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Factors Affecting Choice of Pricing and Payment Practices by Traditional Marketing and New Generation Co-operatives.

By

RAJENDRA KUMAR GURUNG 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirement for the degree of MASTER of SCIENCE

IN

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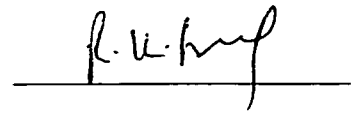

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Abstract

This study examines the factors affecting choice of pricing and payment practices by traditional marketing and new generation co-operatives for commodities delivered by their members. These factors include the demographic variables related to type of co-operative organization, level of competition in commodity market, and risk-return perceptions of members and co-operatives.

Data for the analysis were obtained through a mail survey. Questionnaires were send to one hundred and ninety five (195) co-operatives in mid-west states of the U.S.A. and Canada. Altogether 93 co-operatives responded to the survey. Mean score analysis, factor analysis and multinomial logit analysis were done.

The results indicate that traditional marketing co-operatives are more likely to choose spot market cash price, while new generation co-operatives are more likely to choose pooling practices. Traditional marketing co-operatives appear to be concerned about the members' cash flow needs and members' uncertainty of return; they are also more responsive to increased competitive level in commodity market. Where as new generation co-operatives are more concerned with avoiding the risk of co-operatives' operating deficits and survival of co-operatives.

UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitle FACTORS AFFECTING CHOICE OF PRICING AND PAYMENT PRACTICES BY TRADITIONAL MARKETING AND NEW GENERATION CO-OPERATIVES submitted by RAJENDRA KUMAR GURUNG in partial fulfillment of the requirements for the degree of MASTERS OF SCIENCE in AGRICULTURAL ECONOMICS.

Dr. J. Unterschultz (Supervisor)

Dr. K. Chen

Dr. W. V. Wismer

Date: September 29 /2008

DEDICATION

I dedicate this thesis in loving memory of my late grand mother.

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CHAPTER 1: INTRODUCTION

1.1 Background

Agricultural marketing co-operatives are developed by farmers as a self-help business firm model to move product to market and influence price and other terms of trade while providing fair treatment and other benefits to members. These traditional marketing co-operatives are owned and controlled by member producers for their own benefits. At the global and national level, agri-industry is being transformed into capital-intensive, value-added and more market-driven businesses. At the same time, farm production has become more specialized, financing requirements for production have increased, and direct government support has been reduced in Canada. Although traditional marketing co-operatives are believed to ameliorate the negative economic impact of market failure, they are facing the *internal incentive* problem, which discourages members from investing in their co-operatives. These internal incentive problems are created by the "vaguely defined property right" structure in traditional marketing co-operatives. Cook (1995) asserted that the inability to generate sufficient equity capital from members severely constrained the co-operatives' ability to engage in capital-intensive and value-added ventures.

During the early1990's, with the concerted efforts of a number of key players committed to the growth and development of rural economies, the new wave of producer owned co-operatives emerged in the northern mid-west of the U.S.A. These new co-operatives are named "New Generation Co-operatives" (NGCs). They are believed to ameliorate internal incentive problems associated with traditional marketing co-operatives in generating equity capital and enable producers to capture a greater portion of consumer expenditure (Harris et al. 1996). Although these NGCs were able to solve the internal incentive problem associated with vaguely defined property right structure in traditional co-operatives, maintaining the member commitment is vital for survival of NGCs as well as traditional marketing co-operatives.

Pricing of commodities and methods of payment for a commodity delivered by members is one important aspect of a co-operative's business related to member's satisfaction and commitments. Because pricing and payment practices dictate the timing

and distribution of benefits, these affect the welfare of members and their commitment to co-operatives. New generation co-operatives are mostly engaged in value adding processing ventures; final returns will be realized only after the disposal of final outputs. Considerable time lag may exist between commodity delivery and realization of returns by members. In such a situation, assuring the higher returns and minimizing the co-operative's risk of an operating deficit is crucial for the survival of co-operatives.

Co-operatives, either NGCs or traditional, have to secure sufficient volume of commodities for efficient utilization of their handling, marketing and processing facilities. In a typical agricultural market, co-operatives are not the sole business firm. There exist other co-operatives and investor oriented firms (IOFs) that compete with a co-operative's businesses. In order to maintain the commitment of members and prevent them from leaving co-operatives, co-operatives have to take into consideration the pricing and payment practices of their competitors while choosing their own pricing and payment practices.

This study seeks to identify the factors affecting co-operative's choice of particular pricing and payment practices with the members. It also aims to investigate any differences in payment and pricing practices between new generation co-operatives and traditional marketing co-operatives.

1.2 Research Problem

Members' commitment is key to the survival of any co-operative business. There are various factors, which affect the members' commitment to their co-operatives. Pricing and payment contracts between members' and their co-operative for commodity supplied by members could be one aspect of members' commitment. Because pricing and payment practices dictate the timing and distribution of benefits, this affects the welfare of members and their commitment to co-operatives.

Traditionally, marketing co-operatives have been paying the spot market cash price at the time of commodity delivery or delaying payment until costs and return are determined; i.e., pooling (Cobia 1989). When co-operatives pay spot market cash price at the time of commodity delivery, member's risk of commodity price will be reduced, but the co-operative bears the risk of operating deficits due to price risk in the output market.

Co-operatives also need to maintain more working capital under this scheme. Torgerson et al. (1998) reported that some new generation co-operatives (NGCs) in the Mid-West of U.S.A. had experienced operating deficits by paying the market price at the commodity delivery time. Income received from final product sales was not sufficient to cover the price paid to members. Therefore, paying the spot market cash price at the time of commodity delivery may threaten the long-term viability of co-operatives, especially those engaged in processing ventures.

When co-operatives arrange payment through a pooling mechanism, the risk of a co-operative operating in deficit due to price risk in the output market will be eliminated. As well, co-operatives do not need to maintain as much working capital as they must when using spot cash price payment methods. However, the producer member faces uncertain return because a considerable time lag exists between the commodity delivery and realization of final returns, and final returns are subject to the price level in the output market. Those members having strong time preference for cash may not like the pooling practice. They do not know how much they will get until several months after commodity delivery. Balancing the risk and return between co-operative and its' members is a crucial task in maintaining member's commitment. The types of pricing and payment contract chosen by co-operatives clearly have an impact on this balancing act.

The presence of other firms, either co-operatives or profit-oriented firms who use the same commodity as do co-operative, increases the competition to buy producers' raw commodity. Cobia (1989) asserted that cash price payment at the time of delivery is popular when producers have several marketing alternatives. With increased competition to buy a producer's commodity, members may contract to those firms who offer better alternatives in terms of risk, return and other services. Therefore, with increased competition in the commodity market, balancing the risk and return between member producers and co-operative is more crucial.

Besides pooling and spot market cash price methods, there are other pricing and payment options available to co-operatives. A "Fixed forward price" contract is one of such alternatives. In this contract, members agree to deliver a commodity at a specified time in the future for a pre-specified price. This contract alleviates the risk and uncertainty of final returns on the part of members but co-operatives still face the risk of

operating deficits (Unterschultz et. al. 1997). Co-operatives face the risk of operating deficits due to risk of default on contract terms by the member, and output price risk. Members may default when the spot market price at the time of delivery is higher than the contract price.

"Guaranteed minimum price" contract is another pricing and payment alternative for co-operatives. Under this price contract, farmers contract to deliver a quantity of commodity of a certain quality within a specified time frame at a guaranteed minimum price. The minimum price contract is a cash contract offering "floor price" protection while allowing increased profits from price or basis appreciation. Essentially this "floor price" contracting is a type of put option (Purcell and Koontz 1999).

In basis contracts the producer and co-operative lock in the basis while the cash price is left open with the stipulation that the cash price must be at a basis against a selected futures contract. Basis is simply the difference between market cash price and future prices (Purcell et al. 1999). In this contract, the producer does not lock in a final price so producers are subject to all the many factors, which can affect the market. Therefore, a lower price could be a result for the producer.

The "Hedge-to-arrive contract" is another contract, in which a co-operative or commodity buyer hedges the commodity for the producer in the futures market and allows the producer to fix the basis prior to delivery of commodity. However, this contract has been a failure for many co-operatives and grain elevators in the Mid-Western states of the United States (Blue et al. 1998). Failure of this contract was particularly attributed to the inability of co-operative to assess old-crop-new crop futures price spread risk. Co-operatives and grain elevators designed the contract for multiple crop years based on the future price of old crops. High futures price followed by low futures price led to sharply lower prices for farmers than expected, especially those locked in multiple crop year contracts (Lence et al. 1999).

Different pricing and payment contracts have differential impact on co-operatives and their members in terms of risk, return and managing working capital. Maintaining the members commitment without jeopardizing economic viability of co-operatives is crucial for survival of any type of co-operative.

Relatively very few studies have been done on pricing and payment practices of co-operatives. Fulton et al. (1998) from their studies indirectly indicated that due to increased competition in commodity markets, some co-operatives have started to offer some innovative marketing alternatives to their members. These innovative alternatives include: fixed forward price contract, minimum price contract, hedge-to-arrive contract and delayed pricing and payment contract. The inability of co-operatives to implement other marketing contracts was cited as a lack of know how about the operation of these marketing alternatives among co-operative's managers. Very little information is available about factors affecting choice of different pricing and payment contract by co-operatives. It is essential to recognize the important factors, which are responsible for choosing a particular pricing and payment contract by co-operatives. Better understanding of important factors will enable the policy maker to better analyze the conditions under which co-operatives choose a particular pricing and payment practice. The factors under analysis are demographic variables related to different co-operative organizations, and market environments.

1.3 Objectives

The overall objective of this study is to investigate the differences in choice of pricing and payment practices of different co-operative organizations for the commodities delivered by members.

The specific objectives of this study are as follows:

i) To analyze the factors affecting pricing and payment practices in traditional marketing and new generation co-operatives.

ii) To investigate the differences in pricing and payment practices between new generation co-operatives and traditional agricultural marketing co-operatives.

iii) To analyze the relationships between degree of competition in commodity and output market with co-operative's choice of particular pricing and payment practices.

1.4 Hypotheses

This study aims to test the following three hypotheses:

Hypothesis 1:

New generation co-operatives are engaged in value-added processing ventures and aim at returning greater proportions of consumer expenditures to producer members. Final returns of a co-operative will be realized only after disposal of final goods. There is price risk in the co-operative's output market. In addition, there often exists a two-way contract between members and co-operative regarding quantity and quality of commodity to be delivered into co-operatives. Since membership is closed, co-operatives do not need to offer market cash price to acquire additional commodity and members may have agreed to join with the expectation of higher return. The new generation co-operatives are more concerned with reducing the risk of their operating deficits. The pooling method, which eliminates the co-operative's risk of operating deficit, would be the best alternatives for the new generation co-operatives.

"New Generation Co-operatives choose pooling as their pricing and payment alternatives".

Hypothesis 2:

Traditional marketing co-operatives are characterized by an open membership policy and they accept any quantity of commodity from members. Members are not necessarily obliged to deliver their commodities to co-operatives. In order to acquire sufficient volume of commodity, traditional marketing co-operatives may offer such pricing and payment options which reduces commodity price risk for members. Paying the spot market cash price at the time of delivery is the best alternatives for co-operatives. Members realize the full commodity price at the time of delivery, which removes the uncertainty of returns.

"Traditional marketing co-operatives choose spot market cash price as their pricing and payment option".

Hypothesis 3

With an increased number of firms in commodity market, members have a number of alternatives for selling their commodity. Members will deliver or sell to those buyers who offer the best alternatives. With the closed membership policy, new generation co-operatives might have already arranged the commodity requirement for their marketing and processing facilities through contracts with members. Therefore, the new generation co-operatives do not need to bid to match the pricing and payment practices of rival firms. With an open membership policy and no obligation by members to supply their commodity to co-operatives, traditional marketing co-operatives are more responsive to the level of competition in the market to acquire a sufficient volume of commodity. Co-operatives may want to acquire sufficient volume of commodities in order to operate the marketing and processing facilities efficiently.

"Traditional marketing co-operatives are more responsive to the competitive level in their commodity market than NGCs when choosing a pricing and payment practices".

Many references (Cobia 1989, Fulton 1997) in the literature discusses the statements presented in hypotheses 1,2 & 3. However, very little empirical evidence has been presented to substantiate these claims. Therefore, this study aims to verify the statements presented in three hypotheses.

1.5 Nature of analysis

To meet the objectives mentioned in section 1.3 and to test the hypotheses developed in section 1.4 of this chapter, mail questionnaires were sent to traditional marketing as well as new generation co-operatives of the U.S.A. and Canada. Three analytical methods are used to examine the effects of different co-operative structures and level of competition on co-operatives' choice of particular pricing and payment practices; these are: mean score comparisons, factor analysis and the multinomial logit analysis. Traditional marketing and new generation co-operatives differs in membership policy, commodity contract and transferable equity stocks. So mean scores were compared between these distinguishing characteristics to test the hypotheses. Similarly, probability

estimated by using coefficients of multinomial and rank logit model were used to test the hypotheses.

1.6 Organization of the Thesis

This thesis is divided into seven chapters. Chapter 1 has provided the background to the study and introduced the nature of the problem. The second chapter introduces the history of development of co-operatives and problems faced by co-operatives in changing agri-food industry. This chapter also discusses the development of new generation co-operatives and their strength to solve the problems faced by traditional co-operatives.

The third chapter discusses the theoretical background about optimal price and commodity purchase decisions under different market structures. Different pricing strategies for co-operatives are also discussed with their implications for maximization of members' welfare. This chapter also discusses the different pricing and payment alternatives practiced by co-operatives and private commodity handlers along with their implications for distribution of risk and return between members and co-operatives.

The fourth chapter explains the survey design, methods of data collections and methods of data analysis. There is a discussion on the selection of the study area, an explanation of the sample selection process, outline of the questionnaire and explanation of the method of data collection.

Preliminary analysis of the data obtained for various variables are presented in Chapter 5. The sixth chapter provides the results of data analysis from statistical and econometric methods. This chapter also discusses the implications for different co-operatives. The final chapter summarizes the important findings of the study and its implications for co-operatives. This chapter also discusses the limitations of the study.

CHAPTER 2: EVOLUTION OF AGRICULTURAL MARKETING CO-OPERATIVES

2.1 Introduction

The main objective of this chapter is to discuss the background of co-operative development in agriculture, problems faced by agricultural marketing co-operatives in a changing agri-food industry and the development of new generation co-operatives in North America. It also briefly discusses the importance of pricing and payment practices on the survival of co-operatives.

2.2 Development and Rationale for Formation of Marketing Co-operatives in Agriculture

The first co-operative with systematic operating principles was established in 1844 in England, and it was known as the *Rochdale Society*. The *Rochdale Society* was established as a consumer co-operative selling primarily consumer goods such as food and clothing. The *Rochdale Society* was established because of dissatisfaction with the retail shopkeepers in their community (Barton 1989). According to Torgerson et al. (1997), agricultural marketing co-operatives were evolved as a self help business firm, and were designed to move product to market and influence price and other terms of trade.

Agricultural commodity prices are more volatile than are the prices of most non-farm goods and services, because demand for farm produce is price inelastic in the short run. Therefore, small changes in supply may induce large price changes (Tomek et al. 1990). Because of the biological nature of farm production and asset fixity, farmers cannot adjust their farm production plans rapidly with changes in prices, which leads to cyclical output price relationships for most agricultural commodities (Tomek et al. 1990). Besides the biophysical nature of agricultural production processes, needs for institutional mechanisms to counter the economic ramifications of excess supply-induced prices and to countervail opportunism and hold out situations due to market failure have been cited as the main reasons for formation of agriculture co-operatives. Farmers were also organized because services were not available to them in their rural communities or

because those services were not available at reasonable costs (Cook 1995; Schrader 1989).

Organizational structure and objectives may differ from co-operative to co-operative and from country to country. However, the most common features of traditional co-operatives are:

- The stockholders, who are farmers, are the major users of the co-operative's services.
- Members receive benefits from level of patronage rather the level of equity capital contribution.
- The formal governance of the business by the stockholders is structured "democratically" based on one member one-vote systems.

Therefore co-operatives are unique business organizations, owned and controlled by users for the benefit of users.

2.3 Changing Agri-food Industry and Implications for Traditional Marketing Co-operatives

At the global level, agriculture is undergoing a process of industrialization. The following are some major elements of transformation in agri-food business mentioned by Boehlje (1997).

i) Farm production is becoming increasingly capital intensive.

ii) Specialization and separation of production stages.

iii) Decisions made by firms at all levels of the market are increasingly interdependent.

iv) Contractual arrangements among different players in food chain.

v) Decreasing government supports to farming.

vi) Deregulation of industries and reduction of trade barriers.

These changes have resulted in increased vertical integration and contracting in the agri-business sector (Stefanson et al. 1997). The emergence of greater contracting and vertical integration raises the question about control and power. Stefanson et al. (1997)

asserted that because of information, resources and bargaining power possessed by large agribusiness firms, an individual farmer is less likely to negotiate contract terms in his/her favor. With greater contracting, farmers also face new risks, such as the possibility that a processor will change the contract terms once farm production has occurred, and this is often named as the "hold out problem". This risk increases as the assets needed for agricultural production increasingly become idiosyncratic.

These structural changes in the agri-food industry and their ramification on the farm sector suggest that farmers need to become more involved in the processing of agricultural products than they have been to date. Farmers that continue to be involved only in farm-level production will find themselves being increasingly subject to control from agricultural processors. However, it is difficult for an individual farmer to be involved in the processing of agricultural products. Large-scale involvement in these activities takes much more capital, time, and expertise than is available to any single farmer. Stefanson et al. (1997) argued that although farmer involvement in processing activities can take many forms, one way for farmers to become involved in processing activities is through co-operatives.

However, Cook (1995) argued that traditional marketing co-operatives are facing the internal incentives problem, which creates disincentives for members to invest in their co-operatives. These incentive problems emanate from the *user-versus-investor* set of "vaguely defined property rights" (VDPR) structure in traditional co-operatives. The vaguely defined property right structures are responsible for three main problems in traditional marketing co-operatives. These are i) Free rider problem ii) Horizon problem and iii) Portfolio problem. Brief discussions of these three problems are below.

i) Free Rider Problem:

When property rights are untenable, insecure, or unassigned, the free rider problem emerges. This is a situation in which property rights are not sufficiently well suited and enforced to ensure that current member-patrons bear the full costs of their actions and/or receive the benefits they create. This situation occurs particularly in open membership co-operatives (Cook 1995). In open membership co-operatives free rider

problems surface under two situations. One is when an individual refuses to join co-operatives but captures the benefits of improved terms of trade set by co-operatives. The other situation is when new entrants are entitled to the same payment per unit of patronage as are existing members. This set of equally distributed rights combined with the lack of a market to establish a price for residual claims creates an intergenerational conflict. Because of the dilution of the rate of return to existing members, a disincentive is created for them to further invest in their co-operative.

ii) Horizon Problem:

The horizon problem occurs when a member's residual claim on the net income generated by an asset is shorter than the productive life of that asset. This problem is caused by restrictions on transferability of residual claimant rights and lack of liquidity through a secondary market for the transfer of such rights. Due to the horizon problem, members become reluctant to invest in the co-operative and instead demand redemption of equity invested by them (Cook 1995). This increases the pressures on a co-operative's working capital and precludes co-operatives from undertaking profitable growth opportunities.

iii) Portfolio problem:

Portfolio theory assumes that investors are risk averse and chooses the asset that has the lowest variance for a given expected income, or alternatively chooses assets which maximize return for a given level of risk. It is through this strategy of asset diversification investors optimize their portfolio decision. Equity investment in a co-operative can be viewed as an another asset in the producers' investment portfolio. Due to the lack of transferability and appreciation mechanisms of residual claims, co-operative members are not able to diversify or concentrate their asset portfolios to reflect their personal preferences for risk. Members can benefit only from their level of patronization rather than level of capital contribution in a traditional marketing co-operative. Therefore, capital gains are not a major benefit for stock ownership in co-

operatives, in contrast to investor-owned-firms (IOFs). This unique equity structure and benefit distribution system creates disincentives for members to invest in their co-operatives.

These internal incentive problems associated with generating equity capital are considered as obstacles for traditional co-operatives to engage in capital-intensive value added ventures under a changing competitive economic environment.

2.4 Evolution of New Generation Co-operatives in North America

Although traditional co-operatives were successful in correcting the negative economic impacts of market failure, the problems arising from vaguely defined property right structures have created disincentive for members to invest in their co-operatives (Hackman et al 1990; Cook 1995). With the concerted efforts of key persons, producers in mid-western U.S.A. started developing a new co-operative organizational form that attempts to reduce the costs associated with the traditional organizational structure of co-operatives. This new organizational form is known as the "New Generation Co-operative"(Hackman et al. 1990).

New Generation Cooperatives (NGCs) differ from traditional marketing cooperatives in three aspects. These are i) Closed membership ii) Tradable membership shares iii) Engaged in value-added processing ventures.

i) Closed membership:

NGCs are market driven, in that market demand for the processed product determines the appropriate scale of the business and which, in turn limits the size of the membership, so that these become closed co-operatives.

ii) Tradable membership rights:

In order to patronize NGCs, one must purchase delivery rights or membership shares. Each unit of membership share allows producers to deliver a specified volume

and quality of farm produce to co-operatives. These tradable membership shares not only allocate rights to deliver units of the commodity, but also spread up-front capitalization responsibilities equitably among members according to level of patronage. Furthermore, these rights are tradable, which allows members to adjust their risk preferences.

iii) Engaged in value added ventures:

In contrast to traditional marketing co-operatives, researchers claim NGCs are involved in value added processing ventures. A common reason for the formation of NGCs is the desire to develop new value-added products and to gain access to an increased share of the consumers' food dollar (Harris et al. 1996).

So far more than fifty (50) new generation co-operatives are formed in the mid-west region of U.S.A. Fulton (1990) claimed that despite the interest in the new generation co-operative model in the prairie region of Canada, there are very few examples of formation of new generation co-operatives in Canada.

New generation co-operatives evolved to correct the negative incentive problems of traditional marketing co-operatives and to provide a higher return to members. Types of pricing and payment practices chosen by co-operatives are crucial for the survival of new generation as well as traditional co-operatives. As discussed in Chapter 1, different pricing and payment options have differential impacts on the distribution of risk and return between co-operatives and their members. Traditional marketing co-operatives have an open membership policy and are often not engaged in processing activities to a greater extent. New generation co-operatives are closed member co-operatives and are often engaged in processing activities to a greater extent. The differences in organizational structure of co-operatives and operations method may affect the choice of pricing and payment practices.

CHAPTER 3: MARKETING STRATEGIES, AND PRICING AND PAYMENT PRACTICES OF CO-OPERATIVES: LITERATURE REVIEW

3.1 Introduction

This chapter analyzes the optimal quantity of a commodity purchased by co-operatives under two different market structures: perfectly competitive and monopsonist commodity markets. This chapter will also discuss the various maximization strategies of co-operative's objective functions and, different pricing and payment contracts between co-operatives and their members for commodities supplied by members.

3.2 Optimal Commodity Purchase and Price Level

The industrial organization theory of structure-conduct-performance assumes that the optimum price and output level of any firm is affected by the market structure under which it is operating. Characteristics of the organization of a market, which influence the nature of competition, influence the behavior of an individual firm (Tirole 1990). For the theoretical analysis of pricing and payment practices of marketing co-operatives, it is assumed that the co-operative can be treated just like any other firm and that it has an objective function to maximize. The role of a marketing co-operative is to purchase the raw material (X_0) from the members at a price (P_x), transform it into a finished product (Y) via a production function and then sell it on some final market at a price (P_y). In undertaking this role, the co-operative incurs fixed costs of F. Since the co-operative is formed for the benefit of the members, the primary objective of the co-operative should be to maximize the welfare of its members. Taking producer surplus as a measure of the well being of the members, the welfare of the members will be maximized if the following goal is achieved (Fulton 1995).

Maximize $W = PS + \Pi$ ..... (3-1)

where Π is the profit of the co-operative, W is the member's total welfare and PS is the producer surplus of the members. It is an area under the price and above the supply curve (Figure 3-2).

Levay (1983) quoted Taylor's argument that members are owners as well as users of co-operative. As owners, they desire to maximize the profit of co-operatives, and as users to maximize the producer surplus. Co-operative's maximization problem also implies that co-operatives should maximize the producer surplus of members and profit of co-operative business in order to maximize the welfare of their members. Objective functions of marketing co-operatives as analyzed by Fulton (1995) are given below.
In a competitive market the profit function of a co-operative is given by:

$$\Pi = P_y Y - P_x X_0 - F \quad \text{..... (3-2)}$$

where: P_y is the per unit price of output.

Y= Quantity of output produced from raw material X.

F= Fixed cost of producing Y.

Producer surplus can be expressed by:

$$P.S. = P_0 X_0 - \int_0^{X_0} P(X)dX \quad \text{..... (3-3)}$$

where: $P(X)$ is the member's supply curve.

$\int_0^{X_0} P(X)dX =$ Variable cost of producing X_0.

Substituting equation (3-2) and (3-3) in equation 3-1 gives the following:

$$\text{Maximize } W = P_x X_0 - \int_0^{X_0} P(X)dX + P_y Y - P_x X_0 - F \quad \text{..... (3-4)}$$

After some algebraic iterations expression 3-4 can be written as:

$$\text{Maximize } W = P_y Y - \int_0^{X_0} P(X)dX - F \quad \text{..... (3-5)}$$

The economic interpretation of this maximization problem is one of maximizing the revenue from the sale of the final product, less the variable costs of producing commodity (X_0) and less the fixed costs of producing final goods (Y).

A co-operative's strategies to maximize the welfare of members may be different under a different market structure. Schmiesing (1989) compares the optimal pricing and

quantity of commodity purchase decisions on marketing co-operatives under two different market conditions, monopsonistic and competitive. These are discussed next.

3.2.1 Competitive Commodity Market

Before deriving the optimal price and quantity solutions, it is necessary to understand the concept of the Average Net Revenue (ANR). Average net revenue (ANR) represents the amount that the co-operative has available to return to the co-operative members for each unit of commodity delivered by members. It is obtained by subtracting variable processing cost and fixed cost from sales revenue of final goods (excluding cost of raw commodity) and dividing by quantity of raw commodity used in processing.

$$ANR = \frac{P_Y Y - m(X) - F}{X} \quad \text{.....(3-6)}$$

Where $m(X)$ represents the variable processing and marketing costs excluding the cost of the raw commodity.

Assume a co-operative is one of numerous smaller firms purchasing the raw product (X). In such a situation, the co-operative cannot influence the price it pays for inputs and has to pay the same price as other competitors are paying. Therefore, input price is given and the supply curve for the co-operative becomes horizontal. Horizontal supply curve means co-operative can purchase any quantity of input at given price. It also implies that the level of producer surplus is fixed. In order to maximize producer welfare, the co-operative must maximize profits as do investor oriented firms (IOFs). A co-operative can maximize its profits if it chooses an input purchase level such that marginal benefit from additional input is equal to the given price of input. The solution to a co-operative's welfare maximization problem can be derived by solving the first order conditions of a co-operative's profit functions (expression 3-2).

According to Doll and Orazem (1984) the first order condition for profit maximization is:

$$\frac{d\Pi}{dX} = P_y \frac{dY}{dX} - P_x = 0$$

$$P_y MPP = P_x \quad \text{.....(3-7)}$$

$$MVP = P_x$$

where: P_x is a per unit price of raw input.

MPP= Marginal physical product. It is an increment in the total output with increased in input by one unit.

MVP= Marginal value product. It is a marginal benefit to the co-operative of using an additional unit of input X (commodity).

In Figure 3-1 at a given price of P_x the co-operative will purchase X amount of raw product from producers. With this level of input the co-operative will maximize the profits from the sale of the final output Y. Co-operatives will make profit equal to the area of $abcP_x$. With a similar production function, an investor-oriented-firm (IOF) also chooses the same level of quantity, as does the co-operative. The difference is that for the co-operative any profits that are earned are returned to the member patrons, while for the profit-maximizing firm the profits are returned to the shareholders who may or may not patronize the firm. With this solution a co-operative member receives price of P_x and the patronage refunds equal to distance a-P_x for each unit of commodity.

In the perfectly competitive market, excess profits are earned in the short run only. In the long run, the existence of profits will attract new firms to purchase the commodity from the producer. As new firms enter the industry, the demand for the input will shift outward, which in turn will bid up the price of the commodity. Price will be bid up until no profits are made by firms and the industry will be in long run equilibrium.

3.2.2 Co-operative as Monopsonist

Agriculture is a spatially dependent industry and the markets for products are regionalized. Therefore, attaining a perfectly competitive equilibrium commodity market is unlikely. Markets that appear to be competitive on a national basis may actually have local markets with considerable market concentration. In addition, industry entry barriers may make long-run competitive equilibrium impossible (Schmiesing 1989). In such markets, marketing co-operatives are confronted with an upward sloping supply curve (Figure 3-2).

When a co-operative is the only buyer of a producer's raw product then the co-operative can maximize the member's welfare by equating marginal benefit of input to marginal cost of producing that input. The marginal benefit of input is the marginal value

product (MVP). The marginal cost is the change in $(\int_0^{X_0} P(X)dX + F)$ for a change in X_0. Since F is a fixed cost, the marginal cost is given solely be the change in $\int_0^{X_0} P(X)dX$ for a changed in X_0. Thus, the optimal price and quantity purchase of a commodity can be derived by setting the expression 3-5 equal to zero after taking a partial derivative. According to Fulton (1995):

$$\frac{\partial P_y Y}{\partial X_0} - \frac{\partial \int_0^{X_0} P(X)dX}{\partial X_0} = 0 \quad \text{..... (3-8)}$$

$$MVP = S$$

where: S = supply curve of producers and is summation of all individual member's marginal cost curves.

In Figure 3-2, the supply curve for all producers equates to *MVP* curve at point *C*. A co-operative pays price $P'x$ and obtains *X1* amount of raw produce. If it pays the members an amount $P'x$ per unit of *X1*, then there remains an amount $(a - P'x)$ which is the profit per unit of *X1* utilized. The total profits of the co-operative are equal to the area $abcP'x$ and these profits are paid to the members as the patronage payment.

For the monopsonist investor oriented firms (IOFs), the marginal cost is not given by the price but by the marginal input cost (*MIC*). Marginal input cost is the change in the amount the profit-maximizing firm must lay out for the inputs in order to be able to produce the output. If the investor-oriented firm is the only one in the commodity market then it will maximize the firm's profit by equating marginal value product with marginal input costs.

$$MVP = MIC \text{..... .(3-9)}$$

In figure 3-2, the profit-maximizing monopsonist sets the commodity price at $P''x$, purchase X2 quantity of commodity and makes the total profit equal to the area of $fegP''x$. Because the profit-maximizing monopsonist realizes that obtaining more units of input will raise the price of all units, the firm will restrict the use of input (X_0). The result is that the profit-oriented monopsonist will purchase less than will perfectly competitive profit-oriented firms and monopsonist co-operatives. The result of

monopsony pricing by a profit-maximizing firm as compared to co-operative is at least threefold. The first is a reduction of producer surplus due to a lower price for commodity *(P"x)*. The second effect is the producers no longer receive the profits that are generated. Third, all of society is made worse off because there is a deadweight (triangle area of *cgh*) due to the monopsony power of investor oriented firms.

