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Marketing Information As A Constraint To Locally Grown Produce: Evidence From Ohio*

by

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Abstract

A random sample of 200 Ohio fruit producers were surveyed in January 1988, regarding their use of information for decision making. Survey responses were used to determine if improved marketing information increases the likelihood of Ohio fruit producers gaining a larger share of Ohio's produce market. Results from the production adequacy equations show that larger producers and those marketing a predominate share of their fruit through wholesalers and retailers are the ones most likely to agree that their fruit production is limited by insufficient marketing information. These results suggest an opportunity for Ohio to gain a larger share of the produce market.

Introduction

A January, 1988 survey of Ohio fruit producers revealed that eighty-three percent of them consider Ohio fruit to be competitive and of comparable quality with that from other states and countries. Additionally, retail grocers in the state seem to agree with this assessment, having expressed a strong preference for some Ohio fruits. For example, produce managers of Ohio's largest grocery chain have expressed an equal preference for Ohio and Washington apples because of their comparable quality and consumer acceptance [Uchida].¹

Despite producers' beliefs about the competitiveness of Ohio fruit and retailers' receptive-

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ness to marketing larger quantities, Ohio's production of apples and many other fruits and vegetables is declining. Although some of this decline is undoubtedly due to relative production costs, it is instructive to note that states' market shares in the produce industry can be influenced by various advertising, merchandising and promotional efforts [Aylsworth; Jefferson; Brooker, et al.].

A common denominator of several of the more successful promotion programs is their large expenditure of general revenue funds to better inform consumers about product availability and quality. Such efforts have often increased marketing and subsequent production of local commodities [Brown].

General revenue funds for promoting fruits and vegetables are often limited in minor produce states, such as Ohio. Ohio's produce industry represented less than 5 percent of the state's 1987 agricultural sales [Ohio Agricultural Statistics]. State-supported promotion of produce amounts to \$50,000 annually, initiated under a program entitled "It's Fresher From Ohio." These limited advertising and promotion expenditures are expected to have minimal impact on produce marketing. Ohio fruit and vegetable producers are therefore looking for alternative means to increase their produce marketing.

One strategy to enhance produce marketing involves providing producers with better marketing information to facilitate pricing efficiency and strategic planning. Although the impacts of improved information are realized through better decision making at the firm level, the state could facilitate this by improving the accuracy and timeliness of information delivery. However, designing such an information system would require a better understanding of how producers make decisions and use information to support these decisions. Hence, the objective of this study is to determine the characteristics of those producers who evaluate their marketing information as adequate for marketing decisions versus those who evaluate their information as inadequate for marketing decisions? Insights gained from these analyses will be used to assess the opportunities for expanded produce production and marketing in Ohio. The study results are expected to apply

more broadly to Ohio's vegetable producers as well as fruit and vegetable producers in other states.

Description of Data

A random sample of two hundred Ohio fruit producers were surveyed regarding their usage of information for decision making. A total of 118 producers returned the survey questionnaire, and 80 of these were complete and usable. Of the 38 incomplete surveys, 4 represented producers who refused to complete the questionnaire. The remaining 34 represented inactive fruit farms. Primary commodities among fruit producers were apples, peaches and grapes. Sample statistics for peaches and grapes compare favorably with state averages, while those for apples indicate operations smaller than the state average. Twelve percent of the state's apple producers were included in the sample. However, these producers accounted for only 8.3 percent of the 1987 apple production. By contrast, 14.3 and 28.1 percent of peach and grape producers were included in the sample and they produced 12.2 and 26.3 percent of the state's 1987 production of these commodities, respectively. The sampling population consisted of a disproportion of small apple producers because it was drawn from a 1982 population base which did not reflect an 80 percent increase in the largest category of apple producers between 1982 and 1987. Minor commodities included in the sample were blueberries, cherries, melons, nectarines, pears, plums and strawberries.

Adequacy of Marketing Information

The survey questionnaire asked fruit producers to evaluate the adequacy of their current information sources for decision making. Four types of information were identified: marketing, production, financial and weather. Producers were instructed to evaluate each of these as "adequate" or "inadequate." Results show that 56.9 percent of the producers ranked their marketing information as "adequate." By contrast, production, weather and financial information were ranked "adequate" by 83.6, 80.8 and 64.3 percent of producers, respectively. These evaluations are expected to reflect producers' overall knowledge and perceptions of the various information sources

received in each information category. Hence, nonreceipt of several high cost, but adequate information sources within a given information category can influence the relative rankings of the information categories. A reasonable hypothesis, however, is that producers have some knowledge of most information sources even if they are nonrecipients of those sources. That is, producers who subscribe to a given information source have no incentive to avoid sharing this information with other producers since sharing does not diminish the value of information. This suggests that producers' evaluations of the information categories probably are not biased by the explicit dollar cost of various information sources.

