven a hard bargain, but I decided not to." Simulation requires that this latter phenomenon be accounted for.

The implication in this statement is that the range from which the price offer is selected, is smaller than the range within which the offerer feels that he could actually achieve agreement. This is postulated to be a reflection of estimated costs of non-agreement and that it can be symbolized as $D_i' < A_i \leq C_i$ and $D_i \leq E_i < C_i'$. It is asserted then that the gap represented by $(A_i - D_i')$ and $(C_i' - E_i)$ reflects the present discounting from estimates of the opponent's point at which he will resort to alternatives to negotiation. The estimates C_i' and D_i' are data reported about C_i and D_i by the LP. A_i and E_i are values held in the PSP-TOTE "select offer," that are formed from present estimates of the future costs of non-agreement.

Within this range ($E_i - A_i$) the further discounting that leads to offers such that $A_i < B_i$ and $S_i < E_i$, represents offers at levels less than those indicated by maximum aspirations. It is then appropriate to postulate that the discounting ($A_i - D_i'$) and ($C_i' - E_i$) arises from present estimates of those costs that the opponent is able to impose. It is further postulated that the discounting ($B_i - A_i$) and ($E_i - S_i$) is due to the personal preference of the individual negotiator to not press for prices at present levels of maximum aspiration.

To summarize these statements it can be stated that the convergence, through time, of the overt offers toward agreement is a function of:

1. The alternatives to negotiation open to each person.
2. The mutual estimates of these alternatives for the other person.
3. The perception of the costs that can be imposed by the other person as a consequence of non-agreement.
4. The disutility to the negotiator of the acts or tactics necessary to achieve agreement at his maximum level of aspirations.
5. In turn, each of these factors yields a set of plans from which one and only one must be selected. These plans involve present estimates for future states, hence the fifth factor is time in its static segmented sense.

This list of variables is neither new nor uniquely associated with one researcher. They have been cited in one form or another by Fellner, with respect to the oligopoly problem, and Cartter and Pen, in the industrial relations area (40). This is not surprising because the model proposes to simulate the overt behavior that is the basis for the theories of those authors and others. Citing the two aspects of time and the revisability of estimates of costs is not original with the model; this is cited by Cartter as a factor leading to agreement in wage negotiations (41). The worth of the model then must be identified with statements beyond these, statements that are both general, and those which are also directed toward specific application to agricultural markets. A central purpose of this dissertation is to build a model that yields a way of discussing bargaining and negotiated pricing in an orderly way. It has been indicated that considerable emphasis will be placed on the semantics of the substantives in the model. It is in this area that the value of the model will be asserted.

The balance of this chapter will be concerned with a definition of bargaining power and the explanation of the impact of costs on prices that are determined by negotiation. Before proceeding to this, however

(40) Allan M. Cartter, op. cit., p. 124, William Fellner, op. cit., p. 25, and J. Pen, "A General Theory of Bargaining," American Economic Review, Vol. 42, March, 1952, as cited by Cartter, op. cit., p. 123.

(41) Allen M. Cartter, op. cit., pp. 119-120.

a summary is in order and a brief digression on the peripheral matter of explaining the "eleventh" hour agreement.

Assembling the previous statements in the model it can be stated that:

1. By definition $A_i \leq B_i$ and $S_i \leq E_i$, hence, if at some point $A_n = E_n$, then $B_n = S_n$ at some point in time up to and including n . It is a hypothesis that the perception of heavier estimated future costs to non-agreement and increasing dis-utility for tactics necessary to achieve aspired prices, shortens negotiations.

2. If $C_i = D_i$ but $D_i \neq D_i'$ and $C_i \neq C_i'$ then any bargaining is contingent on the existence of these errors. Increased information by each person about the alternatives open to the other tends to shorten the time period for negotiations.

3. No agreement will be reached by negotiations if, for all offers i , $C_i < D_i$, since by definition of C_i and D_i , alternatives to negotiation would be more feasible. This, in turn, implies that if negotiations are considered feasible, then $D_i' \leq C_i$ and $D_i \leq C_i'$.

4. It is tautological, if the model is considered as a deductive system, that the negotiator which faces the least perceived costs to non-agreement will be able to conclude agreement closer to his maximum aspirations. It does not follow, necessarily, that these maximum aspirations are related to specific profit levels. It was a

major conclusion drawn by Siegel and Fouraker that an "unreasonable" negotiator by conveying the impression that he was irrationally" adamant could impose costs on the other person such that the "unreasonable" or unduly adamant negotiator could force agreement on his terms (42). This could occur even if the other person perceived the unreasonable negotiator's position to be basically weak. To put this another way, it is possible for a person to agree to terms less desirable than his position would indicate, simply because he is unwilling to sustain far less cost than he is in a position to inflict. This is symbolized in the model by heavy discounting due to dis-utility of tactics to achieve maximum aspirations (A_i or E_i) but light discounting due to estimates of the retaliatory power of one's opponent.

Ignoring for the moment that it may not be desirable for either person to push his opponent to his minimal valued price in negotiations, it can be hypothesized that the buyer will attempt to reach agreement at D_i' and the seller at C_i' . It has been postulated that these goals may not be reached due to the discounting to A_i and E_i . This can lead to the explanation of the phenomena in which a decision is not reached until the very last minute before the threat of economic conflict. The reasoning is that until economic conflict before the next counteroffer

(42) Siegel and Fouraker, op. cit.

is a very real possibility, the costs of actual economic conflict do not become an effective constraint on present decision. To put this in the language of the model, the full effect of the costs of economic conflict is not reflected in the value of the plan to engage in economic conflict (that is its feasibility), until the probability factor approaches 1. To illustrate, a milk dealer does not have to face up to the costs of obtaining alternative supplies up to the point where his refusal to agree means that he will have to actually pay these costs. This would be in the face of a milk strike or the point after which he cannot implement delivery of the alternative supplies. This suggests another hypothesis. As information about the other person's alternative increases for each person, and the interval $(C_i - D_i)$ becomes increasingly apparent prior to the onset of negotiations, the actual negotiations will tend to occur during a shorter time period and more closely to contract deadlines, or expiration dates. Protracted negotiations would then be symptomatic of the desire on the part of the negotiators for more information by the probing action of negotiations, the absence of immediate costs as a consequence of non-agreement, or a long list of issues that must be sequentially settled before the final issue, price, can be negotiated.

BARGAINING POWER

The area for negotiations as indicated in the model is defined by the interval $(C_i - D_i)$, that is, the difference between the prices that

represent the minimal value offers beyond which it is more feasible to abandon the plan to negotiate. A completely powerful seller then could secure agreement at C_i . The completely powerful buyer could secure agreement at D_i . This implies three separate propositions under the above model. First, the completely powerful person would have accurate knowledge of the opponent's alternatives and the prices that represent them. Second, the powerful person cannot be subjected to costs to non-agreement imposed by the other person or nature. Third, the powerful person would attach neither positive nor negative utility or preference for engaging in the tactics for securing agreement on his own terms.

Granting this, bargaining power can then be defined for the buyer as: $(C_n - B_n) / (C_n - D_n)$ and for the seller as $(S_n - D_n) / (C_n - D_n)$, where agreement was reached in the n th point in current time. This defines bargaining power as a measure of relative strength as measured uniquely between two particular persons. Bargaining power is measured as a function, ex post, of the next most feasible alternative to negotiation. This can be to negotiate with another person, abandon the plan to seek price agreement (bargaining) or abandonment of the plan to exchange altogether.

As a further point, the definition implies that if, at a given price verbalized as "the market price," both persons perceive equally

valuable alternatives to negotiation, then neither has bargaining power. This can be symbolized as $C_i' = D_i'$ and no negotiation will ensue since the first offer will lead to immediate price agreement, and the plan to negotiate will not be executed. This symbolizes the situation where both persons approach an organized market as price-takers and the alternative for each is the offer of the other person's competitor. The recognition of this dependence of market power on the lack of the presence of nearly equally valuable alternatives to particular negotiations aligns the meaning of "competition" as the word is used by businessmen with the meaning of the word as used by economists. The word in both cases refers to the fact that neither party to a prospective exchange can affect the price by entering or leaving the market. This is true because to each party there exists a nearly equally valuable alternative to attempting to elicit a counteroffer from any particular other person. The leap from here, however, to the statement in market structure analysis that atomistic numbers of buyers facing atomistic numbers of sellers leads to conditions approaching perfect competition, requires a second hypothesis about the relationship between numbers of offerers and the independence of alternative offers. Under the postulates of the model of this dissertation, the absence of market power requires that only one other potentially more feasible independent alternative exist. As an example, Ford can conduct itself in such a fashion as to

deprive Chevrolet of bargaining power over individual consumers by matching any offer that Chevrolet may make, on the individual consumer's scale of preference. This is not intended to refute the connection between the perfect competition idealization and atomistic numbers of firms. It is simply asserted that the second hypothesis is necessary to make a hypothesis about this connection.

The relationship between bargaining power and the feasible alternatives to negotiations become even more plain in the agricultural market. It is entirely possible, if not typical, that the alternative to negotiations is accepting any price offered by sellers of farm inputs and buyers of a farm output. If this leads to insufficient revenues to maintain the farm as a producing unit, then at some planning level the alternative to negotiation is to quit farming. It follows from this that where returns to labor, management, and capital accrue jointly to the same person, as it does to many farmers, he can be forced to accept a price as an alternative to negotiation down to that price that will lead him to quit farming. Further, the cost of home-grown and consumed products and services will be included as income in the rational calculations of the farmer. This situation could reasonably be expected to arise in an area of adaptability to a single crop and to involve farmers with insufficient non-farm skills to earn respectable wages in urban employment. The processor who is the

proprietor of specialized facilities in a general crop area, especially if he is not a young man, can find himself in the same powerless position (43).

THE SEMANTICS OF SUPPLY AND DEMAND

It has been stated above that past costs of production are not a primary constraint on the range of prices that are potential points for agreement in negotiations. This is a complex statement and the exploration of its ramifications leads to considerations of the interpretation of cost in the dynamic context and to the consideration of the semantics of such terms as supply, demand, and marginal cost that occur in static price theory.

From the model of this dissertation, it is seen that production plans are chosen at a point in current time, and that this is a process in which a given course of action is selected from a finite set of alternative plans. It would seem intuitively that there should be some common ground between the process of making the decision to produce the extra unit up to the point where the last unit just pays for itself, and the decision process of the TOTE model. Identification of this

(43) This is a statement that is also derived from the "fixed asset theory" associated with Prof. Glenn L. Johnson in the current literature of agricultural economics. The statement as advanced by that theory would say that a given source of human services will be retained as long as the MVP of these services in their current use is greater than their salvage value, or in the case of human labor, the next most remunerative employment open to the individual. See Glenn L. Johnson, "The State of Agricultural Supply Analysis," Journal of Farm Economics, XLII, May 1960.

relationship is important since it furnishes a bridge between the dynamic model and the static theory of price determination.

Of course, the other general relationship that indicates the determination of price in the static theory is the marginal revenue function which is a mathematical transform of the demand or average revenue function.

The approach is made to exploring the concept of costs by suggesting several meanings for the words supply and demand.

The word supply can have several distinct interpretations. The distinction as it is currently made in economic theory is generally called "length of run." First, it has been assumed in the bargaining model that at the time a price is being negotiated the quantity is fixed. This may be represented in the conventional price-quantity plane by a supply curve of infinite slope (vertical), and the negotiations are presumed to lead toward the selection of a point on that vertical line. The bargaining model assumes a fixed quantity of the property being exchanged.

A second referent for the word supply would be a schedule of quantities of defined property that will arrive at some point in relationship to the market in response to a given price in the market. This is a supply response curve. It is in effect the summation of, or aggregation of, plans and the length of the planning horizon must be specified.

A third sense is similar to the first but is an aggregate of the quantity that flows into specific categories of disappearance during a given time period. An example of this would be all apples that were not left in the orchard or farm-located storage during the period September 1 to March 31. This requires the specification of the commodity, the specification of the categories of disappearance, and the time period.

Analogous meanings for the word demand may also be found. First, there is the quantity that is being demanded under the fixed quantity assumption of the bargaining model. Second, there is the aggregation of plans to remove varying quantities of a specified commodity from the market at various expected prices, over a given time period. Third, there is the flow of goods into specified categories of disappearance during a given time period.

The words supply and demand each taken in their first interpretation coincide along a vertical supply or demand function that indicates the fixed quantity being negotiated and the range of feasible prices at which exchange of price will be consummated.

