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CONSUMER EXPENDITURES AT DIRECT PRODUCE MARKETS[1]

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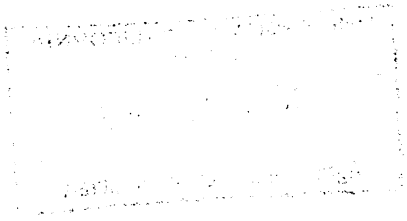
ABSTRACT

Interviews of customers at direct produce markets were conducted to determine the reason why expenditure patterns vary. Frequency of shopping at outlets, income, uses of produce, household composition, and distance to the outlet are important determinants of expenditures at direct product outlets.



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Vegetable and fruit crops are being considered as alternative or supplemental crops in many areas of the U.S. Direct marketing is an alternative that is often considered by new producers, especially those located near population centers. Direct marketing is used by producers with relatively small acreages who do not have access to strong marketing organizations and by larger producers who also sell in wholesale channels. Smaller producers may lack the ability to attract principal produce buyers except where they market through packing firms that accumulate large quantities and insure sufficient quality regulation. Direct markets can provide immediate market access to growers in areas where such packing firms do not exist or are inaccessible. Producers may find direct marketing more profitable than selling to wholesalers.

Producers who operate or participate in a direct market need to understand purchase behavior of customers and develop merchandising and promotion strategies designed to appeal to the need of their customers. Understanding purchase behavior may lead to the ability to identify market segments to whom particular appeals are best.

The objective of this research is to explain variations in annual customer expenditures at produce markets. Household income, household composition, lifestyle, preferences, and season of the year are hypothesized to explain variation in annual direct market produce expenditures per family member.

The hypotheses are derived from Becker's revised approach to consumer choices (Becker, p. 45-48). Consumer preferences are assumed to be an ordered function of a set of commodities. The utility function is assumed to possess normal properties. Commodity purchases are restricted by the budget constraint and time allocation is restricted to the time available to the consumer.

Becker's theory recognizes the importance of time allocation and the opportunity cost of time as a cost of commodities like fresh produce some of which require substantial preparation prior to consumption. People who shop at produce markets are spending extra

time making a special stop to buy produce. Some of those buyers may also buy in bulk quantities and substantially further process for future consumption. Because of variation in knowledge levels and experience of individuals, the human capital input into the production process is differentiated and will likely have an impact on the purchase of produce from direct outlets.

Specifically the Becker theory suggests that the quantity of produce purchased at the direct market can be hypothesized to be a function of the age distribution of household members, household budget constraint, allocations of the time of household members, and a vector of cultural and lifestyle factors.

Data and specific variables related to the hypotheses are described in the following section. Estimation procedures and results are then presented and followed by conclusions.

DATA AND HYPOTHESES

Three year-round roadside markets in Northeastern Oklahoma were selected for conducting customer research. All three markets were within a four mile radius with two located along the same major highway and the other just off that highway. The largest market was over 15 years old, and is the one located off the major highway. Another one was under five years old and the third between five and 15 years old. Each of the markets had over 100 acres in produce production and supplemented their own produce with produce purchased from others. Most produce sold at the markets that can be grown in the area is locally grown during the local production season. Produce is supplied from other states when it is not available locally. Thus these markets were combinations of direct markets and specialty produce markets. These markets were selected because of their year-round business cycles, managerial interest in consumer research, and managerial merchandising expertise.

Survey personnel visited each of the markets simultaneously during twelve days between August, 1983, and July, 1984. Each survey day consisted of two-and-a-half to seven hours of survey work per market. As many customers as possible were approached and asked to complete the questionnaire at their leisure while they shopped. Surveys were conducted on one weekday and one Saturday each period. Survey dates included August 18 and 20, October 25 and 29, December 17 and January 5, March 5 and 10, May 16 and 19, and July 3 and 7.

A total of 2,282 surveys were collected. Respondents answered an average of 83.2 percent of the questions on the questionnaire. These surveys represented a sample of approximately 16.9 percent of all individuals including children that entered the market, as counted by a person taking surveys, during the survey periods. A subsample of 1,037 respondents or 45.4 percent of the sample gave complete answers for each of the questions used in the final model reported here.

