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Abstract

Questionnaires were mailed to cooperatives in the mid-western states of the U.S. and selected provinces in Canada to evaluate the impact of type of organization and level of competition on the choice of cooperative pricing and payment methods. Traditional marketing cooperatives are more likely to choose the "spot market cash price" for payment to members and are more responsive to increased competition in commodity markets. New Generation Cooperatives are more likely to choose a "pooled" price, and appeared indifferent to short run increased competition in commodity markets. The type of cooperative has an impact on the pricing and payment methods used to pay for commodities supplied by members of the cooperative. The reasons for these differences may be rooted in the competitive pressures which these cooperatives face, the degree of processing that they undertake, and the goals of their membership.

Agricultural cooperatives are owned and controlled by users for their own benefit. Two main economic rationales are provided for the formation of agricultural marketing cooperatives. These reasons are to counter the economic ramifications of excess supply variability related to prices and to counteract the opportunistic behavior of commodity buyers (Schrader 1989; Torgerson, Reynolds, and Gray 1998). Although traditional cooperatives are believed to correct the problem associated with market failure, they face an internal incentive problem. These incentive problems are created by the open membership policy of cooperatives and by an imbalance between level-of-equity capital contribution and level of patronage by members. These internal incentive problems discourage cooperative members from investing in their own cooperatives, which in turn precludes cooperatives from engaging in capital-intensive ventures (Cook 1995). To address the internal incentive problem of traditional marketing cooperatives, an alternative type of cooperative organization emerged. These cooperatives, known as "New Generation Cooperatives" (NGCs), typically have a closed membership policy, and the level of patronage and equity capital contribution are closely tied together.

These NGCs may engage in marketing, production (Poray and Ginder 1999), or other joint activities. Marketing NGCs are claimed to engage in a greater level of processing activities than traditional marketing cooperatives (Stefanson and Fulton 1997; Harris, Stefanson, and Fulton 1996). Harris, Stefanson, and Fulton (1996) suggest that marketing type NGCs have delivery

contracts as one of their key features, which allows the NGCs to deter opportunistic behaviour of members through the contracting of delivery rights. This fact still leaves unresolved the issue of pricing product delivered to the cooperative. Royer and Bhuyan (1993) conclude from a three-stage market model that assembler-type cooperatives that engage in profit sharing agreements via formula price contracts with downstream processors will be forced to restrict producer output. Royer and Bhuyan (1995) extend the three-stage model and determine that forward integration of the cooperative requires that the cooperative restrict the raw product output of its members. If the cooperative cannot restrict delivery through non-price means then the cooperative's optimal actions are to act as a competitive firm. Formal empirical work exploring these pricing issues has been limited.

Pricing of and payment for product supplied by members could be one important aspect of member satisfaction, which will affect commitment to the cooperatives. Type of pricing and payment practice may dictate the timing and distribution of benefits and risk between members and cooperatives (Cobia 1989). Maintaining the members' commitment without jeopardizing the economic viability of cooperatives is important for the survival of any type of cooperative. This study seeks to identify important factors that affect the cooperative's choice of a particular type of pricing and payment practice by conducting a survey of producer marketing cooperatives in Canada and the United States. Additional issues examined are the relationship between pricing policies and further processing activities of the firm.

Background

Traditionally, marketing cooperatives pay the spot market cash price at the time of commodity delivery or delay full payment until costs and return are determined (pooling) (Cobia 1989). In such a spot market, cooperatives pay a market cash price and take title to commodity delivered by members. These products are then processed and sold. Net income remaining after expenses is refunded to members. The policy of cash payment at delivery is perceived to be common when producers have several marketing alternatives and producers have a strong time preference for cash (Cobia 1989). When cooperatives pay spot market cash price at the time of commodity delivery, member's risk from commodity price changes is reduced, because members get the full price of their commodities at the time of delivery. However, the cooperative bears the risk of operating deficits due to price risk in the output market. The cooperative may be able to manage this price risk through the use of future markets or other contracting opportunities. Cooperatives may still need to maintain more working capital under these pricing schemes, especially those engaged in processing

ventures where there is a significant time delay between the payment for inputs and the receipts from the processed output.