Using the second meaning of each word, the resultant graphic representation would be the usual sloping supply and demand curves that intersect at a point at which the expectations of sellers agree with the expectations of buyers. This determines price in a theoretical

system where all expectations are assumed to be met. It is a stable equilibrium if lower prices induce some people to plan to buy more of the property and other people to produce less, and if higher prices induce some people to plan to buy less and other people to plan to produce more. A world in which expectations are met is the stationary state defined by the assumptions of static analysis. The concept of the stable equilibrium requires the additional postulates about plans that define the supply demand equilibrium as a point of homeostasis. The stationary state defines the point at which expectations will be met for both demanders and suppliers. It says nothing about how the point is reached from some other price.

The third interpretation that can be given the words supply and demand is indicated on the conventional graph by a point. This point indicates the aggregate of the de facto transfers of property that have taken place in the market between a specified group of persons or exchangers. Economic analysts look at these points and try to estimate the nature of the plans underlying the second interpretation of supply and demand discussed above. This implies that the inference of supply and demand relations from sales data requires assumptions that the plans underlying buying and selling are relatively stable, the homeostatic reactions are operative, and the recurrent aspects of the planning leads to an accuracy of expectations that approaches the level assumed in the stationary state.

These interpretations of the words supply and demand are not incompatible, but some people use one more than another. They can be sorted out by looking at them in relationship to the different aspects of time that they involve. The supply response curve and its plan-based counterpart that aggregates plans to buy are essentially estimates. That is, they represent aggregates of quantities that would be planned for exchange during a given chronological time period for each given expected price which exists during some prior time period. Or conversely, the implication is that for each quantity there is a price such that if it is expected during some future period, this quantity will be either supplied or demanded. Recognizing that marginal cost reflects the decision to plan to engage in production up to the point of zero marginal net revenue, these response curves are the referents for the supply and demand functions used by economists. They are formal static constructs under the assumptions which align them with the stationary state.

The points or supply demand intersections that are the data in empirical price analysis, in effect, aggregate total revenues that are transferred from buyer to seller for the sum of quantities of specified property in specified transactions. In the stationary state where planning is done with complete accuracy of expectations, this is the supply demand intersection where the sum of quantities at a given price

agree exactly. In the "real world" this point reflects agreement of plans; but, in the absence of the assumptions made in statis analysis, there is no procedure for establishing the other points that are presumed to exist on the supply and demand curves. The time involved in this interpretation is current time. The point reflects the sum of money transfers made at discrete points on a chronological time scale and within a given time period.

The first interpretation of the words supply and demand, that implied by the model of this dissertation, draws the other two interpretations together. Relying on the assumption that the price is the last issue to be settled in a bargained transaction, it may be asserted that the quantity is fixed and negotiation establishes a point on what may be visualized as a vertical supply function. Over a time period one may add up quantities sold in whatever categories of transactions that the researcher may deem appropriate. The revenues may be aggregated and divided by the quantity. This yields a point on the conventional price-quantity graph representing average revenue, associated with some composite "batch" of property. With respect to the bargaining model, this point may be interpreted as a supply-demand intersection on a vertical supply function. The composite of quantities that was defined to establish this point, however, is not composed of homogeneous product but is in fact a pattern of distribution.

To illustrate, the point that represents the total revenues accruing to farmers for all processing apples in Michigan in the fall of 1961, represents, in one figure, all grades of apples. It is possible to proceed from this to the statement that the word supply can refer to a fixed quantity with a specified distribution pattern. It is then possible to reconstruct a demand curve of the plan-based type by asserting that such a function is the locus of all points of average revenues presently estimated to accrue at future alternative levels of quantity appearing in specified categories of the property. If the quantity includes all storage stocks and the revenue includes imputed value, then the "demand" is represented by a point on a single fixed supply schedule. This view is not restricted to agriculture since a production period can be defined and all product of positive value used as a basis for calculating revenues. It is characteristic of agriculture that "a crop" is defined as a fixed quantity if inter-year carry over is included as supply. It is hypothesized at this point, and demonstrated in a later chapter, that the point of supply-demand equilibrium is a point of homeostasis in which the reaction is based on deviations from an optimal distribution pattern, e. g., maximum revenue consistent with X bushels in storage. It is asserted that this is the referent of the word supply to the business person. This is the elementary statement that sellers tend to view supplies of product in

terms of "finding a home" for a planned output that will yield revenues according to some planned criterion that is set up to measure the degree to which the goals of the firm are achieved. This is usually considered to be profits as defined by the accounting system of the firm. It is also suggested that the usual diagram used by economists showing a positively sloped supply curve and an intersecting negatively sloped demand curve is a graphic representation of the expectations of sellers superimposed on the graphic representation of the expectations of buyers, each based on estimated revenues accruing to alternative discrete quantities. There is no reason to infer that the intersection is a stable equilibrium unless an unequal quantity that is planned for exchange at a given price leads to appearance of goods in an undesirable distribution pattern and this in turn leads to reaction to restore the equilibrium. To the extent that the reaction modifies the values held about optimal distribution patterns the equilibrating process can shift the point of equilibrium. This is asserting that supply and demand functions are inter-dependent. It is further recognized that advertising expenditures are quite often functions of expected undesirable distribution patterns.

These statements are of considerable import to those who attempt to estimate the plans to buy by assembling data based on past buying. To the extent that demand is affected by attempts to maintain a particular distribution pattern of fixed supplies, the persisting

impacts of the reaction to maldistribution must be recognized. An example of this is the recognition in estimating the future demand for Michigan cherries of the present purchase of cherries by the Great Lakes producers for the development of European markets. The purchase was motivated in large part by excessive storage stocks of frozen cherries. The increase of demand creation activities by producer groups, if effective, would indicate the use of shorter time series in statistical estimates and increased attention to estimation of demand by category of final product. To put this another way, where the record of past transactions is used as data to estimate future demand, some procedure should be used that recognizes the demand creation activities that are associated with the appearance of certain undesirable categories of supplies. For a commodity such as apples, the necessary data does not currently exist in a form that can be assembled by a public agency, a single firm, or a private agency. The question of who should gather such data and by whom he should be hired, given the value conditions, will be considered in a later chapter.

COSTS

It was stated in the previous section that marginal costs in the dynamic model could be represented by the quantity associated with present estimated future costs. In other words, the marginal cost

curve was a supply response curve in the dynamic context. It has also been stated above that past costs are not a primary constraint on the range of negotiated price agreement. These statements may be drawn together in a form that demonstrates the function of price as a vehicle for allocation of scarce means among competing ends.

One of the difficulties of handling costs in economic analysis is the problem of measuring them. The businessman might snort at this a bit and drag out the bills. It is true that out-of-pocket costs are relatively easy to record. There are certain categories of costs, however, that require the rather arbitrary procedure of imputation to indicate them on a ledger. It is not wide of the mark to assert that the costs to a firm are defined by the particular accounting system used. For the purposes here, however, it is not necessary to become so rigid. The assertion can be made that there is for each firm, an order in which the inputs will be withdrawn in the event of non-payment. Out-of-pocket costs are associated with those inputs that will be the first to be withdrawn, e. g. labor, utility services, raw materials, etc. Some others will not be withdrawn so quickly, such as management services, or credit services. Still further, non-payment to funds for replacement of deteriorating buildings or the abandonment of payments for basic research or product development and advertising will be the last such that withdrawal will cause

cessation of production. The ordering is unique for each firm. For some, the withdrawal of payment to advertising would cause trouble in very short time.

If it is recognized that expectations are not always met and a firm does not always get what it anticipated for its product, it can be stated generally that total revenue is not determined until after the price has been agreed upon. It follows that the exact composition of costs is contingent on the de facto distribution of revenues following the sale of the product or commodity. To put it more briefly, costs are not determined until after the conclusion of exchange. It follows, in turn, from this that in an on-going dynamic context the impact of costs on price is exercised through the reaction of input levels to the distribution of revenues from past transactions. These levels affect volume of production and present supplies, which are the result of plans chosen at some previous point in time on the basis of price estimates made at the time the plans were selected. Once the supplies have arrived on the market, past costs are not a constraint on the range of the prices negotiated after their arrival. These are rather elementary statements but a good many of the assertions that farmers are more or less at the mercy of the market arise from the situation to which these statements refer. Farmers are not the only entrepreneurs who are in this position. It is, however, characteristic of

agricultural production that plans are inflexible over long periods of time, the capital assets are useable for the large part in specialized production, and, as noted above, the returns to labor, capital, and management all accrue to a single person. Under these conditions, if the distribution of the revenues from exchange to the various categories of inputs is not at planned levels, reduced payment does not lead to immediate withdrawal of inputs such that production is terminated. It will not be significantly reduced unless revenues are sufficiently low as to impair annual planning (43).

The significance of these comments on costs is that the model that is advanced in this dissertation explains the basis for the allocative function of prices. More importantly, it does this without the necessity of invoking the highly restrictive assumptions of the static theory. The model requires no more than the TOTE hierarchy which is synthesized wholly from the cybernetic or TOTE hypothesis, and the recognition of the two aspects of time. As an example, it is no longer necessary to invalidate Say's Law solely by asserting that it is not necessarily true that payments to inputs will result in the effective demand necessary to remove the product from the market. It is more explanatory to say that production takes time and the effective demand

(43) "Fixed Asset Theory," again see footnote p. 90.

as estimated at the time the plan to produce was selected and executed is not necessarily the effective demand when the product is placed in the market. In short, expectations are not always accurate, and people's preferences change in an unpredictable manner. The former statement about Say's Law is simply dicta. The TOTE hypothesis offers an explanation based on an assumption about individual human behavior.

It will now be shown that even the rules defining property and the conduct of groups acting as single economic actors can be explained by the same cybernetic hypothesis.

CHAPTER IV

SHARED PLANS TO NEGOTIATE

Although there have been references to shared plans in the preceding chapters, the description of the plan to negotiate has been largely couched in terms applicable to individual behavior. It is the function of this chapter to demonstrate that the cybernetic hypothesis is equally applicable to the explanation of the plan to negotiate where the economic actors are groups of individuals. To phrase it differently, the hypothesis that behavior is plan-controlled furnishes a conceptual framework for the orderly discussion of cooperative bargaining associations. These are, in essence, groups of individuals who have chosen to participate in the shared plan to determine the terms for trade.

As a starting point, the necessary conditions for the exchange of property are stated as follows:

1. Definition of the person.
2. The definition of property and the authority to exchange as vested in two persons, one buyer and one seller.
3. Communicative contact between the two persons.
4. Plans to exchange held by each person.
5. Formation of and agreement on a single unambiguous offer.

The description of the plan to negotiate as executed by a group of individuals requires the description of the procedures by which each of these conditions are met, within the framework of the TOTE model.

Taking the above conditions one at a time, first, the definition of the person is simply the bargaining association as incorporated under the laws pertaining to the exclusion of cooperative action from designation as criminal conspiracy in restraint of trade.

Second, the definition of property and the authority to exchange requires some procedure for establishing the joint control of the property to be exchanged by the group and the delegation of the authority to the spokesman or offer-maker. This is a matter of the contractual relationship between the group and the group member.

Third, communicative contact requires that all components of the communications process be present. The senders and receivers are defined as persons. The messages that are considered include offers. The contact is contingent on code and channel (44). The code is assumed to be a common language and monetary system. The matter of channel is more complex. One of the primary battles that a newly formed agricultural producers' cooperative faces is the recognition of the association as the bargaining agent for the producers as a group.

(44) The Source-Message-Channel-Receiver model is assumed. See David K. Berlo, op. cit.

The persons may exist; the question of linking them by a channel for transmission of offers is quite another problem.

Fourth, the plan to exchange by the group means the formation of a shared plan to exchange that integrates the individual plans to exchange. This also implies not only integration and sequence per se (MAP), but also shared plans to select plans (PSP), and group learning and information processes (LP).

Fifth, the formation of and agreement on a single unambiguous offer requires that some procedure be formed under existing law for the resolution of varying and often conflicting interests within the group such that they can perform as a single economic actor. The formation of the single offer is assumed to represent the selection of the single most feasible offer, and implies the scaling of group preference on a value scale. The necessity of code in the transmission of the offer to the other person requires that the group jointly express preferences on a cardinal scale of preference, apart from any assumptions about the underlying and unobservable preference function. This scale is usually the equal interval scale indicated by the monetary system.

The general procedure in the remainder of this chapter is to examine the relationship of the individual to the group in the implementation of these conditions for exchange within the three programs that have been assumed to jointly control human behavior.

MAP -- PLANS INTEGRATION

The concept of the Main Activity Program (MAP), as applied to groups, is the control process in which multiple plans being executed by the individuals at lower hierarchical levels are integrated into some larger single course of action. This program is concerned with sequence per se.

