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Local Cooperatives' Evaluation of Business Investment Opportunities

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Agricultural cooperatives have been restructuring, by way of mergers, acquisitions, joint-ventures, and strategic alliances, to increase efficiencies to remain competitive in a changing business environment. The research evaluating the reorganization of cooperatives has revealed that less than one-half of the restructured businesses are financially successful. There is the potential to significantly influence the future health of the cooperative business sector if, first, insights can be gained concerning the factors being considered by cooperative managers when making restructuring decisions and, second, extension education programs can be adapted to meet the greatest need. In this study we examine: (a) what methods of valuation cooperatives are using when evaluating new business opportunities, and (b) what factors influence the methods of valuation preferred by cooperatives when evaluating new business opportunities.

Key Words: capital budgeting methods, cooperatives, finance, restructuring

All sectors of agriculture are in the midst of dramatic change, often referred to as the industrialization of agriculture (Boehjle, 1999; Drabenstott, 2000). As agribusiness firms respond to these changes, they are restructuring to expand into new areas of business and form linkages with firms at other stages of the supply chain. Agricultural cooperatives are no exception. Vandenburg et al. (2000a) identify the following driving forces behind restructuring of locally owned cooperatives through mergers, acquisitions, joint-ventures, and strategic alliances: decreasing numbers of farms, increasing costs, industrialization of agriculture, increased competition, and decreased profits.

Between 1992 and 1997, the number of grain cooperatives in the United States declined over 30%, from 1,193 to 826 (Crooks, 2000). Merlo (1998) reports that in 1998 there were more mergers, consolidations, acquisitions, joint-ventures, and strategic alliances among U.S. cooperatives than in the entire history of cooperatives.

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Fulton's research (2001) confirms this trend, and shows it continued through the remainder of the decade of the 1990s.

These same trends are evident in Colorado and Indiana, the geographic areas chosen for our analysis. In fact, the importance of educating cooperative managers and directors about finance and capital budgeting decisions became quite evident after completing this study. It was discovered that many of these individuals could truly benefit from educational programming and workshops designed to help cooperative managers and directors understand capital budgeting techniques.

The remainder of the article proceeds as follows. The next three sections provide a review of the literature, a description of the four methods of business evaluation, and the research hypotheses. The data, from locally owned cooperatives in Colorado and Indiana, are then described, along with a detailed discussion of the descriptive statistics. Next, we discuss the methodology used in the study, and present the empirical model specification. The results of the logit analysis are then reported. The study ends with conclusions and suggestions for further research.

Previous Studies

Previous research has considered questions relating to the successfulness of cooperative reorganization and cooperative financial health. Parliament and Taitt (1989) examined 24 reorganizations involving 53 locally owned cooperatives in Minnesota from 1979 to 1984, and found consolidation of cooperatives only resulted in increased efficiencies in some cases. Specifically, their results show, over the long run, only 33% of the reorganizations were unqualified successes, as measured by the fact that the financial performance of the reorganized cooperative was stronger than the independent performance of either of the original cooperatives.

In a study of grain cooperatives, Crooks (2000) tracked the financial health of the cooperative businesses. He evaluated consolidations of 330¹ grain cooperatives which took place between 1993 and 1997, and concluded approximately two-fifths of the 291 cooperatives that stayed in the cooperative family could be described as financially sound.

Fulton, Popp, and Gray (1996), and Vandeburg et al. (2000a) examined factors influencing the successfulness of new business arrangements. They found successful new business arrangements require not only attention to the financial and operational components, but diligence in the interpersonal dynamics of trust, commitment, open communication, and having managers who work well together.

