Food Demand and Consumption Behavior
Selected Research Topics

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PROBLEMS IN ANALYZING DOMESTIC FOOD DEMAND

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INDUSTRY RESEARCH ORIENTATION

If there is an insight to be gained from industry experience in analyzing domestic food demand it revolves around pragmatism. The pragmatic approach of industry stems from needed answers to present problems. It is unlikely to break new frontiers in demand theory but it could help to apply current demand theory by assisting in problem definition, structural specification, data requirements and in evaluating results. As will be developed later, industry research may operate on two different levels. One would concentrate on food demand at an industry or aggregative level while the other would concentrate on consumer behavior. Both are topics of this workshop and if there were not limitations on data availability, model specification and statistical techniques, it would be possible to aggregate consumer behavior into industry demand. Such is not the case at present.

Industry research must be problem oriented. This is in direct contrast to much academic research which tends to be technique oriented. One of the most difficult tasks facing research workers is to be able to delineate problems by cutting away the imagined problems to get at the core problem, then to decide how solutions should be approached. This latter step may involve data requirements, statistical techniques and communication skills. It is also worth pointing out that the problem description in itself often suggests solutions and this can limit the researcher's ability to correctly analyze the problem and to reach a best solution.

A second observation on the nature of industry research is the need for continuity. Again, this is a major difference between industry and academic research. Not only does academic research tend to be project oriented but it often has a time horizon prescribed for completion of the research with no provisions made for continuity. Such continuity involves reformulation and revision as the market structure changes in order to keep the results meaningful. The importance of this cannot be overemphasized. To undertake such project research with no provision for continuity is to encourage an inefficient use of research resources. Any research analyst knows the difficulties involved in specifying a structure which is descriptive of the market for recent years (or at present if cross-sectional), and which will yield useful results for the present. It is not likely that a structure can be specified which will hold into the future. This is the major reason for continuity in research.

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Industry personnel charged with research responsibilities must also be competent in the art of communication. Research results become useful knowledge only when they are used to make decisions. This requires that the research analyst bear the responsibility for transmitting the results to users. Transmission requires that results be in a readily understandable form and that the user be educated to the point of understanding. A thorough effort in communication often helps in the reformulation and respecification of the structure.

If the above seems like a digression from the major topic assigned, it is only to emphasize that if one is

(a) problem oriented,
(b) provides continuity of research, and
(c) communicates it to users in a form they understand,

a large measure of success will be achieved in "analyzing domestic food demand". These three research criteria will be extremely useful in providing guidance on problems of data requirements, including its nature and the frequency of observation, the types of models specified, the techniques used, the manner in which results are presented, and, most important, its acceptance by a clientele.

INDUSTRY PROBLEMS IN ANALYZING FOOD DEMAND

Recent experience with clients who have indicated demand oriented problems, and from a very cursory survey of several industry marketing executives who function almost exclusively in marketing departments brought to light several problem areas. The indicated problem areas are all real but none are described in a fashion comprehensive enough to suggest solutions.

In recent years food marketing specialists have been deluged with problems never before encountered in their generation. Some of these are discussed.

1. Since 1972, the extent of price volatility in many commodity markets has been beyond imagination. Soybean meal prices which had never reached $100 per ton prior to 1972 reached $430 per ton in 1973. Sugar prices, which for some 50 years never exceeded 12 cents per pound, reached 65 cents in 1974. Cocoa prices which in mid-1975 had reached 60 cents per pound, itself an abnormally high price, reached $2.00 per pound in early 1977. Soybean oil prices which had a monthly high from 1950 to 1972 of 14.5 cents per pound reached 43.1 cents per pound in August 1974. Many more examples can be cited.

When such a trauma befalls a food manufacturer it would be extremely beneficial to be able to rely upon completed research to

provide answers to the problems which arise. Obviously, the first thought is to maintain a physical supply, which is a purchasing problem, but close beyond it is the problem of volume sales. The inference is that at some price level there is a price elasticity of demand which will affect sales volume. Since prices had been relatively stable prior to such enormous increases, there were no studies prior on price elasticities of demand one could have used to provide such answers. This recent period of price volatility may have provided the first real opportunity to get useful measures on price elasticity of demand for many commodities. If the academic profession does not capitalize on it, one may conclude that there is good evidence that price elasticities are a concept that should be banned from further research efforts and eliminated from the economist's vocabulary.

