AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Consumers' Willingness to Purchase Locally Produced Agricultural Products: An Analysis of an Indiana Survey

Mark D. Jekanowski, Daniel R. Williams II, and William A. Schiek

Using a survey of over 320 consumers from across the state of Indiana, we estimate an ordered probit model to determine the demographic and attitudinal factors which are most important in predicting the likelihood of consumers to purchase products that are produced within the state. Our results indicate that the willingness to purchase locally produced agricultural products increases with time of residency in the state, and we find a greater tendency for female consumers to purchase such products. We also find that quality perceptions play a critical role in these food purchase decisions. We underscore the importance of maintaining minimum quality standards to maximize the effectiveness of state level agricultural promotion programs.

The highly competitive nature of agricultural commodity markets has since the early days of commercial agriculture challenged legislators to devise methods of increasing or stabilizing farm incomes. While the bulk of agricultural policy is still implemented at the federal level, efforts at the state level to protect and promote local agricultural interests have existed for more than 60 years. State governments have been involved in the advertising and promotion of agricultural products since the 1930s (Halloran and Martin 1989).

Advertising by commodity groups and marketing boards tends to focus on increasing consumer demand for a single product, such as pork, milk or potatoes. Ward, Chang and Thomson (1985) refer to this as "generic advertising." These campaigns could either be supported nationally, as are the "Pork—The Other White Meat" and the "milk mustache" campaigns, or by producer groups within a particular state, like "Washington Apples" and "Idaho Potatoes." Funding usually comes directly from the producers through a checkoff program.

Growing in popularity are state-funded programs aimed at promoting, or at least identifying, all agricultural products produced within the state; adding a "family branding" aspect to generic promotions which typically focus on a single commodity. These programs are expected to grow in popularity as agricultural markets become increasingly global, and U.S. producers face greater competition from Latin and South American countries, especially in the fresh fruit and vegetable markets. Liberalized trade policies have already prompted some producer groups to request mandated "country of origin" labeling, and while the impetus here is ostensibly related to food safety issues, the side benefit of increased demand owing to consumers' loyalty to U.S. products is most certainly well-known and appreciated. State promotion programs can be viewed as a type of "state of origin" labeling initiated to protect local producers from interstate competition by capitalizing on consumers' loyalty to their state of residence. By differentiating products produced within the state, these programs could complement national promotion efforts which tend to be aimed at building consumer awareness to particular agricultural commodities.

States tend to view agricultural promotion pro-

Mark P. Jekanowski is an agricultural economist with the Economic Research Service, USDA; Daniel R. Williams II is an economist with Agricultural Marketing Service, USDA; and William A. Schiek is an economist with the Dairy Institute of California. Comments from Kevin Kesecker of USDA/AMS, and two anonymous reviewers are gratefully acknowledged. Partial funding for this project was provided by Indiana's Value Added Grant Program.

Agricultural and Resource Economics Review 29/8 (April 2000) 43–53
Copyright 2000 Northeastern Agricultural and Resource Economics Association

grams as relatively inexpensive means by which to stimulate economic activity, especially in rural areas. They are generally intended to appeal to consumers who have an interest in supporting local agriculture. The popularity of these programs has been increasing, with at least 23 states actively involved in promoting their own agricultural products, and several others considering the introduction of such a program (Williams 1995). Budget commitments vary by state, with some spending as little as $80,000 on agricultural promotion, and others spending over $2.0 million (Williams 1995).

Examples of some popular state programs include: "Ohio Proud," "Jersey Fresh," and "Virginia's Finest." Programs such as these usually rely heavily on the use of a standardized logo or slogan, which can be displayed on point-of-purchase (POP) materials supplied to supermarkets, in sales flyers distributed by individual supermarkets, or via television or radio advertisements. Three key functions of state promotion programs are the following: expanding consumer awareness of state-sourced products, motivating consumers to buy state-sourced products, and establishing new markets or expanding existing markets domestically and/or internationally (Williams 1995).

Perhaps one of the most successful state branding programs in recent years has been the "Jersey Fresh" campaign, administered by the state of New Jersey. It was started in 1983 with a budget of approximately $350,000, and is credited with doubling consumer awareness of New Jersey agriculture in the first year of operation (Brown 1988). Adelaja et al. (1990) found that the "Jersey Fresh" tomato has a more inelastic demand with respect to price, a more elastic income response, and fewer substitutes relative to tomatoes produced in other states. Arizona's recently implemented promotion program, "Arizona Grown," has so far not shown the same level of success. Patterson, et al. (1999) find little evidence that sales have increased or consumer preferences have changed as a result of the campaign. This emphasizes the need for detailed knowledge of the factors that might contribute to the success of promotion programs implemented at the state level.