The research to date has focused on examining business restructuring after the reorganization has occurred. It is interesting to note that while cooperatives are restructuring to remain competitive in a changing business environment, the research

¹ Crooks reported that 367 cooperatives merged, consolidated, or otherwise went out of business between 1993 and 1997. His analysis focused on the 330 cooperatives with total sales of at least \$5 million and located in four principal grain-producing regions (Crooks, 2000, p. 15).

reveals less than half of the restructured businesses are financially successful. Therefore, the potential exists to significantly influence the future health of the cooperative business sector if insights can be gained concerning the factors being considered by cooperative managers when making restructuring decisions. Extension education programs can then be adapted to provide managers and board members of cooperatives appropriate financial and managerial education in order to improve their future decision making. Toward this end, we examine two questions in this study:

- What methods of valuation are cooperatives using when evaluating new business opportunities?
- What factors influence the methods of valuation preferred by cooperatives when evaluating new business opportunities?

Methods of Business Evaluation

Four common business evaluation methods, used in investment decision-making processes, are considered in this study: (a) payback, (b) simple interest rate (SIR), (c) discount or net present value (NPV), and (d) internal rate of return (IRR). The payback method relies on a simple method of calculating the amount of time it would take to recapture an initial cash outflow through a series of net cash flows, without incorporating the time value of money. The original investment is divided by the anticipated cash flows over the life of the project. The SIR is merely the inverse of the payback method, where the cash flows are divided by the original investment to provide an interest rate. Once again, the time value of money or the compounding of interest is ignored.

According to the finance literature, however, the NPV and IRR methods of evaluation are the preferred approaches for business evaluation since they incorporate the time value of money (Gallagher and Andrew, 1997). The NPV method discounts all future net cash flows at a predetermined investment rate that would be used by the business as a hurdle rate for new venture decisions. If the resulting dollar amount is positive, then the new venture would earn at least the specified rate of return and the project should be a "go," all else equal.

The IRR uses a similar approach, but calculates a rate of return that equates all net cash flows to zero. If this rate of return is equal to or greater than the rate of competing projects, it also is considered to be a good investment decision. Between the two methods, however, the NPV is the preferred choice by financial officers (Gallagher and Andrew, 1997) because the IRR assumes all cash flows will be reinvested at the interest rate determined for the project, which may not be the case. The IRR approach can also give inaccurate results when cash inflows are combined with cash outflows in the same calculation. Nevertheless, relative to those methods which do not use the time value of money, IRR is still a preferred choice.

Research Hypotheses

The cooperative businesses comprising this study are all viable business units of significant size, with 52% of them doing over \$15 million of sales in 1999. It is hypothesized that businesses of this stature will utilize the more effective evaluation methods, from the perspective of financial management. In addition, it is useful to note that all four methods of business evaluation are well known, and their relative merits have been described in financial textbooks for years. With respect to the first research question identified above, we hypothesize:

- **HYPOTHESIS 1.** *Cooperatives in general will prefer the NPV and IRR methods of evaluation, followed by payback and SIR.*

In order to test this hypothesis, summary statistics were used from the data set.

Our second research question considers what factors influence the methods of valuation preferred by cooperatives when evaluating new business opportunities. The cooperatives in the sample vary by size, financial health, and the degree to which they are adopting new technologies. It is expected that the larger cooperatives, those in a stronger financial position, and those which are more innovative, are more likely to be using the business evaluation methods that incorporate the time value of money (NPV and IRR). Specifically, we hypothesize:

- **HYPOTHESIS 2.** *The managers of those cooperatives that are larger in size, have a stronger financial position, and are more innovative will rate NPV and IRR higher (or more favorable). Consequently, ratings for payback and SIR will be lower (or less favorable).*

In order to test this hypothesis, independent logit models were estimated. Since NPV and IRR are the more effective methods of business evaluation from the perspective of financial management, a positive correlation is expected between the ratings of these measures and the performance of the cooperative. In this analysis, three measures of performance are utilized—size, financial strength, and innovativeness. The specific ways in which each of these measures is calculated are discussed below.

