AN EMPIRICAL ANALYSIS OF THE INTERTEMPORAL STABILITY OF RISK PREFERENCE

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Abstract

The interval measurement approach was used to obtain risk preference measures for 23 Michigan farmers in 1979 and again in 1981. This paper analyzes how risk preferences of the individuals in this group of decisionmakers changed over a two year time period. Risk preferences were most stable near typically experienced personal income levels.

Key words: risk preferences, interval approach, risk attitude stability.

This paper addressed the question of whether or not risk preferences are stable over time. More than 15 years ago Officer and Halter recognized that if risk preference estimation was to be useful in applied decisionmaking, the question of the effect of time on preferences would need to be resolved. More recently, Young et al. noted that *"changing objectives, information and attitudes could make an individual's risk aversion coefficient an elusive moving target"* (p. 14). Increased emphasis on application of risky decision theory to multiperiod analysis emphasizes the need to understand the dynamic nature of individual's preferences (Hazell, Pederson). While the importance is apparent, to date almost no empirical evidence has been available to answer the question: Are risk preferences stable? This paper provides such evidence.

BACKGROUND FOR AN EXAMINATION OF INTERTEMPORALLY STABLE RISK PREFERENCES

There is apparent agreement that precise reliable individual risk preference measures will be difficult if not impossible to obtain given the current state of the art in decision theory (Schoemaker). Yet, the successful application of risky decision analysis depends on an increased body of empirical knowledge about individual risk preferences. While fully appreciating the limitations imposed by previously employed methodologies, the literature stresses the need for an empirical data base of preferences (Binswanger; Lins, Gabriel, and Sonka; Young et al.). Young et al. state that *"knowledge of risk preferences of individual agricultural producers is necessary for many useful private managerial and public policy analyses of decisionmaking under risk"* (p. 1). In the same article, the authors expressed their primary reservations with eliciting risk preferences as twofold: the errors inherent in previously used measurement techniques and the possible temporal instability of preferences. In reference to the former reservation, King and Robison presented a promising new methodology, based on stochastic dominance with respect to a function (Meyer), for measuring risk preferences. The methodology, the interval approach, overcomes many of the shortcomings attributed to previously employed measurement techniques. This study employs that approach to examine the temporal stability of risk preferences.

As to the latter reservation, Young et al. note that the question of stability of risk preferences is ultimately an empirical question whose resolution requires intertemporal studies. Unfortunately, little empirical research regarding intertemporal risk preferences exists. Officer and Halter estimated risk attitudes for four wool producers in Australia for two points in time. They hypothesized that *"if utility functions are to serve as a guide to the decisionmaker, they must be derived at each point in time at which decisions are made"* (p. 263). This hypothesis implies a lack of intertemporal stability. Their only conclusion however was that over a period of a year the farmers' utility functions did not change radically. Officer and Halter's own remarks and subsequent literature (Robison) have revealed significant shortcomings in the reliability of their and similar risk preference measures.

The remainder of the available information about the stability of risk preferences over time comes indirectly. In 1976, Whittaker and Winter repeated a 1974 Halter and Mason study resulting in risk preference data being collected at two points in time. In both studies, risk attitudes were measured using direct utility elicitation methods and these were regressed

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against characteristics of the decisionmakers. Generally, signs of the regression coefficients relating characteristics to risk aversion coefficients were reversed in the two studies. And while these two studies did not address the question of intertemporal stability of risk preferences, their results might be used to infer instability of risk preferences. However, Whittaker and Winter were skeptical of the results because of a change in sample size, possible model misspecification and the use of a point estimate methodology.

Results of other studies may or may not contribute information to the stability question. Hazell suggests that based on studies by Dillon and Scandizzo, Binswanger, and Moscardi and de Janvry, individual utility functions may not be stable over time because they vary with the socioeconomic status of the household. While this is a reasonable concern, the suggestion is not verified in the context of those studies. The studies were also carried out in developing countries, thus limiting their application to the U.S. producer's situation (Young et al.).

From the information available, it is concluded that little is known about the stability over time of risk preferences. This paper corrects that deficiency by presenting results from an intertemporal study of farmers' risk preferences. The study employs the interval approach to measure risk preferences of 23 mid-Michigan farmers across four possible ranges of income. The following section reviews the interval estimation approach used to measure the farmer's risk preferences. Subsequently, a description of the sample and empirical data are presented. Finally, the data are analyzed and the hypothesis that risk preferences are intertemporally stable is tested.

