

COGNITIVE DISSONANCE, MENTAL FRAMES AND THE  
FINANCIAL VALUE OF AGRICULTURAL CO-OPERATIVES

A Thesis Submitted to the  
College of Graduate Studies and Research  
in Partial Fulfillment of the Requirements  
for the degree of Doctor of Philosophy  
in the Department of Bioresource Policy, Business and Economics  
University of Saskatchewan  
Saskatoon

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# ABSTRACT

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**Cognitive Dissonance, Mental Frames and the Financial Value of Agricultural Co-operatives.**

Supervisor: Dr. Murray E. Fulton

The co-operative as an economic and social institution has long been recognized for its contribution to economic development as well as its positive effect on local communities. However, over the last decade or so substantial structural changes in the agricultural sector have undermined some of the most prominent North American co-operatives. In some cases, co-ops asked for bankruptcy protection, others ceased operations while some were transformed to for-profit firms. The present study offers three essays that explore the challenges that co-operatives are facing in terms of their relationship with their members in local markets, the decision making process of their leaders and the co-ops' role in the modern economy.

These first two essays are linked by the fact that they both develop models that are about cognitions. Examining cognition offers some new insights to understanding the process behind the decline of agricultural co-ops. In the first essay the model examines consumers' cognitions, while the model in the second essay examines management's cognitions. The essays differ on the agent's ability to change the perceptions that result from those cognitions. Essay One assumes that consumers' perceptions are partially flexible and thus can change over time with some cost; on the other hand, essay Two assumes that beliefs are inflexible due to the high cost of changing them.

Essay One examines the relationship between a co-operative and its membership in a local market using an economic psychological approach. More specifically, the essay presents a modified rational-choice model to investigate how cognitive dissonance can influence members' loyalty. The effect of cognitive dissonance is analyzed in a case where a local co-operative operates alongside with an investor-owned firm (IOF) in a market. The model illustrates how cognitive dissonance can give rise to switching costs for those consumers who wish to switch to the IOF. Analytical results demonstrate the effect of these switching costs on equilibrium market shares and discuss how a drop in the dissonance cost because of managerial decisions by the co-op can result in dramatic drops in its market share.

Essay Two illustrates how management's mental frame can be incorporated into an economic model and develops a theoretical underpinning for the link between a strong mental frame and the financial difficulties that a firm might experience. The case of the Saskatchewan Wheat Pool with its Project Horizon plan is proposed as an example of a situation where the established mental frame gave rise to a belief regarding future member support that had a significant influence on the decision making process of the co-op's CEO. The analysis includes a game theoretic model of a duopoly between a co-operative and an IOF, where mental framing is explicitly incorporated into the primitives of the model. Analytical results illustrate how the CEO's belief regarding member commitment can influence decision making and therefore affect the market share and profits of the firm.

Essay Three uses non-parametric econometric techniques to examine the stock price effect of a co-op's acquisition by a publicly traded IOF. The potential for this study emerged as a result of the takeover of Dairyworld, a dairy co-op, by Saputo, a publicly traded private corporation. The study uses the prediction-error approach to estimate Saputo's returns after the acquisition as a deviation from its expected returns. A non-parametric bootstrap technique simulates Saputo's stock returns and examines its behavior around the acquisition date. The empirical results are consistent with a number of hypotheses, including the pro-competitive role that co-operatives are believed to have in the economy. The essay also includes a comprehensive discussion regarding the greater financial value that co-ops have for IOFs.

## ACKNOWLEDGEMENTS

The author would like to thank the following who contributed to the completion of this thesis:

Dr. Murray E. Fulton, my supervisor, for his guidance and support during the preparation of this thesis.

Dr. Richard Gray, member of my advisory committee, for his interest and valuable advice.

Dr. Jim Vercammen, member of my advisory committee, for his time, insightful comments and valuable suggestions.

Dr. Jingang Zhao, member of my advisory committee, for his interest, time and useful comments.

Dr. John Cranfield, for agreeing to be the external examiner for my thesis - his time and helpful comments.

I gratefully acknowledge the financial support of the College of Graduate Studies and Research of the University of Saskatchewan, the Ontario Credit Union Charitable Foundation for the Amy and Tim Dauphinee Scholarship and the Social Sciences and Humanities Research Council of Canada.

*Ευχαριστώ τους γονείς μου Νίκη και Ιωάννη, καθώς και τον αδελφό μου Θεοφάνη.*

*Η παρούσα Θέση αφιερώνεται εις τους γονείς μου Νίκη και Ιωάννη, καθώς και εις τον αδελφό μου Θεοφάνη, για την αγάπη και τη στήριξη τους όλα αυτά τα χρόνια.*

*Λάμπρος*

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# CHAPTER 1

## INTRODUCTION

The co-operative as an economic and social institution has long been recognized for its contribution to economic development and its positive effect on local communities (Theurl, 2003; Pollet and Develtere, 2003; Develtere and Pollet, 2004). In Canada, around 40 per cent of the population are members of at least one co-operative while in the province of Saskatchewan approximately 56 per cent patronize at least one co-operative or credit union. In 2004, there were 9,271 co-operatives in Canada that hold more than \$160 billion in assets and employed over 160,000 people nationwide (Co-operatives Secretariat, 2004).

In a changing economic and social environment there are new challenges that co-operatives have to face. These challenges partly reflect the current trend of economic liberalization and disengagement of the state, and include tougher competition, stringent consumer demands, and the introduction of new production technologies (Huff and Owen, 1999; Marks, Freeze and Kalaitzandonakes, 1999; Cash, Goddard and Leroh, 2006; Herath, Hassan and Henson, 2007). Moreover, international trade agreements in the WTO and the NAFTA greatly affect the agricultural economy and the operations of agricultural co-operatives (Meilke and van Duren, 1996; Meilke and Huff, 2000). These new challenges ask for a detailed examination of the role of agricultural co-operatives and how they can effectively respond to the new economic and social changes.

A number of new challenges in the economic and institutional environment of Canadian agricultural co-operatives makes it crucial for them to re-evaluate their strategies and their role in the modern economy. The ratification of NAFTA in 1994 provided an incentive for several multinational corporations to enter the Canadian market resulting in increased competition, while the elimination of the Crow Benefit in 1995 resulted in rising transportation costs for Western Canadian farmers that also affected their co-ops (Meilke and van Duren, 1996; Schmitz, Highmoor and Schmitz, 2002). The 1994 WTO agreement calls for the liberalization of agricultural markets, which implies a reduction in market protection and subsidies (Meilke

and Huff, 2000). The operation of the Canadian Wheat Board (CWB) is also at stake since the current Doha Round framework agreement requires the removal of all trade distorting practices with respect to exporting state trading enterprises (STEs) (Koo et al., 2004). In addition, the federal government has introduced legislation governing food quality and food safety; agro-food firms now face stringent demands in terms of quality, safety and convenience. These changes are accompanied by the introduction of biotechnology, modern logistics, food standardization and the application of the Hazard Analysis and Critical Control Points (HACCP) protocol that bring new challenges for agri-food firms (Marks, Freeze and Kalaitzandonakes, 1999; Herath, Hassan and Henson, 2007). While these changes affect both co-operatives and for-profit firms, agricultural co-operatives may experience a particular difficulty to successfully adapt, due to the specific functional and organizational characteristics as well as the underlying cultural values that govern their economic behavior (Hogeland, 2004).

The above-mentioned trends have resulted in a significantly changed economic environment. Agro-food firms had to adapt their business practice and mentality to the new economic reality and re-adjust their structure and operations. Even though most agricultural co-operatives successfully transformed themselves, the way they reacted resulted, in many cases, in sharp declines in their market shares and poor financial performance. Especially over the last decade or so several agricultural co-operatives in both Canada and the U.S. have either demutualized or sold assets to address adverse financial situations and battle bankruptcy while in some cases they were forced to completely cease their operations.

Starting from the early 1990s several Canadian agricultural co-operatives got involved in high-profile mergers and acquisitions while others initiated new expansion plans in an attempt to respond to the changing environment. Saskatchewan Wheat Pool (SWP), once the largest agricultural co-operative in Canada, initiated an overly ambitious program that involved aggressive expansion and extensive investments. In 1996, SWP entered the Toronto Stock Exchange as a publicly traded enterprise (TSX: SWP.B) in an attempt to increase its eligibility for debt capital and two years later raised an additional \$160 million with a new share offering. In 2003, after almost four years of consecutive multi-million dollar net losses the SWP underwent a major restructuring and divestment plan with its creditors, which decreased its assets and business volume (SWP Annual Report, 2003). Alberta Wheat Pool (AWP) merged with Manitoba Pool Elevators in 1998 to become Agrifore Co-operative, one of Canada's largest grain handling and marketing businesses at the time (Agrifore Co-operative Annual Report, 2000).

In 2001, Agrifoods International Co-operative Ltd., also known as Dairyworld Foods, Canada's largest dairy co-operative and the second-largest dairy processor in the country sold most of its processing

facilities to the Montreal-based Saputo Inc. (Saputo Annual Information Form, 2001). Even though Agrifoods International still remains in operation, it is at a much smaller scale than before the sale and Saputo has effectively replaced it in the marketplace. In the same year, Agricore Co-operative merged with United Grain Growers Limited to become the private company Agricore United (TSX: AU) (Agricore United Annual Report, 2002). In 2007 Agricore, the largest grain handling and merchandising company in Western Canada, was acquired by the SWP for \$20.5 per common share, or a total of \$1.8 billion.

Similar changes appeared in the US agricultural sector where many prominent and well-established co-operatives filed for bankruptcy protection. A well-known example is Tri Valley Growers (TVG) that filed for Chapter 11 bankruptcy protection in 2000. Even though TVG was one of the country's premiere fruit and vegetable co-operatives for 68 years, in its last three years of operations it accumulated more than \$120 million in net losses (Sexton and Hariyoga, 2004). In 2002 AgWay, which at that time was the largest agricultural co-operative in the Northeastern U.S., also filed for Chapter 11 bankruptcy protection and had to sell its agronomy and seed businesses to the agricultural supplier Growmark Inc. (Fairbairn, 2003; Anderson and Henehan, 2002). Similarly, Farmland Industries, which was the largest agricultural co-operative in North America, filed for Chapter 11 bankruptcy protection in the same year (Hogeland, 2004). In 2003 US Premium Beef (USPB) bought Farmland National Beef (FNB) after FNB's financial distress over the previous years (Duffey, 2003). Originally a co-operative of beef producers, USPB became a limited liability company (L.L.C.) in 2004 even though it continues to pay patronage dividends to its members.

The above-mentioned cases in Canada and the U.S. are examples of some of the most well-known agricultural co-operatives that followed different strategies in their struggle to adapt. In many cases, however, their efforts were ineffective. While several for-profit firms had a similar fate, the co-op cases are particularly interesting because of their size and importance for many rural communities. Their failure asks for a detailed examination of the co-operative organization that will account for the specific issues that agricultural co-ops face.

This thesis contains three essays that explore the current issues that co-operatives face from different perspectives and attempts to answer the following three questions: (1) what are the dynamics of the relationship between a co-op and its membership in a local community and how can the co-operatives take advantage of this special bond; (2) why did several co-op leaders failed to properly respond to the changing environment even though they had the necessary information and resources to do so; and (3) what is the real financial value of a co-op and what are the implications of this valuation for co-ops as takeover targets?

Each one of these chapters is presented as a self-contained essay.

Business organizations are driven by a dominant paradigm (Johnson, 1992) or dominant logic (Bettis and Prahalad, 1995), which is a collective interpretive device that processes information, establishes proper interconnections and produces knowledge. Prolonged periods of stability and financial success re-enforce this paradigm and make it harder for the decision makers to deviate (Bettis and Prahalad, 1995). In that sense the recent changes in the agricultural industry can serve as an effective test for an organization's ability to adapt. The thesis addresses this issue with the first two essays that focus on cognition and beliefs and their effect on market shares.

Essay One, titled "Cognitive Dissonance and Member Allegiance in Co-operatives", examines the relationship between a co-operative and its membership in a local community using an economic psychological approach. More specifically, the essay presents a modified rational-choice model to investigate how cognitive dissonance can influence members' loyalty. The model allows for consumers to have partially flexible preferences that affect their decisions; revising their perceptions results in cognitive dissonance and thus added psychological costs. The effect of cognitive dissonance is analyzed in a setting where a local co-operative coexists with an investor-owned firm (IOF) in a local market. The model explicitly incorporates individuals' perceptions regarding the quality of the two organizations as a choice variable in the utility function and individuals trade off utility from perceptions against utility resulting from their actions. The model considers a case where managerial decisions or the introduction of new products forces consumers to modify their initial perceptions regarding the quality of their co-operative. Consumers who choose to switch may experience cognitive dissonance and thus additional costs. Analytical results demonstrate the effect of these switching costs on market shares and discuss how cognitive dissonance can act as an impediment to an IOF's expansion, and perhaps more importantly to the co-operative leaders, how a reduction in dissonance cost can act as a catalyst to a rapid fall in market share.

Essay Two, titled "The Impact of Framing on Organizations: The Case of the Saskatchewan Wheat Pool" considers the co-operative as an organization that needs to adapt to new challenges. The essay constructs a game theoretic model of a duopoly between a co-op and an IOF to examine how mental frames can influence the decision making process of a CEO and therefore affect the market share and profits of his/her firm. The model assumes that the two CEOs have a particular mental frame through which they make an inference on the co-op's member support. The model allows the two CEOs to either hold the same or different beliefs regarding member commitment and thus two scenarios arise: the first is a consistent beliefs scenario while the second is an inconsistent beliefs scenario where the co-op CEO holds an unrealistically

high belief whereas the IOF CEO holds a correct belief. The analysis examines the case where the CEOs have to decide their investment on future capacity simultaneously and its results show that when the co-op CEO holds an incorrect belief regarding member support she will generally choose to over-invest – something that can have an adverse effect on co-op's profits and market share.

The first two essays are linked since they both develop models about cognitions. Examining cognition offers some new insights to understanding the process behind the decline of agricultural co-ops previously described. In essay One the theoretical model examines consumers' cognitions, while the model in essay Two examines management's cognitions. The difference between these two models lies on the agent's ability to change the beliefs that result from those cognitions. Essay One examines a case where agent's beliefs are partially flexible and can change over time with some cost. This cognitive cost effectively acts as a switching cost that makes it harder for the consumer to abandon the co-op. In the case of essay Two, on the other hand, the beliefs are inflexible due to the high cost of changing them. The co-op CEO believes that consumers think that they get more utility from the co-op. The co-op CEO is then able to observe that historically the co-op members would stay with the co-operative and hence she makes the inference that the switching costs must be large. More importantly, she forms the belief that the switching costs will remain high in the future even though new information signals that this may not be the case. The co-op CEO uses this belief as a central part of her frame and builds her strategy around it. In other words, in essay Two the co-op CEO relies in the strong effect of cognitive dissonance, believing that this effect will restrict consumers from leaving the co-operative and thus it will help maintain the high market shares for the co-op.

Essay Three, titled "Does a Co-operative Takeover Generate Greater Profits for the Buyer? The Dairyworld/Saputo Case" uses non-parametric econometric techniques to examine the stock price effect of a co-op's acquisition by a publicly traded IOF. The potential of this study emerged as a result of the takeover of Dairyworld, a dairy co-op, by Saputo, a publicly traded private corporation. The study uses the prediction-error approach to estimate Saputo's returns after the acquisition as a deviation from its expected returns. A non-parametric bootstrap technique simulates Saputo's stock returns and examines its behavior around the acquisition date. The empirical results are consistent with a number of hypotheses, including the pro-competitive role that co-operatives are believed to have in the economy. The essay also includes a comprehensive discussion regarding the financial value that co-ops have for IOFs.

A summary and conclusions chapter constitutes the last part of the thesis. The chapter offers a review over the different theories that the thesis examines and attempts to generalize the findings.

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## CHAPTER 2

# ESSAY ONE: COGNITIVE DISSONANCE AND MEMBER ALLEGIANCE IN CO-OPERATIVES

### 2.1 Introduction

Over the last decade or so substantial structural changes in the agricultural sector have given rise to a more challenging economic environment that is characterized by tougher competition, more stringent consumer demands and economic liberalization (Huff and Owen, 1999; Martin, 2000; Meilke and Huff, 2000). These challenges, combined with a declining member commitment and poor strategic decisions, helped undermine some of the most prominent North American agricultural co-operatives; some of them filed for bankruptcy protection, some ceased operations while others were transformed to for-profit firms. A characteristic example is the Saskatchewan Wheat Pool (SWP) in Canada that lost approximately 12 percentage points of its provincial market share in less than three years and suffered substantial net losses that forced the Pool to restructure its debt in 2003 (Lang and Fulton, 2004). Well-known examples of U.S. co-ops include AgWay (Anderson and Henehan, 2002; Fairbairn, 2003) and Tri-Valley Growers (Sexton and Hariyoga, 2004) that experienced similar problems.

Interestingly, the above cases share a common characteristic – all of them involve highly successful and well known co-operatives whose decline was sudden and swift. One possible explanation for their decline lies in understanding the cognitive dissonance phenomenon and its effect on the relationship between a co-operative and its members. Cognitive dissonance refers to how individuals manage new cognitions that disagree with their old ones; it is a form of cognitive bias that affects individuals' perception and thus their decisions and actions.

In the case of co-ops, cognitive dissonance can affect members' perceptions regarding the value of their

co-op and thus influence their relationship with the co-op. The relationship between a co-operative and its membership is particularly important for the co-ops since it is the commitment of their members that effectively differentiates co-operatives from other organizational forms and enables them to successfully compete in the marketplace (Fulton, 1999; Fulton and Giannakas, 2001). Changes in members' perceptions regarding the role of co-operatives in the economy or the value they provide to their members can affect member commitment and thus the co-op's market share.

The purpose of this essay is to provide further insights into the relationship between a co-operative and its members and offer a new approach to understanding the dramatic decline in market share that many U.S. and Canadian co-operatives have suffered over the recent years, a decline which can be at least partially attributed to declining member commitment. More specifically, the essay examines how cognitive dissonance can serve as a buffer that protects the co-op from market competition and how the removal of this buffer can lead to dramatic and rapid changes in market share. In doing so, the essay develops a theoretical model of cognitive dissonance to explore the conditions under which a co-op member may choose to switch business from a co-op to an investor-owned firm (IOF). The model shows that when cognitive dissonance is strong it creates added switching costs for those consumers that wish to shift their business to a competitor.<sup>1</sup> However, when the effect of cognitive dissonance weakens, switching costs are lowered and rapid changes in market shares can be observed.

The analysis offers a model of choosing perceptions where there is a psychological cost associated with changing one's perception. Specifically, what we model is the cost that one incurs when changing the perception regarding the relative quality of the products provided by a co-op and an IOF. The cognitive cost from changing perceptions can have a number of different sources, two of which are particularly interesting. One source can be peer pressure from other consumers that are able to observe purchasing decisions (Benabou and Tirole, 2006; Cervellati, Esteban and Kranich, 2007). A second source is a more individualistic; consumers can suffer a psychological cost whenever they choose to reverse previously held perceptions (Festinger, 1957). The analysis focuses on the latter case and offers a new approach in modeling the psychological cost for the individual of changing her perceptions.

In particular, this essay explores how changes in the economic environment can influence a person's perceptions regarding the quality of an IOF's service relative to that of a co-operative's. The analysis considers the case where a local co-operative competes with an IOF in a market. Initially the co-op and the IOF are assumed to have identical quality products and consumers are assumed to view the two products as

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<sup>1</sup>For a discussion on switching costs see Klemperer (1995).

being of the same quality. Although quality is identical, most consumers are assumed to prefer the co-op because it better fits with their view of how they see themselves situated in their local community. Given this starting point, the IOF is then assumed to improve the quality of its service. Consumers are now faced with a decision as to whether they should alter their perception about the quality of the IOF's product. While altering their perception will allow them to purchase the higher quality product, it also creates cognitive dissonance, since their original perception about the relative quality has to be revised.

More formally, the framework developed in this chapter assumes that consumers are heterogeneous and have a preference regarding the organization they choose to patronize. This preference is partly a function of the perceived quality of the product supplied by each of the organizations. For instance, many co-op members are highly committed to their organization; they believe that the co-op is operating in their best interests and therefore they attribute higher quality to its product (Fulton and Giannakas, 2001; 2006). Other consumers perceive the co-op as an organization that enhances their local economy and is therefore a crucial institution for their community (Merrett and Walzer, 2003).

Regardless of the preferences that one has, the analysis assumes that there is a set of perceptions that, even though are already established, are not impervious to change, but instead adjust over time in ways that are most useful for the consumer. Changes in the economic environment, including managerial decisions, introduction of new products or services, and changes in prices or quality, will create new cognitions for the consumer. For instance, consider a case where the co-op's board undertakes consecutive poor managerial decisions. These decisions are likely to create doubts by members regarding the extent to which their co-operative is operating in their best interests and therefore have a negative effect on the perceived quality of the co-op product or the value that it provides (Fulton and Giannakas, 2001; 2006). Similarly, new investments by the IOF that result in products of relatively higher quality will change individuals' cognitions regarding the quality of the IOF relative to the co-op. In both cases the individual consumer receives new information that forces her to review her perceptions regarding the qualities or values of the two organizations.

In a situation where consumers perceive that the co-op no longer offers a product of equal quality relative to the IOF, there will be a discrepancy between the initial set of perceptions and the new informational signal. Consumers will either have to maintain their perception that the IOF offers a product that is no better in quality than that of the co-op (thus allowing them to continue doing business with the co-op), or they will have to change their perception (which allows them to do business with the IOF) even though this involves incurring a cognitive cost.

The essay uses the case of the SWP as a real-life example. The analysis and the subsequent model provide results that can be generalized to other business organizations. By incorporating psychological dimensions in the economic model the analysis also provides a new way of understanding shifts in consumers' attitudes and changes in market shares. In addition, the model can serve as the foundation for an examination of the strategic decisions made by firms when they are able to shape the cognitive costs of consumers.

The rest of the chapter is structured as follows. The next section introduces the main concepts regarding cognitive dissonance and briefly discusses some of its main applications in economic literature. Next, a simple theoretical model is presented where consumers differ in their attitudes towards the co-op and the IOF. The article then outlines how cognitive dissonance can change the market outcome and how changes in perception can influence the market shares. The article ends with a summary and conclusions.

## **2.2 Cognitive dissonance**

The theory of cognitive consistency has been one of the most influential theories in social psychology (Jones, 1985) – it has helped to chart a new course of research in decision making and has generated hundreds of research studies in the field. Cognitive dissonance is the most widely known and researched of cognitive consistency theories and was first identified by Leon Festinger (1957) as a psychological phenomenon where there is an inconsistency between what a person believes, knows and values, and credible information that calls these cognitions into question.

