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FARMERS' GOALS AND RISK AVERSION:
SOME PRELIMINARY ANALYSES

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Several of the objectives of the regional research project W-149, "An Economic Evaluation of Managing Market Risks in Agriculture," are concerned with the risk preferences of farmers and evaluation of techniques used by farmers to transfer or retain the risk bearing function. This emphasis on risk represents a considerable change from the assumptions of profit maximization or cost minimization used in many studies in agricultural economics. However, the importance of multiple goals or objectives in farmers' decision-making has generally been recognized. It has been shown previously that differences in goal orientation can have considerable influences on the farm firm over time (Patrick).

The study reported in this paper considers risk aversion or risk avoidance as one in a set of multiple goals or objectives. The paper is divided into four major parts. First, an overview of the objectives, procedures and techniques used in the study is presented. This is followed by a brief description of the primary characteristics of the farmers included in the study. Third, the use of various risk shifting or management techniques are quantified and related to characteristics of the farmer and farm operation. Fourth, some of the preliminary results obtained using the alternative measurement procedures and the factors explaining the risk-income indices for a subsample of the data are presented and discussed. Analyses of the data are not complete and the preliminary nature of the results presented must be stressed.

Study Procedures

The objectives of this study are to:

- 1) Identify goals of farmers pertinent to major economic decisions;
- 2) Compare the effectiveness of alternative techniques for goal measurement and subsequently develop more efficient methods of measuring such goals; and
- 3) Determine the weighting or priority assigned to various goals and the factors which influence these weightings.

A review of previous studies led to identification of a number of goals which have been expressed by farmers in various ways. ^{1/} Some of these goals are very general and would be expected to have only limited impact on many of the decisions made by farmers. Short-run and long-run goals have also been expressed. The goals relevant to allocation of financial/material resources and operator time are considered to cluster into the following categories: 1) current income for consumption; 2) investment for greater future income; 3) risk aversion; 4) community organizations-responsibility; and 5) intrinsic interest in specific work/leisure activities.

A questionnaire was developed which consisted of several parts. First, farmers were asked to rate 34 statements as to how important each was as a

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goal or objective in their own business or personal life. A nine point rating scale ranging from 0 for "not important at all" to 8 for "very important" was used. Most of the 34 statements had been expressed as goals by some farmers in previous studies and were related to the five categories discussed above. Factor analysis is being used to determine which goal statements tend to group together. Determining which statements tend to load on the same factors will also be of use in interpreting later goal statements used in the magnitude estimation and paired comparisons.

Second, eight goals were selected for magnitude estimation. 2/ One goal was assigned the weight of 100 and the farmers were asked to assign points to each of the other seven goals in such a way as to reflect the importance of each goal relative to the base goal. Then a second goal was selected as the base goal and the procedure was repeated. Finally, a third goal was selected as the base and the procedure was repeated again. 3/ In the case that a farmer assigned the same number to two goals in a set, the farmer was asked which of the two goals was preferred.

The magnitude estimation procedure was also supplemented with questions to obtain the basic data for the paired comparison type of analysis used by Harman et al., and by Smith and Capstick. In paired comparisons, an individual is asked to indicate a preference between combinations of goals taken two at a time. The paired comparison provides an ordinal ranking of the goals and, after appropriate transformations, an estimate of each goal's numerical position on an interval scale can be derived.

The multidimensional scaling (MDS) represents another way of analyzing goals ranked in order of preference (Blake et al., Green and Wind). MDS includes checks on internal consistency and clearly specifies the differences among subgroups. It is highly heuristic in that it estimates the perspective or dimensions that farmers use to evaluate goals and estimates the type of "ideal" that a farmer group would find most desirable from these perspectives. Unlike the paired comparison analysis, MDS does not assume that all goals can be ordered on a single continuum which holds for all subgroups. 4/

Third, farmers were asked to rank order 27 clusters of goals in order of preference. The conjoint analysis (Schrader et al.) considers three levels of three different goals. Income, probability of bankruptcy and hours worked per day are considered. The conjoint analysis indicates the relative preference for each goal, for each level of a goal, and for combinations of goals. This provides the possibility of testing whether the utility derived from a goal is independent of other goals and their levels. Whether the substitution rate among goals is constant can also be tested. Conjoint analysis does have checks on internal consistency and is fairly easy to administer. However, the necessity of presenting combinations of goals to farmers limits the number of goals which can be considered unless fractional factorial designs are used. 5/