MEASUREMENT PROCEDURE

The interval approach was developed in response to well documented deficiencies attributed to previously used methods of measuring preferences. Meyer developed a general efficiency criterion, which is at the same time more flexible and more discriminating than previous criteria. His criterion can be used to order uncertain action choices for classes of decisionmakers defined in terms of the absolute risk aversion function, R(Y), over income Y (Pratt). Given an upper bound $R_U(Y)$ and lower bound $R_L(Y)$ on a decisionmaker's absolute risk aversion function, an efficient set of action choices can be isolated which is consistent with the bounded preferences. Before this procedure could be used in an applied context, however, an operational procedure had to be developed for determining the lower and upper bounds, The interval approach designed by King and Robison appears to be appropriate in this regard.

Measuring risk preferences using the interval approach compares choices between carefully selected distributions. Information from these choices may then be used to establish the upper and lower bounds on a decisionmaker's absolute risk aversion function. The procedure for constructing interval measurement of decisionmaker preferences is based on the fact that under certain conditions a choice between two distributions defined over a relatively narrow range of outcome levels divides absolute risk aversion space over that range into two regions: one consistent with the choice and one inconsistent with it.

The decisionmaker's preferences, as revealed by the ordering of the two distributions, determine into which of these two regions the level of absolute risk aversion falls. Through a hierarchy of choices, wider portions of the risk aversion space may be shown as inconsistent with the decisionmaker's preferences until a desired level of accuracy is attained. Upper and lower limits for the level of average absolute risk aversion can be determined at several income levels. These values are used to estimate upper and lower limits for average absolute risk aversion over the relevant range of income.

For this study, each individual was required to make three choices between pairs of distributions of possible after-tax annual income at four different income levels. Each choice moves the individual through a hierarchy of choices. Based on these choices, the individual's average absolute risk aversion function could be bounded by one of the eight possible risk intervals at each of the four income levels. The eight risk intervals of Pratt coefficient values are: (1) $-\infty$ to -.00025; (2) -.0005 to 0.0; (3) -.0001 to .0002; (4) .0001 to .0004; (5) .0003 to .0008; (6) .0006 to .0015; (7) .001 to .005; (8) .0025 to ∞. An individual's risk attitudes are estimated to be in one of the eight intervals at four possible income ranges in the neighborhoods of \$0 (-\$1,000 to \$1,000, level I); \$10,000 (\$9,000 to \$11,000, Level II); \$25,000 (\$22,000 to \$28,000, level III); and \$45,000 (\$40,000 to \$50,000, level IV).

Since positive Pratt coefficient values suggest risk aversion while negative values suggest risk preferring attitudes, the interval measures 1 through 8 can be associated with ordered levels of risk preferring to risk averting behavior. Interval 1, for example, represents strong risk preferring attitudes, while interval 8 represents strong risk averse attitudes. Intervals 2 and 3 both include the risk neutral ($R(y)=0$) attitude and range from moderately risk preferring ($R(y)=-.0005$) to moderately risk averse ($R(y)=.0002$) attitudes. Intervals 4 to 7 represent increasingly strong risk averse attitudes. Throughout the remainder of this paper, risk

TABLE 1. SELECTED BUSINESS AND PERSONAL CHARACTERISTICS OF 23 CENTRAL MICHIGAN FARMERS, 1979 AND 1981

Measure	Unit	1979	1981
Total sales:	dol.		
Median		169,600	231,900
Range		22,017 to 470,000	52,900 to 680,300
Net cash income:	dol.		
Median		46,617	67,542
Range		-12,565 to 132,832	16,500 to 149,705
Net farm income:	dol.		
Median		45,500	52,500
Range		-15,161 to 155,340	-62,200 to 230,500
Tillable acres owned:	ac.		
Median		217	220
Range		0 to 608	34 to 698
Total acres tilled:	ac.		
Median		405	408
Range		134 to 998	137 to 1019
Net worth/total assets:	--		
Median		.70	.73
Range		.25 to 1.00	.27 to 1.00
Age: years	yr.		
Median		45	47
Range		20 to 58	22 to 60
Farm management experience:	yr.		
Median		24	26
Range		5 to 38	7 to 40

Source: Michigan Telfarm Records and unpublished data collected by Garth Carman.

attitudes will be identified by a number which corresponds to one of the eight risk intervals.