Festinger (1957) identifies at least two kinds of dissonance. In the first, dissonance arises because the individual perceives two cognitions as being psychologically inconsistent or contradictory; in the second, dissonance arises when “culture or group standards may dictate that they do not fit” (p. 13). More formally, two related elements ( $x, y$ ) that exist in a person's cognition are dissonant if not- $x$  follows from  $y$  – i.e., the obverse of one element would follow from the other. According to this theory, the inconsistency between any two cognitions (dissonance), being psychologically uncomfortable, motivates the person to reduce the dissonance. The more important are the cognitions, the greater is the magnitude of the dissonance; at the same time the greater the magnitude of this dissonance, the greater is the impulse to reduce it. The main ways of reducing dissonance include altering one's behavior, seeking information that is consonant with existing behavior, or distorting new information (Suedfeld, 1971). Therefore, the theory of cognitive dissonance not only predicts systematic differences in the interpretation of pre-specified information sets but also biased receptivity to new information according to one's perceptions/beliefs (Akerlof and Dickens

1982). Although the theory of cognitive dissonance is prominent in social psychology, where it was intensively developed in the 1960s and 1970s, it was only at the beginning of the 1980s that it began to receive attention in the economics literature.

The model in this article shares a basic intuition with the main models in the literature of rational-choice cognitive dissonance that started with Akerlof and Dickens (1982). In this literature individual perceptions are modeled as choice variables in a person's utility function and individuals trade off utility from perceptions against utility resulting from their actions (Dickens, 1986; Nagler, 1993; Rabin, 1994; Montgomery, 1994). In many cases additional factors such as conformity or uncertainty are incorporated to further modify the basic model. Nevertheless, these economic models are applied almost exclusively to individual decision making and ignore any institutional arrangements in the marketplace that may trigger such phenomena. The model developed in this article is distinct from these approaches in that we examine cognitive dissonance in a setting where a co-operative competes with an investor-owned firm in a local market and where consumers have to choose the organization from which to purchase. The analysis is applied over a range of heterogeneous individuals where the cognitive dissonance they suffer differs depending on their characteristics.

## **2.3 A model of cognitive dissonance: co-operative vs. IOF**

### **2.3.1 General description of the model**

The concept of cognitive dissonance is captured by assuming that an agent's perceptions are *partially flexible* and can be introduced directly into the utility function as a choice variable. Individuals are assumed to form their perceptions pragmatically and then choose their actions to maximize utility.<sup>2</sup>

The model looks at a two-period world where a co-operative and an IOF operate in a local market.

Consumers are able to observe the qualities and the prices of the two products that are offered and then decide whether to purchase a unit of the product from either the IOF or the co-op. The model further assumes that the IOF enjoys economies of scale and/or scope and therefore is able to potentially offer its product at a better price or to provide a higher quality in the second period.

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<sup>2</sup>The formation of partially flexible pragmatic perceptions implies that these perceptions are most useful in utility maximization. Hvide (2002) stresses the latter point and offers a discussion on how this approach is different from the standard rational approach where individuals use Bayes' law and form perceptions that reflect the world as it is. Akerlof and Dickens (1982) also offer a discussion on this subject.

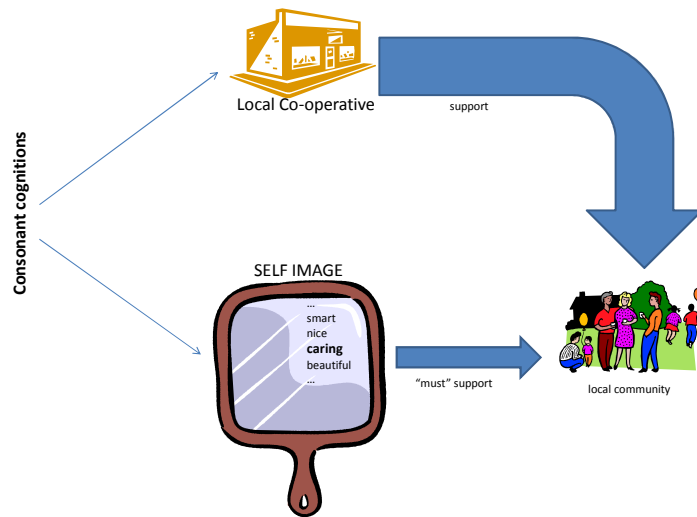
The first period serves as a benchmark that defines the situation we wish to explore. The model assumes that the two firms, a co-operative and an IOF, offer physically identical products. To make the story more specific and hopefully more informative we assume that the competition of the two firms takes place in a rural town where the local co-op competes with a multinational IOF for the local market. The distinct features of the two organizations, due to their different nature, produce different consumer preferences for the products from the two organizations. Locally owned co-operatives, especially in rural areas, have historically played a critical role in local economic development and are considered to be of vital importance for local economies (Merrett and Walzer, 2003). Moreover, it is documented (Fulton, 1999; Fulton and Giannakas, 2001) that the commitment of their members effectively differentiates co-operatives from other organizational forms, like IOFs, that focus almost exclusively on profits and serve the market as long as it remains profitable.

The model adopts the standard presumption in the cognitive dissonance literature that people view themselves as “nice and caring persons”, which implies that individuals care about their local community and want to support it. Hence, consumers believe that the local co-op is a superior organization even though it offers an identical product, since it enhances the local economy and hence the local community; this perception is consonant with the cognition they have for themselves – i.e., that they are good persons that want to help their community (Figure 2.1). Even though everyone believes that the co-op is better, some consumers do shop from the IOF, but only because the IOF offers a better price and because these consumers view the IOF as only slightly inferior to the co-op.

In period two, consumers receive new information that signals that the co-op’s and the IOF’s products are no longer of similar quality - instead, information is received that the IOF’s product is of higher relative quality. For instance, this might be the case where the IOF undertook new investment that enhanced the quality of its product relative to the co-op. Alternatively, poor managerial decisions from the co-op can signal that the co-operative no longer operates for the best interest of its members or the local community and thus its perceived quality decreases (Fulton and Giannakas, 2001; 2006).

Given this new information, consumers that had patronized the co-op have to decide whether they will continue to do so. In making this decision, consumers have to consider not only the monetary gains/costs that arise from their shopping decision but also the psychological costs associated with changing their perceptions about the IOF’s quality so that they can in turn purchase from this organization. The cognitive cost arises because consumers that believe the IOF is better than the co-op now hold a perception that contradicts their previous perception. The consumer group that remains with the co-operative will not





**Figure 2.1:** Cognitions and buying decisions.

Source: Author's own interpretation.

experience any dissonance since they do not have to adjust their perceptions. In addition, those consumers that previously purchased from the IOF also do not have to adjust their perceptions and hence do not experience any dissonance.

### 2.3.2 Formal model

In this section a formal model of cognitive dissonance is presented. Consumers are presumed to have personal perceptions  $q_i$  and  $q_c$  regarding the quality of the IOF and the co-operative, respectively. Moreover, to capture different consumer attitudes toward these two different types of organization, consumers are assumed to differ with respect to a differentiating characteristic  $x$ . One interpretation for  $x$  is that it captures the physical location of each consumer from the two organizations; a second interpretation is that  $x$  captures an ideological location of each consumer from the co-op and the IOF – see Fulton and Giannakas (2001) for an interpretation along these lines. With this setup, each consumer has to decide whether to purchase a unit of good from the IOF or the local co-op. Consumers spend a small fraction of their total income on this purchase and they are uniformly distributed with respect to  $x$ .

Consider a consumer with the following utility function:

$$\begin{aligned}
U_i &= \bar{u} - p_i + q_i - tx \\
U_c &= \bar{u} - p_c + q_c
\end{aligned}
\tag{2.1}$$

where  $U_i$  and  $U_c$  are the net consumer benefits (overall utility) associated with purchasing a unit of the product from the IOF and the co-operative, respectively. The parameter  $\bar{u}$  is a base level of utility received from consuming the physical product, while  $p_i$  and  $p_c$  are the prices charged by the IOF and the co-operative, respectively, with  $p_i < p_c$ . Parameter  $t$  is a non-negative utility reduction factor that captures the difference in utility obtained by consumers with different values of the differentiating attribute  $x$ . The greater is  $t$ , the greater are the differences in consumers' utility from the two goods. One interpretation is that  $t$  captures transportation costs where higher  $t$ -values suggest higher cost to consumers of shifting their business between the IOF and the co-op; the larger is  $t$ , the less responsive are consumers to price changes.

Notice that when  $q_i = q_c$  and  $p_c = p_i$ ,  $U_c > U_i \forall x \geq 0$ . Thus the model encompasses the idea that, everything else being equal, people prefer the co-op to the IOF – one reason is that, properly run, the co-op appeals to people's desire to support their local community.<sup>3</sup> To ensure positive market shares for the two firms, it is assumed that  $p_i < p_c$ . Furthermore, we simplify by assuming that consumers do not consider possible patronage payments when determining the utility they receive from the co-op (Royer and Smith, 2007).

In this model a consumer will choose to shop from the IOF as long as  $U_i \geq U_c$ :

$$\bar{u} - p_i + (q_i - q_c) - tx \geq \bar{u} - p_c
\tag{2.2}$$

where the  $(q_i - q_c)$  captures the difference between the two qualities that consumers assign to the two organizations.

Figure 2.2 illustrates the decision problem that consumers face. The downward sloping curve shows the utility received when one unit of the good is purchased from the IOF, while the horizontal line shows the utility received when the good is purchased from the co-op for different consumers – i.e., for consumers

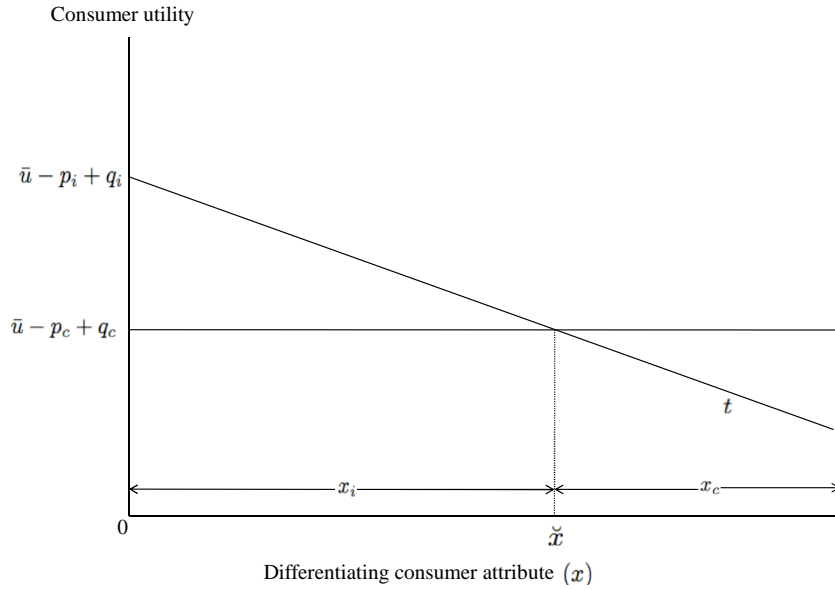
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<sup>3</sup>This is true for all consumers, except the consumer who is located at  $x = 0$ .

with different values of  $x$ . The consumer with differentiating characteristic  $\check{x}$  given by:

$$\check{x} = \frac{(p_c - p_i) + (q_i - q_c)}{t} \quad (2.3)$$

is indifferent between buying from the co-operative and buying from the IOF since her utility from consuming these two products is the same. Consumers who are “located” to the left of  $\check{x}$  (i.e., consumers with  $x \in [0, \check{x})$ ) purchase from the IOF, while those located to the right of  $\check{x}$  (i.e., consumers with  $x \in [\check{x}, 1]$ ) buy from the co-operative (see Figure 2.2).



**Figure 2.2:** Consumer decisions.

When consumers are uniformly distributed with respect to their differentiating attribute  $x$ , the level of  $x$  corresponding to the indifferent consumer,  $\check{x}$ , also determines the market share of the IOF. The market share of the co-op is given by  $(1 - \check{x})$ . By normalizing the mass of consumers at unity, the market shares give the consumer demands faced by the IOF,  $x_i$ , and the co-operative,  $x_c$ , respectively. The preceding analysis is used extensively in utility models and originates from the seminal paper of Mussa and Rosen (1978).

Formally,  $x_i$  and  $x_c$  can be written as:<sup>4</sup>

<sup>4</sup>The structure of equation 2.4 in which output is a function of price means that the co-op and the IOF can be expected to engage in price (Bertrand) competition.

$$\begin{aligned}
x_i &= \frac{(p_c - p_i) + (q_i - q_c)}{t} \\
x_c &= \frac{t + (p_i - p_c) - (q_i - q_c)}{t}
\end{aligned} \tag{2.4}$$

One may graph the above equations in standard price-quantity space using the following expressions:

$$\begin{aligned}
p_i &= p_c + (q_i - q_c) - tx_i \\
p_c &= p_i - (q_i - q_c) + t - tx_c
\end{aligned} \tag{2.5}$$

In the first period a set of perceptions regarding the qualities of the two firms is established. Specifically it is assumed that consumers believe that co-op and IOF offer products of equal quality – i.e.,  $(q_i - q_c) = 0$ . Thus, equations 2.4 and 2.5 reduce to:

$$\begin{aligned}
x_i &= \frac{(p_c - p_i)}{t} \\
x_c &= \frac{t + (p_i - p_c)}{t}
\end{aligned} \tag{2.6}$$

and

$$\begin{aligned}
p_i &= p_c - tx_i \\
p_c &= p_i + t - tx_c
\end{aligned} \tag{2.7}$$

### **Introducing cognitive dissonance**

In period two, new information is available that signals that the IOF's quality has increased relative to the co-op such that  $q_i > q_c = 0$ . Let  $q_i$  be given by  $q$ . All agents learn of the change in  $q_i$  but, because of

differences among them, the perception adopted by each of them is different. Each consumer is assumed to have a subjective valuation  $q^*$  that characterizes the perceived quality of the IOF;  $q^*$  is a non-negative parameter that is then contrasted to  $q_i$ , the real quality. The higher the value of  $q^*$ , the more the IOF is considered to be a superior organization compared to the co-op.

A central theme in the theory of cognitive dissonance is the assumption of *partially flexible* beliefs/perceptions that make it costly for an agent to change her initial perception. In our model, even though the quality of the IOF is higher, acknowledging this observation implies that the consumer now has to recognize that the IOF is superior to the co-op – something that is inconsistent with her previous perception (period one). The consumer thus has two options. She can modify her perception and incur a cost, or she can ignore the new information and continue to do business with the co-op.

In general, the level of dissonance  $d$  is a function of  $q^*/q$ , the consumer's subjective assessment of the IOF's relative quality. This function is assumed to be of the form:

$$d = \frac{q^*}{q} \quad (2.8)$$

over the range  $q^* \in [0, q]$ . Each consumer, prior to her choice to patronize the co-operative or the IOF, establishes her own perception  $q^*$ . Cognitive dissonance is modeled by letting each consumer choose any value of  $q^*$  in the range between 0 and  $q$ .

To examine the impact of cognitive dissonance we need to modify the consumer's utility function by adding the cognitive dissonance cost when the perceived relative quality of the IOF equals  $q^*$ . Assuming that cognitive dissonance has unit cost  $c$ , the cost of dissonance is  $\frac{q^*}{q}c$ . Therefore, a consumer who maintains a perception  $q^*$  will have a utility function of the following form:

$$\begin{aligned} U_i &= \bar{u} - p_i + q^* - \frac{q^*}{q}c - tx \\ U_c &= \bar{u} - p_c \end{aligned} \quad (2.9)$$

where all variables are as previously defined. Notice that in the case of the IOF, the overall utility is enhanced by the parameter  $q^*$  that captures the extra utility due to the perceived quality that is associated

with doing business with the IOF in period two. Choosing  $q^* > 0$ , however, creates a cognitive dissonance cost of  $\frac{q^*}{q}c$ , which of course is larger for higher values of  $q^*$ .

In making their purchase decision, consumers that purchased from the co-op in period one face a trade-off. Choosing to believe in high  $q^*$  (which will lead to a purchase from the IOF) implies high dissonance cost but the consumer gets the psychological benefit of  $q^*$  and pays only  $p_i$  instead of  $p_c$ . Choosing to believe that  $q^* = 0$  (which leads to continued purchases from the co-op) implies zero dissonance cost but now the consumer loses  $q$  and pays the higher price  $p_c$ . Therefore consumers that previously bought from the co-op can either shop from the IOF and suffer some level of dissonance; or they can avoid any dissonance cost by shopping from the co-op but pay a higher price and forego the better quality product. As will be shown, those consumers that bought from the IOF in period one will choose  $q^* = 0$  and continue to purchase from the IOF.

Focusing attention on those consumers that purchased from the co-op in period one – i.e., those with  $x > \frac{p_c - p_i}{t}$  – consumers will prefer to shop from the IOF as long as  $U_i \geq U_c$ , which implies:

$$\frac{q^*}{q}(x) \geq \frac{p_i - p_c + tx}{q - c} \quad (2.10)$$

with  $q - c > 0$ . Consumers who choose to believe in  $q^*$  that satisfies the above equation will shop from the IOF. Since choosing to believe in  $q^*$  is costly, those consumers that now purchase from the IOF will select a value of  $q^*$  so that the equality in equation 2.10 is satisfied. If they continue to purchase from the co-op, however, they will set  $q^* = 0$  (since this creates no dissonance costs).

Consumers choosing to purchase from either the co-op or the IOF will incur what can be called a real cost. In the case of purchasing from the co-op, the real cost ( $C_c$ ) is the loss of utility experienced by not purchasing the IOF's product of higher quality. Thus the cost of staying with the co-op is:

$$C_c = p_c - p_i + q - tx \quad (2.11)$$

Alternatively, consumers choosing to purchase from the IOF will incur the cost of dissonance ( $C_i$ ) which is given by:

$$C_i = \frac{q^*}{q}(x)c = \frac{p_i - p_c + tx}{q - c}c \quad (2.12)$$

The individual consumer will choose the value of  $q^*$  that minimizes her real costs; hence she compares  $C_c$ , the cost associated with shopping from the co-op (equation 2.11), with  $C_i$ , which is the dissonance cost (equation 2.12). Accordingly, the consumer should choose  $q^* = 0$  if  $C_c < C_i$  and choose  $q^* = \frac{q(p_i - p_c + tx)}{q - c}$  if  $C_c > C_i$ .

Therefore, the decision making process in period two is a two-step procedure. First, the consumer chooses her belief on  $q^*$  that minimizes her total cost. Then, she chooses to buy from the IOF or the co-operative based on her personal belief regarding  $q^*$ .

For consumers who choose to believe in high  $q^*$  and hence patronize the IOF:

$$c + tx < p_c - p_i + q \quad (2.13)$$

which implies that the consumer with differentiating characteristic  $\hat{x}$ , given by:

$$\hat{x} = \frac{p_c - p_i + q - c}{t} \quad (2.14)$$

is indifferent between buying from the co-operative and buying from the IOF since her utility from purchasing a good from these two organizations is the same. Consumers who are then characterized by  $x \in [0, \hat{x})$  purchase from the IOF, while the rest buy from the co-operative.

Since consumers are uniformly distributed with respect to the differentiating attribute  $x$ , the location of the indifferent consumer  $\hat{x}$ , will also determine the market share of the IOF; the market share of the co-operative is given then by  $(1 - \hat{x})$ . By normalizing the mass of consumers at unity, the market shares give the consumer demands faced by the IOF,  $x_i$ , and the co-operative,  $x_c$ , respectively. Formally,  $x_i$  and  $x_c$  can be written as:

$$\begin{aligned} x_i &= \frac{p_c - p_i + q - c}{t} \\ x_c &= \frac{t - p_c + p_i - q + c}{t} \end{aligned} \quad (2.15)$$

The above equation for the IOF can be graphed in standard price-quantity space using the following expression:

$$p_i = p_c + q - c - tx_i \quad (2.16)$$

while for the co-operative the relevant expression is:

$$p_c = p_i - q + c + t - tx_c \quad (2.17)$$

The market shares and the demand curves for both the co-operative and the IOF are directly linked with the cognitive cost ( $c$ ) and the true quality ( $q$ ). In the case of the IOF the cognitive dissonance creates the extra cost  $c$  that negatively affects its demand and its market share. However, the new information in period two about the higher quality  $q$  has a positive effect on market share (see equation 2.15). Overall, the higher is the IOF's relative quality and/or the lower is  $c$ , the greater is the quantity purchased from the IOF at any given price. Alternatively, lower  $q$  and/or higher  $c$  results in a lower quantity purchased from the IOF at any given price.

Substituting the value of  $\hat{x}$  into equation 2.10 gives the critical value of dissonance that arises:

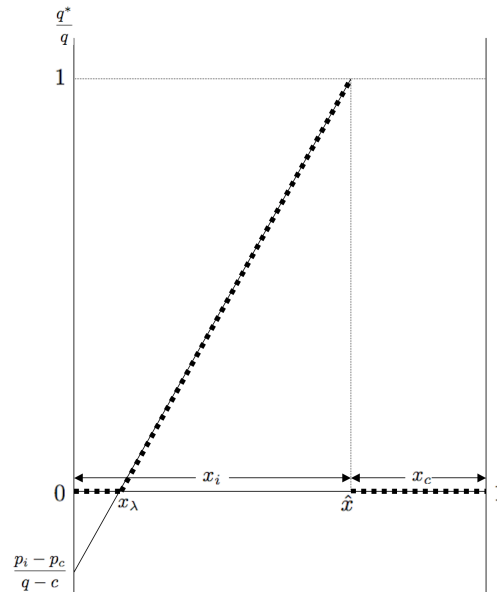
$$\frac{q^*}{q} = 1 \quad (2.18)$$

Equation 2.18 is a result of the economics of the model. Consumers try to minimize the overall cost of their decision and thus they choose to raise  $q^*$  until the location of  $\hat{x}$ . Increasing  $q^*$  after  $\hat{x}$  means that consumers need to believe that the IOF is even better than it really is. Therefore, no consumer will set  $q^* > q$ .

Choosing to believe in higher values of  $q^*$  unnecessarily increases their cost.

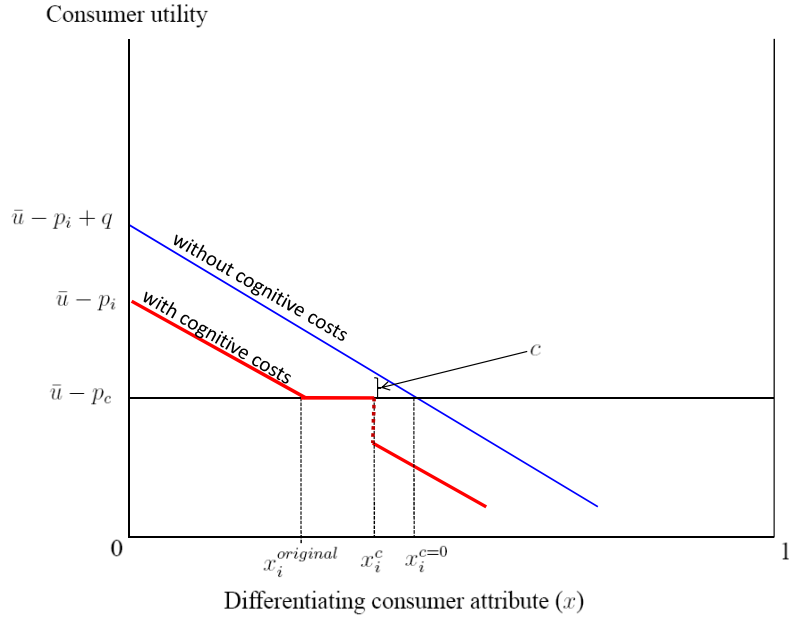


Figure 2.3 illustrates how the dissonance level changes with respect to the differentiating attribute  $x$ . The bold dashed kinked curve shows  $\frac{q^*}{q}$  for every  $x$ . The consumers that are located close to the IOF ( $x \in [0, x_\lambda]$ ) have zero dissonance since they set  $q^* = 0$ . Yet, despite believing that the co-op has the higher quality good, these consumers buy from the IOF because the price is lower. These consumers effectively can “have their cake and eat it too”. They can continue to believe that the co-op is superior thus incurring no dissonance cost and still buy from the IOF. However, as one moves more farther from the IOF ( $x > x_\lambda$ ), consumers have to believe in higher values of  $q^*$  in order to shop from the IOF. Consumers further away from the IOF need to adopt larger values of  $q^*$  in order to offset the distance they are away from the IOF. Thus the further away one moves from the IOF the higher the level of dissonance. The last IOF customer is located at  $x = \hat{x}$  and sets  $q^* = q$  – i.e., the actual quality. After that point, the costs associated with shopping from the IOF are too high and all consumers to the right of  $\hat{x}$  set  $q^* = 0$  and buy from the co-op.