Despite the growing interest in these programs among state legislators, little research has been conducted to determine the likelihood of success or the factors that could influence a successful implementation. This knowledge could be useful for identifying and targeting those consumers most willing to build loyalties to commodities produced locally, thereby ensuring the largest return possible from the promotion budget. This is especially important given that these promotions are often criticized as an inefficient use of resources. For example, many researchers contend that state-level promotional efforts should be abandoned either in favor of multi-state efforts (e.g. Halloran and Martin) or research to reduce costs and increase production efficiency (Wohlgenant 1993).

We do not focus here on the normative aspects of the optimal distribution of government resources, rather we aim to identify factors that might be important in determining consumer demand for locally produced agricultural products. This type of information could be useful in program design since the success of any advertising campaign is tied to its ability to target those consumers who have the highest likelihood of purchase.

Conceptual Framework of Agricultural Promotion Initiatives

As Waugh pointed out over 30 years ago, the general purpose of commodity advertising is to change the shape of the demand curve. Price advertising for generic commodities, which is common among chain stores and supermarkets, has the effect of increasing demand elasticity by encouraging greater consumption as soon as the price drops. Advertising, which attempts to differentiate products, has the opposite effect: it induces consumers to build loyalties to particular brands, decreasing demand elasticity and possibly allowing the seller to receive a price premium over the non-differentiated product. State sponsored promotional programs fall into this second category.

Building a brand image which effectively differentiates food products by their place of origin can be a daunting task, since the market for fresh food commodities (especially fruits and vegetables) is overwhelmingly price competitive. While some national fresh food brands exist (e.g. Dole, Green Giant, Chiquita), and some producer groups have successfully differentiated particular commodities by their place of production (e.g., Florida Orange Juice, California Raisins, Washington Apples), most fresh produce commodities are homogeneous and compete primarily on price and easily perceptible quality differences. The wholesale markets are predominantly generic, and quality differences at the retail level tend to be attributed to the reputation of the grocery store. The challenge for state promotion programs is to provide local producers a vehicle for building consumer loyalty, so that purchase decisions may be based on attributes other than price and easily recognized quality differentials. This is especially important if the local pro-

ducer faces a comparative disadvantage in production.

States that actively promote their own agricultural products do so in an attempt to develop a local brand to compete against, what is in essence, a national generic (unbranded) product. The generic brand appeals to the price shoppers, but the local brand will appeal to those shoppers who have a propensity to build brand loyalties, or who otherwise value the information provided in the advertisement. An example could be the "Jersey Fresh" tomato placed beside an unbranded tomato from Florida: if the promotion is successful the local brand will be more appealing to some consumers, either because of real or perceived differences in quality. State promotion programs can influence consumers' perceptions of local agricultural products by providing information about superior quality or freshness, or they may simply appeal to the parochial interests of consumers wishing to support local agricultural industries. The important assumption is that demand is not only a function of prices and income, but also depends upon consumer preferences and perceptions, which could vary across consumers, and which might be influenced by advertising.

Not all consumers are equally susceptible to the messages conveyed by this form of advertising. The competing interests of price shoppers and brand loyal consumers can be modeled conceptually as a consumer duopoly model, similar to that illustrated by Rao (1991). Consider a market with two brands of a particular product. Brand 1 is a national, undifferentiated brand, while brand 2 is produced locally and is labeled as such. Assume a market of fixed size D, composed of segments A and B. Segment A consists of price shoppers with no brand preferences, and it constitutes a fraction q of the market, where $0 \leq q \leq 1$. Segment B corresponds to the remaining $(1 - q)$ of the market.

Consumers in segment A choose brands based on the following rule:

$$(1) \quad p_i < p_j \rightarrow \text{choose brand } i, \quad i = 1,2, \quad j = 3 - i$$

i.e.—they are price shoppers. Consumers in segment B choose products based both on price and the relative preferences for each of the two brands, where δ_k represents consumer k's preference for the local brand (brand 2). The choice rule for consumer's in segment B is then:

$$(2) \quad p_2 \leq p_1 + \delta_k \rightarrow \text{choose local brand}$$

$$(3) \quad p_2 > p_1 + \delta_k \rightarrow \text{choose national generic brand}$$

δ_k therefore corresponds to a price premium commanded by the local brand. Consumers in segment A are willing to pay no premium.