Pooling is a delayed-payment scheme often involving signed-marketing contracts (Cobia 1989). Farmers sign marketing contracts with the cooperative whereby the producers guarantee delivery of commodities to the pool. The contract transfers authority over marketing decisions to the cooperative. An initial advance is paid to members upon delivery of the product. One or more progress payments may be made as the product is processed and sold out of inventory. When cooperatives arrange payment through a pooling mechanism, the cooperative's risk of operating deficit due to price risk in the output market is lowered. However, the producer member faces uncertain return because a considerable time lag may exist between the commodity delivery and realization of final returns.

Besides pooling and spot market cash price methods, other pricing and payment options that may be available to cooperatives include: "Fixed Forward Price Contract", "Guaranteed Minimum Price Contract", "Basis Contract" and "Hedge-to-Arrive Contract". Under a fixed forward price contract, members agree to deliver a commodity at a specified time in the future for a pre-specified price. The minimum price contract involves the producer contracting to deliver a quantity of commodity of a certain quality within a specified time frame at a guaranteed minimum price. The member and the cooperative agree upon how many cents below or above a selected futures contract the final selling price will be set for a basis contract. The hedge-to-arrive contract can be thought of as a type of forward-pricing alternative whereby the basis will be locked in at a future date. These different contracts may have different impacts on the distribution of benefit and risks between members and cooperatives. The amount of product a member is allowed to deliver may be restricted or unrestricted under any of these pricing scenarios

Traditional marketing cooperatives are usually characterized by having an open membership policy and accept unlimited quantities of commodity from their members. Further claims are made that they engage in low levels of further processing activity. Members are not obliged to deliver to their cooperatives. To acquire sufficient volume for efficient utilization of marketing and handling facilities, traditional marketing cooperatives may have to match the pricing and payment alternatives offered by rival firms. They may also have to offer pricing and payment practices that pass on immediate benefits to producers and reduce member's risk and uncertainty of return.

NGCs are characterized by a closed member policy. In order to patronize NGCs, producers often purchase delivery rights. Each unit of delivery rights allows a member to supply a specified quantity and quality of product to the cooperative. These delivery rights are equivalent to stocks in a capital market,

which can be traded with other producers. The total delivery rights are determined according to the size of the business. Through these delivery rights, NGCs may have already arranged the total quantity of commodity required for their processing plant. Therefore, they need not worry about their rival's short run pricing and payment practices. However, some issues may arise with member failure to deliver if market prices become extremely high. The incomes of NGCs that have relatively high levels of further processing are determined much later than the time of delivery of the member's product. Thus, it is hypothesized that different cooperative organization structures have impacts on a cooperative's choice of pricing and payment alternatives.

Optimal conditions for quantity purchased and price paid to members may vary with different market structures and cooperative objectives. With an open membership policy, cooperatives may need to match the pricing and payment policies of other firms in order to acquire sufficient volume of commodities. Alternatively, with closed membership structure, cooperatives may have already arranged the total commodity requirement for their processing facilities, so they need not match the short-run offers of other firms to acquire additional input commodity. Therefore, the hypothesis is that traditional marketing cooperatives are more responsive to change in the level of competition in the member's market.

The Questionnaire and Survey Methodology

The survey questions were designed to elicit information on whether these organizations were traditional cooperatives or NGCs and what type of product delivery payment policy they employed. Opened-ended and close-ended questions asked related to the following items:

- Type of membership policy
- Equity ownership and transfer rules
- Member delivery options such as open delivery or fixed quantity delivery
- Level of competition in input and output markets
- Ranking of payment alternatives preferred by the cooperative
- Business factors that influence the choice of member pricing and payment schemes (Likert Scales)

Six pricing and payment alternatives for the ranking question were identified prior to sending out the survey. These alternatives were spot market cash price, pooled price, fixed forward price contract, guaranteed price contract, basis contract and hedge-to-arrive contract. The alternative "other" was included as a default option. Respondents were asked to rank these alternatives according to the most commonly used alternative in their cooperatives.

