Information Usage by Commercial Ohio Cash Grain Farmers: Sources, Uses and Adequacy of Marketing Information.

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ABSTRACT

Farm marketing decisions are made in a risky environment. Reliable information about prices and the resulting outcome distribution for different decision alternatives is useful in the decisionmaking process. The objective of this research is to better understand the usage of market information by cash grain farmers. Results of a 1987 survey of Ohio commercial farmers are reported. Logit analysis is utilized to determine factors associated with manager perceptions of the adequacy of marketing information sources currently used by the farmer.

Farm decisions are made in a risky environment. Input and output prices vary considerably within short periods; government policy dealing directly and indirectly with agriculture are in a constant state of flux; and world financial and agricultural markets are in continual adjustment. Often substantial time elapses between the time a production decision is made and implemented and the actual delivery of output to markets. As a result, substantial variability of decision outcomes is possible.

Market information may alter a manager's view of possible price and decision outcomes. Reliable information will aid managers as they make decisions. During the past decade, information options available to farm managers changed substantially. Developments in computer and telecommunications technologies have increased the potential for improved measurement, processing and timely dissemination of information. Yet, for many decisions, traditional information sources, many of which may be very informal, may serve well the needs of the manager.

The general objective of this paper is to provide insight into the usage of market information by cash grain farmers. More specifically, the paper reports the results of research designed to: 1) determine the sources of market information used by cash grain farmers and 2) determine those factors that influence whether the market information derived from these sources is adequate for the farmer's needs. Statistical analyses of a random survey of Ohio cash grain farmers were employed in these evaluations.

The Data Source

A questionnaire addressing information usage on farms was mailed to a stratified random sample of 1800 Ohio commercial farmers. An initial mailing and two follow-ups were used. Fifty-three percent of the questionnaires were returned. Of these, 730 farmers were farming and completed the instrument. An

additional 227 returned incomplete surveys. These are largely retired farmers or others who exited farming. A small number refused to answer the survey.

Many of the farms reported substantial crop and livestock enterprises. To eliminate complicating factors associated with enterprise mix, farms selected for analysis included only those with at least 200 acres in grain crops and no livestock enterprises. Ninety-five farms meet these selection criteria.

Average farm size for the specialized grain subgroup is 651 acres, with an average 512 acres planted in corn, soybeans, wheat or oats. Mean age is 49 years. Eighty-two percent of the grain subsample report education levels of high school or less. Sixteen individuals report college degree work, two with post graduate work. Sixty percent of these grain farms have a single owner. Of the 28 cases with multiple business owners, 50 percent of the respondents considered themselves equal participants in the business; 36 percent were senior participants, and 14 percent were junior participants.

Market Information Needs

Although cash grain farmers have a variety of information needs, marketing decisions have particular prominence on these farms. The typical midwestern cash grain farm has substantial latitude in terms of the mix of crops to produce in a given year. Plantings of corn, soybeans, and wheat may vary considerably from year to year depending upon profit expectations and farm program provisions. Marketing information may play an important role in determining the combination of crops to produce in a given year.

Cash grain farmers also are presented with a number of options for marketing the crop. Sales can occur at harvest. Or, the crop may be stored and sold following harvest. A routine "sell at harvest" marketing plan does not require an elaborate market information system. Neither would a plan with

storage but routine grain sales at predefined points during the marketing season. However, if the manager exercises judgement about when grain will be released to the market from storage rather than routinely releasing at fixed calendar dates, the amount of market information demanded likely will increase.

Forward pricing mechanisms are frequently used by grain farmers and likely increase the demand for market information. Forward contracting arrangements are typically negotiated with local grain merchandisers. Information required for this marketing method may be primarily price quotations from local grain merchandisers. Forward contracts can be negotiated prior to planting or late in the growing season. Hence, the portion of the year over which market information is demanded may be substantial.

Futures market or options hedging strategies are used by some farmers. Information sources for these marketing techniques will be more formalized than for forward contracting. Price for futures commodities contracts or options are determined at the futures exchanges. These may be provided to the farmer via a number of sources including local market reports on radio or television, newspapers, or personal communications with brokers or local grain merchants. Again, the length of time over which futures instruments can be used is long, perhaps substantially preceding planting and succeeding harvest.

Market Information Sources

The mailed questionnaire contained a number of questions designed to elicit the sources of information used in farm decisionmaking. Twenty-three information sources were identified, ranging from very informal sources (e.g., personal communications with other farmers, salesmen, and lenders) to highly formalized sources including marketing consultants, computerized information services, and accountants. Farmers were asked to indicate the source of

information that is most useful when making marketing decisions. Two follow-up questions asked the decisionmaker to identify the second and third most useful sources of information. Table 1 summarizes the results for these three questions. Three sources of information (attorneys, insurance agents, and veterinarians) are primarily useful for decisions other than marketing. The remaining 20 sources are categorized by delivery method.