Heterogeneity is introduced into the consumer population by allowing the proportion of consumers in segment B with $\delta \leq x$ (a given premium) to be denoted by $F(x)$ where:

$$(4) \quad F(x) = \int_r^x f(\delta)\,d\delta \quad f(x) > 0, r < x < u$$
$$F(r) = 0, F(u) = 1.$$

No consumer is willing to pay a premium greater than u, and all consumers (in segment B) are willing to pay a premium of at least r (which could be zero) for the local brand. Therefore, if the local brand (brand 2) charges a premium of x over the national generic brand (brand 1), its share of consumers in segment B is given by $(1 - F(x))$: the proportion of consumers willing to pay a premium greater than or equal to x. The sales of the local brand (denoted S_L) and the national generic (denoted S_N) given a premium x are defined as:

$$(5) \quad S_L = D[(1 - q)(1 - F(x)) + qI(x)],$$

$$(6) \quad S_N = D[(1 - q)F(x) + q(1 - I(x))],$$

where $I(x)$ is an indicator variable given by:

$$(7) \quad I(x) = 1 \text{ if } x \leq 0, \quad I(x) = 0 \text{ otherwise.}$$

If $x < 0$, both consumer segments (A and B) purchase the local brand exclusively. If $0 < x < r$, the local brand receives all of segment B but none of segment A, and if $x > r$, segment B is divided among the two brands according to $F(x)$ above. If $x > u$, no consumer purchases the local brand.

When a state considers implementing an agricultural promotion program, it is assuming that consumer segment B comprises some significant proportion of the market, and that these consumers are willing to pay a premium ($\delta \geq x$) high enough to cover the expense of the program and any possible comparative disadvantages in production which might result in a higher price for the local brand. The state promotion effort serves to ensure maximum sales by identifying local products to those consumers in segment B, and it might also change consumer preferences in favor of the local brand—effectively increasing δ in the above example. The following analysis focuses on determining the attitudes, purchasing patterns, and demographics that best characterize consumers in segment B, i.e.,—those that are most likely to exhibit brand preferences for locally produced agricultural products. The results will aid state agencies in developing programs that most effectively reach their target market.

Model Specification

Consumer purchasing behavior is assumed to be a function of several factors, including perceptions of the quality and value of the product in question, prior shopping experiences, the degree to which consumers build loyalties to particular brands of products, as well as the demographic composition of the household. Unfortunately, obtaining detailed data on actual consumer purchases of agricultural commodities is difficult. Most grocery stores use PLU (price look-up) codes to identify the price of particular produce items, but unlike UPC codes, these provide little information other than the type of product, so purchases of local products are often not distinguishable from purchases of products produced elsewhere. A consumer survey is one of the few tools available to extract information about consumer preferences for locally grown produce.

We believe that the likelihood of purchasing agricultural products advertised as being produced in-state can appropriately be modeled as follows:

(8) *Likelihood of Purchasing Locally Produced Agricultural Commodities =*

f(Perceptions of price and quality of locally produced products, typically shopping behavior, family income, demographic characteristics of the household).

Data for the variables in this model (described below) were collected as part of a consumer survey conducted in Indiana. Several variables were used to represent the right-hand-side factors. Specifically, the model was estimated using the following set of survey-response variables:

(9) *Likelihood of Purchasing Locally Produced Agricultural Commodities =*

f(Perceptions of price of local produce, perception of quality of local produce, number of visits over the past year to local farmers markets, degree of brand loyalty when shopping, importance of product freshness, annual household income, time as a resident of Indiana, family size, education level of primary food shopper, gender of primary food shopper, degree of urbanization where respondent resides).

The survey questions are described in more detail below.

Data

The survey data used here comes from a larger study funded by the state of Indiana to investigate the feasibility of a statewide identification, branding, and promotional program for Indiana-sourced food and agricultural products. This study included a consumer telephone survey, part of which was aimed at determining the factors which would motivate consumers to purchase products identified as locally produced.[1]

The survey was conducted by KLD Marketing, in December 1994. Survey participants were chosen based on a random sample of residents from all counties in Indiana, weighted by population. A total of 498 people were surveyed, with 324 of the respondents providing enough information to be used in our empirical analysis. The questions addressed consumer food buying behaviors, perceptions of the quality and value of products produced in Indiana, the likelihood of purchasing locally produced food products at the grocery store, and demographic characteristics of the household. The focus of the survey was both locally produced processed food products, such as bakery items, ice cream, and wine; and unprocessed agricultural commodities such as tomatoes, melons, etc. The results are therefore not limited only to "produce," but instead are applicable to any segment of the food industry that hopes to capitalize on state loyalty by identifying itself as being a "local" producer.[2]