Under the TOTE hypothesis the motivation to act or execute plans has been assumed to arise from the control process bearing on some higher level plan. To illustrate, the motivation to reach agreement on the price for a commodity arises from the position of the TOTE "bargain," in the plan to exchange.

The functioning of the MAP in group behavior may be best seen if it is supposed for a moment that the PSP and LP are non-functioning. The resulting behavior could best be described as fully "programmed." The written prototype of this behavior would simply be a list of instructions, fully detailed from the beginning and inflexible in the face of any contingent reaction. This is even more restricted than the programmed behavior described by Simon (45). Such a program would simply stall if Exit criteria were not met in the execution of the inflexible plans and in the absence of controlling feedback. The instructions

(45) H. A. Simon, "The Role of Expectations . . . , " op. cit.

would simply indicate what is to be done next along a given time scale. The basic constraint on such programming is that activities that involve physical movement preclude an object being in more than one place at a given time. On the other hand, the execution of a single plan may advance several other plans simultaneously. As an example, the inventory of the modern supermarket is such that one may advance the plans to obtain food, plant the garden, care for one's skin, and wash one's clothes at the same time, by executing the single plan to go shopping (46).

There is also the constraint of the physical impossibility of two objects occupying the same space at the same time, which in turn leads to the requirement that some acts precede others. As an example, one must open the garage door before driving the car in. Sequencing may also be dictated by convention which in turn may be based on the impact of sequence on the purpose of the plan. As an example here, one dons clothing in a specific sequence borne of the purpose for which the clothing is worn. As an example where sequence is contingent on the purpose of the plan, it is rather inadvisable to bale hay that hasn't been properly cured. It is intuitively clear from the consideration of the difficulty that would be encountered in trying to

(46) Miller et al., op. cit., p. 95.

coordinate behavior into such a rigid internally consistent system, that increases in flexibility ease the problem of plans integration.

The relevance of these remarks to agricultural markets is that farm plans are characteristically composed of many inflexible sub-plans. The integration of production plans on the farm is a very complex procedure. It is further complicated by the presence on the farm, and the involvement, of the farm family. There is the constant and intimate interrelationship between the conflicting goals of consumption and production or capital formation. The complexity of such relationships is very apparent to extension specialists and those agricultural economists whose specialty is farm management. Compound this further into a cooperative plan to integrate the sales plans of several farms and the often repeated statement that "farmers don't pull together" is better understood.

The formation of the group plan to sell the output from several farms raises problems of the coordination of movements of physical commodities. At one end of a control continuum is the very minimum of constraint where many farmers bargain cooperatively with several buyers such that there is considerable freedom to choose the preferred plan to physically handle the commodity. At the other end of such a continuum is the situation where the bargaining unit actually furnishes transportation services or maintains control on the transportation

services such that for all practical purposes the association assumes physical possession of the commodity. Along another dimension there is the range of situations, from the general farm that only sells one crop cooperatively to the one-crop farm where the entire output is sold to or through a cooperative. It has been asserted that the bargaining cooperative does not buy and sell farm commodities but simply acts as the bargaining agent for a group of producers who bargain cooperatively. It is argued here that, upon examination of the required control and information processes, the difference is largely a matter of the degree to which the producers may find it necessary to handle the commodity cooperatively to meet their goals. This is closely related to the power to withhold and the decision on the part of recognized bargaining associations to furnish services for themselves that enhance individual gain. It may be convenient to make the distinction between bargaining cooperatives and selling cooperatives, but both are shared plans and the difference is contingent on the nature of the plans selected, not of form as behavioral units.

One further observation may be made, that the MAP as applied to groups may be conceptualized as that system of rules that operates in the absence of management plans selection.

PLANS SELECTION (PSP)

It is difficult to deal very extensively with the matter of sequence without talking about the problem of which plan to select from the finite set of plans known to the person. The consideration of plans selection at the individual level involves the very broad field of decision theory. It is not the intent of the discussion to generalize about procedures that people use for plan selection. The assertion is that plans selection is an aspect of human behavior. The unique property of the TOTE hierarchy, however, is that it provides a means of discussing plans selection that does not impose a theoretical barrier when passing from consideration of the individual to the consideration of the group of individuals. To recognize disciplinary labels, once one moves from the individual plan selection process to that of groups, the subject matter area comes under the increased scrutiny of the social psychologists, the sociologist, and the political scientist. When the exchange and valuation of property become involved, the economist directs his attention to this behavior.

Once the plans selection process involves a PSP in which more than one person is selecting a single course of action for a group, the process of plans selection becomes a political matter. The question of which rules shall be used to select plans is no longer a matter of some subjective choice procedure for a single person, such as maximization

of expected utility. The question of which rules to use becomes a matter of the form of the legal system. A constitutional convention at the state or national level represents the execution of a shared plan to define the rules within which the selection of shared plans and the delimitation of individual plans are carried on. The cooperative or shared plan to determine the terms for exchange of property are part of the shared plans that must operate in this environment. These public rules also prescribe the form of the organization by-laws which are in turn the rules for shared plan selection within the organization.

Within the limited number of cooperatives observed in connection with this dissertation, it was found that election of delegates or local representatives, the designation of spokesmen, the formation of single offers, the acceptance of offers, and the specification of policy are all executed by majority vote.

The complexity arises on the other side of the exchange. Under the provisions of the Sherman Anti-Trust Act and its subsequent interpretation in the courts, firms which are not of cooperative form and not farmer- or consumer-owned are not allowed to act cooperatively as persons. The balance of power that this imposes in the market is largely the product of interpretation of evidence as to the nature of the inter-firm information flows. There is a large area of

law relating to collective action as yet undefined, in spite of the existence of a body of jurisprudence extending back to the passage of the law in 1898.

Among the cooperatives observed, it was found that the formation of the price offer was a choice process executed by a board of directors or sales committeemen. The procedure was a matter of voting on a motion to make a specific offer after a second thereto, and a discussion. This may be asserted to be a multi-person form of the process that goes on in the PSP of the individual, although neither the logical form nor the rules are accessible. The offer is then encoded in a written message and presented to the individual other persons in the market under public laws that proscribe certain information flows. Although the current law forbids cooperative bargaining by groups of non-agricultural firms, the author would assert that this is partly illusory. Individuals or individual firms bargaining in a common information environment where the association on both sides is voluntary is basically a squaring off of groups operated under a choice mechanism that conforms to a majority decision weighted by the volume of the commodity that each group member controls.

The hypothesis of the preceding chapter, that the range of feasible offers is limited by the presence of independent, nearly equal valued alternatives, is valid in the group context. The cooperative or

shared plan to bargain, which may or may not mean negotiations, is, in essence, the execution of a shared plan to limit the range of alternative offers to the other person, and to set up an alternative to the other person. These are two separate operations. The first is implemented by the contractual arrangement with members not to accept terms other than those specified by the association. The second is implemented when the association assumes responsibility for disposal of the commodity. This latter action includes the shared plan to limit production, or, to put it differently, set up some rule whereby the plan to distribute or dispose of undesirable stocks is executed at the individual member level. Evidence of these functions is cited in the next chapter when the discussion turns to the problem of finding real world referents for the limiting and most feasible prices defined in the formal bargaining model.

It follows from these statements that if the majority vote of a farmer bargaining cooperative does not have the weight of withholding power behind it, it will tend to fail in gaining recognition. This depends, of course, on the knowledge of the withholding power by the other person. Similarly, the public announcement of offers by or tacit cooperation of non-farm buyers must carry the weight conveyed by the absence of the independent alternatives to sellers or such announcements will be ineffective.

These statements may be summarized by saying that the PSP function in the shared plan to establish the terms for trade of agricultural commodities can be characterized as being under the control of the assent of sufficient members as can jointly establish price leadership. The PSP function itself is spelled out in the by-laws of the associations, and by the status of individuals in collective action before the law.

Under the foregoing postulates about the plans selection process, price determination by negotiation stands at the conjunction of the impact of plans selection from three sources. First, there is the individual plan to participate in the plan to bargain cooperatively. Second, there is the selection of the plan to bargain, possibly to negotiate, and the shared plan to select the offer or accept an existing offer at the group level. Third, there is the participation of the individual, and usually the group in the governmental processes that define the context for negotiation and possible economic conflict.

INFORMATION PROCESSES -- LP

The information processes are that portion of the model of behavior proposed in the preceding chapters concerned with the feedback control on plans execution. Conceptually the Test phase must somehow be modified by events in the environment if the Test is to signal the successful completion or the failure of a plan. This

modification process permeates the TOTE hierarchy at all levels and hence is as complex as the structure of human behavior itself. For the purposes of discussion, however, the procedure will be to examine the information flows in a shared plan to exchange in relation to the five necessary conditions for the consummation of exchange. Further, the information will be classified by source and receiver, and by direction and intent.

The information process within the individual is largely inaccessible to observation. When it becomes necessary for a group to act as a single individual, however, messages are sent between the group members. There are conversations, discussions and often a great deal is written down. The information flows that lead to the conduct of a bargaining association as an individual assume a number of visible forms. There is the discussion between group members, there is the flow of information from member to representative, and there is also the flow from the organization to the individual member. This last flow is usually implemented by both the written statement of an organization publication and by messages transmitted through the local representative. The information flows that are pertinent to the formation of the individual are comparable to the individual talking with himself.

The information that flows from member to the board of directors and to the association management is the basis on which the majority vote is exercised in plans selection. Of course, it is channeled through the local representative. The kind of information that proceeds out from the association can be classified into three categories. First, there is the reporting function. That is, there is data pertaining to the operation of the association and market data that is basically supplied as a basis for individual plans selection. There is a second kind of message that is directed toward goal formation. This is directed toward the value system of the member, e. g., let's-all-pull-together types of messages and those serving to establish uniform knowledge of association goals. Third, there is the message that is plainly designed to expose the decision making process of the association to the membership, e. g., "this is what we have decided and here is why." It is hypothesized that there is a major shift in the type of these messages as an organization gains recognition and matures. In the initial phases of the organization the messages are largely directed toward establishing the value system of the shared TOTE "bargain." The belief system is the knowledge of market conditions and organization capabilities which are rather ill-defined in the absence of operating experience. As the organization matures, the goals are rather well established and known and the data of the belief system and the knowledge of the

feasibilities of shared plans accumulate from experience. The internal messages reflect this change as they become increasingly concerned with data.

It is stated then that the formation of the person in the shared plan to exchange can be conceptualized as the construction of a large multi-person TOTE. The initial construction involves the establishment of a stable set of goals, the establishment of the rules for the control processes, and the implementation of the information flows for the purpose of modification of values, beliefs, or both. Since association of individuals with the association is voluntary, it is defined by the extent to which the goals are established, and there is a two-way flow of information between member and group. Within the limited number of organizations observed, it was noted that the persuasive content of the internal written messages dropped and the reporting of market data increased with the age of the organization.

The control process that delegates the authority to a spokesman defines the source of messages that proceed from the group, that is, the person in the market to other persons, be they other bargaining associations or processing firms. Among these messages are the overt offers and the messages that establish the communicative contact external to the association. This is essentially one-way communication since the receivers in the reverse direction are the individual group

members and the information that is received is aggregated via the plans selection processes. The information flow that is concerned here may be expected to be essentially persuasive, that is, it is deliberately intended to alter the belief and value systems of people external to the group.

The importance of this kind of information flow is indicated by the bargaining model. It will be recalled that the constraint on the range of feasible offers that would appear in the market was postulated to be, not the prices that represent the points beyond which negotiations would be non-feasible, but the mutual estimates of these points. It was also pointed out that there is a loss involved from errors in the perception of the limits to feasibility. It becomes a tactic, therefore, if it is desirable to keep initial offers from being made close to one's own alternatives to negotiation, to try to convince the opponent that the minimal valued prices are at more favorable levels. Also concealed in these tactics is the manipulation of the context of negotiations and conduct such that desirable inferences are made by the other person about the willingness to yield.

The consideration of the communicative contact between persons in the market has been dealt with in the discussion of the matter of recognition. The information flows have been interpreted as proceeding from the spokesman to the membership or their elected

representatives. This contact is essentially defined by the extent to which the communicated message is received. It has been noted that there is a problem of law where one person in the market is a bargaining association and the other is a group of individual business firms. It is interesting to note that there is the continuing question in the negotiations between Michigan Milk Producers Association and the dealers in Detroit and Southern Michigan, of whether or not it is legal for these dealers to meet in a body to negotiate with the association. The dealers contend that such a meeting is illegal; and in the 1962 negotiations, only a small proportion of the dealers showed up for the negotiations session. The contact in this case amounted to the transmission of the price demands of the association to the individual firms. This kind of contact can best be described as the individual decision by persons on one side of the market not to negotiate. That is, the dealers decided not to try to jointly or individually elicit a counteroffer from the Association. It is also interesting to note that B. I. Freeman, Secretary-Manager of the Great Lakes Cherry Producers Cooperative Marketing Association, has termed bargaining as an anachronism and visualizes the procedure as one in which the association chooses a price which it seeks to establish. Again the decision, under the definition of negotiations, is to not negotiate (47).