The information source most frequently cited as "most important for marketing decisions" is the local market report, with over 27 percent of those responding in this category. The second most common information source is the commercial newsletter, with just under 10 percent so indicating. Radio and marketing consultants, two very different information sources, tied for third ranking, each with nearly 9 percent of the observations.

The final column in table 1 is the total number of first, second and third most useful votes cast for these various information sources. Local market reports and radio broadcast remain in the first and second place rankings, but general farm magazines now appear as the third most frequently cited source of information. This result is not surprising. Although very few farmers selected these magazines as their most useful sources of market information, most farmers subscribe to these magazines.

Perhaps more interesting is the relatively small number of farmers who use professional consultants, computerized information sources, or other similar information services which are specialized to the marketing process and are more timely than many of the other sources reported. Conversely, many farmers cite other farmers and salesmen as their primary source of market information. Perhaps this may be explained in part by the purposeful absence of a definition of "marketing information" in the survey. There likely are some farmers who

are more concerned with input acquisition than with the disposition of outputs: Hence, the use of salesmen or other farmers as a primary source of information.

There are substantial differences in usefulness scores for information sources by farm size, operator age and other characteristics. For each of the 20 sources of market information, the farmer respondents scored each with a VERY USEFUL, USEFUL, NOT USEFUL, and DO NOT RECEIVE response. These scores were recoded as 2, 1, 0 and 0, respectively. Weighted average response scores were then calculated for each of the information categories identified in table 1. Farmers were then categorized on the basis of farm size, age, and education, and mean scores calculated for each information category (table 2). Farms using hedging techniques or computers also were identified.

Larger farms gave significantly higher evaluation scores for DAILY and PERIODIC sources of information than did small farms. Older farmers gave a significantly higher evaluation score for PERIODIC information sources than did younger farmers. Respondents with college degree work scored two sources significantly lower than farmers with high school or lower educations. These were the relatively informal sources of BROADCASTS and OTHER INDIVIDUALS.

Farmers who employ futures or options hedging strategies scored PERIODICS and PROFESSIONAL CONSULTANTS higher than did other farmers. Farmers using computer technologies scored BROADCAST MEDIA significantly lower than other farmers. They also scored PROFESSIONAL CONSULTANTS higher (significant at the 12 percent level) than other farmers.

Also of interest from table 2 is the consistently high evaluation scores given for BROADCAST MEDIA information sources. Almost all farmers reported using these information products, and they typically gave these sources high evaluations. All groups reported in table 2 also scored the PERIODICS category

to be more useful than the DAILY information category.

Multivariate Analyses

The relationship between the farmer's evaluation of market information "adequacy" and various farmer and firm characteristics was analyzed using multivariate techniques. All farmers were asked to indicate whether the market information available to them was adequate or inadequate. This response serves as the dependent variable in a binary-choice model.

Discriminant analysis, and probit and logit regressions can be used to analyze qualitative dependent variables. One of the basic assumptions for discriminant analysis is that the independent variables have a multivariate normal distribution (Klecka). When this assumption is violated, the discriminant function can yield misleading results regarding the significance of a coefficient (Press and Wilson; Halperin, et al.). The probit and logit models are quite similar in form. The probit regression is restricted to the cumulative normal probability function form, while the logit model is based on the cumulative logistic probability function (Pindyck and Rubinfeld). Capps and Kramer, in a comparison of the empirical performance of logit and probit regression models, concluded that "the differences in empirical performance between the respective models were indeed minimal" (p. 58). The logit model, however, is easier to estimate, and was chosen for this analysis.

The probability of evaluating current information as adequate is hypothesized to be affected by farm size, operator age, marketing strategy employed, the amount of management time available for decisionmaking, and the types of information sources used. Age and farm size are represented as continuous variables measured in years and crop acres, respectively. Other farmer and information characteristics are specified as binary variables.

The equation estimated is:

LOG P = 2.378 - .046 AGE + .002 ACRES + 1.954 HEDGE - 0.831 PTIME

(1.769)* (0.027)** (0.001)** (1.225)* (0.557)*

- .880 BFORM + 1.221 BCAST + 1.450 DAILY - 0.642 PERIODIC - 0.234 PROF

(0.602)* (1.050) (0.928)* (0.978) (1.109)

where LOG P = log of probability of having an adequate rating,

AGE = Age in years of the respondent,

ACRES = Acres of corn, soybeans, wheat and oats,

HEDGE = 1 if futures hedging is used in marketing; 0 otherwise,

PTIME = 1 if farmer works off the farm,

BFORM = 1 if a multiple owner business form,

BCAST = 1 if "most useful" information is a broadcast source,

DAILY = 1 if "most useful" information has daily availability,

PERIODIC = 1 if "most useful" information has periodic availability, and

PROF = 1 if "most useful" information is a professional consultant.