**Figure 2.3:** Dissonance level.

An interesting result is the three consumer groups that appear in Figure 2.3. The first group consists of those consumers who are characterized by  $x \in [0, x_\lambda]$ . This is the same group that purchased from the IOF in period one. They are the most fortunate since they do not experience any dissonance ( $q^* = 0$ ) and at the same time they shop from the IOF and take advantage of the better price and quality of its product. The second consumer group consists of those with  $x \in (x_\lambda, \hat{x}]$ . They also purchase from the IOF but their overall utility is less than the utility of the first group since they have to incur an increasing dissonance cost. The last consumer group, where  $x \in (\hat{x}, 1]$ , is the group that remains loyal to the co-operative. Although they do not incur any dissonance cost ( $q^* = 0$ ) they pay a higher price ( $p_c$ ) for an inferior good.



**Figure 2.4:** Impact of cognitive cost on net utility.

Figure 2.4 illustrates how the net utility that consumers receive is affected by cognitive costs. Consider first the net utility curve for the IOF’s product when  $q = 0$ . This curve cuts the net utility curve for the co-op’s production at  $x_i^{original}$ ;  $x_i^{original}$  is thus the market share of the IOF in the first period. If the IOF’s quality increases to  $q$  and cognitive costs are zero (i.e.,  $c = 0$ ), the net utility curve for the IOF’s product is shifted upward to the line marked “without cognitive costs”. Thus, in the absence of cognitive costs, the IOF’s market share would increase to  $x_i^{c=0}$ . When cognitive costs are present, however, only a portion of the net utility curve for the IOF’s product moves upward as the curve labeled “with cognitive costs” shows. Specifically, the net utility curve for those consumers that purchased the IOF’s product in the first period does not shift at all. These consumers choose to believe that product quality has not increased – however, since they still purchase the IOF product, they receive the benefits of the higher quality good without having to incur any dissonance costs. Given the high quality of the IOF product, a number of consumers located beyond  $x_i^{original}$  switch to purchasing the IOF product. To minimize dissonance costs, the net utility curve for the IOF’s product now lies on the net utility curve for the co-op’s product for values of  $x$  greater than  $x_i^{original}$ . At location  $x_i^c$ , however, the cognitive costs become too large and consumers from this point on choose  $q^* = 0$ , thus incurring zero dissonance costs. The result of this behaviour, however, is that the net utility curve for the IOF’s product drops to the original net utility curve when  $q = 0$ .

Comparing these results with the benchmark model from period one (equations 2.6 and 2.7) shows the effect of cognitive dissonance for the market shares and the demands that the two firms face (Table 2.1).

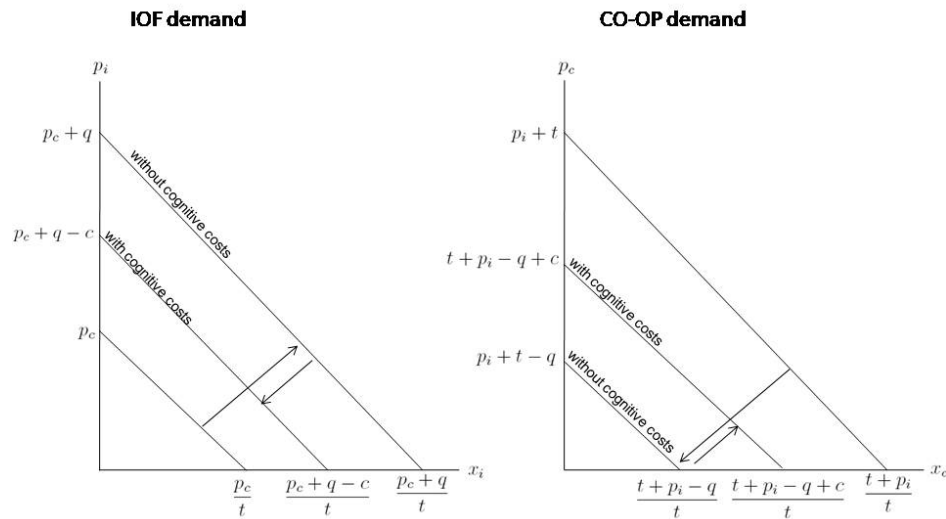
**Table 2.1:** Comparison of market shares and demands with and without dissonance.

Parameter	Period One (no dissonance)	Period Two (with dissonance)
<b>Market share</b>		
$x_i$	$\frac{(p_c - p_i)}{t}$	$\frac{(p_c - p_i) + q - c}{t}$
$x_c$	$\frac{t + (p_i - p_c)}{t}$	$\frac{t + (p_i - p_c) - q + c}{t}$
<b>Inverse demand curve</b>		
$p_i$	$p_c - tx_i$	$p_c - tx_i + q - c$
$p_c$	$p_i + t - tx_c$	$p_i + t - tx_c - q + c$

The change in the relative quality  $q$  affects the demands that the IOF and the co-op are facing as illustrated in Figure 2.5. Without cognitive costs ( $c = 0$ ) the increase in the IOF's relative quality would result in an upward shift of the demand curve to the furthest right position (see left panel). When dissonance costs are present ( $c > 0$ ) the shift of the demand curve is limited to the position labeled "with cognitive costs". Therefore, cognitive costs limit the upward shift of IOF's demand by an amount equal to the cognitive cost  $c$ . For the co-op, the increase in the IOF's relative quality has a negative impact on its demand curve. In the absence of any cognitive cost, the co-op's demand curve would shift to the furthest left position (see right panel). The presence of cognitive costs limits the shift of the curve to the position labeled "with cognitive costs".

The cognitive costs  $c$  that consumers experience when they have to revise their perceptions acts as a buffer that limits the shift of both demand curves. In the case of the IOF, cognitive costs constrain the expansion of its demand, while cognitive costs limit customer losses in the case of the co-op. The lower is  $c$ , the worse off is the situation for the co-op, *ceteris paribus*.

The cognitive cost  $c$  can diminish for a number of reasons. One reason could be that the co-op is distancing itself from its members and the community. The more distant the co-op becomes from its customers, the easier would be to change perceptions and thus the smaller the cost  $c$ . Another reason for a diminishing  $c$  could involve a change in the way individuals perceive the co-op's role and identity. As long as the co-op acts in a way that is consistent with the individuals' image as being "nice and caring" then the cognitive cost  $c$  should remain sufficiently significant; undertaking actions that are inconsistent with this image will produce contradictory signals and cognitions that are not consonant anymore, thus reducing  $c$ .



**Figure 2.5:** The effect of cognitive cost on demand curves.

Smaller cognitive cost  $c$  means that the area that restricts the movement of the demand curves (Figure 2.5) gets smaller so that it becomes easier for the IOF to expand and capture a larger market share. Therefore, in cases where there is no cognitive cost (i.e.,  $c = 0$ ) one may observe rapid shifts in market shares since there is not buffer to constrain the movement of the demand curves. In such cases there is no cognitive connection between shopping from the co-op and consumers' self-image, so it is "cognitively costless" for consumers to change their perception.

One interpretation for the quality change in period two is that the IOF undertook investments that increased the quality of its product. However, our results show that the higher is  $c$ , the higher the increase in quality needs to be to have a positive effect on IOF's market share and demand. Therefore, in cases where the co-op has already managed to create a high  $c$ , the IOF will have to undertake substantial investments in order to enhance its position in the marketplace. Since higher investments usually imply higher risk, it will be even harder for the IOF to increase its market penetration and more likely for the co-op to maintain its market share. Another interpretation for the IOF's quality increase is that the co-op did something that decreased its own quality relative to the IOF. This will be a case where co-op customers feel that the co-op does not support their local community anymore. In such a case, the unit cost of dissonance for abandoning the co-operative will be minimum so it may be fairly easier for an IOF to capture a much bigger share of

the market.

### **2.3.3 Cognitive dissonance and the decline of the SWP**

Our proposed hypothesis is that the cognitive connection between consumers and co-operatives that the previous sections demonstrated may be one of the main reasons behind the recent demise of several U.S. and Canadian co-ops described in the introduction. More specifically, our model offers an explanation that fits the case of the SWP.

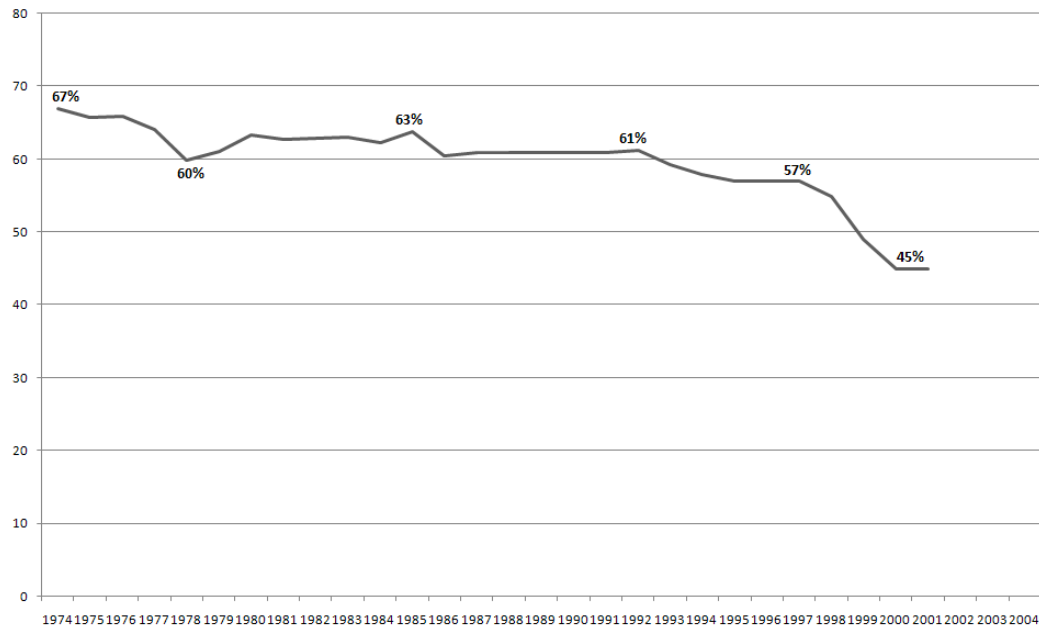
Facing several new challenges in a rapidly changing economic environment, the Pool adopted new policies and initiatives in an attempt to adapt and strengthen its position vis-à-vis the competition. The changes in the economy were a result of a number of factors, including the ratification of NAFTA in 1994 and the elimination of the Crow Benefit in 1995, as well as the ongoing transformation of the railway industry in the late 1990s (Meilke and van Duren, 1996; Schmitz, Highmoor and Schmitz, 2002; Wilson and Dahl, 2005).<sup>5</sup> SWP's response, however, was followed by rapid drops in its market share. The Pool had a provincial market share of 61% in 1992; this declined to 57% in 1997 and dropped to a historic low of 45% in 2001 (SWP Annual Reports, several years) (Figure 2.6).

Two events on SWP's recent history are of particular importance in understanding the rapid drop in its market share. The first is the share conversion of 1996 where the Pool converted its retained member equity to tradable "Class B shares" and entered the Toronto Stock Exchange as a publicly traded enterprise (TSX: SWP.B) (SWP Investor Relations) (Painter, 2004). The share conversion marked the end of patronage dividends. As a co-op the members had to do business with the Pool in order to obtain any patronage benefits; with the share conversion this was no longer the case – members could benefit from the market fortunes of the Pool without doing business with it.

The second event was Project Horizon. Initiated in 1997, Project Horizon involved the construction of 22 high-throughput grain handling facilities (concrete elevators) that were to replace the over 400 small mainly wooden elevators in service all over Saskatchewan (Painter, 2004). This reconstruction of its grain handling network required the closure of numerous small facilities, something that could potentially upset many of the co-op's members, since these elevators served both an economic and a social role for many

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<sup>5</sup>The Crow Benefit was a subsidy that guaranteed low freight rates for prairie grain. It was a central provision of the Western Grain Transportation Act (WGTA) that the federal government had to cover a certain amount of the rail transportation costs of Western grain destined to specific ports (mainly Thunder Bay and Vancouver). The WGTA subsidy was often referred to as the "Crow Benefit" after the Crow's Nest Pass Agreement of 1897.



**Figure 2.6:** SWP Provincial market share.

rural communities. Project Horizon could be considered as a signal to the co-op members that the Pool had abandoned their communities – an abandonment that made it easier for the members to in turn abandon the Pool.

Both events signaled that the co-op had changed in the most fundamental way. The new entity was a fully commercialized organization focused solely on profits. Therefore, the cognitive connection that previous sections describe was now broken. In terms of our model the commercial transformation of the co-op and Project Horizon effectively lowered the cognitive cost  $c$  and made it much easier (less costly) for people to change their perceptions. The lower cognitive cost made the co-op more exposed and vulnerable to IOF competition and acted as a catalyst to a rapid fall in market share (see Figure 2.6).

## 2.4 Summary and conclusion

The purpose of this essay was to shed more light on the relationship between a co-operative and its members and to offer a new way of understanding the dramatic decline in market share that many North

American co-operatives have suffered in recent years, a decline which can be at least partially attributed to declining member commitment. The analysis considers the case of a rural community where a local co-op competes with a multinational IOF for the local market. A central assumption is that the consumers of this community perceive the co-op as giving them higher value compared to the IOF because doing business with the co-operative generates consonant cognitions. New opposing information, however, signals that the IOF's quality has been upgraded and thus forces consumers to revise their previous held perception. The developed model is distinct from the standard analysis of market competition and member commitment in that personal beliefs/perceptions are introduced as a choice variable in consumers' utility function.

Analytical results illustrate that market shares and demands will be affected by cognitive dissonance. Quality increases in the IOF's product can attract new customers that need to decide if it is worth to switch or stay with the co-operative. Previous cognitions create a bond between this consumer group and the co-op; breaking this bond and switching to the IOF results in cognitive dissonance and hence psychological costs. In this setting consumers need to find the balance between the psychological cost and the monetary cost of their actions.

The analysis also demonstrates that the relative magnitude of the unit dissonance cost has an important effect on the market outcome. When the increase in the IOF's quality is accompanied with a relatively small dissonance cost, the IOF is more likely to increase its market share. However, as the cognitive cost becomes more substantial it offers a buffer that protects the co-op from the IOF's actions.

The magnitude of cognitive dissonance depends on how important and discrete the cognitions are from the two firms. People that perceive the two institutions as indistinguishable will never experience the dissonance. For them, buying from the co-op or the IOF is not related to their self-image. Therefore, they will simply choose the organization that maximizes their net utility without considering any additional cognitive cost. Creating a distinct and strong image that is consonant with individual's self-image can effectively shield the firm from competition by increasing the switching costs for consumers.

Even though the analysis focuses on SWP, its results go far beyond this specific case. The essay provides a new way to establish market demands for two firms when cognitive dissonance is present. In that respect, the model combines elements from the economics literature (namely oligopoly theory and product differentiation) with elements from psychology (specifically cognitive dissonance). The developed model can serve as a basis for the examination of the strategic interactions between firms.

It remains for future research to examine how the market shares are affected in multistage/multi-period

games when prices become endogenous. Another suggestion would be to examine a case where the co-op has some control over the cognitive cost  $c$  that could be influenced at a cost (for example advertising can serve such a purpose). Finally, allowing the two firms to directly control their qualities through investments in previous periods will also give more insight on the dynamics and complexity of the co-op – member relationship.



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## CHAPTER 3

### ESSAY TWO: THE IMPACT OF FRAMING ON ORGANIZATIONS: THE CASE OF THE SASKATCHEWAN WHEAT POOL

#### 3.1 Introduction

Over the last decade or so there have been major changes in Canadian agriculture, including the ratification of NAFTA and the elimination of the Crow Benefit in the 1990s, and the liberalization of world agricultural markets through the WTO (Meilke and van Duren, 1996; Schmitz, Highmoor and Schmitz, 2002; Meilke and Huff, 2000). Consumers have become increasingly concerned with food quality, safety and convenience (Huff and Owen, 1999; Cash, Goddard and Leroh, 2006). In addition, the introduction of biotechnology, modern logistics, food standardization and the application of the Hazard Analysis and Critical Control Points (HACCP) protocol brought new challenges for the agri-food firms (Marks, Freeze and Kalaitzandonakes, 1999; Herath, Hassan and Henson, 2007).

Many businesses managed to adapt to these changes; other organizations, however, struggled to develop strategies that were effective in this new environment. Among the organizations in the latter group were several reputable and well-established co-operatives, including Tri Valley Growers (TVG) (Sexton and Hariyoga, 2004), AgWay (Anderson and Henehan, 2002; Fairbairn, 2003) and Farmland Industries (Hogeland, 2004) in the US, and Agrifoods International Co-operative Ltd. (Saputo Annual Information Form, 2001), Agricore Co-operative (Agricore United Annual Report, 2002) and the Saskatchewan Wheat Pool (SWP) (Lang, 2006) in Canada.

Recent studies show that the mental frame or dominant logic of the company can play an important role in its lack of success – especially when combined with a rapidly changing environment (Salgado, Starbuck and Mezas, 2002). Well-known examples include the cases of Motorola Inc., whose management

overlooked the digital revolution and instead remained focused on analog technology, and Dunlop Holdings where the management remained stuck to an obsolete dominant paradigm that led to a series of disastrous decisions that eventually led to a sell-out to Sumitomo (Shimuzu and Hitt, 2004; Sanderson and Taylor, 1999).

The detrimental effect of obsolete mental frames extends to firms in the agri-food sector. A characteristic Canadian case is the Saskatchewan Wheat Pool (SWP) and its Project Horizon plan that is proposed as an example of a firm that was unable to adapt to the previously mentioned changes in the agricultural sector; SWP's failure brought along loss of market share, large debt and significant losses that eventually brought the firm to the brink of bankruptcy (Lang and Fulton, 2004).

The purpose of this essay is to illustrate how mental framing can be incorporated into an economic model and to develop a theoretical underpinning for the link between a strong mental frame and the financial difficulties that a firm might experience. The case of the SWP with its Project Horizon venture is used as an example of a situation where an established belief regarding future member support had a significant and detrimental influence on the decision making process. The analysis discusses how SWP's management might have formed a mental frame that gave rise to this belief and how this frame affected management's investment decisions.

The case of the SWP plays a central part in providing a real-life example for the analysis. However, the results of our model are more general and can also be considered with respect to the previously described co-op cases. More generally, the theoretical model that is developed can provide intuition for cases where CEOs exhibit systematic biases in their decision making.

The mental frame is incorporated into a game theoretic model of a duopoly involving a co-operative and an investor-owned firm (IOF), where mental framing is explicitly incorporated into the primitives of the model. The analysis assumes that the two firms compete for the local market and have to choose their future capacity investments simultaneously; an important element of the co-op's investment decision is the belief it has about member commitment. The model presents two Nash equilibria; a comparison between these two equilibria allows for an examination of the impact of the mental frames that are held.

The idea of mental frames can fruitfully be applied to a corporate culture setting where the organization's leaders need to take decisions on highly complex issues. Loasby (1976; 2001; 2002) argues that organizations construct mental frameworks and cognitive structures to interpret their environment. Framing allows focusing on the things that are deemed to be of greatest importance and the ignoring of other

factors; even though those other factors may be relevant, they are deemed to be less important and therefore distract from the main issues. Information that does not fit in the frame is either ignored or routinely characterized as non-credible. Prolonged periods of success typically reinforce the existing frame/dominant logic and make it harder for the agent to deviate (Bettis and Prahalad, 1995).

Frames tend to work well as long as the environment in which organizations and the key decision makers operate in is stable. When there is significant change, however, the foundations on which the mental frame is based can change, thus making the frame less relevant. The bigger the change the more irrelevant the old mental frame becomes. Therefore, a changing environment can result in a situation where a decision maker may undertake actions that are unfit for the current state of affairs because she still bases her decisions on the old frame. This situation was portrayed in Chapter One that discussed many cases involving co-ops; several of these co-operatives focused on growth, rather than profitability, as a response to the new market challenges. In a number of instances they failed to correctly interpret signals of falling member commitment and undertook risky endeavors that required the absolute loyalty of their members. A common characteristic of these cases is that the board of directors or the co-operative CEOs seemed blinded to current economic realities and undertook disastrous decisions that eventually severely hurt the company. As a result, co-operatives suffered from a sharp decline in their market share, a decrease in their member base and financial problems that resulted either in bankruptcy or in their acquisition by an IOF.

The rest of the chapter is organized as follows. The following section introduces the main concepts regarding framing and other decision biases and briefly discusses some applications in economics. The next section highlights the main points in SWP's recent history and discusses how certain managerial decisions may be linked to obsolete framing by the senior management. Next, a simple theoretical model of a duopoly is presented where the co-op's CEO uses a mental frame to make an inference on future member support and to decide on capacity investment. The essay then outlines how framing and beliefs can affect the investment decisions, profits and the equilibrium market shares. The article ends with the analysis of the results and the summary and conclusions.

## **3.2 Framing and other decision biases**

Understanding the way people use information to create knowledge is a problem that goes back to the very early days of economics. According to Smith ([1795] 1980) there is a natural psychological need to impose a pattern on all incoming information that will simplify and rationalize the chaotic environment that the

agent faces. This pattern is the individual's mental frame that will allow the creation of knowledge and enhance the decision making process.

Framing is one of the most common cognitive biases and is a term that is used to describe the process of understanding and interpreting a particular event (Brockner, 1992). The notion of mental frames appears in the work of Goffman (1959; 1974) who defines frames as "principles of organization which govern events – at least social ones – and our subjective involvement in them" (1974, p. 10-11). Frames are the "schemata of interpretation" that allow individuals "to locate, perceive, identify, and label a seemingly infinite number of concrete occurrences... rendering what would otherwise be a meaningless aspect of the scene into something that is meaningful" (1974, p. 21). Gitlin (1980) suggests that "Frames are principles of selection, emphasis, and presentation composed of little tacit theories about what exists, what happens, and what matters." (p. 6). Schön (1983, p. 40) describes framing as a mental device that sets the boundaries of our attention, while Ahn and Ergin (2006) model frames in terms of different levels of awareness.