Fourth, farmers were asked a series of questions about themselves, their background, family situation, off-farm employment, current farming operation, importance of livestock, use of various risk management and marketing procedures and future farm plans. Financial information on assets and liabilities was also obtained, but information which would allow

calculation of a net farm income or labor income on the basis of the farmer's information was not. 6/ Farmers were also asked about the target level for a number of goals they wished to attain in the next three years such as family consumption, hours worked per day, level of debt, and others.

A random sample of farmers in the Central Indiana counties of Henry, Howard, and the northern half of Montgomery County were selected for personal interviews. The sample was drawn from the list of agricultural producers maintained by the Crop Reporting Service. A letter explaining the study was sent to each farmer initially selected and they were then contacted by telephone. Farmers operating less than 80 acres and individuals 65 years of age and older were eliminated as were those operating specialty farms such as poultry production, ornamental or horticultural crops. Family partnerships and corporations were included if no more than two operators were involved and generally both operators were interviewed. A total of 91 personal interviews were obtained. Each interview required about an hour and a half and all were performed by the research assistant involved in the project during July and August 1979.

Characteristics of the Sample

Table 1 summarizes some selected characteristics of the farmers interviewed and their farm operations. The three counties selected for the study are typical of much of Central Indiana and the Eastern Corn Belt. Grain production tends to be the primary activity, but livestock operations are common and some farms are specialized in livestock production.

Over 90 percent of the farm operators in the sample had grown up on farms and over 75 percent still lived in the county of their birth. Nearly 70 percent started in farming with their father and about 20 percent started on their own. The average farmer was 47 years old and the range of ages was from 21 to 64. All but three of the farmers had completed high school. The farm operators generally rented more land than they owned. About eight percent of the operators owned no land and 22 percent rented no land. Farms ranged in size from 70 to 3600 tillable acres operated.

In 1979, almost all of the farmers were growing corn and soybeans and, on the average, the areas devoted to each crop were very similar. About one-half of the farmers raised wheat and one-third grew hay. The average annual gross farm income for the 1976 to 1978 period was \$88,000. Over 73 percent of the farms had livestock in 1979. Farrow-to-finish hog operations were most common (37 farmers), yet there were farmers with beef cattle, feeder cattle, dairy cows or feeder pigs included in the sample. Of the farmers having livestock, about one-third got 20 percent or less of their gross farm income from livestock activities and 15 percent got 75 percent or more of their gross farm income from livestock. 7/ For those having livestock, an average of 46 percent of the gross farm income came from livestock.

About 32 percent of the farmers had off-farm jobs and 23 percent of the spouses had nonfarm employment. 8/ Of the 28 farmers reporting off-farm jobs, 13 had full-time jobs, 6 had part-year jobs, and 9 worked part-time.

Table 1. Selected Characteristics of the Farmers and Farm Operations in Three Counties, Central Indiana, 1979.

Variable	Number of Observations	Mean Value	Median Value	Low Value	High Value
Age	91	47.1	49	21	64
Education (years)	89	13.1	12	9	16
Total acres owned	90	231.0	160	0	2000
Tillable acres owned	90	200.2	133	0	1800
Total acres rented	90	308.3	237	0	1200
Tillable acres rented	90	287.7	201	0	1800
Tillable acres operated	89	487.7	362	70	3600
Acres of corn <u>a/</u>	88	236.7	170	20	1200
Acres of soybeans <u>a/</u>	86	209.2	160	10	1100
Acres of wheat <u>a/</u>	48	33.0	25	4	150
Acres of hay <u>a/</u>	31	51.7	23	7	810
Gross farm income (\$000)					
1976-1978 Average	88	122.7	82	10	1033
Hogs sold <u>a/</u>	39	838.7	802	40	3000
Beef cows <u>a/</u>	13	25.2	20	8	100
Feeder cattle <u>a/</u>	19	127.5	99	4	400
Dairy cows <u>a/</u>	6	40.3	40	36	44
Feeder pigs finished <u>a/</u>	8	268.3	200	100	875

a/ Only observations having this enterprise were included in calculating the mean, median, and range.