Annual per capita expenditures on produce at a specific direct market is used as the dependent variable in the model. This variable is obtained by combining three survey responses. The typical amount spent on produce at the market per visit was multiplied by the number of visits per year. The result was an annual expenditure on produce at the market per household. This variable was then divided by the household size to obtain an estimate of annual per capita spending for produce at the market for each household. Price and quantity data on individual items purchased were not collected because of the time required to complete a longer questionnaire and market managers' concerns about disrupting customer flow through the market.

Definitions of each of the dependent and independent variables used in the model are contained in Table 1 and are discussed below.

The age and sex composition of the household has been shown to influence the consumption of various food groups including fruits and vegetables (Price, 1969; Buse and Salathe, 1978, p. 467). The number of household members in various age groups is

included as independent variables to represent age composition. No specific composition hypotheses are presented.

Gross annual household income class is the income measure used. Households with higher incomes have more area under the budget constraint and should spend more per capita, ceteris paribus, if fresh fruits and vegetables purchased from direct markets are normal goods. Consumers were classified in one of the six income categories shown in Table 1.

We hypothesize that goodwill and ability to merchandise to customers are positively related to length of time in business. As a result of goodwill and superior merchandising, consumers at the oldest and largest market are expected to spend the most per capita while the consumers at the smallest and newest market are expected to spend the least per capita.

Shopping frequency is included to measure the effect of having loyal customers who shop regularly at a market. It is hypothesized that frequency of shopping will be positively related to annual expenditures per household member. In particular, those who shop at these markets each week would be expected to spend significantly more than any other group.

The use for fresh produce purchased at the market has time constraint effects. Consumers processing some of the produce they purchase have chosen to budget time for food processing. Different processing methods are probably used for different reasons (Johnson, 1976, pp. 7-8).

Miles to the market involves both the cost of time and the expense of traveling and potentially impacts on the money available for produce purchases. It is hypothesized that those traveling greater distances will try to spread the fixed cost of the mileage across more units and are likely to spend more at the direct markets.

Seasonality of consumer expenditures at direct markets has received very little attention. The survey months include August, October, December/January, March, May, and July. The expected pattern of expenditures per visit by month should not be the same

as the pattern for annual per capita spending by month. Pumpkin promotions in October should attract more spending for the visit but is also likely to attract families that shop less frequently at the markets. March and August are the two slowest months to be included in this survey in terms of produce sales but should include a higher proportion of the regular shoppers, who visit the market even when little locally grown produce is available. These two months should have the highest per capita spending. May shoppers may include berry buyers who visit less often in other months. Likewise December/January shoppers probably visit the market specifically for pecans or fruit baskets and may shop less frequently in other months. July features sweet corn and high traffic flows. It is likely to feature an intermediate level of annual per capita expenditures since the market area is best known for sweet corn production and many of the loyal shoppers at the market were probably first introduced to the market during this season and consider it a prime time to shop.

Other household characteristics considered for inclusion in the model were home gardening status, race, occupation, and residence (urban or rural). Previous research by Smallwood and Blaylock, Blackburn and Jack, Kaitz, and Blaylock and Gallo suggest that some of these factors may be related vegetable consumption or purchases at direct markets. The variable selection process used to arrive at the final model presented is described in the following section.

ESTIMATION PROCEDURE AND RESULTS

Generalized least-squares (GLS) or weighted least square was used to estimate the model since heteroscedasticity was expected. (Judge, et al. p. 419). Glejser's procedure of regressing the absolute value of the ordinary least squares residuals on the dependent variables was use to define the weight variable. The weight variable was the reciprocal of the predicted residuals squared.

A series of general linear hypotheses were tested to determine which groups of dummy variables and classification variables had significant F statistics for inclusion in the model. Home gardening status, race, occupation, and residence were excluded from the final model because the F statistics were not significant at the .10 level. Statistics for the model are presented in Table 2. The parameter estimates, standard error for each parameter estimate, and F statistics for each group of variables are reported in Table 3.

The GLS model did a good job of explaining the dependent variable. Six of the seven variable groups are significant for inclusion in the full model at the 95 percent confidence level. The model F statistic is highly significant. The coefficient of multiple determination is .62, high for cross-sectional data.

