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RECONCILING ATTITUDES AND BEHAVIOR IN ORGANIC FOOD RETAILING

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ABSTRACT---
For organic food to reach the average consumer will require greater penetration into conventional supermarkets. Product placement can be expanded into more stores by altering attitudes that lower the probability of selling organic foods. This study identified significant factors in the retail decision to sell organic foods and quantifies the effects of retailer attitudes on behavior. We used a probit model to quantify the effect of customer demographics, store characteristics, manager characteristics, and profitability of organic retailing on the decision to sell organic foods. The model was based on interview data collected in Atlanta, Georgia from 66 retailers who sell organic foods and 21 who do not. Our research indicates that organic education programs can be a cost-effective way to expand market penetration without requiring changes in price or cost premiums. If properly composed and targeted, such programs can alter underlying attitudes and increase the probability of selling organic foods.

-----KEY WORDS-----

organic agriculture, marketing margin, food retailing, probit model

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Reconciling Attitudes and Behavior in Organic Food Retailing

Introduction

In the United States, organic foods have entered the agricultural marketing mainstream. Once available only through a scattering of food co-operatives, small specialty stores and stalls at farmers' markets, organic foods are now also available in a stunning variety at chain natural products stores offering more than 26,000 square feet of products. More significantly from both growers' and consumers' perspectives, fresh and processed organic food products have entered conventional supermarkets, where they are often presented side-by-side with nonorganic food items.

The Organic Trade Association [OTA] anticipates expansion of organic market share to 10 percent in the coming decade (*Natural Foods Merchandiser*, 1999b). To achieve this goal, organic food must reach the average consumer, which will require greater penetration into conventional supermarkets.

More than 56 percent of all shoppers buy organic foods at least occasionally, while eight to 20 percent of all shoppers use organic grains, meats, produce, breakfast cereal and processed foods once a week or more (HealthFocus, Inc.). Nearly 99 percent of organic consumers shop at supermarkets. Smaller percentages also shop at small natural food stores (51 percent), supermarket-type natural food stores (44 percent) and natural foods co-ops (23 percent) (HealthFocus, Inc.; The Hartman Group). Conventional supermarkets are likely to remain the primary outlet for consumers, due to convenience, price and other factors that shoppers consider important (HealthFocus, Inc.).

However, growers and processors have not attained product placement in supermarkets to the extent desired. In 1997, more than one third of farmers sold organic products directly to retail markets and more than half wanted to increase their sales in this category (Organic Farming Research Foundation). Also in 1997, food manufacturers received 62 percent of sales revenue from natural products stores, and only 31 percent from mass market groceries (Organic Trade Association). For several product categories, supermarkets accounted for less than 12 percent of manufacturer sales.

The OTA offers retailer education programs on the mechanics of selling organic foods such as product placement and advertising. The industry also provides informational programs at major trade events to promote organic foods. These programs are not targeted to retailer subgroups, nor are they specialized in the type of information delivered. A lack of research on factors that affect the retailer's decision to sell organic foods has hindered more efficient information delivery. Previous market analyses have described characteristics of consumers, retailers and products that affect sales, but have not addressed the issue of how attitudes translate into behaviors for retailers.

Product placement can be expanded into more stores by altering attitudes that lower the probability of selling organic foods. This study identified significant factors in the retail decision to sell organic foods and quantifies the effects of retailer attitudes on behavior. Literature in this field suggests that several consumer, retailer and product factors influence organic marketing decisions. We used a probit model to compare interview data collected from 66 retailers who sell organic foods with 21 who do not in the Atlanta, Georgia MSA. From the results, we made recommendations for strategic information campaigns to change retailer attitudes and achieve the desired behavior, which is getting more retailers to offer organic foods.

Selling Decision Factors Suggested by Surveys

Several seller and consumer surveys have been conducted in the last 10 years to try to identify factors that affect willingness to sell or purchase organic food products. Broadly classified, these include customer demographics, store characteristics, manager characteristics, and profitability of organic retailing. These are discussed in detail in the following sections to provide insight into the decision model specified.

Customer Demographics

Most organic consumer studies have assessed willingness to pay for organics, and have identified the demographic variables believed to influence purchase. In the current research, we focused on consumer characteristics for which secondary data could be collected. Although there are several regional analyses of organic consumers, national surveys of a cross-section of shoppers provide the most generalizable information about demographic factors correlated with organic purchases. Since supermarket managers are most likely to decide on selling organic foods according to their entire customer base, not just committed buyers of organics, we relied on these surveys in variable selection.

Three national surveys were relied upon for development of these variables. The Packer, a trade publication of the fresh produce industry, conducts annual surveys of 1,000 representative households on topics of interest to the fresh produce industry. In surveys conducted in 1996, 1998, and 2000, The Packer questioned respondents about purchases of organic produce. HealthFocus, Inc. conducted a survey on organic food purchases and buyer characteristics in 1996 for the OTA which was completed by 2,005 shoppers. The Hartman Group conducted a survey of 1,879 households in 1996 for The Food Alliance to develop marketing profiles for consumers of sustainable and organic food products. The discussion here is limited to income, interest in healthy food, and age.