A comparison of the co-operative outcome with that of the profit-maximizing firm suggests that the co-operative is a mechanism for remedying monopsony power. The co-operative is able to fulfill this role because it takes account of the impact its' decisions have on members. Since the owners of the profit-maximizing firm do not patronize the firm, the profit-maximizing firm is under no such obligation to consider the effect its decisions will have on raw input supplies. Yet, by acting as a monopsonist, the profit-maximizing firm does have an impact on these producers, decreasing the price paid to them and thereby reducing their welfare. The co-operative, on the other hand, by internalizing this cost, is able to more correctly balance the impact such decisions have on the welfare of the various groups in the industry.

3.3 Pricing Strategies of Co-operatives

3.3.1 Maximum Net Price Objective

It is often suggested that the co-operative should maximize the price that it pays to the members (Cobia 1989). In Figure 3-3 a co-operative can maximize the price paid to the members and still break even if it sets price equal to the maximum level of Average Net Revenue (*ANR*). The solution for this objective is point *a* where *MVP* and *ANR* intersects, which set P_x1 as the price of the commodity. Price P_x1 is the greatest per unit amount the co-operative can pay out to members. If this price is actually paid to producers, the producers will supply *X2* quantity of commodity. Co-operatives can avoid the lower price from oversupply by two means. The first is to pay a maximum price *Px1*, but restrict the amount of output each member can produce or deliver to the co-operative, i.e., production contract. The other solution is to set a price equal to *Px2*, where price equals marginal cost and return dividend payments of (*Px1-Px2*) per unit of commodity delivered (*X1*). However, this latter solution will only work if producers clearly

distinguish between the price paid for their raw commodity and patronage payment, otherwise the co-operative again needs to restrict the quantity of input supplied by members. It appears that co-operatives can offer the highest possible price to members only if membership is closed and the co-operative accepts a fixed quantity of commodity from each member.

While both of these solutions will give producers the maximum price possible for their output, the member welfare is not maximized. At an output level *X1*, the marginal value product (*MVP*) curve is lying above the marginal cost curve (supply curve) so the marginal benefit of another unit of raw commodity (*X*) is greater than the marginal cost. Hence, the welfare of the members could be increased if the co-operative increased the purchase of commodity from *X1* to *X3* level. Levay (1983) also posited that co-operatives could offer maximum prices only if members' supply curve pass through the apex of the *ANR* curve, which would happen only under long-run perfect competition.

3.3.2 Marginal Value Product Pricing

Marketing co-operatives can maximize co-operative's profit and producer surplus by equating *MVP* with the supply curve (S) at point *d* (Figure 3-3) by which P_x3 price is achieved and the co-operative accepts the *X3* quantity of commodity. Since the marginal benefit of using the commodity is equal to its supply price, this solution is also *pareto optimal*. Producer members receive two payments: a price for the raw material (P_x3) and a patronage refund (deP_x1P_x3). If the members do not separate these two payments, then members tend to supply more commodity *(X2)*. Therefore, this solution seems unstable. However, if co-operatives pay increased price to members, then it will not have sufficient revenue to cover its fixed costs because the price at commodity level *X2* (at point *b)* clearly exceeds the *ANR* due to increased supply *(X2)* from members. Co-operatives cannot maintain this strategy unless they could somehow restrict output and clearly distinguish dividends from the commodity sold to the co-operatives.

3.3.3 Average Revenue Pricing

Levay (1983) claimed that average net revenue pricing of members commodity is not a deliberate strategy of co-operatives' maximization problem. However, the average

revenue pricing *(ANR)* objective is achieved when co-operatives have an open membership policy and accept any eligible quantity of commodity. This average pricing can be obtained by equating the *ANR* curve of co-operatives with the aggregate supply curve*(S)* of members. At point *g* (Figure 3-3) *ANR* equates with supply curve (S), members supply *X4* amount and receive P_x4 price per unit of commodity. With this pricing mechanism, the amount supplied by the members is consistent with the amount that the co-operative can afford to purchase. However, no profits are being made by co-operatives and hence no patronage payments are returned to the members. The result is that the price paid by co-operative is the effective price that members base their output decisions on. The level of commodity purchased by the co-operative is higher under this pricing than maximum net price and marginal value product pricing rule. At equilibrium point *g* (Figure 3-3) the supply curve (S) exceeds the marginal value product (MVP) curve, which implies the marginal cost of another unit of raw material exceeds its marginal benefit, so the ANR pricing rule is not *pareto optimal.* While the level of *producer surplus* obtained by members is greater under average revenue pricing than under marginal value product pricing, the members are actually worse off. The loss of patronage payments is greater than the gain in producer surplus. In figure 3-3, with *ANR* pricing objective total welfare is only the producer surplus, which equals to area fgP_x4. With *MVP* pricing, total welfare equal to patronage refund plus producer surplus, which is equal to area fdP_x3 plus area deP_x3P_x1. The gain in producer surplus with *ANR* pricing dgP_x4P_x3 is less than the loss in patronage payment edP_x1P_x3. Area *edg* is the deadweight loss due to *ANR* pricing, which is also mentioned by Vercammen et al. (1996). Thus, members could be made better if the level of output could be reduced to *X3*.

Marginal value product pricing and Average Revenue Pricing strategies are both legitimate co-operative policies and both achieve business at cost (Cobia et al 1989). The choice depends on the co-operatives' objectives, methods to generate equity capital, cost structure, competitive environment, and ability to forecast costs. Cobia et al. (1989) claimed that most co-operatives in the U.S. follow a marginal value product pricing rule for the following reasons: (i) fear of retaliation from competitors (ii) desire to finance

growth of co-operative through retained member patronage earning and (iii) to avoid free rider problem by nonmembers.

On the other hand, some co-operatives have chosen to use net average revenue pricing for the following reasons: (i) co-operative's desire to exert competitive behavior on investor oriented firms (ii) to encourage members to patronize co-operative with an immediate benefit for members.

Vercammen et al. (1996) claimed that the consequences of average net revenue *(ANR)* pricing are likely to be severe, particularly for capital intensive processing co-operatives. Finally, if members do not see the patronage payment as part of the price paid for the raw commodity then a pricing rule approaching $MVP=MC$ may be more appropriate. However, the above theoretical analysis of the optimal pricing and quantity purchase of commodities did not take into considerations member's and co-operative's risk, timing of payment and need for working capital. The following section discuss the different pricing and payment contracts between members and co-operatives, along with their impact on the distribution of risk between a co-operative and its members.

3.4 Pricing and Payment Contract in Marketing Co-operatives

A pricing and payment contract in marketing co-operatives involves the method of setting price and arrangement of payment for commodity supplied by members. Pricing and payment contracts dictate timing and distribution of income among members. Type of pricing and payment contracts have a differential impact on distribution of risk and return between co-operatives and its members (Cobia et al. 1989). Perception of risk and uncertainty about co-operative's final return, member's cash flow needs, the working capital requirement of co-operatives, the degree of competition in commodity and output markets, and market behavior of rival firms may play important roles in a co-operative's choice of a particular pricing and payment contract with its members.

In marketing co-operatives, paying the cash price for commodities on delivery or delaying payment (pooling) until costs and income are determined, have been two popular methods (Cobia 1989). However, with increased competition in commodity markets and the need to address risk and return of members and co-operatives, some co-

operatives are offering more innovative marketing alternatives to their members. They are: i) Fixed forward price contracts, ii) Minimum guaranteed price contracts, iii) Basis contracts and iv) Hedge-to-Arrive contracts. Brief discussions of the different pricing and payment contracts between marketing co-operatives and their members are discussed next.

3.4.1 Spot Market Cash Price

In a market cash price at the time of commodity delivery practice, co-operatives pay a cash price for and take title to products delivered by patrons. These products are then processed to a greater or lesser extent and sold in the market at the most advantageous price. Net income remaining after expenses is refunded to patrons. The policy of cash payment at delivery is popular when producers have several marketing alternatives and if members or farmers have strong time preference for cash (Cobia 1989). If there are a number of other firms who purchase the same commodities from farmers, then those firms are likely to bid away commodity from co-operatives by offering attractive marketing alternatives to farmers. If co-operatives can not match the rival firms' offer then it may lose the patronage from farmers. Therefore, a co-operative's desire to keep members' commitment and address member's cash flow needs might have contributed to the strategy to offer cash price at the delivery time. This type of pricing and payment practices is consistent with average net revenue (ANR) pricing discussed in the preceding section. ANR pricing aims at passing the immediate benefit (higher commodity price) to producers. By offering the spot market cash price, co-operatives can pass on immediate benefits to producers. With the spot market cash price, producers can realize the price of their commodity immediately, thus the price risk is eliminated. Although a farmer's uncertainty about future return is removed, additional risk of uncertain final return and a requirement of more working capital for co-operatives are drawbacks of cash at delivery system (Cobia 1989).

3.4.2 Delayed Payment or Pooling

Pooling is a delayed-payment scheme often involving signed-marketing contracts (Cobia 1989). Farmers sign marketing contracts with the co-operative whereby the producers guarantees delivery of all or part of their production to the pool. The contract transfers all authority over marketing decisions to the co-operative and its professional management. An initial advance is paid to members upon delivery of the product. One or more progress payments may be made as the product is sold out of inventory. When all or most of the product has been sold the pool is closed, and a total value is determined for the pool. Operating and administrative expenses are allocated and subtracted. Any excess over previous payments is then distributed to patrons. This final payment results in zero net income for the co-operative (Cobia.1989). This payment scheme reduces the price risk and requirement of operating capital for the co-operative. Similarly, producer members share risk and marketing expenses, and receive a uniform average per unit price irrespective of the timing of delivery.

Whether the pooling practice is consistent with the any of the pricing strategies discussed in the preceding section depends upon the type of membership policy and commodity delivery contract. If a co-operative has an open membership policy and accepts any eligible quantity of commodity, then any of the pricing strategies practiced by co-operatives will end up with average net revenue (ANR) pricing, as claimed by Levay (1983). However, if a co-operative restricts the membership and quantity of commodity delivery, the pooling practices confirms with marginal value product (MVP) pricing or maximum price objectives (MVP=ANR). The maximum price objective is unlikely to be achieved in the short-run unless the member's supply curve passes through the apex of ANR curve (Levay 1983).

In spite of their benefits, pools are not adapted to all circumstances and not all growers want to participate in them. Members sometimes do not like the system because they do not know what they will receive until several months after delivery. The producer is at risk of declining future prices or a weakening basis. Some producers may not wish to delegate the responsibility of marketing their products to a specialist; nor do they want to commingle the results and thus forgo some short-term opportunities.

3.4.3 Fixed Forward Price 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. Unlike futures contracts, forwards are not traded on an exchange. A futures contract only locks in a price while a forward contract locks in a price and a basis. Forward contracts are used for hedging and for price speculation. Farmers may enter in forward contracts to reduce a price risk and co-operatives may enter in expectation of making a profit (Unterschultz et al 1997). By offering forward price contracts co-operatives assume the price risk and counter party risk. The latter may arise when farmers do not honor the contract obligations. Farmers may default on contracts when farm production fails or when the open market price exceeds the contract price. In the case of a contract between a farmer and private or profit-oriented firms, the producer has locked in a fixed price, and the farmer cannot reap the benefit of increased prices. In the case of a co-operative, any profit from increased future prices are ultimately returned to the farmer as a patronage payment; this fixed forward price contract ensures returns from commodities or reduces the price risk of commodities for the producers. The co-operative may hedge with futures or negotiate with buyers in the co-operative's output markets to offset the risk of fixed forward price contract.

3.4.4 Guaranteed Minimum Price Contract

Under a minimum price contract, the farmers signs a minimum price contract. 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. This contract may involve the use of the options market. The producer does not purchase the option. Instead, the co-operative purchase the underlying *put option* for the minimum price contract while at the same time passing on the benefits and costs of the option to the producer. The minimum price contract is similar to a forward contract with three major exceptions: The producer now has the opportunity to:

- Benefit from increase in the futures price, but is protected from major price drop.
- Benefit from an improvement in basis and,

- There is a cost or premium to pay for the underlying option.

3.4.5 Basis Contract

Basis is the difference between the local cash price and the relevant futures price (Tomek et al. 1990). The basis contract is a written agreement between the producer and co-operative or commodity merchant in which the basis is set. In other words, the producer and co-operative or commodity merchants agree upon how many cents below a selected futures contract the final selling price will be. The cash price for the commodity is left open with the stipulation that the cash price must be at a basis against a selected futures contract (Jones, Ohio State University). The "Basis Contract" gives producers the opportunity to "stay in the market" until such a time as they can take advantage of price increases in the futures market. With the basis contract producers can take advantage of a favorable local basis situation and have the opportunity to gain from an increase in the future price. However, a basis contract does not lock in a final price. The producer is subject to the many factors and forces which can affect the market. Therefore, the possibility exists that a lower cash price could result.

3.4.6 Hedge-to-Arrive Contract

The hedge-to-arrive is a marketing contract that offers producers an opportunity to lock in a referenced future price when it is considered attractive (Blue et. al 1998). 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, generally prior to delivery rather than at the time of signing the contract. As such, there remains the opportunity to experience a basis gain or loss from the time of contract initiation to contract close. The farmer establishes a price at the initiation of this cash contract. The price selected by the farmer will be some futures crop price, presumably insuring adequate returns above costs, minus the basis fixed by the farmer.

This contract would be a viable alternative if future prices are expected to decline and basis strengthens. With hedge-to-arrive contracts, the futures price is locked in and producers are subject to basis risk. Requirements of more working capital to meet the

increased margin calls due to unprecedented increase in commodity price is one demerit of hedge-to-arrive contract for co-operatives(Barett 1997).

3.5 Implications for Study

The literature suggests the main objective of marketing co-operatives is to maximize the welfare of members. From the above analysis, without restricting the membership and controlling the supply of commodity, co-operatives are unlikely to attain their maximization objectives. Moore et al. (1995) also claimed that without restricting memberships and quantity of commodity purchased, co-operatives are unlikely to transfer the benefits of transferable delivery rights to members. From the above analysis, it also appears that some pricing and payment practices are risky for members but not for co-operatives, and some are risky for co-operatives but not for members. A proper balance of risk distribution between co-operatives and their members is crucial for maintaining members' commitment without jeopardizing the co-operatives' economic goals. As discussed in the concluding sections of Chapter 2, organizational structure and operations of co-operatives may also dictate the choice of particular pricing and payment practices.

New generation co-operatives are closed member co-operatives and are often engaged in processing activities, in which final returns will be realized only after the disposal of final goods produced by co-operatives. The final returns are subject to output price risk. Zeuli (1999) concluded from her simulation studies that members joined NGCs in order to reap greater returns rather than manage commodity price risks. This finding is consistent with the analyses of pricing objectives in Section 3.3. Closed member co-operatives are likely to practice maximum price *(MVP=ANR)* or marginal value product *(MVP)* pricing strategies with the aim to pass a greater benefit to members. If NGCs pay spot market cash price with the aim to pass immediate benefit to members, then it assumes the risk of operating deficits. Therefore, NGCs might choose such pricing and payment alternatives which minimizes the co-operative's risk of operating deficits. With the objective of passing greater benefit to members and at the same time avoiding operating deficits, NGCs are likely to choose pooling practices (Hypothesis 1 in Chapter 1).

Traditional co-operatives on the other hand are usually open member co-operatives in which members are not obliged to deliver commodities into co-operatives. Traditional marketing co-operatives thus might have to match the offer of other firms in order to acquire a sufficient volume of commodity. They might have to pass on immediate benefits to members in order to attract the greater volume of commodities. They are likely to set price paid to members equal to average net revenue (ANR). They may choose a pricing and payment alternative, which minimizes the member's risk and uncertainty of returns. By paying spot market cash prices a traditional marketing co-operative can pass on the immediate benefit to members, and thus eliminate the member's uncertainty of return. Therefore, traditional marketing co-operatives are more likely to offer spot market cash price, to attract greater volume of commodities (Hypothesis 2, Chapter 1).

Theoretical analysis in this chapter shows that co-operatives' optimal conditions for quantity of commodity purchase and price paid to members varies with different market structure and co-operative's objectives. With the open membership policy, traditional marketing co-operatives have to match the pricing and payment policies of other firms in order to acquire sufficient volume of commodities. Alternatively, with closed membership structure, NGCs might have already arranged the total commodity requirement for their processing facilities so they don't need to match the offers of other firms to acquire the additional raw commodities. Therefore, it is hypothesized that traditional marketing co-operatives are more responsive to changing competitive level in the commodity market (Hypotheses 3, Chapter 1).

Co-operatives are unlikely to maximize the welfare of their members without controlling the supply of commodities and restricting the memberships. Different pricing and payment practices have differential impacts on the distribution of risks between co-operatives and their members. Therefore, it is expected that different co-operative organization and market structures have impacts on a co-operative's choice of pricing and payment alternatives.

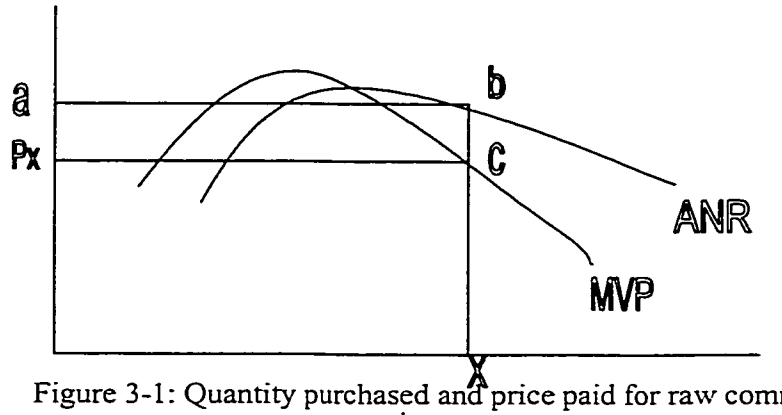


Figure 3-1: Quantity purchased and price paid for raw commodity by Cooperatives and IOFs in perfectly competitive market[1].

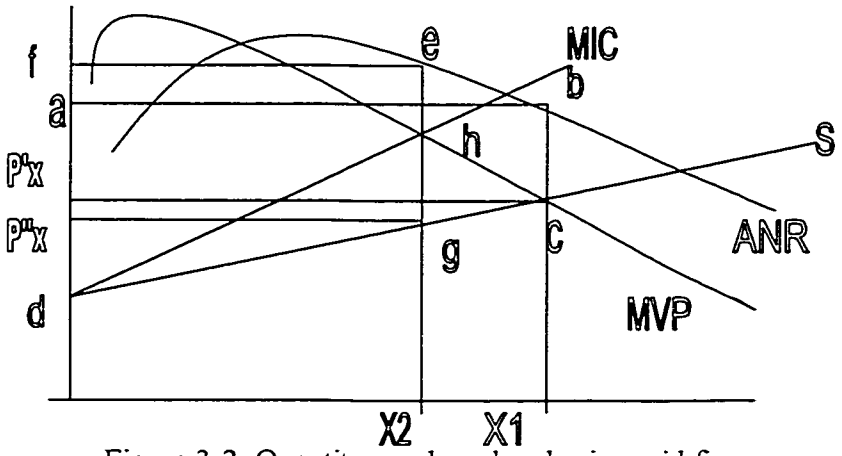


Figure 3-2: Quantity purchased and price paid for commodity when cooperative & IOF is monopsonist in commodity market[1].

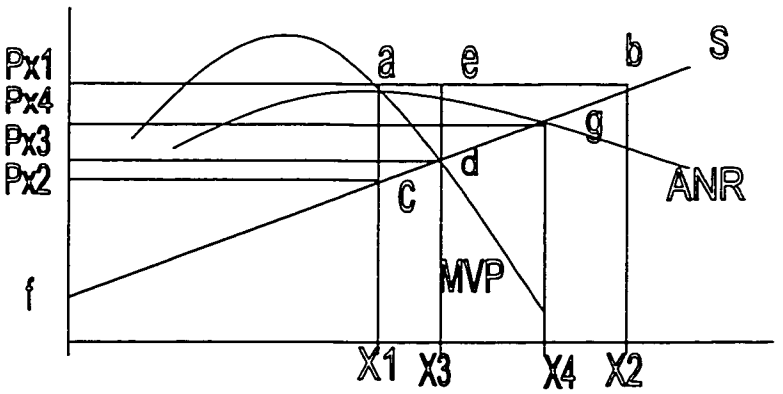


Figure 3-3: Pricing objectives of agricultural marketing co-operatives[1].

[1] Where MVP is marginal value product, MIC is marginal input cost, ANR is average net revenue and S is supply curve.

CHAPTER 4.0: SURVEY DESIGN, DATA COLLECTION, AND ANALYTICAL METHOD:

4.1 Introduction

This chapter discusses the design of the survey, method of data collections and analytical methods employed. This chapter consists of three sections. The first section discusses the survey design and pre-testing. The second section discusses the method of data collections and the third section discusses the empirical method used to analyze the data.

4.2 Survey Design

The written survey was designed to elicit information on each co-operative's choice of particular pricing and payment practices. The questionnaires were designed according to information needed to fulfill the objectives of the study and to test the hypotheses. *Appendix E* provides a copy of the survey questionnaire used for this study. The survey questionnaire has two sections. The first section of the questionnaire progressed from general inquiries about the co-operatives' demographic characteristics to market structure. It is hypothesized that new generation and traditional co-operatives might have different choices for pricing and payment practices. These two co-operatives differ in several demographic variables, so questions were asked to elicit information on these differential characteristics of co-operatives. These differential characteristics include: membership policy, commodity delivery contract, provision of transferable equity shares, proportions of commodity processed and year of business operations. Except for the proportions of commodity processed and year of business operations all variables were elicited in binary responses; i.e. in "0" and "1" form. Information on other demographic variables were also elicited (refer to questions 2,6,8,9,10,1,12,16,17,18,19, 21,22,23 and 24 in appendix E).

From a literature review of pricing and payment practices for commodity delivered by members in co-operatives as well as by private commodity handlers (Chapter 3), six pricing and payment alternatives have been identified. These are: spot

market cash price, pooled price, fixed forward price contract, guaranteed minimum price contract, basis contract and hedge-to-arrive contract. Respondents were asked to rank these alternatives according to the most commonly used alternative in their co-operatives. The range of ranking for seven alternatives was 1-7, in which alternatives ranked as number "1" indicates that alternative is the most commonly practiced, and alternatives ranked as number "7" indicates that alternative is least commonly practiced in co-operatives. Open ended questions were also asked in section 1 of the questionnaire, to elicit the information on reasons for maintaining a particular membership policy, doing business with a non-member, conditions for transferring or trading equity shares, mechanisms of equity revolving plan and reasons for differential price payment.

The second section of the survey questionnaire includes the close-ended questions to elicit information on co-operative's perceptions about the importance of various factors which play a role in a co-operative's decision to choose a particular pricing and payment practice. Responses on these factors were measured on a *1-5 likert* scale, where "1" indicates the factor under consideration is "not important at all" and "5" indicates "very important" for co-operatives. The Likert scale is widely used in the measurement of attitudes, attitude differences, brand image, store image and other similar phenomenon in marketing research (Menezes et al. 1979). The Likert scale detects the intensity of feeling that respondents have about their attitudes (Albaum 1997). Fulton et al. (1993) used a 5 point likert scale to elicit the perceptions of co-operatives' members and to investigate the factors influencing members' commitment to the co-operatives. Information was elicited on factors related to market environment in which co-operatives do business, managing co-operative's working capital, risk and return to co-operative's and their member's, cash flow management of their member's, incentive for members to deliver into co-operatives and co-operatives' business philosophy.

Similar types of closed-ended questions were included at the end of section 2 to elicit the perceptions of co-operatives' about the success of their pricing and payment policy to meet various objectives. These objectives are: maintaining member commitment, providing higher returns to members, meeting competitors' prices for commodities, and maintaining the desired volume and quality of commodities. This information was also elicited in 1-5 rating scale, where "1" indicates "very unsuccessful"

and "5" indicates "very successful". An open-ended question was included in section 2 asking the general description and special circumstances of pricing and payment practices adopted by co-operatives.

The questionnaire was revised a number of times. It was reviewed by a number of different professors to ensure that the instrument was generating the type of information that was desired. It was also reviewed by some senior students experienced in survey development to make certain that the language used in the questionnaire was appropriate. Pre-testing was done with two marketing co-operatives in the Edmonton area in order to determine the approximate time needed to fill out the questionnaire, and to ensure that the questions were easy to answer and well understood by the respondent. It was confirmed from the pre-test that it only takes 20 minutes to answer the all question, and respondents will not have any problem in answering the questions.

4.3 Data Collection

Varieties of methods were considered for data collection. Conducting an in-person interview with the manager or director was considered expensive. Identifying the persons involved in decision making of co-operatives and arranging the time for interview is difficult. Because co-operatives are scattered over wide geographical areas, to visit the different co-operatives at an appointed time is difficult from a logistical point of view. Telephone surveys were considered inappropriate for this study. Arranging the time for interview with managers and directors is considered difficult. From the pre-test it was known that it takes twenty minute to answer all questions. Therefore, conducting a telephone survey with almost two hundred co-operatives is also time consuming and costly. A mail survey is another alternative considered for this study. Although there is a degree of uncertainty concerning the response rate, mail survey technique is considered efficient in terms of costs. Aaker et al. (1998) claimed that a mail survey yielded more accurate results because the mail questionnaire is answered at the respondent's discretion, the replies are likely to be more thoughtful and others can be consulted for necessary information. Mail survey was chosen over interviewing managers and directors of co-operatives.

Names and addresses of three hundred (300) traditional marketing as well as new generation co-operatives were collected from various sources (Secretariat of Co-operative Canada, Center of Co-operative Studies, University of Wisconsin, Alberta Agriculture Research Institute and web address of University of Minnesota). Co-operatives from the Mid-West region of United States such as Minnesota, North and South Dakota, Missouri, Iowa and Nebraska were selected, because these regions have experienced the formation of new generation co-operatives. For Canada, co-operatives from the provinces of British Columbia, Alberta, Saskatchewan, Manitoba and Ontario were included. Co-operatives were contacted by telephone in order to verify their mailing address and request their consent for survey. Initially, the member relations officer or purchasing manager of co-operatives were targeted for first contact. At the time of telephone contact, names of the contact person who could fill out the questionnaire were asked. The objectives of the survey and approximate time needed to fill out the questionnaire were explained at the time of telephone contact. Altogether one hundred and ninety five (195) co-operatives agreed to participate in the survey. In the third week of January 2000, questionnaires were mailed to the those co-operatives that agreed. Questionnaires were addressed to the people who were identified as a contact person from the telephone inquiry.

A follow up telephone call was made in the last week of February to those co-operatives that had not returned the survey questionnaire. By the end of March 2000, ninety-three of the co-operatives had responded to the questionnaire, a response rate of 48 percent.

4.4 Analytical Method

This section discusses the various methods of data analysis used in this study. The methods employed to analyze various information are mean score comparison, factor analysis, the multinomial logit and rank-logit analysis.

4.4.1 Mean Score Comparison

There are many applications for which it is desirable to compare the means of two different populations. In order to identify the differences in perceptions of various types of co-operatives on the importance of factors in choosing the particular pricing and

payment practices, the mean scores given to different variables were compared. Similar kinds of mean score analyses were done on responses elicited to understand the co-operative's perceptions of effectiveness of their pricing and payment practices in meeting various objectives. According to Berenson et al. (1996) mean score comparison tests the following hypotheses.

$H_0 : \mu_1 - \mu_2 = 0$ (There is no difference between mean score of sample 1 and 2)

$H_1 : \mu_1 - \mu_2 \neq 0$ (There is a difference between mean score of sample 1 and 2).

Before testing differences between two means, it is necessary to test the equality of variance. A hypothesis test for the difference between two means from samples that do not have equal variance has more inherent variability than samples from populations with equal variances. According to Berenson et al. (1996) hypothesis for testing equality of variance between two samples would be:

H_0: $\sigma_1^2 = \sigma_2^2$ (Variance of sample 1 and 2 are equal)

H_1: $\sigma_1^2 \neq \sigma_2^2$ (Variances of sample 1 and 2 are not equal)

If the null hypothesis of equality of variance is rejected using an *F-test*, then the *t-statistics* estimated from separate variance assumptions instead of pool variance should be used to test the differences in mean. The t-statistics is give by:

$$t = \frac{\mu_1 - \mu_2}{\sqrt{S_P^2\left(\frac{1}{n_1} - \frac{1}{n_2}\right)}} \quad \text{..... (4-1)}$$

$$t = \frac{\mu_1 - \mu_2}{\sqrt{\left(\frac{S_1^2}{n_1} - \frac{S_2^2}{n_2}\right)}} \quad \text{..... (4-2)}$$

$$S_P^2 = \frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2} \quad \text{..... (4-3)}$$

where:

μ_i = mean of group i.

n_i = number of observations in group i.

S_i^2 = sample variance in group i.

S_P^2 = pooled variance of sample 1 and 2.

where equation (4-1) is t-statistics under the assumption of equality of variance, and equation (4-2) is t-statistics under the separate variance assumption.

4.4.2 Factor Analysis

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* (Jobson 1992). One measure of the amount of information conveyed by each factor is its variance. The objective of the factor analysis is to generate a first factor that explains the maximum variance. Then, with the first factor and its associated loading fixed, factor analysis will locate a second factor that maximizes the variances it explains. The procedure continues until there are as many factors generated as there are variables (Aaker et al. 1998). *Factor analysis* can also be viewed as a statistical procedure for grouping variables into subsets such that the variables within each set are mutually highly correlated, whereas at the same time variables in different subsets are relatively un-correlated (Jobson 1992).

The two most commonly employed factor analytic procedures in marketing applications are *principal component analyses* and *common factor analyses*. If a researcher's objective is to summarize information in a larger set of variables into fewer factors, principal component analysis method is used. On the other hand, if the researcher's objective is to uncover underlying dimensions surrounding the original variables common factor analysis is used. Principal component analysis is based on the total information in each variable, where as common factor analysis is concerned only with the variance shared among all the variables (Aaker et al. 1998).