(47) B. I. Freeman, "Pricing Raison d'Etre for Bargaining Association," mimeo, presented at the convention of the American Institute of Cooperation, Berkeley, California, August 10, 1960.

It is the opinion of the author that communicative contact in the market will be largely informal and between the associations and the firms they face as individuals. This is asserted even beyond the requirements of anti-trust legislation. One of the major concerns of processing firms is not the level of prices but the relationship of the prices that he must pay relative to those of competitors. The major concern of the processor is then going to be maintenance of market share unless his operation is sufficiently close to marginal that the price demands of the association will force him out of business. This means that the farmers' association is going to be picking prices and the processor, dealer, or broker is going to be picking quantity. This will be seen, in the next chapter, to affect the definition of supply and demand as seen by association management and raise the problem of supply control for the association.

With regard to the fourth condition for exchange, the use of the TOTE "bargain" as the model of the bargaining association implies the formation of plans by the association. The process of plans selection has been described as has the flow of data in this process.

The fifth condition for exchange, which is agreement to terms, arises from the interchange of messages at the point of communicative contact which is the third condition for exchange proposed above.

THE CONTEXT OF INFORMATION FLOWS

It has not been the intent here to catalogue all of the kinds of information or intent of messages as they appear in negotiations. The purpose of the foregoing is to demonstrate that the TOTE and the plan are useful concepts for the orderly discussion of the information flows that do occur in bargaining and negotiations. It is postulated that the basis for the choice of offers, and all of the other acts attendant to exchange, is the inferences of "what causes what" from a complex of interacting behavior of people.

One of the issues that generates a lot of controversy in the discussion of cooperative marketing is the question of "fairness" of permitting agricultural producers to combine in groups on a local, state, regional, or interregional basis for the purpose of determining the terms for exchange for their product with consumers or intermediary firms. Agricultural producers are exempt from the anti-trust laws under the Capper-Volstead Act. This privilege of collective action is denied the intermediary firms. Aside from the arguments about the equity of such laws it is important to note that such laws are actually directed at the specification of the information flows between firms. It would be safe to say that the extensive body of litigation pertaining to anti-trust prosecution is concerned with defining the line between similar action on the basis of common

information, and action that is designed to collectively restrain the range of alternatives open to the other person(s). The legal profession is then saddled with the task of ferreting out and defining the lines between persuasive and non-persuasive messages, and the definition of the lines between effective and ineffective sanction that renders persuasion effective or ineffective. This casting of bargaining power in terms of the operation of the information processes within groups does not indicate a mechanism for determination of equity, but it does indicate a procedure for the description of the position indicated by court decisions. The reaction to feelings of inequity bears on these decisions via shared plans to enact legislation which is the frame of reference for the operation of the judicial system. The referent here is the shared plan that is a government.

The assertion that a position of equity is identified by the interpretation of rules governing the content of messages and exercise of physical force, leads directly to the hypothesis that the solutions to conflict of interest in establishing the terms of trade are in large part determined by the legal context of the negotiations. This does not mean that the price can be predicted from examination of the legal context. It does mean that the approximate solution could be predicted if some function relating the legal context to the present estimates of future costs of non-agreement could be established.

This does go on to some extent. The question was asked of a cooperative manager, "Do you feel that within the range of solutions that is deemed possible prior to negotiations, there is one that appears markedly to be the most likely compromise?" The negotiator's answer was in the affirmative and tied to comment on the necessity of yielding to avoid the charge of unilateral price determination or bargaining in bad faith. It is hypothesized that the perception of a most likely settlement increases as the value difference between minimal acceptable offers decreases down to coincidence of perceived minima where bargaining does not ensue. This last sentence is simply a restatement of the proposition that the perfect market idealization represents the coincidence of minimal acceptable offers due to the accurate perception of the existence of at least one independent equally valuable alternative to each of the opposing parties. Negotiation is precluded in the perfect market as purposeful behavior, under the assumption of perfect knowledge.

SUMMARY

In summary, it is possible to interpret the various facets of the price or offer formation process within bargaining groups in terms of the plan concept. There is no attempt to classify bargains, or bargainers, according to the nature of the processes. The assertion is

simply that each of the components of the plan hierarchy are identifiable in the overt manifestations of groups of individuals who seek to execute plans to establish terms of trade. The MAP is seen in the sequencing that is directed by executive function. PSP is seen in the process of decision making by both executive function and the rules governing the expression of a single choice by a group of members or their representatives. The LP function is seen as the composite of information flows, persuasive and non-persuasive, between persons engaged in negotiations, within the bargaining associations, and between firms. The extent of permissible communications and intent (channels and content) are defined in the legal context of the negotiations.

CHAPTER V

THE DEMONSTRATION OF SIMULATION

A primary objective of this dissertation is to demonstrate that the TOTE concept, as proposed by Miller et al. and extended for the present purpose, is the basis for a theoretical model that simulates real world bargaining and negotiation. The previous chapters have been directed at forming the model. It is now appropriate to demonstrate that the model does simulate overt manifestations of the process.

Tests that determine whether or not simulation has been achieved are generally of the form in which the data and the output are submitted to a panel of experts. These in turn may be required to pass judgment according to some set of rules as proposed by Starbuck (48), or meet the criterion that at least one judge fail to distinguish between data and the output of the model (49).

As a step toward that criterion, the following chapter will attempt no more than to establish the link between the substantive terms of the model and some referents in verbal and written accounts of bargaining and negotiation. The primary source of such data is

(48) William H. Starbuck, op. cit.

(49) Editorial comment on the author, William H. Starbuck, Behavioral Science, Vol. 6, No. 3, July, 1961.

the messages sent from the cooperative bargaining association to its own membership. Reference is also made to excerpts from private conversation for which, due to the nature of the content, the sources shall have to remain anonymous.

It is the general approach of this chapter to first examine the referents in the data for the bounds to the range of prices which are potentially agreeable to both persons. The next step is to seek evidence of the pressures toward agreement that were described in Chapter III. Finally, the data will be examined for points of homeostasis.

LIMITS TO FEASIBLE PRICE OFFERS

It has been postulated that the limits to feasible offers in negotiation are imposed by the existence of prices beyond which it is more feasible for the person to not negotiate. These have been labeled C_i and D_i in the model. The range of prices that fall between these minima is the range of acceptance at point of time i . The following quotation and description of the final stages of negotiations are cited and contain reference to such limits. The principals are John Stewart, President of Twin Pines Dairy, Detroit, Michigan, and Glenn Lake, President, Michigan Milk Producers Association. The object of negotiation is the premium per hundredweight to be paid to producers for Class I milk (milk for fluid use) during the period from February 1, 1961 to January 31, 1962.

Stewart: There are only two possibilities for settlement-- a knock down drag out fight or arbitration by a disinterested third party.

Lake: You are saying that you cannot or will not settle.

Stewart: You are asking for a higher price than last year. An increase is not justified.

Lake: We are asking 27¢ on Class I over last year. This is not exorbitant or unreasonable. You have increased costs but so have we. We won't take any cut. If you refuse to move from your decision, we will have to direct our actions accordingly. You leave us no choice but to recommend the strongest possible action.

Stewart: If the sales committee decides to come close to our \$1.33 - \$1.73 offer, we will meet with you again.

Lake: You may as well conclude that the Sales Committee will not make another offer if you say that you will not negotiate from \$1.33 and \$1.73. If you stand by that position you may as well not expect to get milk on Monday. As far as I am concerned these negotiations are closed.

This verbal exchange was followed by the following events:

1. . . . the Sales Committee . . . directed that dairies be sent an ultimatum to pay the price demanded by MMPA or get no milk after February 1.

2. . . . dealers asked to meet with the Price Committee (MMPA) Friday afternoon and tried to reopen negotiations with an offer to pay the same negotiated premiums as last year (\$1.43 - \$1.83).

3. Lake told dealers their offer was too little and too late.

4. Friday night, telegrams were sent to all Detroit dairies advising them of the Sales Committee ultimatum.

5. By late afternoon on Saturday, a large number of the medium and small size dairies agreed to Association demands. The big four, after several had made an effort to obtain milk from other sources in and out of Michigan . . . conceded to the price ultimatum by late Sunday afternoon [January 31] (50).

(50) The Michigan Milk Messenger, February, 1960.

The price C_i was postulated in the model to be the maximum above which the buyer was unwilling to agree. It is noticed in this case that it is the price demand of the seller. The alternative that was explored was the attempt to buy milk from other sources. The price D_i is postulated to be the lower limit below which the seller will not agree. In the above case any price below that of the previous year was stated as unacceptable and a higher price was backed by the decision to engage in economic conflict. In this latter case the alternative to negotiation was diversion, which may be interpreted as a case where the alternative to negotiation was furnished by the shared plan to divert to another buyer represented by the various outlets that could be developed. It may be inferred that the success or failure of such ultimatums is dependent on the presence of such alternatives. The dealers could be pressed no further than the price of alternative supplies. The selling cooperative could be pressed no further than the composite price offered by diversion outlets.

Similar constraints can be seen in the following excerpts from Tart Talk, Great Lakes Cherry Producers Cooperative Marketing Association:

Some processors accepted our price and contract but returned blocks of tonnage back to the Association, saying they did not need that much tonnage at our price. (We sold it to other processors.)

Not a single processor in Western New York (West of Rochester) would accept our price and forced the association to process its own members' cherries at a contracted price of 5-7/8¢ per lb. for processing(51)

The alternative associated with D_1 in the first case is the presence of alternative buyers. In the second case it is the association itself assuming ownership and functioning as a processor.

To cite still another example, one may find the limits to negotiation in the following statements by Kenneth Robinson of the Eastern Fruit Marketing Cooperative, Inc.

Complete victory as indicated by processor recognition and price negotiation is analyzed as having been prevented by three factors:

. . . Processors were able to find too high a proportion of their needs outside of the bargaining group for it to be effective. . . . The inability to sufficiently interest growers in other areas of bargaining. This prevented:

- a - Being able to assure Appalachian processors that those located elsewhere couldn't buy much cheaper fruit, and
- b - The grower comfort of protection from the device of 4-state processors going to other areas to secure the fruit supply that would otherwise come from bargaining association members.

. . . inability to interest growers in other areas in bargaining, remains the knottiest of the three (problems).

Also at the individual grower level:

Some members will be lost due to sole dependence on a processor and inability to resist his tactics. Others are simply

(51) B. I. Freeman, Tart Talk, Great Lakes Cherry Producers Cooperative Marketing Association, September 10, 1959.

going out of the apple business to keep from going broke completely (52).

In this case the limit C_i is imposed by the presence of competitive supplies but on an interregional basis. The lower limit D_i is represented in this case by mention of individual growers ceasing production activities. That is, the most feasible alternative to accepting the offer in the market is to abandon negotiation, abandon bargaining, and abandon production. This is represented in the model by the invoking of stop rules through three levels of plans hierarchy, due to a lack of feasible plans.

In summary, there are several kinds of limiting factors which are mentioned as constraints on the range of prices that are feasible for agreement. Among them there are:

1. The upper limit beyond which the buyer need not go due to the presence of at least one independent alternative seller.
2. The upper limit beyond which the buyer cannot go in purchasing inputs due to the presence of supplies at equal or lower prices that are available to competitors.
3. The upper limit beyond which a substitute product or activity is more feasible.

(52) Kenneth Robinson, "Progress on a Bargaining Association To Sell Processing Apples in Appalachia," Proceedings, 105th Annual Meeting, The New York State Horticultural Society, 1960, pp. 77-86.

4. The lower limit to price beyond which the seller need not go due to the presence of at least one independent alternative buyer.

5. The lower limit to price beyond which the supplier will cease production.

6. With respect to group negotiations and bargaining, there are upper and lower limits to the range of acceptable prices imposed by the inability to get a majority vote beyond these limits. This refers to the situation where a group offer is minimal because anything less valuable could be achieved by individuals acting separately and the group would dissolve. This is allied to the offers that may be made by persons opposing the formation of bargaining groups by granting more favorable terms, thus making the individual plan to participate in the shared plan non-feasible. It is also observed that there is extreme reluctance on the part of bargaining groups to agree to less favorable terms than existed in the prior contract.