Conventional wisdom holds that because higher income households have greater disposable income, they are more likely to purchase higher-priced organic foods. The Packer (1996, 1998, 2000) found that more than 30 percent of consumers with household incomes of $50,000 or more purchased organic produce. However, from 22 percent to 33 percent of consumers in all other income groups, including those earning less than $12,500 ($17,500 in the 2000 survey), reported buying organic produce in each of the survey years. HealthFocus, Inc. determined that 38 percent of consumers with incomes lower than $50,000 buy organic foods, while 17 percent of those with incomes higher than $50,000 do. The Hartman Group’s survey verified that both low and high income groups purchase organics. Empirically, the income-purchase relationship is not a simple positive correlation, and the model specification attempted to accommodate this.

The relationships among food safety, healthy eating and organics are also difficult to generalize. In these three studies, food safety concerns and organic foods were not strongly related, but interest in healthy foods was high. The Packer's 1996 survey found that only 12 percent of consumers selected organic produce due to concern over agrichemicals. In the 2000 survey, 46 percent considered organic to be safer than nonorganic produce, but this was not necessarily a primary reason for selecting organics. HealthFocus, Inc. found that organics were perceived to be safer to eat by 62 percent of shoppers. Organic consumers were 7 percent more likely than other shoppers to describe themselves as eating healthy foods and 4 percent more likely to use healthfulness as a criterion for selecting food items. Although 45 percent of respondents in The Hartman Group' survey considered pesticide residue on food to be one of the most important environmental issues in grocery product selection, only 18 percent sought out food grown free of pesticides. About 11 percent of this sample reported spending substantial time to learn about good nutrition.

Even though a majority of shoppers see organics as safer or healthier than conventionally grown food, they do not necessarily buy organic products for this reason. Despite this empirical result, retailers believe health and safety are reasons for purchase. In a survey of 27 organic produce retailers in North Carolina, Estes et al. found that 100 percent believed customers buy organic produce for health and nutrition reasons. In their study of New Jersey distributors, Morgan and Barbour observed that both supermarket and natural food store managers rated lowering health risks as a main reason to sell organic foods, some linking this attribute to consumer perceptions. This perception was incorporated into the selling decision model.

The presence of young children and babies in a household has been hypothesized to influence consumer willingness to purchase organic foods. The argument holds that fresh produce is more likely to retain chemical residues at levels higher than the youngest children can tolerate. Concerned and aware parents are likely to be interested in organic foods as an alternative. However, The Packer's 1996, 1998, and 2000 surveys found little difference in purchase decisions between households with and without young children. If anything, households without children were more likely to buy organic produce. Although the baby food sector was recently touted as a major opportunity for organic processors to enter mainstream supermarkets, sales increases of only 2 percent per year are expected through 2002 (OTA), making this one of the slowest growing organic segments. Preliminary analysis revealed that presence of babies and young children in households did not affect the selling decision, so this variable was not included in the final model.

Store Characteristics

Attributes such as location, size, layout and number of items offered may affect a consumer's decision to frequent a store, but a retailer's selling decision is unlikely to be influenced by such physical features. Instead, management aspects of the enterprise such as time in operation, decision making authority, corporate structure, and store financial status affect flexibility to respond to changing market conditions and new trends in retailing, such as introduction of organic products.

Other than financial status, store attributes have been little studied as determinants of the selling decision. New Hope Media tracks some of these characteristics through surveys of the natural products industry and publishes the summary results annually in the *Natural Foods Merchandiser*.

Store types differ within the natural products industry. A "natural products store" is similar to a supermarket, but emphasizes organic and natural foods and supplements. A "natural or health foods store" is primarily an outlet for food products. Well-known chains such as Wild Oats and Whole Foods are natural products stores. Food co-operatives and specialty stores such as organic bread makers could be in the natural food store category. Neither type is synonymous with "organic," as retail outlets cannot be certified in this sense, although both types handle organic products. This distinction is presented to aid understanding of industry statistics.

Currently, sales per square foot are relatively high in the natural products industry, averaging about $460 for natural product stores and about $200 for health food stores in 1998 (May). Sizes ranged from less than 1,000 to more than 6,000 square feet, with the natural food stores ranging from a few hundred to a few thousand square feet and the natural product stores often being measured in tens of thousands of square feet. Net profit for natural products stores averaged 4.9 percent, and was slightly higher for health food stores. The *Natural Foods Merchandiser* (1999a) reported that total organic sales in natural products stores topped $2.6 billion in 1998.

Chain stores having centralized national and /or regional offices and individual outlets in multiple cities tend to have some competitive advantages. Chains have larger, centralized buyers, capital for acquisition and new store development, and the ability to enter multiple market areas to reduce overall risk. The two main natural product chains, Whole Foods and Wild Oats, with net profits of 3.3 percent and 2.9 percent, underperformed in relative to the industry average of 4.9 percent for large stores (Stewart). These chains did better than the industry average of $460 sales per square foot, with $670 for Whole Foods and $430 for Wild Oats.

Although the OTA projects sales growth at 30 percent per year through 2002 for processed organic foods, store margins, defined as retail prices less cost of product and in-store expenses, are not keeping pace. Pressure is increasing for natural products stores to compete on price, as conventional supermarket retailers long have done, resulting in discounting prices 30 percent to 40 percent in some parts of the United States (*Natural Foods Merchandiser*, 1999b). Store margins could drop to the single-digit margins obtained by many conventional groceries.