SAMPLE CHARACTERISTICS

Using the interval approach described, risk preferences were measured for 23 mid-Michigan farmers in the summers of 1979 and 1981. The sample consisted of 12 dairy farmers, 7 cash crop farmers and 4 beef-cash crop producers. Table 1 lists some of the measures which characterize the sample of farmers and their farms. Most of the individuals in the sample operate medium to large commercial farms. Only two of the farms might be considered part-time. Even on these part-time farms, the farm income comprises 50 percent of the individual's income. Seventy-four percent of the respondents obtained 95 percent or more of their income from the farm. Established farmers comprised most of the sample, with no farmer having less than 5 years managerial experience in 1979. Eleven of the 23 farmers were in their fifties and 8 of the 11 were in a partner or corporate arrangement with a younger family member. Finally, median total sales were $169,600 in 1979 and increased to $231,900 in 1981, while net farm income increased from $45,500 to $52,500 over the same time period. Although the income measures mostly increased in dollar amount, care should be taken with generalization since not all sample members had increased incomes.

ANALYSIS OF THE AGGREGATE DATA

The null hypothesis this paper tests is that risk preferences of individual farmers are intertemporally stable. While test of the hypothesis depends on analysis of individual data, analysis of cumulative data provides some insight as well. This is especially true considering the capabilities of the interval approach as an instrument for grouping farmers into risk preference classes for decisionmaking. Such information is especially important if risk preference measures are to be used in policymaking and group prescription (Lins, Gabriel, and Sonka; Officer, Halter, and Dillon).

Table 2 records the percentage of sample members whose average risk aversion is estimated to lie within each interval, for both 1979 and 1981. The percentages are shown for the interval bounding the most risk preferring region, interval 1, to that interval bounding the most risk averse region, interval 8. At each of the four income levels, these data demonstrate that the average risk aversion of at least some individuals could be located within wholly risk preferring intervals, wholly risk averse intervals and intervals allowing for mixed as well as risk neutral functions. This result is not unexpected based on previous studies measuring risk preferences in developed economies. Thus, the data in Table 2, while not conclusive, reinforce the likelihood of risk averse, risk preferring and

TABLE 2. DISTRIBUTION OF SAMPLED CENTRAL MICHIGAN FARMERS BY INCOME LEVEL AND RISK INTERVAL, 1979 and 1981 [a]

Panel A (1979)	Income level			
	I	II	III	IV
Risk Interval	----------Percent----------			
1 - ∞ to -.00025	26.1	17.4	21.7	26.1
2 -.0005 to 0.0	17.4	8.7	21.7	13.0
3 -.0001 to .0002	47.8	21.7	21.7	30.4
4 .0001 to .0004	0.0	21.7	21.7	8.7
5 .0003 to .0008	8.7	17.4	0.0	8.7
6 .0006 to .0015	0.0	8.7	4.3	0.0
7 .001 to .005	0.0	0.0	4.3	8.7
8 .0025 to ∞	0.0	4.3	4.3	4.3
	100	100	100	100
Panel B (1981)	**Income level**			
	I	II	III	IV
Risk Interval	----------Percent----------			
1 - ∞ to -.00025	34.8	21.7	34.8	21.7
2 -.0005 to 0.0	8.7	13.0	21.7	26.1
3 -.0001 to .0002	30.4	17.4	8.7	13.0
4 .0001 to .0004	8.7	21.7	30.4	13.0
5 .0003 to .0008	0.0	17.4	0.0	8.7
6 .0006 to .0015	4.3	0.0	0.0	0.0
7 .001 to .005	4.3	0.0	0.0	4.3
8 .0025 to ∞	8.7	8.7	4.3	13.0
	100	100	100	100

[a] Income levels are represented as follows: I (-$1,000 to $1,000), II ($9,000 to $11,000), III ($22,000 to $28,000), and IV ($40,000 to $50,000).

risk neutral decisionmakers at each income level examined.