Another set of limiting prices in negotiation is represented by the mutual estimates of the bounds to agreement held by the other person. These limits are represented in the model by C_i' and D_i' . The price C_i' is rather easily identified in the intra-association messages of the bargaining cooperative. One uniformly finds reference to competitive supplies, estimates of derived demand, and in general the detailed economic analysis that is data to the plans selection process of the

organization. One would expect the counterpart of this activity on the part of processors, dealers, or brokers, whichever happens to be the buyer in a particular industry.

In informal conversation about these limits, however, there is a tendency not to talk about such extremes since there are factors that tend to hold the range of acceptable offers away from the alternatives to negotiations. In the model this is described by postulating that the levels of maximum aspiration, A_i and E_i , fell inside of the range bounded by C_i' and D_i' due to the discounting of present estimates of the future cost of sanctions that can be imposed by the other person. Further, the overt offers by definition fell within the range bounded by the levels of aspiration by an amount representing the discounting due to self-imposed costs or the present estimate of the disutility of conflict per se. It is reasonable to suppose that there is the consideration of the costs of economic conflict although this is not usually exposed to public observation. The more frequent reference to discounting occurs with reference to that which is imposed by the public interest. When costs of conflict were mentioned, it was usually in terms of short term conflict and tactics. The awareness of third parties is found in the following statements by Stewart:

We don't want the newspapers to say dealers and farmers got together and set the price without the consumer having anything to say.

. . . you should not be afraid to defend your price to the consumer.

. . . Arbitration is still a part of our offer and any statements to the newspapers about this situation should say we did offer to arbitrate (53).

With the research facilities open to both the buyer and sellers it would be expected that each party should be able to make a reasonably close estimate of the outcome of negotiations. The alternatives to negotiation are rather accessible, and although subjective discounting or the precise impact of the prospect of economic conflict is unobservable, they are not beyond rough estimation. It would seem then that after definition of the minimal prices and the estimates of mutual discounting, only a very narrow range should appear for negotiation. To compound this there is the statement by Freeman that the objective is to form a price demand and force its recognition, and, there is the non-negotiation that preceded the January, 1962 MMPA price agreements. The direct question as to whether or not the negotiator felt that there was an obviously most probable price for agreement before the start of negotiations produced an affirmative answer. Further, the utilization of the data supplied by economic researchers to boards of directors or sales committees seems to be a process where the data with estimates of the consequences of various prices is considered and

(53) John Stewart, quoted in "They Said It Couldn't Be Done!" The Michigan Milk Messenger, Michigan Milk Producers Association, Feb., 1960.

a "best" price is selected by majority vote. It is a reasonable observation that what is happening is that the processor or dealer is selecting quantity on the basis of the price demands of the producer group and then taking advantage of the problems created by supplies turning up in undesirable categories. It must be recognized that the supplies of a storable commodity in the hands of a buyer is a supply that is alternative to the purchase from producers. It is asserted later that such supplies in the hands of producers can depress prices.

BARGAINING ASSOCIATION GOALS

The approach to the single offer that is agreed upon in negotiation has been described in terms of what is not agreeable, that is, the bounds to agreement. It has been suggested that the range of possible agreement is further restricted by present estimates of future costs to non-agreement. It has been pointed out, however, that quite often it is incumbent on the producer organization to make the first price offer and that when this is done, with some show of protest by the other person in the market, the other person selects a quantity on the basis of the price. To avoid an apparent contradiction with the assumption that the price is fixed in negotiations, it is asserted that the price negotiations are based on quantity estimates but subsequent decisions about actual quantities exchanged can be based on the negotiated price. This is the implication of the quotation from Tart Talk (supra, p. 128).

There is evidence, however, that there are some points or prices which develop that reflect homeostasis in the bargaining environment. One has already been mentioned--the price of a previous contract. It is attached to maintenance of the bargaining association and the current management. An examination of a statement of bargaining association goals by B. I. Freeman illustrates another point of homeostasis. The following remarks are pertinent:

. . . a marketing cooperative is . . . developed to handle a single commodity or very closely related commodities which are sold in the same market. . . . It becomes in essence a decision-making body. . . .

Its primary objective is to obtain for its membership the highest returns consistent with current and prospective economic conditions and the long run welfare of growers.

. . . In contrast, today, so-called bargaining associations to be effective must be price leaders and must organize the market in such a manner that its initial price announcement is effective in the trade.

. . . the exchange of ownership of the commodity between the grower and the processor represents a proportional allocation of those consumer funds based on our best estimate of existing market conditions and the estimated marketing conditions for the coming twelve months.

On the production side, the funds so allocated will either attract or repel the production resources of our members.

It is recognized that in agriculture, we cannot control production so as to realize maximum profits based on a given amount produced. However, in the fruit industry, each year develops a maximum amount produced. If this entire production can be sold with no danger of carryover in the following year, or a minimum danger of carryover in the following year, then optimum returns will be more assured to growers since each

past year's experience is the most important factor in the reception of his commodity in the trade. Furthermore, his commodity is priced to receive optimum profits from optimum sales at the national level into all outlets over a twelve month period (54).

Of course, the above remarks are of primary relevance to the cherry industry, but it presents an example of the homeostasis set up by a desired distribution pattern. In the light of the above, it may be reasonably assumed that the speaker:

1. Considers the marketing problem to be one of distributing a maximum quantity over a twelve month period.
2. Considers it undesirable to have a carryover from year to year and maximizes total revenue within this constraint.
3. Rejects negotiation as a procedure for establishing the price.
4. Rejects supply control as a profit maximizing device.
5. Asserts that "optimum" returns are maximum returns consistent with the "no carryover" pattern.
6. Sees the allocative function of price as being implemented through the de facto distribution of revenues from each year's sale of the crop.

Using the definitions of this dissertation this is a bargaining situation, but negotiation is not executed as a feasible plan except

(54) B. I. Freeman, op. cit.

where the individual processor attempted to elicit a counteroffer from the association.

The locus for price determination may be represented by a conventional supply curve indicating a fixed quantity (vertical) and the demand represented by the point on that supply curve that indicates the total revenue (average revenue $\times$ quantity). These supply and demand representations are estimates. The quantity is estimated in advance of the harvest season, and the price is selected that is considered the most likely to lead to the zero carryover goal. With the assertion that the previous year's experience is the most important factor in determining the "reception" of the commodity, it is seen that the distribution pattern is controlling. The appearance of carryover leads to immediate reaction. This reaction can and does lead to demand creation activities by the selling association, hence the ex post revenues are in part a function of the errors of estimates in quantity. Conceptually, the bargaining association is seen to execute the plan to bargain with a person that is a composite of buyers, but in the event of the appearance of undesirable stocks, resorts to negotiation with individual sellers to attempt to reach the desired pattern. Price leadership is an accurate description of the use of the association power to deny the access of buyers to independent alternative sellers. It has been seen that the association itself can function as an independent alternative buyer in

competition with the processor. The only feature of the bargaining model that is not present in the cherry industry is negotiation of the original pre-harvest price.

It must be remembered, however, that demand, in the dynamic sense, is the aggregation of plans to buy based on price expectations for a product to be sold at some future time. The problem facing the group that is attempting to estimate a price that will achieve a desired distribution pattern is that of estimating plans. The tactic of acting as a competitive buyer (e. g. , processing its own product) puts competitive pressure on the other buyers who seek to maintain market shares or meet some other sales criteria. The involvement of values in the plans of the buyers means that there is some pressure on the goals of the buying firms. This particular point was the subject of some strong discussion appearing in the American Fruit Grower, April, 1961. The writer charged that the root of the price difficulties in the California Peach Industry was that the "old line" packing executives did not want to bargain over price. Each preferred to set the price at his plant at a level that could be "easily" sold. The grower accusation was that the failure to move the crop was due to canner "laziness" and arbitrary price setting (55). The merits of these particular arguments are not pertinent here. The important point to be recognized is that demand

(55) William J. Monahan, "Harvest of Perpetual Crisis, " American Fruit Grower, April, 1961.

involves plans and plans involve values. The estimation of the other person's plans in the selection of the price offer involves forming an estimate of the limits to which his value system can be shifted in a favorable direction. It is hypothesized that, given the quantity supplied, there is a variation in average revenue that is a function of the activities of the suppliers, not in the form of direct promotion but by their assuming the role of competitor. This proceeds directly from the execution of the shared plan to furnish the necessary independent offer to limit the bargaining power of the other person in the market. To illustrate, given a crop, say apples, it is possible for the suppliers of apples to affect the total revenues derived from the sale of the crop. This is achieved by execution of the shared plan to promote apples and of the reaction by apple buying firms to a shared plan executed by a group of apple producers to function as a competing processor, dealer, or broker.

With regard to the semantics of economic terminology, it can be noted that the seller often feels that he is engaging in a price "discovery" process. Businessmen are quick to talk about the "iron law of supply and demand." The economist talks about the stable equilibrium, under certain assumptions, that is characteristic of equality of supply and demand. It is suggested that both are talking about the reaction to the appearance of stocks (including flows at given rates

over a given period of time) in certain undesirable categories. A point of difference can arise when persons differ on the specification of the categories that make up the supply and demand schedules, and on the value judgment of just which categories are undesirable.

Another statement of purpose and point of homeostasis appears in the following statements of Robert E. Braden, Field Service Director, Michigan Agricultural Cooperative Marketing Association:

To avoid or ease the present price-cost squeeze, farmers and growers must work together to organize their marketing power. By uniting in a single voice, we can obtain, at the market place, the prices that reflect the full market value of our products.

Its (MACMA) primary purpose, of course, is to act as sales representative for its members in negotiating terms of trade for the sales of their products (56).

Then, perusal of the leaflets that are being used to inform potential members of the organization's goals in each of the commodity divisions indicates the following objectives:

1. Reduction of price fluctuation.
2. Work for "full market value" and "best price for everyone concerned" (57, 58).

(56) Robert E. Braden, op. cit.

(57) "Marketing Opportunities for Michigan Asparagus," Michigan Agricultural Cooperative Marketing Association, 1961.

(58) "Marketing Opportunities for Michigan Processing Apples," Michigan Agricultural Cooperative Marketing Association, 1961.

In conjunction with the above statements it is important to note two statements from the 1962 policy statement of the Michigan Farm Bureau, the parent organization to MACMA:

We recommend that marketing orders and agreements be prohibited from establishing programs that would involve:

1. Production controls
2. Market quotas
3. Price fixing (59).

The method used by M. A. C. M. A. involves an orderly and well informed approach to the negotiation process. We do not approve of the use of strikes or forced withholding practices as the bargaining procedures for a farm organization (60).

Before commenting on the above statements it should be noted in passing that the above statements are directed at the value systems of the potential member and apparently for the purpose of establishing the MACMA value system. This is in agreement with the hypothesis that this is characteristic of newly formed organizations. As yet MACMA has not gained recognition as a bargaining agent for any producer group although it has been reported that the existence of a move to organize has had some impact on prices (61).

Looking at these statements by MACMA and its parent organization, the Michigan Farm Bureau, it is seen that if the hypothesis is

(59) 1962 Policies, Michigan Farm Bureau, adopted November 1961, East Lansing, Michigan, p. 19.

(60) Ibid., p. 35.

(61) From conversation with Dr. David Call, Department of Agricultural Economics, Michigan State University, January, 1962.

correct that the convergence to agreement is contingent on perceived costs to non-agreement, imposition of these costs on any dealer or processor can only be achieved in a limited way. Since supply control by collective withholding or under federal order is not advocated, the remaining alternatives are to seek out all possible alternative buyers, or, execute a shared plan to buy and process. This means that the Association is proposing to act primarily as an information agency unless it is willing to assume the burden of fostering the farmer cooperative ownership of strategic blocks of its own commodity in as yet undetermined quantity. This latter contingency was accepted by the Great Lakes Cherry Producers when it moved rejected cherry tonnage and processed the output of Western New York State. The assertion is simply that once the organization embarks on its chosen course it will be faced with the necessity to withhold or assume ownership of large blocks of commodity.

The intent is not to criticize the people who forge such policy and policy statements. The assertion is that the use of superior information alone and cooperative bargaining without the "or else" necessary to impose costs to non-agreement cannot lead to significant gains. The conflict of interest centers on the value judgments about just what categories of distribution are desirable. It is possible to stabilize prices at low levels by moving large quantities into low value categories.

The relationship of the foregoing discussion to the bargaining model is that it demonstrates again that, within the constraints of not imposing supply control, the point of homeostasis for the organization is an optimal distribution pattern for a given supply of a commodity.

This question of the value conflicts involved in the definition of demand categories became apparent at a recent seminar exploring the problems of developing data for efforts to organize the producers who sell processing apples. The initial question, "What is a processing apple?" dominated the discussion. It became apparent during the course of the discussion that too little is known about which apples go where under varying supply conditions.