2. There are concomitant problems with such price gyrations. An important one involves ingredient substitution and consumer behavior. If cocoa powder increases from 40 cents per pound to $2.00 per pound and you are putting out chocolate ice cream, do you increase production of vanilla, strawberry, etc. and reduce the volume of chocolate, or pass along the cost to the customer in chocolate, or maintain the price on chocolate and absorb the cost increase? This might appear to be a trivial problem relative to nutritional problems of American consumers, but in a high volume - low margin business it can become a critical issue involving whether or not customers can be retained. A somewhat parallel example involves ingredient substitution and consumer product acceptance. Suppose you are a purchaser of five million pounds of edible oil for a potato frying operation and soybean oil is the base oil. Palm oil becomes available and is at a price discount of 8 cents per pound. Technology permits its use, but what will consumer reaction be? Potential savings of almost a half million dollars are available but if consumers detect a noticeable difference and sales volume declines, losses could exceed that several times over. Such decisions do not permit test marketing at the time, but if marketing people can foresee such situations in advance, they may be able to describe the problem so that consumer demand could be analyzed. A similar situation has arisen recently involving the substitution of lower priced high fructose corn sweeteners for higher price sucrose. One solution, of course, is to have a continuous consumer test panel operating so that some quantitative measure of the substitution effects can be obtained.

3. A third problem area facing marketing people is that involving relative demands for brand name items versus private label items. There may be good possibilities to exert more control over the costs of private label goods by buyers than for brand named items. The question is what kind of sales volume can be expected when it is sold in competition with brand names, and what kind of pricing should be followed? The latter will determine the markups and, hence, profits. Good examples of this are found in consumer packaged sugar, edible

oils, shortening, margarine and family flour. These are items that have less product differentiation in the eyes of consumers than many others. The recent announcement by Jewel Company to concentrate on private label products indicates the importance of this problem.

4. While this workshop is concentrating on problems and research involving domestic demand, there is a great concern in industry over export demand. When commodities become in potentially short supply for domestic use a fairly definable panic grips manufacturers who may be affected. The stronger the product franchise; i.e., product differentiated image in the minds of consumers due to advertising, promotion and sales effort, the greater the degree of concern. Lack of physical supplies are problems of deep trauma to marketing people. In such cases problems of export demand become of extreme importance in analyzing domestic demand, completely superseding any interest in price or demand elasticities, ethnic or racial demand, family size, or problems of a similar nature. Substitution possibilities, export embargoes, inventory accumulation policies and methods of stretching supplies become real management problems.

5. In recent years, marketing departments have been faced with a new challenge. This centers around labelling requirements. There is justifiable concern over the nutritional content of many prepared foods. Public education along with public information are programs deserving of support. However, such programs have costs which eventually must be borne by consumers. A balance must be reached between the degree of regulation which labelling causes and the cost. An example may point this up. Bakery manufacturers have been large users of lard as a fat source in cookies, crackers and bread. Typically, on the basis of refined product costs, lard has sold at a discount to its next closest price competitor, soybean oil. However, if labelling requirements force manufacturers to specify the source of fats or oils used, there could be a complete switch out of lard in all metropolitan areas where ethnic beliefs prohibit or discourage lard consumption. The additional premium paid for soybean oil, and it will increase as the demand for soybean oil increases, is a cost passed on to consumers. To my knowledge, little research has been conducted on the magnitude of such costs, the likely shifts in demand and alternative policies which might be pursued.

The above example relates to labelling requirements. The same problems exist with regard to federal and state regulations including those under the jurisdiction of the FDA. I am reminded here of a comment I made in an AFEA paper given in 1967 dealing with the role of production economists. It was to the effect that while most research efforts are concentrated on microeconomic problems, the results of a lifetime of such work can be completely overshadowed by one administrative policy decision. Research efforts should be concentrated where marginal returns are the greatest. These lie primarily in macroeconomic areas and, especially, where policy decisions and actions

by governmental agencies have effects, both good and bad, on consumers far beyond what is often contemplated or imagined.

RESEARCH REQUIREMENTS AND TECHNIQUES

Inventories and Invisibles, An Industry Example

Volume sales are of great importance to food manufacturers. This is evidenced by efforts to retain or enlarge their "share of market". Thus, when volume sales show abnormal declines, a ripple effect is generated from sales to marketing to management with the peripheral functions of manufacturing, purchasing, traffic, advertising and finance becoming involved. Questions center around the reasons for the decline; i.e., is it a loss of market share or a decline in the total market; have substitutes made an inroad; is to transitory or permanent; will price adjustments regain sales; and how should current plans on new product development be altered?

There are no ready answers to the questions raised. Answers involve having adequate data on a continuous basis and adequate analyses to help make decisions. Data sources such as SAMI are used to measure the movement of particular packaged goods from distributor warehouses to individual stores. Such a source is useful in measuring market share relative to competitors and in measuring total product movement of the particular goods. The report is of less value in determining why total sales varied abnormally and how long the abnormality may persist.

For some particular product categories, it may be possible to supplement data and analyses from reports such as SAMI with other data and analyses to provide more complete reasons for abnormal sales patterns. Two such examples are shown below for sucrose and edible oils. In the case of sugar, the demand data are measured by the volume of deliveries made by refiners and beet processors to customers. Data are reported weekly with an approximate one week lag.

The Bureau of Census report M20K contains monthly information on the consumption of each of several fats and oils in the production of baking or frying fats, salad or cooking oil, margarine, and in other edible products. Data are reported for the total industry with an approximate one month lag.