The respondents tended to be least risk averse for incomes in the neighborhood of $0. For both 1979 and 1981, the cumulative percentages of the three most risk preferring intervals were highest for income level I. This outcome might have been expected for several reasons. Farmers may have been willing to take added risk at the $0 income level due to the relatively small magnitude of absolute dollar amounts and variability of the paired distributions. It was noted from farmer comments that while they make decisions involving a wide range of dollar values, many put little time and effort into decisions involving dollar amounts in the $0 to $500 range. If this is the case, perhaps there exists a critical dollar amount below which the intermediate steps in a typical decision process are not exercised. Therefore, a somewhat altered decision process might be used for small monetary values, resulting in some of the difference between income levels. It also became apparent from discussion that the sample members almost never experienced the -$1,000 to $1,000 income range. Therefore, comparison at that level becomes difficult and unrealistic.

Risk averse tendencies were greatest for the $9,000 to $11,000 income range. Level II showed the lowest percentage of respondents in either the three or four least risk averse intervals (1 through 3 or 1 through 4). Income level II represents "poor year" scenario incomes typically experienced by the sample members. In other words, incomes at $11,000 and below comprised only 15 percent of the 92 income observations (4 years per sample member). Therefore, level II represents a lower limit of incomes experienced and expected by most individuals in the sample. Thus, at or near the level II range of incomes, the loss of an extra $1,000 or so might mean considerable hardship on the farm family or critically reduce the ability to meet fixed responsibilities. Thus, it seems reasonable that as a group the surveyed farmers might tend to be more averse over this range.

Interval 3 allows for the average risk aversion function to be slightly averse, neutral or slightly preferring. For incomes levels II, III, and IV, approximately 20 percent of the sample was located in this interval. Given this result, the assumption of risk neutrality may be valid for many decisions farmers make. Conversely, at least 70 percent of the sample's estimated risk aversion functions lie in intervals not including risk neutrality. The high percentage not at or near risk neutrality supports the conclusions of Lin, Dean and Moore, "that Bernoullian utility maximization explains actual farmer behavior more accurately than profit maximization" (p. 507). The results also reinforce the call for improved application of utility theory to decisionmaking.

ANALYSIS OF THE INDIVIDUAL DATA

Table 3 lists the risk intervals which correspond to each individual measured at four different income levels in 1979 and 1981. The data are arranged so that each individual's preferences for the two time periods are on the same line; e.g., farmer 1's risk preference intervals in 1979 over income levels I, II, III, and IV were 3, 1, 1, and 1, respectively, and in 1981, these preferences over the same income levels were 3, 4, 1, and 1.

The data show no evidence of a consistent pattern of risk attitudes. This result is important for two reasons. First, those studies assuming *a priori* the shape of the utility or risk aversion function limit their ability to include all relevant decisionmakers. Second, studies representing the decisionmaker's risk aversion as a single point or in the neighborhood of one income must carefully consider the choice of the income level. Moreover, researchers must be prepared to limit any conclusions or prescriptions to be made using point risk measures to the particular income level investigated.

Intervals bounding the risk aversion functions of the 23 individuals changed from 1979 to 1981. For at least one income level, all 23 members of the sample changed at least one interval. Twenty-six percent changed intervals for two income levels, 22 percent for three

TABLE 3. INTERVALS BOUNDING THE RISK AVERSION FUNCTION FOR EACH SAMPLED CENTRAL MICHIGAN FARMER BY INCOME LEVEL AND YEAR[a]

	Income level by year							
	1979				1981			
	I	II	III	IV	I	II	III	IV
Farmer Number	Risk Interval							
1	3	1	1	1	3	4	1	1
2	3	6	6	4	2	5	4	4
3	2	2	3	3	3	4	4	2
4	3	4	1	1	7	1	1	2
5	1	1	1	7	8	1	2	8
6	3	3	1	1	4	3	1	5
7	3	4	2	1	1	2	4	4
8	3	3	2	3	1	3	2	3
9	3	2	1	1	3	4	1	1
10	1	3	2	5	3	3	2	3
11	1	4	3	4	1	5	1	1
12	2	4	2	2	4	2	3	4
13	1	8	7	1	8	3	2	8
14	3	1	4	2	1	1	4	2
15	5	5	3	3	1	5	4	2
16	3	5	4	3	3	1	4	5
17	2	5	4	3	6	8	8	8
18	5	6	2	2	1	5	1	1
19	2	3	3	3	1	2	2	7
20	1	1	4	7	1	8	4	2
21	3	4	4	5	3	4	1	2
22	3	3	3	3	2	1	3	3
23	1	5	8	8	3	4	1	1

[a] Income Levels are represented as follows: I (-$1,000 to $1,000), II ($9,000 to $11,000), III ($22,000 to $28,000), and IV ($40,000 to $50,000).

income levels and 35 percent changed at all income levels tested. The changes in intervals evidence no clear pattern between 1979 and 1981. In other words, statements as to general tendencies toward greater or lesser risk aversion cannot be verified. Neither is it possible to verify any distinct change in general functional form from 1979 to 1981. This evidence indicates that a change in risk preferences may not generally be affected by structural changes in agriculture or the general economy. Such an indication assumes that any changes in risk preferences caused by a structural change would follow a similar pattern among all producers.