One of the first questions of the survey was, "If Indiana produced food products were clearly identified and offered where you shop, how likely would you be to purchase these products?" Participants were asked to rank their likelihood on a scale from 1 (not at all likely) to 5 (extremely likely). The response served as the dependent variable in this analysis, but to make interpretation of the results easier, we collapsed the responses into three categories: 1 = "unlikely," 2 = "neutral to somewhat likely," and 3 = "highly likely."[3]

Responses to other survey questions served as the independent variables. Two variables con-

[1] The complete survey was intended to identify current consumer attitudes towards a statewide promotion/branding program for food at home and away, and to collect opinions concerning various proposed state slogans and logos. For this study we focused on the variables that we believed were most relevant to identifying consumer attitudes towards Indiana agricultural products at the grocery store, with the least amount of redundancy (several of the questions were either open-ended, or were asked in such a way to be highly correlated with other questions in the survey). A copy of and descriptive analysis of the complete survey is available from the authors upon request.

[2] For food processors, it is generally required that the agricultural inputs be sourced exclusively from within the state in order for the processed product to carry the state identification logo.

[3] There was practically no difference in the parameter estimates (sign and significance) resulting from the use three categories in lieu of five, and most would agree that interpretation is easier with only three levels of likelihood. Results based on the five categories are available from the authors upon request.

trolled for the perception of the quality and price of food products produced locally. Respondents were asked to rank their quality perception of locally produced products (i.e., produced in Indiana), compared to other state's products, on a 5 point scale. A response of 5 meant the products were perceived to be much higher in quality, 1 meant much lower in quality, with 3 meaning no quality difference. A similar question addressed price perceptions: a response of 5 meant the consumer believed locally produced products tend to be much higher in price than those from other states, and 1 meant they tend to be much lower in price. Again, a response of 3 meant the consumer believes no noticeable price differential exists. We expect that higher perceptions of quality, and lower perceptions of price, will have a positive effect on likelihood of purchase.

Three variables controlled for shopping behavior. Respondents were asked the approximate number of times in the past year that they shopped at a local farmers' market, corresponding to the following four categories: zero, 1–5 times, 6–10 times, and greater than 10 times. This variable was coded to correspond to the midpoints of these response categories: 0, 3, 7, and 11. We expect that the likelihood of purchasing local products increases with increased frequency of visits to farmers' markets, since these people would tend to have a greater awareness of the products produced within the state, and shopping at farmers' markets could indicate a willingness to search for products produced locally.

The respondent was also asked to rank his or her typical degree of brand loyalty, where a response of 1 meant the respondent is never brand loyal (i.e., consumer is a price shopper), and 5 meant the respondent always tries to purchase particular brands of products. We expect that a tendency towards brand loyalty will increase the likelihood of purchasing local products if they are so labeled.

For the final measure of shopping behavior, respondents were asked to rank the relative importance they place on product freshness when shopping for groceries, with 5 meaning they are extremely concerned about product freshness, and 1 meaning product freshness is not a serious factor. We expect that people concerned about product freshness will have a greater likelihood of purchasing locally produced agricultural products, especially produce, given the perception that the time between harvest and delivery to the food store is minimized for products produced locally.

Income is practically always expected to play a role in consumption decisions, and here is no exception. People with higher incomes have a higher opportunity cost of time, and therefore tend to be more susceptible to advertising, especially if it is informative. Since labeling of locally produced products is a form of advertising, we expect the likelihood of purchashing these products to increase with income. Respondents were asked to state their annual household income in one of eight categories, the lowest being under $10,000, the highest over $75,000.

Several variables control for demographics. The length of time the respondent was a resident of the state is expected to have a positive effect on the likelihood of purchase, since a stronger identity with the state is expected to be built over time, along with state pride, a greater interest in the state's economy, and possibly a desire to "help neighbors." Other variables include family size and the level of education of the primary food shopper in the household (in one of five ranges, from some high school or less, to graduate work or degree), and the respondent's age. A binary indicator controls for the gender of the respondent (1 = male, 0 = female). We have no strong expectations concerning the effect of these variables. Finally, respondents were asked the type of area which best describes the location of their home, in increasing order of urbanization, with 1 meaning "rural," 2 "small town," and 3 "city." We expect, if anything, for rural consumers to have a greater likelihood of purchasing local agricultural products since these tend to have a greater awareness, and possibly appreciation for, the local agricultural economy.