Description of Data

In-person interviews with the general managers of 35 locally owned agricultural supply and marketing cooperatives in each of Indiana and Colorado were conducted during May and June of 2000. To ensure consistency of the data collected, each interview used a standard survey instrument and was conducted by the same interviewer in each state. The managers were very supportive of the research and willing to share information about their cooperatives, resulting in interviews which averaged 90 minutes in length, but varied from 45 minutes to two and one-half hours.

The survey instrument contained five sections and requested information in a variety of areas. The relevant areas for this study included descriptive information about the cooperative, encompassing size of market territory, lines of business, number of members, and types of computer and electronic commerce being used. In addition, a series of questions were asked about the cooperative's financial performance, including level of sales, percentage of nonmember business, profits, and equity redemption program. Finally, information was collected concerning how the cooperative managers evaluated new business investment opportunities.

It was necessary to construct variables representing the cooperative size, financial strength, and innovativeness. Because size, financial strength, and innovativeness are multi-dimensional characteristics of cooperatives, it was necessary to aggregate over several variables to construct the variables used in the analysis. The development of these variables is described in detail in the text below, and summarized in table 1.

Four measures have been used to describe the size of a cooperative: sales, number of members, geographic area served, and number of different lines of business in which the cooperative is involved. Since cooperative size is multi-faceted, an aggregate variable was calculated for size and used in the empirical analysis. The determination of the aggregate variable was a two-step process. First, the cooperatives were grouped into the lowest one-third, middle one-third, and highest one-third for each of the variables of size, including: 1999 sales, number of members, number of counties the cooperative does business in, and number of lines of business. For example, a cooperative falling in the lowest one-third group for sales received a score of 1 for sales; similarly, a cooperative in the highest one-third for number of lines of business received a score of 3 for that category. At this stage, each cooperative had a score of 1, 2, or 3 for each of the four measures of size. The second step involved aggregating these scores. A cooperative received a score of 3 for *SIZE* if and only if it had a score of 3 for two or more of the four measures. Of the remaining cooperatives, those having a score of 2 (or higher) for two or more of the size measures received a score of 2 for *SIZE*. The remainder of the cooperatives received a score of 1 for *SIZE*.

An aggregation process, similar to the one described above, was performed to construct the variables for financial strength. The four variables used to describe a cooperative's financial strength were: level of profit in 1999, percentage of nonmember business, equity redemption, and sales expectations for the next five years. Profit is a commonly used measure of financial strength, and each firm was assigned a score for profit of 1, 2, or 3 based on which third it fell into. Nonmember business is an important factor for the financial strength of locally owned agricultural cooperatives in today's competitive environment since the traditional agricultural business base is eroding as the number of farms decreases. Each cooperative was assigned a score of 1, 2, or 3 based on which third it fell into with respect to the percentage of business conducted with nonmembers.

The cooperative's performance with respect to equity redemption was determined by asking managers to rate (on a five-point scale) how well their cooperative is doing

Table 1. Description of Variables and Summary Statistics

Variable Name	Description	Min, Max	Mean	Std. Dev.
<i>SIZE</i>	Aggregate variable for the size of the cooperative, constructed from 1999 sales, number of members, number of counties doing business in, and number of lines of business	(1, 3)	2.0	0.764
<i>FINSTR</i>	Aggregate variable for financial strength, constructed from 1999 profit, percentage of nonmember business, equity redemption, and sales expectations for next five years	(1, 3)	2.0	0.707
<i>INNOV</i>	Aggregate variable for level of innovativeness based on usage of computer and electronic commerce technologies	(1, 3)	1.9	0.781
<i>SIZEMED</i>	Dummy variable equal to 1 if the cooperative was in the medium size category as measured by the aggregate of four size variables	(0, 1)	0.414	0.447
<i>SIZELRG</i>	Dummy variable equal to 1 if the cooperative was in the largest size category as measured by the aggregate of four size variables	(0, 1)	0.314	0.467
<i>FINSTRMID</i>	Dummy variable equal to 1 if the cooperative was in the middle financial strength category as measured by the aggregate of four financial strength variables	(0, 1)	0.500	0.503
<i>FINSTRTOP</i>	Dummy variable equal to 1 if the cooperative was in the top financial strength category as measured by the aggregate of four financial strength variables	(0, 1)	0.242	0.431
<i>INNOVMID</i>	Dummy variable equal to 1 if the cooperative was in the middle innovativeness category	(0, 1)	0.385	0.490
<i>INNOVTOP</i>	Dummy variable equal to 1 if the cooperative was in the top innovativeness category	(0, 1)	0.271	0.447