Of the 20 working spouses, 10 had full-time jobs, 3 worked part-year and 7 worked part-time. About 56 percent of the families reported no off-farm income or an off-farm income of less than 5 percent of total family income. About 18.5 percent of the families reported receiving 50 percent or more of their total family income from off-farm sources.

Table 2 summarizes the distribution of debts, assets and net worth of the farm families interviewed. Over 45 percent reported no long-term debt and 37 percent reported no current debt, but only about 10 percent of the farmers had debt-free operations. However, almost 50 percent of the sample owed \$75,000 or less. In contrast, less than 10 percent reported assets of less than \$750,000. Some 8.8 percent of the sample had net worths of \$100,000 or less, 28.6 percent had net worths of \$100,000 to \$250,000 and 25.3 percent were in the \$250,000 to \$500,000 range. About 25 percent of the families reported net worths of over \$1,000,000 at current market values. 9/

Use of Risk Management Techniques

The farmers interviewed were asked a number of questions about their use of risk management techniques. Information on utilization of insurance, futures markets, forward contracting, spreading sales and deferred pricing was obtained. Information on share leasing and cash renting of additional land was also covered.

Insurance. The use of insurance was very common among the farmers studied. Some 97.8 percent had liability insurance, 96.7 percent had life insurance of some type, 98.9 percent had fire insurance and 93.4 percent had medical and/or hospitalization insurance. However, only 47.3 percent had crop or hail insurance. Chi-square analyses indicated that neither age nor education of the operator has statistically significant effects on the percentage of farmers having crop or hail insurance. The total acres operated, net worth and amount of debt also had no effect on the proportion of farmers carrying crop or hail insurance.

Future Contracts. Of the 91 farmers interviewed, 15 or 16.5 percent utilized the futures markets. Hedging of corn and soybeans was the most common, but some livestock hedging also occurred (Table 3). About 25 to 35 percent of the expected corn production was typically hedged. Of the soybean producers who used the futures markets, about one-half hedged 50 percent of their production. Chi-square analysis indicated that age, total acres operated, net worth and amount of debt had significant effects on the use of futures markets. 10/ Younger farmers, those operating larger farms, and those with higher net worths and amounts of debt made greater use of the futures markets. Education of the operator had no significant effect.

Forward Sales Contracts. Forward contracting was used by 61 farmers, or 67 percent of the sample. Age and education of the operator had statistically significant effects on the use of forward contracts as did the total acres operated. Neither the net worth nor amount of debt had statistically significant effects on farmers' use of forward sales contracts. Higher proportions of younger, better educated farmers made use of forward sales contracts, as did those operating larger acreages.

Table 2. Percentage Distribution of Debt, Asset, and Net Worth Category of Farmers in Three Counties, Central Indiana, 1979.

Category	Current Debt ^a	Intermediate Debt ^b	Long-term Debt ^c	Total Debt ^c	Total Assets ^d	Net Worth ^e
None	37.4	25.3	45.1	9.9	--	--
1	34.1	35.2	26.4	39.6	2.2	8.8
2	15.4	20.9	13.2	25.3	4.4	28.6
3	3.3	8.8	11.0	12.1	2.2	25.3
4	3.3	5.5	2.2	9.9	28.6	12.1
5	6.6	2.2	1.1	2.2	37.4	18.7
6	--	2.2	1.1	1.1	25.3	6.6
Total ^f	100.0	100.0	100.0	100.0	100.0	100.0

^aFor current debt (one year or less), the intervals were 0, 1 = \$25,000 or less; 2 = \$25,001 to \$50,000; 3 = \$50,001 to \$75,000; 4 = \$75,001 to \$100,000; and 5 = over \$100,000.

^bFor intermediate-term debt (payable 2-8 years), the intervals were 0, 1 = \$25,000 or less; 2 = \$25,001 to \$50,000; 3 = \$50,001 to \$75,000; 4 = \$75,001 to \$100,000; 5 = \$100,001 to \$150,000; and 6 = over \$150,000.

