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MARKET POTENTIAL FOR "Mississippi Grown" CUT FLOWERS

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ABSTRACT

Consumer willingness to pay for cut flower product attributes was examined using a choice-based experiment through a mail survey. Results show that consumers typically purchase flowers at florists and grocery stores, limiting marketing possibilities for small farmers through farmer's markets. Consumers were willing to pay a premium for cut flower products that were guaranteed as produced in Mississippi, which may offer marketing opportunities for Mississippi producers.

INTRODUCTION

Horticulture is a multibillion-dollar industry in the United States. Nursery products, houseplants, and cut flowers represent a growing market, both at the consumer and institutional level. Institutions such as banks, hospitals, hotels, and restaurants regularly purchase cut flower arrangements and potted plants for decorative appeal. At the same time, cut flower consumption among consumers is growing as well. As income increases, consumers have more disposable income to spend on flowers for gifts as well as personal consumption. At present, more than 50% of all cut flowers consumed in the United States are imported, suggesting that there may be a potential for domestic producers who can compete on a cost basis with foreign suppliers (in terms of both production costs and transportation costs) to supply a greater proportion of domestic consumption.

Research is being conducted at Mississippi State University on a number of flower varieties that can be grown in Mississippi on a cost competitive basis with foreign producers. Domestically produced flowers have a number of advantages over foreign produced flowers. From the consumer's perspective, domestically produced flowers are harvested and delivered to retailers in a shorter period of time, resulting in a longer shelf life. This shorter time to market, then, means the consumer receives greater value for the same price (assuming that the quality of the flower is the same). From the producer's perspective, cut flowers can be grown on relatively small plots of land, offering opportunities for small farmers to increase revenues per acre (and, presumably, profits) without having to increase farm size.

Despite the potential benefits to Mississippi producers, there are a number of challenges. Most important for the current study, flower purchase decisions by retailers tend to be based on established relationships with flower brokers. Because Mississippi producers are not yet established and have not developed long-term relationships with brokers, it may be difficult to gain entry into major markets. However, if brokers perceived some marketing advantage from purchasing locally, it would increase the probability that Mississippi producers could gain access to necessary market channels.

One such advantage may be through marketing by location of origin. That is, if consumers believed that local products were superior and were willing to pay premiums for local products, this would provide incentive to flower brokers to purchase locally grown flowers. The objective of this study was to examine the extent to which Mississippi consumers would be willing to pay premiums for "Mississippi Grown" cut flower products.

METHODS

A survey was designed to collect basic data about consumption and preferences for cut flowers by Mississippi consumers. Data were collected on the typical location where consumers purchase cut flower products, monthly spending on cut flowers, and factors most important in purchase decisions. In addition, consumers were asked to rank a set of flower types in order of preference. Color photographs were provided with the mail survey for consumers to use if they were unfamiliar with flower type or name. The purpose of this question was to establish which flowers were most likely to be preferred by Mississippi consumers. Roses are the most frequently purchased flower. However, roses cannot be grown competitively in Mississippi. Therefore, producers need information about flowers preferred by consumers that can be competitively produced in Mississippi.

Consumers were asked if they were aware that more than 50% of all cut flowers consumed in the United States are imported. Consumers were also asked if they were aware that locally grown flowers exhibited significantly longer shelf life, resulting in blooms that are more full for a longer period of time. The purpose of these questions was to examine consumer awareness of the location of origin of products being consumed and the potential positive attributes of locally grown produce.

Finally, consumers were asked a series of questions using a choice-based question design. Choice-based experiments have been widely used to examine consumer valuations for products (Lusk et al., 2001; Hudson and Lusk; Beggs, Cardell, and Hausman; Adamowitz et al.; Unterschultz et al.). The advantage of this approach is that it allows the researcher to vary the price and attributes for a product in a systematic fashion, thus controlling for correlations among attributes and statistical properties of the model to be estimated (Louviere, Hensher, and Swait).

Table 1. Attributes and Levels in Choice Experiment.