Such reported data can be useful in providing at least a partial explanation for abnormal demands. This centers on the computation of measuring invisible stocks. The technique will be most successful where the price and income elasticities of demand are low and where per capita consumption is either quite stable or changing over time at a fairly stable rate. The procedure is outlined below:

(a) Apply seasonal adjustments to the monthly data if any seasonal pattern is believed to exist. For most agricultural products, significant seasonal patterns of demand do exist. The base period used should be as free as possible from abnormal factors causing shocks to monthly consumption.

(b) Use the monthly seasonally adjusted data on consumption by category of use to estimate a simple trend line. The time period used as the observation base is important and several base periods may be used to develop several trends. Each is subjectively evaluated based upon a knowledge of the market conditions which prevailed.

(c) Plot the seasonally adjusted monthly data about the trend line. When an analyst has worked with the data over a period of years it becomes quite easy to explain why large deviations from the trend line exist. These can be related to such factors as lack of supplies, availability of substitutes, price impact of substitutes, labelling or other restrictions by FDA, large price moves for the particular product under study, inflation rates and the resultant impact on real income, or a variety of other causes.

(d) Many shocks to the system are of a transitory nature and, therefore, one has an expectation of a return to normal demand after a limited period of time. To help measure such a time period, it is possible to compute a statistic termed "user's invisibles". This is simply measured as the cumulative sum of the deviations of the seasonally adjusted data about the trend line. (Obviously these deviations sum to zero if a simple least squares regression is used to estimate the trend line and the same observation base is used in developing the seasonal index. It may be more appropriate not to use similar periods for the observation bases.)

(e) The user's invisibles index can be interpreted as the deviation from normal in stocks at the particular point of the market being measured, in this case at the manufacturing level. (SAMI data could be used to develop a user's invisible index at the retail level and if continuous data were available one could also measure invisibles at the consumer level.) What often happens is that if consumers or retailers, or both, have an expectation of higher prices, an increased volume is ordered and inventory building is undertaken. Such an increase in user's invisibles may even lead to further price increases until invisibles reach a capacity level for users or the risk of holding abnormally high inventories at such high price levels becomes too great. If the buildup occurs over several months, manufacturers may consider the increased demand as being "normal". Thus, when demand declines abruptly due to the using up of invisibles, the decrease in volume sales becomes magnified. By measuring the buildup in invisibles and assuming that a return to normal will occur, the length of the decline in sales volume can be estimated with some degree of accuracy.

(f) The accompanying graphs show the trend line for refined sugar deliveries in the USA from 1961 through 1977 (Figures 1 and 2). (The same trend prevailed through 1974.) In early 1963, world sugar prices rose to a level equal to domestic prices and consumers became concerned over higher domestic prices. The result was that they built user's invisibles during March-April-May 1963 of 483,000 tons above normal, a level almost three times anything held previously relative to normal. Prices peaked in May and during the next three months invisibles were reduced 432,000 tons, or almost equivalent to the buildup. A concern over work sugar appeared again in late summer, and during October invisibles increased 163,000 tons. With world prices dropping in November invisibles declined a similar quantity in November. In spite of the higher prices and the uncertainty prevailing, sugar consumption (as measured by deliveries) was close to normal for calendar year 1963. Thus, the demand fluctuations were transitory, continuous monitoring of the data and using the "invisibles" technique was useful in proving so, and some proof that the price elasticity of demand was very low could be deduced.

In 1974, a different situation prevailed. Again, early in 1974 there was concern that domestic sugar prices would be pushed up by world sugar prices. Users followed the same pattern of building invisibles with deliveries being about 190,000 tons above normal in January-February. In March, prices declined 5.25 cents per pound and invisibles declined about 110,000 tons. However, prices again rose rapidly and, while consumers did build some invisibles in April and May, prices soon reached a level where they were unwilling to hold stocks. In this case, the price elasticity of demand was a significant factor. The collapse in demand for sugar during December 1974 - March 1975 shows that invisibles were still sizable. However, a new factor was added. In late 1973, there was a surplus of corn syrup and new plants producing high fructose corn syrup were coming on stream. These both provided ready substitutes for sucrose. The demand shift in 1974 was not transitory as in 1963, but is likely to be permanent. The extent of the shift in demand can be partially measured by the new trend line which has been plotted since July 1975. For the past 20 months, sucrose consumption has been reduced an estimated 11 percent due to substitution of other sweeteners. Data are not available to measure total sweetener demand as in the case for sucrose and a similar analysis on all sweeteners would be extremely beneficial. However, the results obtained have been helpful to decision makers in both sucrose production and in the production of competitive sweeteners to evaluate current markets and to make future plans.