The Likert scale, included in a group of questions in this survey, is widely used in the measurement of attitudes, attitude differences, brand image, store

image, and other similar phenomenon in marketing research (Menezes and Elbert 1979). It detects the intensity of feeling that respondents have about their attitudes (Albaum 1997). For example, Fulton and Adamowicz (1993) used a 5-point Likert scale to investigate the factors influencing members' commitment to their cooperative.

Managers and board-of-director members are the primary decision makers in choosing a particular type of pricing and payment practice. These individuals were designated as the target group for the mail survey instrument. Over three hundred marketing cooperatives in the U.S. and Canada were identified from various sources. Cooperatives from U.S. mid-western states were selected, because these regions have experienced the formation of many NGSs. For Canada, cooperatives from Alberta, Saskatchewan, Manitoba, British Columbia, and Ontario were selected. From an initial telephone contact, one hundred and ninety-five (195) cooperatives agreed to participate in the survey. In the third week of January 2000, questionnaires were mailed to those cooperatives. A follow-up telephone call was made in the last week of February. Useable responses were provided by eighty-four (84) cooperatives.

Analytical Framework

Four (4) statistical methods were employed to analyze the data where appropriate. Mean score comparison and factor analyses of the Likert scale questions were undertaken. Multinomial-logit analysis and rank-logit analysis were employed to analyze the ranking questions on the choice of member pricing and payment policy. Responses to other questions in the survey were graphed or placed into tables to evaluate the responses.

Factor analysis is a method of transforming the original variables into new, non-correlated variables, called factors. The essential purpose of factor analysis is to describe the variation among many variables in terms of a few underlying but unobservable random variables called factors. Factor analysis was applied in this research to the scaling questions (Jobson 1992). For example, Hind (1999) uses factor analysis to evaluate perceptions of cooperative business objectives from cooperative members and employers in the UK. An important strength of exploratory factor analysis is that it can identify the underlying constructs in the data and can reduce the number of variables to a more manageable set. The determination of the number of factors, their interpretation, and the rotation involves subjective judgement.

One output of most factor analysis is factor scores. Factor scores reduce the number of variables used in subsequent analysis, and it may be appropriate to work with the factor scores instead of original variables (SPSS 1999). Factor score estimates are included as independent variables in one of the probability models described below.

Probability models were employed to estimate the probability of cooperatives ranking their member pricing alternatives as number "1" or the probability of choosing the alternative as the most preferred one. The probability of choosing a particular pricing and payment alternative as the most common practice by cooperatives can be estimated using the multinomial logit model (MNL). This MNL model is represented as:

$$\Pr(j) = \frac{\exp(\beta_j^{'} X_i)}{1 + \sum_{k=1}^{3} \exp(\beta_k^{'} X_i)} \text{ for j=1,2,3} \qquad (1)$$

(Greene 1997) where *Pr(j)* is the probability of the cooperative's choice of a particular pricing and payment practice, as the most common method *j*; X_i represents a set of demographic variables of cooperatives; and β_k is a vector of unknown parameters. The estimated coefficients ($\beta's$) from expression (1) represents the relative movement between a pair of choice outcomes.

Respondents were asked to rank the given alternatives, so dependent variables are not inherently ordered. Ben-Akiva and Levine (1992) argue that if the choice behavior underlying each rank position satisfies Luce's Choice Axiom, the probability of a ranking can be easily linked to the choice probabilities. The ranked multinomial logit (RL) model provides the appropriate method for observing the rank order of alternative 1 being preferred to alternative 2, alternative 2 preferred to alternative 3, and so on. This is given by the product of J-1 ordinary multinomial logit likelihood functions (Ben-Akiva and Levine 1992; Layton 2000):

$$P_i(1,2,....,J \mid \beta) = \prod_{j=1}^{J-1} \frac{\exp(\beta_j ' X_i)}{1 + \sum_{k=j}^{J} \exp(\beta_k ' X_i)} \qquad (2)$$