Variable	Alternative Levels	
Price	$35	$55
Are Flowers Fragrant?	Yes	No
Is Bouquet of Mixed or Single Color	Mixed	Single
Are Flowers Grown in Mississippi?	Yes	No

Consumers were presented a set of scenarios (an example is shown in Figure 1) where they were asked to choose between two generic "packages" of cut flowers containing different attributes, including price, or they could choose none. Table 1 shows the attributes and attribute levels used in the experiment. Scenarios (called choice sets) were formulated by first constructing the full factorial design of all possible combinations of attributes. Next, a random sample of choice sets was drawn from the full factorial design that results in minimum number of choice sets that maximizes design efficiency (Kuhfeld, Tobias, and Garrett). This process resulted in 62 different choice sets. These were blocked into seven groups of eight scenarios and one group of six choice

Scenario 1

Attribute	Package 1	Package 2	None
Price	$55	$55	
Color	Mixed	Mixed	
Fragrance	Fragrant	Non-Fragrant	
Certified Mississippi Product	No	No	
I would choose…			

Figure 1. Sample Choice Set, Cut Flower Survey, Mississippi, 2003.

sets, and each block was assigned randomly to a respondent. Thus, each respondent either received one survey with eight scenarios or six scenarios, depending on the particular survey version they received.

The choice-based experiment is a popular method of estimating consumer values for product attributes because it is built upon random utility theory (Louviere, Hensher, and Swait). Random utility holds that the utility an individual derives from consumption of a product can be decomposed into two elements — a deterministic portion, V_j, and a random portion, e_j, or:

$$(1)\quad U_j = V_j + \varepsilon_j$$

The probability that product j is chosen depends on the utility derived from product j compared with the utility of other products:

$$(2)\quad \Pr\{j \text{ is chosen}\} = \Pr\{V_{ij} + \varepsilon_{ij} \geq V_{ik} + \varepsilon_{ik}\} \text{ for all } k \in C_i$$

where is the choice set given to consumer i $(C_i = \{package1, package2, None\})$. Assuming that the random errors in Equation 1 are independently and identically distributed across the j alternatives and N individuals with a Type 1 extreme value distribution and scale parameter equal to 1, the probability of consumer i choosing product j is given by:

$$(3)\quad \Pr(j \text{ is chosen}) = \frac{e^{V_{ij}}}{\sum_{k \in C} e^{V_{ik}}}$$

Equation 3 was estimated as a conditional logit model composed of the price and attribute levels reported in Table 1 using Limdep 8.0. The primary area of concern is the willingness to pay by the consumer for the attributes of the packages, especially the willingness to pay for a "Mississippi Grown" product. Because the estimated coefficients in the conditional logit model represent marginal utility levels, one can take the absolute value of the ratio of the coefficient on the attribute of interest to the coefficient for the price effect to derive the marginal willingness to pay for that attribute. More specifically, because each of the attributes are represented by a dummy variable for the presence or absence of that attribute, this ratio represents the marginal willingness to pay for moving from an absence of that attribute to the presence of the attribute.

The above calculation provides a point estimate of the willingness to pay. In order to provide a statistical test for the willingness to pay, a distribution of willingness to pay values must be simulated. Krinsky and Robb provide a method using the variance-covariance between the parameter estimates from Equation 3 to simulate the bivariate normal distribution of willingness to pay values, from which a 95% confidence interval was constructed. If this interval does not cross zero, then the willingness to pay value is concluded to be statistically different from zero.

A random sample of 2,000 Mississippi residents was drawn by a marketing firm. Surveys were mailed to these 2,000 residents during June-July 2003. Cost and time constraints prevented multiple mailings, which is a generally preferred method to increase response rates and mitigate nonresponse bias (Dillman). Data were collected and tabulated and descriptive statistics calculated.

RESULTS

Of the original 2,000 surveys sent, 15 were returned undeliverable, resulting in an effective sample of 1,985. A total of 278 usable responses were returned, resulting in a usable response rate of 14%. While the response rate was low, it was expected due to the inability to perform follow-up mailings. The basic demographic characteristics of the sample are shown in Tables 2 and 3. Compared with the 2000 Census for Mississippi, the sample is older, more educated, and has higher income than the average for Mississippi. In addition, 90% of the respondents were Caucasian, suggesting that the sample is biased towards this demographic group. This group is likely the target market for cut flowers (82% of the respondents reported purchasing cut flowers): other groups likely self-selected out of the survey by not responding. To the extent that this group represents the target market, the results will effectively predict consumption behavior. However, if the respondents are not representative of the typical consumer purchasing cut flowers, results will likely be biased.