^cFor long-term debt (payable in 9 years or more), and total debt, the intervals were 0, 1 = \$75,000 or less; 2 = \$75,001 to \$150,000; 3 = \$150,001 to \$250,000; 4 = \$250,001 to \$500,000; 5 = \$500,001 to \$1,000,000; and 6 = over \$1,000,000.

^dThe intervals were 1 = \$250,000; 2 = \$250,001 to \$500,000; 3 = \$500,001 to \$750,000; 4 = \$750,001 to \$1,000,000; 5 = \$1,000,001 to \$1,500,000; and 6 = over 1,500,000.

^eThe intervals were 1 = \$100,000 or less; 2 = \$100,000 to \$250,000; 3 = \$250,001 to \$500,000; 4 = \$500,001 to \$1,000,000; 5 = \$1,000,001 to \$2,000,000; 6 = over \$2,000,000.

^fPercentages may not sum to 100.0 due to rounding.

Table 3. Use of Futures Markets by 91 Farm Operators in Three Counties of Central Indiana, 1979.

Commodity	Farmers Hedging	Number of Farmers Hedging Various Percentages of Production				
		% of Production Hedged				
		10	25	30-35	40	50
Corn	12	--	6	5	--	1
Soybeans	11	2	2	2	--	5
Hogs	3	1	1	--	--	1
Cattle	3	--	--	--	1	2

Table 4 indicates the percentages of corn, soybeans and wheat which were forward contracted by the farmers studied. Almost 60 percent of the corn producers using forward contracts had contracted 25 percent or less of their expected production. In contrast, 45 percent of soybean producers had contracted 40 percent or more of their expected production.

Table 4. Use of Forward Sales Contracting by 91 Farm Operators in Three Counties of Central Indiana, 1979.

Commodity	Farmers Using Forward Sales Contracts	Number of Farmers Forward Contracting Various Percentages of Expected Production						
		% of Forward Contracted						
		10 or less	15-25	30-35	40	50	60-90	100
Corn	46	10	17	3	3	8	4	1
Soybeans	58	6	14	12	7	12	6	1
Wheat	6	--	--	1	1	2	1	1

Spreading Sales. Of the 91 farmers interviewed, 80 or 87.9 percent indicated that they spread sales of the commodities they produced. Only net worth was found to have a statistically significant effect on the practice of spreading sales. Farmers with low net worths were less likely to spread sales. Age and education of the operator, total acres operated and amount of debt had no significant effects.

Table 5 indicates the number of sales per year made by farmers who indicated that they did spread sales. Almost one-third of those making

spread sales of corn sell six or more times per year and about 37 percent sell two or three times annually. In contrast, only 17 percent of those spreading soybean sales sell more than six times per year and 58 percent sell only two or three times. A total of 48 farmers in the sample produced wheat, but only two made more than one sale per year. Commonly farmers sell wheat out of the field at harvest or store it until just before corn and soybean harvest begins. Of the 39 farmers indicating the sale of hogs, 37 or 95 percent sold more than once per year. Almost 20 percent of the hog producers made monthly sales and another 20 percent sold market pigs on a weekly basis. In general, the frequency of hogs sales appeared to be tied to the production system rather than being a risk management technique.

Table 5. Number of Sales per Year by 91 Farm Operators in Three Counties of Central Indiana, 1979.

Commodity	Farmers Spreading Sales	Number of Sales per Year						
		Sales per Year						
		2	3	4	5	6	7-12	13 and over
Corn	63	11	12	14	6	10	6	4
Soybeans	53	19	12	9	4	6	2	1
Wheat	2	2	--	--	--	--	--	--
Hogs	37	2	2	1	1	2	14	12

Deferred Pricing. 11/ Although not generally considered a risk reducing strategy, 17 of the 91 farmers, or 18.7 percent, practiced deferred pricing on some of their production. Only the total acres operated was found to have a significant effect on the use of deferred pricing - smaller farms were more likely to use deferred pricing than large ones. Age and education of the farmers, net worth and amount of debt were not significantly related to the use of deferred pricing.

Table 6 indicates the percentage of corn and soybean production on which farmers decided to defer pricing. Deferring pricing on 30 to 40 percent of production was most common, but farmers generally did not defer pricing on more than 50 percent of their production. One soybean producer deferred the price on the entire production.