The survey questions used in this analysis, along with descriptive statistics of the responses, are presented in the appendix.

Model Estimation

We estimated the model described in equation 9, assuming it to be linear in the independent variables. Due to the special nature of the dependent variable (categorical), OLS cannot appropriately be applied to this model. Heteroscedasticity would lead to inefficient parameter estimates, and the non-normal distribution of ϵ_t would invalidate classical tests of significance. In addition, OLS could result in predicted probabilities greater than one or less than zero. An ordered probit or ordered logit model will provide greater generality by assuming each level of the dependent variable to be a censored apportionment of a continuous distribution of purchase likelihoods. These models are non-linear, and the area of the distribution associated with each level of the dependent variable is simply a probability.

We choose the ordered probit specification.[4] Along with the variable coefficients, a threshold parameter used to segment the distribution of likelihoods into the three categories is estimated within the model. The probability associated with each category is its respective area under a normal curve, calculated as follows (Greene 1991):

$$(10)\quad \begin{aligned} \text{Prob}[y = 1] &= \Phi(-\beta'x), \\ \text{Prob}[y = 2] &= \Phi(\mu-\beta'x) - \Phi(\beta'x) \\ \text{Prob}[y = 3] &= 1 - \Phi(\mu - \beta'x) \end{aligned}$$

where μ is the threshold parameter mentioned above, Φ is the cumulative normal, and x is the vector of independent variables, which we will set equal to the mean. Maximum likelihood estimation was conducted using LIMDEP econometric software (Greene 1996).

Model Results

The parameter estimates for the model estimated above are presented in table 1. No direct measure of goodness-of-fit, such as R^2, is computable for this type of model. However, a pseudo-R^2 can be calculated based on the ratio of the unrestricted and restricted log-likelihood values (Long 1997). Following Ben-Akiva and Lerman (1985), and controlling for the number of regressors in the model, the pseudo-R^2 is 0.11. Probit model significance is verified through a chi-squared test of the difference between the restricted and unrestricted log likelihood values. Here, with 11 degrees of freedom, the chi-square statistic is 29.07 and highly significant.

Table 2 presents the estimated probabilities associated with each level of the dependent variable, calculated using the parameter estimates from table 1. The parameter estimates represent the marginal effect of a change in an independent variable on the probability distribution of the dependent variable, i.e., the probabilities in table 2. In other words, a positive parameter estimate implies that an increase in that variable shifts the distribution towards the right, resulting in an unambiguous increase in the area (probability) associated with highest category (Y = 3), and an unambiguous decrease in the probability for the lowest category (Y = 1). Depending on the threshold parameter estimate, the marginal effect on the middle category is ambiguous. However, in general, the signs of the parameter estimates are indicative of the effect that each variable has on the likelihood of purchasing locally produced agricultural products; positive coefficients imply a greater likelihood, and vise-versa.

The probabilities in table 2 indicate a high likelihood of purchasing locally produced food products when that option is available. Nearly 60% of the probability distribution is associated with the category representing a positive likelihood of purchase (y = 3). Most of the remaining distribution (just under 40%) is captured by the category representing neutral or somewhat likely (y = 2). The probability associated with a resident being unlikely to purchase locally produced food products (y = 1), given the variables in the model, is only about 2% (table 2). This is evidence that consumers have a tendency to favor the local brand when that option is available.

Table 1. Parameter Estimates from Ordered Probit Model Predicting the Likelihood of Consumers to Purchase Locally Produced Agricultural Products

	Parameter Estimate	t-ratio
Intercept	−0.6603	−0.730
Price and Quality Perceptions:		
Perception of Quality	0.3333	2.712**
Perception of Price	−0.0093	−0.068
Shopping Behavior:		
Number of Visits to Farmers Markets	0.0172	0.961
Degree of Brand Loyalty	0.1180	1.079
Importance of Freshness	0.1190	1.015
Income:		
Household Income	0.0941	2.016**
Demographics:		
Time as a Resident	0.0255	1.981**
Family Size	0.0110	0.404
Level of Education	−0.1431	−2.023**
Gender (0 = Female, 1 = Male)	−0.2942	−1.763*
Degree of Urbanization	0.1126	1.207
Threshold Parameter Estimate:		
μ_1	1.8283	10.421**
n = 324, χ^2_{11} = 29.07**		

Single and double asterisks denote significance at the 10 and 5% levels, respectively.