The null hypothesis assumed in this paper was that risk preferences are intertemporally stable. Using the interval characterization of risk preferences listed in Table 3, tests of the hypothesis can be made. Table 4 lists several measures of risk interval stability. Line A summarizes the percentages of individuals who did not change intervals between 1979 and 1981. The percentages of the sample remaining at the same risk aversion interval for income levels I, II, III, IV are 26 percent, 30 percent, 43 percent, and 26 percent, respectively. Income level III, the $22,000 to $28,000 range, demonstrated the most stability.

The measure on line B cumulates the percentage of the sample not changing interval (measure A) and the percentage changing to an adjacent interval. It is a relevant measure for testing stability of risk preferences because the average risk aversion function estimated to be in an adjacent interval may actually lie in both at once or at least be very close to the bounds of both. Based on measure B, risk preference once again proved most stable for income level III. In the neighborhood of $25,000 income, 70 percent of the respondents either did not change intervals or changed to an adjacent interval between 1979 and 1981.

TABLE 4. SUMMARY MEASURES USED TO INFER THE STABILITY OF RISK ATTITUDES FOR SAMPLED CENTRAL MICHIGAN FARMERS BY INCOME LEVEL, 1979 AND 1981 [a]

Measure	Unit	Income level I	II	III	IV
A. No interval change	Pct.	26	30	43	26
Chi-square		3.45	6.17	18.78	3.45
alpha		.1	.025	<.005	.1
B. No change or change to adjacent interval	Pct.	48	52	70	48
Chi-square		1.72	3.07	12.27	1.72
alpha		>.1	.1	<.005	.1
C. No change more than two adjacent intervals	Pct.	74	74	82	61
D. Change from risk prefering to averse (from 1 or 2 to 4-8)	Pct.	9	17	4	17
E. Change from risk averse to preferring (from 4-8 to 1 or 2)	Pct.	9	17	13	17

[a] Income levels are represented as follows: I (-$1,000 to $1,000), II ($9,000 to $11,000), III ($22,000 to $28,000), and IV ($40,000 to $50,000).

It is possible to statistically test the hypothesis of stability at each income level using these measures. Chi-square statistics are used to test the hypothesis that the frequency of interval change experienced is less than or equal the frequency of random occurrences. If this alternative to the null hypothesis cannot be rejected, the stability of the risk preferences is no better than a random event. The implication of this result is the rejection of the intertemporal stability hypothesis. Table 4 reports the Chi-square test statistics and the maximum significance attainable at each income level for measures A and B. The alternative hypothesis could not be rejected at the .01 significance level for either measure A or B over income ranges I, II, and IV. However, the alternative hypothesis could be rejected at the .01 significance level for both measures on lines A and B over income range III. These results imply rejection of the hypothesis of intertemporal stability for incomes in the neighborhood of $0, $10,000, and $45,000; but not for those in the neighborhood of $25,000.

The test outcome is of special consequence in that most of the sample members' personal after-tax incomes are estimated to be in the $16,500 to $34,000 range. This approximation is based on average farm income over a 4-year period, percentage of farm income the respondent received and the proportion of total income from farm sources. From this information, it is estimated that the incomes of approximately 70 percent of the sample members fall in the aforementioned range of around $25,000. The $16,500 income figure represents the mean between income level II's upper income and income level III's lower income. Likewise, $34,000 represents the mean between income level IV's lower income and income level III's highest income. Incomes of 70 percent of the sample are thus best represented by level III. This indicates that for the sample as a whole, preferences were most stable at that level representing the majority of the individuals.