A conceptual or mental frame is easily realized using the metaphor of a picture frame.<sup>1</sup> The frame focuses the attention on specific aspects of the subject and draws distinct borders around an issue segregating the cognitive field in two parts: what is and is not relevant – similar to a picture frame that defines what is in and what is out of the picture.

Individuals use frames to simplify the interconnections in their environment. In that sense, framing acts similar to a model – it is an attempt to simplify complex issues. Consequently, a mental frame carries along the shortcomings of theoretical models – its deduction results in high efficiency in decision making since the agent uses mental shortcuts and rules of thumb instead of considering all possible relations; however, it also results in a major drawback since anything that is left out of the frame is ignored. Loasby (1976) explains that "...one of the dangers in the use [of mental frames] is that they leave us ignorant of our own ignorance. They not only tell us nothing about the effects of what is excluded; they are liable to prevent any recognition that what is excluded may have some effect." (p. 43).

Conceptual frames are important in decision making not only by simplifying the chaotic situation that the agent faces, but also by defining the problem itself. Brubaker, Loveman, and Stamatov (2004) suggest that "...cognitive perspectives are not things in the world but ways of seeing the world". Kahneman and Tversky (1979) incorporate framing as an essential part of their prospect theory, where they distinguish two discrete phases in a decision making process: a phase of framing, editing and analysis, followed by a phase of

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<sup>1</sup>Interestingly, a metaphor is also a frame.

evaluation of the various prospects. Later studies (Tversky and Kahneman, 1981; 1986) have documented large and systematic changes in an individual's preference caused by variations in the framing of the available options in terms of gains and losses.

Similar to the individuals, business organizations also need to create knowledge and mental shortcuts in their everyday operations. The separate mental frames of the individuals that comprise the organization are aggregated to create the organization's mental frame – a collective corporate “mind” that becomes a central part of its dominant logic (Prahalad and Bettis, 1986; Grant, 1988; Bettis and Prahalad, 1995). The organization's mental frame, once constructed, is more than just a sum of its member's frames. Instead it can be better described as a meta-frame that filters all incoming information. According to Loasby (2001) the firm acts as a “focusing device for the organization and structured development of knowledge and skills within a cognitive framework which is reinforced by the emergence of locally relevant institutions”. In that sense, firms act as interpretive systems of their surroundings.

In an organizational setting, framing imposes simplifying patterns and allows individuals to share a common idea of what the firm is about. In his treatment of the firm as an interpretive system, Loasby (2001) argues that the new knowledge that is created inside the firm needs to be organized and fit into the frame in order to promote effective performance and learning. The impact of framing applies to new enterprises as well; indeed it precedes the establishment of the firm itself. Witt (2000) argues that people have already developed a very detailed concept of how the new firm should be even before its establishment and then they try to establish a firm that fits with their prior vision.<sup>2</sup>

Incoming information is processed through the established mental frame to create knowledge. This process, however, also gives rise to an unavoidable biasedness since the organization gets used to a particular vision of the world that is filtered by the frame. Bettis and Prahalad (1995) argue that new information that has no resemblance to previous information may be discarded as irrelevant or “noise” and so the organization's information set becomes artificially confined. This confinement becomes particularly important when the organization deals with a changing environment, since changes may fail to fit the established range vision of the frame and therefore be undetected by the decision-makers (Walsh, 1995; Salgado et al., 2002; Loasby, 2002).

In a similar manner, Bazerman and Chugh (2006) discuss the *bounded awareness* phenomenon as a situation where “cognitive blinders” prevent an agent from properly recognizing and utilizing relevant

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<sup>2</sup>In a similar vein Gray and Donnellon (1989) propose that framing precedes any conscious process of new information.



information. The authors argue that even in cases where the information is readily available the agent may fail to comprehend its relevance mainly because the information has been deemed to be extraneous and therefore has been excluded from the agent's conscious awareness. As a result, relevant and sometimes critical information may get ignored.<sup>3</sup>

Particularly important for our discussion is the idea of *managerial optimism*. Lovallo and Kahneman (2003) argue that managers suffer from native overoptimism; in its most simplified form, this optimism implies that managers tend to systematically overestimate the probability of success and good firm performance and underestimate the probability of bad firm performance. Lovallo and Kahneman (2003) discuss how managers' "native optimism" can be amplified by other kinds of cognitive bias – including anchoring, competitor neglect and political pressures. In short, the authors suggest that since the tendency for overoptimism is unavoidable the only solution lies in seeking an *outside view*<sup>4</sup> – an analysis that consists of two stages. Stage one involves the examination of similar cases that will help lay out the rough distribution of outcomes, while the second stage positions the current project in the distribution found in stage one.

Several empirical studies show that managerial optimism seems to have a particularly strong effect among entrepreneurs and venture capitalists (Palich, Bagby and Ray, 1995; Busenitz and Barney, 1997; Baron, 2000a; 2000b; Arabsheibani et al., 2000; Pinfold, 2001; Zacharakis and Shepherd, 2001). The phenomenon has also received attention for its effect on corporate finance. Malmendier and Tate (2005) show how managerial overoptimism distorts corporate investments, while Heaton (2002) incorporates the idea of managerial optimism with respect to the free cash flow debate and shows that overoptimism gives rise to an underinvestment-overinvestment tradeoff.

### **3.3 SWP history and framing**

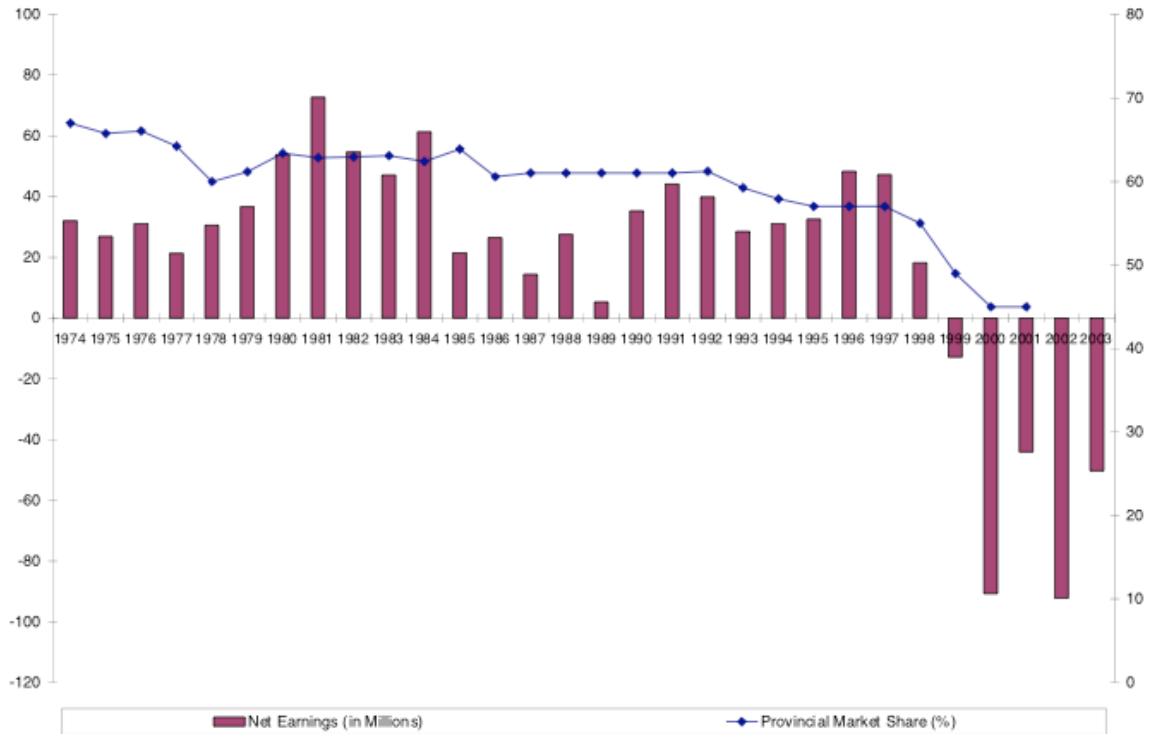
To illustrate the effect of framing on decision making, this essay uses the case of the SWP as an example. In the early 1990s, the SWP entered a period of aggressive expansion and facility modernization. Its main project was called Project Horizon that involved a shift from operating hundreds of small wooden elevators to a number of huge concrete high-throughput elevator (HTE) terminals that would be able to handle 50-60 times the volume of the traditional wooden elevators. Our hypothesis is that the board of directors and CEO

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<sup>3</sup>Cognitive dissonance is another force acting to create "cognitive blinders" (Festinger, 1957). Information that is contrary to the established set of beliefs tends to be ignored so that the agent maintains cognitive consistency – i.e., her beliefs and her actions are in accord. Essay One offers a theoretical model that specifically examines the effects of cognitive dissonance on consumers' decisions.

<sup>4</sup>The outside view sometimes is also known as reference-class forecasting.

at that time believed that SWP’s member commitment was secure so that the members would support this initiative. If their belief was correct then members would continue to patronize their co-operative and effectively help finance this project. However, it turns out that this belief was not the case (Lang and Fulton, 2004). With the rolling out of Project Horizon, members’ patronage started to decrease and SWP’s market share dropped sharply. Combined with an already large debt, the result was a succession of net losses which eventually forced the Pool to restructure its debt in 2003.



**Figure 3.1:** SWP’s market share and net earnings over the 1974 – 2003 period.

Source: SWP Annual Reports (Consolidated Balance Sheets), (several years).

The decline in member support can be seen in Figure 3.1, which reports the provincial market share and net profits of the SWP over the 1974 – 2003 period. For the greatest part of this period SWP had a very high market share (above 60%) and positive net earnings. A significant change occurs, however, during the latter part of the 1990s, which is the period when Project Horizon was initiated. In 1992, SWP had a provincial market share of 61.2%; this share declined to 49% in 1999 and dropped to a historic low of 45% in 2001 (SWP Annual Reports, several years). In 1999, the last year that Mr. Loewen was the CEO, the firm reported a net loss of \$14.7 million (SWP Annual Report, 1999).

As a consequence of the poor financial position, the SWP had to sell many of its businesses, cancel most of

the planned business ventures and divest in general. Since 2000 SWP closed 334 elevators, 88 of its retail stores, divested or exited 29 businesses and reduced its labor force by more than 50% (SWP Annual Report, 2005). In March 2003 the SWP entered its final restructuring and divestment plan with its banks and medium term noteholders that involved the exchange of \$405 million in senior secured debt for \$150 million of senior subordinated notes, \$255 million of convertible subordinated notes and 22,938,037 Class B non-voting shares (SWP Annual Report, 2003).

The rest of the essay uses information obtained from interviews of previous SWP board members, managers and industry experts as supporting evidence of a mental frame that appeared to drive the co-op's board of directors', and the CEO's decisions.<sup>5</sup> The next section outlines the background story on SWP and the following section establishes our main hypothesis on how the mental frame was developed.

### **3.3.1 Background**

In 1994, Mr. Don Loewen was chosen by the board as the new CEO for the SWP. Preceding Mr. Loewen, CEOs Mr. Ira Mumford and Mr. Milt Fair had built trust between the members of the board and senior management that continued with Mr. Loewen. This trust, combined with the board's inexperience, resulted in its reliance on management and thus gave the new CEO significant power to influence and control the decision making process (Lang, 2006).

Mr. Don Loewen had a very clear vision for the organization: SWP had to diversify its activities and follow an aggressive growth strategy in order to survive (Lang, 2006). One of the managers recalled that "It was either grow or die was how it was framed. The die part was left off because we could do this; there was confidence that this could be done".<sup>6</sup> Another manager proposed that "...the board got caught up in the same vision that Loewen had laid out in terms of becoming the biggest and the best grain company in the world. He did a pretty good job of getting all on side, I would say".<sup>7</sup> The planned expansion and reconstruction of the firm can only be described as massive since according to a senior manager the SWP should be transformed to the "ConAgra of the North".<sup>8</sup> The board's blind trust in their CEO allowed the

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<sup>5</sup>The interviews were part of a research project that involved twenty one personal open-ended interviews of past directors and managers of the SWP as well as grain industry participants. The interviewees were asked to answer a semi-constructed list of questions about the challenges and issues that the SWP faced over the period 1980 to 2000. All interviews were conducted by the graduate student at the time Ms. Katherine Lang (M.Sc.) and professor Murray Fulton. For confidentiality purposes each answered questionnaire was given two random transcript numbers. All quotes have a footnote that indicates the corresponding transcript from where the quote came.

<sup>6</sup>Transcript 18.

<sup>7</sup>Transcript 10.

<sup>8</sup>Transcript 15.

new vision to quickly become the central part of the corporate plan. A senior manager recalls that “Anything that was consistent with that vision was deemed to be good and viewed in a favorable light as moving forward with progress. And anything that was inconsistent with that vision, such as keeping some selected wooden elevators and things of that nature in the system was viewed as bad and with an unfavorable light”.<sup>9</sup>

A central element of this strategy was Project Horizon – an investment activity that involved the construction of 22 high-throughput grain handling facilities (concrete elevators) primarily aimed at replacing the over 400 small mainly wooden elevators that were in service all over Saskatchewan (Painter, 2004). Fourteen of the new elevators would be built in Saskatchewan, while six were intended for Alberta and two for Manitoba. The expected capital cost of the project was originally estimated at \$235 and finally rose to \$270 million (Painter, 2004; Lang, 2006).

Project Horizon was a response to the structural changes that were underway in the grain transportation system since the early 1980s. These changes had three aspects. The first two had to do with the railway industry and involved car allocation and rail rationalization, while the third aspect had to do with the private trucks that farmers used to move their grain. Under the Western Grain Transportation Act (WGTA), the allocation of cars was decided by the Grain Transport Authority (GTA) and was predominantly based on historical shipments. This allocation scheme was abandoned in 1996 and was replaced by the Car Allocation Policy Group (CAPG) that successively gave rise to a different allocation system that was much more flexible and responsive to demand (Wilson and Dahl, 2005). The transformation of the railway industry had another important aspect – rail rationalization. The new rail system required fewer, larger trains that would collect the grain from centralized locations, resulting in the closure of many of the smaller branch rail lines. In addition to the changes in the railway industry, the trucks that were used to haul grain became bigger and more efficient so that it became much cheaper for farmers to move their produce further than had been done before. Project Horizon was an attempt to respond to these changes; it aimed to rationalize SWP’s network and increase efficiencies so that the co-op would remain competitive.

Apart from Project Horizon, the new CEO’s expansion plan included a number of other projects that were aimed at diversification and expansion. These projects included the purchase of various companies, such as PGE Canada Ltd., Dawn Foods, Can-Oat Milling, Humboldt Flour Mills, and CanGro, as well as the partial ownership of several other firms, including 10% of the EuroPort grain terminal in Poland, 50% of Matrix Trading Company in England, 40% of the Agro Pacific Industries, 45% of Fletcher’s Fine Foods Ltd., and

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<sup>9</sup>Transcript 15.

50% of Comercializadora La Junta in Mexico. Plans also included a joint partnership with General Mills to build a grain facility in North Dakota and the purchase, through its subsidiary CanGro, of several other agri-food firms including Western Feeds, Hillcrest Farms, Taber Feeds, and 40% of Agro Pacific Industries.<sup>10</sup>

By the mid 1990s, almost half of the SWP members were expected to retire; their retirement meant that the retained co-op equity estimated at more than \$100 million would need to be redeemed (SWP Equity Conversion, 1995). Such an outlay, combined with the planned investments, would put a large pressure on the financial resources of SWP and could potentially result in a capital shortage. The decision was made to change the SWP's corporate structure so that it would be able to finance both the pay-out of equity to its retiring members and the investment plans of the new management (Painter, 1997; 2004).

SWP converted its retained member equity to tradable "Class B shares" and on April 2, 1996 entered the Toronto Stock Exchange as a publicly traded enterprise (TSX: SWP.B) becoming Canada's largest publicly traded agricultural co-operative (SWP Investor Relations). The share conversion increased SWP's eligibility for debt capital and allowed greater access to financial institutions. Two years later, in 1998, an additional \$160 million was raised through the share offering of 7.8 million "Class B shares" (Painter, 2004).

The 1996 share conversion had three important effects on the firm. First, it transformed SWP to a more commercially oriented organization that gradually moved away from policy involvement (Lang, 2006). Following the share conversion, Mr. Glen McGlaughlin, head of the Policy Division, was removed from the organization and the visibility of that division decreased. Second, the transformation brought the end of patronage dividends, thus making it harder for SWP to differentiate itself from other for-profit firms. Finally, the public offering of tradable equity created the need for confidentiality regarding the future directions and strategies of the organization. Several board members believed that information was no longer shared with the entire board and investments were made without board's knowledge (Lang, 2006). Even though the previous President was still in office, the new CEO became the sole figurehead for the co-op and most matters were decided by him and a close circle of the senior administration (Lang, 2006).

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<sup>10</sup>For a complete list of SWP's investments over this period see SWP Annual Reports, 1996 – 2000; Painter, 2004; Lang, 2006.

### 3.3.2 Searching for the mental frame

In order to identify the mental frame that co-op's leaders used, one needs first to consider how the co-operative established itself in the business. The organization started as a grass-root movement in Western Canada in the 1920s and its main function was to serve as a centralized farmer-controlled grain marketing and handling system as well as an advocate for farmers' interests. The movement was successful and quickly built a considerable member base (Fowke, 1957). The limited competition in the grain handling business, along with transportation subsidies, helped strengthen the relationship between the members and the co-op. The SWP was offering reasonably good services and prices, while its extensive network of elevators covered most of the province making it the most logical choice for the average farmer. It was no surprise then that SWP easily became one of the dominant players.

The SWP, along with the other two prairie Pools (Alberta Wheat Pool and Manitoba Wheat Pool), dominated the grain handling industry until the 1990s. A particularly important event in SWP's history was the 1972 acquisition of the Federal Grain Company that allowed the co-op a monopoly in 217 locations across the province (Fairbairn, 1984). With a strong member base and a historically large market share the SWP's business was thriving.

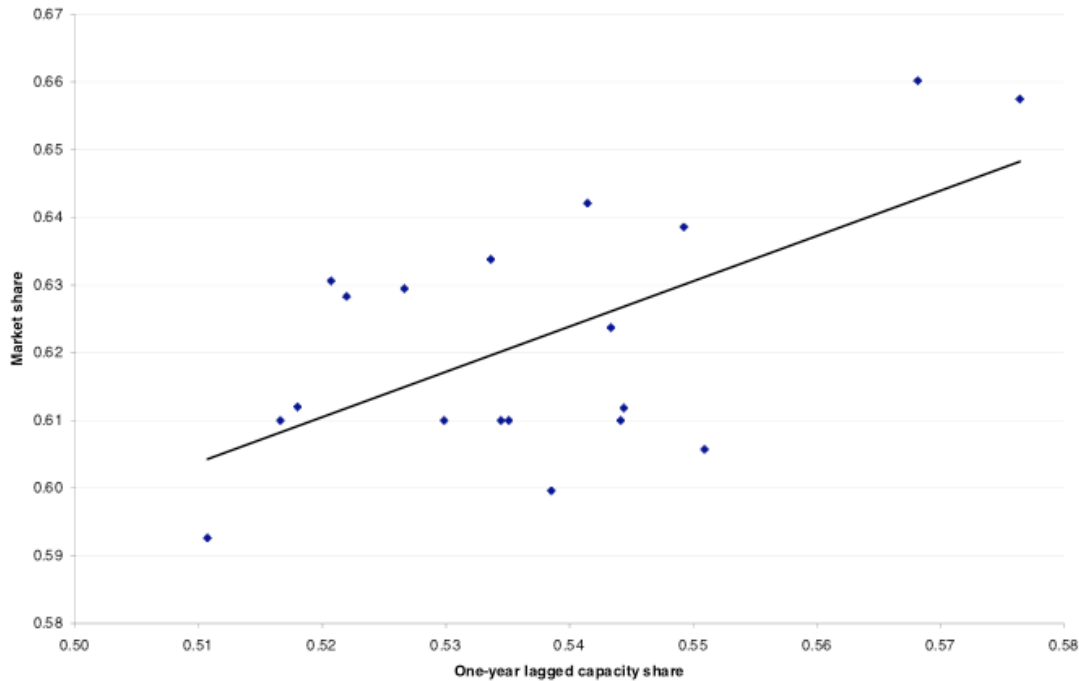
According to a senior manager: “[SWP] had enjoyed tremendous producer support and strong co-operative loyalty for such a long period of time that in the analysis that they were doing when they closed down wooden elevators and opened up a high-throughput elevators, they explicitly included in their assumptions that their producers would go to their high-throughput elevators...the producers for the last thirty years have made the decision to deliver to the local [SWP] elevator, and they have never had to revisit that decision”.<sup>11</sup> This “build it and they'll come” mentality very likely shaped the senior management's mental frame and created the belief that member commitment was strong.

The above quote indicates that the senior SWP leaders believed that the presence of SWP elevators was enough to ensure member patronage and market share. Is there any evidence that elevator presence and market share are correlated? The answer appears in Figure 3.2 that presents the scatter plot of the market share and the one-year lagged capacity share over the 1975 - 1993 period, while Table 3.1 shows the regression line corresponding to this scatter plot. The regression line reveals a strong connection between the two variables over the selected period. The hypothesis is that co-op leaders recognized this relationship

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<sup>11</sup>Transcript 15.

and naturally included it as a central theme in their mental frame. Of course, there are many other factors influencing this relationship. The point of not including these factors in the regression analysis is to show that a simple frame or model can effectively capture a historical relationship like the one described here.



**Figure 3.2:** SWP provincial market and capacity share scatter plot.

Source: Canadian Grain Commission (data on capacity); SWP Annual Reports, (data on provincial market share).

The strong positive relationship of the two variables along with a historically high market share and large capacity that represented more than 50% of the provincial total, gave rise to the belief that the capacity levels had a causal relationship with the market share. Our hypothesis is that this belief about the degree of member loyalty became a central part of the CEO's mentality. The natural persistence of mental frames and their inherent biasedness gradually expanded the latter belief in terms of duration and stability so that the frame finally implied a stable and strong member commitment.

When Project Horizon started in 1996, the existing capacity level became irrelevant since new elevators were going to replace the old ones. As a result it is reasonable to assume that the level of investment in future capacity replaced the existing level of capacity in the mental frame. The basic structure of the mental frame however remained unchanged so that it continued to support the belief that the members were very loyal to their co-operative. According to this belief the senior management would expect that members

**Table 3.1:** SWP’s provincial market share and one-year lagged capacity share.

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Dependent Variable: SWP provincial market share  
Period: 1975 – 1993  
Included observations: 19

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Variable name	Coefficient	Std. Error	t-Statistic	Prob.
Provincial capacity share (lag 1)	1.157493	0.007240	159.8662	0.0000

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Adjusted R-squared: 0.173834  
Durbin-Watson stat: 1.372310

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Source: Canadian Grain Commission (data on capacity); SWP Annual Reports, (data on provincial market share); author’s calculations.

would continue to support their co-op in the future and effectively help finance the new investment projects.