(g) In mid-1973 a sharp decline in disappearance of fats and oils product occurred as prices rose to record levels, supplies were short and uncertainty developed because of export embargoes (Figure 3). Invisibles were reduced drastically. For October and November, disappearance was near normal. In January 1974, disappearance reached

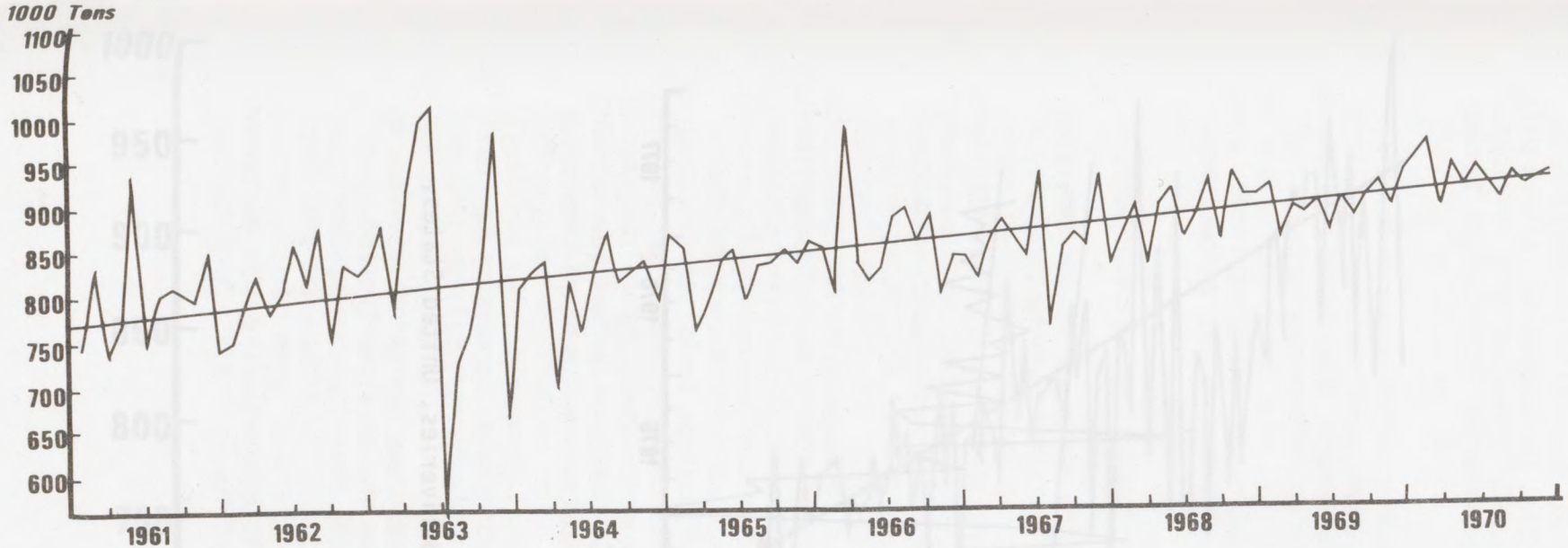

Figure 1. Seasonally adjusted sugar deliveries, United States, 1961-70.

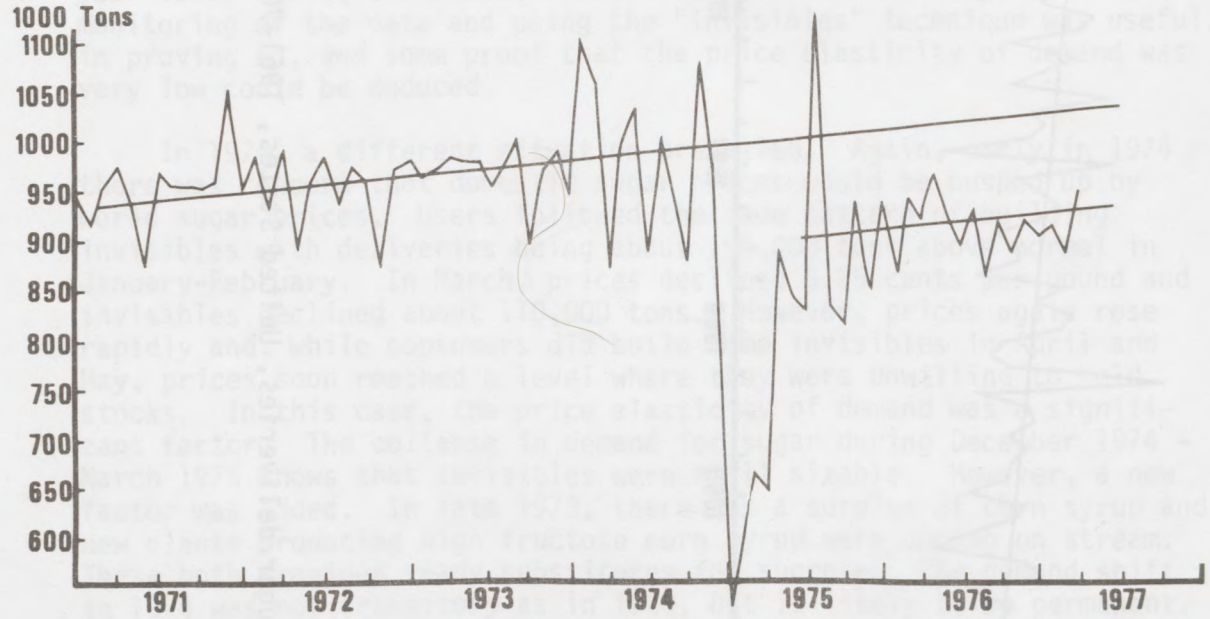

Figure 2. Seasonally adjusted sugar deliveries, United States, 1971-77.