Adequacy of Marketing Information for Production Decisions

Several questions on the survey attempted to ascertain the impact marketing information has on fruit production. Responses to these questions are comparable, but only one of these is highlighted in this study. The relevant question asked producers to state whether their fruit production was limited by insufficient marketing information. Twenty-seven percent agreed that their production was limited by insufficient marketing information, 48 percent disagreed, and 24 percent did not know. Excluding those producers who did not know, the remaining responses were used to identify differentiating socioeconomic characteristics of those who agreed and disagreed with the question. These socioeconomic characteristics are then contrasted with those resulting from analyses of marketing information adequacy to determine the interrelationship of information adequacy for production and marketing decisions.

Procedure

Fruit producers' responses to many of the survey questions could be categorized into "0" and "1" qualitative variables. For example, producers evaluated their information as either "adequate" or "inadequate" for decision making. Similarly, producers either "agreed" or "disagreed" that their fruit production was limited by insufficient marketing information. Responses to each of these questions were coded "1" and "0" respectively, and used as the two dependent variables in this

study. Each dependent variable is specified as a logit regression equation and estimated using maximum likelihood procedures. Because 53 of the 80 respondents produced apples, logit regressions are obtained for apple producers separately and then all fruit producers, including apple producers. Separate analyses of apple producers are obtained because the survey instrument requested data on marketing outlets for apples, but not for all fruit. Inclusion of marketing outlets is intended to test the basic premise of this study: that improved marketing information affords Ohio the opportunity to gain a larger share of the produce market.

It is recognized that relative production cost can influence Ohio's fruit production. However, this factor does not explain why cost competitive Ohio producers have difficulty marketing fruit which is of comparable quality with that from other areas. A basic premise of this study is that these marketing difficulties are partly related to insufficient marketing information. More specifically, a premise of this study is that improved marketing information, which leads to a higher probability of increased marketing through wholesalers and retailers, leads also to a higher probability of market share gains. By analogy, the probability of market share gains is decreased with marketing information which leads to greater marketing through roadside markets and pick-your-own operations.

The next section provides a discussion of the hypothesized effects of the exogenous variables on marketing information adequacy (MRKTAQ). The hypothesized effects of these variables on production information adequacy (PRODAQ) is discussed in the next section only when they differ from those described for marketing information adequacy.

Marketing Information Adequacy

The first two logit equations address information adequacy for marketing decisions among apple producers and all fruit producers, respectively. Several factors are hypothesized to influence fruit producers' evaluation of their information adequacy (MRKTAQ). Among these are the type of marketing information sources utilized,

size of fruit farm, ownership structure, employment characteristics of owners, educational attainment, and experience. Relative to the information sources utilized, Table 1 provides a list of twenty-two information sources which producers ranked according to their usefulness for production and marketing decisions.

From the twenty-two information sources in Table 1, producers were further asked to list the **MOST VALUABLE**, **SECOND MOST VALUABLE** and **THIRD MOST VALUABLE** sources for marketing decisions. These responses are shown in Table 2, separated into five categories of information. Each information category represents a binary variable which is hypothesized to explain producers' evaluation of their marketing information adequacy. **BROADCAST** takes on a value of 1 if a broadcast information source (radio or television) is included in a producer's top three marketing information sources. Similarly, **DAILY**, **PERIODIC**, **FRFARM**, and **PROF** take on values of 1 if any of the top three information sources are included in these categories. Thus, for an individual, as many as three (but as few as one) of these binary variables can take on values of one.

Since the information categories described in Table 2 are most valuable marketing information sources, each category of information is expected to have a positive and significant impact on producers' evaluation of their marketing information adequacy. That is, each category of information should increase the probability that producers will evaluate their marketing information as adequate. Table 3 provides a description of the variables representing these five information categories as well as all other variables used in this study.

Farm size, represented by sales, is expected to have a positive impact on producers' evaluation of their marketing information. Size is projected to reflect producers' past success at managing risk or their willingness to bear risk. Either factor is expected to lead producers to have higher evaluations of their marketing information. Producers' experience is hypothesized to be positively related to marketing information adequacy because of the longer selection process for distinguishing

meaningful and valuable information sources. By contrast, education is hypothesized to be negatively related to producers' evaluation of their marketing information adequacy. Education is a form of human capital which is hypothesized to enhance producers' understanding of the complexities of the marketing system and lead them to demand improved marketing information.

