

Manitoba Producers' Willingness-to-Invest in  
New Generation Cooperatives

by

Tasha J. Turko

A Thesis submitted to the Faculty of Graduate Studies of  
The University of Manitoba  
in partial fulfilment of the requirements of the degree of

MASTER OF SCIENCE

Department of Agribusiness and Agricultural Economics  
University of Manitoba  
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UNIVERSITY OF MANITOBA

Faculty of Graduate Studies

Master's Thesis/Practicum Final Report

The undersigned certify that they have read the Master's Thesis/Practicum entitled:

Manitoba Producers' Willingness-to-invest

in New Generation Cooperatives

submitted by

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in partial fulfillment of the requirements for the degree of

Master of Science

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Date: April 4, 2008

## **Abstract**

The New Generation Cooperative (NGC) has been a popular form of farmer-owned enterprise widely adopted by producers in the United States, especially in North Dakota and Minnesota. The adoption rate of this organizational form has been comparatively slow in the province of Manitoba, which is geographically adjacent to these two states.

The objective of this thesis is to ascertain which factors affect Manitoba producers' willingness-to-invest and willingness-to-commit to NGCs, as well as potential monetary investment in NGCs. Finally, whether or not these decisions are affected by producer farm type is determined.

Data collected from surveying Manitoba producers are analyzed using ordered logit to examine the producers' willingness-to-invest and willingness-to-commit, and tobit to examine the producers' potential monetary investment in NGCs. Further statistical analysis is shown through producer profiles, odds ratios and marginal effects.

Positive and significant associations are found between a producer's self-assessed knowledge about NGCs, having been approached, farm size, education level and their willingness-to-invest, while there is a negative association with age. Self-assessed knowledge level and contracted commodities have positive and significant associations with willingness-to-commit. Finally, self-assessed knowledge level, having been approached, farm size, net cash income, minimum rate of return required, age, and education level have positive and significant associations with potential monetary investment, while production of commodities under contract and risk-aversion levels have negative associations with potential monetary investment.

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## *Chapter 1: Introduction*

The New Generation Cooperative (NGC) organization has been a popular form of farmer-owned enterprise adopted by producers in the United States, especially in the northern states of North Dakota and Minnesota. The first production facility, belonging to American Crystal Sugar was constructed on the North Dakota/Minnesota border in the early 1970s (Stefanson and Fulton, 1997). These producers were interested in owning their own production facilities in order to capture the value-added by processing commodities grown on their own farms. The adoption rate of the NGC organizational form has been comparatively slow in the province of Manitoba, which is geographically adjacent to these two states. While located close to one another, they are quite far away from each other in their rate of NGC adoption. This study looks into the fundamental reason for this slow adoption rate: the producer. Cooperatives are producer-owned and run organizations and therefore are reliant on the knowledge, interest and characteristics of individual producers and the producer groups that are facilitating their development.

### *1.1 Purpose of Study*

The goal of this thesis is to ascertain which factors affect investment in potential Manitoba NGCs. More specifically, factors that affect a Manitoba producer's willingness-to-invest and willingness-to-commit to NGCs are investigated. It is also of interest whether or not these variables have an influence on Manitoba producers' potential monetary investment in NGCs. Finally, whether or not these decisions are affected by producer farm type is investigated.

## *1.2 Benefits of Study*

Similar studies focusing on producer-investor characteristics have been conducted in the United States; however, this is the first study to focus on Manitoba producers and the characteristics influencing their NGC investment decisions. Much of the research that has focused on NGCs in Manitoba has been concentrated on their formation. There have been studies discussing success factors, obstacles, and general start-up information for NGCs. Other research has created guides that provide organizers and researchers with specific information about NGC start-ups.

This thesis is important because the focus is on producer investment in NGCs. An advantage of the study being conducted in Manitoba is that it will also benefit groups across Canada considering NGCs as a potential organizational form. It may help to know what types of farmers typically invest and how to approach different types of producers that might not typically be interested in investing. Not only will it benefit these other producers and groups, but this study will hopefully encourage further and similar research in other provinces.