Demographic variables such as open or closed membership polices and factor scores were used as the independent variables in the probability models. The ranking data on the choice of pricing alternatives were converted to choice data for the MNL by coding the most commonly practiced pricing method used by the firm received one (1) and all other choices were zero (0). The "Guaranteed Minimum Price", "Basis Contract" and "Hedge-to-Arrive Contract" merged into the "Other" category for the MNL models due to their relatively lower ranking and "Other" was used to normalize the MNL model (Huang and Fu, 1995). The responses on "Basis Contract" and "Hedge-to-Arrive Contract" alternatives were merged into the "Other" category to normalize the RL models.

Results and Discussion

Key conclusions from the analysis of the various demographic questions and mean score analysis are summarized here without supporting evidence provided. Results from the exploratory factor analysis and probability models are presented in more detail.

From the frequency analysis of responses on various survey questions, cooperatives with one or more key features associated with NGCs have been in existence for a shorter time period. Cooperatives possessing NGCs characteristics are smaller in member size and are engaged in processing activities to a greater extent than cooperatives possessing characteristics of traditional cooperatives. Debt is the major source of capital for all cooperatives; however, cooperatives with the characteristics of NGCs are more often relying on required equity purchase and entry fees than are cooperatives with the characteristics of traditional cooperatives. Cooperatives with the characteristics of NGCs are doing business in markets with fewer competitors than are cooperatives with the characteristics of traditional cooperatives. A greater proportion of cooperatives with NGCs characteristics sell their output through some kind of contractual arrangements, such as price or volume contract or both. Pooling is the most common pricing and payment practice of cooperatives with the characteristics of NGCs, whereas spot market cash price is the most common practice of cooperatives with the characteristics of traditional cooperatives.

Table 1 summarizes the results from one group of scaling questions used in the survey that requested respondents to rate the importance of different factors in determining the cooperatives choice of member pricing and payment policy. Avoiding an operating deficit or treating members fairly were issues that had the highest mean scale response. This group of questions was segmented to compare cooperatives with Canadian versus U.S. origin; open vs. closed membership; fixed-quantity vs. unlimited-quantity commodity delivery contracts; or transferable vs. nontransferable equity stocks. None of the variables under consideration were significantly different between cooperatives of Canada and the U.S. Cooperatives with the characteristics of traditional marketing cooperatives placed greater importance on matching the competitors' pricing and payment policy, meeting competition in output markets, and encouraging members to deliver to their cooperatives. Whereas, cooperatives with some or all of the characteristics of NGCs gave more importance to reducing the risk of operating deficits and member's uncertainty of return, and treating all members equally.

Table 1. Mean and Standard Deviations of Scores of Importance to Choice of Pricing and Payment Alternative

Variables[1]	Mean[2] (N=83)	Standard Deviation
Matching the rivals' pricing and payment practices	3.8	1.1
Managing work cooperatives' working capital	3.5	1.2
Presence of competitor in output market	3.7	1.0
Encouraging members to deliver to their cooperative	3.4	1.3
Members' cash flow management	3.0	1.1
Avoiding cooperatives' risk of operating deficit	4.0	1.1
Reducing members' uncertainty of return	3.1	1.1
Maintaining target rate of return	3.6	1.1
Equal treatment of members	4.2	1.0

1. Nineteen (19) Canadian and sixty-five (65) U.S. cooperatives provided usable survey responses although not every section of the survey was completed by each respondent.
2. Mean scores measured in 1-5 scale. 1 indicates variable is "Not Important at All" and 5 indicates "Very Important" in determining or influencing the pricing and payment policy employed by the cooperative.

Common factor analysis was applied to the scaling questions on rating the importance of various issues in determining a cooperatives choice of payment policy and sixty-eight (68) percent of the variance (communality) is explained by the four (4) factors retained. The rotated factor loadings, sorted to according to their absolute value, are in Table 2. The factors were interpreted as:

1. Factor 1: Risk and return for members and cooperatives
2. Factor 2: Market environment factor
3. Factor 3: Member incentive to deliver
4. Factor 4: Working capital management

Table 2. Rotated[1] Factor Loading Matrix and Communality From Common Factor Analysis Of Scaling Questions (N=82).