4.4.2.1 Model for Common Factor Analysis

The model for common factor analysis is composed of three sets of variables: a set of p observed variables $X_1, X_2, \ldots, Xp$ with mean vector μ and covariance matrix Σ

$(p \times p)$; a set of r unobserved variables called common factors $F_1, F_2, ...F_r$, where $r < p$, and a set of p unique but unobserved factors $U_1, U_2, ..., U_p$. The model is given by p equations (Jobson 1992):

$$(X_1 - \mu_1) = \lambda_{11}F_1 + \lambda_{12}F_2 + ... + \lambda_{1r}F_r + U_1$$
$$(X_2 - \mu_2) = \lambda_{21}F_1 + \lambda_{22}F_2 + ... + \lambda_{2r}F_r + U_2$$
$$.. \qquad\qquad ..... \quad (4\text{-}4)$$
$$(X_p - \mu_p) = \lambda_{p1}F_1 + \lambda_{p2}F_2 + ... + \lambda_{pr}F_r + Up$$

or equivalently in matrix notation

$$(X - \mu) = \lambda f + u \quad ..... \quad (4\text{-}5)$$

where:

X, μ and U are $(p \times 1)$ vectors,

f is the $(r \times 1)$ vector of linearly independent common factors, $F_j, j = 1,2, ..., r$;

λ is the $(p \times r)$ matrix consisting of the unknown factor loading.

A particular coefficient, λ_{ij}, of λ is called the loading of the i^{th} variable on the j^{th} factor, i=1,2,.....,p,

The unobservable factors F and U must satisfy the following assumptions to meet the orthogonality condition:

F and U are independent

$E(f) = E(u) = 0$, $E(ff') = I$, where I is a $(r \times r)$ identity matrix and

$E(uu') = \Psi$, where Ψ is a $(p \times p)$ diagonal matrix with elements σ^2_{ui},

$i = 1,2,...,p;$

iv) $E(uf') = 0$, no correlation between unique factors and common factors;

The variance of each variable (X) is: $\sigma^2 = \sum_{j=1}^{r} \lambda^2_{ij} + \sigma^2_{ui}$ ..... (4-6)

Hence the variance is divided into two parts. The first part in equation 4-6 is the variance explained by the common factors and is usually referred to as the *communality*. The second term is called the *unique variance* or *specific variance*. All the covariance or correlation are explained by the *common factors*. Some of these factors are assumed common to two or more variables. The unique factors are then assumed orthogonal to each other and they do not contribute to the co-variation between variables. Only

common factors contribute to the co-variation among the observed variables (Kline 1994).

4.4.2.2 Factor Rotation

Usually the initial factor extraction does not give interpretable factors. Factor rotation is usually done to get an interpretable factor-loading matrix (Jobson 1992). If a researcher can make the larger loading larger than before and the smaller loading smaller, then each variable is associated with a minimal number of factors. Hopefully, the variables that load strongly together on a particular factor will indicate a clear meaning with respect to the subject area at hand. If several factors have high loading on the same variables, it is difficult to ascertain how the factors differ and unique factors are not obtainable.

Upon factor rotation, the variance explained by each un-rotated factor is simply rearranged by the factor rotation. Although the factor matrix and percentage of variance accounted for by each factors does change, the communalities and the percentage of total variance explained do not change. There are a number of factor rotation techniques in use, they are: *Varimax, Quatrimax, Oblique and Equamax.* The *varimax* method of rotation is used for producing orthogonal factors that approach the simple structure objective (Jobson 1992) and is the most widely used method of factor rotation. *Varimax* aims to maximize the sum of variances of squared loading in the columns of the factor matrix. This produces in each column, a loading that is either high or near zero (Kline 1994).

4.4.2.3 Determining the Number of Factors

Several procedures have been proposed for determining the number of factors to be retained. These procedures include: the *eigen-value*, *scree plot* and *percentage of variance* criteria. Among these three procedures, *an eigen-value one criterion is* the most commonly used method (Jobson 1992). An *eigen-value* represents the amount of variance in the original variables that is associated with a factor. In other words, *eigen-value* represents the sum of the square of the factor loading of each variable on a factor. Under the *eigen-value one* criteria only factors that account for variances greater than one are

retained. Aaker et al (1998) notes that, a factor with an *eigen-value* less than one is no better than a single variable, since, due to standardization, each variable has a variance of 1. Therefore, a factor should explain at least the amount of variance in one variable; otherwise it is better to have the original variable.

4.4.2.4 Factor Scores

One output of most factor analysis programs is the values for each factor for all respondents or observations. These values are termed *factor scores*. For subsequent analysis it may be convenient and appropriate to work with the factor scores instead of original variables. Factor analysis reduces the number of variables to a few underlying constructs. For respondent k, the score for the j^{th} factor is estimated as (SPSS 1999):

$$F_{jk} = \sum_{i=1}^{P} W_{jk} X_{ik} \quad \text{..... (4-7)}$$

Where X_{ik} is the standardized value of the i^{th} variable for case k and W_{ji} is the factor score coefficient for the j^{th} factor and the i^{th} variable.

Factor scores estimated from expression (4-7) are included in the multinomial logit model to help estimate predicted and marginal probabilities of choosing a particular pricing and payment alternatives by co-operatives. Responses measured in 1-5 likert scale about the co-operative's perceptions on importance of various factors in choice of pricing and payment methods were used for common factor analysis using *varimax* factor rotation method.

The important strength of the factor analysis is, it can identify the underlying constructs in the data and can reduce the number of variables to a more manageable set. Factor analysis can help researchers to determine the redundant variables. The greatest limitation of factor analysis is that it is a highly subjective process (Aaker et al. 1999). The determination of the number of factors, their interpretation, and the rotation all involves subjective judgement. The other limitation is that no statistical tests are regularly employed in factor analysis. As a result, it is difficult to know if the results are merely accidental or really reflect something meaningful.

4.4.3 Multinomial Logit (MNL) Analysis

Ranked responses on seven methods of pricing and payment by co-operatives were elicited (Question # 20, Appendix E). A Multinomial Logit model was employed to estimate the probability of ranking the alternative as number "1" or the probability of choosing the alternative as the most preferred one. However, responses on alternatives "Guranteed Minimum Price", "Basis Contract" and "Hedge-to-Arrive Contract" ranking these as the most common practice (ranked as "1") were very few, so responses on these two alternatives are merged into the "Others" category. For the MNL model full ranking information was not used. As such, four pricing and payment practices, viz. spot market cash price, pooled price, fixed forward price contract and others were considered as dependent variables for estimation of expression (4-8). The estimation of the MNL model requires the normalization of one of the parameter set in order to identify the parameters of the model (Huang and Fu 1995, and Greene 1997). In this study, the regressions coefficients for alternative "OTHERS" was normalized and chosen as the base. As such, the probability of choosing a particular pricing and payment alternative as the most common practices by co-operatives can be estimated by the multinomial logit model (Greene 1993, p. 666):

$$\Pr(j) = \frac{\exp(\beta_j' X_i)}{1 + \sum_{k=1}^{4} \exp(\beta_k' X_i)} \quad \text{for j=1,2,3,4} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(4-8)}$$

where the *Pr(j)* is the probability of co-operative's choice of a particular pricing and payment practice, as the most common method *j*; X_i represents a set of demographic variables of co-operatives, and β_j is a vector of unknown parameters (Huang and Fu 1995). This assumes that alternative given a rank of "1" are chosen and the other alternatives are not chosen.

The estimated coefficients ($\beta's$) from expression 4-8 only represents the relative movement between a pair of choice outcomes with "Others" being the reference pricing and payment alternative. The sign and magnitude of coefficients estimated from the MNL model are not straightforward to interpret (Huang and Fu 1995). The sign of the estimated coefficient does not necessarily indicate the increase or decrease in the

probability of choosing the j^{th} alternative. Predicted probability of choosing alternative j can be estimated by expression (4-8) and marginal effects of changes in one of the independent variables (X) on predicted probabilities can be estimated by the expressions:

$$\delta_j = \frac{\partial \Pr_j}{\partial X_j} = \Pr_j \left[\beta_j - \sum_{k=0}^{J} \Pr_k \beta_k \right] \quad \text{.....(4-9)}$$

where Pr (j) is the probability of a co-operative choosing the j^{th} pricing and payment practices.

As such, the marginal effect measures the shift in the probability of an outcome with respect to change in a given regressor. However, it should be noted that some variables in the models are measured in terms of dummy variables (0's and 1's). "In the case of continuous variable a unit change approximates a small change, thereby the partial derivatives measures the marginal effect; while in the case of a dummy variable the only change is from 0 to 1 and 1 to 0, a 100% change" (Liao 1994, P.:20). Taking the partial derivative of a dummy variable tends to overestimate the marginal effect. Thus, the marginal effects on the event of probability estimated by expression 4-9 only provides an overall impression of the effects of characteristics on a choice of a particular pricing and payment practice. A more accurate approximation of the effects of a change in a dummy variable on choice probabilities can be accomplished by looking at the changes in the predicted probability of a "representative co-operatives" when the characteristics (X_k) is equal to 1 and when it is equal to 0 (Liao 1994). This representative co-operative represents the characteristics of an average co-operative in the sample, regardless of their choice of pricing and payment practices. The latter method of evaluating marginal probabilities is used in this study.

4.4.4 Rank Logit Model

As mentioned in the preceding section, ranked responses on seven pricing and payment alternatives were elicited. Responses on rank cannot be modeled with an ordinary least square (OLS) regression model because of the non-interval nature of dependent variables. Including all ranked responses in a multinomial logit model fails to account for the ordinal nature of dependent variables (Greene 1993). Respondents were

asked to rank the given alternatives, so dependent variables are not inherently ordered. Therefore we can not use an ordered probit and logit model.

Ben-Akiva et al. (1992) argues that to estimate discrete choice models from ranking data, one must identify the correct relation between ranking and choice probabilities. 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, and the multinomial logit (MNL) structure provides the appropriate model.

According to Ben-Akiva et al. (1992) if the probabilistic choice process generating ranking data follows *Luce's Choice Axiom*, a ranking of J alternatives is equivalent to the following sequence of independent choice tasks: the alternative ranked first is chosen over all the other alternatives, the second ranked alternative is preferred to all others except the first ranked, and so on. Decomposition of a ranking probability in terms of choice probability follows:

$$P(1,2,.....,J) = P(1 \mid \{1,2,.....,J\})P(2 \mid \{2,3,.....,J\}).....P(J-1 \mid \{J-1,J\})$$

$$= \prod_{J=1}^{J-1} P(j \mid \{j, j+1,.....,J\}) \quad \text{..... (4-10)}$$

Where $P(1,2,.....,J)$ is the probability of observing the rank order of alternative 1 being preferred to alternative 2, alternative 2 preferred to alternative 3, and so on, and $P\{j|j,j+1,.....,J\}$ is the probability of alternative j being chosen from the set of alternatives $\{j,j+1,.....,J\}$. *Luce's axiom* implies that choice probabilities follow the structure of the MNL model. This means that all the choice probabilities in equation 4-10, $P(j,j+1,.....,J\})$, $j=1,....,J-1$, can be derived from the same logit model. The ranking probability for this ranked-ordered logit model for co-operative i is:

$$P_i(1,2,....,J \mid \beta) = \prod_{j=1}^{J-1} \frac{\exp(\beta_j' X_i)}{1 + \sum_{k=j}^{J} \exp(\beta_k' X_i)} \quad \text{..... (4-11)}$$

For K observations of ranking data, the log-likelihood function for a logit model is:

$$L(\beta) = \sum_{j=1}^{J-1} \sum_{k=1}^{K} \left[\beta' X_{ik} - \ln \sum_{i=j}^{J} \exp(\beta' X_{ik}) \right] \quad \text{..... (4-12)}$$

Equation 4-11 is used to estimate the probability of choosing alternatives when the responses on dependent variables are in ranked form.

Essentially, both multinomial logit model and rank logit model estimates the probability of choosing a particular alternative. Rank logit model is used when the responses on dependent variables are in ranked order. Both multinomial logit and rank logit models were estimated whether there is any differences in estimated parameters and probabilities. Ben-Akiva et al. (1992) and Layton (2000) argue that in the rank-logit model the reliability of parameters estimated from the ranking information decreases as ranks are added. They asserted that respondents rank lower-valued alternatives with less care than higher-valued alternatives or that they are simply more "sure" of their first few choices than they are about their last few choices.

One important issue in the use of multinomial logit models is the assumption of independence from irrelevant alternatives (IIA). This IIA assumption follows from the initial assumption that the disturbances are independent (Liao 1994). Since rank-logit model is an extended version of multinomial and conditional logit model, it embodies the same potential problem (Layton 2000). Assumption of IIA implies that the probability of choosing one alternative should be independent from choice probability of other alternatives, which is known as *independence of irrelevant alternatives* (IIA). However, if two or more alternatives are close substitutes then the assumptions of IIA could likely to be violated and MNL model would not be inappropriate (Kennedy 1992). Therefore, researcher should keep the IIA in mind when estimating MNL models.

Hausman's specification test is used to test the inherent assumption of the IIA. The procedure is, first, to estimate the model with all choices. Then estimate the model with a smaller set of choices but with the same regressors (Greene 1993). The test statistic is:

$$\chi^2 = [\beta_r - \beta_u]'[V_r - V_u]^{-1}[\beta_r - \beta_u] \quad \text{..... (4-13)}$$

where subscript r and u indicates the estimators based on the restricted subset and unrestricted subset respectively, Vs are the estimates of the asymptotic covariance matrices. The statistic is asymptotically distributed as chi-squared with K degrees of freedom. However, due to the nature of the data and amount of grouping that was done to the data, the IIA test is not conducted.

4.5 Chapter Summary

A questionnaire was designed to elicit information on differential demographic characteristics of traditional and new generation co-operatives. Besides demographic characteristics of co-operatives, information on level of competition and differential price payment were also asked. Closed-ended questions were also asked to elicit the co-operative's perceptions about the importance of various factors in the choice of pricing and payment contracts. Mail questionnaires were sent to one hundred and ninety five (195) traditional marketing as well as new generation co-operatives in the U.S.A. and Canada. Four analytical methods are used to analyze the various types of data collected from the mail survey. These methodologies are mean score comparison, factor analysis, the multinomial logit analysis and the rank logit model.

CHAPTER 5: DATA RESPONSES AND DATA DESCRIPTION OF VARIABLES.

5.1 Introduction

This chapter discusses the response rate on section I of the survey and responses to each questions except the type of commodities purchased and sold by co-operatives. It also describes the frequency distribution of responses on various questions from the survey. As discussed in Chapter 2, only co-operatives having a closed membership policy, accepting a fixed quantity of commodity and with the provision of transferable equity stocks are named as "New Generation Co-operatives" (NGCs). The number of pure NGCs are very few, therefore the frequency analysis of responses on various survey questions were done on differential characteristics of traditional and new generation co-operatives.

5.2 Response Rate of Survey

In the initial sample, questionnaires were sent to 195 co-operatives. These co-operatives were identified by initial telephone contact. At the time of telephone contact forty (40) co-operatives were identified as NGCs and one hundred fifty five (155) were identified as traditional co-operatives. Ninety three (93) co-operatives returned the questionnaire, a return rate of almost 48.0%. Among those returned, nine questionnaires were blank. Two of them turned out to be only input supply co-operatives, three co-operatives have just started a business so they could not respond to the questionnaire and four co-operatives had shut down their business so did not respond to the questionnaire. Analyses and discussion of results is based on eighty four (84) questionnaires, which accounts for more than 43% of the surveyed sample. Table 5-1 shows the response rate by country and by type of co-operative.

Table 5-1 shows that among the co-operatives who responded to the survey questionnaire, ten (10) co-operatives are pure NGCs (closed member, accept any quantity and transferable equity stocks). This accounts for 25% of surveyed NGCs. Forty nine (49) co-operatives are pure traditional co-operatives (open member, accept any quantity

and non-transferable equity stocks), which accounts for more than 31% of surveyed traditional co-operatives. Twenty five (25) co-operatives have mixed characteristics of NGCs and traditional co-operatives. Considering the limited sample size, these responses can be considered as relatively representative of the targeted population.

5.3 Respondents of Survey:

While taking the consent from co-operatives before mailing the questionnaire, co-operatives were asked the name of person to whom the mail questionnaire should be addressed. It was assumed that either the general manager or board of directors plays an important role in decision making process. Therefore, it was expected that either managers or board of directors would answer the questions. Eighty two (82) respondents indicated their role in the co-operatives. Figure 5-1 shows the majority of respondents who answered the questions on behalf of their co-operatives were managers (76), four respondents reported that they are members of the board of directors, and two were in others category.

5.4 Demographic Features of Co-operatives

According to Figure 5-2, sixty two of the surveyed co-operatives have an open membership policy, 66 of them accept any quantity of commodity delivered by members, 43 of them are engaged in some kind of processing activity, 57 co-operatives do not have a provision for transferring and selling the equity owned by members, 65 co-operatives accept commodity from non-members and 59 of surveyed co-operatives have an equity revolving plan to redeem the member's equity capital.

Figure 5-3 shows that the majority of open membership co-operatives in both Canada and U.S.A. cited that open membership is the "co-operative's philosophy" as the main reason for adopting an open membership policy (Question # 4, Appendix E). The other cited reasons are: open member and more volume ensures efficient operation of co-operatives and increased bargaining power. Figure 5-4 shows that the main reason cited for a closed member policy by the majority of co-operatives is to match the marketing and processing facility of co-operatives (Question # 5, Appendix E). The other reason for

closed membership is "controlling the quality of commodity". A greater proportion of Canadian closed member co-operatives cited the "controlling the commodity quality" as one reason for closed membership than U.S. closed member co-operatives.

Based upon the qualitative responses (Question # 8, Appendix E) the majority of co-operatives with the provision of transferable equity shares indicated that transfer or sale of equity must be approved by the Board of Directors of the co-operatives. The buyer of equity must be able to supply the required quantity and quality of commodities to co-operatives. Members can sell equity to anyone but existing members in co-operative or co-operatives themselves have first right to purchase.

Open member co-operatives indicated that they purchase commodities from non-members to generate additional return for members, to gain new membership and to generate more volume of commodities to meet increased market demand (Question # 6, Appendix E). They also indicated that accepting the commodity from everyone is the co-operative's policy. Whereas closed membership co-operatives are found accepting commodity from non-members only when the co-operative is short of raw produce, when member's commodities are not ready to deliver to the co-operative and when a member defaults on delivery commitments to the co-operative.

Co-operatives who do not have an equity revolving plan indicated that member's in co-operatives do not hold equity positions (Question # 8, Appendix E). This is because the co-operative paid out all equity except membership fees at the year end. Some co-operatives cited that since members can sell their equity through the open or the stock market, co-operatives are not required to redeem equity.

Co-operatives who have an equity revolving plan cited that the Board of Directors (BoD's) decide at each year-end to revolve equity back to members based on the financial position of co-operative (Question # 9, Appendix E). Generally equity is redeemed in full either after the death of a member or when a member reaches a specified age. In other cases, a certain percentage of equity each year is regularly paid back to members throughout the period following a revolving cycle. The length of the revolving period is specified by the Board of Directors of the co-operative.

5.5 Number of Years of Business Operations

According to information presented in Table 5-2, the mean years of operation of closed member and fixed quantity delivery contract co-operatives are 27.45 and 11.8 years respectively. The mean years for the open member and unlimited quantity delivery contract co-operatives are 61.29 and 62.11 years respectively.

5.6 Member Size Distribution

Table 5-2 shows that the mean member size of co-operatives with open member or unlimited commodity delivery contract or non-transferable equity share are 3779, 3439 and 3726 respectively. The mean member size of co-operatives with closed member or fixed commodity delivery contract or transferable equity shares are 722, 782 and 2444.47 respectively. It appears that co-operatives having characteristics of NGCs have a smaller membership than co-operatives having characteristics of traditional marketing co-operatives.

Figure 5-5 also shows that a greater proportion of closed membership and fixed quantity commodity delivery contract co-operatives are in a member size group of *1-500* than co-operatives with open membership and unlimited quantity commodity delivery contract. On average, Canadian co-operatives in the survey are bigger than U.S. co-operatives in terms of size of members. This observation may be due to the small number of Canadian co-operatives that responded to the survey and a few of them are large co-operatives having over fifty thousand members.

5.7 Voting Mechanism and Sources of Capital

Figure 5-6 shows that more than eighty co-operatives have a one-member-one vote systems. Figure 5-7 shows that the majority of sampled co-operatives indicated loans from financial institutions (55.95%) are the most common source of capital for operations and expansion of businesses, followed by the retained earnings of members (42.85%). It also appears that a greater proportion of Canadian co-operatives are relying on debt, where as a greater proportion of U.S. co-operatives are relying on retained earning as their source of capital. Cobia et al (1989) argued that relying on debt as a

source of capital might hamper a co-operative's ability to survive, especially when the net income and interest rates fluctuate severely. With increased debt financing, co-operatives have to outlay a greater amount of revenue to pay loan interest. A greater proportion of both closed and open member co-operatives are relying on "retained member's earning" as the main source of capital. However, the quantity of retained earnings is dependent on net income, which fluctuates with the business success of co-operatives. The proportions of closed member co-operatives relying on "required equity purchased" by members (18.18%) and "entry fees" (13.63%) is greater than open member co-operatives. It corroborates the fact that new generation co-operatives are more dependent on member's up-front capital investment than are traditional marketing co-operatives.

5.8 Number of Competitors in Commodity and Output Market

Figure 5-8 shows that a greater proportion of co-operatives from U.S.A. has indicated the presence of more than six competing firms in their commodity market. A greater proportions of co-operatives with open membership, unlimited quantity delivery contract and non-transferable equity stocks have indicated the presence of more than six firms in their commodity market than do the co-operatives with closed membership, fixed quantity commodity delivery and transferable equity stocks. However, greater proportions of co-operatives with closed membership, fixed quantity delivery contract and transferable equity stocks have indicated the presence of two to zero competing firms in their commodity market than do co-operatives with open membership, unlimited quantity delivery contract and non-transferable equity stocks. Co-operatives having the characteristics of NGCs are operating in commodity markets with fewer competitors than are traditional marketing co-operatives.

Regarding the co-operative's output market, Figure 5-9 shows that the majority co-operatives have indicated the presence of more than six competing firms in their output market. However, a greater proportion of co-operatives with closed membership, fixed quantity delivery contract and transferable equity stocks have indicated the presence of two to zero competing firms in their output market than do the co-operatives with open membership, unlimited quantity delivery contract and non-transferable equity stocks. It appears that co-operatives possessing NGC characteristics are operating with

fewer competitors in both their commodity and output market. However, fewer competitors do not necessarily imply less competition. These results are consistent with the observation in the mid-west region of the U.S.A. that new generation co-operatives are doing business in niche markets such as: specialty cheese, ethanol plant, bison meat, specialty crops etc. and there are fewer competitors in these output market.

5.9 Proportion of Commodities Sold in Processed Form

Figure 5-10 shows that co-operatives in the United States sold a greater proportion of commodities (34.0%) in processed[1] form than co-operatives in Canada (29.0%). Co-operatives with closed membership policy, fixed quantity of commodity delivery contract or transferable equity share, sold greater proportions of commodities in processed form than co-operatives with open membership policy, unlimited quantity delivery contract or without the transferable equity stocks. It corroborates the claim that new generation co-operatives are involved in more processing activities than are traditional co-operatives.

5.10 Types of Differential Price Offered by Co-operatives

Rather than paying the same average price to all group members, co-operatives pay different prices for commodities supplied by different members. The motivation behind differential prices is that the average contribution of members in co-operatives' total revenue are not the same and the cost of providing a co-operative's services (processing and marketing) are different for different members (Cobia et al 1989). There may be several aspects that co-operatives can use to differentiate among members, but in this study only the commodity quality, volume, transportation and seasonal aspects are considered.

Figure 5-12 shows that the majority of co-operatives offer differential prices by paying quality premium for commodities. A greater proportion of co-operatives with the characteristics of new generation co-operatives are offering differential prices by offering transportation cost premiums for commodities delivered by members. Greater proportions

[1] Processing can be defined as physical transformation of raw commodities (Connor et al. 1985).

of co-operatives with the characteristics of traditional marketing co-operatives are offering differential prices through quality premium. Based on the responses on qualitative questions (Question # 21, Appendix E), co-operatives pay transportation costs to members only when there is competition to buy commodities and when members are located far away from collection points. Some co-operatives included a transportation cost premium in the delivery price of commodities so they do not make a separate payment. Competitive pressure and opportunity to obtain quality premiums in the output market are the main reasons for paying quality premiums (Question # 22, Appendix E). Depending upon the co-operatives' needs and competitive pressures to buy commodities, co-operatives are paying premiums for delivery in a specific time period (Question # 24, Appendix E).

5.11 Co-operative's Output Selling Contract in Output Market

Figure 5-12 shows that the majority of co-operatives sell their output through open market transactions. The greater proportion of co-operatives with fixed quantity delivery contracts and transferable equity stocks are selling their output through some contractual arrangements with buyers than do co-operatives with unlimited quantity delivery contracts and non-transferable equity stocks. These contracts include price contracts or volume contracts or both price and volume contracts with buyers. A greater proportion of closed membership co-operatives are selling their output through open market transactions than open membership co-operatives. This result is inconsistent with the results obtained for co-operatives with fixed quantity delivery contract and transferable equity stocks.

5.12 Co-operative's Output Buyer

Figure 5-13 shows that the majority of co-operatives were selling their output to processors, wholesalers and final consumers. A greater proportion of US co-operatives are selling their output to processors while a greater proportion of Canadian co-operatives are selling their output to wholesalers and retailers. A greater proportion of co-operatives with open membership policy or unlimited quantity commodity contracts are found

selling their output to processors. Greater proportions of co-operatives with closed membership policy or accepting fixed quantity of commodities are found selling output to retailers.

5.12 Pricing and Payment Practices

According to Figure 5-14, the majority of co-operatives indicated the spot market cash price (31%) is the most common pricing and payment practice for commodity supplied by members, followed by fixed forward price contract (30%) and pooled price (27%), respectively. A greater proportion of co-operatives in the U.S.A. indicated the fixed forward price contract (37 %) is their most common pricing and payment practice followed by the "spot market cash price" (35 %). The majority of Canadian co-operatives indicated pooling (58 %) is the most common pricing and payment practice.

A greater proportion of co-operatives with open membership policy or accepting any quantity of commodity indicated the spot market cash price is the most common pricing and payment practices followed by the fixed forward price contract. A greater proportion of co-operatives with closed membership policy or accepting fixed quantity of commodity indicated that pooling is the most common pricing and payment practices followed by fixed forward contracts. Co-operatives with the provision of transferable equity stocks indicated the fixed forward price contract is the most common practice followed by pooling. Spot market cash price appears to be the most common pricing and payment practice for co-operatives with the characteristics of traditional marketing co-operatives. Whereas pooling appear to be the most common pricing and payment practice for co-operatives with the characteristics of new generation co-operatives. A detailed percentage of the ranking of pricing and payment practices is presented in Appendix B.

5.13) Chapter Summary:

From the frequency analysis of responses on various survey questions, the development of co-operatives with the characteristics of NGCs is a recent phenomena. Co-operatives possessing NGC characteristics are smaller in member size and are engaged in processing activities to a greater extent than co-operatives possessing

characteristics of traditional co-operatives. Debt is the major source of capital for all co-operatives, however co-operatives with NGC characteristics are more often relying on required equity purchase and entry fees than are co-operatives with the characteristics of traditional co-operatives. Co-operatives with NGCs characteristics are doing businesses in potentially less competitive market environments than co-operatives with characteristics of traditional co-operatives. A greater proportion of co-operatives with NGC characteristics are selling 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 co-operatives with NGC characteristics, where as spot market cash price is the most common practice of co-operatives with the characteristics of traditional co-operatives.

The findings of this chapter are consistent with the hypotheses developed in Chapter 1 and theoretical analysis in Chapter 3. Co-operatives having the closed membership and fixed quantity delivery contract are practicing a pooling method to pay out member's return. Co-operative's might have practiced pooling to avoid the risk of operating deficits, while members may have participated with the expectation of higher returns. By paying spot market cash price, co-operatives with open membership and unlimited quantity delivery contract are passing on immediate benefits to their members in order to acquire sufficient volume of commodities.

Table 5-1: Number of Co-operatives Surveyed and Responses.

Types of co-operatives	Canada	U.S.A.	Total
Total numbers of questionnaire send out.	54	141	195 (84)[1]
Number of questionnaire send out to NGCs	4	36	40
Number of questionnaire send out to traditional co-op	50	105	155
Responses:			
Pure New Generation Co-operatives (Closed member, accept fixed quantity and transferable equity stocks)	0	10	10 (25.0%)[2]
Pure traditional co-operatives (Open member, accept any quantity and non-transferable equity stocks)	2	47	49 (31.6%)[3]
Mixed Co-operatives	17	8	25

[1] Total Response.
[2] & [3] Percentage of questionnaire send out to NGCs and traditional co-op, respectively.