in redeeming equity, compared to other cooperatives in the state. Ratings for equity redemption of 4 or 5 were assigned a score of 3 for equity redemption. Ratings for equity redemption of 1 or 2 were assigned a score of 1, and a rating of 3 received a score of 2. Scores for sales expectations for the next five years were calculated as follows. Those cooperative managers who expected sales to increase, stay the same, or decrease over the next five years received a score of 3, 2, or 1, respectively, for sales. The aggregate score for financial strength (*FINSTR*) was then calculated in the same manner as described above for *SIZE*. A cooperative received a score for *FINSTR* of 3 if and only if it had a score of 3 for two or more of the measures. For the remaining cooperatives, those having a score of 2 (or higher) for two or more of the financial strength measures received a score of 2 for *FINSTR*. The remainder of the cooperatives were assigned a score of 1 for *FINSTR*.

In this study, the level of innovativeness of the cooperative (*INNOV*) was determined by evaluating the business' use of computer and electronic commerce technology. The adoption of computer and electronic commerce technologies was used

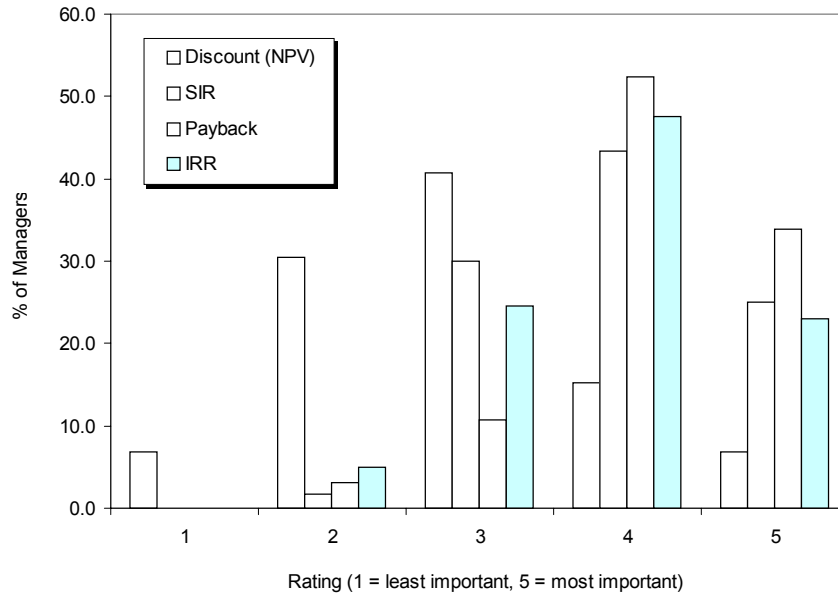


Figure 1. Cooperative managers' ratings of the four business valuation methods: NPV (discount), SIR, payback, and IRR

as the measure of innovativeness since, as noted by Vandeburg et al. (2000b), information and communications technology represents one of the major areas of change currently facing agribusinesses. During the interviews, each manager was asked to identify, from a list of 12 computer and electronic commerce technologies,² the ones that were used by the cooperative. Cooperatives in the top one-third with respect to the number of technologies used received a score of 3 for *INNOV*. Those in the middle and bottom one-third received scores of 2 and 1, respectively.