Table 2. Estimated Probabilities from Ordered Probit Model, of the Likelihood of Purchasing Locally Produced Agricultural Products in a Grocery Store.

	Probability
Highly likely to purchase local food products (Y = 3)	0.5879
Neutral or somewhat likely (Y = 2)	0.3919
Unlikely to purchase local food products (y = 1)	0.0202

[4] The probit model assumes the errors to be normally distributed, while the logit assumes a logistic distribution. Both assume $\mu \sim (0,\sigma)$. In practice, model choice tends to have little effect on the results, which was also the case here.

The negative parameter estimate for the gender indicator variable (table 1) indicates that females tend to be more likely than males to purchase food products produced locally. Since this is a binary indicator variable (where male = 1), it is informative to calculate the predicted probabilities separately for both males and females. This can be done by calculating the probabilities with the gender variable equal to zero for females, and to one for males, instead of holding it at its mean. For females, the probabilities associated with the three increasing levels of likelihood ($y = 1, y = 2, y = 3$) are: 0.017, 0.369, and 0.614, respectively; while for males they are 0.034, 0.468, and 0.499. It is evident that compared to males, females have both a higher probability of being likely to purchase, and a lower probability of being unlikely. The implication for states is that programs to promote or build awareness of local agricultural products could have a larger effect when targeted towards female consumers. This suggests that to maximize the promotion effectiveness, advertising strategy should focus on themes that appeal to female consumers, through media with large female audiences.

It is not surprising that the perception of the quality of local produce is positively related to the likelihood of its purchase. This emphasizes the importance of maintaining minimum quality standards, and suggests strong results from advertisements which promote the quality aspects of food products produced locally. Building a brand image based on tangible quality differences will have a strong likelihood of success. However, if the quality of local food products is comparatively low, due to negligence or mismanagement at any level of the marketing chain, a state branding and identification program could have the opposite effect: the positive parameter estimate also indicates that a low perception of quality will decrease the likelihood of purchase.

The perception of the price of local produce, relative to that from other states, does not have a significant effect on the likelihood of purchase. The mean of this variable was 2.81 (see appendix), indicating that on average consumers expect food items produced locally (i.e., in-state) to be slightly less expensive than products from other areas. We know that this will not always be the case, since although transportation costs might be lower for products produced locally, quite often these producers operate at a comparative disadvantage to other areas. Fortunately, the parameter estimate for this variable indicates that even consumers who expect to pay more for local food products do not have a significantly lower probability of purchase. This is evidence that price does not weigh heavily in the decision to choose local produce over that from other states. Therefore, place of origin can be a source of product differentiation, and if promoted in a favorable light, might allow consumers to justify a higher expense for products grown in-state.

None of the variables controlling for consumer shopping behavior were significant at traditional levels. We expected each to have a positive effect on purchase likelihood, but while the parameter estimates for each of these variables is positive, none is significantly different from zero. We do not believe that this implies that these factors are not important, but rather it illustrates the difficulty in measuring these presumably important factors. For example, asking the respondent how often he or she purchases the same brand might be a poor proxy for their actual degree of brand loyalty. A more accurate measure could be developed by actually tracking their purchase history over time, but this expensive option was not feasible. In other studies of consumer behavior, brand loyalty is often considered to be a powerful force, and is the basis behind much of advertising. We therefore believe that developing a consistent, easily recognizable brand or logo is an important part of any state promotion activity.

The variable measuring the relative importance of "freshness" was not significant, but the survey respondents indicated that "freshness" was quite important in their purchase decisions (the mean response was 4.4 on a scale of 5.0, see appendix). The lack of significance in the estimated model suggests that consumers do not expect local products to on average be any more fresh than products produced elsewhere. But since freshness is important to consumers according to the survey results, the implication for marketers is that emphasizing the superior freshness of locally produced products would likely be beneficial. The speed with which local products can move from the farm to the produce section of a grocery store is perhaps one of their most distinguished characteristics, and should be emphasized accordingly.

The number of visits to farmers' markets is much less subjective, and in our model is not related to the likelihood of purchasing local products. This might indicate a lack of awareness of farmers' markets, or that farmers' markets are an inconvenient option. Despite the desire to purchase local products expressed in our survey, consumers appear to be unwilling to incur the search and time costs involved in purchasing some of their food directly from the farm, or from an organized farmers' market. By segregating and identifying products which are produced locally, grocery stores

provide a service to consumers that reduces or eliminates these search costs.