A more detailed investigation of the individual data indicates a similar outcome. By isolating the income level best representing each individual's typical income, it is estimated that two individuals are best represented by level II, 16 by level III and 5 by level IV. Using the appropriate income level for each sample member, analysis shows that 43 percent did not change interval (measure A) between 1979 and 1981. And, 74 percent demonstrated no change or changed to an adjacent interval (measure B). Measured at the typically experienced income level of the individual, the alternative hypothesis could be rejected. It therefore seems likely that risk preferences may not be intertemporally stable over all incomes which an individual may

experience. However, the outcome does suggest that for incomes close to those typically experienced by farmers, risk preferences are reasonably stable.

On the surface then, the Chi-square test results reject the hypothesis of intertemporal stability of risk preferences except at the typically experienced income level. However, some care should be taken in interpreting these results. Due to the interval nature of the measurement approach, it is not known specifically where within an interval an individual's average absolute risk aversion function lies. This is not a problem using the technique to order choices, but because intervals overlap, an individual's risk preference near a border could actually be in two intervals. This fact and the relative narrowness of the bounded intervals suggest that preferences may actually be more stable than suggested by the Chi-square statistic. Indeed, the percentages of individuals whose risk preference intervals changed two or fewer adjacent intervals was 74, 74, 82, and 61 percent at income levels I, II, III, and IV, respectively, (Line C, Table 4).

Lines D and E list two other, albeit less specific, measures of stability. Measure D represents the proportion of the sample whose measured average risk aversion changed from being within the risk preferring region (intervals 1 and 2) to a risk aversion region (intervals 4 through 8). Measure E represents the proportion changing from risk averse to risk preferring regions (from 4 through 8 to 1 or 2).

In general, if an individual was risk averse (preferring) in 1979 for a given range of incomes, while he might become slightly more or less risk averse (preferring), he likely remained risk averse (preferring) in 1981. These measures again showed that preferences were most stable for incomes in the neighborhood of $25,000.[1] Officer and Halter maintained that a similar effect in their experiment suggested fairly stable preferences over time. What seems important is the degree of accuracy necessary for a given decision situation. Knowledge of stability based on measures D and E may suffice for some general marketing strategies or government policy decisions. For such cases, this study supports the Officer and Halter conclusion. Yet, decisions such as crop rotation and the particular plant varieties to use within those rotations may require information about intertemporal stability more refined than measures D and E provide.

CONCLUDING REMARKS

Investigation of the intertemporal stability of individual risk preferences was the primary concern of this paper. The analysis suggests that while risk preferences may not be intertemporally stable over wide ranges of income, for incomes close to those typically experienced by the individuals, risk preferences are rather stable. Findings of this study also demonstrate that farmers are not neutral toward risk for many of the choices they make; they may exhibit risk preferring as well as risk averse attitudes depending on the level of expected income.

Several implications follow from these results: (1) analysts using risk preferences must carefully select the income levels and interval size dependent on the farmers in question and types of decisions, (2) *a priori* selection of functional forms to estimate risk preferences over a range of incomes will not be accurate in most cases, (3) risk preferences appear to vary at differing income levels so that point estimates or single values cannot adequately represent preferences, (4) the potential for using measured or estimated risk attitudes in dynamic analysis could be improved by careful selection of criteria regarding expected income range, and (5) when using the interval approach for estimating the effect or response over time by a group of decisionmakers, the interaction between interval width and income range is an important consideration.

Results of this study demonstrate the need for additional research in several areas. More risk preference, longitudinal data are extremely important to further test the conclusions. Although the sample was most heavily weighted toward dairy farmers, it did not appear that these individuals had risk attitudes particularly more or less stable over time than the cash crop and beef-cash crop farmers.[2] Yet, it would be especially useful to have data acquired from other farm types and other geographical areas. Also, additional work needs to be completed to better understand why the decisionmakers' preferences are not stable at income levels not typically experienced.

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[1] Three of the four individuals demonstrating major shifts in risk attitude (measures D and E) at income level III experienced dramatic changes in their businesses. Farmer number 21 doubled the number of acres owned. Farmer number 23 changed from a rent only to a land ownership situation with a 600 percent increase in net worth. Finally, farmer 13 received 40 percent of his personal income from a real estate brokerage business and real estate sales were very poor in Michigan in 1980-81.

[2] Of the five individuals who changed more than two intervals at the income level nearest that typically experienced, three were dairy farmers, one was a cash crop producer and one produced beef and cash crops. The relative proportions are similar to that of the overall sample.

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