

## **Research Updates**

### **Examining Relationships Between Prices and Consumption**

#### **For Selected Meat Cuts and Convenience Items**

#### **Using Electronic Scanner Data**

by

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#### **Project Status**

In progress (to be completed in early 1986)

#### **Problem**

Recent advances in technology have facilitated the scanning of meat cuts. Increases in the use of this technology provide an important data base for the analysis of relationships between prices and consumption of meats. Recent changes in consumer demand, including increased demand for convenient food, have altered consumer buying patterns for meat. Information obtained through the use of scanner data provides valuable insight into price/consumption relationships between meat cuts and competing products. The management uses of the information derived from scanning meat cuts have not been previously analyzed. In particular, estimates of retail price sensitivity between meat cuts and competing products, such as convenience (quick-fix) types of foods would be valuable for inventory, purchasing, and merchandising decisions.

#### **Methodology**

Data for selected meat cuts and convenience items will be gathered from a supermarket in central Illinois. Efforts will be made to evaluate the accuracy of meat scanning through monitoring volumes of cuts placed in the meat case versus volumes of cuts passing through the scanner system. Advertising expenditures will also be monitored, particularly in terms of featuring on the products in the analysis. Correlation and regression analyses will be conducted to examine price/consumption relationships. Demand models will be developed and price sensitivities estimated. Forecasting models with quantity as a function of price and advertising expenditures will be developed. These models will provide insight into the management uses of electronic scanner data for meat cuts.

#### **Major Findings**

The findings of the study will be useful to supermarket managers in: (1) assessing the impact of advertising expenditures and price specials on own and competing product sales; (2) determining appropriate case space and advertising allocations; and (3) in de-

veloping sales management models using the data provided by electronic scanning systems. The research community will be able to build upon this results of this initial investigation to refine models of price/consumption relationships at the retail level. Specifically, the results will provide insight into: (1) the uses of scanner data for meat cuts and convenience items in developing models of consumer behavior; (2) the development of store management models using electronic scanner data; (3) the empirical problems and limitations involved with the use of scanner data to estimate retail price sensitivities; and (4) the performance of forecasting models for product movement when advertising expenditures are included. Finally, the results of the study will provide additional insight into the nature of the changes in consumer demand for meat.

## Economic Impacts of Price Volatility in the Egg Industry

by

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### Objectives

1. Document secular changes in egg price volatility at all market levels and identify factors leading to or explaining this volatility.
2. Determine the pricing efficiency in the egg market.
3. Ascertain the nature of marketing margin behavior.
4. Quantify the social cost of price volatility in the egg industry.

### Problem

Price volatility represents a source of economic inefficiency when changes in prices cannot be correctly anticipated. Because of the risks inherent in unstable prices, too few resources may be devoted to an industry subject to variations in prices, especially if decision makers are risk averse. Inelastic demand for farm commodities combined with fluctuating supplies makes the problem of price volatility particularly acute in the food sector. A food industry that appears to be chronically afflicted with price volatility is the egg industry. Egg producers have recently responded in three ways: (1) vertical integration and contract production has increased, (2) firms have gotten larger along with industry concentration, and (3) a proposed marketing order for eggs has been developed. This research attempts to shed light on the

economic consequences of egg price volatility for producers, consumers and middlemen.

### Methodology

The primary forms of research will be to combine econometric procedures with secondary market data to quantify the impact of egg price volatility on egg marketing margins. A working hypothesis is that volatility in farm and wholesale level egg prices causes retail prices to rise and the farm-retail price spread to widen. It is anticipated that auxiliary information on risks in the egg marketing channel will be obtained through a survey of market participants. This information will serve as inputs into an economic model designed to quantify social welfare impacts of price volatility.

### Significance

The research is expected to have significance to food distribution in that it will improve understanding of how price risk affects food markets. Results are expected to be useful to policy makers in Washington D.C. concerned with the egg marketing order proposal. Researchers interested in studying price risk impacts in food marketing may find the methodology and analytical procedures of value.