Question Used for Scaling[2]	Factor 1	2	3	4	Communality
Reducing member's uncertainty of return	**0.83**	0.07	-0.04	0.11	0.70
Maintaining target rate of return	**0.73**	0.39	0.05	0.14	0.70
Cooperative's risk of operating deficit	**0.72**	-0.02	0.42	0.08	0.71
Matching Rival's pricing/ payment policy	0.18	**0.85**	0.00	-0.10	0.76
Presence of competitor in output market	0.06	**0.80**	0.13	0.15	0.69
Member's cash flow management	0.21	0.01	**0.79**	0.33	0.73
Encouraging member to deliver in coop	0.02	0.34	**0.68**	-0.43	0.88
Managing cooperative's working capital	0.34	0.34	0.29	**0.61**	0.59
Equal treatment of members	0.12	-0.05	0.10	**0.59**	0.36

1. The varimax method of rotation along with the eigen-value equals one criteria was used to eliminate factors with low explanatory power (Jobson 1992; Aaker Kumar, and Day 1998)
2. For each question, the respondent provided a rating from 1 to 5 with 1 indicating the cooperative considered this unimportant and 5 indicating this was very important in influencing their choice of payment alternative to their members.

Results are reported for one MNL model (Model 1) and one RL model (Model 2). The variable definitions are found in Table 3. The MNL model predicts the cooperative's choice of the most common pricing and payment practices based on the various demographic characteristics of cooperatives and variables related to the degree of competition in the commodity market. Model 2, the RL model, predicts cooperative's ranking of pricing and payment practices. This model provides an example of results when the factor scores derived from the factor analysis above are also included as independent variables. Models were also estimated that included a country variable but the impact of country was not significant.

Table 3. Definitions of Independent Variables and Their Codes in Probability Models.

Independent variable	Definitions
Year of operations	Number of year of operations
Membership	If open membership=1 If closed membership=0
Transferability of equity stocks	If transferable then variable=1 If not transferable the variable=0
Processing activities	Variable indicating proportion of total commodity processed by the c-operative
Number of competitors in commodity markets	Variable indicating the number of rival firms.
Commodity delivery contract with member	If fixed quantity allowed for delivery then variable=1 If unlimited quantity then variable=0
Risk-return of members and cooperatives	Factor scores 1
Market environment in commodity and output market	Factor scores 2
Member incentives	Factor scores 3
Management of working capital	Factor scores 4

The log-likelihood ratio test and the pseudo R-squared of 0.20 indicate that the results of model 1 are statistically valid (Table 4). Membership policy has a statistically significant impact on the choice of pooling as a price alternative by the cooperative. Types of commodity delivery contract, fixed quantity or open delivery, have a significant effect on the choice of the spot market cash price and fixed forward price. Similarly the transferable equity stocks and number of competitors have a significant impact on the choice of fixed forward price and spot market cash price respectively. Results from model 1 corroborate the fact that the type of cooperative organizations significantly affects the choice of pricing and payment practices.

Table 4: Multinomial Logit Model 1 on Choice of Pricing Policy (N=78)

Variables	Spot cash price		Pooling		Fixed forward	
	Coefficients	T-Ratios	Coefficients	T-Ratios	Coefficients	T-Ratios
Years of operation	-0.008	-0.55	0.02	1.40	0.003	0.20
Membership policy	0.35	0.28	-2.63**	-2.00	-1.01	-0.82
Commodity delivery contract	-4.06**	-2.38	-2.36	-1.61	-3.66**	-2.35
Transferability of equity stocks	1.45	0.98	0.85	0.62	2.46*	1.76
Proportions of commodity processed	-0.82	-0.68	0.81	0.74	0.05	-0.40
Number of competitors in commodity market	0.45*	1.84	0.41	1.74	0.40	1.70
Log likelihood ratio test Statistic					44.12*	
Pseudo R^2					0.20	