This research also has the potential to benefit rural community development organizations, as cooperatives have been shown to strengthen, stabilize and contribute to growth in communities and rural areas (Centre for the Study of Co-operatives, 2001). If these types of organizations are considering whether or not to help fund an NGC, then it will be beneficial for the authorities to have as much information as possible.

Finally, advisors consulted by producers considering an agricultural start-up may benefit from this information. It has been shown that agricultural advisors tend to know

and be involved very little in NGC start-ups in the province (Carlberg and Turko, 2008), so any information will be beneficial to those parties as well.

### *1.3 Outline of thesis*

This thesis has been organized into seven chapters. This first chapter has provided a brief introduction to the topic, the purpose and desired outcomes of the study. This chapter also outlined the potential contributions and benefits of this study, and addressed who this research may assist.

The second chapter reviews new generation cooperatives and the types of NGC shares available in Manitoba. Also, the literature resulting from studies focusing on general producer investment decisions, new generation cooperative and off-farm investment decisions.

The third chapter details theory and resulting empirical model for the thesis. With an overview of capital budgeting theory, social capital theory, portfolio theory and human capital theory/demographics, a series of ten hypotheses are developed. These hypotheses are presented in order to serve as variables for the empirical model.

Chapter Four discusses data collection methods and describes how the survey was distributed. Survey data, charts and tables summarizing the data collected are presented and discussed briefly. The fifth chapter describes the methods used to estimate Manitoba producers' NGC investment and commitment decisions. The ordered logit model is outlined with its application to the measurement of a producer's willingness-to-invest in an NGC, followed by the logit model's application to measuring a producer's willingness-to-commit to an NGC. Next, the tobit model is used to model the amount of

money a producer would be willing to invest in an NGC. Methods used in further analysis of the models are presented at the end of Chapter Five as well: producer profiles, odds ratios and marginal effects.

In Chapter Six, the results of the empirical model analyses are presented. The parameter estimates for the NGC investment probability logit model are given, followed by the producer profiles, odds ratios and marginal effects. Following the investment probability model are the results for the NGC commitment probability logit model. Finally, the monetary investment tobit model results are presented. The seventh and final chapter gives a brief summary of the thesis, followed by conclusions comparing the hypotheses outlined in Chapter Three with the actual results of the three models. Finally, implications and applications of these results are suggested.

## *Chapter 2: Literature Review*

This chapter begins by reviewing the new generation cooperative structure and investment implications. It then examines studies that have been conducted on topics relating to general producer investment decisions, investment decisions in new generation cooperatives, and investments decisions in off-farm ventures.

### *2.1 New Generation Cooperatives*

A cooperative is defined as being an organization that is member-owned and controlled (Coltrain, Barton and Boland, 2000). The producers involved in a cooperative seek to achieve benefits, such as wealth and market power, for themselves and other farmers through the pooling of their resources. Through collaboration, producers may be able to access better resources than they would while attempting to undertake a project independently. The collaboration of producers also tends to alleviate the individual risk by having it spread between other members in the cooperative.

While agricultural cooperatives traditionally focus on the raw commodities produced by farmers, the farmers involved in NGCs are able to capture extra profits through the value-added processes that the cooperative carries out (Stefanson and Fulton, 1997). Such cooperatives are involved in the processing, packaging and/or distributing of commodities produced by the cooperative farmer-members. The cooperative's operations and marketing of products have been a means of helping producers stabilize income and provide financial security.

An NGC is a fairly new type of cooperative created for farmers to achieve the same goals as a traditional cooperative, but have been known to integrate characteristics

of corporations and other organizational structures. Traditional cooperatives, like NGCs, have members who take active roles in the cooperatives. These members benefit by owning part of the cooperative, having control over investment through voting rights, and sharing in profits distributed in proportion to patronage or residual earnings from market transactions the cooperative undertakes. As for control in the cooperative through the holding of voting rights, NGCs maintain the traditional cooperative democracy allocating one vote to one member. NGCs are more restrictive than traditional cooperatives (Coltrain, Barton and Boland, 2000) and generally have three basic distinctive features, as described next.