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**Present and Potential Uses of Scanner-Derived Information  
For Managerial Decision-Making in Food Retailing**

by

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**Problem Addressed**

To date, relatively few resources have been devoted to generating and/or organizing scanner data to be used as tools for managerial decision-making. Little thought has been given to data collection and presentation in terms of which managerial staff members need the information, what needs the various staff members have, and in what form the staff members require the information. Additionally, there has been only limited use of scanner data as a basis for demand analyses.

In this light, this research project, to begin September 1, 1985, funded by the Agricultural Marketing Service, USDA, has three objectives: (1) to determine the present use being made of scanner-generated data in managerial decision-making levels, (2) to determine for various levels of management major areas of decision-making for which scanning checkout systems can generate needed data and in what form such data would be most easily utilized, and (3) to evaluate the use of scanner-derived data relative to long-term management decisions in the areas of economic analysis in general and demand analysis specifically.

**Methodology Used**

The methodology to be used in this study is as follows: (1) construct and conduct personal interviews with selected cooperating

members of the Virginia Food Dealers Association (VFDA), the Mid-Atlantic Food Dealers Association (MAFDA), and other similar associations, (2) secure information relative to present data-generating capabilities, (3) obtain present scanner-generated data usage for managerial decision-making by each of four levels of management, (4) determine the types of scanner-generated data needs of each management level, (5) acquire and organize scanner data from cooperating members of the VFDA, MAFDA, and other similar associations over a twenty-four week period, (6) construct demand models to estimate own-price, cross-price, and total expenditure elasticities for various commodities, (7) conduct demand analyses based on scanner-derived data, and (8) compare the elasticity estimates from this research to those from previously published works.

This project is to be conducted over a period of three years.

**Major Findings and Their Significance  
To Food Distribution**

Because the project is to begin September 1, 1985, no major findings are available at this time. Importantly, though, the acceptance and application of sophisticated, technical equipment by the retail food industry must be combined with decision-making models which utilize the data potential of these systems. Historically,

retail food store management personnel have been reluctant and skeptical to adopt formal decision-making models. This research proposal indicates a potential for retail food stores to use scanner data to assist them in short-term and long-term managerial decision-making. The data collected by scanning systems has great potential application in economic research and management decision-making.

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## Consumer Preference for Locally Produced Fruits and Vegetables

by

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Tennessee's farmers often remark that consumers within the state prefer locally grown fruits and vegetables. This is based on the assumptions that 1) such products can be provided to consumers in a more vine-ripe condition and 2) state consumers would prefer to support local farmers. If these assumptions are correct, then Tennessee farmers, retailers, and consumers could gain through efforts to increase the marketing of these products.

Since consumer preferences are at the center of both premises, a careful assessment of consumer behavior is needed. Such an analysis could generate information about effective market demand for these products. State farmers and food retailers could then respond by merchandising products in a more competitive fashion. In addition, marketing strategies could be developed to assist sellers in providing more relevant information to consumers.

A random sample survey of 231 Knox County households was completed during the summer of 1985. This was the first phase of the effort to determine the distinctive qualities of fresh produce that are preferred, as well as relative preference for locally grown produce. Its purpose was to identify stated preferences for these products. The second phase will be to measure respondent preferences based on visual evidence (photographs). This will permit comparison of the "stated" preferences from the household survey to the "visual" preferences based on the photo-graphs. The third phase will be an actual in-store sales test of locally grown produce. By the completion of the project, information regarding verbal preferences and actual marketplace behavior will be used to derive implications and recommendations regarding the retail marketing of locally grown produce.

## The Effectiveness of Promotional Programs for Florida Tomatoes

by

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This study evaluated the effectiveness of the Florida Tomato Exchange (FTE) promotion and public relations program. A basic goal of the FTE has been to educate consumers as to the proper method of ripening tomatoes. Their kitchen ripening theme has promoted room temperature storage (RTS) as a means of enhancing tomato quality. Its ultimate goal has been to increase tomato sales. The kitchen ripening theme has been used extensively in food publicity and public relations efforts. It has also been the dominant message used in TV and magazine advertising. The basic research strategy was to determine (1) the extent of RTS in markets subjected to various levels of TV advertising, (2) the extent of switching from refrigerated to RTS that had occurred since the inception of TV and magazine advertising programs, and (3) the sources of information that had influenced consumers to switch RTS.