The willingness of consumers to purchase local food products increases with the length of time the consumer has resided in the state. This is the relationship we expected, since pride in one's state of residence likely builds over time, along with the awareness of the local agricultural economy, both of which would be expected to increase the likelihood of purchasing products produced locally. A possible implication for marketers is that advertisements emphasizing nostalgia, tradition, and the agricultural heritage of the state might produce superior results.

Household income is positive and significant. The opportunity cost of shopping time increases with income, thus making the consumer more susceptible to branding and advertising, and less sensitive to price. A program design implication is that point-of-purchase displays and other advertising techniques will have the greatest effectiveness if targeted at consumers in relatively wealthy areas. The level of education has a negative effect, which implies that with education consumers become less susceptible to advertising and branding, and are more likely to differentiate products based on tangible quality characteristics and price. This might also indicate that highly educated consumers are at some level aware of the concept of comparative advantage, recognizing that not all areas can produce high quality products with the same degree of efficiency. These consumers are less likely to be influenced by a state-level branding program.

Neither family size, nor the type of community that the respondent resides in (rural, small town, urban) are significantly related to the likelihood of purchasing locally produced food items. This indicates little need to segment the market or target consumers based on these attributes. The fact that the type of community in which the respondent resides is not significant suggests that consumers living in the city are generally as willing to purchase local agricultural products as those in rural areas, which is important since urban areas comprise a large proportion of the population base of any state. A well-developed state promotion program would be expected to have broad consumer appeal across much of the population base.

Conclusions

We estimated a probit model to identify consumer characteristics that might indicate willingness to purchase agricultural products produced locally. This information could be useful in designing a successful state-sponsored agricultural promotion campaign. Our data was from a survey of over 320 randomly selected consumers from across the state of Indiana. Although we focused on Indiana, we feel our results are widely applicable to many states considering such a program.

The probability estimates from the probit model indicate a strong willingness to purchase local products if that option is available. This is evidence of a latent demand for such products, which increases the likelihood that identifying and promoting agricultural products at the state level will affect sales, directly benefiting the state's producers. An important conclusion is that loyalty to one's state of residence may already be, or could become, an important factor in a consumer's purchase decisions for food.

In our model, we found that household income, the quality perception of Indiana agricultural products, and the length of time that a consumer has resided in the state are all positively related to the likelihood of purchasing agricultural products produced in-state. The level of education has a negative effect. We also found significant differences between male and female respondents, with females having a greater likelihood of purchasing locally produced agricultural products. The perception of the price of local produce relative to that from other states, the propensity to shop at farmers' markets, the length of time the respondent lived in the state, family size, and the type of community the respondent lived in (rural, small town, or urban) were all insignificant.

We emphasize building a strong brand image to promote local agricultural products. Basing this image on quality characteristics and the relative freshness of such products is likely to have a strong effect. The quality of the products is especially important, since the perception of quality was found to have the strongest positive effect on the likelihood of purchase. Allowing quality to fall below that of other states could actually lead to a negative effect from the promotion campaign—by helping to identify products of lower quality.

Due in part to relatively low costs, the popularity of state sponsored promotional programs for agricultural products across the United States is expected to continue to grow. These programs can complement larger national programs. In some national programs, such as dairy, smaller regional programs can qualify for part of the national checkoff. For seasonal items such as fruits and vegetables, state programs may be a low cost promotion vehicle that is implemented during the state's marketing window.

Our results show that consumers generally harbor a strong desire to purchase food products pro-

duced in-state. Identifying and promoting these products is expected to have a positive effect on sales. The results presented here can help states to target their campaigns to provide the most efficient use of resources.

References

Adelaja, A.O., R.G. Brumfield, and K. Lininger. 1996. "Product Differentiation and State Promotion of Farm Produce: An Analysis of the Jersey Fresh Tomato" *Journal of Food Distribution Research* 21(3):73–85.

Ben-Akiva, M., and S.R. Lerman. 1985. *Discrete Choice Analysis: Theory and Application to Travel Demand* MIT Press, Cambridge, MA.

Brown, A.R. 1988. " 'Jersey Fresh': A Fresh Idea in Farm Products Marketing" In *1988 Yearbook of U.S. Agricultural Marketing*, U.S. Department of Agriculture, Washington DC, 256–260.