Multiple ownership of fruit enterprises allows for management specialization and provides more management time in total to collect and interpret data and information. As a consequence, this ownership structure is hypothesized to increase the probability that producers will evaluate their marketing information as adequate. By contrast, part-time employment outside the fruit enterprise is likely to constrain producers' available time for information assimilation and lead to lower evaluations of their information adequacy. Marketing outlets consist of retailers, wholesalers, roadside markets and pick-your-own operations. Marketing information is expected to be more critical to those producers utilizing retailers and wholesalers. Thus, producers' evaluation of their marketing information adequacy is expected to be negatively related to their use of retail and wholesale markets.

Production Information Adequacy

The final two logit equations address information adequacy for production decisions among apple producers and all fruit producers, respectively. The independent variables derived from the categories of information shown in Table 2 are excluded from these equations because those sources represent information utilized for marketing decisions. All remaining independent variables in the first two equations are also included in these latter two equations. Moreover, the signs of the hypothesized effects differ only for experience (**EXPER**), education (**EDUC**) and marketing outlets (**MKTOLET**). Experience is hypothesized to be negatively related to the probability that producers would agree that their production is limited by insufficient marketing information because of the high positive correlation between producers' experience and age. That is, older and more experienced producers are more inclined to reduce than expand production. Education is

Table 1

**Information Sources for Farm Decision making:
Distribution of Relative Importance, Ohio Fruit Producers, 1987.**

<u>Information Source</u>	<u>Very Useful</u>	<u>Useful</u>	<u>Not Useful</u>	<u>Do Not Receive</u>
	-----Percent-----			
Specialized Fruit Magazines	51.4	36.5	4.1	8.1
Cooperative Extension Service	42.1	36.8	10.5	7.9
General Fruit Magazines	33.8	41.9	8.1	16.2
Other Fruit Producers	30.7	53.3	5.3	10.7
Local Newspapers	25.0	40.8	31.6	2.6
USDA and Government Publications	21.6	59.5	8.1	10.8
Ohio Ag. Statistics Newsletters	21.3	57.3	13.3	8.0
Commercial Newsletters	20.5	47.9	4.1	27.4
Agricultural Newspapers	18.1	41.7	16.7	22.2
Salesmen	16.2	50.0	17.6	16.2
Radio Reports	10.5	42.1	35.5	11.8
Tax Preparer	9.7	31.9	29.2	29.2
Certified Public Accountant	9.6	27.4	31.5	30.1
Local Market Reports	9.5	41.9	23.0	25.7
Television Reports	5.5	52.1	28.8	13.7
Marketing Consultant Service	2.8	12.7	19.7	63.4
Brokerage Firm	2.8	6.9	33.3	56.9
Insurance Agent	1.4	18.3	52.1	28.2
Lender	1.4	13.7	37.0	47.9
Attorney	0.0	16.9	40.8	42.3
National Newspapers	0.0	12.5	30.6	56.9
Computerized Information Services	0.0	5.6	22.2	72.2

Table 2

Information Sources Evaluated as Most, Second Most, and Third Most Important for Marketing Decisions

Source	MOST VALUABLE		SECOND MOST VALUABLE		THIRD MOST VALUABLE		TOTAL VOTES CAST	
	N	%	N	%	N	%	N	%
Daily								
Local Newspapers	14	19.7	2	2.8	4	5.8	20	9.43
National Newspapers	2	2.8	0	0.0	0	0.0	2	0.94
Computerized Info. Services	0	0.0	0	0.0	0	0.0	0	0.00
Total	16	22.5	2	2.8	4	5.8	22	10.37
Broadcast								
Radio Reports	0	0.0	3	4.2	1	1.4	4	1.89
Television Reports	0	0.0	1	1.4	3	4.5	4	1.89
Total	0	0.0	4	5.6	4	5.8	8	3.78
Periodic								
General Fruit Magazines	0	0.0	6	8.3	8	11.6	14	6.60
Specialized Fruit Magazines	16	22.5	8	11.1	7	10.1	31	14.62
USDA & Govt. Publications	1	1.4	8	11.1	1	1.4	10	4.72
Ohio Ag. Stat. Newsletter	5	7.0	5	6.9	6	8.7	16	7.55
Local Market Reports	4	5.6	3	4.2	1	1.4	8	3.77
Commercial Newsletters	1	1.4	6	8.3	9	13.0	16	7.55
Agricultural Newspapers	0	0.0	3	4.2	4	5.8	7	3.30
Total	27	38.0	39	54.2	36	52.2	102	48.11
Fruit Producers								
Other Fruit Producers	13	18.3	19	26.4	4	5.8	36	16.98
Total	13	18.3	19	26.4	4	5.8	36	16.98
Professionals								
Certified Public Accountant	2	2.8	0	0.0	2	2.9	4	1.89
Cooperative Ext. Service	10	14.1	6	8.3	13	18.8	29	13.68
Marketing Consultant Service	3	4.2	0	0.0	0	0.0	3	1.42
Salesmen	0	0.0	0	0.0	5	7.2	5	2.36
Insurance Agent	0	0.0	0	0.0	0	0.0	0	0.00
Lender	0	0.0	0	0.0	0	0.0	0	0.00
Brokerage Firm	0	0.0	1	1.4	0	0.0	1	0.47
Tax Preparer	0	0.0	0	0.0	1	1.4	1	0.47
Attorney	0	0.0	1	1.4	0	0.0	1	0.47
Total	15	21.1	8	11.1	21	30.4	44	20.76
Total	71	100	72	100	69	100	212	100