A telephone survey of 2,400 primary food shoppers in five major market areas was used to evaluate the promotional program. Market areas were television "areas of dominant influence" (ADIs) as defined by Arbitron Ratings Company. Telephone numbers were randomly generated for each ADI, and the sample stratified by the population of TV households within each county within each ADI. Four hundred interviews were conducted in each ADI, namely Boston, New York, Philadelphia, Pittsburgh, and Roanoke/Lynchburg (R/L) in late March. TV advertising had been used in all markets except R/L, which was selected as a control

ADI. Following the completion of the 400 interviews in R/L, two different commercials were run 120 times in a two-week period. The cost per 1,000 TV households was comparable to many ADIs where FTE's TV advertising had been conducted in the R/L ADI so that the effects of TV advertising could be isolated. "R/L-1" refers to the first sample, and "R/L-2" to the second.

Almost 75 percent of all households using tomatoes were found to store fresh tomatoes at room temperature. Almost 29 percent had switched to RTS within the past three years. A probit model and direct responses to questions were used to analyze the influence of consumers' recall of various promotional media on switching (to RTS) behavior. TV advertising and publicity appeared to have the greatest impact. In ADIs where TV advertising had been used prior to interviewing, about 24 percent of the respondents said that TV commercials had caused them to switch to RTS. Newspaper stories and magazine ads were cited by 15.2 and 11.5 percent, respectively, followed by other TV in-store signs, and store personnel with 9.9, 6.6 and 6.2, respectively. Recipes, leaflets and booklets and information accounted for 3.7 and 1.2 percent of the switching, respectively. Based upon these direct responses, the average cost of converting households to RTS with TV advertising was 56 cents.

The R/L-1, the control ADI, 24.5 percent of all households using tomatoes had switched



to RTS during the past three years, compared with 28.6 percent in Boston, 28.9 percent in New York, 30.9 percent in Pittsburgh, and 31.1 percent in Philadelphia. Using the control ADI comparison, the average cost of converting households to RTS was 85 cents. Magazine advertising influenced about 17 percent of the households switching to RTS in areas where TV advertising was not used. Because of its wide coverage, magazine advertising apparently influenced nearly 2 million households to switch to RTS at an average cost of slightly over 10 cents each. In areas where TV was not used, all other promotional methods accounted for 83 percent of all switchers to RTS. The average cost per household converted to RTS was slightly under four cents.

Consumers' recall of promotional media used for fresh tomatoes was also examined. Consumers' recall of all ADIs in decreasing order of importance was: newspaper stories (32 percent); recipes, leaflets and booklets (26 percent); TV commercials (20 percent); magazine ads (15 percent); posters in stores (14 percent); other TV (13 percent); magazine stories (13 percent); and radio commercials (6 percent). The two-week TV advertising effort in the Roanoke/Lynchburg ADI was quite effective. An estimated 20 percent of primary food shoppers in households using tomatoes had recall of TV advertising for fresh tomatoes, and about 6 percent had correct recall of the FTE commercials. If general fresh tomato advertising recall is the evaluation criterion, the cost was about 18 cents per household. For specific recall of the FTE message, the cost was about 60 cents.

## Strategic Planning by Mid-Atlantic Food Distributors

by

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### Problem

The current rapid pace of change in the food industry requires more effective use of strategic planning by area food distributors. In order to be of assistance in teaching improved strategic planning skills, the co-operating institutions will be performing a benchmark survey of strategic planning by food distributors in the Mid-Atlantic area.

### Methodology

A mail questionnaire will be sent to a purposively selected list of Mid-Atlantic Food Dealers Association members. The intent of the questionnaire is to establish a benchmark regarding strategic planning skills of area food dealers. Time frame is in the winter of 1985-86.