Project Horizon required the closure of numerous small facilities, something that would certainly upset many of the co-op’s members, since for several rural communities the elevators served both an economic and a social role. Elevators were the loading point for the grain and for many rural towns they were their biggest business. Elevators also served as a meeting point where community members could get together and as a symbol of town’s vitality. Two senior managers remember: “Nobody wanted to see their local elevator close because that is where they went for coffee and visited. We had free coffee in all (laughter)...It paid taxes to the local tax base. *You can’t close our elevator. That is our source of taxes and where we go for coffee*”.<sup>12</sup> However, the senior management retained the belief that member commitment was strong as identified by their mental frame. According to a board member: “It was identified and proven by statistics that the membership would be upset with Saskatchewan Wheat Pool for a period of time, but two or three years after a facility was closed those membership would start coming back to the Pool. I went to many facilities and they would say, *If you close my facility it will be the last bushel of grain the Pool gets*. Everyone would get in on that theme song. We identified that after two or three years the grass was not always greener on the other side of the fence and would come back to the Pool”.<sup>13</sup>

The senior management of the co-op proceeded with the investment plans based on the belief that in the future member patronage would remain strong – a belief that was the product of the mental frame that had been gradually established over time. One can assume that at least initially this mental frame worked reasonably well. After all, a mental frame is designed such that it includes the important factors while it filters out less important things. In addition, a frame is typically adopted and retained because it is successful. As time goes by, however, the economic environment changes and parameters that were

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<sup>12</sup>Transcripts 13 and 8.

<sup>13</sup>Transcript 4.



considered insignificant may become more important. Especially central for the examined case is the NAFTA agreement and the elimination of the Crow Benefit, both of which had a significant impact on the market dynamics.

Beginning with the ratification of NAFTA in 1994, several multinational grain corporations entered the Canadian market resulting in increased competition, while one year later in 1995, the federal government eliminated the Crow Benefit – a subsidy that guaranteed low freight rates for prairie grain.<sup>14</sup> These changes had two effects on farmers' relationship with their co-op. First, farmers had now more alternatives since various foreign and domestic firms had established grain handling facilities as NAFTA opened the borders. Second, the elimination of the Crow Benefit increased the transportation costs and the position of the grain elevators became much more important than it used to be. These changes resulted in a new economic environment characterized by the increased competition among the grain handling companies and the increased importance of the strategic location of the grain handling facilities – things that the established mental frame ignored.

Many SWP grain delivery points had to be either relocated or closed under Project Horizon, making grain delivery more difficult for many farmers. Farmers that were historically doing business with the SWP were left out of the decision process since the board seemed to believe that members would follow the new plan. One of the board members recalls: “I don't remember how many times farmers have said to me, *I'll never deliver another bushel of grain to Saskatchewan Wheat Pool*. But history showed us that after about two or three years they started coming back to Saskatchewan Wheat Pool”.<sup>15</sup> However, transportation costs were on the rise, while at the same time SWP's competitors were offering their services nearby at competitive prices. Not surprisingly, many farmers that were co-op members decided to move their business to other firms and abandoned their co-operative (Lang, 2006).

The closing of elevators under Project Horizon, the removal of the Policy Division and the new more commercial orientation of the co-op resulted in its alienation from its member-base. One of the managers at the time talked about this: “The classic example in my mind is that [SWP's Chief Operating Officer] had this \$80,000 or \$90,000 car that he had bought because as part of the executive you were given a car allowance so the organization would buy you a car. Bruce chose this \$100,000 little sports car as his car, and he would trip out to some farm meeting in rural Saskatchewan where there was a whole bunch of gray

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<sup>14</sup>A central provision of the Western Grain Transportation Act (WGTA) was that the federal government had to cover a certain amount of the rail transportation costs of Western grain destined to specific ports, primarily Thunder Bay and Vancouver. The WGTA subsidy was often referred to as the “Crow Benefit” after the Crow's Nest Pass Agreement of 1897.

<sup>15</sup>Transcript 4.

hairs out there and roll up in this sporty little car when everybody is talking about low grain prices. It doesn't work, and then you try and pitch them on the deal that you need to increase the tariffs, well, they are not compatible. He didn't understand his customer and quite frankly they did everything in the world to piss them off, they could not have done it better".<sup>16</sup>

The share transformation of the SWP also signaled its transformation from a farmer-based co-op to a profit-maximizing corporation. According to a senior manager "...one of the worst reflections of seeking validation from the market, rather than from internal analysis, was when I got to SWP, when you entered the building in the morning, there was a little kiosk in the front that had a little ticker tape in neon lights coming across everyday showing you the fluctuations in the SWP share values. I just thought that was totally inappropriate for a company that exists on the basis of the annual crop and its the annual dealings with farmers".<sup>17</sup>

Several other factors discussed in detail in section 3.3.1 also had a significant effect. The elimination of patronage dividends was one of the more important since this development took away a significant monetary incentive that members had for doing business with their co-op and made it harder for the SWP to differentiate itself from competitors. This alienation further decreased the already declining member commitment (Lang and Fulton, 2004).

One should also mention the changes to the system of rail car allocation under the Canadian Transportation Agency (CTA). The new allocation system was much more responsive to both the capacity and the demand for rail cars. If a firm was able to move more grain then it could request more cars in the current system than it had historically and thus attracting business became more important than it used to be. That meant that the SWP could not count on a market share that was in proportion of its storage capacity – they now had to compete for it.

Our working hypothesis is that the co-op leaders failed to realize that the established mental frame was obsolete due to the changes in the economic environment that have been described. The frame implied a relationship between capacity/investments and market share that was no longer true. Instead of updating their frame the co-op leaders continued to use the old frame and as a result they made the wrong prediction: they were projecting the historic relationship between their market share and capacity share level as a causal relationship that could delineate the future amount of business that the organization could have. So,

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<sup>16</sup>Transcript 7.

<sup>17</sup>Transcript 15.

SWP appears to be an organization that kept an old mental frame instead of updating. The rest of this essay examines what the consequences might be of this outdated mental frame for the strategic decisions of the co-op

## **3.4 A Model of framing**

### **3.4.1 General description of the model**

The model examines a co-operative that competes with an IOF in a duopoly where the leaders of the two organizations are rational agents. Recent organizational changes in the co-op brought in a new CEO who has her own mental frame regarding market share. The analysis attempts to shed more light on how the frame gives rise to a belief regarding future market conditions and how this belief can affect the CEO's decisions.

Initially the model examines how the newly-hired co-op CEO establishes the conceptual frame. This is a particularly important phase since frame theory argues that frames, once established, are very difficult to break and tend to endure for several years. In the case of the SWP, the new CEO had nearly 20 years of experience with the firm so the mental frame was already well developed when he took office. The following model assumes that the CEO has knowledge of the historic market shares and capacity shares and is able to observe their common trend over the years. For the CEO there is a historical context on market share that seems to be linked to co-op's capital; this link will play a central role in frame formation.

The analysis assumes that the two firms compete for the local market and have to choose their optimal level of capacity investment simultaneously. Moreover, it is assumed that after the establishment of the frame the co-op members' commitment can decline. This decline may be for a number of reasons, including that previous managerial decisions have signaled that the co-operative no longer operates for the best interest of its members (Fulton and Giannakas, 2001; 2006). All agents are able to observe the decline in market share but this data is interpreted in different ways according to one's frame. Frame theory suggests that in order for the news to be accepted, it must fit the co-op CEO's already established frame. If new facts do not fit the frame, the frame stays and the facts are discarded. Therefore, the co-op CEO continues to hold onto her previously established belief regarding strong member commitment that fits with her frame and discards any recent signals that indicate otherwise.

There is a difference between the behavior we examine and the behavior of a Bayesian player. A Bayesian agent is typically assumed to have complete awareness and use the new information to correct her decisions (Harsanyi, 1967; 1968a; 1968b). The CEO we model, however, does not update her belief – her behavior is governed by the established frame and she *subconsciously* discards any new information that does not fit her frame. It is because of her obsolete frame that the CEO mistakenly chooses a higher level of capacity investment; the result of this choice is a lower market share and lower profitability for the co-operative.

### 3.4.2 Formal model

In this section a formal game-theoretic model that incorporates mental framing is presented. The model assumes that the co-op CEO observes the historic market shares and capacity shares of the organization and follows a thinking process similar to the one described in section 3.3.2 to establish her frame. The study employs a simple descriptive model to capture the mental frame of the co-op leader. Specifically, the analysis assumes that the CEO believes that market share is determined by the following equation:

$$x_t^c = \alpha \frac{K_{t-1}^c}{K_{t-1}^c + K_{t-1}^i} \quad (3.1)$$

where  $K_{t-1}^i$  and  $K_{t-1}^c$  are the capacity levels of the IOF and the co-op, respectively, at time  $t-1$ , and  $x_t^c$  is the co-op's market share at time  $t$ . The parameter  $\alpha$  is a market-share enhancement factor that captures the CEO's belief regarding member commitment – stronger member commitment implies higher values for  $\alpha$ .<sup>18</sup> Equation 3.1 puts the CEO's belief regarding member support into an economic context and allows for the later examination of its impact on the decision making process. The parameter  $\alpha$  is approximated by the statistically significant and large coefficient of the capacity share regressor in Table 3.1.

Project Horizon resulted in the closure of many old elevators that were going to be replaced by the new terminals and therefore capacity level was replaced by capacity investment in the mental frame, changing the above equation to:

$$x_t^c = \alpha \frac{I_{t-1}^c}{I_{t-1}^c + I_{t-1}^i} \quad (3.2)$$

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<sup>18</sup>For a more general treatment of member commitment on co-operatives see Fulton (1999).

where  $I_{t-1}^i$  and  $I_{t-1}^c$  are the capacity investments of the IOF and the co-op, respectively, at time  $t-1$ .

The analysis models first a situation where a belief has been established that member commitment is strong ( $\alpha > 1$ ) – i.e., the co-op CEO believes that an increase in the co-op’s share of total industry capacity will bring a greater than proportional increase in market share. The analysis then assumes that, even though historically  $\alpha > 1$ , there are new developments in the economic environment that result in  $\alpha \leq 1$ . Consequently, the belief regarding the value of  $\alpha$  becomes important in determining the optimal level of capacity investment.

The CEO of the IOF has his own belief regarding  $\alpha$ . Thus, a number of possibilities arise, although two of them are of particular interest. The first is when the two CEOs hold the same belief and thus operate having *consistent beliefs*. The second is when each CEO has his/her own belief for  $\alpha$  and then compete with the other in an *inconsistent beliefs* setting. For the second scenario the IOF CEO is assumed to have the correct belief while the co-op CEO holds an unrealistically high belief. The next sections examine these two cases.

### Consistent beliefs

Consistent beliefs imply that both the co-operative and the IOF CEOs believe in the same value  $\alpha^c$ . This scenario serves as a benchmark for the next section where the analysis examines the case where the beliefs are not consistent. The subscript *cb* is used throughout to denote results under consistent beliefs.

Following equation 3.2 the market shares of the two firms are identified as follows:

$$\begin{aligned} x_t^c &= \alpha^c \frac{I_{t-1}^c}{I_{t-1}^c + I_{t-1}^i} \\ x_t^i = 1 - x_t^c &= \frac{(1 - \alpha^c)I_{t-1}^c + I_{t-1}^i}{I_{t-1}^c + I_{t-1}^i} \end{aligned} \quad (3.3)$$

where  $x_t^c$  and  $x_t^i$  are the market shares for the co-op and the IOF, respectively. In this setting the problem of the two CEOs is to choose their optimal capacity investment that maximizes the profits of their firms given their beliefs. Since the focus of the analysis is on investment decisions we assume a constant markup ( $p - c$ ) for the two firms, where  $p$  and  $c$  are the price and marginal cost, respectively; they are assumed to be unchanged over time. We further simplify by assuming the two firms have equal rates of interest  $r$  that

remains unchanged. The problem for the co-op can be written as follows:<sup>19</sup>

$$\max_{I_{t-1}^c} \Pi_t^c = \alpha^c \frac{I_{t-1}^c}{I_{t-1}^c + I_{t-1}^i} (p - c) - r I_{t-1}^c \quad (3.4)$$

Similar to the co-op, the problem for the IOF can be written as follows:

$$\max_{I_{t-1}^i} \Pi_t^i = \frac{(1 - \alpha^c) I_{t-1}^c + I_{t-1}^i}{I_{t-1}^c + I_{t-1}^i} (p - c) - r I_{t-1}^i \quad (3.5)$$

For simplicity the time subscript is omitted for the remaining analysis; for what follows  $\Pi_t^i = \Pi^i$ ,  $\Pi_t^c = \Pi^c$ ,  $I_{t-1}^i = I^i$ ,  $I_{t-1}^c = I^c$ ,  $x_t^c = x^c$  and  $x_t^i = x^i$ . Thus,  $\Pi^i$  and  $\Pi^c$  are the expected profits for the IOF and the co-op, respectively, in period  $t$ ;  $x^i$  and  $x^c$  are the expected market shares for the IOF and the co-op, respectively, in period  $t$ .

Solving the system of equations that result from the first order conditions gives:

$$I_{cb}^i = I_{cb}^c = \frac{\alpha^c (p - c)}{4r} \quad (3.6)$$

which means that the two firms will choose the same level of capacity investment in equilibrium. The market shares are then:

$$\begin{aligned} x_{cb}^c &= \frac{\alpha^c}{2} \\ x_{cb}^i &= \frac{2 - \alpha^c}{2} \end{aligned} \quad (3.7)$$

and the corresponding profits:

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<sup>19</sup>Although it is usually assumed in the literature that co-operatives maximize the welfare of their members (Fulton and Giannakas, 2001; Giannakas and Fulton, 2005) the presented theoretical model relates to the SWP case where decisions were made by a commercially-oriented CEO. Consequently the model considers that the co-op follows a profit maximizing strategy.

$$\begin{aligned}\Pi_{cb}^c &= \frac{\alpha^c}{4}(p - c) \\ \Pi_{cb}^i &= \frac{4 - 3\alpha^c}{4}(p - c)\end{aligned}\quad (3.8)$$

In general, the above solution allows for different market shares and profits for the two firms. For  $\alpha^c > 1$  the model gives that  $x_{cb}^c > x_{cb}^i$  and thus  $\Pi_{cb}^c > \Pi_{cb}^i$ . Therefore, in the case where the co-op member support is strong and both CEOs realize that, then both firms will make equal investments in their future capacities while the co-op gets a higher market share and profitability. The other case assumes that the two CEOs hold different beliefs regarding the true value of  $\alpha$ , where the IOF CEO is correct while the co-op CEO is incorrect. This situation is examined next.

### Inconsistent beliefs

The assumption that beliefs are the same is now relaxed. Instead, the CEOs of the two organizations are allowed to have their own unique belief regarding  $\alpha$ . More specifically, the co-op CEO is assumed to believe that  $\alpha = \alpha^c$ , while the IOF CEO believes that  $\alpha = \alpha^i$ . Moreover, the analysis assumes that  $\alpha^c > 1$  and  $0 < \alpha^i \leq 1$ . The different beliefs regarding  $\alpha$  change the market shares in equation 3.3 as follows:

$$\begin{aligned}x_{ib}^c &= \alpha^c \frac{I^c}{I^c + I^i} \\ x_{ib}^i &= \frac{(1 - \alpha^i)I^c + I^i}{I^c + I^i}\end{aligned}\quad (3.9)$$

where the subscript  $ib$  is used throughout to denote the inconsistent beliefs case. Similar to the previous case of consistent beliefs, the problem of the two CEOs is to choose the level of capacity investment to maximize the profits of their firms given their beliefs. This implies that the co-op faces the following problem:

$$\max_{I^c} \Pi_{ib}^c = \alpha^c \frac{I^c}{I^c + I^i} (p - c) - rI^c \quad (3.10)$$

while the problem for the IOF can be written as follows:

$$\max_{I^i} \Pi_{ib}^i = \frac{(1 - \alpha^i)I^c + I^i}{I^c + I^i} (p - c) - rI^i \quad (3.11)$$

Solving the best response functions of the two firms gives:

$$\frac{I_{ib}^c}{I_{ib}^i} = \frac{\alpha^c}{\alpha^i} \quad (3.12)$$

Having  $\alpha^c > \alpha^i$  implies that  $I_{ib}^c > I_{ib}^i$ . Thus, the co-op will invest more in capacity than the IOF. The reaction functions slope upwards; thus the two investments are strategic complements – when one firm increases its investment the other follows, with  $I_{ib}^c$  increasing faster than  $I_{ib}^i$  the higher is  $\alpha^c$ . In a case where the co-op CEO credibly commits to a higher value of  $\alpha^c$ , the IOF CEO will respond by also increasing her investment but at a lower rate – the higher the value of  $\alpha^c$  the co-op CEO commits to, the smaller the relative increase in the IOF's investment. In such a case the strategic effect (SE) of increasing  $I_{ib}^c$  is negative, since IOF's profit maximizing strategy is to also increase  $I_{ib}^i$  thus reducing co-op's profits.

Substituting the expression in equation 3.12 back into the first order conditions (not shown) and solving simultaneously one gets the expressions for the investments of the two firms:

$$\begin{aligned} I_{ib}^c &= \frac{\alpha^i \alpha^{c2} (p - c)}{r(\alpha^i + \alpha^c)^2} \\ I_{ib}^i &= \frac{\alpha^c \alpha^{i2} (p - c)}{r(\alpha^i + \alpha^c)^2} \end{aligned} \quad (3.13)$$

The levels of investment for future capacity are a function of both  $\alpha^c$  and the  $\alpha^i$ . Therefore, the market shares and profits of the two firms will depend on the belief regarding the value of true  $\alpha$ . If it is assumed that the true  $\alpha = \alpha^i$ , so that the IOF CEO's belief is correct while the co-op CEO holds the incorrect belief that  $\alpha = \alpha^c > 1$ ; the realized market shares  $x_{ib}^c |_{\alpha=\alpha^i}$  and  $x_{ib}^i |_{\alpha=\alpha^i}$  are those derived by equation 3.9.

Substituting equation 3.13 into equation 3.9 gives the market share for the two firms:



$$\begin{aligned}
x_{ib}^c |_{\alpha=\alpha^i} &= \frac{\alpha^i \alpha^c}{\alpha^c + \alpha^i} \\
x_{ib}^i |_{\alpha=\alpha^i} &= \frac{(1 - \alpha^i) \alpha^c + \alpha^i}{\alpha^c + \alpha^i}
\end{aligned} \tag{3.14}$$

The profits of the two firms are then:

$$\begin{aligned}
\Pi_{ib}^c |_{\alpha=\alpha^i} &= \frac{\alpha^{i2} \alpha^c}{(\alpha^c + \alpha^i)^2} (p - c) \\
\Pi_{ib}^i |_{\alpha=\alpha^i} &= \frac{(\alpha^c + \alpha^i)^2 - \alpha^i \alpha^c (2\alpha^i + \alpha^c)}{(\alpha^c + \alpha^i)^2} (p - c)
\end{aligned} \tag{3.15}$$

Equations 3.14 and 3.15 show that the market share and profits of the co-operative can be higher or lower than the IOF's depending on the relative magnitude of the parameters  $\alpha^i$  and  $\alpha^c$ . The lower is  $\alpha^i$ , the larger is the decrease in member support and the greater is the likelihood that the co-op's market share and profits will be lower than the IOF's. Table 3.2 summarizes the results for investments, market shares, and profits under the different scenarios.

**Table 3.2:** The effect of management's beliefs on investment, market share and profits.

	Investments	Market shares	Profits
<u>Consistent beliefs</u>	$I_{cb}^i = I_{cb}^c = \frac{\alpha^c(p-c)}{4r}$	$x_{cb}^c = \frac{\alpha^c}{2}$ $x_{cb}^i = \frac{2-\alpha^c}{2}$	$\Pi_{cb}^c = \frac{\alpha^c}{4}(p-c)$ $\Pi_{cb}^i = \frac{4-3\alpha^c}{4}(p-c)$
<u>Inconsistent beliefs</u>	$\frac{I_{ib}^c}{I_{ib}^i} = \frac{\alpha^c}{\alpha^i}$ $I_{ib}^c = \frac{\alpha^i \alpha^c (p-c)}{r(\alpha^i + \alpha^c)^2}$ $I_{ib}^i = \frac{\alpha^c \alpha^{i2} (p-c)}{r(\alpha^i + \alpha^c)^2}$	$x_{ib}^c  _{\alpha=\alpha^i} = \frac{\alpha^i \alpha^c}{\alpha^c + \alpha^i}$ $x_{ib}^i  _{\alpha=\alpha^i} = \frac{(1-\alpha^i) \alpha^c + \alpha^i}{\alpha^c + \alpha^i}$	$\Pi_{ib}^c  _{\alpha=\alpha^i} = \frac{\alpha^{i2} \alpha^c}{(\alpha^c + \alpha^i)^2} (p-c)$ $\Pi_{ib}^i  _{\alpha=\alpha^i} = \frac{(\alpha^c + \alpha^i)^2 - \alpha^i \alpha^c (2\alpha^i + \alpha^c)}{(\alpha^c + \alpha^i)^2} (p-c)$

### 3.5 Analysis

The presented scenarios illustrate how mental frames can influence the decision making process of the CEO and therefore affect the market share and profits of the firm. The model assumed that the two CEOs follow a certain mental frame that gives rise to a belief ( $\alpha$ ) regarding the future member support for the

co-operative. In the first scenario both CEOs share the same belief that  $\alpha = \alpha^c > 1$ . The model shows that even though the two firms undertake the same level of investment expenditure the co-op manages to get higher market share and profits. The second scenario examines how the results change when the co-op CEO holds an incorrect belief regarding future member support while the CEO of the IOF holds the correct belief. Analytical results of the model show that the co-op CEO in general chooses a higher level of investment compared to the IOF CEO and that large declines in member commitment decrease the co-op's relative market share and profits.

To examine the overall impact of co-op CEO's incorrect belief on her firm one needs to compare the results from the inconsistent beliefs scenario with those under consistent beliefs. Comparing the results of the two cases one obtains that:

$$x_{cb}^c - x_{ib}^c |_{\alpha=\alpha^i} = \alpha^c \frac{\alpha^c - \alpha^i}{2(\alpha^c + \alpha^i)} \quad (3.16)$$

Equation 3.16 implies that  $x_{cb}^c > x_{ib}^c |_{\alpha=\alpha^i}$  if  $\alpha^c > \alpha^i$ . Thus, when the co-op CEO believes that member support remains strong, when in fact member support has declined, the co-op's market share decreases. The greater is the difference between the two beliefs ( $\alpha^c - \alpha^i$ ) the larger is the decrease in co-op's market share. The result for market share carries over to profits, since  $\Pi_{ib}^c |_{\alpha=\alpha^i} < \Pi_{cb}^c$  when  $\alpha^c > \alpha^i$ .

The above results describe a situation similar to the one discussed in section 3.3.2. For many years SWP was the biggest player in the province of Saskatchewan, effectively dominating the grain handling industry. This situation is postulated to have established a mental frame within the organization that gave rise to the belief of strong member support. This belief became an integral part of the dominant logic that defined the organizational mindset at the time.

When the new CEO took office in 1994 he had almost 20 years of experience in various positions within the co-op. He had witnessed SWP's dominance and the strong member support of the 1970s and 1980s. Our hypothesis is that these events led to the establishment of a mental frame, a frame that remained even as the agricultural industry faced the new challenges and competition increased.