Alternative Methods of Business Evaluation: Descriptive Statistics

The first question addressed by this study is: What methods of valuation are cooperatives using when evaluating new business opportunities? To gain insight about this question, managers were asked to rate each of the four methods of business evaluation (NPV or discount, SIR, payback, and IRR) on a five-point Likert scale, with 1 signifying least important and 5 signifying most important. The results are summarized in figure 1, where the rating is measured on the horizontal axis and the

²These 12 technologies included: computerized billing, computerized accounting system, informational web page, receive orders via web page, use e-mail with farmer customers, use e-mail with input suppliers and end-users, electronic newsletter, place orders to suppliers via web, plant operations, Cardrol fuel pumps, GPS-monitored fuel tanks, and other.

percentage of respondents is measured on the vertical axis. As seen from figure 1, payback is the method rated highest by most of the managers, with over 30% of the managers assigning it a rating of 5 and over half assigning it a rating of 4. The least popular evaluation method is NPV (or discount), with 28% of the respondents assigning it a rating of 2. NPV (or discount) is the only evaluation method to which some managers actually assigned a rating of 1.

To gain further insight into how managers rated evaluation methods, correlations were performed. Table 2 presents the correlations for NPV, SIR, payback, and IRR. Because NPV and IRR both incorporate the time value of money, it was expected that the correlation of these ratings would be positive and large. Therefore the finding of a negative correlation between NPV and IRR was not expected, since these two valuation measures are very similar. As shown in figure 1, NPV (or discount) is the least preferred method of business evaluation by the cooperative managers. The general conclusion is that managers are making the most use of payback, followed by SIR and IRR. Given the rapidly changing agricultural environment and the need to remain competitive, these results are very interesting. Managers of locally owned cooperatives, in general, favor the evaluation methods that do not incorporate the time value of money. These results are in contradiction to hypothesis 1 identified above. One possible explanation for this finding is that managers do not understand the differences between these measures or their appropriate uses. Extension programming with a focus on capital budgeting decision making could promote improved reorganization decision skills, and ultimately the financial strength of the cooperative sector.

Given these unexpected results, as noted above, further analysis of the information from the interviews was performed—with attention turned to the responses given by managers to the open-ended question concerning the process (including whether they use consultants and how involved the board is in the process) used by the cooperative when making business investment decisions. The results are presented in table 3.

It is important to note, given the open-ended nature of the question, not all of the managers chose to respond. Information was obtained from 17 of the 35 managers of cooperatives in Colorado, and 30 of the 35 managers in Indiana. It was very common for the manager and a team of the key staff from the cooperatives to first evaluate business investment opportunities and then present the proposals to the Board of Directors for final approval. Ninety-six percent of those managers who provided a response indicated that the Board of Directors had final approval for major business investment decisions. These decisions involved a management team in all but seven of the 47 cooperatives. Six of the cooperatives utilized a committee from the members of the Board of Directors to analyze business investment opportunities. Just over one-half of the cooperatives utilize outside consultants to evaluate business investment opportunities. Ten of the local cooperatives obtain service from a regional cooperative.

Given that managers in general assigned a low rating to the evaluation methods which incorporate the time value of money, it is interesting to examine whether the

Table 2. Correlation Matrix for Cooperatives' Use of NPV, SIR, Payback, and IRR Evaluation Methods

Method of Evaluation	NPV	SIR	Payback	IRR
NPV (net present value)	1.00000	0.27837	0.01591	! 0.24450
SIR (simple interest rate)	0.27837	1.00000	0.26225	0.12054
Payback	0.01591	0.26225	1.00000	0.32423
IRR (internal rate of return)	! 0.02445	0.12054	0.32423	1.00000

Note: $N = 70$ locally owned agricultural supply and marketing cooperatives (35 Colorado, 35 Indiana).