* Statistically significant at 10% level of significance
** Statistically significant at 5% level of significance

The log-likelihood ratio test and the psuedo R-squared of 0.38 indicate that the estimates from model 2 are statistically valid (Table 5). The ranked logit model estimates show the membership variable is significant in relation to the choice of a spot market cash price, fixed-forward price contract and pooled price policy. The commodity delivery contract variable is significantly associated with a fixed forward price and a guaranteed minimum price. The number of competitors in a member market significantly impacts the choice of pooling and guaranteed minimum pricing policies. The risk and return perception variable, a factor score based on the results shown in Table 2, is significantly associated with the spot market cash price and guaranteed minimum price. This result is consistent with a priori expectation. With the increased importance of risk and return, cooperatives either have to pay spot market cash price at the time of delivery or guarantee a minimum price to members.

These results from the probability models implicitly support the hypotheses proposed for this study, although it is premature to explain the direction of support based upon the sign of the coefficient estimates. The sign and magnitude of coefficients estimated from these probability models do not necessarily indicate an increase or decrease in the probability of choosing the j^{th} alternative (Huang and Fu 1995). Marginal analysis is used to determine the direction of response. However, several variables in the models are measured in terms of dummy variables (0's and 1's). Taking the partial derivative of the model with respect to a dummy variable tends to overestimate the marginal effect (Liao, 1994). Measurement of the change choice probabilities is accomplished by measuring the changes in the predicted probability of a representative

cooperative, when the characteristics (X_k) is equal to 1 and when it is equal to 0 (Liao 1994). The MNL model 1 is used to explore the marginal responses.

Table 5. Ranked Logit: Model 2 on Ranking of Pricing Policies (N=76)

Variables	Spot cash price	Pooling	Fixed forward price	Guaranteed minimum price
	Coefficients	Coefficients	Coefficients	Coefficients
Years of operation	-0.02*	0.02	-0.001	-0.01
Membership policy	5.59***	-2.97*	2.84***	-0.02
Commodity delivery contract	-1.09	1.34	-2.41*	3.40**
Transferability of equity stocks	-0.10*	0.38	3.13***	-1.17
Proportions of commodity processed	-0.72	2.76**	-1.39	-0.49
Risk return of members and cooperatives	1.11***	0.20	-0.26	1.55***
Market environment in commodity and output market	-0.67	1.96***	-0.83	-0.43
Member incentives	-1.12***	0.64	-0.13	0.46
Management of working capital	0.66	-0.63	0.013	1.36**

Log likelihood ratio tests : 93.0***
Pseudo R-square 0.38
* Statistically significant at 10% level of significance
** Statistically significant at 5% level of significance
*** Statistically significant at 1% level of significance

The profile of a "representative traditional cooperative" is retained as the base case as shown in Table 6. The "representative cooperative" represents the characteristics of the majority of cooperatives with traditional traits. Table 7 shows the predicted and marginal probabilities from the base-case profile of traditional marketing cooperatives using the MNL coefficient estimates from Table 4 when one variable is changed at a time. If a cooperative shifts its policy of open membership to closed membership, keeping all other variables at base-case levels, the choice probability of using the spot market cash price decreases by –0.42. The choice probability of choosing a pooling price alternative increases by +0.52. Shifting its policy of open membership to closed membership, keeping all other variables constant, the cooperatives are more likely to choose pooling practices. If a traditional cooperative changes its policy from accepting any quantity of commodities to accepting a fixed quantity of commodities, the cooperatives are less likely to choose spot market cash price. With the entry of one additional firm into the commodity market, the probability of choosing the spot market cash price increases the most. With the increased number of commodity buyers, the cooperative may have to bid to match offers made by rival firms or may have to pass on immediate benefits in order to acquire sufficient volumes of commodity. The analysis of the results from the models indicates that open versus closed membership is the key variable driving the choice between spot or pooling payment policy.

Table 6: Profile of Representative Traditional Cooperatives.