There is the considerable question about who should develop and supply such rather detailed data. It can be suggested that if the basis for survival of the cooperative is the possession of superior information, the information had better be developed within the cooperative.

The counter-argument can be advanced that if this information is developed by a public agency, such as a land-grant college, and made available to both the Association and the processors, this would shorten negotiations and reduce the likelihood of economic conflict which is presumed to be to the detriment of the general public. There is this justification for the participation of the public research

organization in the development of such information, but there is still the problem of the conflict over optimal distribution categories. The researcher who attempts to define the demand relation must cope with the problem of just how hard the sales organizations of the processors should work. The specification of "full market value" as associated with average revenues that lead to a desirable growth rate, still leaves the problem of selecting the growth rate.

Perusal of the published materials of the Michigan Milk Producers Association indicates that it considers its purpose, aside from the auxiliary services rendered, to bargain for better prices than can be obtained without cooperative effort. The Association indicates that the procedures that are worked out for withholding and diversion to its own and other cooperative facilities are means to that end. The price demands that are made tend to be viewed as changes from the prior contract.

It must be noted in the case of the negotiated premium for milk that only the premium on Class I sales is negotiated and that gains here can be cancelled out by increases in total milk that lower the blend price through larger proportions going into Class II use. The Federal order that provides the base for the negotiated premium also includes a supply-demand adjustment factor.

The officer of MMPA expressed the opinion that the producers

in his organization considered association-imposed supply controls, that is, the shared plan to limit MMPA supplies, to be unworkable in the face of interregional competition.

SUMMARY

It was the purpose of this chapter to develop referents for the words in the formal model by considering the written and spoken statements of people and organizations which are engaged in cooperative marketing efforts. It has been noted that:

1. Minimal offers are associated with ultimatums in the bargaining process. These ultimatums reflect the constraints that the model postulates, the alternative to negotiation with this particular opponent in the market. The harsh lines of these alternatives associated with breaks in negotiation or the abandonment of production or purchasing activities are modified by the longer run aspects of continued association and the potential cost of public reaction to economic conflict.

2. It is seen that under a system where the producer association is negotiating price and the buyer is indicating quantity, the point of central tendency or homeostasis that directs the price demands of the cooperative is some optimal pattern of distribution of an estimated quantity supplied during a particular future time period. This point

may be interpreted as that point on a vertical supply function (assuming the conventional price-quantity coordinates) which maximizes total revenue, given the level of demand creation activity associated with the estimated future quantity supplied.

CHAPTER VI

SUMMARY OF MAJOR STATEMENTS

The primary purpose of this dissertation is to develop a simulation model of the bargaining process. This purpose of simulation is achieved if the referents to the substantives in the model, when inserted into the model, yield a descriptive output that is indistinguishable from the input data. Implementation of this format requires construction of the model, identification of the referents for the substantives in the model, and the submission of the descriptive output for tests of simulation after application to specific case material.

It is the procedure of this dissertation to build the model on the basis of a cybernetic hypothesis about human behavior. This hypothesis is advanced in the form of the TOTE unit of behavior originally proposed by Miller, Galanter, and Pribram, in Plans and the Structure of Behavior. This TOTE unit is extended for the purpose of describing the processes of exchange, bargaining, and negotiations.

It is a property of the TOTE hypothesis that it leads to a hierarchical model of human behavior that is equally applicable to the interpretation of both individual and group behavior.

The principal behavioral form that is derived from the TOTE hierarchy is the plan, which is itself a hierarchical process that

controls the order in which a sequence of operations is to be performed. The TOTE hierarchy as proposed by Miller et al. is extended by postulating not only the control process on sequence (MAP), but by a plan-controlled process for the selection of plans (PSP), and a plan-controlled process for learning or information processing (LP).

It is suggested that the plans selection process is of the Edwards non-additive subjective expected utility maximization form. This is not a necessary form to the model since no explicit assumptions are made concerning the structure of the preference system of the individual except those summarized below concerning the feasibility of plans.

The selection of plans is postulated to be a process in which a single plan is selected from a finite set of known plans on the basis of a property of plans called feasibility. Feasibility is not observable and is assumed to be the product of the subjective expected probability of plans execution at the time of plans selection times the expected utility (incongruity reduction) of the successful execution of the plan.

Since the factors yielding feasibility values are not observable and it is not desired to imply that cardinal measures exist, only three values are considered. First, it is assumed that any plan that is selected for execution is the most feasible and that plans selection precedes action. It follows that all actions are assumed to be rational.

It is assumed that there is an extreme value of feasibility such that expected utility is high but the expected probability of successful execution approaches zero. It is also assumed that there is another value extreme at which the expected probability of execution of the plan is 1. but the expected utility of successful execution approaches zero.

In application of the model to the exchange of property it is assumed that price is a ratio of exchange in which the numerator is money. It is asserted further that regardless of the form of the underlying preference function of the individual or group, the making of offers, which is necessary to exchange, requires the expression of preferences on an equal interval cardinal scale of value, e. g. , money values. It follows that for values of feasibility for plans to exchange where the probability of execution is 1. , if the preference for money is ordered, the money value of offers reflects the feasibility of the plan to make that offer.

The overt price offer in the market is interpreted under the plans hierarchy to be the result of the plan to make that offer. The plan to make the offer is a sub-plan to the plan to bargain. Bargaining is defined as plan-controlled behavior for the purpose of establishing agreement on the terms for trade. Negotiation is defined as offer-making for the purpose of eliciting at least one counteroffer from the

other person in the market. The plan to negotiate is a sub-plan to the plan to bargain. Since price agreement is stated as a necessary condition for exchange of property, the plan to bargain is in sub-plan relationship to the plan to exchange property. This is the form of the hierarchy of exchange behavior.

The three points of feasibility with respect to offers are represented by the overt price offer (maximum feasibility) and the prices which bound the range of possible price agreement (zero probability of acceptance, or, zero value to acceptance, by the other person). The prices at these bounds are such that, at any price offer of less value to the offerer, it is more feasible to not agree with this particular other person. That is, it is more feasible to abandon negotiation.

These three prices and the mutual estimates of the other person's bounds are assigned symbols and the process of negotiation between two persons is described. The description defines the limits to the range of price agreement, the pressure toward some single price for mutual agreement, and points of homeostasis in the environment that bear on the stability of the single agreeable price.

It is demonstrated that the limits to the range of agreement are offered by the presence of at least one nearly equally feasible alternative to negotiation at the prices which bound the range of agreement, and, the mutual estimates of the prices equivalent to these alternatives

for the other person. The pressures yielding the convergence of overt offers toward agreement are hypothesized to arise from present estimates of the future costs to non-agreement as imposed by both the action of the other person and the subjective disutility for activity associated with negotiation and economic conflict. Points of homeostasis that are cited are optimal distribution patterns for fixed quantities of property (such as a "crop") and the criteria used by firms in evaluating progress toward goal achievement (such as the profits entry in its accounting system).

The interpretation of exchange, bargaining, and negotiation is then expanded to the situation where the seller is a group of agricultural producers who have selected, as a most feasible course of action, participation in a shared plan to establish the terms for trade for their joint product.

The establishment of the bargaining association is asserted to be analogous to the formation of a TOTE "exchange," applicable to the group as a whole. Each of the three elemental processes of the TOTE hierarchy (MAP, PSP, and LP) are identified in the group activities. It is asserted that the offers made by the group can be interpreted as conforming to the same constraints, pressures toward agreement, and homeostatic reaction that characterize individual offer-making.

The concept of shared plans is expanded to the interpretation of the behavior of governmental groups and processes. It is postulated that the rules determining the nature of the legal environment for negotiation and economic conflict are the result of the execution of the shared plan yielding the activities of government. In this group context the PSP is interpreted as a political process executed under some rule such as assent or choice of plans by majority vote. The LP in group context is discussed in terms of intra-group, inter-group, and inter-individual information flows. It follows from these statements that price agreement stands at the conjunction of individual plans and shared plans to establish price agreement under the rules set out by the shared plan to govern.

The objective of establishing a simulative model requires that the substantives in the model be replaced by their referents from the real world. To implement this the internal and external messages of bargaining associations and the statements of leading cooperative executives and operating personnel were examined for these referents. Such referents were found in various forms depending on the commodity and the unique characteristics of the association.

The ultimate test of simulation is not attempted. This would involve taking an individual case, inserting the referents unique to this case into the model, and submitting the output of the model to

tests for simulation. One rule for use in such judgment would be that simulation is achieved if the descriptive output of the model is indistinguishable from the input data for at least one judge.

The generation of hypotheses from a simulation model requires that the formal structure be treated as a deductive system. The assertions that are aimed at simulation become assumptions. The general criterion for validity of the hypothesis is that it does not alter the model when it is supplied with the referents for its substantive terms. As an example of the difficulties encountered, it was asserted in the model of this dissertation that the pressure toward agreement from divergent initial overt offers arises from present estimates of the future costs of non-agreement imposed by both the other person and the disutility of negotiation.

This does not yield a testable hypothesis at the primary level since any convergence or lack of it could be explained by assuming the presence or absence of unobservable or unidentified costs or disutility. The possible approach to empirical testing of this assertion in the model is to establish the referents in a particular case which seems to contradict the assertion, e. g. , a lengthy negotiation session where high costs seem apparent. Once the referents (such as the alternatives to negotiation, the mutual estimates of these alternatives for the other person, and the estimates of costs such as

are apparent) are established, they can be inserted in the model and a test for simulation applied. The failure to establish simulation under the specified tests is evidence to discredit the model.

PUBLIC POLICY

The preceding remarks lead to the statement that the key to validation of simulation models lies in the establishment of referents for its substantive terms. This is the reason for the considerable emphasis on the semantics of the terminology of the model and the terminology of economic literature. A form of hypothesizing will follow, therefore, that seeks to combine the syntax of the bargaining model and the lexicon of statements made in relation to public policy and some of the moral issues surrounding cooperative or collective bargaining.

As a point of orientation, the discussion of this section will center around some quotations of persuasive intent directed to the moral issues surrounding negotiated pricing in the agricultural sector of the economy. First:

2. Our company believes that we are a marketing outlet for our growers and we are in partnership in producing fruits and vegetables, and it has always been our basic policy not to interfere with any grower's freedom in joining an association or any organization. We, however, do feel that we owe it to growers when we have mutually had satisfactory dealings to call to their attention some of the points that these contracts (membership agreements and market contracts with bargaining

associations) hold and some of the overall experiences that our growers have had in other areas with like associations.

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. e. The association can tell you to whom or where you may sell your raw products. You would be losing your decision of choice and would be turning over to an outsider all of your rights to make your own decisions. It has worked out this way in other states. Some of your present decisions you would be relinquishing to the association to make for you are: price, although you may decide that it is profitable for your farm -- and services that you customarily know are now being furnished could be eliminated without your knowledge, etc." (62).

Secondly,

The apple grower, marketing his processing apples as an individual, does little to influence and stabilize prices. His volume is insignificant. He is not fully informed on the current market situation. He does not know what growers in other areas are doing. He is susceptible to misleading rumors, and in years of above average production he must actually seek a market on a "what will you give me" basis.

A strong Cooperative Marketing Organization (MACMA) acting as sales representative for its members is necessary to make growers effective in obtaining better prices and other terms in the sale of their apples.

It (MACMA) is a statewide farmer-owned and controlled cooperative. It is a voluntary, non-profit organization, legally operating under Michigan Law as a bargaining and marketing cooperative.

Division operations are directed by a fifteen member Processing Apple Marketing Committee. This committee is elected by the grower members for two year staggered terms, on a District basis. The MACMA Board of Directors delegates

(62) In a letter to pickling cucumber growers. H. J. Heinz and Co., April 11, 1961.

responsibility for Processing Apple Marketing activities to this committee of growers (63).

Thirdly,

May I speak to you in a rather philosophical vein for a few moments. To those of you who are concerned that this (justifying the cooperative marketing of processing apples -- via MACMA) may be viewed as an organization of an ultra-liberal nature, let me point out that the very opposite is true. We look upon this organization as being of growers, by growers, and for growers. We do not think it is necessary for a labor union, a "left wing" organization or the government to tell us how to run our business. But they will if we don't run our own.

. . . You and I are the ones who should control our destinies. It is ridiculous to permit someone else to do so. With our combined intelligence, resources, and determination, great strides can be taken (64).

The first of the quotations is from a company letter with the intent of discouraging the formation of a pickling cucumbers bargaining cooperative. The second is from a brochure encouraging the formation of a processing apple bargaining association. The third is from a statement by the chairman of a marketing committee advancing the arguments for the attempt to gain recognition for a processing apple bargaining association in 1962.

In all three cases, there is reference to the matter of control on the individual's own decision about to whom to sell, and at what

(63) "Marketing Opportunities for Michigan Processing Apples," MACMA, op. cit.