In both the natural products and conventional retail sectors, local decision making authority for product selection varies. Chains are perceived to display more top-down or centralized decision making, but no data are available to verify this view. Flexibility in meeting local product demands quickly is necessary for national chains so that local entities have to make some of these decisions. Single unit or multi-unit local outlets may be concerned with cross-town or cross-region consistency and permit less autonomy. Educational targeting in the organic industry could be very cost effective if individual managers are empowered to make product selection decision.

Manager Characteristics

Research suggests that personal characteristics of retailers may be as important in their selling decision as consumer attributes are in the buying decision. Among retailers who offer organics, personal concern for the environment and for food safety are prominent reasons (Morgan and Barbour). Education, age, support for organic or environmental causes, information sources and other factors have been shown to affect consumer behavior with respect to organics and may also influence retailers (The Hartman Group; HealthFocus, Inc.; The Packer, 1996, 1998, 2000).

Whole Foods and Wild Oats were both started from their founders' premise that organic and natural food products are better for the environment, the producer and the consumer. Conventional supermarket managers are unlikely to sell organics for these reasons alone, but tendencies to support these causes may sway the decision if economic factors are not unfavorable. Lack of data in the existing literature resulted in our undertaking exploratory work on this topic.

Profitability of Organics

Price premiums negatively affect consumer purchase of organics. Numerous studies have shown that as premiums for organic compared with conventional increase, consumer resistance increases (for example, The Packer, 1996; The Hartman Group; Misra, Huang, and Ott). Retailers are sensitive to their clientele's elasticity of demand with respect to price premiums. Natural food store managers report they can obtain higher price premiums than supermarkets, about 33 percent vs. 23 percent for produce (Morgan and Barbour). This may be due to the co-placement of lower priced nonorganic foods in supermarkets which constantly remind shoppers of the price premium.

In observations at 75 of the stores in our study, the price premiums for processed goods varied widely. Average premiums were 24 percent for rice cakes, -0.5 percent for cereal, 17 percent for milk, 5 percent for baby food, 20 percent for spaghetti sauce, and 32 percent for coffee. The range could be accounted for by factors such as relative availability, product placement and branding. For example, 44 of the stores offered organic cereal, but only 5 offered organic coffee. Organic cereal is often offered side-by-side with conventional cereal, so that price comparisons are simpler. Earth's Best baby food is no longer the only eco-labeled product, as Gerber and Beechnut now also have lines of healthier products, again typically offered side-by-side with the organic alternative.

Margins are of interest to all retailers. As competition between natural products stores and supermarkets increases, out-of-stock problems are anticipated to drive up costs at the same time that pressure to discount prices to consumers is increasing (May). Organic produce retailers incur higher handling and item costs, greater losses, and higher wholesale prices, yet most do not charge higher markups for organic produce (Morgan and Barbour; Lin, Payson and Wertz).

The margin for organic relative to conventional food is of particular interest in this study. As supplies increase, price premiums in the industry are expected to decline as are cost premiums for the product at the wholesale level. However, handling costs and other in-store expenses related to organic food may remain the same or even increase if national accreditation costs are passed through the marketing channel. Thus the organic margin relative to conventional foods may decline over time, making introduction of organic foods into supermarkets less attractive to managers. Morgan and Barbour reported that a majority of retailers inexperienced with organic produce expected to increase net returns by adding organics to their stores. Only if other factors compensate for the decline in relative margins will expansion into supermarkets continue.

The Organic Selling Decision

No research to date has investigated the manager selling decision using both natural products and conventional supermarket outlets in the data set. Our research borrows from interview methods used in North Carolina, New Jersey, and the Maryland-DC area. Unlike these studies, which only assessed attitudes about organic foods and their costs, our study relates both managers' perceptions and circumstances to observed retailing behavior. We combined survey data collected in manager interviews with zip code and county level demographic data on household characteristics to characterize the operating conditions for each store.

Data Collection

The sample frame for data collection was the set of all grocery stores within 30 miles of the geographic center of Atlanta, Georgia (U.S.A.). The Atlanta MSA experienced a 32.5 percent population increase between 1980 and 1990, with current annual growth at about the same rate. A variety of outlets, from large natural products and conventional supermarket chains to independent co-ops, farmers markets, subscription farms and upscale restaurants have offered organic foods for years, so consumer awareness is relatively high.

There is no comprehensive listing of stores in the area that sell organic food. To identify an interview sample, a postcard survey asking what organic products are sold was mailed in July 1999 to 487 retailer addresses obtained from electronic yellow pages. Of these, 447 were valid mailings. Completed postcards were returned by 166 managers, a response rate of 37.1 percent.

Follow up telephone contacts were made to set up interviews with store managers, including stores that do not sell organics. Interviews of 90 managers were conducted from September through December 1999. Interviews were conducted using 21 multiple choice and open-ended questions that focused on the manager's perceptions and characteristics, store characteristics, customer attributes, and plans for organic food sales. Average time to complete the interview was 15 minutes. After deleting observations for which relevant data were missing, the final sample contained 87 observations. Of these 66 (75.8 percent) sold organic food and 21 (24.2 percent) did not.