The early 1990s were marked by a new economic environment. New competitors entered the market and invested in grain handling facilities while changes in the transportation industry required a strategic redesign of the elevator network. The SWP's response was Project Horizon. The established belief of strong member commitment justified such an ambitious project since continued member patronage would

finance the new investment. However, as discussed in section 3.3.2 that belief was incorrect – member commitment did in fact decline (Lang and Fulton, 2004).

Equation 3.16 gives the insights into what might have happened at SWP. The left hand side of the equation can be interpreted as showing the difference between what the SWP senior management *expected* to happen and what *actually* happened. The *cb* case where  $\alpha^c = \alpha^i > 1$  shows what the co-op CEO believed would happen in the market share given that her belief on  $\alpha$  was correct. The *ib* case shows what happened when the co-op CEO overestimates  $\alpha$  and the IOF CEO believes the correct  $\alpha$ . According to equation 3.16 the dramatic decline in market share that SWP experienced over the last years (section 3.3) is explained by a large difference between  $\alpha^c$  and  $\alpha^i$  – that is SWP’s senior management must have had an unrealistically high belief on member commitment. In addition, the theoretical model also predicts that when the co-op CEO’s belief is incorrect then the co-operative over-invests relative to the IOF (equation 3.12) and experiences decreases not only in its market share but also in its profitability, both of which are consistent with the available evidence on SWP’s performance in the late 1990s (Figure 3.1).

In general, the results under inconsistent beliefs support the supposition that the SWP CEO at the time believed that member commitment was strong, while in fact the member support for the co-op had substantially declined (Lang and Fulton, 2004). The CEO built his strategy around this belief and undertook contentious and risky initiatives that could possibly compromise the co-op – member relationship. However, the feeling of urgency and the established belief on strong member commitment made these initiatives more plausible. According to a manager: “They committed a fundamental error in choosing to believe the membership would stick with them, yet they were doing everything in my opinion to distance themselves from the membership. On the one hand they were saying, *They’ll come to us because we have the best service*, not acknowledging that you had other elevators out there that could play that game and maybe play it better. Or they said SWP had location, but there were lots of good sites in Saskatchewan the competition could build a facility on. There was this attitude that *We have become more business-like maybe farmers should become more business-like too*. However, that means members could shop around, it is not necessary to be consistent to loyalties unless it’s in your best interest. So there was inconsistency in what they were saying and what they expected membership to do”.<sup>20</sup>

Following an obsolete frame does not necessarily imply that management was not acting in the best interest of the shareholders – at least on a conscious level. Mental frames, as well as the other cognitive biases referred in section 3.2, influence decision making at a subconscious level so that the agents are probably

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<sup>20</sup>Transcript 18.

not even aware of their effect. In addition, these biases, especially frames, require years to develop and were already there when the new CEO took office. Together with managerial optimism, the frame resulted in the overestimation of corporate projects – something that can happen even in cases where managers act as good agents of the shareholders (Heaton, 2002).

### **3.6 Summary and conclusions**

Several changes in the agricultural industry brought new challenges for Canadian agri-food firms. Some firms managed to change and adapt to the new economic environment, while others kept an outdated mentality that in many cases severely harmed their market shares and profitability. The case of the SWP in Western Canada illustrates the latter case and is used as a starting point for the theoretical model developed in this essay.

The purpose of this essay was to examine how mental frames can influence the decision making process of a CEO and therefore affect the market share and profits of her firm. The analysis presents a theoretical model of a duopoly where the CEOs have to decide their investment in future capacity simultaneously. The two CEOs are assumed to have a particular mental frame through which they make an inference on the co-op's member support. The model allows the two CEOs to either hold the same or different beliefs regarding member commitment and thus two scenarios arise: the first is a consistent beliefs scenario while the second is an inconsistent beliefs scenario where the co-op CEO holds an unrealistically high belief whereas the IOF CEO holds the correct belief.

The first scenario serves as a benchmark case while the second scenario shows how the different beliefs can influence the CEO's investment decision and consequently affect market share and profits. When both CEOs believe that member support is strong then they will equally invest in future capacity; the co-op, however, realizes higher market share and profitability. Under inconsistent beliefs the model shows that the co-op is urged to invest more than the IOF. Moreover, the co-operative experiences lower market shares and profitability relative to the case where the CEO holds the correct belief. The latter results illustrate a situation similar to the SWP case examined earlier in the essay.

SWP's new CEO took office after almost 20 years of experience in several positions within the co-op. He had witnessed the co-op's past success and he had experienced first-hand the enthusiasm with which the members supported their co-operative. Our hypothesis is that in such an environment the belief of strong

member commitment was developed and became the central part of the organization's mindset. Moreover, when the CEO took office he kept that belief and he used it to support his vision for the co-op that required extensive investments and aggressive expansion. Consequently, the co-operative over-invested in future capacity (Project Horizon) expecting that the strong member support would allow SWP to keep its market share and to finance the new projects.

The belief of strong member commitment was the product of a mental frame that was developed in a different time. The recent changes in the agricultural industry resulted in a new economic environment where the old frame had little to offer. The management however continued to use the old mental frame and to operate under the incorrect belief. The theoretical model predicts that in such a case a strong decline in member commitment will have a detrimental effect on both the co-op market share and its profitability, both of which are consistent with what the SWP experienced in the late 1990s.

The focus on the case of the SWP serves as a real-life example for the theoretical analysis that is undertaken in this chapter. By modeling mental frames the analysis extends to many other co-ops in both US and Canada as discussed in the introduction. The decline that several of these co-ops experienced can be at least partially attributed to obsolete mental frames and the intuition that our model offers allows for a better understanding of what happened. The model is also relevant for any business organization in which the CEOs' perception gets locked in an obsolete mental frame. More generally, the analysis can offer a possible explanation for systematic biases that a decision maker makes.

The literature referred to in section 3.2 argues that once frames are established they are very difficult to change and tend to endure for several years. This persistence of frames was a basic assumption of the theoretical model developed since the co-op CEO was not able to redefine or update her frame. However, there might be a case where a change in one's frame is possible but it will be accompanied by a cost. This cost will partly reflect the cognitive dissonance cost due to the change in the belief system and partly the real cost due to the efficiency loss in the decision making of the agent.<sup>21</sup> It remains for future research to study how the decision making process would be affected in such a case and what the effects on the firm might be.

One last limitation of the article lies in the way the theoretical model is set-up. The model assumes that the IOF CEO maximizes the profits of the firm so that she explicitly looks after the shareholders' interests. In reality, however, the senior management's relationship with the stockholders is usually characterized by

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<sup>21</sup> Essay One offers a treatment on the effects of cognitive dissonance on decision making.

agency problems (Arrow, 1985; Tirole, 1989; Milgrom and Roberts, 1992). In such a case the CEO's objective function will include private elements thus changing the model's results most likely in favor of the co-op.

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## CHAPTER 4

### ESSAY THREE: DOES A CO-OPERATIVE TAKEOVER GENERATE GREATER PROFITS FOR THE BUYER? THE DAIRY-WORLD/SAPUTO CASE

#### 4.1 Introduction

Co-operatives are typically seen as being pro-competitive market instruments. Specifically, the celebrated *yardstick of competition hypothesis* (Nourse, [1922] 1992) argues that co-operatives provide competition that helps push the market towards the competitive outcome (Helmberger, 1964; Sexton and Sexton, 1987; Fulton, 1989; Sexton, 1990; Innes and Sexton, 1994; Hansmann, 1996, p.125). Co-operatives provide competition by supplying to their members an input that would otherwise have been provided monopolistically or oligopolistically. By internalizing the pricing decision, the co-op maintains lower prices and lower profits.

The current study examines how the takeover of a co-op and its replacement with an investor-owned firm (IOF) that was not previously present in the industry can affect the returns earned by the purchasing firm. There exists a vast literature on corporate control that offers a number of hypotheses regarding the share price effects of acquisitions. One of the key conclusions is that the bidder's shareholders largely do not benefit from a takeover, mainly due to overpayment. If the takeover target is a co-operative, this conclusion may not hold, however. More specifically, the removal of a co-operative from a market can be expected to result in substantially reduced competition and allow the possibility of greater profits for the purchasing firm.

The purpose of this essay is to empirically examine if a co-operative takeover generates greater returns for

an IOF buyer, and in doing so to test indirectly the impact of co-operative involvement in the competitive behavior of an industry in which it operates. The potential for this test emerged as a result of the takeover of a co-operative by an IOF from outside the industry. An examination of the share price of the IOF before and after the takeover provides an indirect test of the pro-competitive effect that the co-op is expected to impart.

The co-operative in question is Dairyworld, an open-membership, dairy-processing co-operative that was acquired by Saputo (a publicly traded IOF) in 2001. At the time of its acquisition, Dairyworld was Canada's largest dairy co-operative and the second-largest dairy processor in the country, with operations concentrated in Western Canada and the Maritimes.<sup>1</sup> It conducted business mainly in the fluid milk and cheddar cheese market. Saputo handled mozzarella and imported cheese and crackers, mainly in central Canada and the United States. It was not a player in the fluid milk market, not in Western Canada where Dairyworld was established.

The yardstick of competition hypothesis argues that having a co-operative in the market results in increased competition. The removal of this pro-competitive player and its replacement with an IOF should decrease competition and thus have a positive effect on the future profits of the remaining firms in the market. Under this scenario, Dairyworld's acquisition should decrease the competitiveness of the dairy market and therefore have a positive effect on Saputo's future profits. This impact, if significant, should be reflected in the value of Saputo's stock price at the time of the initial announcement of the acquisition.

The analysis examines the effect of the acquisition of Dairyworld on Saputo's stock price using the prediction-error technique. This method measures the performance of Saputo's stock price over the acquisition period as the deviation from its predicted value. The acquisition of Dairyworld should signal *good news* to Saputo's shareholders and hence have a positive effect, *ceteris paribus*, on their company's stock price. The empirical evidence indeed show a positive effect on Saputo's stock and therefore is consistent with a number of hypotheses, including the yardstick of competition hypothesis.

The rest of the essay is organized as follows. The next section presents a brief review of the industrial organization literature on the competition yardstick hypothesis. A general overview of the importance of dairy co-operatives in the dairy sector follows, along with a brief examination of the competition framework of the industry. The following two sections present the main theoretical hypotheses on the effect of acquisition on the stock price of the bidder and study their relevance for this particular case. The paper

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<sup>1</sup>The official name of the co-operative was Agrifoods International Co-operative Ltd. but it was widely known under the name of Dairyworld.

then examines the impact that Saputo's acquisition of Dairyworld in 2001 had on Saputo's stock price. The chapter concludes with a summary and conclusions.

## 4.2 The role of co-operatives in competition

A long held view in the industrial organization literature is that co-operatives have a pro-competitive role in imperfectly competitive markets (Nourse, [1922] 1992; Helmberger, 1964; Sexton and Sexton, 1987; Fulton, 1989; Sexton, 1990; Sexton and Iskow, 1993; Innes and Sexton, 1994). This idea was introduced by E.G. Nourse ([1922] 1992) and became widely known as the *competitive yardstick school of thought* (Knapp, 1979). The underlying hypothesis is that co-operatives provide "extra competition" that forces IOFs to operate in a more competitive way (Torgerson, Reynolds and Gray, 1998). According to Nourse, co-operatives exert their competitive influence in various ways – for instance by introducing inputs that are not supplied by the system, establishing innovative services designed specifically for farmers, holding down prices of supplies and services for the agricultural production, and raising prices received for agricultural commodities (Schomisch, 1979). In many cases, agricultural co-operatives appear to have been formed as a response to market failures or to counterbalance the power of IOFs. Classic examples include the dairy co-op movement in New York in the mid-1800s (Porter and Scully, 1987) and the establishment of grain elevator co-operatives in Western Canada in the first decades of the 20th century (Fowke, 1957). In addition, to providing more competition in their immediate market, agricultural co-operatives are also believed to lower prices for consumers.

The typical IOF is primarily concerned with the maximization of its profits and ignores any impact that its pricing has on the welfare of its owners-users. On the other hand, co-operatives are owned by their users – it is because of this dual role of members that co-operatives' objective is the maximization of their members' welfare. The co-op pricing decision takes into account the effect of high prices on its members and sets lower prices than its IOF counterpart.

Nourse ([1922] 1992) believed that co-operatives should consider the IOFs as their primary competitors and not the other co-operatives and that by increasing the overall competition, co-ops should provide a measure against which the competitiveness of other for-profit firms can be measured (Cotterill, 1984). Nourse ([1922] 1992) proposed that farmers should only form co-operatives to maintain and enhance the

competitive status in their industry and not try to establish a co-operative monopoly.<sup>2</sup> He even proposed that after establishing strong competition the co-op members should consider dissolving their co-operative and let the IOFs compete.

Various scholars after Nourse have re-examined the impact of co-operative involvement and have typically confirmed the pro-competitive role in the economy. Helmberger (1964) examined co-operative marketing under different market structures based on the assumption that the objective of a co-op is to maximize its members' surplus for any given level of raw input. He shows that in general the co-operative has a larger output and pays a higher price than an IOF, and therefore has a beneficial impact on farmers' income and on the competitiveness of the market. Sexton and Sexton (1987) examine the threat of entry of a co-operative into an industry and illustrate how a potential co-op entrant can have a pro-competitive effect on market conduct. Sexton (1990) analyses competition between a co-op and an IOF in a spatial setting. He demonstrates that in the presence of an open-membership co-operative, farmers will be better off compared to a situation where all wholesalers are IOFs. Cotterill (1996) argues that co-operatives can perform as competitive yardsticks for consumers in oligopolistic food industries with differentiated products. He shows that in monopoly and oligopoly settings, open membership co-operatives can play an important role in helping to move output and price closer to those of perfect competition and hence increase overall efficiency in the market.

Albæk and Schultz (1998) present a model of mixed duopoly *à la* Cournot and illustrate how the organization of a co-op acts as a commitment device for increased production. In the resulting equilibrium co-op members earn more than the farmers supplying the vertically integrated IOF. Karantininis and Zago (2001) show that the presence of a co-op results in higher aggregate production and lower profits for the processing firms. Fulton and Giannakas (2001) examine member commitment in a mixed oligopoly and show that when the co-op maximizes members' welfare the prices charged by the co-op and the IOF decrease, while consumer welfare is increased. Giannakas and Fulton (2005) show that the presence of a member welfare-maximizing co-op that replaces a pre-existing IOF can result in an increase in process innovation while reducing the prices of agricultural inputs.

This pro-competitive role has had a number of policy implications. Recognizing their unique role in the economy, co-operatives have been offered partial exemption from competition laws in a number of countries. In the United States, the Clayton Act of 1914 offered exemption from antitrust laws for

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<sup>2</sup>Rhodes (1983) examines the case of an incumbent co-operative in an oligopoly industry that gradually grows to a monopoly position. His results illustrate that when competing with IOFs, co-operatives could potentially take over the whole market.



“non-stock agricultural associations”. These antitrust exemptions were later extended to all producer-marketing co-operatives with the Capper-Volstead Act of 1922 (Crespi and Sexton, 2003).<sup>3</sup> Not all countries have followed the U.S. lead. In Canada, the Competition Act treats both co-operatives and IOFs equivalently. Specifically, the Competition Bureau makes no distinction between IOFs and co-operatives in its investigations for anticompetitive behavior (telephone conversation with Chuck Stevenson, senior competition law officer in the Competition Bureau, February 25, 2005) but instead uses the same analysis and procedures when examining the two types of organizations. However, if co-operatives indeed play a pro-competitive role in the economy, then perhaps the Competition Act should have special provisions dealing with co-operative cases. In that sense, testing Nourse’s theory might have possible implications for the future reform of competition policy.

The unique policy treatment of co-operatives is based on the concept that co-ops are pro-competitive forces that improve the performance of imperfect markets and increase general economic welfare. However, little empirical research has examined the existence and magnitude of the co-op’s pro-competitive effect. Fulton (1989), in an analysis of the fertilizer industry in Western Canada, shows that co-operatives may fail to fulfill their pro-competitive role for various reasons, including barriers to entry by an incumbent IOF and information and principal-agent problems. Rogers and Petraglia (1994) examine the yardstick of competition hypothesis using an extended structure-performance model where co-op market share was included as a separate variable. The estimation over a number of food manufacturing markets supports the yardstick hypothesis since consumer prices are generally lower in markets with a substantial co-operative presence. Peterson and Anderson (1996) survey the theoretical strategies typically attributed to co-operatives, and compare them with actual strategies identified by interviews with 21 northeastern U.S. agricultural co-operatives. All the co-operative CEOs in their sample claimed to follow a competitive yardstick strategy, arguing that one of their main roles is to introduce competition in a level of the supply chain that might otherwise expose farmer to market power abuse by an IOF; however, the authors agree that these claims alone do not necessarily constitute the adoption of such a strategy. Finally, Hoffman and Royer (1997) used simulation analysis to show that the yardstick effect is not universal but instead it is sensitive to market structure and the behavior of the members.

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<sup>3</sup>For further information on co-operatives and the competition policy in the United States see Frederick, 1989; Cotterill, 2000; Heykoop and Segarra, 2001; Heykoop, 2003; English, 2005. The IFAP (2004) report offers similar information for the E.U., while Khemani (2002) and the OECD (1997) report explain the situation in Japan. Khemani (2002) also offers a wider discussion for a number of other countries.

## 4.3 Co-operatives and the Canadian dairy industry

### 4.3.1 The competition framework

The Canadian dairy industry operates under a highly regulated environment that has a strong influence on the way firms compete with each other and therefore on competitiveness in the industry. Since the early 1970s the dairy sector has functioned under a supply management system that relies on a combination of production, marketing and import controls along with administered pricing to support and stabilize farm income, protect the domestic industry from import competition and ensure a constant supply of dairy products to satisfy the domestic demand as well as certain planned exports (Agriculture and AgriFood Canada, 1996). More specifically, supply management imposes restrictions in the movement of fluid milk beyond the province of origin, creates barriers to entry, requires plant supply quotas in certain provinces, and limits the raw milk supplies that processors can get for certain manufacturing purposes (Brinkman et al., 1993; Agriculture and AgriFood Canada, 1996).

Dairy supply management policy is the joint responsibility of the federal government and the provinces. Fluid milk is regulated provincially, while industrial milk is regulated federally (Romain and Sumner, 2001).<sup>4</sup> In practice the dairy policy is implemented by a two fold mechanism – first, through the Canadian Dairy Commission (CDC) that annually sets the support price that dairy processors can receive for butter and skim milk powder, and also by controls on the supply of industrial milk (Agriculture and AgriFood Canada, 2001; 2002). Provincial authorities use the CDC's support prices as a reference to determine the prices for both fluid and industrial milk in their areas (Agriculture and AgriFood Canada, 1996).<sup>5</sup> With these prices established, the dairy processors consider their production costs and set the prices of dairy products (Lippert, 2001). Finally, distributors and retailers decide on the price paid by consumers (Lippert, 2001). Therefore, supply management does not regulate the consumer prices – instead, retail prices are determined through competition in the market place.

Supply management thus effectively fixes the total amount of aggregate production, as well as the common (minimum) price that farmers receive. However, this production needs to be allocated to the processing firms – each company decides how much (input) material they are going to source. The price paid to

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<sup>4</sup>Fluid milk refers to table milk or cream intended for consumption in fluid forms. Industrial milk is used for the manufacturing of all other dairy products.

<sup>5</sup>The exception is Prince Edward Island where only the price of fluid milk is regulated.

farmers is typically a premium paid over and above the supply management price.

### 4.3.2 Dairy co-operatives and consolidation

Co-operatives have traditionally played a crucial role in the Canadian agricultural economy and especially the dairy industry. Dairyworld, along with Ault and Beatrice in the 1990s, was one of the major players in the industry. In 1996, Dairyworld became Agrifoods International Co-operative Ltd., while in 1997 Beatrice and Ault were acquired by Parmalat. By the mid 1990s the dairy industry was dominated by three big firms: Parmalat, Agrifoods, and Agropur of Québec (Belhadji, Gagné and Roy, 2000). The last two firms were producer-owned co-operatives.<sup>6</sup>

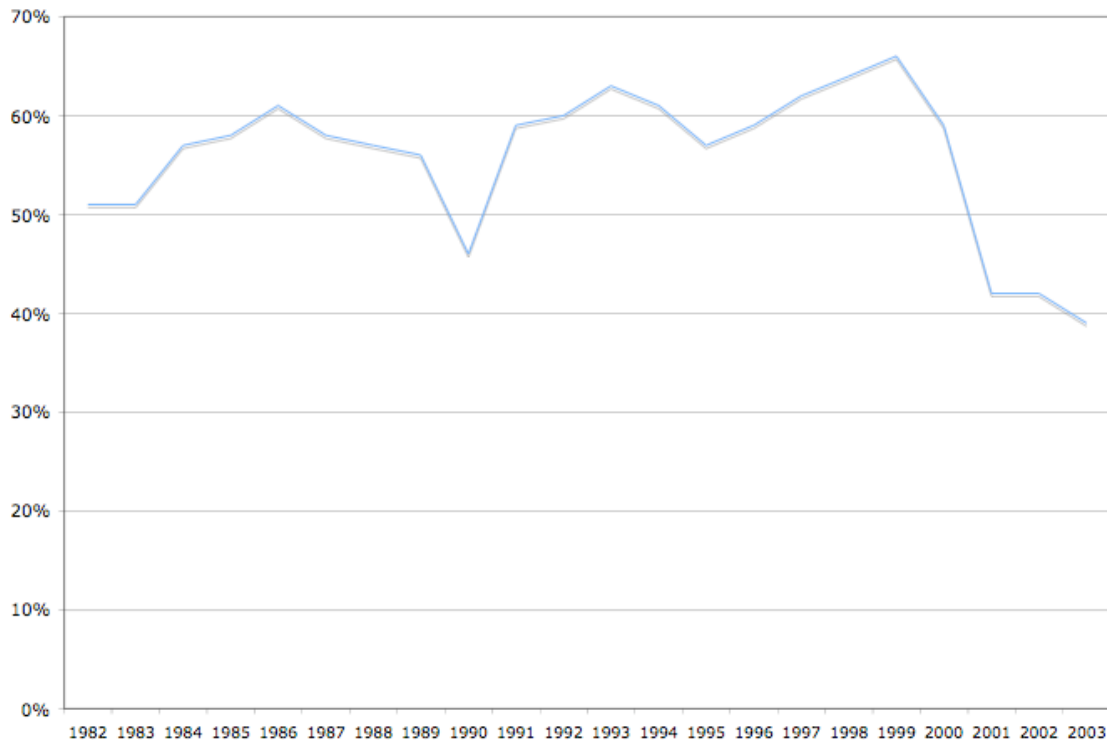
Figure 4.1 shows the dairy co-operatives' market share over the 1985-2003 period. For most of this period co-operatives controlled more than half of the dairy industry – there was a small decrease in the late 1980s and then the market share remained relative stable at roughly the 60 per cent level throughout the 1990s. There is a sharp decrease in the co-operatives' market share in 2001 as a result of the acquisition of Dairyworld by the Saputo Group. The co-operative market share, which was as high as 66% in 1999, declined to 42% after the acquisition (Figure 4.1).