Table 3**Description of Variables for Marketing and Production Information Adequacy Equations**

<u>Dependent Variable</u>	<u>Description</u>
MRKTAQ	1 if information adequate for marketing decisions; 0 otherwise
PRODAQ	1 if fruit producers agree that their production is limited by poor marketing information; 0 otherwise

<u>Independent Variables</u>	<u>Description</u>
SALES	Fruit sales measured in thousand of dollars
EXPER	Fruit production experience in years of the respondent
DAILY	1 if daily information sources are important; 0 otherwise
BROADCAST	1 if broadcast information sources are important; 0 otherwise
PERIOD	1 if periodic information sources are important; 0 otherwise
PROF	1 if professional information sources are important; 0 otherwise
OTFRFR	1 if other fruit farmers are important; 0 otherwise
EDUC	1 if some college education; 0 otherwise
PTIME	1 if owner employed outside fruit enterprise; 0 otherwise
OWNSHIP	1 if multiple owners of fruit enterprise; 0 otherwise
MKTOLET	1 if retailers/wholesalers are major outlets; 0 otherwise

expected to be positively related to PRODAQ because education enhances producers understanding of the constraints information deficiencies can place on production. Finally, retail and wholesale market usage (MKTOLET) is hypothesized to be positively related to PRODAQ because users of these markets are likely to have fewer constraints on their production alternatives.

Empirical Results

A. Marketing Information Adequacy

As shown in Table 4, two of the independent variables described in Table 2 are excluded from the first two regression equations. BROADCAST and PROF were dropped from these equations because their standard errors were more than nine times their coefficients (both positive). With these variables excluded, equation 1 is significant at the .05 level and most parameters are signed as hypothesized. Approximately 79 percent of the observations are correctly predicted and four of the nine parameters are statistically significant at the .10 level or better (one-tailed t-tests).

Contrary to a priori expectations, sales have a negative and statistically significant impact on the probability that producers evaluate their marketing information as adequate for decision making. Perhaps rising sales suggest more risk exposure (greater potential losses) and a need for more accurate and reliable information. Relative to the other statistically significant parameters, education (EDUC), part-time employment off the apple farm (PTIME), and concentrated marketing through retailers and wholesalers (MKTOLET), decrease the probability of producers evaluating their marketing information as adequate. This latter parameter for MKTOLET suggests that retail and wholesale marketing of apples require a better marketing information system than roadside and pick-your-own apple marketing. Since most regional and international competition in fruit and vegetable marketing occur in wholesale and retail markets, improved marketing information should add to Ohio's competitiveness in these markets.

Equation 2 of Table 4 shows results from the marketing information adequacy regression for

all fruit producers. Noticeable changes from this regression and that of equation 1 are the statistical significance of other fruit producers (OTFRPD) and periodical (PERIOD) sources of information. The parameter estimate for OTFRPD suggests that producers of other fruits are more likely than apple producers to use their farm counterparts for marketing information. Similarly, the parameter estimate for PERIOD suggests that periodical information sources are less valuable to apple producers than they are to producers of other fruits. Finally, it should be noted that marketing outlets (MKTOLET) are excluded from this equation since these data were not collected for all fruits.