Table 3. Cooperatives' Use of Management, Board Members, and Consultants in Evaluation of Business Ventures: Frequency Analysis

How Manager Evaluates Business Opportunities	Number of Responses	Percentage of Responses
Management Team	40	81.5
Board Committee	6	12.8
Board Approval	45	95.7
Outside Consultant	24	51.1
Regional Cooperative	10	21.3

Note: $N = 47$ managers of cooperatives (17 Colorado, 30 Indiana).

use of outside expertise (through a consultant or a regional cooperative) influences the ratings. Tables 4 and 5 present results according to whether the cooperatives used outside expertise (via consultants or a regional cooperative) when evaluating business investments.

The values reported in table 4 are the average values for the variables *SIZE*, *FINSTR*, and *INNOV*. Not surprisingly, the cooperatives using outside expertise are larger and are more innovative. In order to test whether cooperatives that use outside expertise are different in *SIZE*, or have a different financial situation (*FINSTR*), or are more innovative (*INNOV*), we conducted independent *t*-tests on the means of these variables. Based on the results of these tests (table 4), the equality hypothesis can be rejected for the variable *SIZE*, implying there is statistical evidence in the sample showing that the size of the cooperatives choosing to use outside expertise is statistically different from those cooperatives not using this expertise. The same finding is observed for the variable representing the cooperative's innovativeness (*INNOV*). In contrast, the level of financial strength (*FINSTR*) of the cooperatives using outside expertise is not statistically different from those that do not.

It is expected that the cooperatives utilizing outside expertise will favor NPV and IRR as methods of evaluation, since it is likewise expected that professional analysts will recommend the incorporation of the time value of money into business investment analysis. However, the results presented in table 5 do not support this

Table 4. Classification of Cooperatives that Did and Did Not Utilize Outside Expertise When Evaluating Business Investments (based on *SIZE*, *FINSTR*, and *INNOV* variables)

Variable ^a	Don't Use Outside Expertise	Use Outside Expertise	$\bar{X}(Use\ Exp)$	$\bar{X}(Does\ Not\ Use\ Exp)$	Reject H ₀ at $\alpha = 0.1$
<i>SIZE</i>	1.80	2.45		3.25	Yes
<i>FINSTR</i>	2.10	2.10		0.00	No
<i>INNOV</i>	1.80	2.17		1.68	Yes

Note: *N* = 70 cooperatives (35 Colorado, 35 Indiana).

^aThe highest value is 3.

Table 5. Classification of Cooperatives that Did and Did Not Utilize Outside Expertise When Evaluating Business Investments (based on business valuation method)

Business Valuation Method ^a	Don't Use Outside Expertise	Use Outside Expertise	$\bar{X}(Use\ Exp)$	$\bar{X}(Does\ Not\ Use\ Exp)$	Reject H ₀ at $\alpha = 0.1$
NPV	2.81	3.04		0.63	No
SIR	4.00	3.96		0.13	No
Payback	4.11	4.25		0.58	No
IRR	3.86	4.00		0.63	No

Note: *N* = 70 cooperatives (35 Colorado, 35 Indiana).

^aRated from 1 to 5, with 5 being the highest rating.

expectation. While some of the cooperatives that used outside expertise rated IRR higher, they also rated SIR and payback higher. Once again, the results are inconsistent with expectations. These observations are also supported by the results obtained from the independent *t*-tests conducted on the means of the NPV, IRR, SIR, and payback valuation methods. No statistical differences are found among these four budgeting techniques (table 5).

Methodology

Logit analysis was used to obtain insights into the second research question: What factors influence the methods of valuation preferred by cooperatives when evaluating new business opportunities? In this analysis, the dependent variable was assigned a value of 1 if the manager had a rating of 4 or 5, and a value of 0 otherwise.³ Four

³ The decision to use logit rather than multinomial logit analysis was based on the number of observations and the lack of diversity of the data. By using a logit analysis and having only two, instead of five possible values for the dependent variable, we were able to obtain meaningful results from the logit analysis.

logit models were estimated relating to the use of NPV, payback, SIR, and IRR methods in the evaluation of business opportunities.