Table 5-2: Mean Year of Operations and Member Size of Different Types of Co-operatives

Variables	Years of operations	Member size
Total sample	52.4	2494
Canadian co-operatives	50.9	8294
U.S. co-operatives	52.8	1311
Open member co-operatives	61.2	3779
Closed member co-operatives	27.4	723
Co-operatives accepting any quantity	62.1	3439
Co-operatives accepting fixed quantity	11.8	782
Co-operatives with transferable equity	32.1	2444
Co-operatives with non-transferable equity	62.1	3726

Figure 5-1: Type of Respondent in Co-operatives:

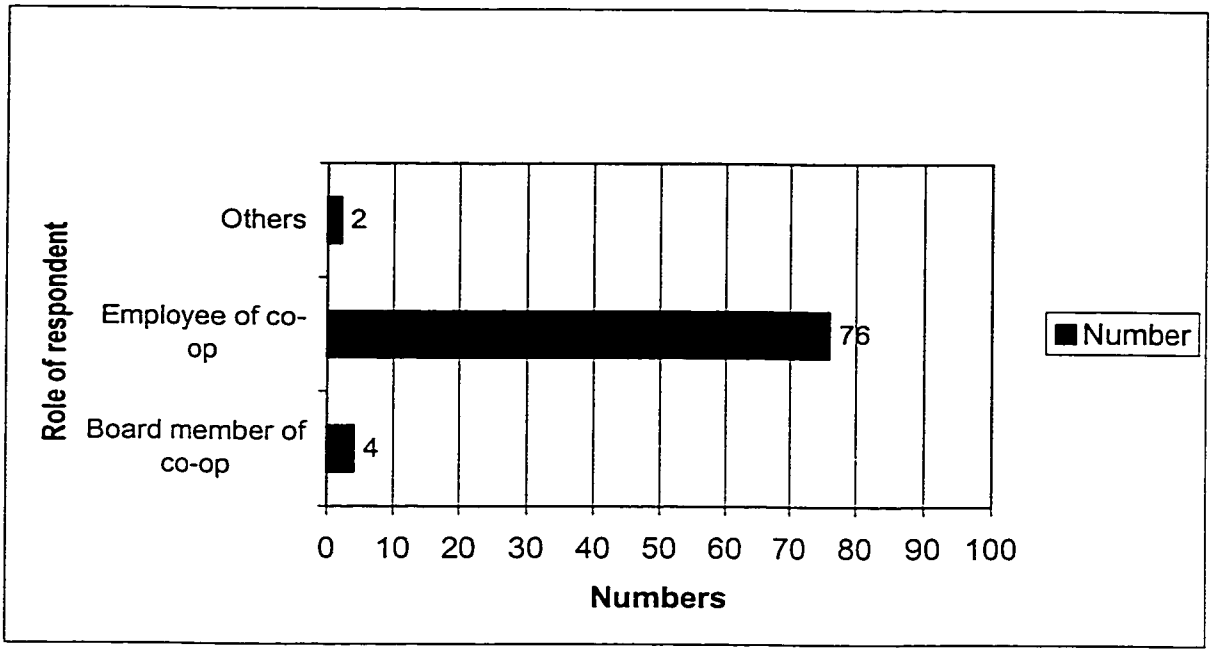


Figure 5-2: Frequency of Demographic Features of Co-operatives (Question # 3,6,7,9,13 and 15):

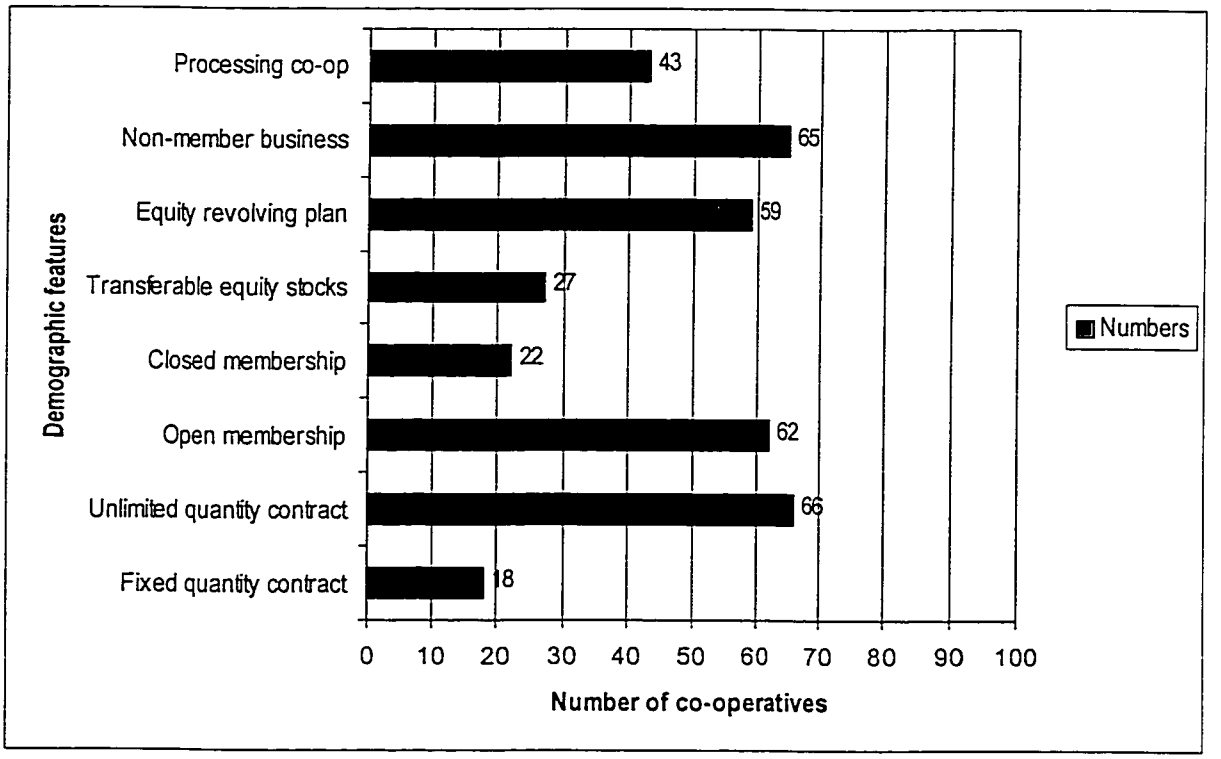


Figure 5-3: Reasons for Open Membership Policy (Question # 4):

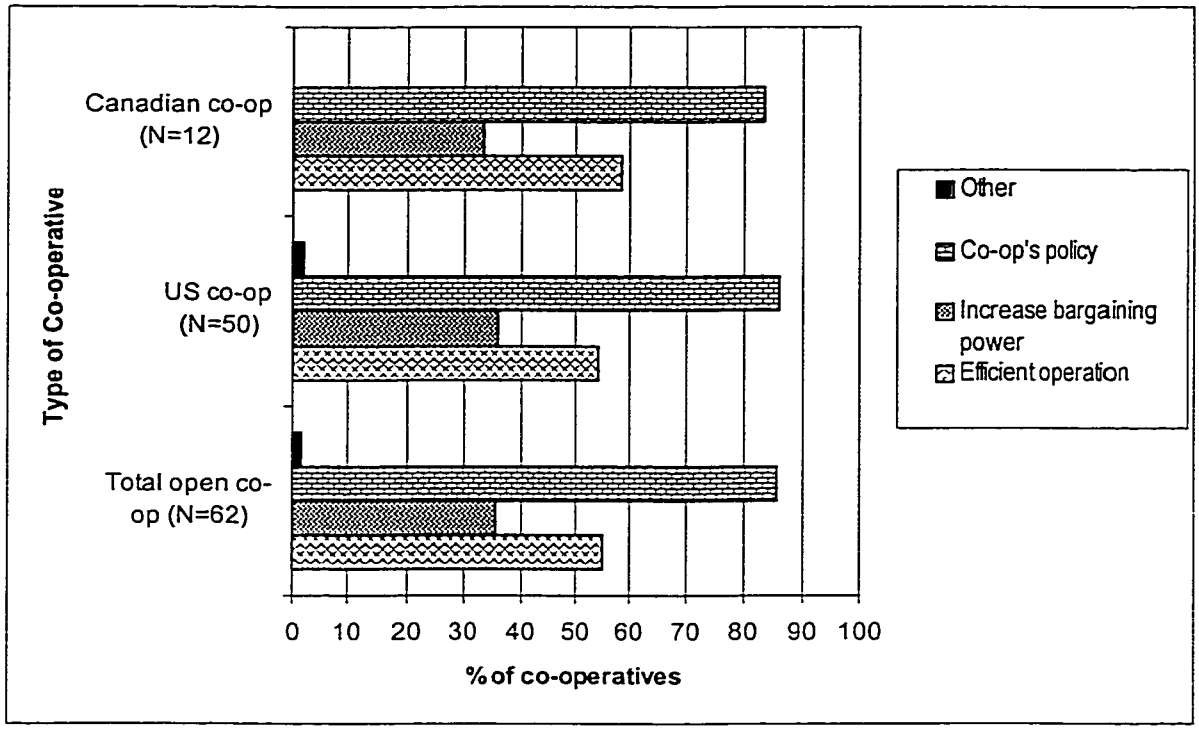


Figure 5-4: Reasons for Closed Membership Policy (Question # 5):

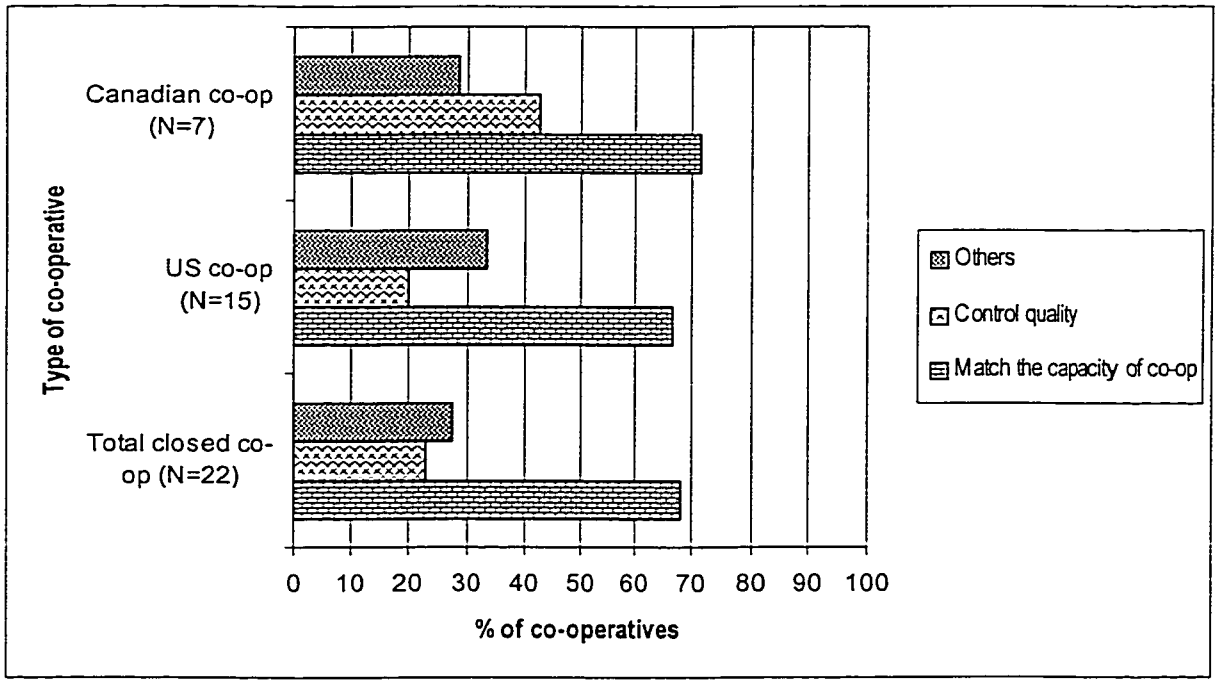


Figure 5-5: Member Size Distribution in Different Type of Co-operatives (Question # 2)

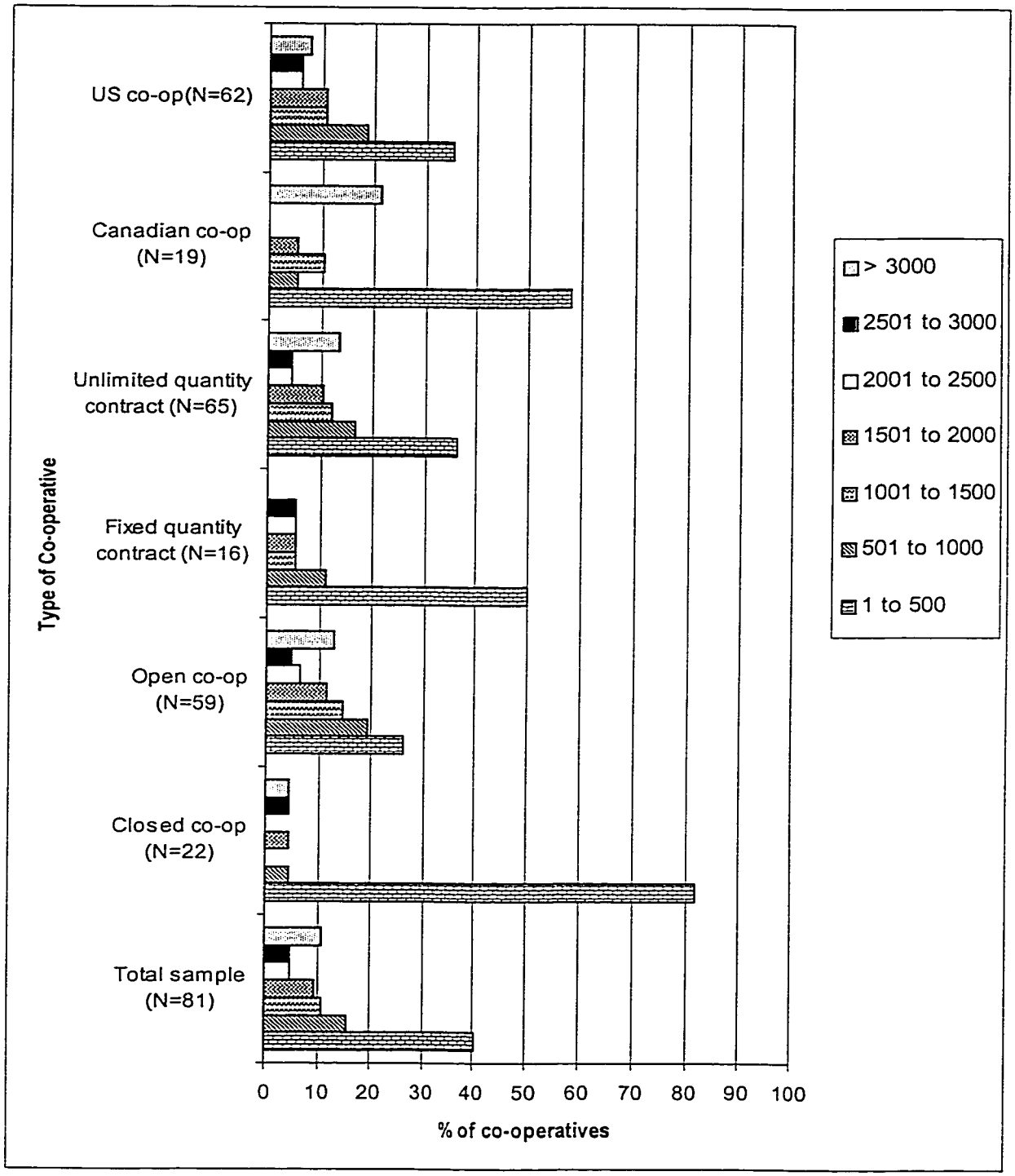


Figure 5-6: Voting Mechanisms in Co-operatives (Question # 11):

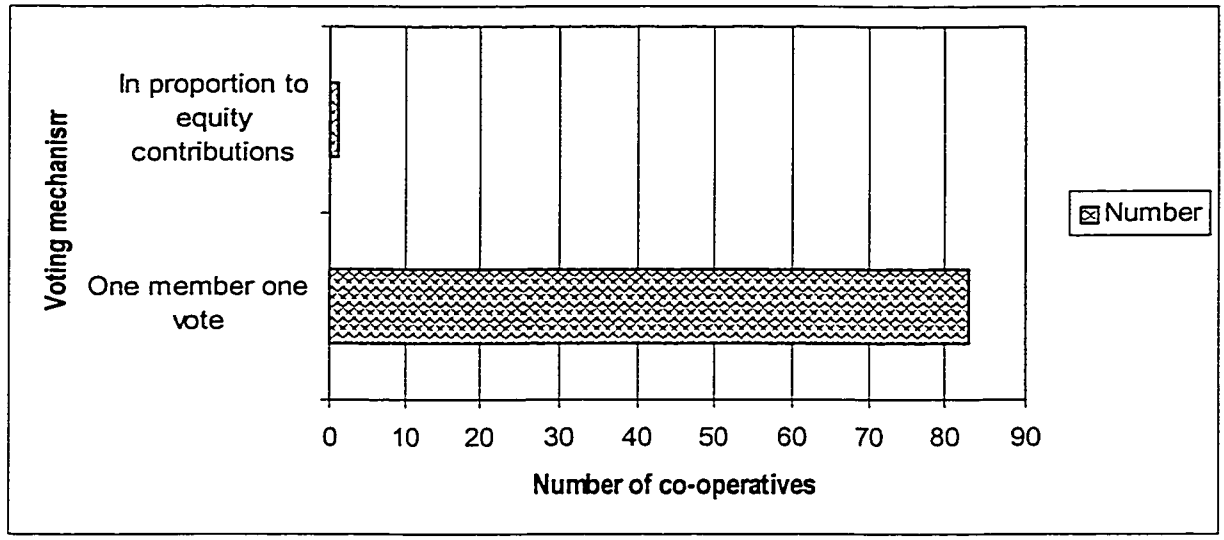


Figure 5-7: Most Common Sources of Capital by Different Type of Co-operatives (Question # 10):

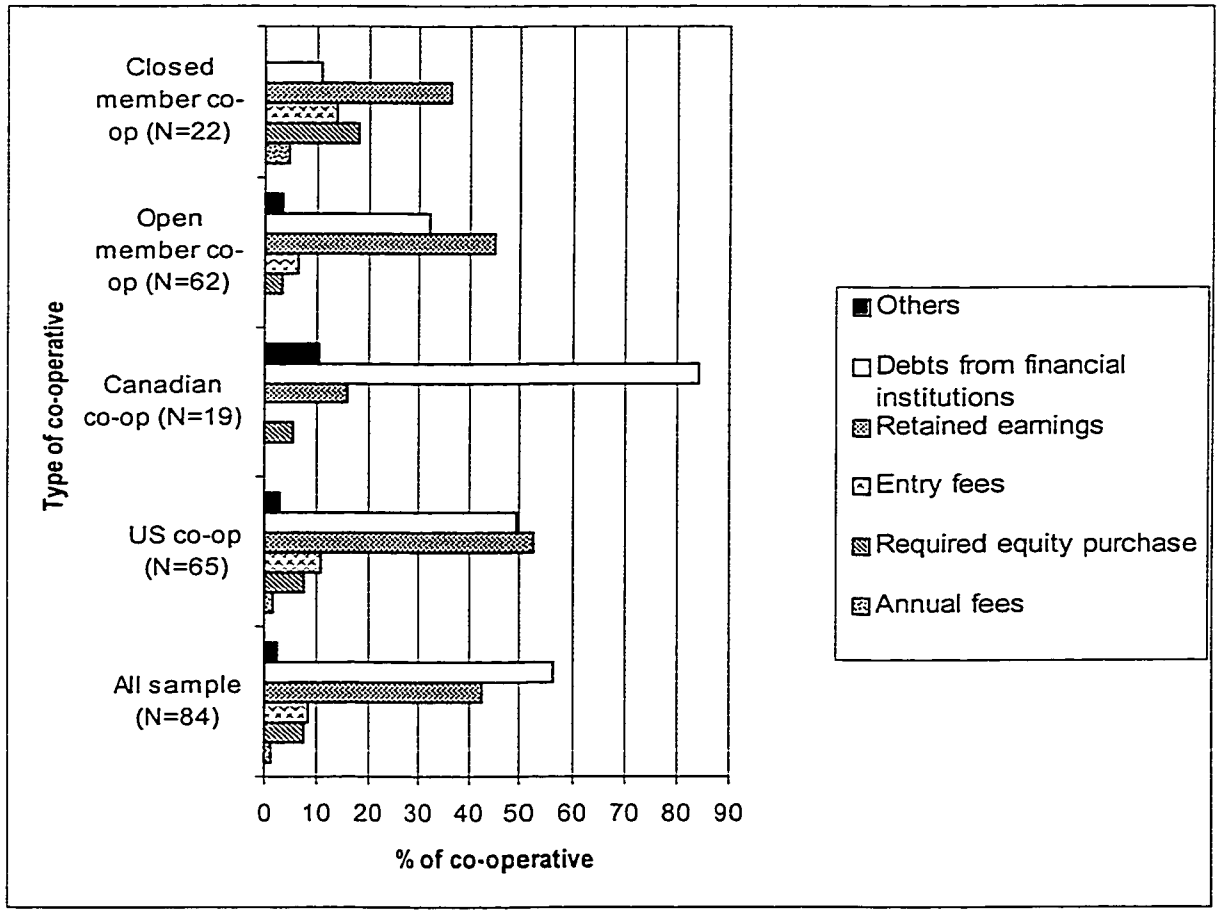


Figure 5-8: Co-operative's Perceptions About Number of Competitors in Commodity Market (Question #14):

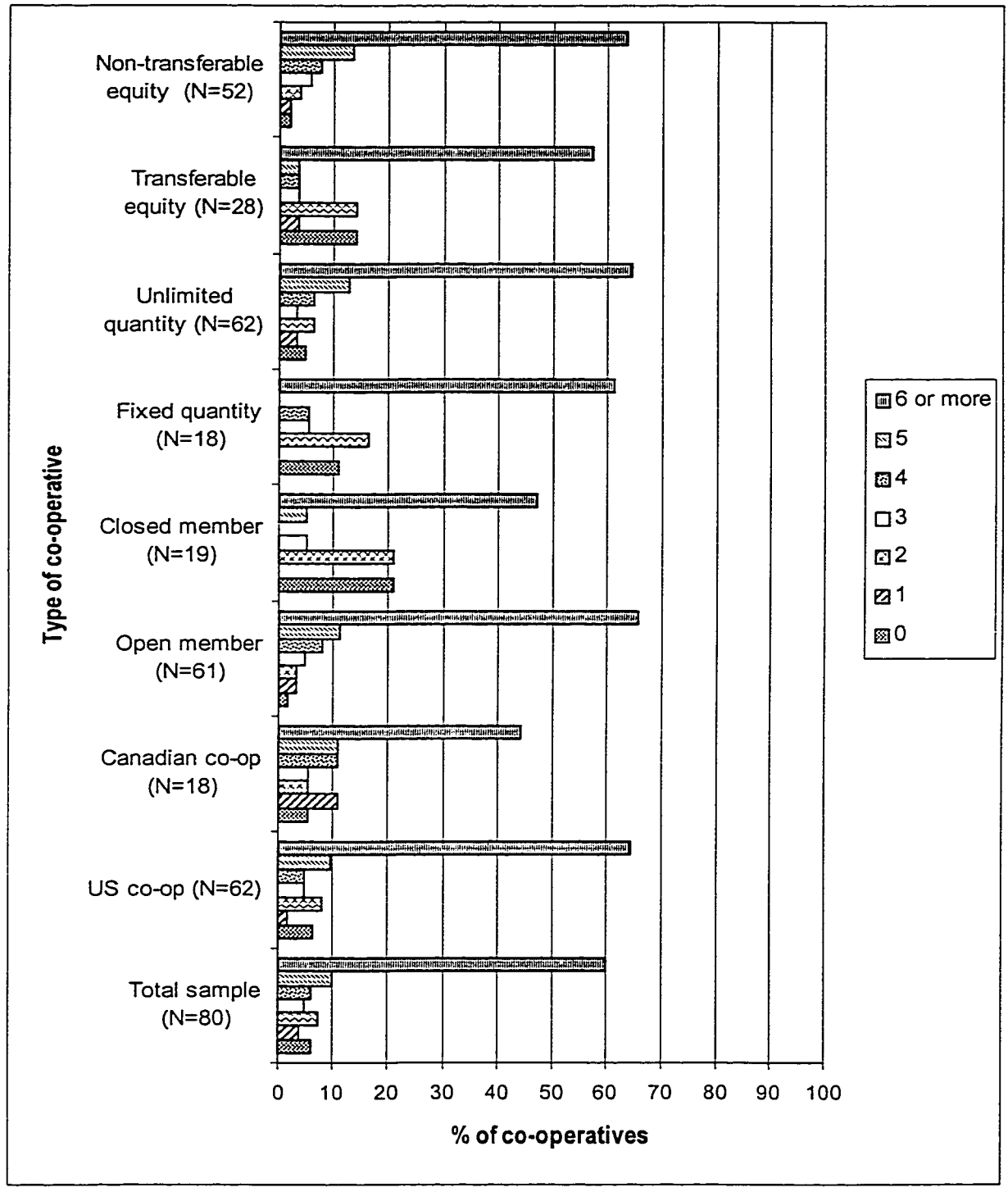


Figure 5-9: Co-operative's Perceptions on Number of Competitor in Their Output Market (Question # 17):

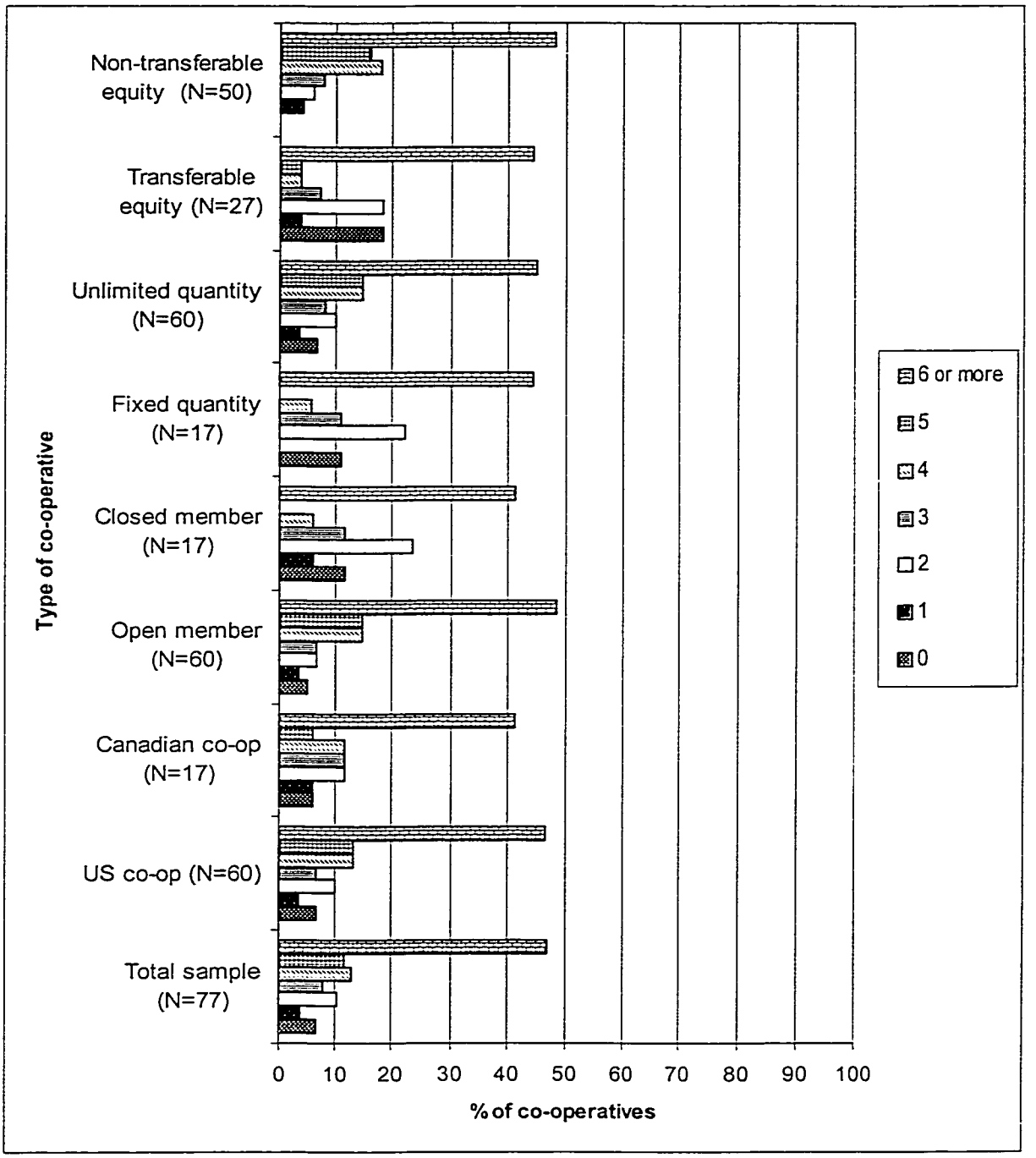


Figure 5-10: Average Percentage of Commodity Sold in Processed Form (Question # 15):

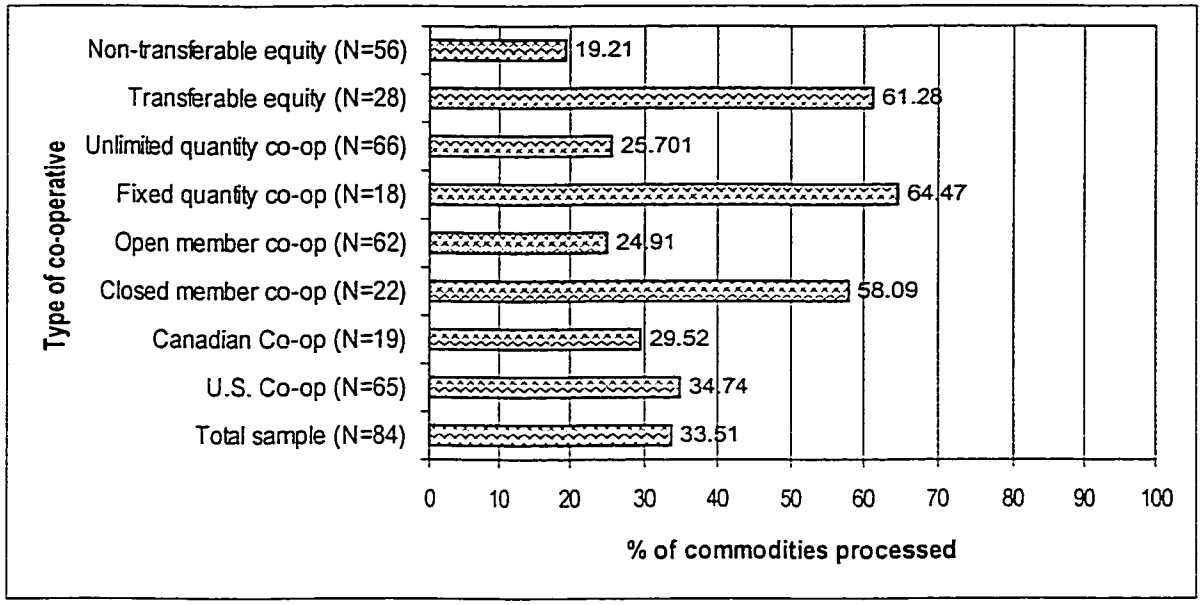


Figure 5-11: Differential Price Payment by Different Type of Co-operatives (Question #21,22,23,24).

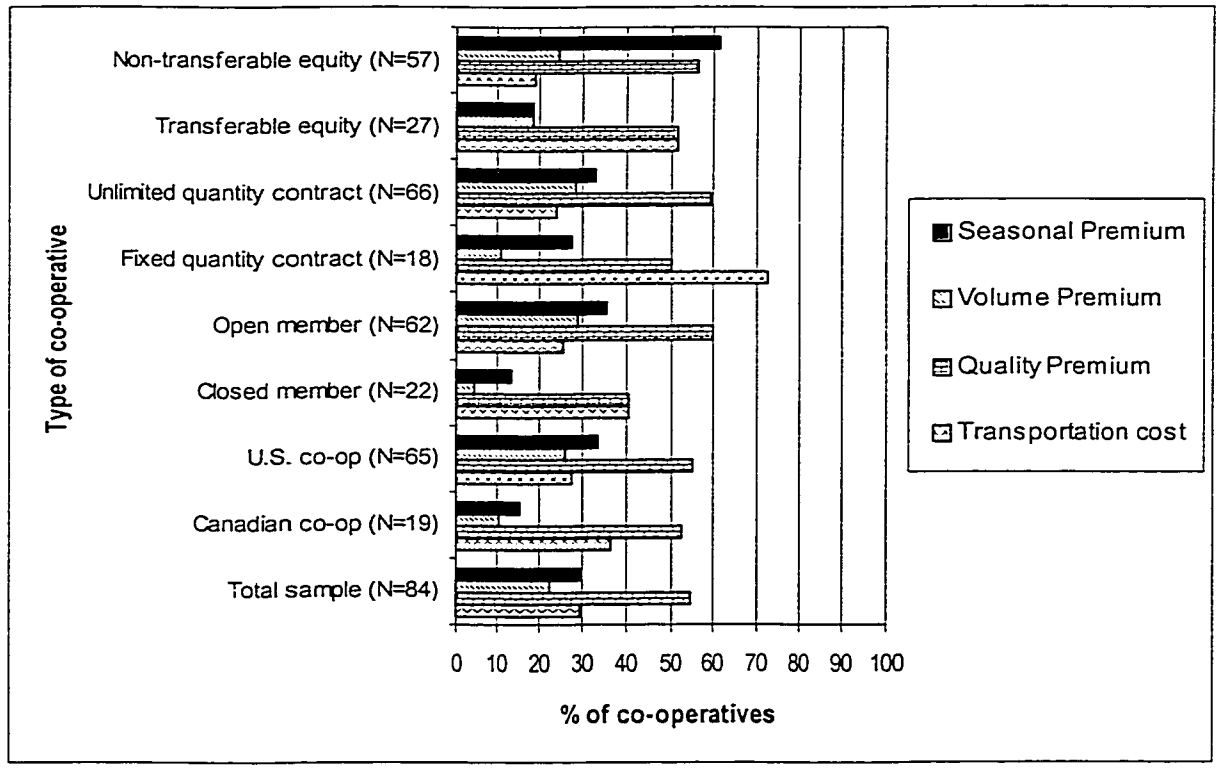


Figure 5-12: Co-operative's Output Selling Mechanisms in Output Market (Question #19).