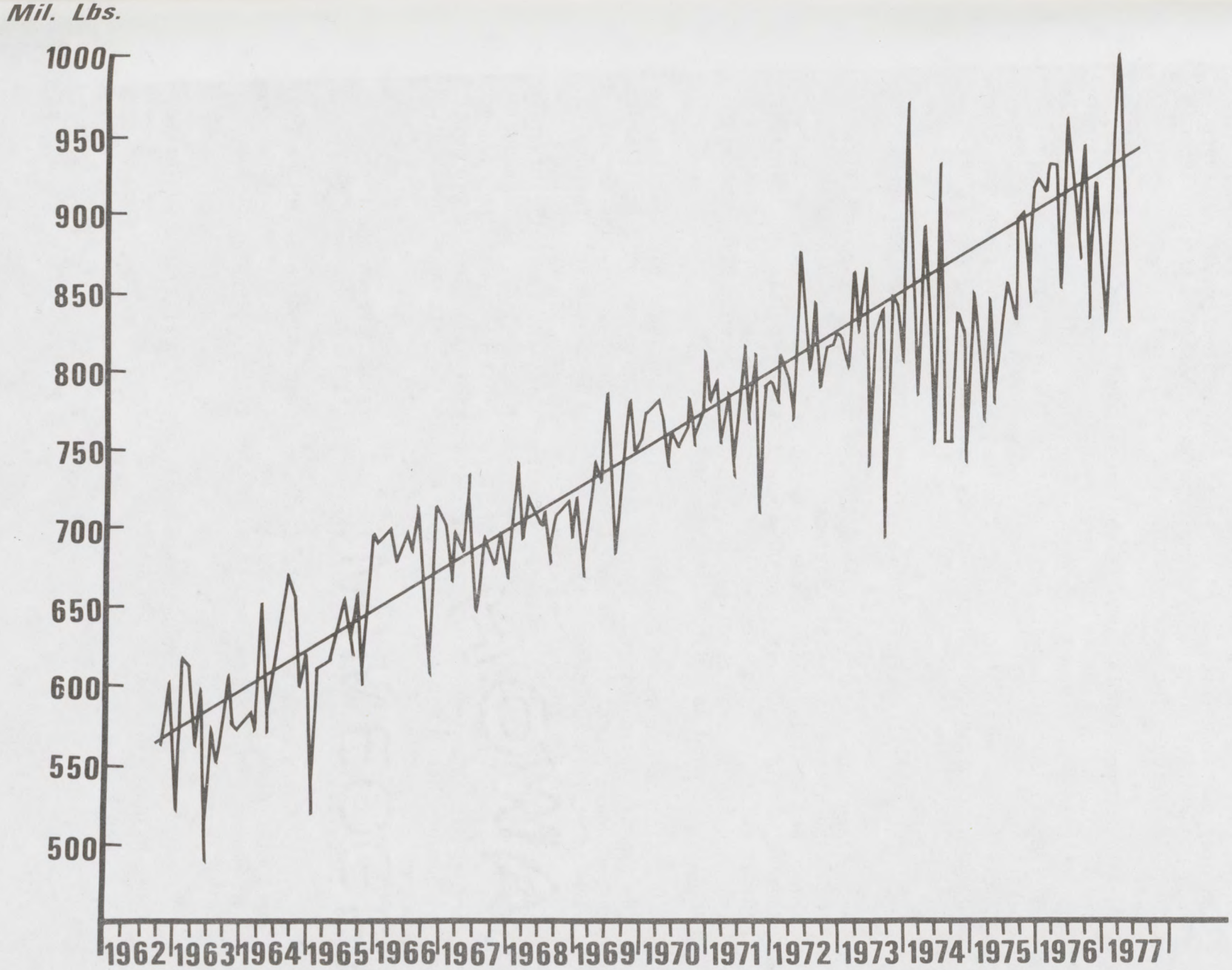

Figure 3. Seasonally adjusted disappearance of edible fats and oils products, United States, 1962-77.

a record as invisibles were rebuilt. For the period August 1974 through August 1975, disappearance was at abnormally low levels. During this time, there was a concern that the demand for edible oils had dropped permanently to a new level. By September 1975, disappearance had reached normal again and from September 1975 through September 1976 averaged two percent above the trend line.

The purpose in the above exposition is not to present frontier breaking techniques which will result in new approaches in analyzing domestic food demand and consumption behavior. What is intended to be conveyed is that to provide useful ongoing information to decision makers in industry, data must be extensive, of a continuous nature and timely in its publication. This combined with ongoing research, even though mundane in character, can be useful to industry executives.