### *2.1.1 Delivery rights are tied to member equity share purchases.*

The purchase of one equity share allows the producer/member to deliver a set amount of their commodity to the cooperative (Fulton, 2000). This implies that the greater the number of shares that are purchased by a producer, the greater amount of the associated commodity they are entitled to deliver to the cooperative. This also entitles them to a greater share of patronage-based net income. As well, the cooperative is required to accept the delivery from the farmer based on production standards outlined in the delivery contract (Stefanson and Fulton, 1997). If the person does not meet their delivery obligation, they will be required to either purchase the product from elsewhere to meet the delivery requirement, or the money needed to purchase the product will be removed from the producer's equity account. However, a potential patronage refund helps to encourage full and timely delivery of product to the cooperative.



### *2.1.2. Closed (or restricted) membership.*

Membership in an NGC is restricted only to producers who have purchased shares from a fixed pool of available shares (Centre for the Study of Co-operatives, 2001).

Closed membership is often advantageous for this type of cooperative because the producers who are able to purchase shares also have the ability to consistently deliver the specified quantity and quality of the required commodity to the cooperative (Triple R CFDC, 2001). The closed membership in structures also provides a potential for the shares to appreciate in value, and helps to eliminate the free-rider problem that would occur in traditional cooperatives.

The total number of equity shares that are available and offered for sale is based upon the optimal processing capacity of the facility. Each NGC plant constructed is built with a certain yearly production capability and this determines the number of membership shares available for purchasing by potential producer/members. The number of membership shares available for purchase has a fixed amount of commodity allocated to each membership share purchased, which, when multiplied by the shares available for purchasing, will equal the production capability of the plant. For example, if an ethanol plant is being constructed to produce 40,000,000 gallons of ethanol, it would require approximately 15,000,000 bushels of feed wheat annually in order to produce at the plant's production capability (Green Car Congress, 2005). In this scenario, one share could require the delivery of 2,500 bushels of feedwheat to the ethanol facility, which would require the NGC to sell 6,000 delivery shares to producers.

The shares sold are the means of financing the equity portion (approximately 30 to 50 percent) of the NGCs (Fulton, 2000). The cooperative then sells this pre-

determined, limited number of shares to potential producer/members. After these shares are distributed and the plant production capacity is yielded by having all of the membership shares sold, the membership to the cooperative is closed and shares can no longer be bought or sold freely. At this point, delivery is also restricted to members. Even though shares can no longer be bought or sold, they can be traded with permission from the board of directors (Triple R CFDC, 2001).

### *2.1.3 High levels of equity investment required by members*

The producers who wish to become members and be able to deliver their commodity to the cooperative must purchase equity shares (Stefanson and Fulton, 1997). This requires up-front funding, and depending on the amount of the commodity they are willing to commit to deliver to an NGC, this can be a large amount of equity. When an NGC is successful and earnings are realized, a certain portion of the profits are reinvested in the cooperative (for maintenance, assets, expansion, etc.) while the other portion is distributed to members as patronage refunds. These patronage refunds can be given out as cash dividends or retained in the patron member's equity account. Though there is a large equity requirement, the cash patronage refunds to NGC producer-members are generally quite a bit higher (65-85%) than traditional cooperatives (20-35%), (Coltrain, Barton and Boland, 2000).

As previously noted, there is a large amount of equity required for NGC plant construction. For this reason, there are different types of equity shares that the cooperative has the option to issue: membership shares, investment (preferred stock) shares and preferred investment shares. For this reason, an NGC will often have both

types of investment shares for sale in addition to the membership shares. Preferred investment shares are shares that allow producers to deliver commodity to the NGC. These share prices are non-par and are set according to financial needs of the cooperative. Due to the fact that NGCs have closed membership, often the capital that is raised from the preferred investment shares alone is not enough. This is why Manitoba NGCs offer additional types of shares. Membership shares are par-value shares required for gaining voting rights and earning limited return on investment capital. Non-producer-members who are looking at diversification strategies while maintaining an active role in an NGC may consider this potential investment opportunity and have the opportunity to purchase membership shares. Investment (preferred stock) shareholders are the third type of share offered by NGCs in Manitoba, allowing non-producers to invest in the cooperative while not maintaining an active role. Investment (preferred stock) shareholders are guaranteed a fixed rate of return, while supporting rural economic development of their communities by creating jobs and encouraging financial gains for local farmers (Centre for the Study of Co-operatives, 2001).