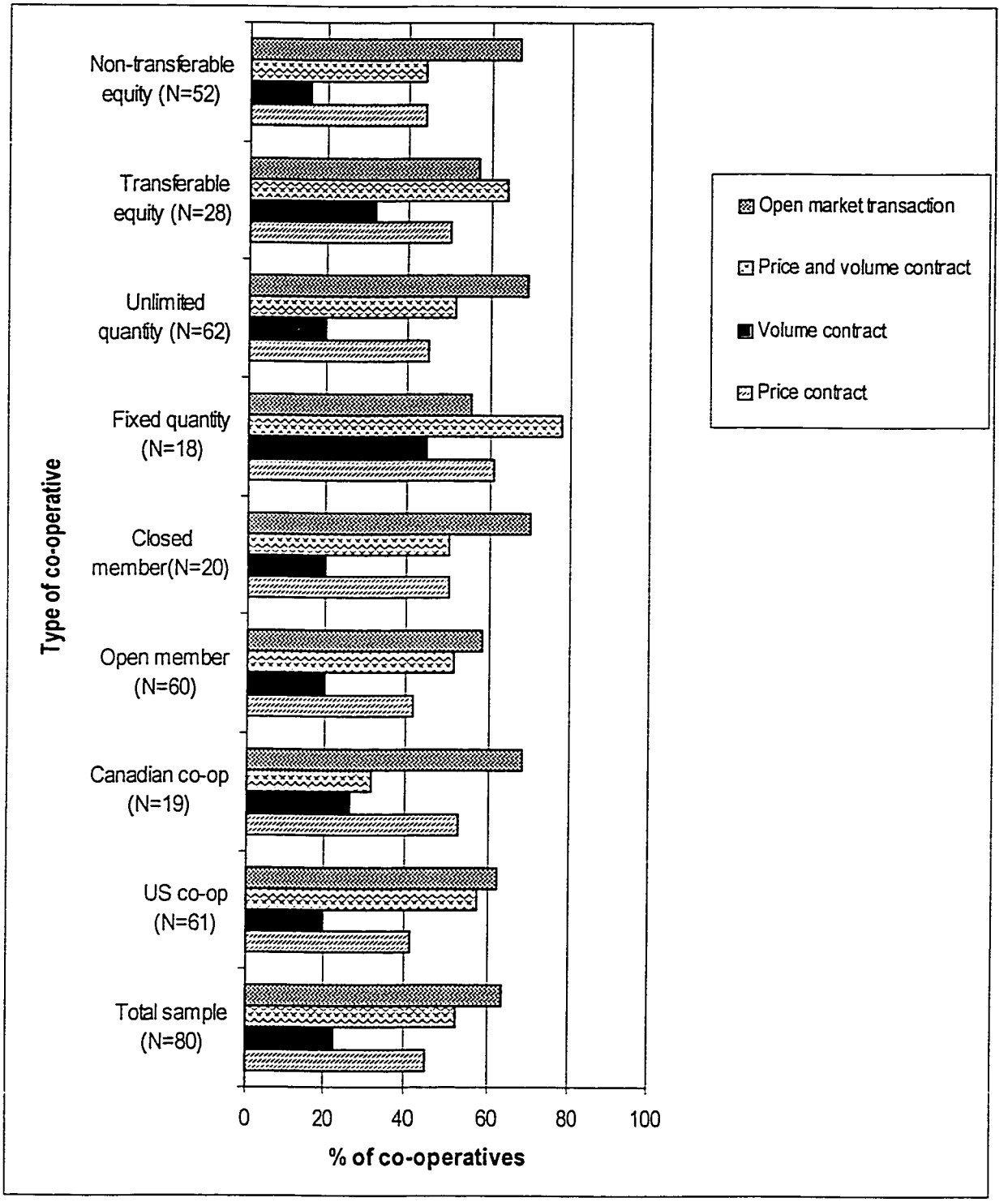


Figure 5-13: Buyers of Co-operative's Output (Question # 18).

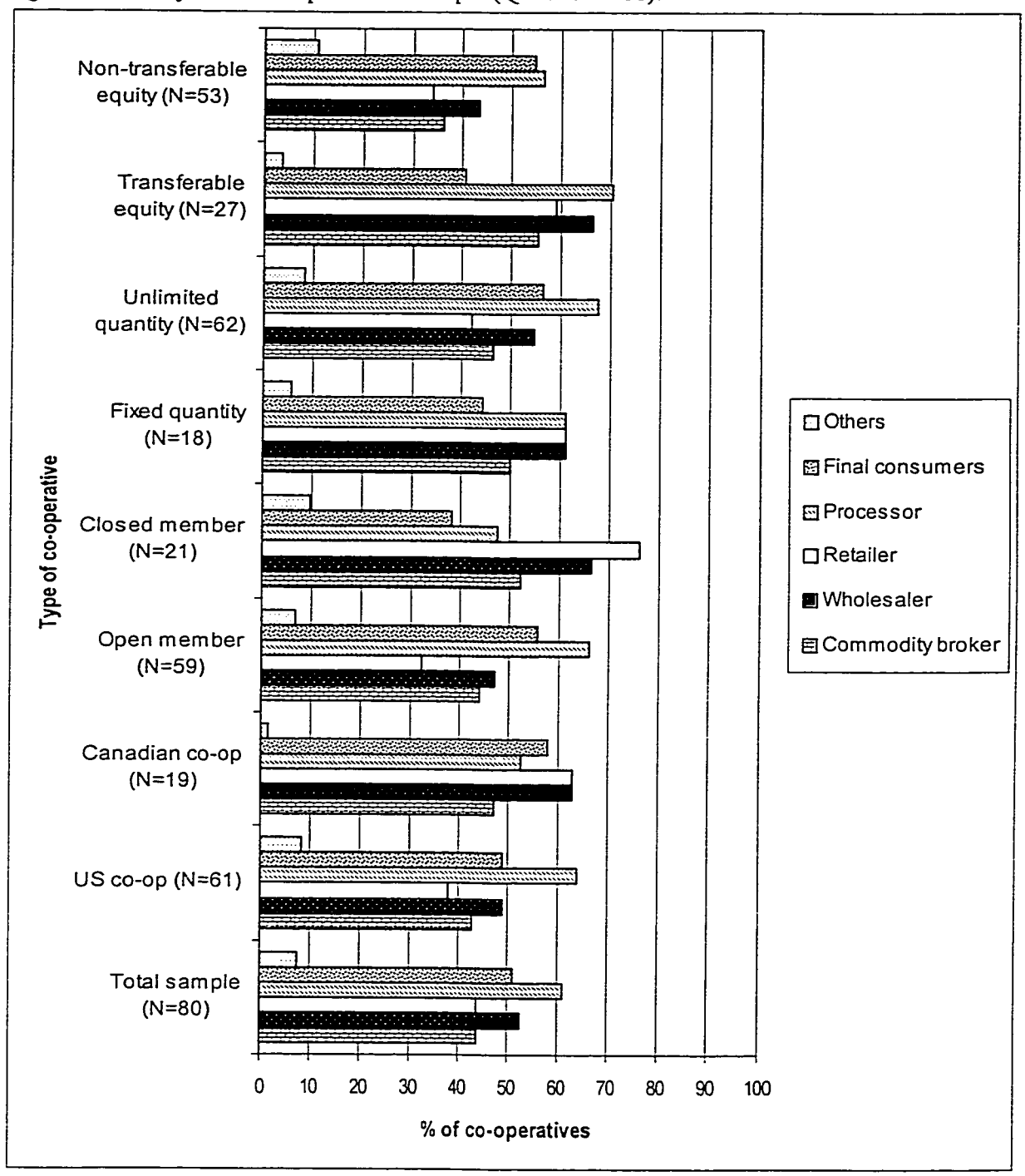
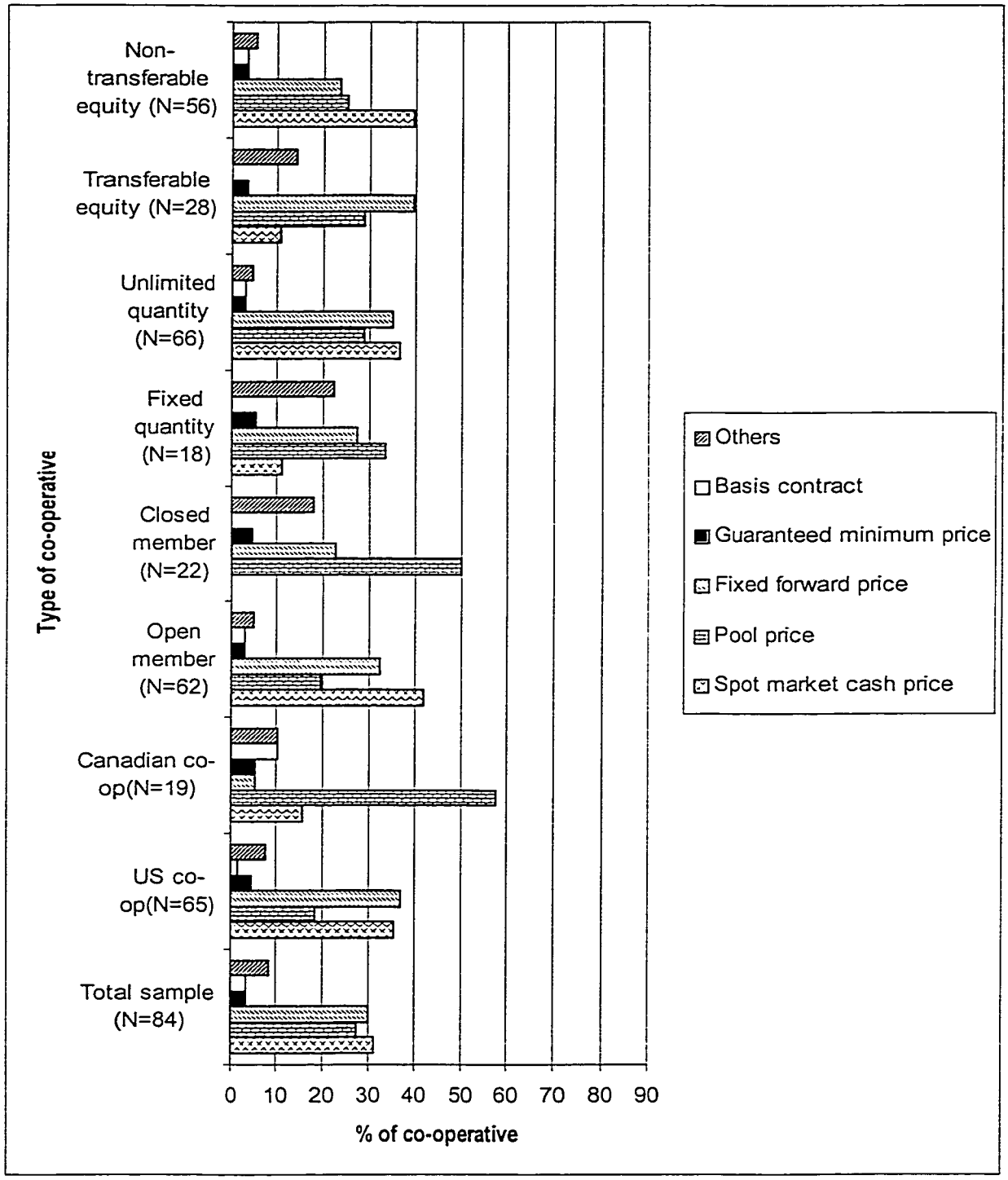


Figure 5-14: Most Common Pricing and Payment Contract Practiced by Different Co-operatives (Question # 20):



CHAPTER 6.0: ESTIMATION RESULTS AND DISCUSSIONS

This chapter has eight sections. The first section includes the results and discussions of the mean score analysis based on the response to various variables (Question # 1, Section II), which are considered important by co-operatives in choosing their pricing and payment alternatives. The second section includes the mean score analyses of co-operative's perceptions about the effectiveness of their pricing and payment practices in achieving various objectives of co-operatives (Question # 2, Section II). The third section includes the discussion of results from the factor analyses (Question # 1, Section II). The fourth section includes the discussion of multinomial logit (MNL) analysis of variables affecting co-operatives' choice of pricing and payment practices (Section I, Appendix E). Section 5 discusses the MNL model predictions of choice probability of pricing and payment practices for two different co-operative organizations. Section 6 includes discussions on the impact of increased competition on the choice probability of two different co-operative organizations. Section 7 includes the summary of the probability analysis. The final sections include the summary of chapter 6.

6.1 Mean Score Comparisons of Importance of Variables Between Various Type of Co-operatives

6.1.1 Background

In order to investigate the differences in co-operatives' perception about the importance of various variables in a co-operative's choice of pricing and payment practices, mean scores are compared. Responses are elicited on a 1-5 rating scale (Question # 1, Section II of Appendix E), where "1" indicates a variable under consideration is "unimportant" and "5" indicates it is "very important" in a co-operatives' decision to choose a pricing and payment alternative. Mean scores and standard deviation of these variables for the total sample are given in Table 6-1. Mean scores for all variables are greater than 3.0, generally co-operatives considered all nine variables important in their choice of pricing and payment alternatives.

New Generation Co-operatives (NGCs) differ from traditional co-operatives in membership structure, commodity delivery contract and tradable equity stocks. From the survey of co-ops, these features are not exclusively confined to NGCs and the number of NGCs consisting of all three characteristics is very few. Comparison of mean scores for each variable is done on co-operatives of *Canada vs. U.S.A.*; co-operatives with *open vs. closed* membership, *fixed quantity vs. unlimited quantity* commodity delivery contracts, and *transferable vs. nontransferable* equity stocks.

6.1.2 Results and Discussions

Tables 6-2 shows the results of mean comparison between co-operatives of Canada or USA origin. None of the variables under consideration are significantly different between co-operatives of Canada and the U.S.A. Co-operatives from both countries provided similar responses when evaluating their pricing and payment practices.

The hypothesis of equality of variance is not rejected for all variables, therefore pooled t-statistics (Equation 4-1) are used to compare the means of closed and open member co-operatives. The hypothesis of equal mean between closed and open member co-operative (Table 6-3) is rejected on questions about encouraging members to deliver to co-operatives, reducing member's uncertainty of return and treating all members equally. Open member co-operatives place significantly greater importance on encouraging members to deliver to their co-operatives. Closed member co-operatives on the other hand, emphasize more the need to reduce member's uncertainty of return and treating all members equally. These results are explained below.

In open membership co-operatives, members are not obliged to deliver commodity to their co-operatives. In order to acquire sufficient volumes of commodity, open member co-operatives may give more importance on encouraging members to deliver to co-operatives. Open member co-operatives may want to pass on immediate benefits to members in order to attract the more commodity. By paying the spot market cash price, open member co-operatives can attract more commodities. Since membership is open, open member co-operatives set price equal to average net revenue (ANR).

Due to binding contracts with members and significant equity capital contributions by members, closed member co-operatives may place greater importance on reducing member's uncertainty of return and treating all members equally.
Open member co-operatives in U.S.A. place greater importance on the presence of competitors in their output market and encouraging members to deliver to co-operatives (Table 6-4). Closed member co-operatives in Canada place greater importance on reducing operating deficits of co-operatives and treating all members equally.

Equality of variance hypothesis is rejected for only the variable matching the rival's pricing and payment policy, so t-statistics from separate variance assumptions (Equation 4-2) is used to compare the mean of that variable. Table 6-5 shows that the variables matching the rival's pricing and payment practices, and encouraging members to deliver to their co-operatives, are significantly different between co-operatives with fixed quantity and unlimited quantity delivery contract. Co-operatives with unlimited quantity delivery contracts place greater importance on matching rival's pricing and payment practices, and encouraging members to deliver to their co-operatives. U.S. co-operatives with unlimited commodity delivery also place greater importance on the presence of competitors in their output market than co-operatives with fixed quantity delivery contracts (Table 6-6). As discussed in Chapter 5, co-operatives accepting fixed quantities of a commodity might have already arranged the total quantity of commodity needed to match their handling, marketing and processing capacities. These co-operatives do not need to match rival's pricing policy to encourage members to deliver commodities in the short run. Canadian co-operatives with unlimited quantity delivery place greater importance on member's cash flow needs and equal treatment of members than do co-operatives with fixed quantity delivery contracts.

Table 6-7 shows that only the variable, encouraging members to deliver to their co-operative is significantly different between co-operatives with and without the provision of transferable equity stocks. Co-operatives with non-transferable equity stocks place greater importance to encouraging members to deliver to their co-operatives than do co-operatives with transferable equity stocks. As discussed in Chapter 2, co-operatives with non-transferable equity stocks faces two problems, viz. horizon and portfolio problems. These two problems create disincentives for members to invest in their co-

operatives, force the management to increase the share of cash payment relative to member's investment and expedite the equity redemption plan. In order to keep business and maintain the capital positions of co-operatives through increased earnings, co-operatives with non-transferable equity stocks generally give more consideration to encouraging members to deliver to their co-operative. In the case of co-operatives with the provision of transferable equity, co-operatives do not need to worry about revolving equity back to members since members themselves can sell their right to deliver commodities if they are not satisfied with their co-operative.

6.1.3 Conclusions of Mean Score Analysis

From the analysis of mean score comparison, co-operatives with the characteristics of traditional marketing co-operatives place greater importance on matching the competitors' pricing and payment policy, meeting competition in output markets and encouraging members to deliver to their co-operatives. This result is consistent with the third hypothesis in Chapter 1. According to the third hypothesis, traditional marketing co-operatives are more responsive to competitive levels in commodity markets. Co-operatives with characteristics of NGCs give more importance to reducing the risk of operating deficits, member's uncertainty of return and treating all members equally. These results could not substantiate the first hypothesis. According to the first hypothesis, NGCs are more likely to choose such pricing and payment alternatives which reduces the risk of operating deficits of co-operatives. Table 6.3 shows the closed member co-operatives give more importance on reducing the operating deficits, but Table 6-5 and 6-7 shows that co-operatives with unlimited quantity delivery contract and non-transferable equity stocks give more importance to reducing operating deficits than do co-operatives with fixed quantity delivery and transferable equity stocks. These results tend to reject hypothesis one.

The second hypothesis that traditional marketing co-operatives choose pricing and payment practices which minimize member's uncertainty of return, could not be supported from the mean score analysis. Table 6-3 shows that closed member co-operatives place significantly greater importance on reducing member's uncertainty of return. Table 6-5 and 6-7 show that co-operatives with closed membership and with

transferable equity stock place equal importance on reducing members' uncertainty of return. These results tend to lead to rejection of hypothesis two.

6.2 Mean Score Analysis of Co-operative's Perceived Successes of Pricing and Payment Practices

Mean scores are compared between different types of co-operatives to investigate the differences in perceived effectiveness of current pricing and payment practices used by each co-operative. Responses on effectiveness of current pricing and payment policies on achieving various goals are used for mean score analysis. These responses were elicited using a 1-5 scale (Question # 2, Section II of Appendix E), where "1" indicates "very unsuccessful" and "5" indicates "very successful".

Table 6-8 shows the sample mean and standard deviation of scores for the five variables under consideration. Based upon the mean scores, co-operatives in general perceived that their pricing and payment policies are successful in achieving the five goals.

Table 6-9 shows that none of the variables under consideration are significantly different between co-operatives in Canada and the USA. Similar kinds of perceptions about the effectiveness of pricing and payment policies are found for respondents of both Canadian and US co-operatives.

Table 6-10 shows that there is significant difference in perceptions about perceived success of pricing and payment practices between co-operatives accepting fixed quantity and unlimited quantity of commodities at maintaining the desired volume and at attracting the required quality of commodity. Co-operatives with fixed quantity delivery contracts believe they are more successful in acquiring the desired volume and quality of commodity than co-operatives with unlimited quantity delivery contracts. This result is consistent with the perception that in new generation co-operatives, there is often a two-way contract between member and co-operatives. Members must deliver the fixed quantity of commodity of specified quality stipulated in the contract terms and the co-operatives must accept the quantity and quality of commodities specified in the contract terms.

Table 6-10 shows that none of the variables under considerations are significantly different between open and closed member co-operatives. It seems that both types of co-operatives perceive similar kind of successes in their pricing and payment practices in achieving their various objectives.

Cross tabulation analysis was done between the pricing and payment alternatives ranked as number "one" and co-operatives' perceptions about effectiveness of their pricing and payment policies in achieving five goals (Question # 2, Section II). However, no clear relationships was found and the degree of association is very weak. Therefore, the results of cross tabulation analysis are not presented and discussed.

From the above mean score analysis, pricing and payment practices of co-operatives having characteristics of NGCs are more successful in acquiring required volume and quality of commodities than pricing and payment practice of co-operatives having characteristics of traditional marketing co-operatives.

6.3 Factor Analysis of Importance of Various Variables in Co-operative's Choice of Pricing and Payment Practices

6.3.1 Background

In this section, results of "common factor" analysis are discussed. Common factor analysis was done on responses elicited from question *i to ix* of Section II of the questionnaire (Appendix E). These responses are elicited on a 1-5 rating scale, in which "1" and "5" indicates variables are "Not Important at All" and "Very Important" respectively when co-operatives are choosing a particular pricing and payment practice. The responses are related to various factors; viz.; commodity and output market environment, financial management of co-operatives, members' welfare, co-operatives' goal and philosophy. Common factor analysis is done on the covariance matrix by using the principal component method of factor extraction, and the *varimax* method is used for the factor rotation. Discussion and analysis of results follow.

6.3.2) Results and Discussions:

Factor loadings were estimated using both principal component analysis and common factor analysis. The extracted factors only explained 58.3 % of total variance in

case of *principal component analysis*, where as 67.9% of variance is explained by extracted factors in *common factor analysis*. As a rule in factor analysis, extracted factors should explain as much variance as possible. Extracted factors from common factor analysis explained more variance than factors extracted by principal component analysis. Only the results on factor loadings and communality estimated from common factor analysis are presented and discussed in this section. Using the *eigen-value* criteria, four factors are retained. The rotated factor loading matrices from cofactor analyses are given in Table 6-11.

Factor 1 has the highest loading with the variables: co-operative's need to reduce the member's uncertainty of returns, maintaining target rate of return and risks of avoiding co-operative's operating deficit. More than 69% of the variance on these three factors are explained by the four factors. Thus factor *"1"* can be considered a *risk-return* factor for members and co-operatives.

Market environment variables, viz.; matching the rival's pricing and payment practices, and presence of competitors in co-operative's output market have higher loading with factor *"2"* with each variable having more than 68% communality. Factor 2 can be considered as *market environment* factor.

Co-operative's need to address cash flow needs of member producers and encouraging members to deliver into co-operatives have higher loading with *factor 3*, with a communality of more than 72% and 87% respectively. So *factor "3"* can be viewed as *member incentive* variable. Similarly, managing working capital and equal treatment of members have higher loading on *factor 4*. *Factor 4* can be considered as the *working capital management* factor. The importance of equal treatment of members explains only 36.4% of communality, which means all the extracted four factors can only explain 36.4% of variability in that variable. There must be other factors which are unique to that variable and not explored by the survey questions of this study.

Different groupings of factors are observed when separate factor analysis is done on responses from different types of co-operatives, such as closed (Table 6-13) and open member co-operatives (Table 6-12), co-operatives with fixed (Table 6-15) and unrestricted commodity delivery (Table 6-14) contract, and transferable (Table 6-16) and non-transferable equity stocks (Table 6-17). Co-operatives with characteristics of NGCs

and traditional co-operatives use different criteria to evaluate the importance of various variables. However, the groupings of variables on factors are not consistent with prior expectations. Variables, matching rivals' pricing and payment policy, and presence of competitor in the output markets are not grouped together. Both of these variables have lower factor loading for co-operatives with unlimited quantity delivery and non-transferable equity, which is contrary to the expectation. Much variation in groupings of variable is observed especially in traditional co-operatives. However, there is more or less consistent grouping of variables in co-operatives with closed membership, fixed quantity delivery and transferable equity shares. These variations made summarization of variables difficult. These variations might be due to the small sample size. So the results of separate factor analyses on different attributes of co-operatives are not discussed in detail .

6.3.3) Summary of factor analyses:

Although results of factor analyses do not explicitly support the hypotheses developed in chapter 1. Results of common factor analysis indicated that co-operative's decision to choose a pricing and payment practice for commodity delivered by members can be summarized by four factors. These factors are: *risk and return* of co-operatives and members, *market environment*, *member incentives* and *capital management* variable. In other words, co-operative considers risk and return of members and co-operatives, market environment in its commodity and output market, members' incentive and management of working capital as important factors. Variance explained by the extracted factors is not overly high when compared with other factor analysis studies, as in Kim et al. (1997). Members' know how and co-operative manager's familiarity with operation of different types of pricing and payment practices are crucial for success of a pricing and payment practices, and convincing members to participate. Therefore, members' education and managers' know how, questions missing in this study, could be included in future studies.

6.4 Multinomial Logit Analysis for Choice of Pricing and Payment Practices by Co-operatives

6.4.1 Model Development for Multinomial Logit Estimation

Ranked responses on seven pricing and payment alternatives were elicited from the co-operatives. These alternatives are: spot market cash price, pool price, fixed forward price, guaranteed minimum price, basis contract, hedge-to-arrive contract and others (Question # 20, Appendix E). These multiple alternatives of pricing and payment practices for co-operatives are the dependent variables for the multinomial logit analysis. Four multinomial logit models were estimated. Models 1 and 2 were estimated by using expression 4-8. In models 1 and 2, only the pricing and payment alternatives ranked as number "1" are included as dependent variable. Alternatives ranked other than number "1" are labeled as "0". Ranked responses on alternatives "hedge-to-arrive contract", "basis contract" and "guaranteed minimum price contract" as number "1" were very few or none. Singularity of matrix is observed when these alternatives are included in the model. Therefore, responses on these three alternatives are merged into "others" category. Along with demographic variables, factor scores extracted from factor analysis were also included as explanatory variables in model 2, where as only the demographic variables are included in model 1 (Table 6-19). A list of independent variables, definitions and labels of variables are given in Table 6-18.

Models 3 and 4 were estimated by using expression 4-11. In models 3 and 4, full rank responses on pricing and payment alternatives are included as dependent variables. As in models 1 and 2, when responses on all seven alternatives are included as dependent variables, singularity of matrix is observed. Ranked responses on alternatives "Basis Contract" and "Hedge-to-arrive contract" were deleted and the new ranks were assigned to remaining alternatives based upon the rank order of original response. As such, ranked responses on five alternatives, viz. spot market cash price, pool price, fixed forward price, guaranteed minimum price and others, became the dependent variables for models 3 and 4. Model 4 includes the factor scores extracted from factor analysis along with other demographic variables, where as model 3 includes only demographic variables as explanatory variables (Table 6-19). Factor scores were included in model 2 and 4, to investigate whether the importance of these factors are statistically valid or not. The

estimation of the multinomial logit model requires the normalization of one of the parameter sets in order to identify the parameters of the model. In this study, the regression coefficients for alternative "others" were normalized and chosen as the base.

6.4.2 Model Estimation and Results

Four multi-nominal logit models were estimated using LIMDEP, Version 7.0 (Greene 1995). Using equation 4-8, Models 1 and 2 predicts the co-operative's choice of the most common pricing and payment practices based on the various demographic characteristics of co-operatives and variables related to degree of competition in commodity market. Models 3 and 4, conversely, predicts co-operative's ranking of pricing and payment practices.

The results from the log-likelihood[2] ratio test indicate that the estimated model "1" and model "2" are statistically valid. The value of *pseudo R-square*[3] are 0.204 and 0.259 for models 1 and 2, respectively. These values of pseudo R-square indicate the acceptable goodness of fit. Due to the nature of the data and amount of grouping that was done to the data, the test of independent of irrelevant alternatives (IIA) is not conducted for non-ranked models 1 & 2. Models were also estimated by including COUNTRY variable as a regressor. The impact of COUNTRY variable was not significant and had little effect on the coefficient estimates of other independent variables. Therefore, results of these models are not discussed. Models were also estimated by including independent variables on whether the commodities purchased by co-operatives from members have a futures market or not. It is hypothesized that traditional co-operatives are operating in primary commodities business such as wheat, corn etc., where as NGCs are doing business on niche markets, such as bison meat, ethanol etc. Therefore, it is assumed that futures markets exist for commodities purchased by traditional co-operatives and does not exist for commodities purchased by NGCs. No clear results were obtained from MNL estimation on the relationship of futures markets and choice of pricing and payment

[2] Log-Likelihood Ratio=-2[Log-L unrestricted model – Log-L restricted model]
[3] Pseudo R^2 = 1-[LnL(β) / LnL(No coefficients)]

alternatives. Therefore, results of MNL models including futures market variables are not presented and discussed.

The results of the multinomial logit model "1" (Table 6-20) shows that membership policy has a statistically significant impact on the choice of pooling practices. Types of commodity delivery contract 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.

The results of the multinomial logit model "2" (Table 6-21) shows membership policy is statistically significantly associated with the choice of the spot market cash price. As in model "1", commodity delivery contract is associated with the choice of spot market cash price and fixed forward price contract. The market environment variable is associated with the choice of spot market and pooling practices. Results from models 1 and 2 corroborate the fact that the type of co-operative organizations and market environment affects the choice of pricing and payment practices.

The results from the log-likelihood ratio test indicate that the estimated model "3" and model "4" are statistically valid. The value for pseudo R-squares for Models 3 & 4 are 0.24 and 0.38 respectively. These value of pseudo R-square indicates the acceptable goodness of fit.