A complete identification of the information sources identified by the last four binary variables can be found in table 1. The numbers below the regression coefficients are standard errors. One and two asterisks indicate significance levels of 0.1 and 0.05, respectively. Nearly 71 percent of the observations are correctly classified by the equation.

The regression coefficient for ACRES of cash grain crops is positive and significant at the 5 percent level. As the size of the cash grain enterprise increases, so also does the probability of being in the "adequate" information category. Larger farms have more units of commodity marketed. Hence, they have greater total value arising from improved marketing information, and a greater incentive to identify useful information products.

The regression coefficient for AGE is significant at the 5 percent level and indicates a negative relationship with the probability of information adequacy. This suggests that older cash grain farmers, ceteris paribus, feel their access to market information is inadequate for marketing decisions.

Various reasons may exist for this relationship. Older farmers typically have more farming experience, and thus have had longer time to witness variability of prices. Furthermore, older managers are likely to be more risk averse than their younger colleagues. They have less time to recover should an adverse decision outcome result. They typically have a higher percentage of equity in the business. Even though this means lower financial risk, there is more wealth at risk. Thus, older managers may demand a higher level of assurance, and thus better information, before they are willing to make decisions. Also, older farmers are likely to have less education than younger farmers, and hence seek larger amounts of information prior to making a decision. However, preliminary tests of the effects of a college education using a binary variable did not prove significantly different than zero.

The type of marketing system employed by the farmer is anticipated to greatly affect information requirements. For this reason, a binary variable (intercept shifter) is included to represent differences associated with those farmers who employ futures or options contracts in a hedging strategy. In preliminary models, binary variables for forward contracting and storage were included, but were not significant at the critical level and were excluded from the final model formulation. The binary variable HEDGE is positive and significant at the 10 percent level. The positive coefficient indicates that those farmers who hedge tend to feel market information is more adequate than those who do not hedge. Although information requirements are greater for this group of individuals, they apparently feel they have identified the most important sources of market information. It also may be that these managers are more skilled, better educated, or simply are more astute managers. Or, one can argue that information for commodity futures and options markets are more

easily and accurately obtained than similar cash prices. Furthermore, correct hedging techniques allow a particular profit position to be locked in early in the production period. Hence, the manager is less susceptible to cash commodity price fluctuations and has lower market information requirements on this side of the marketing equation.

A binary variable (PTIME) is included to identify those farmers who work part-time off the farm. Part-time farmers, with farm size and other factors held constant, have less time to devote to the management process. Because information collection and interpretation is an important and time consuming part of management, it was hypothesized that part-time farmers would have lower perceptions of the adequacy of their market information sources. The regression coefficient for this binary variable is negative in sign and is significant at the 10 percent level of probability. The negative coefficient indicates a downward shift in the logistic regression function for those farmers with part-time jobs.

Along the same lines, it was hypothesized that farm businesses with multiple owners would have more total manager time for information collection and interpretation, and would have higher evaluations of market information adequacy. A binary variable (BFORM) is included to test this hypothesis. BFORM takes on a value of 0 for single ownership and 1 for multiple owner businesses. However, the regression coefficient, significant at the 10 percent level, displays the opposite (negative) sign from that hypothesized.

The remaining independent variables are based on the manager's indication of the information source "most useful" for marketing decisions. BCAST takes on a value of 1 if the most useful market information source is a broadcast media (see table 1 for sources in each category). DAILY takes on a value of 1

if the most useful information source is one of those available on a daily or weekly basis, and PERIODIC is 1 if the most useful information source is one of those available on a periodic basis. Finally, PROF equals 1 for those farmers indicating professional consultants as the most useful source of information.

Of the four variables characterizing information sources, only the regression coefficient for BCAST is significantly different from zero at the 90 percent confidence level. The estimated coefficient is positive in sign, indicating that broadcast information sources do increase the probability of having adequate market information. This is consistent with the results in table 2 which indicate that farmers consistently evaluate this source more highly than other categories of information.

Summary and Conclusions

The analysis of survey results reported here indicate that farmers of different sizes, ages, and education levels employ different types of information sources. Furthermore, these groups indicate differences to the extent that they are pleased with the adequacy of their market information. Results also indicate that marketing methods and the time requirements of marketing decisionmaking are more important determinants of information adequacy than are the types of information sources used. The relatively high evaluation scores for broadcast media and other farmers suggests that the degree of formalization and specialization of information sources are not important determinants of information usefulness. This further suggests that other, unidentified characteristics of information -- for instance, the ability to acquire information from radio broadcasts while doing other tasks -- may be important determinants of use. Hence, additional research is required to completely understand these relationships.