(64) Henry Nelson, "Will We Bargain in 1962 -- ?" Mimeo, Processing Apple Division, Michigan Agricultural Cooperative Marketing Association, 1961.

terms. The packer in this case tells the grower that he will lose his freedom to "outsiders." The organizing farm organization tells the grower that the control is in the hands of his own elected representatives. The chairman of the marketing committee asserts that if the farmer doesn't make his own decisions as a group someone else will.

It would be a modest accomplishment if the preceding model for interpreting the process of price negotiation could at least yield a framework for talking about individual "freedom," or the relationship between group controls and the constraints on the individual, in a somewhat dispassionate manner. Unfortunately "meaning" can be described more as an internal state of people than a unique property of words, and assessing the intended meaning of a word like "freedom" is particularly dependent on the user.

It was suggested in Chapter II in the discussion of the flexibility of plans, that the subjective feeling of freedom might be associated with this property of plans. It has been suggested that flexibility could be measured by looking at the number and feasibility of plans open to the individual at any point in time. Relating freedom to numbers of alternatives, the signing of a binding agreement transferring the authority to sell one's product may drastically curtail the number of potential offerers that one may face as sellers. On the other hand, the cooperative formation of the bargaining association is the means

for implementing one more independent offer. In a market such that the seller of an agricultural product faces the same offer of price made by several offerers, the signing of an association contract may reduce the buyer to one, the association, but pose an alternative offer to the single price in the competitive market. With respect to "freedom" one can say that there is a loss of freedom as measured in numbers of alternative offerers but an increase of freedom as measured in numbers of alternative independent offers. How is one to compare them? Similarly, in the implementation of a price support by CCC purchases in return for acreage controls, one sacrifices the number of alternative cropping systems to gain in the number of alternative offers in the market. How is one to say which is the greater freedom? One can go on to talk about the freedom that accrues to the individual as increased income enables implementation of more elaborate and extensive plans. By the same token it can impose restriction along another dimension if the income increase carries with it expectations of role behavior. A central government can implement a retraining program for persons trapped in resource depletion areas, or set up "homesteads in reverse" and in a very real way increase the freedom of choice of persons trapped in unemployment. On the other hand the "free" market can deny profits to a firm that would permit desired expansion from internal sources of funds. In short,

one way to talk about freedom is to view from the standpoint of the individual and start examining the number of alternatives open to him above some minimal level of desirable consequences.

Another way to talk about freedom is the flexibility of the time intervals in the MAP. When farmers talk about the "freedom" that they enjoy, they aren't talking about the flexibility of their production plans. Far from it. The urban employee can often call it quits at the end of the shift while the farmer is pinned to nursing a bunch of newly born pigs through a cold night. The "freedom" that is the referent here is the absence of the rigid regime imposed by the uniform chronological time units used to time urban employment in many plants. It is essential in urban employment, because mass production and integrated communications nets require that people occupy certain places at certain times for specific functions. The farmer with little or no work force is not bound by the integration of shared plans that characterize industrial firms. A further implication along this line is that as a population density increases, more of what the individual does becomes of public concern and the more the individual becomes involved in the integration of his activity with those of others, if it is no more than ducking faster in thicker traffic.

To return to the matter of executing the shared plan to bargain, one group can impose constraints on the alternatives open to another

by expanding its own list of alternatives. The resolution of such conflicting changes in the flexibility of action are a matter of equity to be settled under the legal system in which the conflict takes place. They are not subject to some over-riding definition of freedom. If there is an over-riding notion of freedom, it is in the access of the individual via the political process to execution of a shared plan to control the rules system.

BARGAINING POWER

Bargaining power has been defined above in terms that measure it as a ratio of the bargainable funds obtained to the total of the bargainable funds (represented by the price difference between minimal offers times the quantity negotiated). This is no more than a measure of relative bargaining strength. There are two other interpretations that simulate the usage of the concept of bargaining power in the real world. The first would be the money difference between the negotiated price and the minimal offer of the opponent. Another interpretation would be the money or quantity of funds between the negotiated price and the minimal offer based on the least acceptable price to the other person with the expectation that he will conform to some pattern of production or consumption. This last meaning is asserted to be that intended for the phrase, "bargaining power," in Henry Wallace's statement above (supra, p. 2) and "marketing power," in Mr. Braden's

statement (ibid.). In this dissertation, the referent for "bargaining power" is the degree to which a person can secure agreement at the maximum terms dictated by the minimal price acceptable to the other person. Further, the time horizon will be specified by the person trying to exercise the bargaining power. As an example, the completely powerful buyer could secure agreement at that price at which further production would be carried on for x number of years as estimated by the buyer. To achieve this power it may be necessary to eliminate the alternative presented by competing buyers. This exercise of power in restraint of trade is the subject of the balance of power struck by the court decisions which interpret the anti-trust legislation and the exemptions thereto. These decisions interpret legislation which is the result of the group plan to determine the rules for economic conflict. Interpreted in this way it is seen that negotiated prices are determined by both the aggregation of preferences within the individual or within the group that is the person in negotiations. It is also seen that the negotiated price is determined in a context that is also the aggregation of preferences in determining the rules for negotiation. This places the process of price formation at one of the points where the subject matter of the study of economic institutions can complement the subject matter of a study of individual and group economic behavior. In the concept of the plan, these two branches of the economic science blend into a continuum.

This exercise in the semantics of the phrase, "bargaining power," makes it rather clear that when one uses the concept as it is defined in Chapter III, the assumption is that the point in time is given, hence it is a snapshot concept. In the point by point shifts of minimal acceptable prices, estimates of them, and the changes on overt offers, the broader meanings of "bargaining power" are represented.

CHAPTER VII

MODELS

In the preface to this dissertation it is asserted that the value of the model that has been developed in the preceeding pages is contingent on its use as a deductive system. This is true in the sense that the intended use is prediction and control. A brief digression on the term model, however, will serve to demonstrate the problem that is faced when a model or theory, which has been derived by structuring empirical data, must be withdrawn from its context and used for this prediction and control.

A model is assumed here to be a descriptive generalization. It assumes that the substantives in the statement have referents and that the logic is internally consistent. In short, the assumption is that the model describes, in an orderly and simplified way, some overt real world phenomenon. There are at least three ways in which models are used and each has its counterpart in the kind of research that is associated with a given model.

First, and often not recognized, is the basic assertion that speech and description presume a model, albeit esoteric, held by the speaker. As an example, a speaker may refer to an object which he calls a desk. Say it is a wooden desk. The word desk implies that it is being classified according to the usefulness of its form.

It is used to contain objects and support other objects. It may be assumed that under normal circumstances that the speaker would use the desk in just this fashion. Suppose, however, that another speaker has had no experience with the support of objects found in and on desks in a modern civilization and sees its usefulness to lie in its materials. One can quite well imagine that the translation of such speech would indicate that the word used referred to the general class of objects or a sub-class that is used for fuel. Nor should one be very surprised if this second speaker became cold, he would chop up the desk (fuel) and burn it to keep warm. Here the person classifies the desk in terms of its composition instead of its form. This would be a trite point if it were not for the often observed annoyance displayed by scientists when one of their colleagues seeks to impose an esoteric vocabulary on his associates. Someone may assert that he has no "right" to do this. This could only be correct in the sense that he may not be permitted to continue to communicate in terms of this vocabulary and continue in the status of an accepted researcher. This places the forger of new theories or models in a difficult position. He can use new terms for new concepts and demand that his audience learn the new terms, or he can use old words for new concepts by re-definition and risk being misunderstood.

The relevance of this to the discussion is that since models are used as structures for classifying for purposes of communication, then

one kind of hypothesis associated with a given model would assert that this model is "better" on some scale of value for the purpose of communication. It is suggested that such a scale has something to do with increased generality without sacrificing the precision of defining the referents. In other words, the model should be capable of describing more events without becoming increasingly vague about what events are being talked about. The exact counterpart of this hypothesis in this dissertation would assert that the cybernetic hypothesis and the model of bargaining that has been derived from it is a more useful framework for researchers in communicating with each other about market phenomena. It is also asserted that the proof of this lies almost of necessity in the course of *ex post* acceptance of the vocabulary. This is inextricably bound up with the other two uses made of models.

The second use or form of models is that which emerges as a static theory. The statement is of the form; if such and such conditions obtain, then a given state of affairs will also be found to exist. One may extend this through time by the useful fiction of the steady or stationary state. This is the basic form of static economic models. The process of change is not a part of such models. It must be kept in mind that the substantives in the statements of both the explanans and explanandum presume the models for communicative

purposes. To assume otherwise leads to breakdowns in communications, or, to put it another way, the models will only exist in the mind of the model builder.

The third use of models is the one which will occupy the balance of the chapter. This use results in theory of the form; if such and such conditions exist now, then, a given event or certain events will follow. This is the form of the dynamic model. The counterpart in research is the investigation of sequences, but once again attention must be given to the matter of semantics.

In the course of discussion, several hypotheses have been advanced concerning the conditions for agreement or non-agreement to terms of exchange, and the relationship between mutual knowledge of the alternatives open to opponents in the market and the length of negotiations. Also, some mention has been made of the difficulties that the researcher might encounter in distinguishing bona fide offers from those made for purposes other than reaching price agreement.

The function of this final chapter is to draw these observations together into a statement suggesting the kind of research that might accompany the use of the foregoing model of price formation for purposes of explanation and prediction.

One form of testing that is basically inductive in nature has been discussed. This is the examination of the hypothesis that the cybernetic

model is of sufficient generality in the interpretation of human economic behavior that it can be used for general description of varying specific bargaining situations. In this type of investigation the syntactic (sign to sign) relationship of the substantive terms of the model is assumed to be of the TOTE hierarchy form and the tests for simulation are applied as the model is used to structure empirical data descriptive of varying bargaining situations. In this form of research the objective is simulation and the emphasis is on the semantics of the substantive terms of the model. The model must retain logical consistency to be valid, but the generality of the system can be preserved by relaxing the criteria for the specific identification of the referents to the substantive terms. To put this in more simple language, the researcher can be specific about the statement of causal relationships but vary the vagueness of just what he is asserting causes what. The explanatory power of the model then increases as the referents for the terms of the model become increasingly well defined.

The step from the inductive simulation model to the deductive system, that is a theory, requires the additional assumption that not only is the syntactic relationship assumed but also the semantics of the if-then statement. Given these assumptions one may proceed to statements of the form; given that a set conditions obtain, then certain specific events will follow.

The step beyond this is not only to assume that the substantives in the theory refer to specific events but to define them, that is to issue specific instructions for identification of the real world referents. In other words, this means to describe how one should go about testing specific hypotheses deduced from the model in specific situations. The balance of this chapter will be directed toward suggesting the procedures for implementing this last step.

SUGGESTIONS FOR SPECIFIC RESEARCH

To facilitate discussion, a concrete example will be used. Suppose that a group of farmers who produce pickling cucumbers, in conjunction with a farm organization, approach an economist. They ask him to estimate the chances for success in the formation of an association to bargain with cucumber processors over the terms for the sale of the unprocessed cucumbers to the processor. More likely, the question would be of the form, "We want a higher price for our cucumbers. We think that a bargaining cooperative will enable us to get higher prices. How do we go about forming a successful cooperative?" The question of feasibility could just as easily be raised by the economist. The specific problem is how does one go about determining whether or not the conditions for successful cooperative bargaining exist.

Turning to the theory, it is seen that, assuming the TOTE hypothesis to be valid, the association would be formed as a result of the decision of individuals to execute the shared plan to seek price agreement. This action would have to be based on the individual perception that this is the most feasible course of individual action. It follows that if $B_0 = S_0$, then bargaining would be precluded and the motivation for the formation of such an association to reach price agreement would be non-existent. However, B_0 and S_0 are not observable, they must be inferred by each side from experiential or overt data in the market environment. It may be further derived from the model, now as a deductive system, that bargaining will be precluded if $C_0 = D_0$, or $C_0' = D_0'$, or, $A_0 = E_0$. Furthermore, if $C_i > D_i$, any agreement other than at D_i (the purpose for formation of the association) would imply the ability of the cooperative to impose costs of non-agreement on the buyer, or arise from tapping, by sellers, of a self-imposed disutility for negotiation per se of the buyer. At the same time the association of sellers must be able to minimize the net effect of the costs to non-agreement that can be imposed by the buyers plus the sellers' own disutility for negotiation per se. The statements of the theory have been assumed to be valid. The crucial point is the identification in the market for pickling cucumbers of the referents for the substantive terms, C_i , D_i , A_i , E_i , C_i' , and D_i' .