Secondary data by zip code and county for expenditures on food consumed at home and household composition and income supplemented the data collected from the stores (CACI; Market Statistics, Inc.). Given the variation within communities of income and household characteristics, zip code level data matched this variation to store locations. Our sample encompassed 56 zip codes in 6 counties. An indicator at the county level of the number of households who say that eating health and natural food is part of their lifestyle was also included (SRDS).

Model Specification

The dichotomous nature of the choice to sell or not sell organic produce can be captured in a probit model. The probability that the observable binary variable is equal to one (a yes response) is the same as the probability that the error term for a standard normal model of the decision is less than the regression estimate. If the error is ε_i then

$$\mathrm{Prob}(\mathrm{Sell}) = \mathrm{Prob}(-\epsilon_i \le \alpha + \beta X_i) \equiv \Phi(\alpha + \beta X_i) \tag{1}$$

where Φ is the cumulative distribution function of a standard normal variable. By specifying X_i, the independent variables, and estimating equation 1 using the maximum likelihood method, we tested which factors influence the probability of selling organic foods.

The specification of the model was based on factors suggested as influential by previous surveys. Based on the hypotheses presented, the equation specified for the probit model was

$$\begin{aligned}\mathrm{Sell}_i = {} & \alpha + \beta_1 \mathrm{AtHome}_i + \beta_2 \mathrm{HFood}_i + \beta_3 \mathrm{LowInc}_i + \beta_4 \mathrm{HHSize}_i + \beta_5 \mathrm{Chain}_i \\ & + \beta_6 \mathrm{SalesSqFt}_i + \beta_7 \mathrm{Educated}_i + \beta_8 \mathrm{Support}_i + \beta_9 \mathrm{Compete}_i + \beta_{10} \mathrm{Econ}_i \\ & + \beta_{11} \mathrm{InfoTot}_i + \beta_{12} \mathrm{Prem0}_i + \beta_{13} \mathrm{Margin}_i + \varepsilon_i \quad .\end{aligned} \tag{2}$$

The dependent variable in the probit model, $Sell_i$, is the probability that a store sells organic food. The first four variables are customer demographics, the next two are store characteristics, followed by five manager characteristics and two profitability attributes.

Data Description and Hypotheses

Table 1 describes the data used and the variables estimated. Zip code and county level variable averages are not equally weighted because the number of respondents by zip code. The means are calculated according to the weighting in the sample.

Zip code level expenditure on food consumed at home ($AtHome_i$) averaged $42,872,000. This was 46 percent higher than the mean expenditure of $29,400,000 on food consumed away from home for the same sample (Market Statistics). Atlanta is considered to be a major restaurant market, with one of the highest per capita expenditures on meals away from home in the U.S. Higher at-home food expenditures should encourage retailers to stock a greater diversity of products, such as organics.

The mean number of households who consider health or natural foods part of their lifestyle ($Hfood_i$) was 44,331 per county. Although it is difficult for retailers to observe most attitudinal data on their customers, interest in health foods is exhibited in purchases made, response to new product introductions and in-store promotions, and customer requests for healthier products or brands. From 16 percent to 21 percent of households per county in the six counties claimed this characteristic, which is 2 percent less to 8 percent more than the average for the entire U.S. (SRDS). To the extent that customers and retailers believe that organic food is healthier, the more customers who express interest in health and natural foods, the more likely a retailer would be to offer this option.

The lack of agreement on the relationship between income and purchase in the customer survey literature is reflected in counterintuitive results from models that use an income composite such as median household income (Lohr and Semali). In that study, the income variable was significant and negative in explaining probability of selling organics. Further exploration of the income variable was recommended.

In the current study, data on numbers of households in six income categories was available. However, the three higher income categories are strongly correlated with food expenditures and interest in health and natural foods. Since these latter are more descriptive of relevant customer demographics that income can only proxy, most income variables were omitted from the model.

The single income variable included was the number of households per zip code that have income between \$0 and \$14,999 ($LowInc_i$). While it is likely that stores in high-income areas would offer organic foods, it is unclear whether the converse is true. Several studies have shown that low income consumers buy organics (The Packer, 1996, 1998, 2000). Equal access to healthy foods is an important issue for this income group and of interest to the organic food sector at large. It is expected that retailers view low income households as less interested in organic foods and less able to afford the price premiums, and so would be less likely to offer organics in low income areas.

Average household size ($HHSize_i$) for the zip codes in the sample was 2.51, slightly lower than the U.S. average of 2.60 and the Georgia average of 2.62 (CACI). Since food shopping is usually conducted on behalf of a household, this variable was considered a more accurate population indicator for retailer decisions than the total population or the total number of households in each zip code. The larger the household, the more sales are generated from a single purchase decision. Retailers should respond to larger household size with a higher probability of selling organics.

Store characteristics of organic retailers are not well studied outside the natural products industry. Chain stores ($Chain_i$), defined as having centralized national and /or regional offices and individual outlets in multiple cities, were expected to be less likely to sell organic foods. This assumes that chains are more likely to be conservative in organic product offerings to avoid inciting safety concerns for conventional foods. In this sample, 39 percent of the stores fit the definition of chain food retailers. Kroger, Bi-Lo, Harris Teeter, Winn-Dixie, and Whole Foods outlets were included in the sample.