## *2.2 Models for Cooperative, NGC and Off-farm Investment*

Puaha and Tilley (2003) studied investment decisions in NGCs and value-adding processing cooperatives. Factor analysis and the tobit procedure were combined in order to determine the effects of farm and producer characteristics on the producer investment decision pertaining to value-adding NGCs. More specifically, the study was performed to determine the effects of monetary and non-monetary variables of NGC members and non-members on the cooperative investment decision. If producers were more familiar

with value-added processing cooperatives, were receiving a tax credit for their investment and are full-time farmers, they were more willing to invest in the cooperative. It was also found if producers believe the NGC will create social and non-monetary benefits, then they were more likely to invest. However, producers who live further away from where the cooperative was located, were also employed off-farm and wanted a lower-risk investment were less willing to invest.

Jensen et al. (2003) studied the willingness of producers to invest in a new generation biodiesel cooperative. A probit model was used to determine which factors affect a producer's willingness to join the biodiesel cooperative, while a tobit model was applied in order to estimate potential share purchases in the NGC. In estimating the probit model it was found that if producers had a college education and had on-farm storage for commodities produced on their farms, then they were more willing to invest in an NGC. If producers felt less positive about the potential of biodiesel markets, were over the age of 65 and not debt free, then they were less likely to invest. In estimating the tobit model it was found that producers with higher incomes were willing to purchase a greater number of shares in the cooperative. If farmers expected minimal returns from the biodiesel facility, then they were less likely to purchase shares in the cooperative. Also, if more than half of a producer's income came from an off-farm source and if the producer lived in a western (grain-producing) region in the state then they were also less likely to purchase shares in the NGC.

LaDue, Miller and Kwiatkowski (1991) studied producer investment behaviour and the potential for expansion in the farm business enterprise. Ordinal logit models were employed in order to analyze investment behaviour and the probabilities of the

producer making an investment. The study was carried out to ascertain which characteristics affect the investment behaviour of farmers. It was found that when producers had a higher gross income and were of a lower age, they were more likely to make an investment towards expanding their farm operation. It was stated that as older farmers near or reach the age of retirement, there was a tendency for those farmers to shy away from new investments.

Davis and Patrick (1998) studied influences on off-farm investment decisions. Tobit models were used in order to investigate which variables would have a significant effect on off-farm investment; one was designed to estimate the effect of specified variables on the percentage of total investment in off-farm assets, the next estimated the effect of specified variables on the level of total investment in off-farm assets. It was found that if a producer was educated, had a higher net worth (or had greater amounts of equity that they were able to invest), was already involved with off-farm ventures and was a livestock producer, then they were more likely to have a higher percentage of off-farm investment. On the other hand, if the producer was older and/or if they had higher levels of debt, then they were less likely to have a higher percentage of off-farm investment. It was found that if a producer had a higher net worth and some sort of off-farm involvement, then they were more likely to have a higher level of off-farm investment as well. Additionally, if a producer was farming a higher number of acres and was of a younger age, then they were more likely to have a higher level of investment in off-farm ventures.

Aramyan, Lansink and Versteegen (2005) studied the investments in energy-saving technologies by Dutch greenhouse farm owners. The probit model was combined with a

truncated regression model in order to estimate two different decisions: whether or not they were willing to make the decision to invest and, if the decision was to invest, what the level of investment will be. They found that numerous variables had a positive and significant effect on the probability a farmer would invest in the energy-saving systems; a larger farm, a larger family, an available farm successor, higher solvency, and the implementation of modern equipment. It was found that if the level of labor was higher and there was capital already invested in energy installations then there was an increase in the level of investments that an individual makes.