Table 2. Basic Demographic Characteristics of the Sample.

Variable	Mean	Standard Deviation
Age	52.8	15.54
Income ($/year)	61,650.94	68,127.36
Monthly Spending ($) on Cut Flowers	19.93	10.3
Household Size	2.44	1.33

Figure 2 shows the typical purchase location of cut flowers by the respondents. As can be seen, florists are the most frequent point of purchase, followed by grocery stores. Other methods are used, but to a much lesser extent. Of particular interest to Mississippi growers is the use of farmer's markets. Farmer's markets are convenient for farmers because they allow direct purchase by consumers without the farmer having to have long-term relationships with flower brokers. The low usage of these markets by consumers, however, suggests that the potential volume of sales through this outlet is likely to be low overall.

Figure 3 shows the most important reasons in cut flower purchase decisions. Occasion dominates as the primary reason. Holidays, weddings, and funerals compose a significant portion of cut flower purchases. Price was ranked fourth, on average, out of a list of six, suggesting that while price may play a role in purchase decisions, it is not the primary decision-making attribute. In fact, respondents appeared more concerned about the color or type of flower in purchase decisions than price.

In terms of flower types, roses are preferred by a majority of respondents. However, roses cannot be grown in Mississippi on a cost competitive basis with either other production regions in the United States or foreign flower producers. However, other flower products were preferred by some consumers. For example, daisy and carnation varieties were each cited as most preferred by more than 10% of the sample for each. Other flower varieties were less preferred, but it appears that a market exists for most flower types that can be produced in Mississippi. However, these data suggest concentration on daisy and carnation varieties because of the larger potential volume of sales.

Table 3. Education Level of Sample.

Level	Percentage
High School	21.66
Some College	24.88
College Graduate	23.96
Graduate Degree	28.11

Table 4. Preferences for Flower Types, Mississippi, 2003.[1]

Flower Type	Percentage Ranked as Most Preferred
Rose	61.97
Daisy	11.59
Carnation	10.53
Iris	7.69
Tulip	6.73
Lily	5.29
Gladiola	4.81
Zinnia	2.87
Sunflower	1.93
Snapdragon	1.45
Liatris	1.44
Celosia	0.00

[1]Numbers add to greater than 100% because many respondents ranked more than one product as most preferred.

Finally, consumers were asked to evaluate alternative flower products in the choice-based experiment. Results indicate, as expected, that the price of the flower arrangement has an inverse relationship with the probability of choice (Table 5). Both alternative specific constants (ASCs) are positive and statistically significant, indicating that consumers, on average, preferred to consume a flower arrangement as compared with not consuming. Consumers preferred mixed color

Figure 2. Most Typical Purchase Locations of Cut Flowers, Mississippi, 2003.

arrangements as compared with single color arrangements as indicated by the positive and statistically significant relationship between color and probability of choice. Similarly, consumers preferred arrangements that possessed fragrance as opposed to arrangements with no fragrance. Finally, the coefficient for "Mississippi Grown" is positive and statistically significant, suggesting that consumers preferred Mississippi grown cut flowers over other flowers, other things equal.