Sales of all food items per square foot ($SalesSqFt_i$) averaged $113, lower than for natural product stores and health food stores, for which sales ranged from $203 to $670 per square foot in 1998 (May; Stewart). This is not surprising, given that conventional food stores dominate the sample and that 52 (60 percent) of the stores receive less than 5 percent of food sales revenue from organic products. The minimum sales per square foot in the sample was $0.79 and the maximum was $1,250.00. A retailer with higher sales should be more likely to risk a loss in selling organics.

This sales variable was constructed from five mutually exclusive revenue categories ranging from under $100,000 to more than $5,000,000 and five ranges for organics as a percentage of food sales, from less than five percent to more than 50 percent. Pretesting of the survey instrument in Athens, Georgia indicated that retailers would not or could not provide specific answers if these questions were open-ended, so the questions were multiple choice. The midpoint of each sales range was multiplied by the midpoint of each percent organic range to obtain total organic sales revenue. Reasonable values were used for ranges without midpoints. The results gave 26 different total revenue categories, bounded below by $0 and above by $7,500,000. Total sales were divided by square feet in the store, which was a continuous variable obtained from an open-ended question.

We collected data on various personal characteristics of the manager, but included in the model only factors expected to most directly affect the selling decision. A composite variable, $Educated_i$, indicated whether the manager had authority to make product selection decisions for the store and whether the manager held a college or postgraduate degree. This group was 37 percent of the sample. College-educated managers were assumed to be more likely to understand the environmental and human health messages being delivered by the organic industry. The authority to make product choices is necessary for an individual manager to translate the information into a selling decision.

Managers described their attitude toward organics as supportive, neutral or not supportive. About 71 percent of the sample described themselves as supportive ($Support_i$), although not all of these were selling organic products in their stores. We hypothesize that a supportive attitude should increase the probability of selling organic food.

Managers were provided with a list of factors from which to choose the three that most influenced their selling decision, whether positively or negatively. We grouped these factors into three categories. Competitive factors (Compete_i) included what competing stores were selling, what customers wanted and what the corporate officer or owner decided. Economic factors (Econ_i) consisted of wholesale product availability, wholesale cost, organic markup and quality of organic foods. Personal factors included personal concern for the environment or for human health. This latter was not used in the model because it was perfectly correlated with selling organics. If two of the three factors selected by the respondent were in a single category, then that reason, either competitive or economic, was assumed to dominate the decision. Compete_i and Econ_i each influenced the selling decision for 28 percent of managers. We did not form expectations of the signs on these variables.

Previous research on information factors indicated that use of trade and organic industry sources positively influences the probability of selling organic foods (Lohr and Semali). In the current study, the total number of information sources (TotInfo_i) was evaluated. Respondent choices included trade shows and publications, corporate newsletter or meeting, popular media, customers and organic distributors. The minimum used was zero and the maximum five, with an average of 1.5 sources. If these sources are favorable toward organics, more access should increase the probability of selling.

Almost 14 percent of the managers in the sample believed they could get no price premium (Prem0_i) over conventional for their organic products. Nearly 44 percent believed their customers would be willing to pay at most one percent to 10 percent more for organic, while only five percent thought they could get a premium of more than 30 percent. A perception that organics cannot command any premium should significantly reduce the manager's willingness to sell, given that 78 percent of the sample thought that organic foods cost them more compared to conventional foods.

The pretest for the survey instrument revealed that supermarket managers have no hard data on the actual costs allocated to organics, since so many expenses are shared with activities related to conventional food items. However, most managers were able to form an estimate of the cost premium, which is the cost relative to conventional foods on a percentage basis.

The margin variable (Margin_i) is the difference between the expected price premium and the predicted cost premium, expressed as percentage net gain or loss relative to conventional food. The percentage cost difference answered to an open-ended question was subtracted from the midpoints of price premium categories ranging from up to 10 percent to more than 30 percent. The upper and lower bounds on price premiums were 0 percent and 50 percent. The mean for Margin_i was an expected loss on organics of 2.4 percent relative to conventional foods. This variable ranged from -50 percent to 50 percent, with some managers exhibiting considerable optimism about the profitability of organic foods.

Marginal Effects of Factors

Table 2 shows the maximum likelihood estimates and elasticities (marginal effects for the dichotomous variables) for the probit model in equation 2. In this table and in subsequent text, the subscript *i* is dropped for convenience. For the six dichotomous variables, marginal effects were calculated by subtracting the cumulative distribution function of equation 2 with the binary variable set to zero from the function generated when the variable is set to one, then taking the mean of the differences for all individuals (Caudill and Jackson).

Customer Demographics

All consumer variables were significant and the coefficients had the predicted signs, but all were relatively inelastic with respect to probability of selling organics. Retailers are not sensitive to changes in these demographics in making their selling decisions. Seventy-six percent of retailers in the sample currently sell organic foods, so most have already responded to population growth and increased healthconsciousness in the region by adding this food choice. Despite this, Atlanta's tremendous growth rate could induce more retailers in outlying communities to add organics as these communities add households at rates exceeding 100 percent or even 1000 percent per year, especially if these households describe themselves as regularly consuming healthy or natural foods.

A retailer is 0.27 percent less likely to sell organics if the number of low income households in the zip code increased by 136 (10 percent) from the mean. This result for LowInc suggests that the number of low income households would have to increase dramatically, on the order of 1,000 percent to have a significant negative impact on probability of organic retail availability. This is a positive result in terms of equal access to organic food choices. Anecdotal evidence indicates that this income category also includes college students and retirees, two groups who traditionally are strong purchasers of organic foods (The Hartman Report).