The independent variables in the logit analysis are related to the size (*SIZE*), financial strength (*FINSTR*), and innovativeness (*INNOV*) of the cooperative. Because each of these variables is a discrete variable taking on a value of 1, 2, or 3, they were incorporated into the logit analysis as dummy variables. *SIZE* was represented by two dummy variables (*SIZEMED* and *SIZELRG*), with the smallest size category omitted. Financial strength was represented by two dummy variables (*FINSTRMID* and *FINSTRTOP*), with the smallest financial strength category left out. Similarly, two dummy variables (*INNOVMID* and *INNOVTOP*) were used to represent *INNOV*, with the lowest level of innovativeness omitted.

Empirical Model Specification

In order to model the factors affecting the rating of NPV, payback, SIR, and IRR as methods of business evaluation, the following logit model was empirically estimated for each evaluation method, with Y_i representing the cooperative's preference for using the four different budgeting techniques:

$$(1) \quad Y_i^{(c)} = \alpha_1 + \beta_1 \text{SIZEMED}_i + \beta_2 \text{SIZELRG}_i + \beta_3 \text{FINSTRMID}_i + \beta_4 \text{FINSTRTOP}_i + \beta_5 \text{INNOVMID}_i + \beta_6 \text{INNOVTOP}_i + g_i,$$

where
$$Y_i^{(c)} = \begin{cases} 1 \\ 0 \end{cases} \text{ if } Y_i^{(c)} = \begin{cases} > 0 \\ \neq 0 \end{cases},$$

and *SIZEMED*_{*i*} and *SIZELRG*_{*i*} represent, respectively, whether the *i*th cooperative scored in the middle or largest size categories. *FINSTRMID*_{*i*} and *FINSTRTOP*_{*i*} indicate whether the cooperative received a score of 2 or 3 for financial strength as described above. In a similar manner, *INNOVMID*_{*i*} and *INNOVTOP*_{*i*} represent whether the cooperative received a score of 2 or 3, respectively, for innovativeness. Notice the dummy variables corresponding to the low ends of the variables are dropped from the model specification to avoid the “dummy variable trap”—i.e., the coefficients obtained must be interpreted relative to the lower end or dummies excluded from the model.

Results

Equation (1) was estimated independently for each of the four evaluation methods of NPV, payback, SIR, and IRR. Logit regression results are reported in table 6. The overall lack of statistical significance for any of the estimations is evident. This may be due to the fact of having a cross-sectional data set. The equation for payback was the only one where the set of variables, as a whole, was statistically significant. In that equation the coefficients for *SIZEMED* and *FINSTRMID* were statistically

Table 6. Logit Regression Results

Variable	Business Valuation Method			
	NPV	Payback	SIR	IRR
Constant	! 0.176 (! 0.219)	! 0.475 (! 0.528)	0.305 (0.401)	! 0.273 (! 0.371)
<i>SIZEMED</i>	! 0.770 (! 0.852)	2.378* (1.882)	0.617 (0.846)	0.007 (0.010)
<i>SIZELRG</i>	0.542 (0.532)	! 0.262 (! 0.206)	! 0.249 (! 0.290)	0.300 (0.321)
<i>FINSTRMID</i>	! 1.456* (! 1.750)	1.989* (1.879)	! 0.351 (! 0.476)	1.285* (1.776)
<i>FINSTRTOP</i>	! 0.650 (! 0.706)	0.466 (0.433)	0.651 (0.687)	0.283 (0.339)
<i>INNOVMID</i>	! 0.507 (! 0.571)	1.836 (1.583)	0.446 (0.617)	0.241 (0.340)
<i>INNOVTOP</i>	! 0.162 (! 0.162)	1.000 (0.754)	0.617 (0.713)	1.144 (1.221)
% Correct Predictions	77.97%	89.23%	66.66%	75.41%
χ^2 (6 d.f.)	5.80	11.82*	3.97	6.61