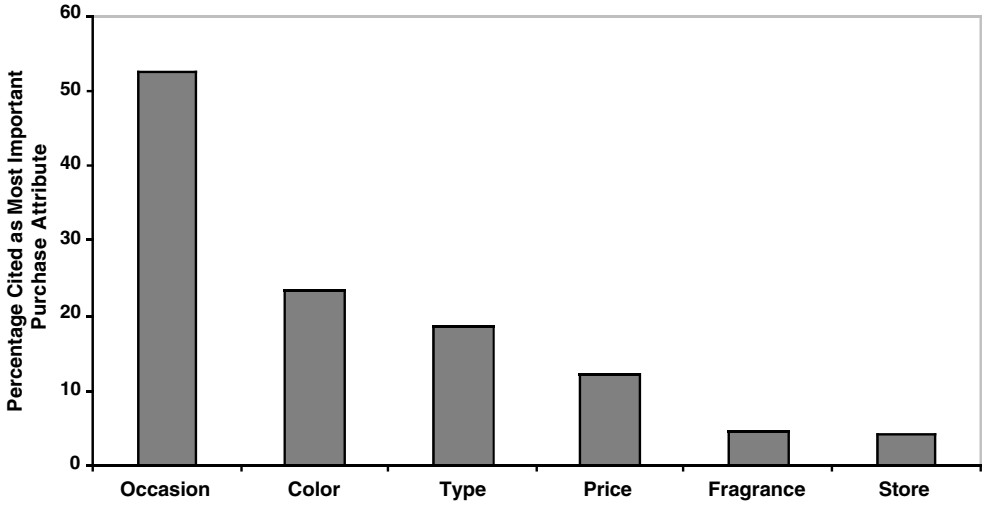

Figure 3. Most Important Reasons in Cut Flower Purchasing Decisions, Mississippi, 2003.

The estimated coefficients were used to calculate the mean willingness to pay for the flower arrangement attributes and the associated 95% confidence interval on willingness to pay (Table 5). As can be seen, the average consumer was willing to pay $18.66 more for an arrangement of mixed colors as compared with a single color arrangement, other things equal. The 95% confidence interval does not cross zero, so we conclude that this willingness to pay is statistically different than zero (or, more specifically, there exists a statistically significant premium for mixed color arrangements). Likewise, consumers were willing to pay an average premium of $13.16 for a fragrant flower arrangement, other things equal.

Finally, consumers expressed a positive willingness to pay of $15.12 more for a flower arrangement made with "Mississippi Grown" flowers as compared with an arrangement where the flowers were not guaranteed to come from Mississippi. Thus, other things equal, it appears that Mississippi consumers would prefer to purchase Mississippi-grown flowers if (1) they were given a choice, and (2) the product was identified as "Mississippi Grown."

Table 5. Conditional Logit and Willingness to Pay Results for Cut Flower Arrangements, Mississippi, 2003.

Variable	Parameter Estimate	Standard Error	t-value
ASC1	2.3245	0.1982	11.727[1]
ASC2	2.4785	0.1995	12.422[1]
Price	-0.0579	0.0042	-13.78[1]
Color	0.8757	0.0816	10.737[1]
Fragrance	0.7617	0.0807	9.438[1]
Mississippi Grown	1.0805	0.0728	14.832[1]
Log-Likelihood	-1382.588		
Adjusted R^2	0.235		

	Willingness to Pay		
Variable	Mean	Lower CI	Upper CI
Color	$18.66	$16.53	$20.78
Fragrance	$13.16	$10.87	$15.47
Mississippi Grown	$15.12	$12.80	$14.47

[1]Parameter estimate is statistically different from zero at the 0.05 level of significance.

Conclusions

It appears from the available data that Mississippi consumers predominantly purchase cut flowers in traditional locations such as florists and grocery stores. While some purchases are reported at farmer's markets, this does not appear to be a long-term viable market channel for producers to market cut flowers at volumes necessary to be commercially viable. Thus, the results of this analysis suggest that more attention needs to be paid to developing relationships with flower brokers, thus giving access to the more traditional shopping outlets. Because Mississippi growers are likely to be too small in scale to supply a sufficient number of flowers to a broker to meet overall demand, growers may have to pool output so as to have sufficient supply to attract brokers.

Results of this analysis do indicate that there is sufficient demand on the part of consumers to warrant consideration of a marketing strategy of labeling Mississippi grown flowers as "Mississippi Grown." If florists perceive an opportunity to increase revenues through such a marketing strategy, they will be more likely to seek out Mississippi-grown cut flowers, thereby opening market channels for Mississippi producers. This strategy, as above, may necessitate some coordination among Mississippi producers to develop and implement a labeling and certification program to deliver cut flowers to brokers/retailers that are guaranteed Mississippi products.

Readers should recognize, however, that these results are based on a sample that is not representative of the overall Mississippi population. The sample was drawn at random. However, some segments of the population apparently self-selected themselves out of the survey by failing to respond. To the extent that the responding group is the target population of cut flower consumers, the results are valid. However, one should be aware that the results only extend to the segment of the population that this sample represents.

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