Share Leases and Cash Rents. Of the 91 farmers in the study, 30 (43 percent) had cash rents and 56 (62 percent) had 50-50 share leases. Two farmers also reported other types of rental arrangements and 20 farmers, 22 percent of the sample, did not rent land. The average amount of land cash

rented was 263 acres as compared with 300 on a share lease arrangement. In general, farmers have preferred to have share lease arrangements, but competition for land has led to a shift toward cash rentals.

Table 6. Use of Deferred Pricing by 91 Farmers in Three Counties of Central Indiana, 1979.

Commodity	Farmers Deferring Pricing	Farmers Deferring Pricing on Various Percentages of Production						
		% of Production						
		5	15	20	25	30-40	50	over 50
Corn	10	3	--	2	--	4	1	--
Soybeans	13	1	1	1	1	6	1	2
Wheat	2		--	--	--	--	--	2

Age, education and net worth of the operator had no significant effect on the probability of a farmer cash renting land, while both the total acres operated and the amount of debt did. As would be expected, the larger farmers were more likely to be cash renting land. Farmers with larger amounts of debt were also more likely to be cash renting. In contrast to cash renting, the age of the operator did have a significant effect on share leasing, but the size of farm did not. Older farmers were more likely to share lease. Net worth did have a significant effect on share leases, but amount of debt did not. Although the analysis is not complete, the results suggest that farmers with a large absolute debt may cash rent in order to obtain land to service their debt even though greater risk may be involved.

The general results presented in this section suggest that farmers make somewhat greater use of the market risk management techniques available than is commonly assumed. The results also indicate that characteristics of the farmer and farm operation do influence the use of risk management techniques. Further analysis to be conducted in the study will attempt to relate individual farmer's goals and risk aversion to their use of these and other risk management techniques.

Risk and Farmer's Goals

Rating Scales

Farmers were asked to indicate how important 34 situations were as a goal or objective in their business or personal life. A nine point scale ranging from 0 for "not important at all" to 8 for "extremely important" was used for the ratings. These situations have been selected from the goals indicated by farmers in the studies reviewed and covered a variety of areas. The overall average importance rating was 5.32 and the five conditions receiving the highest and lowest ratings are presented in Table 7.

Two of the highest rated conditions, "making mortgage and loan payments on time", and "having a farm business which produces a stable income", are risk related. "Avoid using borrowed funds for the farm business" is also risk related, but was the condition rated as the least important. However, a number of farmers indicated when they read the statement that they would like to avoid borrowing, but it was simply impossible in their situation.

Table 7. Importance Ratings of Selected Conditions by 91 Farm Operators in Three Counties of Central Indiana, 1979.

<u>Highest Rated Conditions</u>	<u>Average Rating</u>
Make mortgage and loan payments on time	7.17
Show a yearly profit from the farm operation	7.14
Be my own boss	7.01
Live in the country	6.74
Have a farm business which produces a stable income	6.57
<u>Lowest Rated Conditions</u>	<u>Average Rating</u>
Buy more land	4.37
Have a job without a lot of daily repetitious tasks	3.96
Develop a farm business which will grow to employ more than one operator	3.91
Rent more land	3.57
Avoid using borrowed funds for the farm business	3.28

Two other risk related conditions, "knowing the low limit of my gross income for this year" and "have stable prices for my products" were rated as 5.02 and 5.88 respectively.

The 34 conditions covered a variety of areas as can be seen from the ten statements listed in Table 7. Factor analysis was used to determine which statements tend to group together. In general, the factor analysis results were not very satisfactory with respect to identifying goal orientations. A total of seven conditions were eliminated from the analysis because they had multiple factor loadings which suggests they may have had multiple interpretations to the respondents. In the analysis, nine factors had eigenvalues larger than one and together they explained 63.5 percent of the variation. Statements which, a priori, had been expected to load together on a factor, generally did not. Because of these complexities it was not possible, in this preliminary analysis, to identify orthogonal factors which would correspond to the expected goal groups.