THE PARALLEL BETWEEN MARKETING FUNCTIONS AND RESEARCH NEEDS

Management executives with sales and marketing responsibilities are faced with a series of problems. The nature of the problems change and solutions, therefore, are not permanent. Thus, managers operate within a dynamic framework where static equilibrium solutions do not exist. It might be well to list some of these problem areas and then try to draw parallels between them and consumption behavior or market demand as defined by this workshop.

Sales or marketing executives perform functions which facilitate the transformation of supply into demand. Static economic equilibrium theory would depict this as two curves denoted as supply and demand with an equilibrium price indicating where the two curves are equated. It is not enough that after 100 years of economic theory and the application of powerful theories of mathematics and statistics that we do not even know the shape of such curves for any individual products, but we are just as presumptuous in always denoting one of the axes as price. In an attempt to encourage the investigation and development of demand theory for food, some modifications of standard theory are suggested.

As stated, sales people perform a function between their production facilities (supply) and their clients (demand).

1. Sales executives concentrate on forecasting sales volume by product type. This involves estimating the total market and the particular firm's share, and knowing the firm's planned production volume.

2. Competitive products are analyzed for quality and evaluated as to price. This helps set pricing policy.

3. Their own product quality is evaluated to see that it meets client needs.

4. Distribution facilities, whether owned or leased, are evaluated to determine what volume of sales can be adequately handled (traffic).

5. Product lines are evaluated to see where bottlenecks might occur; i.e., where is supply most likely to exist as a constraint to sales. This problem can be magnified if joint products are manufactured in fixed ratios.

6. Payment terms are decided upon with accounting or financial departments.

7. The sales force is evaluated (including direct sales force as well as field or general brokers).

This is not meant to be a complete list of marketing functions but it will serve for expositional purposes.

If marketing personnel could answer all such questions with perfect accuracy, it would always be possible to plan production exactly in advance to meet a known demand with given product lines. What in reality happens is that marketing people are trying to estimate consumption behavior and to adjust their operations to fit such behavior. Stated differently, consumers have certain desires which must be met and suppliers are trying to fulfill them. A carload of sugar has no value as such. Its value lies in satisfying a client's need in producing, say, a confectionery product. The car of sugar must contain a whole series of utilities to satisfy the client's need. Price is only one of these and in some cases is not the most important; i.e., price elasticity of demand is low. If one can break out the other utilities, it might further demand theory somewhat by regarding these as the forces which provide demand-supply equilibrium. Such utilities are involved at every stage of demand-supply equilibrium. Farm supply and primary demand, whether it be elevators, meat packing plants, dairies, fruit and vegetable processors or handlers, Commodity Credit Corporation, etc., represents the interaction of one set of utilities. A second set will exist between the "demanders" of the first group, who now become the suppliers, and their outlets be it wholesalers, other processors, retailers or consumers. Such utilities are involved at every stage of title change until final consumption is reached. Since very few food products are consumed in the form in which originally produced, the bundle of utilities varies at each step. Price or income will be more important at some stages than at others. In any case, to attempt to measure price or income elasticities of demand at the consumer level for a product such as wheat, for which the form

changes greatly, and where there is a different bundle of utilities at each stage, is to encourage results of limited value and with potentially great variation between researchers. Only if the intervening structure between farm and consumer was constant would one expect to get useful results. The difficulty of specifying such structural changes is one of the major problems in demand analyses. Because structures are different at each stage of the demand chain, it is too much to expect that one demand theory will serve all stages equally well. If one concentrates on microeconomic problems; i.e., developing a consumer demand behavior, it will simply not be possible to apply this behavior to demand at the industry level. To attempt to do so is similar to fitting reduced forms without even first specifying the theoretical model involved.

To illustrate how one might graphically treat such utilities two diagrams are shown (Figure 4 and 5). In figure 4, time utility is depicted as the demand and supply setting mechanism. Since time is a continuous function, the demand and supply curves, while not known, can be assumed to be continuous in nature. Quantity is represented on the horizontal axis and time in days on the vertical axis. Time may be considered as the elapsed time between order placing and being received at the user's warehouse. With a delivery period of seven days suppliers can supply OA' but users will take only OA. At a 4 day delivery, users would take OB but suppliers can supply only OB'. At 5 days, each would settle on a quantity OC. The supply curve could be shifted to the right by plant expansion, an increase in leased railroad cars, or a technological improvement. The demand curve could be shifted right by an improvment in selling terms; e.g., 2% cash discount in 30 days since it would permit the user to stock some inventory, or a guarantee to protect floor stock against a price decline for 30 days. Such shifts could occur with no actual change in price.

In Figure 5, form utility becomes the equilibrating factor. Since the number of product forms is limited, the supply and demand curves will be discrete rather than continuous. For instance, let the form be product packed in 100 lb. bags, supplied in bulk truck, in small rail cars or in jumbo rail cars.

If the user must take bags, his use is very limited because a bulk system has been installed and labor to break bags is either unavailable or prohibitive in cost. In the case of bulk trucks, usage could increase substantially but unloading facilities and no night receiving limit this. Small rail cars may also increase use but since he is set up to receive bulk sugar in jumbo rail cars this maximizes use.