If average household size increases by 10 percent to 2.75 people, retailers will increase the probability of selling organics by 0.44 percent. As the Atlanta region matures and the large percentage of young adults living there starts or expands their household size through marriage and childbearing, this result for HHSize indicates that organic foods should be slightly more available. This could stabilize local demand for organic foods for decades.

Store Characteristics

Of the two store characteristics examined, Chain and SalesSqFt, only the former produced a significant coefficient, although its sign was positive, the opposite of that expected. This result may be explained by statements made by managers during the interviews. In numerous cases, smaller independent natural products stores were located near conventional chain supermarkets. Many smaller store managers stated that they did not expect to remain competitive as the nearby chains added organic inventory and so were eliminating organic foods from their stores. Some managers of smaller conventional groceries stated they would not begin selling organics because nearby chains had already cornered local demand.

Contrary to the assumption of top-down management, several chains leave product decisions to individual store managers. With flexibility in stocking decisions and access to the chain's buying power, these managers can maintain a wide variety of organic products. The result is seen in the marginal effect, such that if a store is a chain food retailer, the probability that it sells organic food increases by 0.17 percent.

Manager Characteristics

All manager characteristics were significant, with Educated, Support and InfoTot being positively signed and Compete and Econ negatively signed. If the manager had a college education and could select products for the store, the probability of selling organics increased by 0.10 percent. If the manager expressed support for organic foods, the probability increased by 0.18 percent. A 10 percent increase in number of information sources resulted in a 0.21 percent increase in sales probability. These factors are related, in that more educated managers are more likely to seek out a diversity of information sources. They are thus more likely to be exposed to sources that are supportive of organic agriculture than are managers who only read a limited range of materials.

The negatively signed variables displayed some of the largest marginal effects. If a manager was responding mainly to competitiveness factors in making the selling decision, this probability declined by 0.31 percent. If responding to economic factors, the probability declined by 0.24 percent. The negative sign on Econ indicates that wholesale costs, availability and quality and the markup are unfavorable for organics. The negative sign on Compete suggests that the preferences of influential others (customers, corporate office, owner) and competition with local stores undermine support for organics. This effect was consistent with the reports of discontinuing organic items when nearby competitors begin to dominate the local market.

Profitability

Both Prem0 and Margin are significantly correlated with the dependent variable. If a retailer believed no price premium can be extracted from customers, he or she was 0.34 percent less likely to sell organic foods. If the estimated margin relative to conventional foods increased by 10 percent, this probability increased by 0.02 percent.

The absence of a price premium was more important than the size of the organic margin in the selling decision for this sample. Since the margin may be improved by a lower cost premium, managers may have felt they had more control over this factor through in-store cost reduction, which could make them more insensitive to variation in the margin. Because consumer demand with respect to price premiums is elastic, those managers who believed they could not extract a premium would be less likely to sell organic foods.

Tradeoffs with Relative Margin

It is useful for planning market expansion strategies to know the tradeoffs between the relative margin and other variables. To the extent that the other factors can be affected by educational programs, market share can be increased without relying on price premiums or cost reductions.

Following Cragg and Kahn, we calculated the marginal substitution between the relative margin and the other parameters such that the probability of selling organic food remains unchanged. Holding all other variables constant, the tradeoff may be computed for any variable, x_k, $k \neq 1$ with the relative margin, x_{13}, as:

$$\begin{aligned} dProb(Yes) &= \beta_{13}\ \varphi_{\eta_i}(Sell_i)dx_{13} + \beta_k\ \varphi_{\eta_i}(Sell_i)dx_k = 0 \\ dx_{13} &= -\frac{\beta_k}{\beta_{13}}\,dx_k \qquad k \neq 1 \end{aligned} \tag{3}$$

where $\varphi_{\eta j}$ is the first derivative of the cumulative distribution function in equation 1. The tradeoff is based on the marginal rate of substitution between x_{13} and x_k, shown in the second line of equation 3. The parameter estimates from Table 2 were used to determine the marginal rates of substitution.

The change in margin relative to conventional foods, dx_{13}, is assessed for relevant marginal changes in other variables, dx_k, from their means. For variables measured in discrete units, AtHome, HFood, LowInc, HHSize, Sales, and InfoTot, dx_k was set at 1 or -1. The latent binary variables, Chain, Educated, Support, Compete, Econ, and Prem0, were originally constructed from multiple response choices to questions as described on Table 1. Marginal changes in these variables represent changes in the likelihood of answering a question with a choice that represents a constructed "yes" response. For consistency, dx_k for these variables was set at 0.10 or -0.10, a 10 percent change in probability of the condition holding true.

The tradeoffs were calculated for all variables, but interpreted only for those that could be affected by informational strategies. In planning intervention strategies to expand the organic market, the key tradeoffs are between the relative margin and manager characteristics. Education campaigns can alter underlying attitudes that affect the probability of selling organic foods. If effective, education programs can substitute for profitability requirements and prevent erosion of market share. We expressed these values as reduction in the margin required to maintain the same probability of selling organics that is associated with a specified change in the variable x_k The tradeoffs are on Table 3.