### Topics to be Investigated

Strategic planning is the on-going process of setting long-term (3-5 years) performance objectives for the company, determining appropriate actions and allocation of resources to achieve these objectives.

- A. Need for strategic planning in the food industry
- B. Current level of strategic planning the food industry.
- C. Factors necessary for success in strategic planning.
- D. Individual responsible for strategic planning within each firm.
- E. Strategic planning activities
  1. Written mission statement
  2. Establish objectives
  3. External environment
    - a. Appraise competition
    - b. Condition of economy
    - c. Understand developing technology
    - d. Governmental impact
    - e. Anticipate consumer needs
  4. Involve top management
  5. Assessment of strengths and weaknesses
  6. Establish corporate strategy
  7. Develop tactical plans
  8. Establish implementation procedures
  9. Set evaluation system
  10. Establish responsibility

### **Major Findings**

Once the benchmark on strategic planning has been established, research and educational programs can be planned to assist in upgrading area food distributors skills in strategic planning.

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## **Impacts of Socioeconomic and Demographic Factors On Household Expenditure**

### **For Disaggregate Fish and Shellfish in the United States**

by

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#### **Problem Addressed**

As the popularity for seafood in the United States continues to grow, information about consumer behavior and expenditure patterns of fishery products will be a valuable aid to various groups in the seafood industry. To date, the amount of information available in regard to household expenditure patterns for fishery products is limited. The primary objective of this research is to provide own-price, income, and household size elasticity measures and to pinpoint key demographic factors of household expenditure for particular finfish and shellfish species.

#### **Methodology Used**

The methodology used in this study is as follows: (1) organize and analyze at-home seafood consumption data for specific finfish and shellfish species by three product forms (canned, fresh and fresh frozen, and other prepared) from the 1981 Seafood Consumption Survey conducted by the Market Research Corporation of America: (i) finfish -- cod, flounder, (or sole), haddock, herring, mackerel, perch, pollock, salmon, sardines, snapper, tuna, whiting, total finfish, and (ii) shellfish -- clams, crabs, oysters, scallops,

shrimp, and total shellfish; (2) identify and assess the factors that affect household expenditure on these products for home consumption, (3) construct econometric models to estimate demand parameters, and (4) compare the results of this research to those from previously published works.

#### **Major Findings and Their Significance to Food Distribution**

The findings of this research work indicate that price and coupon (or deal) value are the dominant factors in explaining the variation of household expenditure on seafood commodities for at-home consumption. With two exceptions, all price elasticities are negative and in the inelastic range. Coupon values have positive impacts on at-home expenditure for seafood commodities. All shellfish products are normal goods, while the nature of the income effects for finfish products is mixed. Generally, household size elasticities are positive but less than unity, and they are lower for shellfish species than for finfish species. Key demographic factors include geographic region, urbanization, race, seasonality, type of market outlet, and age and employment status of the household manager.

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**An Assessment of Delaware Consumers'  
Perception of Retail Package Sizes for Meat,  
Poultry and Bulk Purchases**

by

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**Introduction**

The food retailing sector of the food marketing system has a considerable impact on the rest of the food industry. Their size, power and strategic position have earned food retailers the title of gatekeepers of the food industry. They are making many of the major market decisions for the entire food industry. In essence, they serve as consumer purchasing agents and they control one of the most important food marketing resources, the shelf space which is vital to the success of farmers, food manufacturers and food wholesalers.

The major purpose of the study reported here is to determine how effectively food retailers in Delaware are working with other segments of the food industry in fulfilling the needs of Delaware consumers.

**Objectives**

The objectives of this project are:

1. To evaluate the extent to which Delaware food retailers are fulfilling the needs of Delaware consumers in the areas of store facilities available, package sizes desired, and availability of bulk products.

2. To determine Delaware consumer preferences for generic products and locally grown products.

**Procedures**

A random sample of 5000 Delaware consumers was selected to receive a mail survey concerning their shopping patterns and product preferences. The survey questionnaires were mailed to the sample during October 1985. In addition to the six-page questionnaire, the survey packet included a cover letter and a postage paid return envelope.