The regression coefficients for each variable group are discussed briefly in this section. Variables are discussed in the same order in which they appear in Table 3. The results of tests of hypotheses suggested for each variable group are discussed.

The results confirm the hypotheses that age composition of the household affects annual per capita spending at direct outlets. The presence of various age-groups in the household are examined by construction of hypothetical families. A single 18-24 year old would have an estimated decrease in spending level of $3.86 per capita from a base level. The comparable figure for the 45-64 age group is a decrease of $7.19, for 65-70 is a decrease of $2.39, and for 71 or over is an increase of $1.68. Children can be added by simply adding the negative coefficients for each child of either or both age-groups to the adult age-groups.

The presence of children does lower the per capita spending levels. Households with adults 70+ years old spend the highest amounts per capita. Couples with a teenager spend less than couples with a college-aged household member or couples with a household member less than 12. The results suggest that households with older members prefer shopping at direct outlets and are sufficiently interested in fresh product to take time to shop for and prefer fresh produce. These results suggest that markets located in areas with an

older population are likely to find higher per capita expenditures at direct markets. Given an aging population, direct produce market located near areas with concentrations of people over 65 should direct marketing and merchandising strategies toward that group.

Households with members in the 25-44 and 45-65 age categories are estimated to spend the smallest amount per capita. These are the households that are also most likely to have children which would further decrease the expected per capita expenditure level. The household composition results suggest several alternative hypotheses. First, households with adults in the labor force are more likely to face a time constraint such that shopping at direct specialty markets and preparing fresh produce is not done. Presence of children may reflect increased time pressure on the household, lower consumption of fresh produce by children and/or economics of scale in preparation or purchasing by the household. Given the data, it is not possible to determine which explanation is most important.

Annual income of the household is significantly related to expenditures. The results indicate that those households in the highest income class spend more per capita on produce than households in all other income classes except the lowest. The other pairwise parameter differences are not significant. Thus, the significance of the income variables is primarily due to differences between the four middle income categories and those in the highest income category. These results suggest that market managers need to develop merchandising strategies with a broad appeal to consumers with different incomes while maintaining the ability to specifically meet the needs of high income households.

The market where the consumer was shopping when the questionnaire was filled out is an effective variable in explaining consumer expenditure variation. The largest and oldest market with the widest selection and volume of produce attracted higher spending per capita than the other two markets. The difference between the intermediate and new market is not statistically significant. The ability of the older market to achieve higher spending was hypothesized and reflects the relative market share of each market. This is

probably the result not only of wider produce selection, volume, and more experienced management, but also of accumulated reputation and goodwill for older markets.

Shopping frequency is perhaps the most important variable influencing annual per capita spending at direct produce markets. Weekly shoppers spend almost twice as much as semimonthly shoppers, semimonthly shoppers spend more than monthly shoppers and quarterly or annual shoppers spend the least. The number of shoppers in each category is shown in the right-hand column of Table 3. Of the 1,037 customers represented in the data set, 21 percent shop weekly, 23 percent twice per month, 17 percent once per month and 39 percent quarterly or annually. The results suggest that these markets need to emphasize strategies to attract and maintain their frequent shoppers. The large number of less frequent shoppers suggests that methods to convert them to becoming more frequent shoppers would likely increase the level of purchases from a given customer base. This also suggests a potential problem for markets that are not open 12 months and therefore may not develop a frequent shopping customer base.

The use of produce for nonfresh purposes is significantly related to annual expenditures. As hypothesized, consumers using at least some of the produce purchased other than fresh are estimated to spend more than those who use produce only fresh. Those who use all produce fresh may have less preference for local produce and may spend less at direct markets of all types. Consumers who freeze or can could prefer the convenience this method offers and may have a greater appreciation for the freshness of produce sold at direct markets.

Over one-half of the sample did use produce for other than fresh uses and spent significantly more for produce. Merchandising to meet the needs of these customers is likely to be an important way to increase sales. All three of the markets offered some canning or freezing supplies and literature telling how best to preserve specific produce items.