The results of ranked logit models 3 (Table 6-22) and 4 (Table 6-23) show membership variable is highly significant to the spot market cash price, fixed forward price contract and pooled price. Commodity delivery contract variable is significantly associated with fixed forward price and guaranteed minimum price. The variable transferable equity share is significantly associated with the fixed forward price contract. The number of competitors in commodity market have significant impact on the choice of pooling and guaranteed minimum price. The risk and return perception variable is significantly associated with the spot market cash price and guaranteed minimum price. This result is consistent with a priori expectation. With increased importance of risk and return, co-operatives either have to pay spot market cash price at the commodity delivery time or guarantee a minimum price to members.

When we compare models 1 and 3, variables membership policy, commodity delivery contract, transferable equity stocks and number of competitors are significant in both models. However, significant associations of these variables with choice alternatives are different. The proportions of commodity processed variable is not significant in model 1 but is significant in model 3. The sign on the coefficients of variables remained the same in both models. Similar results are observed when models 2 and 4 are compared. Coefficients estimated from the four models show that the distinguishing characteristics of NGCs and traditional co-operatives such as type of membership policy, commodity delivery contract and transferable equity stocks have a statistically significant impact on a co-operative's choice of pricing and payment practices. Similarly, the level of competition in the commodity market also has a significant impact on a co-operative's choice. These results 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. As mentioned in the methodology sections of Chapter 4, the coefficient estimates from probability models are not always straightforward to interpret. So further interpretations and analyses are based on predicted and marginal probabilities.

6.4.2.1 Predicted Probabilities and Marginal Probabilities For Representative Co-operative: Model 1 (non-ranked model)

Estimation of marginal probability of variables measured by factor scores is difficult to interpret. Models 1,2,3 & 4 provided similar qualitative results. Therefore, total and marginal probabilities were estimated by using the coefficients of models 1 and 3. Marginal probabilities of each variable are estimated for two scenarios. The first scenario is when the profile of a "representative traditional co-operatives" is retained as the base case, and the other is when the profile of a "representative new generation co-operatives" is retained as the base case. The "representative co-operative" represents the characteristics of the majority of NGCs and traditional co-operatives from the survey sample. Base case profiles for traditional co-operatives and NGCs, and changes in these levels are given it Tables 6-24 and 6-26 respectively.

Table 6-25 shows the predicted probability of the representative traditional co-operative (base case scenario) choosing the spot market cash price as the most common

pricing and payment practices is 0.5182, 0.1972 for pooling, 0.2351 for fixed forward price contract and 0.0493 for other practices. If a co-operative shifts its' policy of open membership to closed membership, keeping all other variables at base case level (Table 6-24), the choice probability of "spot market cash price" decreased by -0.4216 whereas the choice probability of the "pooling" increased by +0.5221. Similarly, if a co-operative shifts its policy of accepting unlimited quantity to fixed quantity of commodity from members then the choice probability of "spot market cash price" is decreased by -0.4101, where as the choice probability of "others" increased by +0.5449. When sign coefficients estimated in model 1(Table 6-20) are compared with the estimated marginal probability (Table 6-25), the directions of change in probability are same in both estimates. The membership variable has a negative sign with pooling alternatives (Table 6-20), which implies open membership co-operatives are less likely to choose pooling alternatives. When the open membership is changed to closed membership, the direction of change in choice probability of pooling has the expected positive sign. Similarly, commodity delivery contract variable has significant negative sign coefficients with spot market cash price and fixed forward price contract. When a traditional co-operative changes its' policy of accepting any quantity to fixed quantity the direction of change in choice probability of spot market cash price and fixed forward price have negative signs (Table 6-25). The sign on estimated coefficient parameters and predicted marginal probabilities are the same for the base case.

These results are consistent with the assumption that pooling is the popular pricing and payment practices in new generation co-operatives (Fulton 1997). In NGCs, the number of members and quantity of commodity to be delivered by each member are restricted according to the needs of the co-operative business. Therefore, NGCs do not need to attract any new members by matching competitor's price by offering spot market cash price. Members' in NGCs with an assured market for their commodities and expectation of higher returns from processing activities may not demand spot market cash prices. Furthermore, when co-operatives engage in processing activities, final returns will be realized only after the sale of final goods. Thus, the final return to the co-operative is uncertain at the time of commodity purchase. If the co-operative pays "spot market" cash price at the time of commodity delivery then co-operatives incur a risk of operating

deficits and place pressures on their working capital. By paying a pooled price, co-operatives can avoid the risk of operating deficit and use less working capital.

If the co-operative shifts its policy of non-transferable equity stocks to transferable equity stocks the choice probability of all pricing and payment alternatives are decreased except the fixed forward price contract (Table 6-25). In MNL model 1 (Table 6-20), the coefficient on transferability of equity is statistically significant with the alternative fixed forward price contract. With the transferability of equity stocks, members can adjust their asset portfolio to match their personal risk preferences. This increases the flexibility on the part of members about whether they continue to deliver to co-operatives or transfer that right to some one else. In order to maintain the members' commitment, co-operatives may want to assure the price paid to members by offering fixed forward price contracts. At the same time co-operatives might not be able to offer a spot market cash price due to uncertain final returns and pressures on managing working capital.

If one additional firm enters in the commodity market of the co-operative then the probability of choosing all the alternatives except the "spot market cash price" is decreased. The probability of choosing the spot market cash price is increased by +0.0217 (Table 6-25). This result is consistent with the assumption that with an increased number of firms in a market, the competition for the producer's commodity is increased. In order to acquire sufficient volumes of commodity for efficient operation, co-operatives may have to match the pricing and payment alternatives offered by rival firms. Producers may also have a strong time preference for cash. In such a situation producers may deliver to buyers who pay the spot cash price rather than waiting for uncertain returns at a later date.

Marginal probabilities are also estimated by using a base case profile of NGCs (Table 6-26). The estimated results are presented in Table 6-27. In order to estimate the marginal probabilities, the level variables are changed from closed to open member, fixed to any quantity and transferable to non-transferable equity stocks. It was expected that the direction of change in choice probability of a particular pricing and payment policy due to change in level of these variables, would be the opposite from the marginal probability estimated from the base profile for traditional co-operatives. Table 6-27 shows the

direction of change in predicted probability due to changes in membership, commodity delivery contract or transferable equity stocks are as expected. Changes in choice probability due to change in proportion of commodity processed and number of rival firms are as expected and consistent with the marginal probabilities estimated from the base profile of traditional co-operatives. Therefore, those results are not discussed further.

Marginal and predicted probabilities for the ranked logit model 3 were estimated but are not reported. According to the expression 4-11 (Chapter 4), we can estimate the probability for a particular order of ranking of choice alternatives, as well as the probability of choosing one alternative. There could be numerous combinations of ranked order of alternatives. The probability of a particular ranked logit model is very small if all the ranks are included. The marginal analysis from the ranked model 3, when using the model to choose only one alternative provides similar results as found with model 1. The estimated marginal probability for model 3 are given in appendix C and are not discussed further.

6.5 Predictions of Choice of Pricing and Payment Practices by Traditional and New Generation Co-operatives

6.5.1 Background

The New Generation Co-operative's (NGCs) are different from traditional marketing co-operatives in membership policy, commodity delivery contract, provision of tradable and transferable equity shares and level of processing activities. NGCs often have a closed membership policy, and accept fixed quantities of commodity from each member. Equity shares in NGCs can be transferred to any qualified member and the level of processing activities is higher in NGCs who responded to this survey. Traditional marketing co-operatives conversely often have open membership policies, accept any quantity of commodity, do not have a provision of transferable and tradable equity shares and are engaged in little or no value-added processing activities. This section seeks to identify what kind of pricing and payment options producers are likely to be offered if they join traditional marketing co-operatives or new generation co-operatives.

Predicted probabilities of choosing different alternatives for traditional marketing and new generation co-operatives are estimated when each type of co-operative has all

their set of distinguishing characteristics. The whole set of features which are considered different between NGCs and traditional marketing co-operatives are changed (Table 6-28).

6.5.2 Result and Discussions

The estimated choice probabilities for NGCs and traditional marketing co-operatives by using coefficient estimates of Model 1 are presented in Table 6-29. When producers deliver their commodities to traditional co-operatives, they are more likely to be offered the "spot market cash price" by co-operatives. The producers are more likely to be offered "pooled price" when producers shift their commodity delivery from traditional marketing co-operatives to new generation co-operatives,

This result does not reject the first and second hypothesis developed in Chapter 1. Although we do not verify with statistical tests, the probabilities are different. However, coefficients of some of the variables used in predicting choice probabilities are statistically significant (Table 6-20). The first hypothesis that new generation co-operatives choose pooling practices cannot be rejected. This result is also consistent with Fulton's (1997) claim that pooling has been a distinct pricing and payment practice in NGCs. Most NGCs are engaged in value-added processing ventures and final returns will only be realized after disposal of the final output. By paying a pooled price, new generation co-operatives can avoid an operating deficit and reduce pressure on their working capital. We also cannot reject the hypothesis that traditional co-operatives choose the spot market cash price. Due to an open membership policy, members are not obliged to deliver their commodities to co-operatives, so traditional co-operatives may have to offer immediate returns which eliminates the member's uncertainty of final returns.

Predicted probabilities estimated from ranked model 3, when each type of co-operative has all their set of distinguishing characteristics gives similar results (Appendix D) as found with model 1. Therefore, results of predicted probabilities estimated from ranked model 3 are not discussed further.

6.6 Predicted Impact of Increased Competition on Choice Probability of Pricing and Payment Alternatives.

This section analyzes the impact of increased competition in the commodity market on the choice probability of pricing and payment practices of traditional marketing and new generation co-operatives. Choice probabilities for both NGCs and traditional marketing co-operatives were estimated when they faced six (6) competitor and when they faced seven (7) competitor firms in their commodity market, keeping all other variables constant. These predicted probabilities were compared to probabilities estimated from the base case scenario presented in Table 6-28.

Table 6-30 shows that with the entry of one more firm into the co-operative's commodity market, the choice probability of the spot market cash price increases the most for traditional marketing co-operatives. The choice probability of pooling increases the most for NGCs. With the closed membership policy and fixed quantity commodity delivery contract, new generation co-operatives might have already arranged the total quantity of commodity needed to match their marketing and processing capacities. Therefore, with an increased number of buyers in the commodity market, new generation co-operatives may not have to match a rival's price to acquire the required quantity of commodity. Where as, in the case of traditional marketing co-operatives, with the provision of an open membership policy and accepting any quantity of commodity, members can deliver their commodities to anyone who offers better terms. With the increased number of commodity buyers, the co-operative may have to bid to match offers made by rival firms in order to acquire sufficient volumes of commodity. Although changes in probabilities were not tested statistically, the third hypothesis can not be rejected.

6.7 Summary of Probability Analysis

New generation co-operatives are more likely to offer *pooled price* contracts for commodities supplied by members where as traditional marketing co-operatives are more likely to offer *spot market cash prices*. Traditional marketing co-operatives are more responsive to increased competition in commodity markets than new generation co-operatives.

From the analysis of the multinomial logit models, traditional marketing co-operatives are more responsive to members' needs and the competitive environment. By paying the spot market cash price, traditional marketing co-operatives have addressed the members' cash flow needs and risk of uncertain returns. Because members are hypothesized to have strong time preferences for cash, they may want to avoid the risk of uncertain returns. However, by paying spot market cash prices traditional co-operatives may incur a risk of operating deficit due to output price risk and they may also need to outlay more working capital. These facts may act as a disincentive for traditional co-operatives to engage in further processing activities. However, co-operatives' requirement of working capital and risk of operating deficits depends upon the level of processing activities carried out by co-operatives, the period between the time of acquiring commodities from members and time of selling co-operatives' output, and the arrangement of output selling contracts.

By using a price pooling method, NGCs appear concerned about survival of co-operatives and less responsive to members in the short run. One motive for formation of new generation co-operatives is to capture greater proportions of the consumer's expenditure (Harris et al. 1996). With the expectation of a higher return from value added processing ventures or favorable price signals in the co-operative's output market, members may forgo the immediate benefit from receiving a spot market cash price at the time of commodity delivery. Furthermore, members in NGCs are required to make a significant up-front investment. Any pricing and payment practices that demand more working capital for co-operatives may pressure members to contribute more equity capital. Since only viable co-operatives can pass on greater benefit to their members, pricing and payment practices that minimize the risk of an operating deficit may be justified for new generation co-operatives.

6.8 Chapter Summary

From the mean score analysis, the third hypothesis that traditional co-operatives are more responsive to competitive level can not be rejected. However, the first and second hypothesis can not be rejected from mean score analysis. From the analysis of

mean score comparison, co-operatives with characteristics of traditional co-operatives are giving greater importance on matching the rivals' pricing and payment policies, meeting the competition in the output market, and encouraging members to deliver to their co-operative. Co-operatives with the characteristics of NGCs are found to place greater importance on reducing members' uncertainty of return and treating all members equally.

Results of factor analysis shows that the co-operatives' decision to choose pricing and payment practices for commodities supplied by members can be explained by four important factors. These are: perceptions of risk and return by co-operatives and members, market environment in commodity and output market, need to address incentive for members and management of working capital. Traditional and new generation co-operatives used different criteria to evaluate the importance of various variables.

From the coefficient estimates of non-ranked models 1 and 2, and ranked models 3 and 4, open member co-operatives are less likely to choose pooling practices but are likely to choose spot market cash price and fixed forward price contract. Co-operatives with fixed quantity delivery contract are less likely to choose spot market cash price. Therefore, statistically we cannot reject the second hypothesis that traditional co-operatives are more likely to choose spot market cash price. However, we do not have statistical ground to either reject or not reject the first hypothesis that new generation co-operatives are more likely to choose pooling practices. Coefficients for variables fixed commodity delivery contract and transferable delivery rights are not significantly associated with pooling alternative. Results from models 1 and 3 show that with an increased number of competitors, traditional co-operatives increase their probability of choosing spot market cash price. We did not directly statistically test the third hypotheses that traditional co-operatives are more responsive to changing levels of competition.

Probability analysis of multinomial logit shows that traditional co-operatives are more likely to offer spot market cash prices and they are also more responsive to changing competition in the commodity market than new generation co-operatives. New generation co-operatives are more likely to offer pooled price for commodities supplied by members. Therefore, from the probability analysis we can not reject all three hypotheses developed in Chapter 1.

Table 6-1: Mean and Standard Deviations of Scores of Important Variables (Question # 1, Section II)

Variables	Mean[1] (N=83)	Standard Deviation
Matching the rivals' pricing and payment practices	3.780	1.077
Managing work co-operatives' working capital	3.548	1.167
Presence of competitor in output market	3.731	1.006
Encouraging members to deliver to their co-op	3.390	1.303
Members' cash flow management	3.024	1.143
Avoiding co-operatives' risk of operating deficit	3.987	1.149
Reducing members' uncertainty of return	3.134	1.074
Maintaining target rate of return	3.573	1.122
Equal treatment of members	4.195	1.047

[1] Mean scores measured in 1-5 scale. 1 indicates variable is "Not Important at All" and 5 indicates "Very Important".

Table 6-2: Results of Mean Score comparison of U.S. and Canadian Co-operatives.

Variables	Mean scores[1]		*P*-value(2-tailed)
	Canada (N=18)	U.S.A.(N=65)	
Matching rival's pricing and payment policy	3.66	3.769	0.732
Managing working capital	3.44	3.538	0.769
Presence of competitor in output market	3.722	3.692	0.915
Encouraging members to deliver	3.352	3.400	0.895
Cash flow management of the member	3.117	3.000	0.708
Reducing the risk of operating deficit	3.914	3.553	0.852
Reducing the member's uncertainty of return	3.352	3.076	0.456
Maintaining the target rate of return	3.647	3.553	0.762
Treating the all members equally	4.117	4.276	0.643

N= Number of response for each country.
[1] Mean scores measured in 1-5 scale. 1 indicates variable is "Not Important at All" and 5 indicates "Very Important".

Table 6-3: Results of Mean Score Comparison of Closed and O pen Membership Co-operatives

Variables	Mean score[1]		*P*-value (2-tailed)
	Closed member (N=21)	Open Member (N=62)	
Matching rival's pricing and payment policy	3.428	3.854	0.189
Managing working capital	3.571	3.500	0.814
Presence of competitor in output market	3.285	3.838	0.084
Encouraging members to deliver	2.761	3.606	0.029*
Cash flow management of the member	3.047	3.016	0.915
Reducing the risk of operating deficit	4.333	3.868	0.111
Reducing the member's uncertainty of return	3.666	2.950	0.008**
Maintaining the target rate of return	3.761	3.508	0.375
Treating the all members equally	4.857	4.032	0.000**

* Mean score are significantly different at 95% confidence level.
** Mean score are significantly different at 99% confidence level.
[1] Mean scores measured in 1-5 scale. 1 indicates variable is "Not Important at All" and 5 indicates "Very Important".

Table 6-4: Results of Mean Score Comparisons between Closed and Open Member Co-operatives of Canada and the U.S.A.

Variables	Mean Score[1]					
	Canada			U.S.A.		
	Closed (N=6)	Open (N=12)	P-value	Closed (N=15)	Open (N=50)	P-value
Matching rival's pricing and payment policy	3.66	3.90	0.712	3.33	3.90	0.131
Managing working capital	3.50	3.63	0.841	3.60	3.52	0.815
Presence of competitor in output market	3.83	3.90	0.898	3.06	3.88	0.044*
Encouraging members to deliver	3.66	3.18	0.508	2.40	3.70	0.008**
Cash flow management of the member	3.16	3.09	0.917	3.00	3.00	1.00
Reducing the risk of operating deficit	4.66	3.54	0.038*	4.20	3.94	0.456
Reducing the member's uncertainty of return	4.16	2.90	0.078	3.46	2.96	0.077
Maintaining the target rate of return	4.33	3.27	0.058	3.53	3.56	0.937
Treating the all members equally	4.83	3.72	0.039*	4.60	4.10	0.082

* Mean score are significantly different at 95% confidence level.
** Mean score are significantly different at 99% confidence level.
[1] Mean scores measured in 1-5 scale. 1 indicates variable is "Not Important at All" and 5 indicates "Very Important".

Table 6-5: Results of Mean Score Comparison of Co-operative Accepting Unlimited and Fixed Quantity of Commodities.

Variables	Mean scores[1]		*P*-value (2-tailed)
	Unrestricted quantity (N=65)	Fixed Quantity (N=18)	
Matching rival's pricing and payment policy	3.937	3.105	0.018*
Managing working capital	3.531	3.473	0.855
Presence of competitor in output market	3.843	3.210	0.075
Encouraging members to deliver	3.714	2.315	0.001**
Cash flow management of the member	3.095	2.789	0.310
Reducing the risk of operating deficit	4.142	3.473	0.075
Reducing the member's uncertainty of return	3.190	2.947	0.391
Maintaining the target rate of return	3.682	3.210	0.109
Treating the all members equally	4.238	4.263	0.924

* Mean score are significantly different at 95% confidence level.
** Mean score are significantly different at 99% confidence level.
[1] Mean scores measured in 1-5 scale. 1 indicates variable is "Not Important at All" and 5 indicates "Very Important".

Table 6-6: Results of Mean Score Comparison of Co-operatives Accepting Unlimited and Fixed Quantity of Commodity of the USA and Canada.

Variables	Mean Score[1]					
	Canada			U.S.A.		
	Fixed quantity (N=4)	Unlimited quantity (N=13)	P-value	Fixed quantity (N=14)	Unlimited quantity (N=52)	P-value
Matching rival's pricing and payment policy	3.20	4.08	0.188	3.07	3.96	0.036*
Managing working capital	3.20	3.75	0.436	3.57	3.52	0.905
Presence of competitor in output market	3.40	4.08	0.261	3.14	3.84	0.094
Encouraging members to deliver	2.40	3.75	0.061	2.28	3.70	0.005**
Cash flow management of the member	2.00	3.58	0.024*	3.07	2.98	0.784
Reducing the risk of operating deficit	3.20	4.25	0.068	3.57	4.11	0.232
Reducing the member's uncertainty of return	2.80	3.58	0.312	3.00	3.09	0.807
Maintaining the target rate of return	3.20	3.83	0.301	3.21	3.61	0.208
Treating the all members equally	2.60	4.75	0.020*	4.57	4.11	0.171

* Mean score are significantly different at 95% confidence level.
** Mean score are significantly different at 99% confidence level.

Table 6-7: Results of Mean Score Comparisons of Co-operatives with Transferable and Non-Transferable equity stocks.

Variables	Mean score		*P*-value(2-tailed)
	Non-transferable equity (N=55)	Transferable equity (N=27)	
Matching rival's pricing and payment policy	3.872	3.481	0.191
Managing working capital	3.527	3.481	0.872
Presence of competitor in output market	3.781	3.518	0.289
Encouraging members to deliver	3.777	2.592	0.001**
Cash flow management of the member	3.074	2.925	0.588
Reducing the risk of operating deficit	4.055	3.814	0.378
Reducing the member's uncertainty of return	3.092	3.185	0.718
Maintaining the target rate of return	3.629	3.444	0.490
Treating the all members equally	4.129	4.481	0.134

** Mean score are significantly different at 99% confidence level.
[1] Mean scores measured in 1-5 scale. 1 indicates variable is "Not Important at All" and 5 indicates "Very Important".

Table 6-8: Mean and Standard Deviation of Variables Related to Effectiveness of Co-operatives' Pricing and Payment Practices (Question #2, Section II)

Variables	Mean[1] (N=83)	Standard Deviation
Maintaining members' commitment	3.880	0.707
Providing higher returns to the member	3.750	0.771
Meeting the competitor's price for commodities	3.900	0.768
Maintaining the desired volume of commodities	3.876	0.713
Attracting the required quality of raw materials	3.772	0.861

[1] Score measured in 1-5 rating scale. 1 indicates the "Very Unsuccessful" and 5 indicates "Very Successful"

Table 6-9: Results of Mean Score Comparison of Effectiveness of Pricing and Payment Practices between Canadian and the US co-operatives

Variables	Mean score[1]		*P*-value(2-tailed)
	Canada (N=18)	U.S.A. (N=65)	
Maintaining member's commitment	4.0	3.85	0.470
Providing higher returns to the member	3.52	3.80	0.186
Meeting the competitor's prices for commodities	3.94	3.89	0.811
Maintaining the desired volume of commodities	3.88	3.87	0.970
Attracting the required quality of raw product	3.56	3.82	0.279

N= are number of response on each type of cooperatives

[1] Score measured in 1-5 rating scale. 1 indicates the "Very Unsuccessful" and 5 indicates "Very Successful"

Table 6-10: Results of Mean Score Comparisons of Effectiveness Pricing and Payment Practices Between Different Co-operatives.

Variables	Fixed quantity (N=19)	Unlimited quantity (N=64)	P-value	Open member (N=62)	Closed member (N=21)	P-value
Maintaining member's commitment	4.00	3.85	0.437	3.86	3.95	0.659
Providing higher returns to the member	3.66	3.77	0.694	3.71	3.85	0.507
Meeting the competitor's prices for commodities	4.05	3.85	0.329	3.91	3.85	0.733
Maintaining the desired volume of commodities	4.21	3.77	0.019**	3.85	3.95	0.670
Attracting the required quality of raw product	4.10	3.60	0.053	3.69	4.00	0.173

Table 6-11: Rotated[1] Factor Loading Matrix and Communality From Common Factor Analysis (N=82).

Variables	Factor[2]				Communality
	1	2	3	4	
Reducing member's uncertainty of return	**0.828**	0.071	-0.036	0.111	0.704
Maintaining target rate of return	**0.725**	0.386	0.049	0.141	0.697
Co-operative's risk of operating deficit	**0.724**	-0.021	0.421	0.078	0.708
Matching Rival's Pricing and payment policy	0.176	**0.846**	-0.003	-0.100	0.757
Presence of competitor in output market	0.057	**0.803**	0.131	0.153	0.688
Member's cash flow management	0.209	0.006	**0.786**	0.329	0.727
Encouraging member to deliver in co-op	0.016	0.337	**0.683**	-0.427	0.875
Managing co-operative's working capital	0.336	0.336	0.288	**0.614**	0.592
Equal treatment of members	0.119	-0.054	0.100	**0.589**	0.364

[1] Varimax rotation method.
[2] Factor extraction method: Principal component.

Table 6-12: Rotated[1] Factor Loading Matrix and Communality From Common Factor Analysis: Open Member Co-operatives (N=61)

Variables	Factor[2]			Communality
	1	2	3	
Maintaining target rate of return	**0.818**	0.035	0.143	0.691
Reducing member's uncertainty of return	**0.718**	0.192	-0.187	0.587
Co-operative's risk of operating deficit	**0.713**	0.357	0.137	0.655
Encouraging member to deliver in co-op	**0.653**	0.395	0.063	0.587
Matching rivals' pricing and payment policy	**0.551**	-0.066	0.288	0.391
Managing co-operative's working capital	0.081	**0.844**	0.052	0.722
Members' cash flow needs	0.205	**0.734**	0.141	0.601
Equal treatment of members	-0.075	0.088	**0.908**	0.839
Presence of competitor in output market	0.262	0.129	**0.636**	0.489

[1] Varimax rotation method.
[2] Factor extraction method: Principal component.

Table 6-13: Rotated[1] Factor Loading Matrix and Communality from Common Factor Analysis: Closed Member Co-operatives (N=21)

Variables	Factor[2]			Communality
	1	2	3	
Matching rivals' pricing and payment policy	**0.898**	0.134	0.037	0.826
Presence of competitor in output market	**0.754**	0.510	0.132	0.846
Managing co-operative's working capital	**0.626**	-0.263	0.077	0.466
Maintaining target rate of return	**0.542**	0.358	0.317	0.523
Members' cash flow needs	-0.261	**0.837**	-0.118	0.783
Co-operative's risk of operating deficit	0.151	0.494	0.292	0.352
Equal treatment of members	0.261	0.461	0.184	0.315
Encouraging member to deliver in co-op	0.010	0.174	**0.960**	0.952
Reducing member's uncertainty of return	0.469	-0.015	0.496	0.466

[1] Varimax rotation method.
[2] Factor extraction method: Principal component.

Table 6-14: Rotated[1] Factor Loading Matrix and Communality From Common Factor Analysis: Unlimited quantity delivery (N=65)

Variables	Factor[2]				Communality
	1	2	3	4	
Reducing member's uncertainty of return	**0.851**	0.018	-0.042	0.093	0.735
Maintaining target rate of return	**0.808**	0.082	0.038	0.089	0.668
Co-operative's risk of operating deficit	**0.571**	0.246	0.207	0.309	0.525
Matching Rival's Pricing and payment policy	0.491	0.166	0.290	-0.216	0.400
Encouraging member to deliver in co-op	0.271	**0.853**	-0.118	-0.076	0.821
Member's cash flow management	-0.035	**0.758**	0.217	0.376	0.765
Equal treatment of members	-0.016	-0.130	**0.915**	0.099	0.863
Presence of competitor in output market	0.185	0.212	0.423	-0.136	0.276
Managing co-operative's working capital	0.155	0.109	0.056	**0.911**	0.869

[1] Varimax rotation method.
[2] Factor extraction method: Principal component.

Table 6-15: Rotated[1] Factor Loading Matrix and Communality From Common Factor Analysis: Fixed quantity delivery (N=17)

Variables	Factor[2]				Communality
	1	2	3	4	
Presence of competitor in output market	**0.913**	0.041	0.076	0.039	0.842
Managing co-operative's working capital	**0.723**	0.247	0.142	-0.183	0.638
Matching Rival's Pricing and payment policy	**0.698**	-0.457	0.070	0.387	0.851
Maintaining target rate of return	**0.639**	0.425	0.118	0.266	0.673
Equal treatment of members	0.168	**0.784**	-0.113	0.213	0.701
Co-operative's risk of operating deficit	0.067	**0.609**	0.420	0.476	0.778
Encouraging member to deliver in co-op	0.171	-0.095	**0.923**	0.126	0.907
Reducing member's uncertainty of return	0.100	0.557	**0.592**	-0.240	0.729
Member's cash flow management	0.042	0.166	0.016	**0.868**	0.783

[1] Varimax rotation method.
[2] Factor extraction method: Principal component.

Table 6-16: Rotated[1] Factor Loading Matrix and Communality From Common Factor Analysis: Transferable Equity Stocks (N=26)

Variables	Factor[2]			Communality
	1	2	3	
Presence of competitor in output market	**0.863**	0.167	0.189	0.807
Matching rivals' pricing and payment policy	**0.816**	0.182	-0.111	0.711
Maintaining target rate of return	**0.582**	0.399	0.228	0.550
Managing co-operative's working capital	**0.536**	-0.068	0.380	0.436
Encouraging member to deliver in co-op	0.129	**0.883**	-0.022	0.796
Co-operative's risk of operating deficit	0.032	**0.714**	0.499	0.760
Reducing member's uncertainty of return	0.198	**0.558**	0.150	0.373
Members' cash flow needs	0.047	0.108	**0.860**	0.753
Equal treatment of members	0.199	0.211	**0.627**	0.477

[1] Varimax rotation method.
[2] Factor extraction method: Principal component.

Table 6-17: Rotated[1] Factor Loading Matrix and Communality from Common Factor Analysis: Non-transferable Equity Stocks (N=56)

Variables	Factor[2]				Communality
	1	2	3	4	
Reducing member's uncertainty of return	**0.852**	-0.034	-0.156	0.116	0.765
Maintaining target rate of return	**0.807**	0.221	0.056	0.086	0.710
Co-operative's risk of operating deficit	**0.623**	0.051	0.151	0.467	0.631
Matching rivals' pricing and payment policy	0.489	0.260	0.239	-0.141	0.383
Encouraging member to deliver in co-op	0.301	**0.750**	0.029	0.114	0.667
Members' cash flow needs	-0.019	**0.748**	-0.149	0.210	0.626
Presence of competitor in output market	0.124	**0.506**	0.504	-0.229	0.577
Equal treatment of members	0.001	-0.153	**0.915**	0.106	0.872
Managing co-operative's working capital	0.122	0.196	-0.005	**0.894**	0.852

[1] Varimax rotation method.
[2] Factor extraction method: Principal component.

Table 6-18: Definitions of Independent Variables and Their Codes in Multinomial Logit Model.

Independent variable	Codes	Definitions
Year of operations	YEOPR	Number of year of operations.
Membership	MEMBR	If open MEMBR=1 If closed MEMBR=0
Transferability of equity stocks	TRNEQ	If transferable TRANEQ=1 If not transferable TRANEQ=0
Processing activities	PROCES	Variable indicating proportion of total commodity processed.
Number of competitors in commodity markets	COMNO	Variable indicating the number of rival firms.
Commodity delivery contract with member	COMCON	If fixed quantity COMCON=1 If unlimited quantity=0
Price contract with buyer in output market	PRICN	If price contract PRICON=1 Otherwise=0
Co-operatives risk-return variable	RSKRT	Factor scores summarized from common factor analyses
Competitive measures	MKTEN	Factor scores summarized from common factor analyses
Member incentive variable	MEMIN	Factor scores summarized from common factor analyses
Capital management and co-op's philosophy	WORCA	Factor scores summarized from common factor analyses

Table 6-19: List of Independent Variables in Different Multinomial Logit Model.