Independent variables	Level for base case scenario for representative traditional cooperatives	Change in level
Membership policy	Open (1)	Closed (0)
Commodity delivery contract	Any quantity (0)	Fixed (1)
Transferable equity stocks	Non-transferable (0)	Transferable (1)
Years of operation of cooperative	61.29 years*	62.29 years
Proportions of commodity processed	24.91 %*	25.91 %
Number of rival firms in commodity market	Six	Seven

Figure in parenthesis is dummy variables.
* Mean value of open cooperatives.

Table 7: Predicted and Marginal Probability from MNL Model 1 Versus: Base Case Profile Of Choice of Pricing Policy

Variables	Spot Cash Price	Pooling	Fixed-Forward Price	Other
Base case scenario probability of choice by representative traditional cooperatives[1]	0.52	0.20	0.24	0.05
Changes to the predicted probability when one of independent variables is changed in the base scenario, ceteris paribus, where:				
Years of operation are increased by one year from mean value of (61.29).	0.51 (-0.005)	0.20 (0.004)	0.24 (0.0005)	0.05 (-0.00004)
Membership is changed from open to close.	0.10 (-0.422)	0.72 (0.522)	0.17 (-0.064)	0.013 (-0.036)
Shifts the policy of accepting any quantity to fixed quantity of commodity	0.11 (-0.4101)	0.22 (0.027)	0.073 (-0.162)	0.59 (0.545)
Shift non-transferable equity stocks to transferable	0.40 (-0.115)	0.08 (-0.113)	0.50 (0.268)	0.01 (-0.040)
Proportions of commodity sold in processed form is increased by 1% from mean value of 24.91%.	0.52 (-0.003)	0.20 (0.002)	0.24 (0.0005)	0.05 (0.0001)
Number of rival firms in commodity market is increased to 7 from the base case of 6.	0.54 (0.023)	0.20 (-0.002)	0.23 (-0.003)	0.03 (-0.017)

1. Probabilities in each row may not sum to 1 due to rounding. Numbers in parenthesis are the marginal probability.

The MNL model can also be used to predict the most likely pricing alternative used by cooperatives with different attributes. In summary, the results from Table 8 indicate that when members deliver to traditional marketing cooperatives, they are more likely to be offered the spot market cash price by cooperatives. The members are more likely to be offered pooled price when producers shift their commodity delivery from traditional marketing cooperatives to new generation cooperatives. This result is also consistent with claim of Harris, Stefanson and Fulton (1996) that pooling has been a distinct pricing and payment practice in NGCs. By paying a pooled price, new generation cooperatives can avoid an operating deficit and reduce pressure on working capital.

Table 8: Effect of Change in Type of Cooperative Structure on Choice Probability of Different Pricing and Payment Alternatives Using MNL Model 1

Pricing and payment practices	**Predicted probability**	
	Traditional cooperative (Open member, unlimited quantity, non-transferable equity and no processing)	**New Generation cooperative (Closed membership, fixed quantity, transferable equity and with processing)**
Spot market cash price	0.62	0.01
Pooled price	0.12	0.79
Fixed Forward Price	0.21	0.16
Other	0.05	0.04

Conclusions

The distinguishing characteristics of NGCs and traditional cooperatives such as type of membership policy, commodity delivery contract, and transferable equity stocks have a statistically significant impact on a cooperative's choice of pricing and payment practices. Similarly, the level of competition in the commodity market also has a significant impact on a cooperative's choice of pricing policy. These results provide empirical support for the theoretical models developed by Royer and Bhuyan (1995) and for the claim that certain cooperative features such as closed membership or fixed delivery quantities are associated with more processing activities.

The finding that cooperatives with features associated with traditional marketing cooperatives are more likely to choose the spot market cash price while cooperatives with policies similar to NGCs are more likely to choose pooling practices appears rooted in the business environment in which each operate. This suggests that traditional cooperatives and NGCs are likely to develop in environments that differ in the type of commodity, the competitive environment, and the degree of processing that can be undertaken by the cooperative.

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