Isengildina and Hudson (2001) studied the cotton industry and the factors that affect the adoption of hedging decisions. A multinomial logit model was used in order to find the probability of adopting alternative marketing strategies; direct hedging decisions, such as futures and/or options, indirect hedging, such as pools or marketing contracts and cash markets. They found that the variables that were positive and significant on the probability of producers choosing direct hedging over other marketing strategies were risk-aversion, farm size and the purchase of crop insurance. Direct hedging selection was inversely related to the amount of income received by government payment and the agreement with the statement that the producer had the preference of alternative risk management measures as opposed to hedging. They also found that the variables directly related to the probability that farmers would choose indirect hedging (cooperative marketing pools or forward contracts) were the size of the farm and the agreement with a statement that pools netted the producers a higher price than they would receive in a cash market. Agreement with a statement that there was preference of risk management measures as an alternative to hedging was also positively related to

choosing indirect hedging practices. Isengildina and Hudson (2001) also used marginal effects to show the probability of choosing one marketing strategy instead of the others. The marginal effects used the means of the independent variables to show that the probability of choosing indirect hedging was the greatest, followed by cash sales and direct hedging.

### *Chapter 3: Theory & Empirical Model Development*

The decision by a producer to invest in a new generation cooperative is complex. When making this decision, producers are actually faced with three component decisions: the capital budgeting decision, the social capital investment decision and the off-farm investment decision. NGC investment is characterized by requiring producers to provide a one-time outlay of capital up-front, which is the focus of capital budgeting decisions. Whether or not the capital investment fits into the producer's business plan and investment portfolio is also an issue. The characteristics of the off-farm investment and whether it possesses the desired risk and return of the producer will be factors in the investment decision. At the same time, producers are pooling their resources with others in an attempt to capture value-added benefits the cooperative creates. This relationship created by the interaction with other producers demonstrates that the investment is one for which social capital theory can be applied.

Individual component decisions cannot be made without taking into consideration the dynamics of the additional decisions. This is because the ultimate decision to invest requires a significant commitment of monetary resources. In order to develop a model of producer investment in a new generation cooperative structure, theories pertaining to each component decision must be discussed with respect to their relevance to the overall cooperative investment decision. First, capital budgeting theory will be defined, as will support for the application of the theory. Next, the description and application of social capital theory will be outlined. As well, in order to model the off-farm investment decision, portfolio theory and its application will be discussed. In the model development section, arguments for inclusion each variable to be included in the model



will be given along with the hypotheses that can be drawn. Human capital theory will also be discussed as studies have shown that personal characteristics and resources of an individual have an effect on the outcome of the investment decision (Davis and Patrick, 1998; Jensen et al., 2003; Olson, Kibbe and Goreham, 1998; Puaha and Tilley, 2003; Aramyan, Lansink and Versetegen, 2005; Isengildina and Hudson, 2001; Zeuli and King, 2004). Social capital theory and human capital are the two most common types of capital and are often discussed together as there can often be found a relationship between the two (Lin, 2001). However, their applications will be discussed separately in this chapter to see the different effects of each.

### *3.1 Capital Budgeting Theory*

A capital asset investment is one for which a one-time outlay of capital is required for an asset that may be retained for several years (Olson, 2004). A share purchase in an NGC may fit into this classification because of this sizeable capital requirement. When faced with the decision of whether or not to invest in potential capital projects and/or assets, capital budgeting is the decision tool the financial manager or producer will employ. This procedure determines whether or not an investment fits into a producer's business plan and whether the investment is worthwhile. Generally, capital budgeting decisions are for long-term investments for which funding is required at the time of investment. When a producer is expending capital for investment in an NGC, they are purchasing shares that fund the establishment of the structure while reserving the right to deliver commodity to the NGC (Fulton, 2000). According to Bromwich (1976), investment decisions, such as the decision to invest in a plant, are the focuses of capital