In the case of a particular supplier, he may have ample sugar stored in bags, have a truck fleet which he wants to keep in use, have

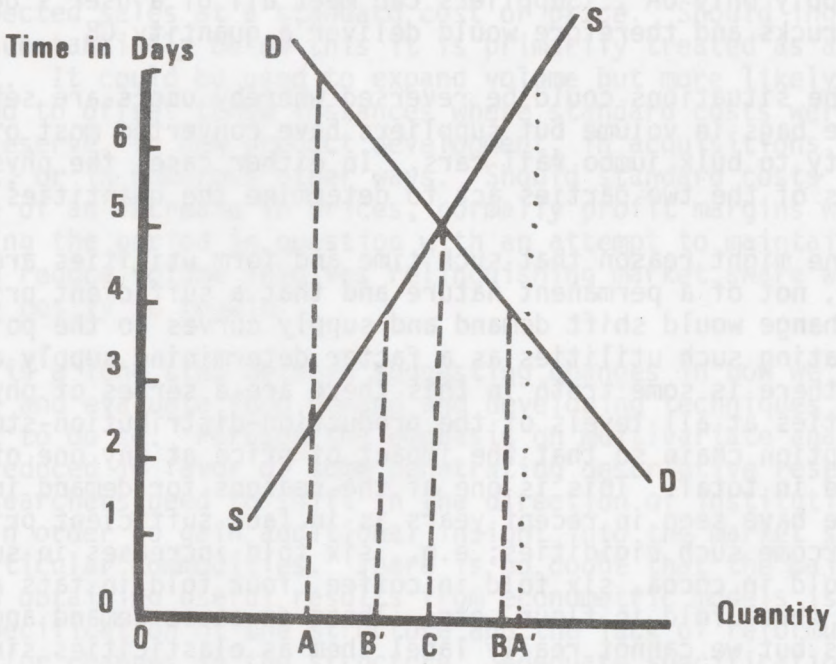

Figure 4. Supply and demand curves depicting time utility.

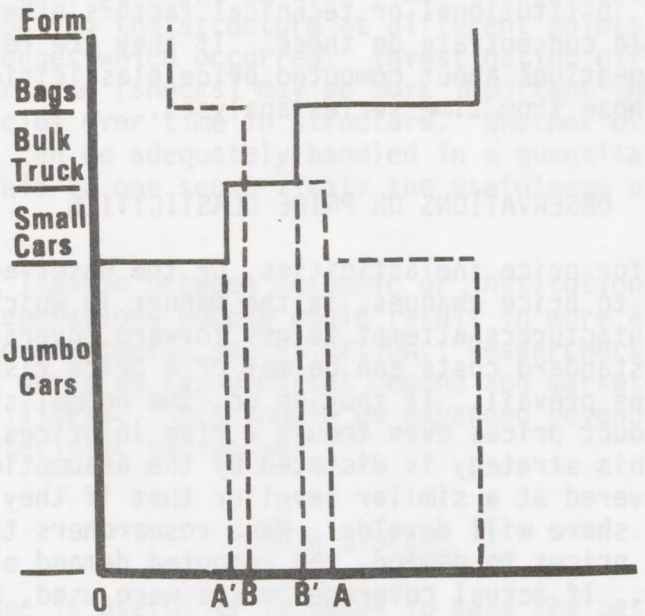

Figure 5. Supply and demand curves depicting form utility.

some limitation on small rail car leasing and be unable to get jumbo cars into his plant. Thus, two very distinct demand and supply curves exist. While the user would take OA in small rail cars the suppliers can supply only OA'. Suppliers can meet all of a user's demand OB for bulk trucks and therefore would deliver a quantity OB.

The situations could be reversed whereby users are set up to receive bags in volume but suppliers have converted most of their capacity to bulk jumbo rail cars. In either case, the physical limitations of the two parties act to determine the quantities delivered.

One might reason that such time and form utilities are artificial, not of a permanent nature and that a sufficient price or income change would shift demand and supply curves to the point of eliminating such utilities as a factor determining supply and demand. While there is some truth in this there are a series of physical rigidities at all levels of the production-distribution-storage-consumption chain so that the impact of price at any one of them is diluted in total. This is one of the reasons for demand inelasticities. What we have seen in recent years is in fact sufficient price changes to overcome such rigidities; e.g., six fold increases in sugar prices, five fold in cocoa, six fold in coffee, four fold in fats and oils, two to three fold in flour, etc. These do cause demand and supply changes but we cannot really label them as elasticities since many such changes are nonreversible. What happens is that product substitution occurs, often in the form of new products. This essentially means a new structure and once again the type of utility discussed previously will have an influence on where demand and supply reach an equilibrium. In essence, I am suggesting that demand (or supply) may be determined by institutional or technical factors other than price and that we should concentrate on these. If they are real then it raises serious questions about computed price elasticities of demand, and especially those from time series analyses.