Table 1. Information Sources Declared 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	%
Radio	8	8.79	15	17.05	12	13.79	35	13.16
Television	4	4.40	6	6.82	5	5.75	15	5.64
Broadcast Media	12		21		17		50	
Local Newspapers	2	2.20	2	2.27	2	2.30	6	2.26
National Newspapers	3	3.30	4	4.55	2	2.30	9	3.38
Agricultural Newspapers	6	6.59	2	2.27	4	4.60	12	4.51
Local Market Reports	25	27.47	12	13.64	7	8.05	44	16.54
Computerized Info. Sources	2	2.20	1	1.14	1	1.15	4	1.50
Daily Availability	38		21		16		75	
General Farm Magazines	6	6.59	7	7.95	16	18.39	29	10.90
Specialized Farm Magazines	4	4.40	5	5.68	3	3.45	12	4.51
USDA & Gov't Publications	3	3.30	2	2.27	5	5.75	10	3.76
Ohio Crop Reporting Service	1	1.10	6	6.82	4	4.60	11	4.14
Commercial Newsletters	9	9.89	7	7.95	5	5.75	21	7.89
Periodic Availability	23		27		33		83	
Certified Public Accountant	0	0.00	0	0.00	1	1.15	1	0.38
Cooperative Extension Service	2	2.20	3	3.41	4	4.60	9	3.38
Marketing Consultant Service	8	8.79	5	5.68	0	0.00	13	4.89
Brokerage Firm	1	1.10	1	1.14	1	1.15	3	1.13
Professional	11		9		6		26	
Salesmen	4	4.40	2	2.27	5	5.75	11	4.14
Other Farmers	3	3.30	8	9.09	7	8.05	18	6.77
Lender	0	0.00	0	0.00	2	2.30	2	0.75
Tax Preparer	0	0.00	0	0.00	1	1.15	1	0.38
Insurance Agent	0	0.00	0	0.00	0	0.00	0	0.00
Other Individuals	7		10		15		32	
Total	91	100	88	100	87	100	266	100

Table 2. Mean Responses for Various Information Source Categories.

Farmer or Firm Characteristic	N	Broadcast Media Mean	Broadcast Media Std. Dev.	Daily Availabilty Mean	Daily Availabilty Std. Dev.	Periodic Availabilty Mean	Periodic Availabilty Std. Dev.	Professional Consultants Mean	Professional Consultants Std. Dev.	Other Individuals Mean	Other Individuals Std. Dev.
All Respondents	95	1.06	0.60	0.77	0.33	0.88	0.42	0.55	0.39	0.71	0.38
Size:											
Less than 600 acres	51	1.07	0.64	0.73	0.31	0.78	0.45	0.51	0.39	0.67	0.39
More than 600 acres	40	1.05	0.58	0.85	0.35	1.02	0.37	0.62	0.40	0.74	0.37
Mean Difference		0.02		-0.12 *		-0.24 ***		-0.11		-0.07	
Age:											
Less than 50 years	48	1.00	0.64	0.79	0.36	0.96	0.39	0.58	0.40	0.74	0.40
More than 50 years	46	1.12	0.55	0.75	0.31	0.79	0.44	0.51	0.38	0.67	0.37
Mean Difference		-0.12		0.04		0.17 **		0.07		0.07	
Education:											
High School or less	78	1.11	0.54	0.77	0.34	0.90	0.44	0.56	0.40	0.75	0.38
College	16	0.81	0.79	0.75	0.31	0.79	0.33	0.48	0.32	0.51	0.34
Mean Difference		0.30 *		0.02		0.11		0.08		0.24 **	
Hedging:											
No use of hedging	83	1.08	0.59	0.77	0.34	0.84	0.42	0.49	0.37	0.84	0.43
Hedging used	12	0.92	0.63	0.76	0.29	1.15	0.39	0.95	0.35	0.75	0.45
Mean Difference		0.16		0.01		-0.31 **		-0.46 ***		0.09	
Use of Computer in Business Management:											
No	85	1.12	0.58	0.78	0.34	0.87	0.44	0.53	0.38	0.82	0.43
Yes	10	0.60	0.52	0.74	0.31	0.94	0.31	0.75	0.43	0.94	0.51
Mean Difference		0.52 ***		0.04		-0.07		-0.22		-0.13	

* Means for the two groups are significantly different at the 90 percent level of confidence.
** Means for the two groups are significantly different at the 95 percent level of confidence.
*** Means for the two groups are significantly different at the 99 percent level of confidence.

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