Information that was requested from each consumer included the following:

1. Types of stores patronized.
2. Reasons for shopping at specific types of retail outlets.
3. Consumer knowledge of freshness code-dating on perishable products.
4. Preferred package size for various cuts of meat and poultry.
5. Preferred package size for major fruit and vegetable commodities.

6. Acceptance of bulk vs. prepackaged products.
7. Acceptance of generic vs. branded grocery products.
8. Preference for locally produced agricultural products.

#### **Preliminary Results**

At the present time, we have a 20 percent return rate on the survey forms.

## Using Micro Computers to Facilitate the Management of Independent Supermarkets

by

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### Problem Addressed

The decrease in cost of equipment and the ease of use has facilitated the use of micro-computers in the management of independent supermarkets. Because of the changes in technology, the independent operator now has essentially the same capability as main frame computers of several years ago. Changes in software have been another factor in the break-through to enable lay individuals to use micro-computers. The advent of spreadsheets has caused micro-computers to be used with minimal effort and training. The operator has a choice of developing personal worksheets or, as an alternative, acquire templates with the desired computations already customized. Independent operators may design spreadsheets to satisfy their individual needs with the realization that changes may be made by the operator as circumstances demand.

We have developed a technique to give instruction in the use of spreadsheets in non-narrative graphic format. The instructions are simple to follow. With a little experience using our procedure the user is able to design his/her own template to cope with unique applications. The real break-through is the ease with which the operator may learn to use the spreadsheet. The technique is generic with respect to spreadsheet as well as computer.

### Methodology Used

We have used micro-computers and spreadsheets in the classroom as well as in practice. Using our techniques and procedures, students learned spreadsheet applications rapidly and achieved relatively trauma-free productive use of them.

### Major Findings and/or Their Significance to Food Distribution

Micro-computers and spreadsheets may be used by the independent operator to facilitate the management of independent supermarkets. Both the micro-computers and spreadsheets are inexpensive and easy to use. They are fast, flexible and do not require major changes in the immediate computer environment.

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## **Comparison of Food Stamp Program Participation and Nonparticipation**

### **By Elderly Households: An Exploratory Study**

by

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#### **Problem Addressed**

What are some of the differences in elderly households who participate in the food stamp program and those elderly households who do not participate in FSP?

#### **Methodology Utilized**

Personal interviews were completed in 1979-80 with over 150 households who had one member over 59 years of age in a rural area and urban area both in Virginia and in California. A follow-up study in the urban area of Virginia (Tidewater) was done in 1982 with some 39 elderly households to find out why those households eligible for food stamps did not utilize this medium.

#### **Major Findings**

The most striking differences in whether households did not participate was (1) if the household head was 65 years or older, (2) was a single person, (3) receiving Supplementary Security Income, and (4) State. Families headed by an individual under 60 years of age were much more likely to participate in food stamps. Families in communication with an outreach worker in other programs was much more likely to participate in FSP.

A later study of 39 Tidewater, Virginia households who had individual family members 60 and over, were income-wise and asset-wise eligible for food stamps but did not participate. The households interviewed did not differ significantly from other households in their census tract except for having smaller household size, income and age. Approximately half (21) felt they were not eligible. Another sizeable group (12) claimed their primary reason for not participating was the "hassle and unpleasantness of obtaining the food stamps." A small cluster (4) mentioned transportation problems. Another cluster (2) named as their primary reason for not participating their desire not to have anything to do with government welfare programs.

#### **Conclusions**

The data strongly hints that the communication with the target group--the elderly poor--needs to be strengthened. Evidentially, mass media does not reach more than half of the eligible poor and in turn, may be giving noise or confusion about eligibility. Outreach programs involving innovative approaches and also employing more one-on-one communication including perhaps paraprofessionals may be desirable.

## **Opportunities for Order and Delivery Consolidation**

by

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### **Introduction**

Numerous transportation research studies have been conducted in the food industry and on behalf of the food industry. Two aspects of previous research studies stand out. First, a discussion of the psychological barriers to consolidation and pooling, and second, the opportunities for consolidation among vendors for delivery on combined loads to food stores, convenience stores and restaurants.