Variables	Non-ranked model		Ranked model	
	Model 1	Model 2	Model 3	Model 4
Year of operation	Yes	Yes	Yes	Yes
Membership policy	Yes	Yes	Yes	Yes
Commodity delivery contract	Yes	Yes	Yes	Yes
Transferability of equity stocks	Yes	Yes	Yes	Yes
Proportions of commodity processed	Yes	Yes	Yes	Yes
Number of competitors in commodity market	Yes	No	Yes	No
Importance of risk-return of members & co-op.	No	Yes	No	Yes
Importance of market environment	No	Yes	No	Yes
Importance of member incentives	No	Yes	No	Yes
Importance of management of working capital	No	Yes	No	Yes

Table 6-20: Maximum Likelihood Estimates of the Multinomial Logit Model 1 (N=78)

Variables	Spot cash price		Pooling		Fixed forward	
	Coefficients	T-Ratios	Coefficients	T-Ratios	Coefficients	T-Ratios
Years of operation	-0.00805	-0.551	0.02178	1.398	0.00304	0.208
Membership policy	0.3473	0.275	-2.626**	-2.002	-1.013	-0.820
Commodity delivery contract	-4.056**	-2.384	-2.359	-1.613	-3.659**	-2.353
Transferability of equity stocks	1.448	0.977	0.853	0.623	2.460*	1.760
Proportions of commodity processed	-0.8180	-0.677	0.8056	0.748	0.05041	-0.40
Number of competitors in commodity market	0.4503*	1.840	0.4127	1.743	0.4001	1.701
Log likelihood function					-86.071	
Restricted log likelihood function					-108.131	
Chi-square (d.f.=18)					28.87	
Log likelihood ratio tests					44.12	
R-square (%)					20.40	
* Statistically significant at 10% level of significance.						
** Statistically significant at 5% level of significance						

Table 6-21: Maximum Likelihood Estimates of the Multinomial Logit: Model 2 (N=78)

Variables	Spot cash price		Pooling		Fixed forward	
	Coefficients	T-Ratios	Coefficients	T-Ratios	Coefficients	T-Ratios
Years of operation	0.00167	0.111	0.03741**	2.284	0.01985	1.274
Membership policy	1.922**	1.960	-1.7404	-1.482	-0.1829	-0.174
Commodity delivery contract	-3.5413*	-1.942	-1.1318	-0.784	-3.1251*	-1.950
Transferability of equity stocks	1.856	1.069	1.292	0.846	3.129*	1.929
Proportions of commodity processed	-0.7905	-0.615	0.6020	0.507	-0.2384	-0.192
Importance of risk-return of members and co-op.	0.3132	0.689	0.3580	0.773	-0.1327	-0.303
Market environment	0.8317*	1.664	0.8716**	1.978	0.4088	0.971
Member incentives	-0.6862	-1.472	0.0440	0.096	-0.4094	-0.949
Management of working capital.	-0.1332	-0.266	0.4493	0.887	0.1039	0.228
Log likelihood function					-80.069	
Restricted log likelihood function					-108.131	
Chi-square (d.f.=27)					40.11	
Log likelihood ratio tests					56.124	
R-square (%)					25.37 %	
* Statistically significant at 10% level of significance.						
** Statistically significant at 5% level of significance						

Table 6-22: Maximum Likelihood Estimates of Ranked Logit: Model 3 (N=76)

Variables	Spot cash price		Pooling		Fixed forward price		Guaranteed minimum price	
	Coefficients	T-ratios	Coefficients	T-ratios	Coefficients	T-ratios	Coefficients	T-ratios
Years of operation	-0.0149	-1.409	0.0116	0.781	-0.0084	-0.931	-0.0068	-0.640
Membership policy	5.512***	3.076	1.492	1.044	3.632***	3.757	1.213	1.259
Commodity delivery contract	-1.576	-1.459	1.861	1.419	-1.952*	-1.678	1.899	1.538
Transferability of equity stocks	1.196	1.474	0.0561	0.062	2.628**	2.87	0.186	0.204
Proportions of commodity processed	-1.665*	-1.684	1.711*	1.648	-1.318	-1.497	0.487	0.565
Number of competitors in commodity market	-0.3165	-1.307	-0.5357**	-2.398	-0.166	-0.965	-0.285*	-1.848
Log likelihood function: -91.816								
Restricted log likelihood function: -122.317								
Chi-square (d.f.=24) : 36.41								
Log likelihood ratio tests : 61.002								
R-square (%) : 24.93								
* Statistically significant at 10% level of significance								
** Statistically significant at 5% level of significance								
*** Statistically significant at 1% level of significance								

Table 6-23: Maximum Likelihood Estimates of Ranked Logit: Model 4 (N=76)

Variables	Spot cash price		Pooling		Fixed forward price		Guaranteed minimum price	
	Coefficients	T-ratios	Coefficients	T-ratios	Coefficients	T-ratios	Coefficients	T-ratios
Years of operation	-0.0224*	-1.74	0.0159	0.903	-0.0011	-0.97	-0.0084	-0.595
Membership policy	5.588***	5.373	-2.967*	-1.95	2.838***	3.215	-0.0242	-0.022
Commodity delivery contract	-1.094	-0.933	1.339	1.050	-2.41*	-1.748	3.399**	2.45
Transferability of equity stocks	-0.095*	-0.091	0.383	0.347	3.127***	2.889	-1.169	-1.077
Proportions of commodity processed	-0.719	-0.661	2.763**	2.319	-1.389	-1.353	-0.494	-0.428
Risk-return of members and co-op	1.107***	2.632	0.196	0.412	-0.257	-0.572	1.551***	2.730
Market environment in commodity and output market	-0.666	-1.302	1.962***	3.012	-0.834	-1.430	-0.425	-0.603
Member incentives	-1.117***	-2.577	0.635	1.196	-0.132	-0.349	0.455	1.118
Management of working capital	0.656	1.346	-0.634	-1.121	0.0133	.027	1.364**	2.288
Log likelihood function: -75.795								
Restricted log likelihood function: -122.317								
Chi-square (d.f.=36) : 50.71								
Log likelihood ratio tests : 93.044								
R-square (%) : 38.03								
* Statistically significant at 10% level of significance								
** Statistically significant at 5% level of significance								
*** Statistically significant at 1% level of significance								

Table 6-24: Profile of Representative Traditional Co-operatives.

Independent variables	Level for base case scenario for representative traditional co-operatives	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 co-operative	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 co-operatives.

Table 6-25: Predicted and Marginal Probability from MNL Model 1: Base Case Profile (Traditional Co-operatives).

Variables	SPOT CASH PRICE	POOLING	FIXED FORWARD PRICE	OTHERS
Base case scenario	0.5182	0.1972	0.2351	0.0493
Changes to the predicted probability when one of independent variables is changed in the base scenario, ceteris paribus, where:				
Years of operation increased by one year from mean value of (61.29)	0.5136 (-0.0046)	0.2013 (0.0041)	0.2356 (0.0005)	0.0492 (-0.00004)
Membership is changed from open to closed.	0.0966 (-0.4216)	0.7193 (0.5221)	0.1709 (-0.0642)	0.0130 (-0.0363)
Shifts the policy of accepting any quantity to fixed quantity of commodity	0.1081 (-0.4101)	0.2245 (0.0273)	0.0729 (-0.1621)	0.5943 (0.5449)
Shift non-transferable equity stocks to transferable	0.4031 (-0.1151)	0.0846 (-0.1126)	0.5032 (0.2680)	0.0090 (-0.0403)
Proportions of commodity sold in processed form is increased by 1% from mean value of 24.91%	0.5154 (-0.0028)	0.1993 (0.0021)	0.2356 (0.000529)	0.0494 (0.00013)
Number of rival firms in commodity market is increased to 7 from the base case of 6.	0.5400 (0.0217)	0.1956 (-0.0016)	0.2317 (-0.0034)	0.0325 (-0.0167)

Numbers in parenthesis are the marginal probability.

Table 6-26: Profile of Representative New Generation Co-operatives.

Independent variables	Level for base case scenario for representative NGCs co-operatives	Change in level
Membership policy	Closed (1)	Open (1)
Commodity delivery contract	Fixed Quantity (0)	Any Quantity (1)
Transferable equity stocks	Transferable (0)	Non-transferable (1)
Years of operation of co-operative	27.45 years*	28.45 years
Proportions of commodity processed	58.09 %*	59.09 %
Number of rival firms in commodity market	Six	Seven

Figure in parenthesis is dummy variables.
* Mean value of closed member co-operatives.

Table 6-27: Predicted and Marginal Probability from Multinomial Logit Model 1: Base Case NGCs Profile.

Variables	SPOT CASH PRICE	POOLING	FIXED FORWARD PRICE	OTHERS
Base case scenario	0.04304	0.6022	0.2760	0.0786
Changes to the predicted probability when one of independent variables is changed in the base scenario, ceteris paribus, where:				
Years of operation increased by one year from mean value of (27.45)	0.0421 (-0.00092)	0.6071 (0.0049)	0.2731 (-0.0029)	0.0775 (-0.0010)
Membership is changed from closed to open.	0.2149 (0.1719)	0.1538 (-0.4484)	0.3537 (0.0776)	0.2774 (-0.1988)
Shifts to the policy of accepting fixed quantity to any quantity of commodity	0.1264 (0.0834)	0.3242 (-0.278)	0.5452 (0.2692)	0.004 (-0.0746)
Co-operative shifts transferable equity stocks to non-transferable	0.0274 (-0.0156)	0.6955 (0.0932)	0.0639 (-0.212)	0.2130 (0.1344)
Proportions of commodity sold in processed form is increased by 1% from mean value of 58.09%	0.0425 (-0.0005)	0.6043 (0.0021)	0.2747 (-0.0012)	0.0783 (-0.00032)
Number of rival firms in commodity market is increased to 7 from the base case of 6.	0.0460 (0.0029)	0.6198 (0.0176)	0.2805 (0.0045)	0.0535 (-0.0250)

Numbers in parenthesis are the marginal probability.

Table 6-28: Level of Explanatory Variables for Traditional and New Generation Co-operatives.

Independent variables	Level for traditional marketing co-operatives	Level for new generation co-operatives
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 co-operative	52.40 years*	52.40 years*
Proportions of commodity processed	0 %	100.00 %
Number of rival firms in commodity market	Six	Six

Numbers in parenthesis are dummy variables.
* Mean value of total sample.

Table 6-29: Effect of Change in Type of Co-operative Structure on Choice Probability of Different Pricing and Payment Alternatives: Model 1

Pricing and payment practices	*Predicted probability*		*Difference in probability*
	Traditional co-op (Open member, unlimited quantity, non-transferable equity and no processing)	New Generation co-op (Closed membership, fixed quantity, transferable equity and with processing)	
Spot market cash price	0.6224	0.0135	-0.6088
Pooled price	0.1212	0.7862	0.6649
Fixed Forward Price	0.2112	0.1577	-0.0536
Others	0.0449	0.0425	-0.0024

Table 6-30: Effect of Increased Competition on Choice Probability of Different Pricing and Payment Alternatives (Model 1).

Pricing and payment practices	Predicted probability for traditional co-operatives		Change in Probability	Predicted probability for New Generation co-operatives		Change in probability
	No. of rival firms = 6	No. of rival firms = 7		No. of rival firms = 6	No. of rival firms = 7	
Spot market cash price	0.6224	0.6424	0.0199	0.0135	0.0142	0.0007
Pooled Price	0.1212	0.1205	-0.0007	0.7862	0.7988	0.0126
Fixed forward price	0.2113	0.2074	-0.0038	0.1577	0.1582	0.0005
Others	0.0449	0.0296	-0.0153	0.0425	0.0286	-0.0139

CHAPTER 7.0: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

7.1 Summary and Conclusion

This study examined the co-operative's choice of a particular pricing and payment contract for commodities supplied by member producers. This study also examined a number of demographic variables associated with the co-operatives' choice of pricing and payment practices, such as membership policy, commodity delivery contract, transferability of equity stocks, years of operation, and market environment in which co-operatives are operating. It is the intent of this chapter to summarize the most important issues and conclusion from the analysis, to provide recommendation to groups planning to form NGCs and to provide recommendations for future research.

A mail questionnaire survey was used to elicit information on co-operative's choice of pricing and payment contracts for commodities supplied by members. Questions were designed to elicit general information on demographic features of co-operatives, level of competition and sources of capital. Information on co-operatives' perceptions of the importance of various factors on their choice of pricing and payment options, and effectiveness of co-operatives' pricing and payment policies in achieving various goals were elicited using a 1-5 rating scale. Four different approaches were used to examine a co-operative's choice for a particular pricing and payment contract: mean score comparisons, factor analyses, multi-nominal logit models and ranked logit models.

Percentage distribution of demographic characteristics of co-operatives, sources of capital acquisition, market environment in commodity and output market, commodity purchasing and output selling contract, and differential price payment are presented and discussed in Chapter 5. Based upon the percentage distribution, co-operatives with the characteristics of NGCs are practicing the "pooling" alternatives, where as co-operatives with characteristics of traditional marketing co-operatives are practicing the "spot market cash price" as the most common pricing and payment alternatives.

Based upon the results of mean score comparison, co-operatives with characteristics of traditional marketing co-operative generally give more importance to encouraging members to deliver commodities into co-operatives and matching the competitor's pricing and payment practices. On the other hand, co-operatives with

characteristics of NGCs give more importance to reducing operating deficit of co-operatives, reducing members uncertainty of return, and treating all members equally.

The results of common factor analysis show that co-operatives' choice of pricing and payment practices can be explained by four factors. These factors are: risk and return perceptions of co-operatives and members, market environment in commodity and output market, member incentives and management of working capital. Although results of factor analyses does not explicitly support the hypotheses developed in Chapter 1. Logit analysis of models 2 and 4 showed that market environment, member incentives and risk-return factor have significant impact choice of pricing and payment practices by co-operatives.

Based upon the estimated marginal effects of explanatory variables on choice probability, it appears that "pooling" is the most common pricing and payment alternative for NGCs. On the other hand "spot market cash price" is the most common alternative for the traditional marketing co-operatives. When the number of firms in a co-operatives' commodity market increases then co-operatives are more likely to choose the "spot market cash price".

Besides the analysis of marginal probability of individual demographic variables, predicted probabilities for traditional marketing co-operatives and NGCs were compared. NGCs are more likely to choose "pooling" alternatives, whereas traditional marketing co-operatives are more likely to choose the "spot market cash price".

Predicted probabilities were also estimated for two different co-operative organizations, when the degree of competition in the commodity market increases. With the entry of one additional firm into the co-operatives' commodity market, the predicted probability of choosing the spot market cash price increases the most for traditional marketing co-operatives. On the other hand, the predicted probability of pooling alternatives increases the most for NGCs.

From the estimated marginal probabilities we could not reject all three hypotheses developed in Chapter 1. The first hypothesis is that NGCs choose pooling as their main pricing and payment practice. The second hypothesis is traditional marketing co-operatives choose spot market cash price. The third hypothesis is that traditional marketing co-operatives are more responsive to the competitive level in their commodity

market than NGCs. Results are also consistent with theoretical predictions analyzed in Chapter 3.

NGCs are more concerned about avoiding co-operative's risk of operating deficits and are not concerned about the competitive level in their commodity market. As NGCs are engaged in value-added processing ventures, final returns of a co-operative will be realized only after disposal of the final goods. There is price risk in the co-operatives' output market. By restricting membership and putting restrictions on the amount of commodity a member can deliver, NGCs might have arranged the required quantity of commodities for their processing and marketing facilities. Therefore, NGCs do not need to match the rival firm's pricing and payment offer to attract the raw materials. In such a case, NGCs are more likely to be concerned with reducing the co-operatives' risk of an operating deficit. The pooling method, which eliminates the co-operative's risk of an operating deficit, could be an attractive alternative. Results of probability analysis shows that NGCs are more likely to choose a pooling option. However, the pooling method increases the member's uncertainty of return. Members might have joined NGCs to capture greater benefit. With closed membership and control of commodity supply, NGCs are likely to pass this greater benefit on to their members. NGCs are closed membership co-operatives with the restrictions on commodity supply. The pooling practice of NGCs is consistent with the marginal value product (MVP) pricing or maximum net price objective discussed in Chapter 3. While maximum net price objectives are unlikely to be achieved in the short-run, the pooling practice of NGCs is most likely to be consistent with the MVP pricing rule. With MVP pricing rule NGCs can finance the growth opportunities through retained member earning and avoid the free rider problem by non-members. However, the NGCs requires control over the quantity delivered by members.

Traditional marketing co-operatives address members' cash flow needs and uncertainty of return. They are also more responsive to changes in the competitive level in the commodity market. With the open membership policy in traditional co-operatives, members are not obliged to deliver commodities to their co-operatives. In order to acquire sufficient volume of commodities, traditional co-operatives might have to match the rival firm's pricing and payment offer. By paying the spot market cash price at the

time of commodity delivery, co-operatives can acquire the needed volume of commodities and pass on the immediate benefit to members. With the spot market cash price members get the price of their commodities at the commodity delivery time. Member's uncertainty of return is eliminated. The results from the probability analyses show that traditional co-operatives are more likely to offer the spot market cash price. This result is consistent with the average net revenue (ANR) pricing rule discussed in Chapter 3. With open membership policy and accepting any eligible quantity of commodities, any pricing rule in co-operatives results in ANR pricing rule. Through an ANR pricing rule members get immediate benefit, which may act as incentive for members to patronize their co-operatives. However, minimal profits are made and co-operatives may not be able to finance growth opportunities through members' retained earnings. Indeed survey respondents reported debt as the main source of new capital in traditional co-operatives (Chapter 5).

7.2 Implications for Co-operatives

The information about sources of capital presented in section 5.6 of Chapter 5.0, could have significance for those thinking about formation of NGCs and marketing co-operatives. The majority of co-operatives rely on external "debt" followed by "retained earnings". Excessive reliance on debt could be risky for co-operatives when the net income of co-operative and interest rates both fluctuate severely (Cobia et al. 1989). Cobia et al. (1989) also cited the findings of Royer that co-operatives appear more heavily leveraged than do IOFs in the same industries. Co-operatives also have to outlay greater proportions of income for debt servicing. Existing or new co-operatives should focus on acquiring capital from internal sources, such as: issuing new shares, membership fees from existing and new members or issuing preferred[1] shares to the public.

7.2.1 Implications for New Generation Co-operatives

From the probability analyses it is found that pooling is the most common pricing and payment contract among the NGCs. By offering pooling options, NGCs effectively

[1] Preferred stocks seldom has voting rights. Preferred stock holders have priority over common stock holders if a co-operative is liquidated (Cobia 1989).

minimize the co-operative's risk of operating deficits from output price risks. However, pooling exposed members to risk of uncertain returns. In NGCs, equity shares allocate the right to deliver a certain quantity of commodity to the co-operative. These delivery rights represent a "dual contract"- the farmer must deliver a unit of commodity for each share purchased and the co-operative must accept and compensate the farmer for each unit delivered. If farmers fail to supply the amount contracted, farmers must purchase it elsewhere or have the co-op purchase it on their behalf. Farmers may fail to deliver the contracted volume either due to lower farm production or higher cash price offered by other firms in the market, which reduces the co-operative's throughput (Zeuli 1999).

Commodity delivery contracts for longer periods, heavy punishment in case of contract default, assurance of higher return from processed products and education of members about pooling process could maintain the member's commitment to new generation co-operatives. Assurance of higher returns from final products may discourage members from taking short-term benefits by acting opportunistically. Memberships size and size of marketing pool are closed in NGCs. Members may have joined the NGCs with the expectation of higher returns. An NGC can assures higher return to members if it starts business with careful analysis of market conditions or where there are scarce investor-owned firm involvement. Most of NGCs in the USA are operating in niche markets such as pasta production, sugar beet processing, ethanol plant, specialty cheese, bison meat etc.

7.2.2 Implications for Traditional Marketing Co-operatives

By paying spot market cash price, a traditional co-operative reduces the price risk of members or producers, but increases co-operative's risk of operating deficits. Paying the spot market cash price also puts pressure on co-operatives' working capital. In such cases traditional marketing co-operatives may have to seek outside debt capital. This increases the financial risks for the co-operatives. Due to open membership policy and no obligation on the part of members to deliver their commodities, pooling may not be an appropriate pricing and payment contract especially if there are a number of other firms in the commodity market. Traditional marketing co-operatives should hedge the price of their output in futures market or negotiate contracts with buyers of co-operative's output

to minimize the risk of having operating deficits. Traditional co-operatives may choose such pricing and payment alternatives which demand less working capital and at the same time reduces the member's risk of uncertain returns.

Fixed forward price contract and guaranteed minimum price contract could be attractive alternatives for traditional marketing co-operatives. A fixed forward price and guaranteed minimum price contract reduces the member's uncertainty of return. Fixed forward and guaranteed minimum price contracts also reduces the pressure on working capital requirement, because with these two contracts co-operatives do not need to pay full price at the time of commodity delivery.

7.3 Limitations and Implications for Future Research

This study does not address the pricing method of supply managed commodities. Some of the surveyed co-operatives are doing business in supply managed commodities such as dairy products. These co-operatives commented that the questionnaire used in this survey is inadequate to capture the information on pricing and payment practices on supply managed commodities. Throughout the volume of this study, it is claimed and discussed that by choosing pooling alternatives NGCs effectively reduce their risk of operating deficits while members are exposed to risk of uncertain returns. Some co-operatives who practice pooling alternatives commented that they make advance payment of a certain portion of the value of the commodities at the time of commodity delivery. Advance payment may solve the members' immediate cash flow needs and to some extent may reduce the uncertainty of return. This study does not address the impact of advance payment on member's commitment to co-operatives using pooling practices.

Similarly, most traditional co-operatives are doing business on multiple commodities and some are often supplying farm inputs to members. There is a strong possibility that income loss on one business may be compensated from other businesses. Despite the losses, co-operatives may continue to do business in order to stay in the market. This study could not address the impact of possible revenue transfer between business enterprises within the co-operative on choices of pricing and payment practices.

Equity capital contribution from members generally constitutes a significant proportion of capital structure of NGCs. This study only studied the perception of

managers of co-operative, and linked these perceptions to demographic variables of different co-operative organizations. A fruitful area of study would be to survey members of NGCs as well as traditional co-operatives about how satisfied they are with the pricing and payment practices of their co-operatives. If the researcher knows the members' reasons for joining traditional marketing co-operatives and NGCs along with their socio-demographic characteristics, the researcher could analyze the differences in members' preferences and circumstances. With information on these differences in members' perceptions, pricing and payment practices of their co-operatives could be further analyzed. With this information researchers could make better recommendations for co-operatives about their pricing and payment practices.

The other important limitation of this study is estimation of impact of the competition on the choice probability of pricing and payment practices. Responses on the number of competitors in the co-operative's commodity market were the respondent's (manager's) perceptions and it may not be an explicit number. If researchers could use secondary sources of quantitative data, the estimated result would be more reliable. Furthermore, an increased number of firms does not necessarily imply increased competition. There might be tacit collusion and alliance among the firms, which allows firms to behave in a monopsonistic way. Alternatively a few firms competing on price can be very competitive despite the limited number of competing firms. This study does not consider possible collusion or alliances among the firms.

It is often claimed that NGCs are doing business in niche markets, which implies that there may be fewer rival firms in NGC's markets. Efforts were made to find the competitive level in co-operatives output and commodity markets by analyzing the concentration ratios. Data on concentration ratios of manufacturing industries for the U.S.A. were available, but the concentration ratios on raw commodity were not available. Efforts were made to relate the establishment of NGCs and the type of output they produced, but the grouping of products in four-digit standard industrial classifications (SIC) were too broad to include the specific type of output of new generation co-operatives, such as ethanol, bison meat, specialty cheese, pasta etc. Furthermore, due to the regional nature of agricultural markets, predicting the competitive level in co-

operative's output market based on national data on concentration ratios would be inadequate.

Management's ability to handle and operate different pricing and payment alternatives, and member's ability to adapt with these operation may influence the co-operative's choice of pricing and payment practices. Education about operation and management of different alternatives to members and management could play an important role in the success of these pricing and payment alternatives. This study does not consider any of these aspects. Therefore, future research on choice of pricing and payment practices should include the education of members and co-operative's management about different pricing and payment practices.

There might be variation in methods of operation of spot market cash prices among the traditional co-operatives, and in pooling practices among the new generation co-operatives. Therefore, an important area for future research could be how traditional co-operatives operate and manage the spot market cash price, and how NGCs manage and operate pooling practices.

7.4 Concluding Statement

It is important to recognize the differences in choice of pricing and payment practices for different co-operative organizations. It is also important to recognize the factors affecting co-operatives' choice of pricing and payment alternatives. Types of pricing and payment alternatives have different impacts on different co-operative organizations. Understanding these differential impacts could be helpful for co-operatives to tailor their pricing and payment policy, which will maintain member's commitment and make the co-operatives' business viable. Despite a small sample size and a data limitation, this study identified the important factors responsible for choice of pricing and payment alternative used by co-operatives. These factors and findings are consistent with economic theory and the theoretical problems associated with traditional co-operatives.

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Appendix A: Number of Respondent Answering Each Question.

Variables	Number of Responses
Year of operations of co-operatives	84
Member size	81
Membership	84
Reasons for open membership	84
Reasons for closed membership	84
Non-member business	84
Equity revolving plan	83
Transferability of equity stocks	83
Voting mechanisms	84
Sources of capital	84
Commodity delivery contract	84
Commodity market structure	80
Output selling contract with buyer	80
Output market structure	77
Type of output buyer	80
Differential price	84
Proportions of commodity sold in processed form	84
Importance of various factors on co-operatives' choice of pricing and payment alternatives	83
Effectiveness of co-operatives' pricing and payment policies in achieving various objectives.	83
Pricing and payment practices	84

Appendix B: Ranking of Pricing and Payment Practices by Co-operatives.

Figure B-1: Ranking[2] of Pricing and Payment Practices by Co-operatives of the U.S.A.

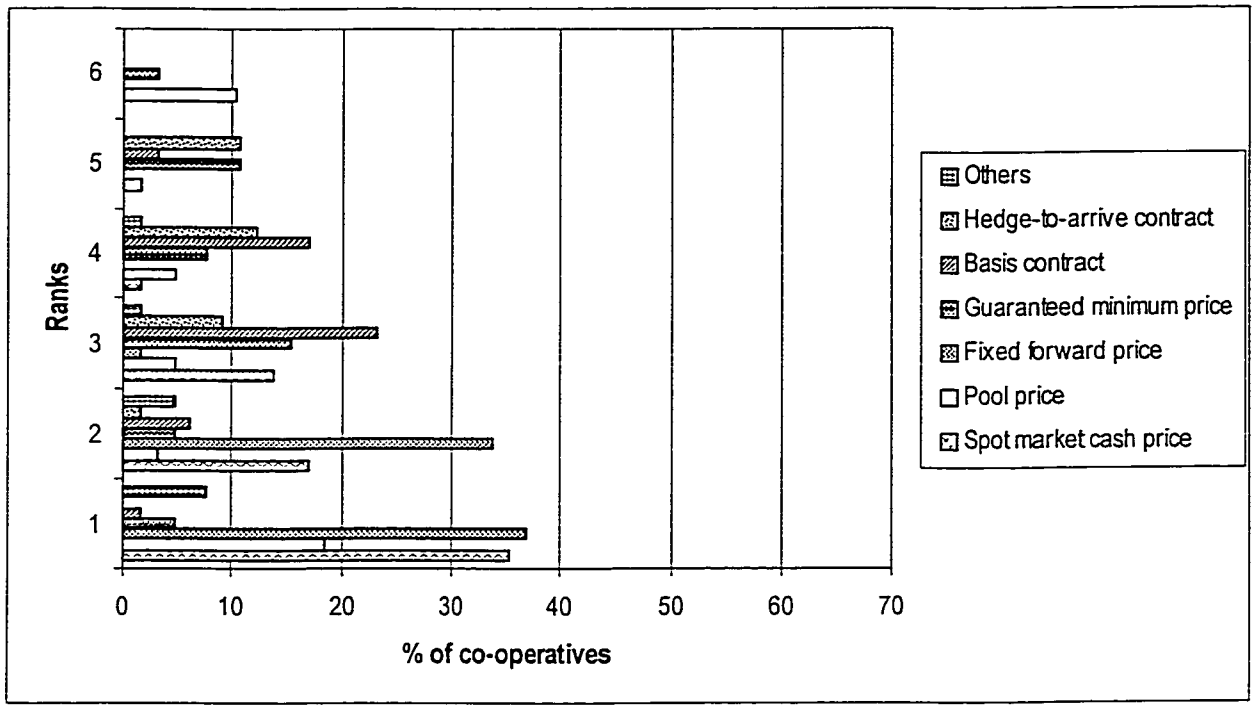
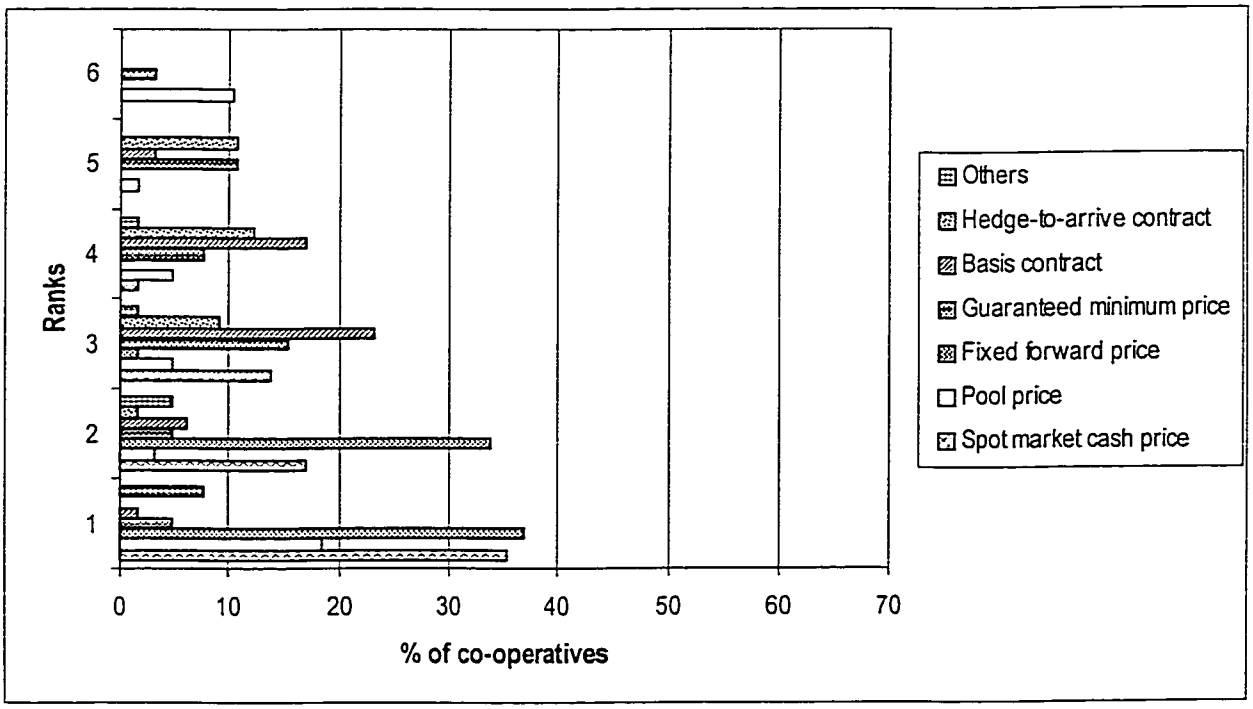


Figure B-2: Ranking of Pricing and Payment Practices by Canadian Co-operatives.