In the formal model it is assumed that price is the sole variable and that the other aspects of the terms of trade may be reduced to price equivalence. This assumption is retained. The term C_i is then that price above which the buyer will seek alternatives to price agreement with a particular seller. In the market for pickling cucumbers this may refer to one of two prices, either the price below which the buyer (assumed here to be a processor) will turn to alternative supplies or will discontinue the processing. This means that C_i will be the lower of two prices. One of these prices is the price of supplies that are potentially competitive, over a given time period, to those of an estimated association membership. The other price is that above which the processing firm cannot be expected to remain in the processing business after a given length of time. Note that in each case the length of time must be indicated. It is suggested that in assessing what might be called the "break even point" for the buyers, the cost analysis would be more effective than the usual studies if it is approached as suggested in a preceeding chapter. The specific recommendation is to examine each purchasing firm (processor) and estimate cost on the basis of a given length of time and the sequence in which the inputs to the firm would be withdrawn in the event of non-payment. This procedure brings to bear such factors as the age of entrepreneurs, the status of the existing capital equipment, and the rate of replacement. If the

cooperative makes demands such that managerial or capital inputs are withdrawn from the buying firms over a long period of time, the initial planning should at least take cognizance of this potential consequence. A specific case study is implied.

The relevance of the length of the time period to the price of alternative supplies lies in estimates of the long run supply response of the alternative supplies. If such response is highly inelastic, the sellers could overestimate the importance of such supplies. If such response is elastic, it could lead to permanent establishment of alternative supplies and perhaps the eventual migration of processing facilities out of the community. As an example of the kind of information that may emerge, the competitive supply of pickling cucumbers to Michigan growers may be Southern growers utilizing surplus family labor. The withdrawal of payments from producers may lead to immediate withdrawal of Bracero labor from Michigan leaving the Southern growers in the market. On the other hand, increased payments may elicit a sharp increase in production in Michigan since the use of Bracero labor can be expanded much more sharply than family labor. It is seen therefore, that the definition of C_i in the specific case of pickling cucumbers involves analysis of the costs of production in competitive areas of supply and in the processing facilities. A key factor is the price below which Bracero labor would be withdrawn

for lack of revenues to pay them under federal regulations.

The term D_i is formally defined as that price below which the seller will pursue some alternative to seeking price agreement with a particular buyer. Once again there are two apparent courses of action. One is to seek an alternative buyer; the other is to cease production. The identification of the real world referent for the substantive term D_i would require estimates of the alternative buyers and the prices that would be offered to remove given quantities of pickling cucumbers from the market. It would also require an estimate of the supply response to various price levels among the community of producers as a whole, and in particular, that group of buyers that may be expected to comprise group membership.

This latter estimate presents a sticky but crucial problem. It is characteristic of organizations that a good deal of the final success in reaching group objectives is contingent on the initial estimates by a community of potential members as to the chances of success. It is suggested that this aspect be investigated along with the estimate of the disutility of bargaining per se by means of the Semantic Differential Test that is outlined by Osgood et al. (65). The test object would be a designation of the proposed organization, and the test would yield a measure of attitude toward the organization along both potency (weak-

(65) Osgood et al., op. cit.

strong) and evaluative (good-bad) dimensions. Once this test is administered among the population from which the membership is to be drawn, these values may be weighted by the value of product normally produced by the individual, and some estimate formed of the composite opinion of a sufficiently large block of producers such as can impose sanction by withdrawal of the product. One may question this procedure on the grounds that a majority vote is the usual decision procedure in a cooperative, with each member having one vote regardless of the size or value of his individual production. This may be true but large supplies external to the organization are an alternative to the organization and as such impose restriction on the marketing power of an organization.

This use of the Semantic Differential to determine potential cohesion and economic or market power of an organization would represent an area of investigation in itself. The measure that would be developed in the above fashion would be meaningless unless prior studies were conducted that established some correlation between weighted attitudinal measures and subsequent performance by individuals and by aggregates of individuals in cooperative action. There is already a considerable body of research bearing on the relationships between opinion and subsequent action.

Related to the identification of the terms C_i and D_i is the definition of the mutual estimates of these terms C_i' and D_i' . Apart from the estimates of what constitutes the potential membership of a bargaining cooperative, the terms C_i and D_i may be largely estimated from factors external to the immediate interaction between the opposing parties in the market. The definition of the mutual estimates and the relationship of these to C_i and D_i lead to interesting hypotheses about associated behavior. First, as a matter of procedure, it is suggested that these estimates be assessed by direct interrogation of the principals involved. That is, simply ask the potential sellers and buyers what they consider to be the minimal valued offers that would be acceptable to the persons that they face in the market. It is hypothesized that if $C_0 = D_0$ and $C_0' > C_0$, then the information gathering processes (LP) that accompany the organization process will draw C_0' toward C_0 and result in the elimination of the motivation for the organization. To express this differently, the information transmitted to a potential membership in the process of setting up the organization would make it apparent that the minimum that they as sellers would accept is the maximum beyond which the buyer would turn to alternative suppliers or simply abandon the plan to buy. Hence bargaining and negotiation, the assumed bases for organization, would be precluded.

If it were true that $C_0' = D_0'$, $C_0 > D_0$, and $C_0' < C_0$, then the initial motivation for the organization would have to come after a shift in the beliefs of the potential membership induced over time and/or by supplying new information to the membership. The promotional activity that accompanied the attempts by organizers would tend to create the basis for formation of the organization.

One may also describe the situation in which the presence of a bargaining association in inactive form can preclude bargaining. In this case $C_0 > D_0$, $C_0' > D_0'$, but $A_0 = E_0$, hence $B_0 = S_0$. Verbally, the buyer's maximal level of aspirations are limited to that offer which is sufficient to just inhibit the choice of bargaining by the seller as a feasible course of action. There is a margin involved that just equals the price equivalence of the difference in per unit operating costs of the active v. the inactive organization. In even more simple terms, it is a strategy in the market to make sufficient a priori concessions such that the opponent does not figure that organization is worth the effort. It is a common occurrence that the threat of organization is sufficient to induce concessions from an opponent in the market. The basic target of such maneuvers is the feasibility of plans. Persuasive and other tactical efforts are directed at both the present estimates of future subjective probability of executing a plan to bargain and at the value of such plans on the assumption that they can be

successfully carried to completion. A priori concessions are evidence of the latter tactic; subversion of potential leadership is one example of the former.

From the foregoing it is seen that in the period prior to actual negotiation, the terms A_0 and E_0 are pertinent to the question of feasibility of formation of the bargaining association. Once again the problem emerges of making an estimate of the internal feelings of an as yet indeterminate membership. The definition of A_0 and E_0 requires the estimate of the discounting applied to the value of one's own maximal valued alternatives due to the power of the other person faced in the market to impose future sanction. That is, present estimates of maximal valued feasible terms are contingent on present estimates of the future consequences of non-agreement imposed by the other person. Closely related to this is the estimate of the further discounting $E_i - S_i$ and $B_i - A_i$ due to the person's own dislike for bargaining (or preference for it, negative discounting).

It is reasonably apparent that two crucial areas of research which must be conducted are alien to current economic analysis. One of these areas is that of probing the value of the ends to be achieved by plans; the other is the subjective estimate of success. Taken together these are the two factors that determine feasibility as defined

in the bargaining model. This means that researchers investigating the bargaining situation will have to become sufficiently competent in the area of attitude research so they can at least converse knowledgeably with those who can carry out the research on a supporting basis. The Semantic Differential test is not the only procedure for assessing the meaning that people attach to concepts or attitudes toward objects, but it is one that seems to be highly appropriate to the model in this dissertation.

With respect to the more traditional areas of investigation in the economic science, two different kinds of research are called for. First, it is suggested that the present techniques for linear programming of individual farms be extended to programming groups of farms. It is suggested as the initial step that some specialty crop, perhaps blueberries, where the number of farms is small and the inter-regional competition well defined, be examined empirically and interpreted on a multiple farm basis. The questions here would be the problem of inter-farm integration of total farm programs with respect to all crops produced on the farms and also the macro effects of individual shifts in programs.

Secondly, the variant on the usual cost studies has been suggested. The structuring of costs on the basis of withdrawal of inputs in the event of non-payment requires case study techniques. Objections

could be raised on the grounds that this departs from a rather well-ordered and formalized science of accounting. It can also be argued that the arbitrariness of asserting what persons may do, in general, in any particular stage in the life cycle with respect to savings or capital investment is no more arbitrary than the choice between LIFO or FIFO procedures for handling depreciation.

If any generalization is to be attached to the foregoing recommendations for research, it is to be found in the basic suggestion that the attention of researchers in economics be shifted from measures of economic activity per se to the underlying behavior that generates the data. This does not mean subordinating data to behavioral hypotheses. On the contrary, it means that increasing attention must be given to alternative measures and structuring of the same phenomena, with the further aim of rendering increased precision to the fitting of measurements to the statements of the theory or hypotheses under consideration.

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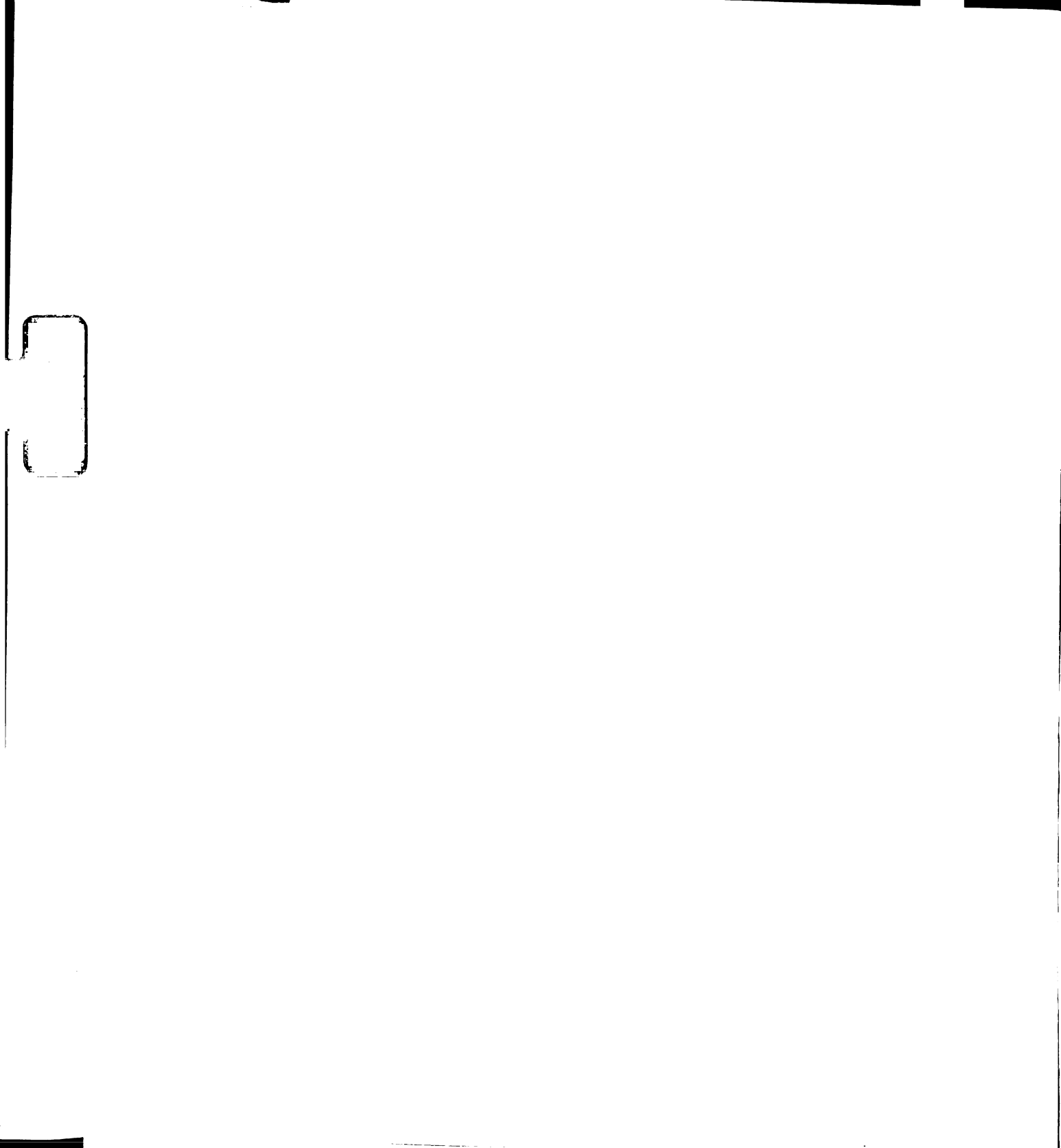
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