The number of miles from home to market has a significant effect on annual per capita expenditures at the market. The results suggest the relationship expected between mileage and expenditures within the first five ranges. The three longest ranges were not statistically different. This would mean that the consumers who take the time to visit the market from relatively longer distances may prefer the time spent traveling to and shopping at the market more than consumers traveling shorter distances. It may also show that those shoppers who shop regularly at these markets prefer the produce and buy larger amounts to justify the added shopping expenses. The markets may also be located between the consumer's home and work place or other major shopping areas such that the time spent traveling the distance was also used for other purposes.

The month in which the consumer shopped at the market and completed the survey is significantly related to annual per capita expenditures. August was the lowest annual spending month, followed by March with no significant difference between the two months. July was also not significantly different than August and March. October and May were intermediate in annual spending levels. These results would tend to support the hypothesis that those shoppers who used the markets during the off-season make the largest annual per capita expenditures. December/January had the highest level of annual per capita expenditures. These results suggest that even though customer counts are down in the winter, significant sales are made by featuring fruit and specialty items for the holidays.

CONCLUSIONS AND IMPLICATIONS

Annual per capita expenditures on produce at year-round direct markets are related to household and market characteristics. Characteristics found to be important are: age composition, income, market where the survey was completed, frequency of shopping at the roadside market, use of produce other than fresh, miles to market, and month the consumer was surveyed.

The results also indicates that it is possible for markets to develop considerable goodwill or merchandising expertise that significantly increases consumer purchases at an outlet.

Older consumers make up an important segment of the direct market consumers in this market area exhibiting the highest per capita spending level. Families with multiple members in the 25-44 and 45 to 64 age categories and with children would be expected to spend substantially less per capita. Frequent shoppers are a very important customer group that spend more per capital on an annual basis than other customer groups. Direct market managers should develop advertising, promotion and merchandising strategies to encourage frequent shopping. Shoppers who visit the store less frequently should be given incentives to become regular shoppers.

Households who can or freeze produce are an important market segment representing more than one-half of the existing customers. The ability to appeal to this segment of the market is likely to be important to direct marketers success.

Regular customers that travel 15 or more miles to the market make up a surprisingly large portion of the sample. Those consumers who travel to the market over 15 miles, once a year or more, comprise over 38 percent of all consumers. These shoppers also had the highest expenditure coefficients for mileage. Although this group might be difficult to target in the general population other than through ads or promotions in distant cities, the present shoppers can be targeted with direct mail such as seasonal newsletters with special promotional features.

REFERENCES

Becker, Gary S. *A Theory of the Allocation of Time.* Econ. J., 75(1965):493-517.

Blackburn, Kitty Lou and Robert L. Jack. *Consumers' Opinions, Attitudes and Use of Direct Markets in West Virginia.* West Virginia University, Agricultural and Forestry Experiment Station, Bulletin 686, March, 1984.

Blaylock, James R., and Anthony E. Gallo. *Modeling the Decision to Produce Vegetables at Home.* American Journal of Agricultural Economics, Vol. 65, 4(1983):722-729.

Buse, Reuben C., and Larry E. Salathe. *Adult Equivalent Scales: An Alternative Approach.* American Journal of Agricultural Economics, Vol. 60, 3(1978):460-468.

Glejser, H. *A New Test for Heteroscedasticity.* Journal of the Amer. Stat. Assn., 64(1969):316-323.

Johnson, Evelyn H. *Canning and Freezing - What is the Payoff?* Family Economics Review, ARS-NE-36(1976):6-13.

Judge, George G., W. E. Griffiths, R. Carter Hill, Helmut Lütkepohl, and Tsoung-Chao Lee. The Theory and Practice of Econometrics, 2nd edition. New York: John Wiley & Sons, Inc., 1985.

Kaitz, Evelyn F. *Home Gardening and Incidence of Freezing and Canning.* Family Economics Review, ARS-NE-36(1977):3-6.

Price, D. W. *The Effects of Household Composition on Income Elasticities of Food Commodities.* Pullman, WA Washington State University, Ag. Exp. St., Tech. Bul. 63, 1969.

Smallwood, David M., and James R. Blaylock. *Household Expenditures for Fruits, Vegetables, and Potatoes.* USDA, ERS, Tech. Bulletin 1690, May, 1984.