[2] Rank "1" indicates the alternative is the most commonly practiced and "6" indicates that alternative is least commonly practiced.

Figure B-3: Ranking of Pricing and Payment Practices by Open Member Co-operatives.

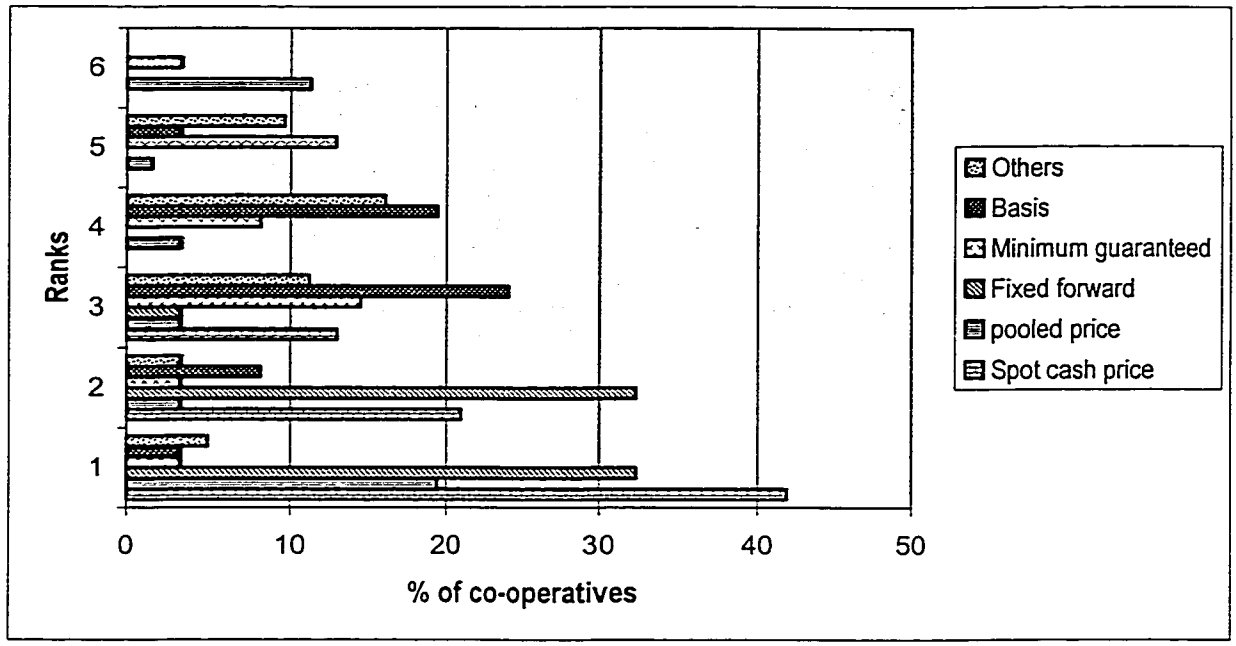


Figure B-4: Ranking of Pricing and Payment Practices by Closed Member Co-operative.

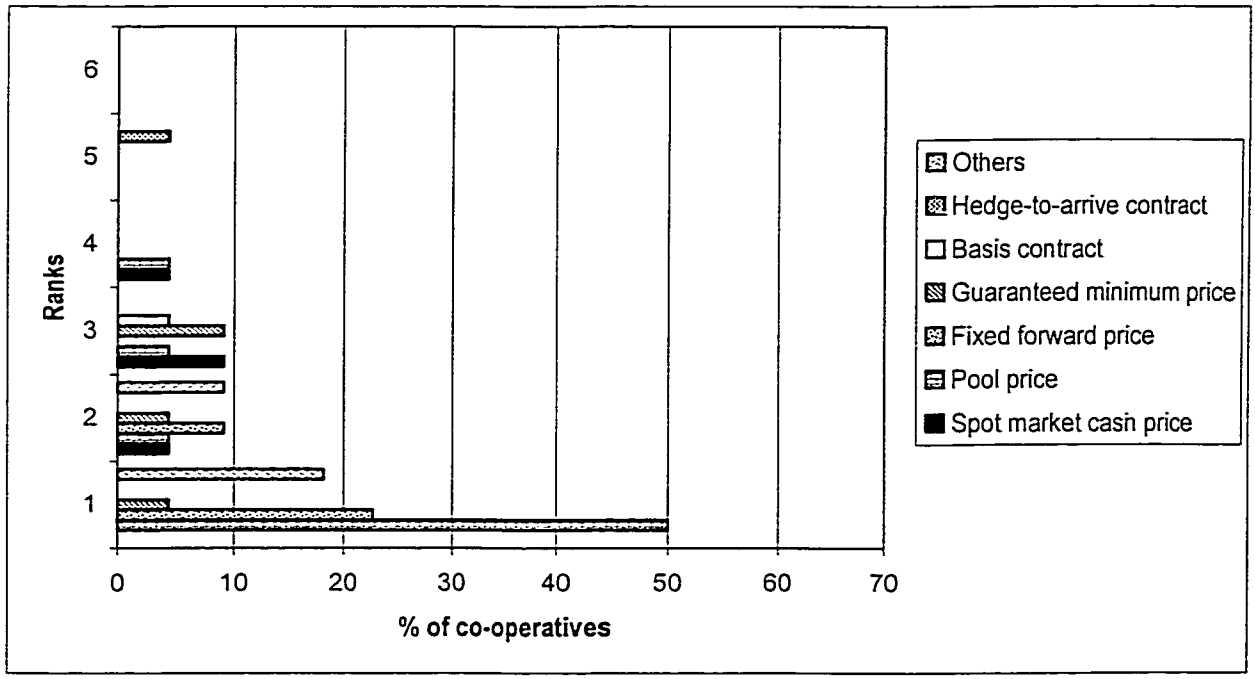


Figure B-5: Ranking of Pricing and Payment Practices Co-operative with Fixed Quantity Delivery Contract.

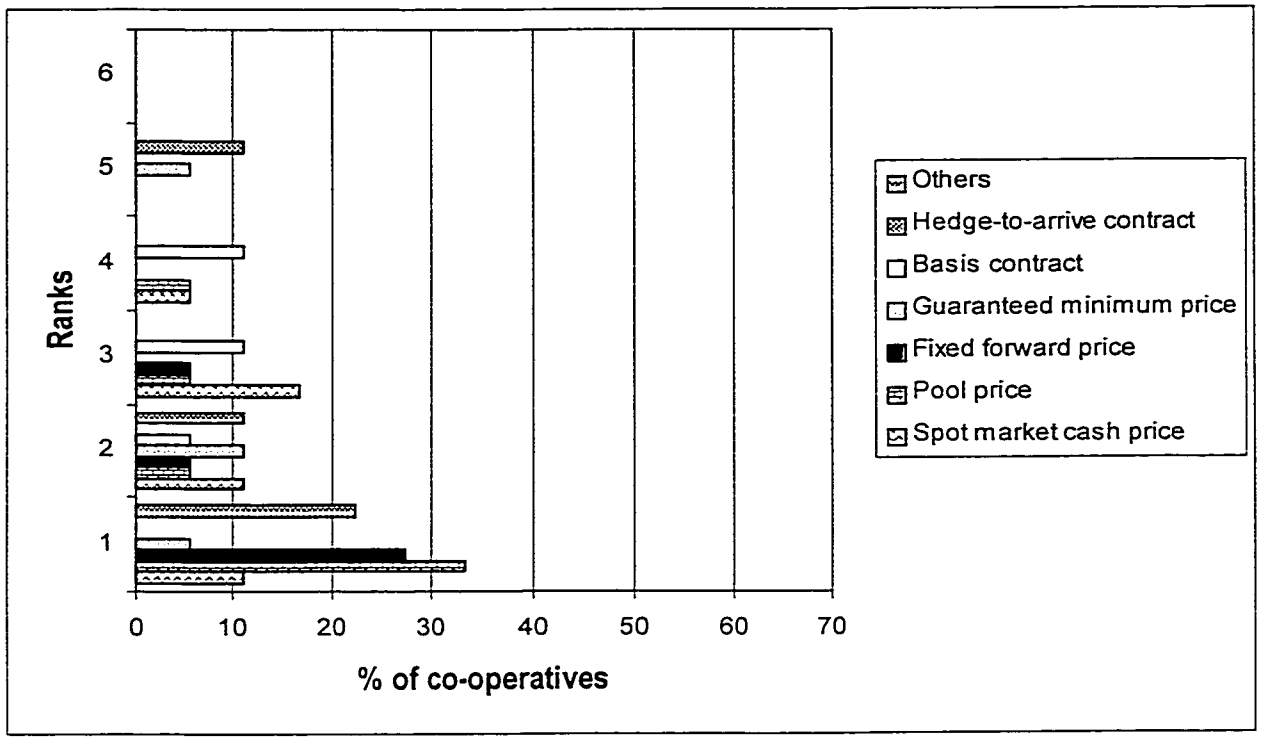


Figure B-6: Ranking of Pricing and Payment Practices by Co-operative with Unlimited Quantity Delivery Contract.

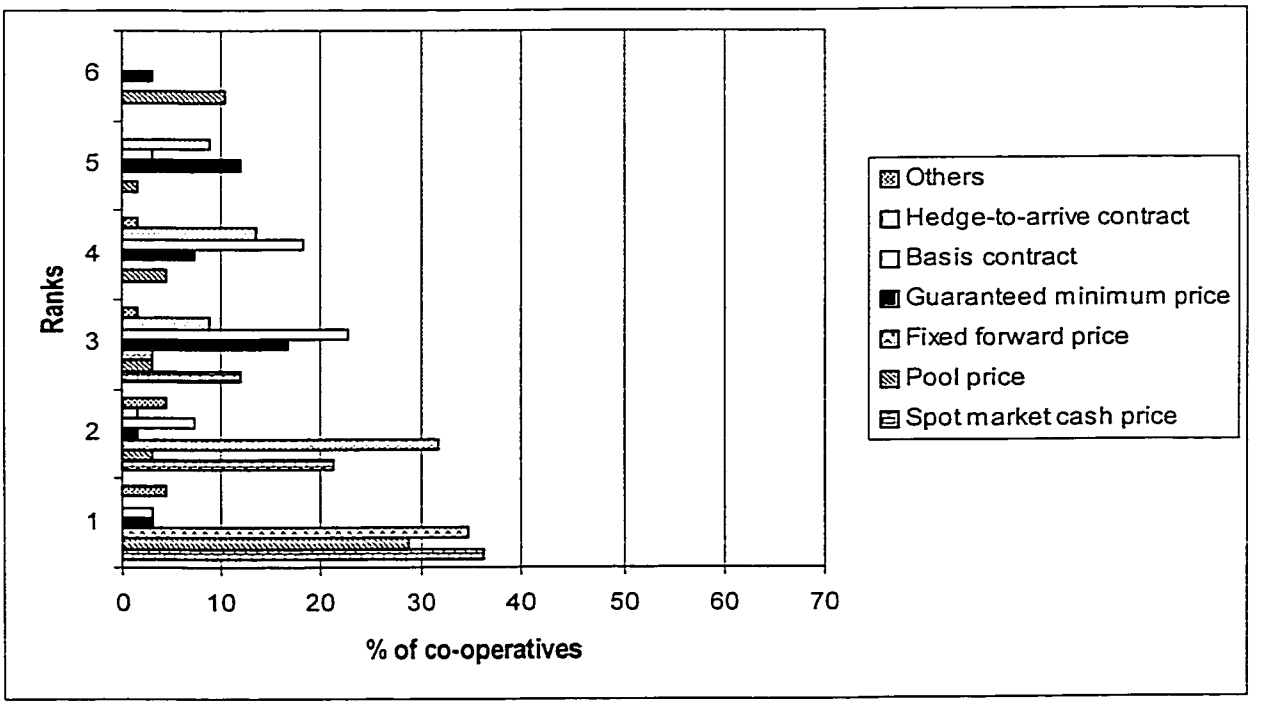


Figure B-7: Ranking of Pricing and Payment Practices by Co-operative with Transferable Equity Stocks.

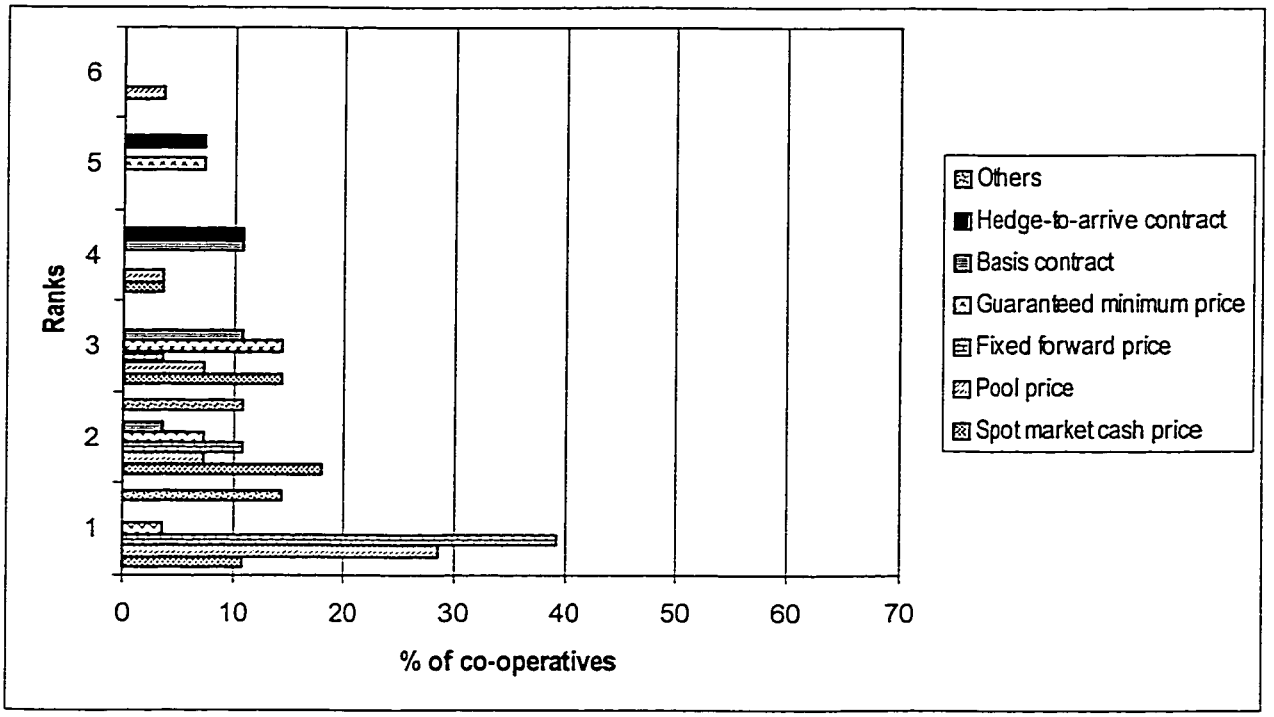
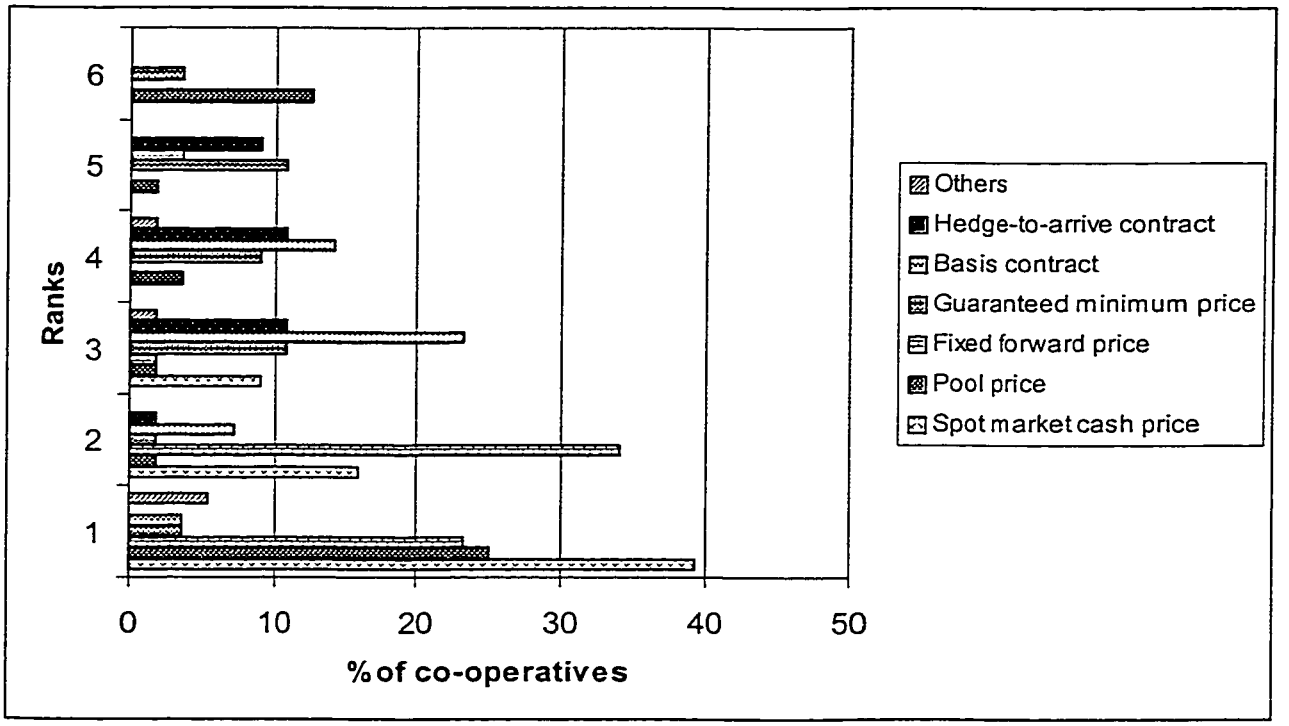


Figure B-8: Ranking of Pricing and Payment Practices by Co-operatives with Non-transferable Equity Stocks.



Appendix C: Predicted and Marginal Probability from MNL Model 3 (Ranked model): Base Case Profile (Traditional Co-operatives).

Variables	Spot cash price	Pooling	Fixed forward price	Guaranteed minimum price	Others
Base Case Scenario	0.5507	0.0312	0.3366	0.0253	0.056
Changes to the predicted probability when one of independent variables is changed in the base case scenario, ceteris paribus, where:					
Years of operation	0.5484 (-0.0022)	0.0319 (0.0007)	0.3374 (0.0008)	0.0254 (0.0001)	0.0567 (0.0006)
Membership policy	0.0272 (-0.5235)	0.0859 (0.0546)	0.1089 (-0.2276)	0.0922 (0.0669)	0.6856 (0.6295)
Commodity delivery contract	0.1936 (-0.3570)	0.3414 (0.3102)	0.0813 (-0.2553)	0.2882 (0.2628)	0.0953 (0.0392)
Transferability of equity stocks	0.2758 (-0.2748)	0.0050 (-0.0262)	0.7060 (0.3693)	0.0046 (-0.0207)	0.0085 (-0.0475)
Proportions of commodity processed	0.5486 (-0.0020)	0.0321 (0.0009)	0.3365 (-0.000086)	0.0258 (0.00045)	0.0568 (0.00072)
Number of competitor in commodity market	0.5145 (-0.0361)	0.0234 (-0.0077)	0.3656 (0.0290)	0.0244 (-0.0009)	0.0719 (0.0158)

Numbers in parenthesis are the marginal probability.

Appendix D: Effect of Change in Type of Co-operative Structure on Choice Probability of Different Pricing and Payment Alternatives: Model 3

Pricing and payment practices	*Predicted probability*		*Difference in probability*
	Traditional co-op (Open member, unlimited quantity, non-transferable equity and no processing)	New Generation co-op (Closed membership, fixed quantity, transferable equity and with processing)	
Spot market cash price	0.6125	0.0015	-0.6109
Pooled price	0.0118	0.4987	0.4868
Fixed Forward Price	0.3241	0.0224	-0.3016
Guaranteed Minimum Price	0.0153	0.2976	0.2823
Others	0.0361	0.1795	0.1434

Appendix E: Questionnaire on Pricing and Payment Policies of Agricultural marketing and New Generation Co-operatives.

Dear Participant:

The University of Alberta is conducting a survey of agricultural marketing and new generation co-operatives. Information from this survey will be used to evaluate factors that influence the commodity pricing and payment policies of marketing and new generation co-operatives. Pricing and payment practices have an impact on the co-operatives' ability to meet members' needs and the cooperatives' business objectives.

It will take about 20 minutes to complete the enclosed questionnaire. Please return it in the stamped reply envelope. Participation is voluntary. Answers from this questionnaire will be compiled with others. All individual information obtained from this survey is confidential and will only be viewed by the two persons undersigned below. If you are interested in receiving a report of the results of this research, please enclose a "Business Card" of your co-operatives with this questionnaire.

This questionnaire has two sections: The first section contains questions about features of your co-operative, the marketing environment you deal with and pricing and payment practices of your co-operative. The second section contains questions relating to factors that affect the co-operative's choice of pricing and payment policies.

This research project is being carried out by "The Cooperative Chair in Agricultural Marketing" at the University of Alberta, and is funded by the Alberta Agricultural Research Institute (AARI). For more information about this survey, please contact the undersigned.

Your participation will be greatly appreciated.

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Section I: Features of the cooperative and marketing environment:

1) In what year did your cooperative begin operation?

_____

2) Approximately how many members are currently in your cooperative at this time?

_____

3) Is membership open (i.e. can any qualified producer enter and exit at any time)? Please "√" the appropriate one.

_____ YES. (If Yes, Go To Question 4)
_____NO. (If No, Go To Question 5).

4) If YES, what are the reasons for open membership? (Please "√" all that apply to your cooperative).

____More members and a greater product volume allow the cooperative to operate more efficiently.

____More members and a greater product volume give the co-op more bargaining power.

____Open membership is the cooperative's policy.

____Other (Please list and explain briefly): _____

_____

(Please Go To Question 6)

5) If NO, what are the reasons for closed membership? (Please"√" all that apply to your cooperative).

_____Physical plant facilities are currently at efficient capacity.

_____To match the capacity of the cooperative's marketing and handling facilities.

_____To control the commodity quality.

_____Other (Please list and explain): _____

_____

6) Does your cooperative purchase commodities from non-member producers? (Please "√" the appropriate one.)

_____ YES. Please briefly explain: _____
_____
_____

_____ NO. Please briefly explain: _____
_____
_____

7) In your cooperative, can a member sell their equity share to other members or other qualified persons? (Please "√" one).

_____YES. (If Yes, Go To Question No. 8)
_____NO. (If No, Go To Question. No. 9)

8) If YES, are there any conditions for selling equity? Please explain.

_____
_____
_____

9) Is there a plan in place to revolve equity back to members? (Please "√" the appropriate one.)

_____ YES. Please briefly explain how it works: _____
_____
_____

_____ NO. Please briefly explain the cooperative's policy:_____
_____

10) How does your co-op acquire additional capital for operations or expansion of the business? Please rank the following capital sources, from most important to least important. [One (1) is for the most important and NA (Not Applicable) for alternatives that are not relevant to your cooperative]..

_____ Annual membership fees.

_____ Required equity stock purchases for existing members.

_____ Initial entry fees for new members.

_____ Retained patronage funds

_____ Debt from financial institutions.

_____ Other (Please list and rank):_____

_____

11) How is member voting conducted in your cooperative? (Please "√ " the appropriate answer).

_____ One member one vote.

_____ In proportion to the member's patronage.

_____ In proportion to equity capital invested by the member.

_____ Others (Please explain): _____

_____

12) Based upon business volume, please rank the four most important commodities your cooperative purchases from members. (Using the scale from 1 to 4, 1 for most important and 4 for least important).

1) _____(The most important in terms of cooperative's business volume)
2) _____
3)_____
4)_____

13) How does your cooperative accept the delivery of raw commodities from members? (Please"√ "the appropriate answer).

_____ In fixed quantity from each member (set in delivery contract).

_____ Any quantity delivered by a members.

_____ Others (Please explain):_____

14) How many other firms in your region, or market, purchase a significant volume of the commodity ranked number *one (1)* in question number 12 ? Please check one.

_____ None
_____ One
_____ Two
_____ Three
_____ Four
_____ Five
_____ Six or more

15) Approximately what percentage of the cooperative's raw commodity ranked number one *(1)* in question number 12 is sold or marketed:

_____ % With no processing
_____ % With minimal processing (such as cleaning)
_____ % In processed form
_____ % Other, (Please list):_____

Total= 100%

16) Please rank the four most important products (either in processed or unprocessed form derived from commodities purchased from members) your cooperative markets in terms of business volume? (Using the scale from 1 to 4, 1 for the most important and 4 for the least important).

1)_____(The most important in terms of cooperative's business volume)
2)_____
3)_____
4)_____

17) How many other business firms in your region, or marketing area, market a significant volume of product ranked number one (1) in question number 16?(Please check one).

____ None
____ One
____ Two
_____ Three
_____ Four
_____ Five
_____ Six or more

18) To what type of firms does your cooperative sell these products listed in question 16? (Please "√ " all that apply to your cooperative).

_____ Commodity brokers

_____ Wholesalers

_____Retailers

_____ Processors

_____ Directly to Final consumers

_____ Other (Please list):_____

_____

19) How does your cooperative arrange the sale of these final products (listed in question number 16) ? (Please "√ " all that apply to your cooperative).

____ Price Contract With Buyer

____ Volume Contract With Buyer

____ Price and Volume Contract With Buyer

____ Open market transaction

____ Other (Please list): _____

_____

20) Rank the most common payment or contracting alternatives used by your cooperative for the commodities delivered by members? *(Using the scale of 1,2,3 ...., 1 as the most common, 2 is the second most common and so on.)*

_____ Spot market cash price at the time of delivery.

_____ Pool price or average price over a certain period.

_____ Fixed forward cash price contract.

_____ Guaranteed minimum price or the floor price contract.

_____ Basis Contract.

_____ Hedge-to-arrive contract.

_____ Others (Please list and rank):_____

_____

21) Does your cooperative pay transportation costs to members for delivery of a commodity?

_____ YES. Please briefly explain:_____
_____
_____

_____ NO. Please briefly explain:_____
_____

22) Does your cooperative pay quality premiums for commodities delivered by the member?

_____ YES. Please briefly explain:_____
_____
_____

_____ NO. Please briefly explain: _____
_____

23) Does your cooperative differentiate between low volume and high volume member deliveries in terms of per unit price?

_____ YES. Please briefly explain: _____
_____
_____

_____ NO. Please briefly explain:_____
_____

24) Does your cooperative offer incentives to encourage members to deliver at specific times of the year?

_____ YES. Please briefly explain: _____
_____
_____

_____ NO. Please briefly explain: _____
_____

Section II: Factors affecting pricing and payment practices.

1) Using a scale of 1-5, please indicate how important each of the following factors are to the payment and pricing policy of your cooperative in purchasing commodities from members.

Label of ordering is as follows:

1- Not important at all.
2- Less important
3- Neutral
4- Important
5- Very Important

Example:

How important is it to purchase a computer with a chip manufactured by *Intel* ?

Not Important At All				Very Important
1	2	3	(4)	5

The choice is 4, which implies that the individual considers a computer with a chip manufactured by *Intel* as an important factor when purchasing the computer.

i) How important is *matching the pricing and payment policy of rival firms* when buying commodities from members?

Not Important At All				Very Important
1	2	3	4	5

ii) How important is *managing the cooperative's working capital* when determining the pricing and payment policy of the cooperative?

Not Important At All				Very Important
1	2	3	4	5

iii) How important is *the presence of major competitors in the cooperative's output (derived from commodity purchased from members) market* when determining the pricing and payment policy of the cooperative?

Not Important At All				Very Important
1	2	3	4	5

iv) How important is *encouraging members to deliver to your co-operative* in determining the pricing and payment policy?

Not Important At All Very Important

1 2 3 4 5

v) How important is it to *consider member's cash flow requirements* when determining the pricing and payment policy?

Not Important At All Very Important

1 2 3 4 5

vi) How important is it *to reduce the cooperative's risk of having an operating deficit* when determining the pricing and payment policy of cooperative?

Not Important At All Very Important

1 2 3 4 5

vii) How important is it *to reduce member's uncertainty of returns because of price fluctuations* when determining the pricing and payment policy?

Not Important At All Very Important

1 2 3 4 5

viii) How important is it for the cooperative *to maintain a target rate of return* when determining the pricing and payment policy?

Not Important At All Very Important

1 2 3 4 5

ix) How important is it for the cooperative *to treat members equally* when determining the pricing and payment policy?

Not Important At All Very Important

1 2 3 4 5

The next set of questions are related to your perception of how successful the pricing and payment policy of your cooperative is in meeting the cooperative's goals.

2) Using a scale of 1-5, indicate the level of success of the pricing and payment policy of your cooperative.

Label of ordering is as follows:

1- Very Unsuccessful
2- Unsuccessful
3- Neutral

4- Successful
5- Very Successful

i) How successful is the pricing and payment policy of your cooperative *at maintaining the members' commitment to the cooperative*?

Very Unsuccessful				Very Successful
1	2	3	4	5

ii) How successful is the pricing and payment policy of your cooperative *at providing higher returns to the member*?

Very Unsuccessful				Very Successful
1	2	3	4	5

iii) How successful is the pricing and payment policy of your cooperative *at meeting the competitor's prices for commodities?*

Very unsuccessful				Very Successful
1	2	3	4	5

iv) How successful is the pricing and policy of your cooperative *at maintaining the desired volume of commodity deliveries*?

Very unsuccessful				Very Successful
1	2	3	4	5

v) How successful is the policy of your cooperative *at attracting the required quality of raw commodity?*

Very unsuccessful				Very Successful
1	2	3	4	5

What is your role with this cooperative?

_____ Member of Board of Directors

_____ Employee

_____Others (please list): _____

_____

Briefly describe the cooperative's pricing and payment policy for members and any special circumstances that strongly influence the policy of your cooperative.

Please use the space below for your opinions and comments about this survey.

-The End-

Thank you for taking the time to complete and return this questionnaire. Your contribution to this research effort is greatly appreciated.

Jim Unterschultz
Rajendra Gurung