### **General Problem Focus**

Deliveries involving less than truck load lots are not uncommon in the food industry. It is assumed that consolidation opportunities exist. It is also assumed that there are costs as well as benefits associated with consolidation and that there are barriers to the acceptance of consolidation.

### **Project Goal**

The goal of this project is to determine the feasibility of consolidating deliveries, on combined loads, destined for food stores, restaurants, and convenience stores in a market area.

### **Methodology**

The methods being implemented to collect the data involve personal interviews and a mail survey instrument followed up by a telephone interview. Numerous transportation professionals in the food industry have been, are being or will be contacted for reactions to four transportation models and the potential barriers to the implementation of each.

### **Sponsorship**

This project is being conducted under a cooperative agreement with the USDA, AMS, Dr. Harold Ricker, Director.

## Factors Affecting Adoption of the Uniform Communication Standard

### In Major Wholesale Grocery Markets

by

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#### Statement of the Problem

Changes in technology are of continuing interest to food distributors, particularly developments that offer the possibility of significant reductions in the costs of handling large shipment volumes and the associated administrative burdens of order handling, invoicing, preparation of announcements, adjustments and allied tasks. One such development, the Uniform Communication Standard (UCS), is the product of an industry-sponsored effort to devise feasible and economic ways to improve business transactions among grocery distributors, manufacturers, and brokers by adapting computer technology to transmission of business documents.

At the end of 1984, two years after successful tests of the feasibility of UCS, only 11 percent of the sales of food stores involved shipments from warehouses of wholesale distributors using UCS. Moreover, adoption rates differ markedly in different market areas and for the same firms in different markets, suggesting the possibility that local markets' structure may influence the adoption of UCS.

This study analyzes adoption rates of the Uniform Communication Standard in wholesale food distribution in the major markets of the United States. It attempts to identify economic variables that may help to explain differences in rates and to assess their relative importance.

#### Methodology

The basic hypothesis underlying this analysis is that market structure is a major determinant of the rate of adoption of the Uniform Communication Standard (UCS). Possible relationships among market structure variables and adoption rates are estimated with regression models.

The UCS adoption rate is measured as the percent of a market area's sales originating in warehouses of wholesalers using UCS in 1984.

The structural elements hypothesized to influence adoption rate are growth in demand, market competition and market size. Demand growth is likely to encourage the adoption of new technology, particularly if the new technology offers the prospect of servicing an expanding market by adapting existing facilities.

A second structural element likely to affect UCS adoption rates is potential competition. Wholesalers face competition from suppliers who operate primarily in adjacent markets. Most major markets contain principal suppliers with accounts in the same market but served from distant warehouses. Wholesalers in market areas that have a high percentage of out-of-market based operators would be particularly sensitive to the market share protection and improved service levels that adoption and use of technology brings. Thus, one would predict a positive

relationship between UCS adoption rates and the market share of out-of-market distributors.

Competitive conditions in wholesalers' primary market may also influence the adoption of new technology. In this regard, alternative hypotheses have been advanced. One suggests that only large firms may be expected to have the requisite resources for major innovations, the other that large numbers of competing firms spur the search for improved technology. The Herfindahl index is used here as a measure of primary market competition. This index, which is the sum of the squared shares of individual firms in a market area, declines with increases in the number of firms and increases with rising inequality among the number of firms. Its maximum value is 1, that is, a single seller or monopolistic market. A positive association of this index with UCS adoption rates would support the proposition that wholesalers' holding a large share of particular markets are likely adopters of UCS, and a negative association its converse.

Wholesalers are more likely to invest in new technology in high volume than low volume markets to remain competitive and because of the greater likelihood of pay-off from the investment. Thus adoption rates should be positively related to market size.

#### **Major Findings**

Preliminary results support the conclusion that the structure of local wholesale food markets affects adoption of the Uniform Communication Standard. The main structural determinant appears to be the extent of market concentration. This suggests that the likely expansion in use of UCS will be among distributors who hold large market shares or who expect to expand substantially.