Magnitude Estimation

Magnitude estimation was one of the scaling procedures used to determine the importance of each goal in relation to other goals. As indicated previously, farmers were asked to assign points to each goal relative to a base goal which was given a score of 100 points. For example, if the farmer thought goal B was twice as important as the base goal, then 200 points was assigned to goal B. If the comparison goal was viewed as only half as

important as the base goal, then the statement was given 50 points. Any number of points could be given to a goal as long as the score reflected the importance of the comparison goal to the base statement.

The magnitude estimation procedure was repeated three times to determine if farmers were consistent in their scoring and ranking of goals. Each time a different goal was chosen as the comparison statement. In the first trial, the base statement was "a farm business that produces a stable income" (stable income). In subsequent trials the base statements were "to avoid being unable to meet loan payments and/or avoid foreclosure on my mortgage," (bankruptcy) and "to be recognized as a top farmer in my community" (recognition). These were chosen because it was thought that the second and third base statements would rank at the top and the bottom of the goal list, with the first somewhere in the middle. The median Spearman rho correlations in a subsample of 33 farmers between base 1 (stable income) and 2 (bankruptcy) was .59; between bases 1 and 3 (recognition), .62; and between bases 2 and 3, .71. Farmers were able to assign points and maintain more consistent goal rankings if statements 2 and 3, the hypothesized endpoints, were used as base goals for comparisons. For each farmer, the score for a goal is the mean of the numbers obtained when statements 2 and 3 are used as the base statements. 12/

The median values for the goal statements are presented in Table 8. The most important goal is "to avoid being unable to meet loan payments and/or avoid foreclosure on my mortgage". The least important is "to be recognized as a top farmer in my community". However, there is more than just an ordinal relationship between the listed goals. Due to the comparative nature of the scaling procedure, the obtained scores are assumed to have

Table 8. Median Values of Scores Assigned to Goal Statements by 33 Central Indiana Farmers, 1979.

<u>Goal Statement</u>	<u>Points</u>
To be recognized as a top farmer in my community	100
To have time away from the immediate responsibilities of the farm to spend in leisure and enjoyable activities	105
To reduce the physical effort and strain in my farming operation	113
Having the value of my net worth accumulate steadily	175
To attain a desirable level of family living	175
Selecting a farm enterprise with the highest return on investment	182
A farm business that produces a stable income	200
To avoid being unable to meet loan payments and/or foreclosure on my mortgage	225

ratio properties (Stevens). Table 8 indicates that the avoidance of bankruptcy is 2-1/4 times more important than being recognized as a top farmer. Similarly, having a farm business which produces a stable income is twice as important as top farmer recognition.

Risk-Income Goals

A number of studies have estimated farmers' utility functions and risk aversion coefficients or EV frontiers for various farm organizations. Although the present study is not concerned with estimating these relationships, information on the risk-income goal trade-offs of farmers can be derived from the magnitude estimation results. This scaling procedure generates results in a metric, like the Pratt measure of risk aversion, suitable for comparisons among individuals of the importance of one item versus another (Stevens).

Two risk-income indices have been developed from the magnitude estimation scores for the 33 farmers. One is the ratio of the points assigned to the "avoid being unable to meet loan payments and/or avoid foreclosure on my mortgage" and the "attain a desirable level of family living" goals times 100. The second is 100 times the ratio of "a farm business that produces a stable income" to "attain a desirable level of family living" goals. These indices will be referred to as the catastrophe-income and variability-income indices respectively. Higher values on both indices indicate lower weight is given to the desirable income and can be interpreted as indicating greater risk aversion. The mean value of the catastrophe-income index was 130.8 as compared with 101.7 for the variability-income index. This reflects the higher score assigned to the avoiding repayment difficulties goal by most farmers. The simple correlation between the two indices is .34.

Table 9 presents the preliminary results of regression analyses using the risk-income indices and some socio-economic characteristics of the farmer and farm operation. Although the R^2 s are relatively low and most of the coefficients are not significant at the generally accepted levels, the patterns of the coefficients are quite similar. It is commonly suggested that older farmers tend to be more risk averse, but as age increases, farmers in the subsample appear to be less concerned about both catastrophe and variability aspects and give greater emphasis to income. However, as farmers move through various stages of the life cycle from a childless situation to all of the children being grown and away from home, their risk aversion tends to increase. Further analysis with a larger number of observations should permit a different form of coding and testing whether these relationships are linear.