For a 10 percent increase in the probability that the manager is an educated decision maker, relative margin can decrease by 4.7 percent. A 10 percent increase in likelihood that the retailer is supportive of organics is worth a reduction in relative margin of 3.2 percent. If the probability that the manager made the selling decision primarily due to competitive reasons declines by 10 percent, the margin required decreases by 4.1 percent. For a 10 percent decrease in probability that economic factors were the main determinants of the decision, the margin required decreases by 3.6 percent.

Information sources have the greatest marginal rate of substitution with relative margin of all the manager variables. One more information source, relative to the mean of 1.5, was worth a 13.0 percent reduction in the margin required for constant probability of selling organics. Although the survey listed six possible information sources, it is apparent that managers currently do not take advantage of all the choices available. While this could be due to adequate time, lack of awareness for several sources was mentioned in the interviews.

The price premium is controlled by market conditions, but the organic industry can provide data about average premiums in specific regions and for particular food categories that could dispel concerns about zero premiums. A 10 percent decrease in the probability that a retailer thinks no premium can be assessed for organic foods is worth a 3.6 percent increase in the relative margin.

Conclusions

To continue expansion into conventional supermarkets while supporting the role of natural products stores, the organic industry must identify controllable variables that affect the probability of a store selling organic foods. Many in the organic industry have expressed concern over the dampening effect of falling price premiums on retail expansion. Reducing store costs to maintain margins is one way to combat this effect, but once the most obvious changes in handling, storage, display and stocking practices are completed, specific store knowledge is required to improve margins. We observed that most stores in our sample already use reasonably good practices to minimize these costs.

Our research indicates that organic education programs can be a cost-effective way to expand market penetration without requiring changes in price or cost premiums. If properly composed and targeted, such education programs can alter underlying attitudes that affect the probability of selling organic foods. Specifically, college educated managers who have authority for product selection should be targeted. Educational program content should focus on the advantages consumers perceive in organic foods and their willingness to pay price premiums. Specific data on premiums for different products in different regions should be offered, rather than the vaguer assurances offered by willingness to pay surveys.

Now that SPINS scanner data are available for organic foods in an increasing number of markets, this is a feasible action.

If the organic industry can develop materials that alter personal perceptions of organics, such that belief in environmental and health advantages and support for organic agriculture are instilled, then managers will be less inclined to required sustained positive margins relative to conventional foods. Changes in these underlying attitudes would result in a lessening of the required margin by 3 percent to 4 percent for a 10 percent change in probability of the belief. Insuring access to the organic message through multiple information sources is one of the most effective ways to deliver the message as well as to reduce the required margin.

One issue not addressed in this research that affects the industry and is of significance in retailers surveys is certification verification (Morgan and Barbour; Estes et al.). Organic foods currently may carry a label stating they are organic without adhering to any particular standard. The organic industry has worked hard to develop a voluntary unified standard, but it is the retailer's ultimate responsibility to verify certification. Until the national organic standard is in place, the verification process will remain cumbersome and expensive for retailers, which may explain why only 28 percent of our sample stated that they checked certification documents to verify organic status. An additional 24 percent relied on the label, which for nationally recognized certifiers is sufficient proof. However, if retailers cannot move product due to certification problems, they will not carry organic foods. This issue should be addressed in future research.

Table 1. Data and Variable Description

Variable	Description	Mean	Standard Deviation
Sell	Sell organic food products,1 if yes	0.758	0.430
AtHome	Total expenditures on food consumed at home, 1998, $\$10^6$, by zip code	42.872	21.016
HFood	Number of households who consider health or natural foods part of their lifestyle, 1997, 10^3, by county	44.331	17.705
LowInc	Number of households with income from $0 to $14,999, 1998, 10^3, by zip code	1.364	1.051
HHSize	Average household size, 1998, by zip code	2.511	0.357
Chain	Store is a national chain food retailer, may be conventional or natural foods, 1 if yes	0.391	0.491
SalesSqFt	Sales revenue from all food items, 1998, $ per square foot, calculated from 5 revenue categories	112.941	181.365
Educated	Manager has authority to select store products and has college or postgraduate degree, 1 if both are yes	0.368	0.485
Support	Manager's self-described support for organics, 1 if yes	0.713	0.455
Compete	Competitive factors influence sales decision: competing stores, customers, corporate office or owner, 1 if any 2 of these	0.276	0.450
Econ	Economic factors influence sales decision: wholesale availability, wholesale cost, markup, quality, 1 if any 2 of these	0.276	0.450
InfoTot	Number of sources influencing sales decision: sum of dummy variables for trade, corporate, popular media, customer or organic sources, ranging from 0 to 5	1.540	1.054
Prem0	Expected average price premium of 0% over conventional, 1 if yes	0.138	0.347
Margin	Margin between price premium and cost premium, percent of conventional, based on five price categories	-2.402	19.749

Table 2. Probit Model Parameter Estimates and Marginal Effects on the Decision to Sell Organics

Explanatory Variable	Coefficient	Asymptotic t-statistic	Elasticity at Means
AtHome	0.035*	2.056	0.00091
HFood	0.064*	2.298	0.0017
LowInc	-1.050*	-2.461	-0.027
HHSize	1.695*	1.681	0.044
Chain	3.536*	2.353	0.169
SalesSqFt	-0.0013	-0.868	-0.000034
Educated	2.918*	1.987	0.103
Support	2.026*	2.005	0.183
Compete	-2.561*	-2.269	-0.312
Econ	-2.250*	-1.858	-0.237
InfoTot	0.816*	1.638	0.021
Prem0	-2.245*	-1.903	-0.339
Margin	0.063*	2.053	0.0016
Intercept	-8.060*	-2.171	
Maddala R-squared		0.48	
Observations at 1		66	
Observations at 0		21	
Percentage of Correct Predictions		88.5	

Notes: The dependent variable is **Sell**. Asterisk indicates significance at the 0.10 confidence level or higher. Marginal effects for dichotomous variables were calculated using the method described in Caudill and Jackson (1989).