Dairyworld's acquisition helped Saputo gain access to fluid milk and allowed it to join Parmalat and Agropur as major dairy processing companies (Agriculture and AgriFood Canada, 2004). By the end of 2000, these three firms had dairy product sales of nearly \$2 billion each, controlled roughly 28% of the industry's establishments and accounted for 67% of manufacturing shipments (Agriculture and AgriFood Canada, 2001). In 2002, they owned approximately 36% of the plants, which processed 71% of the milk produced in Canada (Agriculture and AgriFood Canada, 2002; CDIC). Saputo, in particular, is considered the fifth largest dairy in North America, with leading shares in the production of cheese (No. 1 in Canada with a 26% share, No. 5 in the United States with a 6% share) and fluid milk (No. 3 in Canada with a 21% share) (National Bank Financial, 2004).

In terms of specific markets, the big three (Agropur, Parmalat and recently Saputo) have a combined 72 per cent share of the fluid milk market; smaller players include Neilson Dairy Ltd. (10 per cent) and private labels (17 per cent) – the rest goes to other smaller firms. In the yogurt market Danone, Ultima Foods and

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<sup>6</sup>Dairyworld/Agrifoods and Agropur were responsible for approximately three quarters of the total dairy product sales by reporting Canadian co-operatives in 1996, and processed about 40 per cent of the milk produced (Belhadji, Gagné and Roy, 2000; McNeill and Daoust, 2003).



**Figure 4.1:** Dairy co-operatives' market share.

Source: Co-operative Secretariat, 1992; Co-operative Secretariat, 2005; McNeill and Daoust, 2003; Gurung and McCagg, 2005.

Parmalat control about 82 per cent, while a significant market segment is under private labels (6.3 per cent). The cheese market is primarily dominated by Saputo and Kraft – together they have roughly half of the market. Other important players include Agropur (18.9 per cent) and Parmalat (12.3 per cent). Finally, in the ice cream market, Nestlé and Unilever are the two dominant players and control more than half of the market (Euromonitor, 2005).

#### **4.4 Literature review on the effects of acquisition announcements**

The effect of takeover announcements on the returns to the shareholders of the acquiring and target firms is an extensively studied topic.<sup>7</sup> More than two decades of research following the seminal work of Jensen and Ruback (1983) suggest that the announcement of a takeover generally generates positive returns to target

<sup>7</sup>The term *acquisition* or *takeover* is typically used to describe the act of one company taking over controlling interest in another company by purchasing all or a majority of its outstanding shares, or by purchasing its assets.

firm shareholders, while the average returns to the acquiring firm shareholders are, at best, insignificantly different from zero (in most recent studies the average returns are negative). The combined returns to the target and acquiring firm are relatively small, but in most cases positive which indicates that corporate takeovers generate positive gains overall. After a company announces its intention to acquire another company, the stock price of the target company predictably goes up, while the stock price of the acquiring company typically goes down. This latter result can be for many reasons including shareholder concerns over the actual usefulness of the merger, concerns over the specific merger arrangements, and the likeliness of the promised operating synergies.

The evidence on wealth effects (i.e., changes in stock price) of takeovers are summarized by Jensen and Ruback (1983) and Jarrell, Brickley and Netter (1988). Jensen and Ruback (1983) surveyed 13 studies on mergers and tender offers published from 1977 to 1983.<sup>8</sup> All of these studies use pre-1980 stock market data and report positive returns of between 16 per cent and 30 per cent for the shareholders of the target firms. In general, they show positive returns for the shareholders of the target firm, negative or zero returns for the shareholders of the bidding firm, and an overall net gain for the combined firms. Their review was updated by Jarrell, Brickley and Netter (1988) who summarize the evidence on wealth effects of takeovers made in the 1980s and confirm that the shareholders of target companies clearly benefit from takeovers.

Several other studies provide additional evidence that suggests that target firm stockholders realize significant positive abnormal returns upon the announcement of a takeover offer. Bradley, Desai and Kim (1983) report that target firm stockholders, on average, receive significant positive abnormal returns with the announcement of a takeover offer. Jarrell and Poulsen (1989) show that the shareholders of target firms over the period 1963-1986 received relatively high premiums, while Andrade, Mitchell, and Stafford (2001) report steady target firm returns of 23 to 25 per cent for completed mergers over the 1973-1998 period.

The positive effect on the target firm appears to be independent of country. Many studies report evidence of positive gains to target firms' shareholders for specific countries – Conrad and Niden (1992) for the USA, Cheung and Shum (1993) for Hong Kong, Draper and Paydal (1999) for the UK, Firth (1997) for New Zealand, and Goergen and Ronneboog (2004) for several European countries. The above examples illustrate a consensus in the literature of corporate control regarding the effect of takeover announcement on target firms. However, the wealth effects on the shareholders of acquiring firms are less definite.

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<sup>8</sup>A merger occurs when two corporations join together into one, with one corporation surviving and the other corporation disappearing. The assets and liabilities of the disappearing entity are entirely absorbed into the surviving entity. Hence, the acquired institutions lose their corporate identity and are absorbed into the surviving institution. A tender offer is a public, open offer by an entity to purchase a large block of securities from the existing stockholders of a publicly traded corporation under specific terms in effect for only a specific period. Such offers are often made as part of an effort to gain a controlling interest in a corporation.

In general, researchers measuring the returns on bidding firms after an acquisition proposal have found them to average close to zero and even be negative for some categories of offers (Jarrell and Poulsen, 1989). Most of the studies that examine the 1960s and the 1970s show that the gains for the shareholders of the acquiring firm are very small (and frequently statistically insignificant) or even zero; however, other researchers report significant negative abnormal returns over the same period. Jensen (1988) offers a comprehensive review of the available evidence, arguing that on average the shareholders of the acquiring firm earn about four per cent in hostile takeovers and approximately zero in mergers.<sup>9</sup> A key study comes from Jarrell and Poulsen (1989) who document the decline in the returns of successful bidders in tender offers over the period from 1963 to 1986. In the 1960s, bidders experienced significant positive abnormal returns of about five per cent; these were reduced to 2.2 per cent in the 1970s and became negative but statistically insignificant in the 1980s. Andrade, Mitchell and Stafford (2001) examine 4,000 mergers during the period 1973-1998 and obtain similar results for their sample.

The returns to the acquiring firms are sensitive to various factors including the method of payment, the competition among bidding firms and the relative size of the target firm. Jarrell and Poulsen (1989) review 663 successful takeovers and show that the size of the target firm (relative to the acquiring firm) and the level of competition for the target have an influence on the acquiring firm's stock price reaction. As the target firm increases in size, the acquiring firm gets a significantly larger appreciation in its stock price; in contrast, competition between bidders leads to overpayment and hence diminishes any positive gains. Asquith, Bruner and Mullins (1983) show that the bidding firm's shareholders typically gain from mergers and the observed abnormal returns are positively related to the relative size of the two merging firms. Draper and Paudyal (1999) show that the returns to the shareholders of the bidding firm can also depend on the mode of payment – there is a strong stock market preference for cash-based acquisitions (Hou, Olsson and Robinson, 2000; Andrade, Mitchell and Stafford, 2001). Travlos (1987) reports negative abnormal returns for firms financing a takeover with common stock and no abnormal returns for those financing with cash.<sup>10</sup> Doukas and Travlos (1988) show that when the bidder is an internationally expanding domestic firm then its shareholders will experience positive returns, while more recently, Goergen and Ronneboog (2004) present evidence that the shareholders of the acquiring firm may gain in friendly takeovers but lose in hostile ones.

Takeover bids are not always surprises. Schipper and Thompson (1983) focus on programs of acquisition

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<sup>9</sup>An “unfriendly” or “hostile” takeover attempt is usually characterized by an offer far in excess of the market value of the shares, which is meant to induce current stockholders into selling.

<sup>10</sup>More empirical evidence are provided in Wansley, Lane and Yang (1983); Asquith, Bruner and Mullins (1987); Servaes (1991).

activity, as opposed to individual mergers. The authors examine the economic impact of various regulatory changes (including the Williams Amendments, the 1969 Tax Reform Act, and APB Opinions 16 and 17) and provide evidence that these changes had a significantly adverse impact on the share values of acquiring firms.

#### **4.4.1 Management considerations**

Evidence of negligible or negative returns to acquiring firms in most tender offers and mergers leads some researchers to argue that acquisitions are in fact poor investments that are driven by objectives other than the wealth-maximization of the shareholders. According to Roll (1986) managers may pursue to acquire a company because of hubris, and this arrogance can result in overpayment for target shares.<sup>11</sup> Weidenbaum and Vogt (1987) discuss various studies on corporate control and conclude that many managers of acquiring firms act self-interestingly. They undertake acquisition activities to increase the size of the corporation they control – something that generally implies higher compensation schemes for themselves, while at the same time limits the ability of their shareholders to monitor their actions. Related to the hubris hypothesis is the “empire building” argument. Executives undertake merger and acquisition activities in an attempt to increase their own authority and control within corporations or industries (Baumol, 1967; Mueller, 1969; Lubatkin, 1983).

The results by Bradley et al. (1983) and Asquith (1983) are largely consistent with the hubris hypothesis. Bradley et al. (1983) examine the impact of tender offers and hostile takeover bids while Asquith (1983) focuses on the impact of mergers – in both cases target firms display increases in value on the announcement of an offer, but they fall back to their original level if the acquisition fails. Avery, Chevalier and Schaefer (1998) present evidence from the mid-1980s that CEOs may acquire other firms for personal reasons – namely to increase their prestige and reputation in the business community. Blair (1993) presents several studies that examine the acquisition activity in the latter half of the 1980s which was mostly characterized by leveraged buyouts. Her evidence supports the hypothesis that many managers used excess earnings to inefficiently pursue further takeovers. Several other studies (Odagiri and Hase, 1989; Cosh, Hughes, Lee and Singh, 1989) refer to empire building as one of the factors driving takeover activity.

Although most of this literature argues on managerial self-motivation there is some literature that offers an explanation on why the observed wealth effects are in fact consistent with value-maximizing behavior. For

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<sup>11</sup>Romano (1992) discusses evidence related to the hubris hypothesis.

instance, Schipper and Thompson (1983) show that after controlling for acquisition type and regulatory changes, the examined takeovers were in fact capitalized as positive net present value projects at the time they were first announced.<sup>12</sup> Their results are consistent with the hypothesis that the examined acquisitions had a positive *ex ante* impact on the value of the bidding firm; however, institutional and regulatory changes decreased their profitability.

#### **4.4.2 Takeovers of privately held firms**

Studies of takeovers of privately held firms and their impact on the wealth of shareholders are uncommon. Available evidence is limited to five articles – Hansen and Lott (1996), Chang (1998), Ang and Kohers (2001), Fuller, Netter and Stegemoller (2002), and Draper and Paudyal (2006). On average, bidders offering common stock experience significantly positive abnormal returns, while bidders offering cash experience zero or slightly positive abnormal returns. The negligible or positive abnormal returns earned by bidders for private firms sharply contrasts with the negative or zero abnormal return earned by bidders acquiring a publicly traded target. Several hypotheses have been proposed to explain this result.

The *limited competition hypothesis* (Chang, 1998) argues that the takeover market for privately held firms is usually less competitive compared to publicly traded targets. As a result of this lower competition, it is possible for the bidding firm's stock to experience a positive shock at the time of the announcement of the acquisition since the probability of underpayment is high.

Chang (1998) also suggested the *monitoring hypothesis* based on the common presumption that privately held target firms are usually controlled by a small group of people.<sup>13</sup> In cases of a takeover through common stock exchange this small group automatically transforms to an outside stakeholder group that can serve as an effective monitor of managerial activities (Shleifer and Vishny, 1986).

Furthermore, in stock offers the small shareholder group of the target firm has a significant incentive to carefully evaluate the bidder's prospects since a significant amount of its stock will come to their possession once the merger is complete. The fact that they are willing to accept shares as compensation is a positive signal to the market for the bidding firm and therefore may have a positive impact on bidder's

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<sup>12</sup>They specifically account for the differences between individual acquisitions that are applied mainly in vertical or horizontal mergers, and programs of acquisition activity that are usually encountered in conglomerates.

<sup>13</sup>Poulsen and Stegemoller (2004) show that the insider ownership prior to the transaction is (on average) over 58 per cent for takeovers of private firms by publicly traded firms (sell-outs) and 67.5 per cent for initial public offerings. Insiders are the officers, or senior executives, and directors of the company.



stock. Chang (1998) calls this effect the *information hypothesis*.

Fuller, Netter and Stegemoller (2002) propose the existence of a *liquidity effect*. Their argument is that the private targets are in a relatively illiquid market, in the sense that they cannot be acquired and then resold as easily as public firms. It is because of this lack of liquidity that private firms can be less attractive and therefore less valuable than comparably more liquid investments allowing for a “liquidity discount” in their price. The liquidity effect can also be seen as enhancing the bidder’s bargaining power and hence causing underpayment (Draper and Paudyal, 2006).

More recently, Draper and Paudyal (2006) advocated the *managerial motive hypothesis*. This hypothesis argues that managers motivated by hubris (Roll, 1986) will most probably target publicly listed firms, since they are generally larger, better known and more prestigious than the private firms. Acquiring a private firm should not be based on self-centric motives and private objectives (status, prestige from controlling a larger company) but it should rather be motivated by real synergies and management’s desire to maximize shareholders’ wealth.

Finally, tax considerations and the method of payment can also affect bidder’s abnormal returns. When the bidding firm pays in stock, the owners of the target firm can potentially delay their tax liability and therefore they may be willing to accept a lower price (Fuller, Netter and Stegemoller, 2002). In this case the bidder can experience positive returns due to underpayment.

The above hypotheses offer an explanation for the contradictory results associated with the acquisitions of privately held firms. It still remains an empirical question which of these hypotheses best explains the empirical evidence. As might be expected, bidding on private targets can also result in the same effect as in the case of public companies. For instance, the usually small group that controls a private firm has the discretion to potentially choose the timing of the sale and in some cases even the buyer. This ability to control the terms of sale implies that private firms may have bargaining power that can allow its owners to receive a better price for their firm leading to overpayment by the bidder (Draper and Paudyal, 2006).

## **4.5 Theoretical share price effect of acquiring Dairyworld**

The previous sections outline the institutional setting of the two players and the main theoretical hypotheses offered to explain stock price effects in takeovers. The presented hypotheses can be divided in

two main groups depending on whether they focus on the characteristics of the seller or the buyer.

The first group is focused on the seller and includes four hypotheses: monitoring, information, limited liquidity and limited competition. Dairyworld, as a co-operative where the members are also the owners, has many characteristics of a privately-held company. However, the board and the general assembly of a co-op are quite different in nature than the closed group of trustees that controls the typical private firm described in this literature and therefore Dairyworld's acquisition would not result in the creation of a stakeholders group that would serve as a monitor of managerial activities. In addition, Saputo's offer was in cash and not common shares and therefore did not allow for any information leakage to the market. Therefore, the first two hypotheses do not seem applicable for this particular case.

The other two hypotheses in this group are more appealing: limited competition and limited liquidity. Dairyworld was in the oligopolistic dairy-processing industry where potential bidders were limited to the rest of the domestic players and a small number of multinational corporations. In retrospect it seems that Parmalat would have been the best candidate to offer a bid for Dairyworld. In fact there was a preliminary agreement in 1999 between the two firms. After the failure of the negotiations with Parmalat over Maxima Foods in 2000, Saputo was essentially left as the only potential bidder and therefore could possibly gain due to underbidding.

Agrifoods was searching for new alliances or for buyers for some of its manufacturing assets for almost two years; after the collapse of the Parmalat agreement it also attempted to sell its fluid milk plants in an auction. This limited liquidity of its assets could further enhance Saputo's bargaining power allowing for a "liquidity discount" and hence have a positive effect on its stock price. The last two hypotheses entail a relatively weak bargaining position for Dairyworld in its negotiations with Saputo.

Finance literature has recently started using bargaining models to shed more light on mergers and acquisitions/takeovers – seminal recent articles include the study by Canoy et al. (2000) for takeovers and Rosenkranz and Weitzel (2005) for mergers. To tighten our thinking on the various factors affecting the price paid in an acquisition, consider the following formal bargaining model.

In a simple bargaining game two players, a buyer and a seller (indexed  $b$  and  $s$  respectively), must split the bargaining surplus, available only in case of agreement (Osborne and Rubinstein, 1990; Muthoo, 1999; Powell, 2002). Let  $V$  be the perceived value of the merger/takeover, and  $\pi^s$  and  $\pi^b$  the expected discounted future profits earned by the seller and the buyer, respectively, if the takeover does not occur. If the two players have equal bargaining power, the price paid will be:  $P = \pi^s + \frac{1}{2}(V - \pi^s - \pi^b)$ . The gross benefit

to the buyer ( $B_{gross}^b$ ) is equal to the perceived value of the combination minus the price paid – i.e.,  $B_{gross}^b = \frac{1}{2}(V - \pi^s + \pi^b)$ , with  $\frac{dB_{gross}^b}{d\pi^s} < 0$  and  $\frac{dB_{gross}^b}{d\pi^b} > 0$ . The net benefit to the buyer ( $B_{net}^b$ ) is its gross benefit ( $B_{gross}^b$ ) minus the profits earned in case the bargaining fails ( $\pi^b$ ) – i.e.,  $B_{net}^b = \frac{1}{2}(V - \pi^s - \pi^b)$  where  $\frac{dB_{net}^b}{d\pi^s} < 0$ . The net benefit is important since the stock market evaluates a merger's impact based on its net benefit to the buyer. In a case where  $(V - \pi^s - \pi^b)$  is close to zero (i.e., the takeover does not create more in terms of added value), then the impact of the acquisition to the buyer will be relatively small; consequently, there shouldn't be any significant effect on the buyer's stock price at the time of the announcement.

An important feature of the standard bargaining game is the alternative options that the bargaining parties have. The *inside options* are all options that a bargainer can take advantage of while still negotiating, while the *outside option* (also referred to as the *status quo payoff*) is the option that the bargainer will exercise in case the bargaining process is unsuccessfully terminated.<sup>14</sup> When outside options are involved the bargaining equilibrium can be much different from the Nash bargaining solution (Chiu, 1998; de Meza and Lockwood, 1998).

The set of bargaining outcomes will change as a result of the limited competition and limited liquidity hypotheses. In terms of bargaining theory, the two hypotheses imply that the outside option for the seller is restricted – i.e., the firm's alternative options in case negotiations with the only available bidder breakdown or deteriorate are very limited.<sup>15</sup> The relatively poor fall-back position for the seller can be modeled by allowing for a decrease on  $\pi^s$  that consequently implies an increase in the buyer's net benefit. In such a case the stock market would reward the buyer by increasing the demand for its stock and thus generating a positive effect on the buyer's stock price. Thus, the limited competition and the limited liquidity hypotheses are consistent with an appreciation of the buyer's stock at the time of the announcement of an acquisition. With respect to the Dairyworld case, this result implies that the announcement of the acquisition should have a positive effect on Saputo's stock price.

On the other hand, from the side of the buyer, the theory offers two main hypotheses: managerial motive and hubris. According to the former hypothesis, self-interested managers generally avoid purchasing private firms; instead, they prefer to acquire public firms that are typically characterized by their larger relative size, are more recognizable and hence more prestigious. Therefore, targeting a private firm is evidence of a manager's intentions to maximize shareholders' value. Dairyworld, however was a private

<sup>14</sup>Sutton (1986) offers a comprehensive mathematical treatment on the difference between inside and outside options.

<sup>15</sup>In our case the outside option is exogenous – i.e., it does not depend on the negotiation.

firm that also had several characteristics of a public corporation – it was a well-established, well-known firm in Canada with large member base and wide geographical spread. Therefore, it seems reasonable to suggest that its acquisition was influenced by the hubris hypothesis. In terms of bargaining, the hubris hypothesis possibly implies a higher degree of buyer's impatience and hence has a detrimental effect on its bargaining power. The stronger the hubris, the weaker the buyer's bargaining power and, *ceteris paribus*, the less its attributable surplus in case the negotiations are successful. Alternatively, the hubris hypothesis suggests that the perceived value of the combination increases for the buyer. To see this, suppose that because of hubris the new perceived value of the merger/takeover is  $V + H$ , rather than  $V$ , where  $H$  is the extra value perceived by the bidder because of hubris. This change implies that the price paid by the buyer is equal to  $P = \frac{1}{2}(V + H + \pi^s - \pi^b)$ . Therefore, the new gross benefit for the buyer ( $B_{new-gross}^b$ ) changes to:  $B_{new-gross}^b = \frac{1}{2}(V - H - \pi^s + \pi^b)$ ; the new net benefit ( $B_{new-net}^b$ ) to buyer is  $B_{new-net}^b = \frac{1}{2}(V - H - \pi^s - \pi^b)$ , with  $\frac{dB_{new-net}^b}{dH} < 0$ . Thus, the higher the hubris, the lower the net benefit for the buyer. In this way hubris has a detrimental effect on the buyer's stock price.

Finally, according to the yardstick of competition hypothesis the buyer obtains an additional positive payoff in case the negotiations are successful; this extra positive surplus captures the additional future profits due to the lessening of competition that is expected to occur when an IOF takes over a co-op. In terms of the previously described bargaining model, the yardstick of competition hypothesis implies that the overall value of the combination is substantially higher than the profits of the two firms individually. Thus  $V > \pi^b + \pi^s$ ; the result is that the buyer's net benefit increases and the stock market's evaluation of the merger can be expected to be positive.

#### 4.5.1 Additional considerations

The literature on corporate control also discusses the case where the target is an underperforming firm. A successful bidder can simply change the incompetent management with new skillful executives and quickly make the firm more efficient. Several pieces of evidence indicate that Agrifoods had financial difficulties over the last years of its operation as a co-op. Starting from 1997, its return on equity (ROE) steadily declined, becoming negative after 2000, while its current ratio was below one for several years before its acquisition (Goddard, 2002). In the beginning of 1997 Dairyworld sold its ice cream products group to Nestlé Canada (but continued to supply dairy ingredients). A couple of months following the failure of the agreement on Maxima Foods, Agrifoods sold various interests for total net proceeds of \$4,435,063. In November 2000 Agrifoods sold Nutrilait. Dairyworld was finally sold to Saputo in January 2001. These

financial difficulties do not necessarily imply underperformance or even inefficiency. Starting from 1990, Dairyworld, following the general trend in the industry, expanded quickly and assumed a lot of debt that had a detrimental impact on its finances. Moreover, the only available study on co-operatives and supply management in Canada reported that dairy co-operatives in BC performed competitively with the other IOFs in the industry (Janmaat, 1994).<sup>16</sup> Interestingly, Saputo's assessment of Dairyworld at the time of the acquisition was favorable regarding Dairyworld's efficiency, but rather negative for its profitability. Mr. Lisio, president of Saputo and chief operating officer at the time acknowledged that Agrifoods was an efficiently run company, but it had a profit margin of only 4.3 per cent, while Saputo had a margin of 13.6 per cent (The Globe and Mail, December 19, 2000). One reason for this difference may be the different objectives and priorities that the two organizations had because of their corporate structure (co-operative versus IOF).