Education has positive coefficients in both equations indicating that farmers with more education tended to be more risk averse. Previous studies have not found consistent results with respect to education's effect on risk aversion.

It is commonly hypothesized that risk aversion decreases as wealth increases. The net worth variable did have the expected sign and was statistically significant in the catastrophe-income equation. However, total acres owned had negative signs in both equations and was significant in the catastrophe-income equation indicating that farmers owning more land tended

to be more risk averse. Total acres rented had a negative sign in both equations, but was not significant. In many instances individuals share or cash renting land are doing so to spread fixed machinery costs and increase income.

Table 9. Estimated Coefficients and Standard Errors (in parentheses)
Risk-Income Goal Equations, Central Indiana Farmers, 1979.

Variable	Catastrophe- Income	Variability Income
Age	-1.3728 (1.4119)	-.2631 (.9900)
Education ^a	14.9353 (9.5720)	6.1635 (6.7573)
Total Acres Owned	0.0916 (.0387)	0.0137 (0.0247)
Total Acres Rented	-0.0104 (.0417)	-0.0137 (.0287)
Life Cycle ^b	28.4769 (16.4422)	12.7052 (11.3208)
Net Worth (\$1,000)	-0.0642 (.0347)	--
Job ^c	-12.6520 (21.7776)	-24.6426 (15.9296)
Percent Debt	--	0.8565 (.5661)
Constant	93.6426 (72.4156)	56.7050 (52.5454)
R ²	.2907	.2210

^aEducation is coded as: 1 - for some high school; 2 - for completed high school; 3 - for vocational school or winter short course; 4 - for some college; and 5 - for college graduate.

^bLife cycle is coded as: 0 - for childless; 1 - all children under 6; 2 - all children under 18; 3 - all children over 18; and 4 - all children have left home.

^cJob is coded as: 0 - for no off-farm job and 1 - if either the farm operator or spouse has an off-farm job.

The variable JOB refers to whether the farm operator or spouse had an off-farm job. The negative coefficients in both the risk-income equations indicate those with off-farm jobs give relatively greater emphasis to income. This is consistent with the observation that off-farm jobs are commonly held to supplement farm income.

Percent debt was included in the variability-income equation. As would be expected, greater weight was given to risk aversion as the percentage of debt increased. However, the estimated coefficient was not statistically significant.

Future analysis will involve the entire sample of farmers. The larger number of observations will allow alternative specifications of the model. The data from the conjoint analysis will also be analyzed to gain greater understanding of the risk-income trade-off preferences of farmers.

Footnotes

- 1/ Among the studies reviewed are Fitzsimmons and Holmes, Gasson, Harman, et al., Hesselbach and Eisgruber, Kerridge, Nielson, Patrick and Eisgruber, and Smith and Capstick.
- 2/ This is basically the procedure used by Kliebenstein, et al., but the goals considered are different. The statement of the goals differed slightly from the first part of the questionnaire, but all of the items had been included in the previous section.
- 3/ Repetition of the magnitude estimation provides a basis for tests of internal consistency and reliability.
- 4/ For a further discussion of the differences between these measurement techniques, see Green and Tull.
- 5/ The alternative methods of measuring farmer's goals and their correspondence to the requirement of various multiple goal models are discussed by Patrick and Blake.
- 6/ Estimates of income can be developed on the basis of the information collected and the use of standardized input and cost data.
- 7/ Farmers were asked what percent of their income was derived from livestock. The numbers reported probably indicated an average or target rather than results in a specific year.
- 8/ On two farms included in the study, the operator was female.
- 9/ Some of the larger farms involved more than one operator, but the entire capital was attributed to the individual interviewed. No provision has been made for the contingent income tax liability of farm operators.
- 10/ The 20 percent level has been used in this preliminary analysis for statistical significance.
- 11/ With deferred pricing, farmers deliver grain to an elevator for sale, but no price is set. The farmer retains the option of selecting the day he will price the grain which was delivered. The price received by the farmer is the market price minus the various service charges made by the elevator operator.
- 12/ The numbers obtained using base 2, bankruptcy, are transformed so that the value assigned to base 3, recognition, equals 100 before the mean is determined.

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