OBSERVATIONS ON PRICE ELASTICITIES

One reason for price inelasticities, or the observed lack of reaction of demand to price changes, is the manner in which ingredients are priced. Manufacturers attempt to get forward coverage at fixed prices whenever standard costs can be met or a price rise is expected or both situations prevail. If they do so, the normal strategy is to maintain end product prices even though a rise in prices for ingredients occurs. This strategy is dictated by the assumption that competitors also covered at a similar level or that if they did not, an increased market share will develop. When researchers then relate published market prices to demand, the computed demand elasticities appear to be low. If actual coverage prices were used, the relationship between prices and demand would be much more pronounced.

Another reason for the lack of response in demand to price changes is that price is not treated by manufacturers or retailers as an equilibrating force. Production departments plan a certain volume to meet expected sales at a standard cost or price. Should ingredient prices be substantially below this it is primarily treated as a windfall profit. It could be used to expand volume but more likely it will be used to offset those instances where standard costs were not met, as a reserve, in new product development, in acquisitions, to retire debt, or in numerous other ways. Should standard costs not be met because of an increase in prices, normally profit margins will shrink during the period in question with an attempt to maintain volume. To reduce volume involves relinquishing market share which may be very costly to regain.

There is a long step between suggesting changes in how we should investigate and evaluate food demand and developing techniques of measurement to do so. Perhaps the emphasis on multivariate analyses should be reduced in favor of some penetrating descriptive research. Perhaps researchers need to shift in the direction of institutional economics in order to gain additional insight into the market structure of particular commodities. There is no doubt that the major obstacle in obtaining useful results from econometric models is inadequate specification of the structure and the lack of reformulation to account for changes in the structure. Adequate specification requires insight into the structure that can in many cases best be gained by working with industry. This requires a large degree of disaggregation; i.e., there is not much payoff in looking at wheat but there may be in looking at bread flour, pastry flour, cake flour, family flour, and, perhaps, an even finer disaggregation. It also involves evaluating the structure at different points in time and noting the changes which occurred. Investigating differences in structure over time (shocks) may be more important than investigating the consistencies over time in structure. Whether or not such structural changes can be adequately handled in a quantitative manner is debatable. This in one sense limits the usefulness of time series analyses.

A closer liaison between academic or institutional researchers and industry operations people could result in more accurate problem definition and structural specification. Researchers need to uncover those factors which do cause market demand and market supply to reach temporary equilibria. This should be expanded beyond price, income or social characteristic variables.

DATA SYSTEMS

"Knowledge is useful if it helps to make the best decisions." This statement by Marschak is appropriately the lead sentence in the

Hood and Koopmans book on Econometrics. Data or information is the basis from which knowledge is developed. However, one must keep in mind that it is useful only if it does aid in decision making. It therefore follows that data requirements should originate from the decisions to be made. If one is problem oriented in research then the development of data will depend upon the problem. If one is technique oriented, data are selected to satisfy the technique and whether or not a problem can be solved becomes of secondary importance. It obviously follows that data will have costs and benefits that must be measured in terms of the importance of the decision to be made. Researchers need to know what clients will pay for data which forms a useful basis for making decisions.

In the above sense, it is unfortunate that most research in demand and consumption behavior has been based upon data not specifically developed to provide solutions to specific problems. This includes much of the data collected by the government and published in its many forms. Such data are extremely valuable but may have limited usefulness when used to answer specific problems.

There are several data sources consistently mentioned by industry people. The first of these would be SAMI and SARDI which reports the movement of almost all items of packaged goods from food distributor warehouses to individual stores. It covers dry groceries, frozen and refrigerated foods, and health and beauty aids in 36 marketing areas. Data are reported by four week periods. For each item, for each marketing area, the size is given, pack per case, cash volume, dollar share of the market, the average shelf price, number of shippers of the item, percent share of market for particular shippers and other data in detail. The usefulness hinges on the detail available, the continuity of the reports and the analyses provided. MRCA and Nielsen data collections fall into a similar category in the opinion of industry marketing executives.

In the case of retail food chains, there is a heavy reliance on data generated by their own system. The large scale use of automated inventory control systems in retail food chains has required both the collection of data and the development of demand forecasting functions for each item. While these tend to be simple functions, such as the use of exponential smoothing techniques, there has been improvement in the techniques. Such demand functions can incorporate irregularities caused by promotional activities, seasonal demand for products, various recurring price discounts, and even freight discounts for larger size loads. Because data are available on a continuous basis and because problems are present for which solutions are desired this area would appear to be a fertile one for this group to investigate.

For food manufacturers, published data are not normally available on the items which they wish to analyze; therefore, they place a heavy

reliance on their own data as a primary source. One reason, of course, is the impossibility of acting in concert with competitors to develop an industry series.

It might be difficult for outside researchers to work with them, again because of the need for confidentiality. On the other hand, industry researchers require help with both techniques and how to work with incomplete data sets and academic researchers could be of great benefit in supplementing industry workers in this area.