Table 3. Tradeoffs Between Margin and Other Variables to Hold Probability of Selling Constant

Change in Variable	Percent Change in Margin
One unit decrease in expenditure for food consumed at home	0.56
One unit decrease in households interested in health foods	1.03
One unit increase in households with income below $15,000	16.76
One unit decrease in average household size	27.05
Ten percent decrease in probability of chain food retailer	5.64
One unit increase in food sales per square foot	0.02
Ten percent increase in probability of educated decision maker	-4.66
Ten percent increase in probability of supporting organic foods	-3.23
Ten percent decrease in probability that competitive reasons most influenced sale	-4.09
Ten percent decrease in probability that economic reasons most influenced sale	-3.59
One unit increase in number of information sources	-13.02
Ten percent decrease in expectation of zero price premium	-3.58

References

CACI. *The Sourcebook: Zip Code Demographics*. 13th edition. Arlington, VA, CACI Marketing Systems, 1998. pp.62A-69D.

Caudill, S. B., and J.D. Jackson. “Measuring Marginal Effects in Limited Dependent Variable Models.” *The Statistician* 38(1989):203-206.

Cragg, M., and M. Kahn. “New Estimates of Climate Demand: Evidence from Location Choice.” *J. Urban Econ*. 42(1997):261-284.

Estes, E.A., J. E. Herrera, and M. Bender. “Organic Produce Sales Within North Carolina: A Survey of Buyer Opinions.” ARE Report No. 11, Dept. Agr. and Res. Econ., North Carolina State University, Raleigh, NC, 1994.

Estes, E.A., T. Kleese, L. Lauffer, D. Treadwell, and R. Burton. An Overview of the North Carolina Organic Industry.” ARE Report No. 17, Dept. Agr. and Res. Econ., North Carolina State University, Raleigh, NC, 1999.

The Hartman Group. *Food and the Environment: A Consumer’s Perspective*. Phase 1. Bellevue, WA: The Hartman Group, 1996.

HealthFocus, Inc.“What Do Consumers Want from Organics?” 1997 HealthFocus Fast Facts Report, Des Moines, IA: HealthFocus, Inc., 1997.

Lin, B-H., S. Payson and J. Wertz. “Opinions of Professional Buyers Toward Organic Produce: A Case Study of Mid-Atlantic Market for Fresh Tomatoes.” *Agribusiness* 12(1996):89-97.

Lohr, L., and A. Semali. “Retailer Decision Making in Organic Produce Marketing.” In *Integrated View of Fruit and Vegetable Quality,* W. J. Florkowski, S. E. Prussia and R. L. Shewfelt (eds.). Lancaster, PA: Technomic Publishing Co., Inc., 2000. pp. 201-208.

Market Statistics. *Demographics USA Zip Edition* . New York: Market Statistics, 1998. pp. 5.120-5.125.

May, T. G. “Distributors Hurdle Out-Of-Stocks, Consolidation.” *Natural Foods Merchandiser,* 20(1999):35,37.

Misra, S. K., C. L. Huang, and S. L. Ott. “Consumer Willingness to Pay for Pesticide-Free Produce.” *West. J. Agric. Econ.* 16(1991):218-227.

Morgan, J., and B. Barbour. “Marketing Organic Produce in New Jersey: Obstacles and Opportunities.” *Agribusiness* 7(1991):143-163.

“Natural Products Stores 1998 Sales by Category.” *Natural Food Merchandiser*, 20(1999a):60.

“Retailers Standing Up to Tough Competition.” *Natural Food Merchandiser,* 20(1999b):1,34-35.

Organic Farming Research Foundation. *Final Results of the Third Biennieal National Organic Farmers’ Survey*. Santa Cruz, CA: OFRF, 1999.

Organic Trade Association [OTA]. *Manufacturers ‘ Market Survey.* Greenfield, MA: OTA, 1998.

The Packer. “Organic Growth.” *Fresh Trends 2000.* Lincolnshire, IL, Vance Publishing Corp: The Packer, 2000. pp. 36-40.

The Packer. “Gobbling Up the Vegetables.” *Fresh Trends 1998.* Lincolnshire, IL, Vance Publishing Corp: The Packer, 1998. p.54.

The Packer. “Organics’ Attraction.” *Fresh Trends 1996.* Lincolnshire, IL, Vance Publishing Corp.:The Packer, 1996. pp.74-80.

SRDS. *The Lifestyle Market Analyst*. Des Plaines, IL: SRDS, 1998. pp.23-58.

Stewart, R. “Analysis of Top Natural Retail Chains.” *Natural Foods Merchandiser* 20(6):56.