Table 1. Definitions of Variables by Concept Group

Variable	Description of Variable	Description of Concept Group
SPEND	Amount spent per visit x visits per year/household size	Dependent variable; spending per capita per year
AGE 0-11	Member 11 and under	Household composition; number of household members in each age group.
AGE12-17	Members between 12 & 17	
AGE 18-24	Members between 18 & 24	
AGE 25-44	Members between 25 & 44	
AGE 45-64	Members between 45 & 64	
AGE 65-70	Members between 65 & 70	
AGE 71+	Members 71 and older	
INC 0-9	$0-9,999 income class	Income range of respondent's household, 1 if household is in a category, 0 otherwise.
INC 10-19	$10,000-19,999 income class	
INC 20-29	$20,000-29,999 income class	
INC 30-39	$30,000-39,999 income class	
INC 40-49	$40,000-49,999 income class	
INC 50+	$50,000 and up income class	
NEW-MKT	Newest and smallest market	Market at which person completed survey, 1 if survey. completed at this market 0 otherwise.
OLD-MKT	Oldest and largest market	
MID-MKT	Intermediate aged and sized market	
WEEKLY	Shop once a week	Shopping frequency at the market where surveyed, 1 or 0.
SEMI-MONTHLY	Shop twice a month	
MONTHLY	Shop once a month	
QUARTERLY	Shop four times a year	
ANNUALLY	Shop once a year	
FRESHUSE	Use all produce fresh	Use of produce, 1 or 0.
OTHERUSE	Not all produce used fresh	
MIL 0-4.9	Less than 5 miles	Miles from home to market, 1 or 0.
MIL 5-9.9	5 to 9.9 miles	
MIL 10-14.9	10 to 14.9 miles	
MIL 15-19.9	15 to 19.9 miles	
MIL 20-24.9	20 to 24.9 miles	
MIL 25+	25 or more miles	
AUGUST	Surveyed in August	Month during which person completed survey, 1 or 0.
OCTOBER	Surveyed in October	
DEC/JAN	Surveyed in Dec. or Jan	
MARCH	Surveyed in March	
MAY	Surveyed in May	
JULY	Surveyed in July	

Table 2. Model Statistics

Statistic	
Unweighted Mean of Dependent Variable	90.32
Unweighted Coefficient of Variation	72.55
Weighted Mean of Dependent Variable	24.38
Weighted Coefficient of Variation	4.873
Coefficient of Multiple Determination	.6292
Adjusted Coefficient of Multiple Determination	.6185
Model F Statistic	58.93
Probability of F Value	.0001
Mean Square Error	1.411

Table 3. Parameter Estimates and Related Statistics

Variable	Parameter Estimate	Standard Error	F Value for Concept Group	Number of observations for which the variable is not zero.
INTECEPT	24.465	5.647	18.77	1,037
AGE 0-11	-4.8936	0.8194	28.10	383
AGE 12-17	-7.1322	0.9380		241
AGE 18-24	-3.864	1.222		211
AGE 25-44	-8.088	1.348		619
AGE 45-64	-7.189	1.338		434
AGE 65-70	-2.389	4.666		83
AGE 71+	1.676	5.165		49
INC 0-9	-6.047	7.465	3.523	53
INC 10-19	-7.021	2.563		141
INC 20-29	-8.467	2.299		224
INC 30-39	-6.086	2.243		223
INC 40-49	-5.644	3.243		181
INC 50+	0.0			215
NEW-MKT	-9.764	2.355	9.333	140
OLD-MKT	0.0			553
MID-MKT	-6.672	2.055		344
WEEKLY	204.570	7.814	311.2	214
SEMIMONTHLY	93.797	4.207		243
MONTHLY	43.771	3.074		173
QUARTERLY	12.774	2.518		307
ANNUALLY	0.0			100
FRESHUSE	0.0		8.153	485
OTHERUSE	5.004	1.752		552
MIL 0-4.9	0.0		7.257	153
MIL 5-9.9	4.451	3.206		230
MIL 10-14.9	10.026	3.386		253
MIL 15-19.9	14.246	3.508		131
MIL 20-24.9	18.743	4.909		95
MIL 25+	14.881	3.511		175
AUGUST	0.0		1.914	127
OCTOBER	5.170	3.123		170
DEC/JAN	9.316	3.576		81
MARCH	0.556	4.545		112
MAY	5.671	2.701		222
JULY	2.947	2.702		325