B. Production Information Adequacy

Unlike the first two equations which assess whether producers' current marketing information is adequate for decision making, results for the last two equations assess the likelihood that producers would expand production with improved marketing information. As shown in equation 3 of Table 4, experience is statistically significant and negatively related to PRODAQ. This suggests that the most experienced producers are unlikely to have expansion plans. Indeed the sample results show strong positive correlation between age and experience, suggesting that experienced producers are likely to be phasing down their operations. Larger producers, as measured by SALES, do view insufficient marketing information as a constraint to production. The parameter estimate is positive and statistically significant at the .05 level. None of the other parameters are significant.

Although the MKTOLET parameter is statistically insignificant, additional analyses (not shown in Table 4) show that fruit marketing channels would change with improved marketing information. The parameter estimates revealed that many of the current users of roadside markets and pick-your-own operations would expand production and increase marketing through wholesalers and retailers with improved marketing information. This finding suggests that roadside markets and pick-your-own operations are probably used by some producers because they lack sufficient information about alternative outlets.

Table 4

Empirical Results for Four Logit Regressions

Independent Variables	MRKTAQ				PRODAQ			
	Apple Producers (1)		All Fruit Producers (2)		Apple Producers (3)		All Fruit Producers (4)	
	Parameter	T-Value	Parameter	T-Value	Parameter	T-Value	Parameter	T-Value
CONSTANT	3.5174*	(1.767)&	-0.6677	(-.5349)	0.0191	(.01142)	1.3321	(1.1822)
EXPER	0.0034	(.1108)	0.01762	(.80170)	-0.0686@	(-1.599)	-0.0826*	(-2.398)
SALES	-2.5E-05*	(-2.11)	-3.0E-06@	(-1.503)	2.9E-05*	(1.9159)	1.8E-05*	(1.9753)
DAILY	-1.1332	(-1.20)	-0.7845	(-1.143)	---	---	---	---
PERIOD	0.3636	(.2832)	1.3001@	(1.4306)	---	---	---	---
OTFRPR	1.015	(1.016)	1.2501*	(1.8026)	---	---	---	---
EDUC	-1.9636*	(-2.06)	-1.3245*	(-1.998)	-0.0132	(-.0114)	0.10121	(.12040)
PTIME	-3.2486*	(-2.40)	-0.9143@	(-1.309)	-0.6301	(-.5037)	-1.5977*	(-1.803)
OWNSHIP	0.6035	(.4902)	0.84347	(1.1256)	1.1019	(.93107)	-0.3433	(-.3949)
MKTOLET	-1.6928@	(-1.49)	---	---	0.29264	(.24177)	---	---
McFadden R-Square	0.31908		0.16822		0.3431		0.2582	
Log Likelihood	-19.791		-34.835		-13.659		-22.465	
Log Likelihood, Restricted	-29.065		-41.879		-20.794		-30.286	
Chi-Squared	18.5479		14.089		14.271		15.6416	
Restrictions	9		8		6		5	
Correct Predictions	78.6		72.1		80		73.3	

* Significant at .05 level.

@ Significant at .10 level.

& Asymptotic t-values.

Equation 4 of Table 4 offers even stronger evidence that larger fruit producers view their marketing information as a constraint to expanded production. SALES are positively related to PRODAQ and the parameter is statistically significant at the .025 level. Even though SALES is positively related to PRODAQ and negatively related to MRKTAQ, it is important to emphasize the consistency of these estimates. That is, larger producers agree that insufficient marketing information limits their production of fruit and they also agree that their marketing decisions are hampered by insufficient marketing information. Relative to equation 3, equation 4 offers stronger evidence that experience is negatively related to PRODAQ. That is, experienced producers have a low probability of agreeing that their production is limited by insufficient marketing information. An obvious implication of this relationship is that an improved information delivery system could be targeted toward less-experienced and younger producers, rather than toward more experienced and older producers. Additionally, equation 4 shows that part-time employment outside the fruit farm is more prevalent among producers of other fruits than among apple producers. Since off-farm employment reduces on farm expansion plans, the parameter estimate is shown to be negative and statistically significant at the .05 level.

Summary and Conclusions

Results from the marketing information adequacy regressions show that producers' evaluation of their marketing information as adequate decreases with size, education, off-farm employment and concentrated usage of wholesalers and retailers. Results from the production adequacy equations show that larger producers and those marketing a predominate share of their fruit through wholesalers and retailers are the ones most likely to agree that their fruit production is limited by insufficient marketing information. These results suggest an opportunity for Ohio to gain a larger share of the produce market. That is, with improved marketing information leading to increased marketing through wholesalers and retailers, producers would have their marketing efforts focused on the marketing channels which offer growth opportunities as well as competitive

interaction with produce from other states and countries.

Endnote

1. By inference, other high quality Ohio fruit is equally preferred by grocery chains.

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