Halloran, J.M. and M.V. Martin. 1989. "Should States be in the Agricultural Promotion Business?" *Agribusiness* 5(1):65–75.

Greene, W.H. 1996. Econometric Software Incorporated. *LIMDEP* Version 7.0.

Greene, W.H. 1991. *Econometric Analysis* Second Edition, Macmillan Publishing, New York.

Long, J.S. 1997. *Regression Models for Categorical and Limited Dependent Variables* Series 7 of Advanced Quantitative Techniques in the Social Sciences. Sage Publications, London.

Patterson, P.M., H. Olofsson, T.J. Richards, and S. Sass. 1999. "An Empirical Analysis of State Agricultural Product Promotions: A Case Study on Arizona Grown" *Agribusiness* 15(2):179–196.

Rao, R.C. 1991. "Pricing and Promotion in Asymmetric Duopolies" *Marketing Science* 10(2):131–144.

Ward, R.W., J. Chang, and S. Thompson. 1985. "Commodity Advertising: Theoretical Issues Relating to Generic and Brand Promotions." *Agribusiness* 1(4):269–276.

Waugh, F.V. 1959. "Needed Research on the Effectiveness of Farm Products Promotions." *Journal of Farm Economics* 41:364–376.

Williams II, D.R. 1995. "Feasibility of a Statewide Branding Program for Indiana-Sourced Food and Agricultural Products." Unpublished Masters Thesis. Department of Agricultural Economics, Purdue University.

Wohlgenant, M.K. 1993. "Distribution of Gains from Research and Promotion in Multi-Stage Production Systems: The Case of the U.S. Beef and Pork Industries" *American Journal of Agricultural and Resource Economics* 75(4):642–651.

Appendix

Telephone survey questions used in the analysis, with the mean and standard deviation of the responses. All questions were asked of the primary food shopper. 324 useable responses were collected.

Dependent Variable:

If Indiana produced food items were clearly identified and offered where you shop, how likely would you be to purchase Indiana produced food products? Would you say that you are:

Extremely likely	5	Mean (as asked):	3.57
Very likely	4	Standard Deviation:	0.93
Neutral or somewhat likely	3		
Not very likely	2	Mean (collapsed to three levels):	2.55
Not at all likely	1	Standard Deviation:	0.56

Independent Variables:

In comparison to other state's products, would you say Indiana produced food products are:

Much higher quality	5		
Highly quality	4	Mean:	3.57
About the same quality	3	Standard Deviation:	0.54
Lower quality	2		
Much lower quality	1		

In comparison to other state's products, would you say Indiana produced food products are:

Much higher in price	5		
Higher in price	4	Mean:	2.81
Priced about the same	3	Standard Deviation:	0.50
Lower in price	2		
Much lower in price	1		

Since January of this year, how many times have you purchased food at a Farmers' Market?

More than 10	11		
6–10	7	Mean:	5.19
1–5	3	Standard Deviation:	4.17
0	0		

In general, when purchasing food products which of the following best describes your behavior?

I always purchase the same brand	5		
I usually purchase the same brand	4	Mean:	3.78
. . . sometimes	3	Standard Deviation:	0.62
. . . rarely	2		
I never purchase the same brand	1		

How important is product freshness in your decision to purchase a food product?

Extremely important	5		
Very important	4	Mean:	4.40
Somewhat important	3	Standard Deviation:	0.57
Not very important	2		
Not at all important	1		

Please stop me when I read the category that best describes your yearly total household income. Is it . . .

Under 10,000	1		
10,001–25,000	2		
25,001–30,000	3		
30,001–45,000	4	Mean:	3.75
45,001–55,000	5	Standard Deviation:	1.93
55,001–65,000	6		
65,001–75,000	7		
More than 75,000	8		

How long have you lived in Indiana?

Less than 1 year	1		
1–5 years	3	Mean:	17.31
6–10	8	Standard Deviation:	5.66
11–20	15		
More than 20 years	20		

Including yourself and any children, how many people are currently living in your household?

Mean:	3.23
Standard Deviation:	2.91

What is the last grade of school that you completed?

Some high school or less	1		
High school graduate/equivalent	2	Mean:	2.72
Some college/technical degree	3	Standard Deviation:	1.21
Bachelors degree	4		
Graduate work/degree	5		

What is the gender of the primary household food shopper?

Male:	75
Female	249

Which of the following best describes the area in which your home is located?

Rural	1	Mean:	1.94
Small town	2	Standard Deviation:	0.81
City	3		