Notes: An asterisk (*) denotes statistical significance at $\alpha = 0.1$ or below. Numbers in parentheses are *t*-values.

different from zero and had a positive sign. All of the coefficients, except for the constant, were positive in the equation for payback, suggesting larger cooperatives, cooperatives with a higher level of financial strength, and cooperatives that are more innovative are more likely to assign a high rating to payback. This finding is contrary to hypothesis 2 noted above.

In the remainder of table 6, only two other coefficients are statistically significant: *FINSTRMID* in the NPV equation and in the IRR equation. In the NPV equation, *FINSTRMID* has a negative sign, which is contrary to the original hypothesis. The coefficient in the IRR equation is positive, as expected.

Conclusions and Suggestions for Further Study

This study has addressed two questions: What methods of valuation are cooperatives using when evaluating new business opportunities? and What factors influence the methods of valuation preferred by cooperatives when evaluating new business opportunities?

With respect to the first question, it was hypothesized that cooperatives would be more likely to use net present value (NPV) and internal rate of return (IRR) as compared with the payback and simple interest rate (SIR) evaluation methods. The results contradict this first hypothesis (see figure 1 and table 2). Payback was found to be the most preferred method of evaluation, followed by SIR and IRR. NPV was the least preferred method of evaluation.

The second hypothesis, which followed from the second research question, was that cooperatives characterized by larger size, a higher level of financial strength, and more innovativeness are more likely to use IRR and NPV and less likely to use payback and SIR. The general lack of statistical significance suggests the second hypothesis can be neither supported nor rejected. These results raised some concerns about the methods managers are currently relying upon to make business investment decisions, and the reasons for these decisions.

The payback method may be the most popular among cooperative managers because it is very easy to understand. The manager simply gets an answer to the question: "When will I receive enough cash flow to pay for the initial investment or outflow?" Understanding discounting and time value of money can sometimes be difficult, and some managers would prefer to go with a "gut feeling" or a strategy they can more readily understand. The explanation for the preference of IRR over NPV may be that people simply understand percentages better than a "net present value" (Gallagher and Andrew, 1997).

Three possible factors may be contributing to the phenomenon of NPV being the least preferred method of evaluation. First, decisions about many new business ventures must be made very quickly, and managers may not have time to conduct an NPV evaluation. Second, cooperative managers may not understand how to perform a discounting calculation for NPV, and therefore find the entire process intimidating. Because of this, they do not have much confidence in the ending calculation—even if a professional consultant performed the calculation. Finally, some cooperative managers who do understand NPV evaluation may simply find it too complicated to explain to their Board of Directors and cooperative membership. It is important to remember that the Board of Directors and cooperative membership are farmers. Personal communications with agricultural lenders in Indiana revealed that farmers are not using discounting when evaluating their own business opportunities. Thus, one would not expect these farmer members to embrace NPV analysis at the cooperative level.

The results reported here highlight an opportunity for educational programming for cooperative managers and directors around the country. First, cooperative managers and directors could benefit from educational programming which illustrates the role of each of the four evaluation methods examined in this study—NPV, payback, SIR, and IRR. Second, workshops designed to assist cooperative managers and directors in setting up these types of analyses in a spreadsheet format would be very beneficial. If directors and managers left one of these workshops with a template that they could insert numbers into the next time they had a project to evaluate, there is a very good likelihood they would begin to employ more effective evaluation techniques.

Finally, there is an opportunity for further study and analysis that could be accomplished by surveying bankers across the country, from both CoBank and investor-oriented banks. In this survey of loan officers, information could be collected concerning what types of analysis they require before approving loans to locally owned cooperatives and what practices are commonly undertaken. In this way, further support for proper budget evaluation could be documented.

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