In theory, Dairyworld, as a co-operative, had the objective of maximizing its combined profits and member's welfare. Saputo, on the other hand, was solely interested in profit maximization and in increasing shareholder value. The takeover not only changed the management of Dairyworld but also signaled its transformation from a co-operative to an IOF; profitability became the top priority while member's welfare was no longer pursued. Evidence indicates that after the acquisition the new management placed more emphasis on profits. The day after the first official announcement of the takeover, Mr. Lisio was reported saying: "We want to drive down costs and bring out the profitability. This company has great potential." (The Globe and Mail, December 19, 2000). Dairyworld's integration started immediately after the acquisition was complete (February 5, 2001) and became a top priority for the new management. As part of its restructuring plan Saputo proceeded with the closure of three of its 20 cheese plants in Canada. Two of these plants (Yorkton, Sask., and Oakville, Ont.) came with Dairyworld's acquisition, while Saputo owned the third plant (Souris, Man.) for several years. Saputo's vice-president at the time, Mr. Claude Pinard, said that the plant closures were designed to improve efficiencies and did not reflect a drop in demand for Saputo's products (Dairy Foods, October 2002). According to Saputo officials, these closures were estimated to result in after-tax costs of about \$3.8 million and annual after-tax savings of about \$4 million (The Globe and Mail, September 13, 2002). Saputo's Interim Report for the fiscal year 2002 (3rd quarter) shows that the restructuring process and the integration of Dairyworld was swift and very successful. The EBITDA margin for Dairyworld activities, that was only 4.3% at the time of acquisition, rose to 5.2% for the first quarter, 5.9% for the second quarter, and climbed to 6.6% for the third

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<sup>16</sup>The study specifically examines the Fraser Valley Milk Producers Co-operative Association (FVMPCA), which was one of the three co-operatives that formed Dairyworld in 1992.

quarter, thus indicating a steady increase in Dairyworld's profitability.<sup>17</sup>

Dairyworld needed to sell and get cash for its liabilities while Saputo, the only plausible buyer, required more raw material and access to the market.<sup>18</sup> The previous discussion shows that Dairyworld had to face some rather undesirable default positions in the bargaining process mainly due to the limited competition among the bidders and the limited liquidity of its assets. On the other hand, hubris could potentially decrease Saputo's bargaining power and lower its bargaining gains. Therefore, the literature on corporate control suggests that the takeover could have a positive effect on Saputo's stock price, due to the limited competition, limited liquidity and possible impending synergies between the two firms. However, it does not rule out the possibility of a negative effect, due to management hubris. How this situation could affect Saputo's stock remains an open question since the previously described hypotheses are not mutually exclusive. Saputo could, for example, seek to gain more access to raw material and at the same time be building an empire and believe that it can more efficiently manage Dairyworld. The yardstick of competition hypothesis, however, argues that Saputo's stock price should be positively affected because Saputo replaced a co-op in the market and hence decreased the overall competition.

## 4.6 Empirical investigation

According to the yardstick of competition hypothesis, the replacement of a co-operative (Dairyworld) with an IOF (Saputo) should lead to a less competitive market and therefore result in higher future profits for the remaining for-profit firms in the market. The announcement of the agreement between the two firms should then convey to the market favorable information about Saputo's prospects and thus have a positive effect on its stock price. The limited liquidity and limited competition hypotheses also support this prediction, while the hubris hypothesis implies the opposite effect. The purpose of this section and the next one is to examine the behavior of Saputo's stock at the time that it acquired Dairyworld and to determine which of the explanations are consistent with the observed stock reaction.

On the day of the announcement the stock price of Saputo appreciated from \$33 to \$36, an increase of 9%. Dairyworld's reaction to the initial offer was mostly positive as well. Its representatives publicly argued that the takeover was "inevitable" due to constraints of its organizational structure. Mr. Wong, the co-op's

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<sup>17</sup>The EBITDA margin is a reliable indicator of a company's operative profitability. It is equal to the EBITDA (earnings before interest, tax, depreciation and amortization) divided by total revenue.

<sup>18</sup>Saputo had no presence in the fluid-milk market but with Dairyworld's acquisition it became one of country's top three distributors.

representative, was reported saying that: “We have reached a point where the co-op’s ability to expand was limited by the structure of the co-op” (The Globe and Mail, December 19, 2000), and that “In order for the business to remain competitive it needed to expand, maintain a national presence and invest, and members didn’t had that kind of money” (The Gazette, December 19, 2000). According to him “The co-operative structure doesn’t give you the capital base to expand infinitely [...] In order to keep pace with the needs of the marketplace, you have to find a way to capitalize yourself to keep growing and by joining Saputo, you have access to that capital.” (The Vancouver Sun, December 19, 2000).

#### **4.6.1 Research methodology**

This study uses stock market data to compare Saputo’s actual stock price (TSX: SAP) at the time of its acquisition of Dairyworld with an expected stock price. If the actual price is statistically greater than the expected price, then the acquisition of Dairyworld is an event that has generated positive returns to Saputo. This methodology is generally referred to as the *residual, prediction-error, or event study approach* (Campbell, Lo and MacKinlay, 1996). Binder (1998) offers a comprehensive review of the development of this type of study over the last thirty years.

The analysis is based on the *efficient market* hypothesis, where the basic assumption is that at any given time stock prices reflect all available information and therefore are accurate in reflecting the collective beliefs of investors about future prospects of a particular firm (Campbell, Lo and MacKinlay, 1996). The market efficiency assumption implies that the new information from the acquisition is quickly incorporated into Saputo’s stock price and hence will accurately predict investors’ beliefs about the impact of the acquisition.

#### **4.6.2 Data description**

To conduct the *prediction-error* analysis two pieces of information are needed: historical stock prices for Saputo and the exact date when the market learned about the acquisition. The historical stock prices are provided by the Canadian Financial Markets Research Centre Database (CFMRC/TSX) via the Computing in the Humanities and Social Sciences Data Centre (CHASS) at the University of Toronto. These data include daily opening and closing prices for Saputo’s stock, its daily returns as well as the daily volume. Finding the correct date of the first public announcement of the acquisition is critical since, under the

semi-strong form of the efficient market hypothesis, the impact of the acquisition on the value of Saputo would occur on the announcement day. Historically, the *Wall Street Journal Index* and *Lexis-Nexis* have been popular sources for announcement dates. The present study relies on the *Canadian Business & Current Affairs Databases (CBCA Complete)* that focus on Canadian content and provides a wide collection of full-text databases covering news, business, and legal research. Following other studies of this sort, the present analysis relies on the official announcement of the agreement and not rumors or hearsay that may precede this announcement. The examined announcements are generally in the form of press releases from Saputo's management.

## 4.7 Application

The purpose of this section is to examine the null hypothesis,  $H_0$ , that the event under examination has no impact on the behavior of Saputo's returns. Fama et al., (1969) were the first to introduce a technique to identify the impact of a specific event on a security's rate of return. Their technique attempts to remove any market influences from the rate of return of a security over the event time period. This approach results in an adjusted rate of return of the security that represents the impact that the event under examination had (Campbell, Lo and MacKinlay, 1996; Kothari and Warner, 2007).

The literature offers a numbers of models to provide this kind of adjustment and thus quantify the impact of the event on the security. The simplest is the *constant mean returns model*:

$$R_t = \mu_t + \zeta_t \quad (4.1)$$

The variable  $R_t$  is the return on the security in period  $t$ ,  $\mu_t$  is the mean return on the examined asset and  $\zeta_t$  is the disturbance term, with  $E(\zeta_t) = 0$  and  $\text{var}(\zeta_t) = \sigma_{\zeta_t}^2$  (MacKinlay, 1997). Brown and Warner (1980, 1985) show that although simple, this model provides robust results that are similar to those generated by more elaborate and sophisticated models (MacKinlay, 1997).

Another family of statistical models includes *factor models* that incorporate portfolios of traded securities in the regression and *multifactor models* that include industry indexes in addition (MacKinlay, 1995; 1997). The gains from using these models are generally limited mainly due to the fact that the marginal explanatory power of the added factors is small (MacKinlay, 1997).



The *Capital Asset Pricing Model* (CAPM) (Sharpe, 1964; Lintner, 1965) and the *Arbitrage Pricing Theory* (APT) (Ross, 1976) were popular in studies in the 1970s. In CAPM the expected stock return is determined by its covariance with the market portfolio, while it is assumed to be a linear combination of various market risk factors in the APT. More recent studies, however, have questioned the validity of these models arguing that the obtained results may be sensitive to model restrictions (Fama and French, 1996; MacKinlay, 1997; Kothari and Warner, 2007). This sensitivity can be potentially removed by applying the *market model* (MacKinlay, 1997) that is used for the rest of the analysis in this chapter.

One of the most frequently used methodologies in prediction-error analysis is the *market model*, where the rate of return of a security over a period of time is generated as follows:

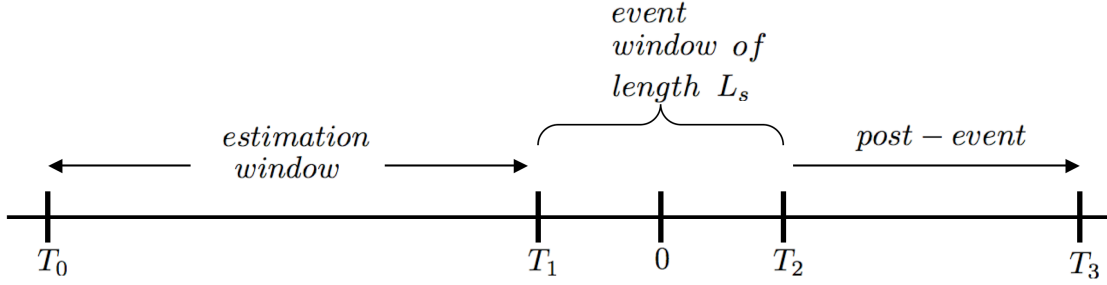
$$R_t = \alpha + \beta RM_t + \epsilon_t \quad (4.2)$$

where  $R_t$  and  $RM_t$  are the period  $t$  returns on the security under examination and the market portfolio, respectively, and  $\epsilon_t$  is the stochastic error term with  $E(\epsilon_t) = 0$  and  $\text{var}(\epsilon_t) = \sigma_\epsilon^2$ . The parameters  $\alpha$ ,  $\beta$  and  $\sigma_\epsilon^2$  are the parameters of the market model. A broad based stock index is used for the market portfolio,  $RM$ , with the CRSP Equal Weighted Index and the S&P 500 Index being the most popular choices. This study uses the CFMRC Equal Weighted Index (*CFMRCeq*) as a proxy for the market portfolio, which is defined as the average daily return (fully adjusted for distributions) for all domestic common equities in the CFMRC database. This is the sum of all defined common equity returns divided by the number of valid equity returns (only for Canadian based firms).

The fully adjusted daily return  $R_t$  for Saputo is calculated by the CFMRC database as if the security was purchased at the close yesterday and sold at the close today. Let  $P_t$  be today's closing price,  $D_t$  be the cash or cash equivalent dividend (in \$) paid today (ex-dividend date) and  $S_t$  be the stock split factor for a stock dividend or split today. The return is defined by the database as follows:  $R_t = \frac{(P_t + D_t)S_t - P_{t-1}}{P_{t-1}}$ . If there was no cash dividend,  $D_t=0.0$ ; if there was no stock dividend or split,  $S_t=1.0$ .

The model is estimated using data in the period  $T_0$  to  $T_1$  prior to the event window  $T_1$  to  $T_2$ . The estimated event window has a length of  $L_s$  (Figure 4.2).

Let  $AR_\tau$  with  $T_1 < \tau < T_2$  be the firm's abnormal returns during the event window. Using the market model to estimate the normal return, the sample abnormal return is the disturbance term calculated on an out-of-sample basis:



**Figure 4.2:** Time line for the market model.

$$AR_\tau = R_\tau - \hat{\alpha} - \hat{\beta}RM_\tau \quad (4.3)$$

where  $\hat{\alpha}$  and  $\hat{\beta}$  are the estimated market model coefficients from equation 4.2. Under the null hypothesis,  $H_0$ , the distribution of the abnormal returns (conditional on the event window) is assumed to be normal, with zero conditional mean and conditional variance  $\sigma^2(AR_\tau)$  (MacKinlay, 1997), where:

$$\sigma^2(AR_\tau) = \sigma_\epsilon^2 + \frac{1}{L_s} \left[ 1 + \frac{(RM_\tau - \hat{\mu})^2}{\hat{\sigma}^2} \right] \quad (4.4)$$

As the length of the estimation window  $L_s$  becomes relatively large, the sampling error of the parameters vanishes and hence  $\sigma^2(AR_\tau) = \sigma_\epsilon^2$  while the abnormal return observations become independent through time. Under the null hypothesis that the examined event has no impact on mean and variance of stock returns, the distribution of the sample abnormal return in the event window is  $AR_\tau \sim N(0, \sigma^2(AR_\tau))$ .

The abnormal returns are usually aggregated in order to draw overall inferences for the event under examination (MacKinlay, 1997). For  $T_1 < \tau_1 \leq \tau_2 \leq T_2$ , let  $CAR$  be the cumulative abnormal returns:

$$CAR_{\tau_1, \tau_2} = \sum_{\tau=\tau_1}^{\tau_2} AR_\tau \quad (4.5)$$

Asymptotically (i.e., for large  $L_s$ )  $CAR$ 's variance is  $\sigma^2(\tau_1, \tau_2) = (\tau_2 - \tau_1 + 1)\sigma_\epsilon^2$ . Under the null hypothesis,  $H_0$ , the distribution of the sample cumulative abnormal returns in the event window is then  $CAR_{\tau_1, \tau_2} \sim N(0, \sigma^2(\tau_1, \tau_2))$  (MacKinlay, 1997).

**Table 4.1:** Unit root tests.

Series	ADF Test Statistic	PP Test Statistic
SAP	-4.126319	-12.36658
CFMRCeq	-4.108965	-7.709408
1% Critical Value: -3.4856		
5% Critical Value: -2.8855		
10% Critical Value: -2.5794		

### 4.7.1 Identification – properties of the data

The data were first examined for *stationarity*. A stochastic process is stationary if its mean and variance are constant over time and the value of the covariance between two time periods depends only on the lag between the two time periods and not the actual time at which the covariance is computed. Multiple tests were conducted including the standard unit root tests along with correlograms (autocorrelation function) (the unit root tests are shown in Table 4.1).

The reported ADF Test Statistic is the augmented Dickey-Fuller (1979) test in levels (lag 4), while the PP test statistic is the Phillips-Perron (1988) nonparametric test. The null hypothesis of a unit root is rejected against the one-sided alternative if the *t*-statistic is less than the MacKinnon critical value (1991).

Therefore the above tests reject the null hypothesis of a unit root in the two series at any of the reported significance levels and hence each of the series is stationary (Table 4.1). The same results hold for the ADF with first-differences and second-differences (results not shown).

### 4.7.2 Estimation and results

To carry out the analysis it is necessary to specify a length of the observation interval, an estimation window and an event window. The observation interval is set to one day, thus daily stock returns are used. A three-day event window is employed, comprised of one day before the event, the event day, and the day after the event. The estimation period is set to 120 trading days prior to the event window. Therefore, the model is estimated over the period June 23, 2000 to December 14, 2000.

Several scenarios were examined including various ARMA/ARIMA applications, and the overall model fit was evaluated for each case. The best fit is from an ARMA(1,1) model, which is used for the estimation.

Table 4.2 presents the results of this model. The autocorrelation function of the residuals and the

Ljung-Box Test (Q-Test) (Ljung and Box, 1979) are reported in Table 4.3.

**Table 4.2:** Market model estimation.

Variable name	Coefficient	Std. Error	t-Statistic	Prob.
Intercept	0.000561	0.001974	0.284070	0.7769
CFMRCeq	0.607361	0.264935	2.292488	0.0237
AR(1)	-0.880599	0.110048	-8.001955	0.0000
MA(1)	0.748101	0.154404	4.845082	0.0000
Inverted AR Roots: -0.88				
Inverted MA Roots: -0.75				

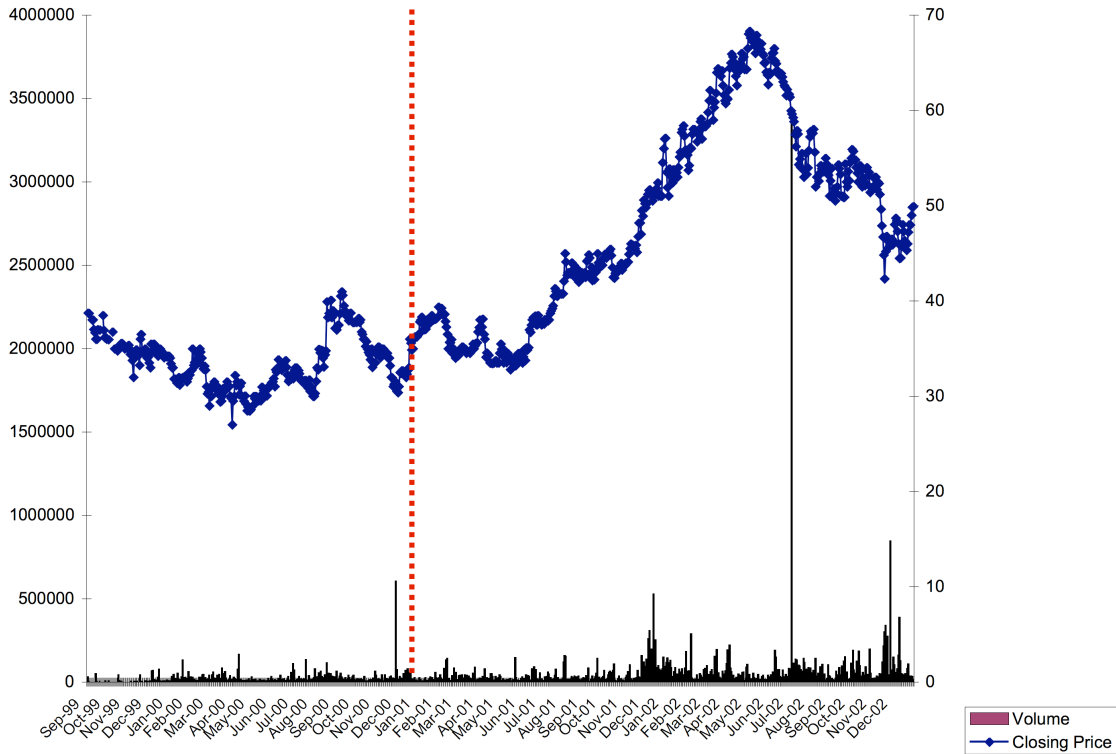
The last two columns in the correlogram are the Ljung-Box Q-statistics and their p-values respectively. The Q-statistic at lag  $k$  is a test statistic for the null hypothesis that there is no autocorrelation up to order  $k$  and is computed as  $Q_{LB} = T(T + 2) \sum_{j=1}^k \frac{\rho_j^2}{T-j}$ , where  $\rho_j^2$  is the  $j$ -th autocorrelation and  $T$  is the number of observations. Under the null hypothesis the residuals are *white noise* and  $Q_{LB} \sim \chi_{(j-\rho-q)}^2$ . Therefore, following the work of Harvey (1990; 1993), one cannot reject the null hypothesis.

On the day of the announcement of the acquisition (December 18), the price of Saputo shares rose from \$33 to \$36, an increase of 9%. Figure 4.3 shows the price performance of the stock and the volume of trade over the period September 1999 to December 2002. The dashed vertical line marks the day of the announcement.

Using the market model, the abnormal returns (AR) and the cumulative abnormal returns (CAR) for Saputo are estimated over the the forty-day period centered on the event date (Figure 4.4). Abnormal returns are generally small in magnitude and randomly distributed during the 20 days leading up to the event date. The proportion of negative ARs is 50% while all pre-event CARs are negative with the highest value on the day just before the announcement.

The event study literature suggests a simple hypothesis test, which in our case gives an estimated value of  $z = 2.52$  (Prob= 0.0119) for the AR, and  $z = 3.1$  (Prob=0.0019) for the CAR. The asymptotic distributional result ( $\theta_1$ ) for CAR is estimated at  $\theta_1 = 4.56$ . Therefore, the null hypothesis,  $H_0$ , that the event under examination has no impact on the behavior of Saputo's returns, is strongly rejected.

The above test statistics however, are based on the normality assumption that is associated with large samples (McWilliams and Siegel, 1997). In addition, the expected non-normality of  $\epsilon$  (due to the non-normality and asymmetry of daily stock returns) can affect the efficiency and strength of the usual hypotheses tests (Fama, 1976; Brooks, 2002). More recent studies in the field indicate that the



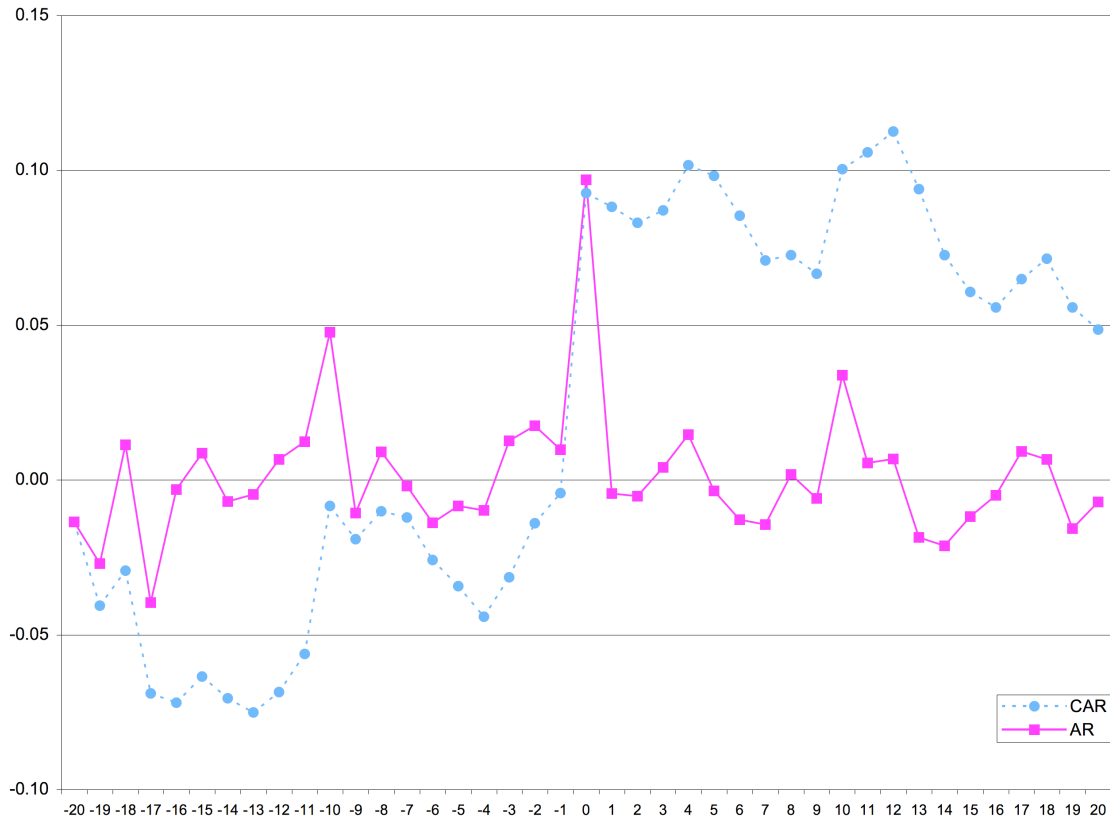
**Figure 4.3:** Stock price reaction.

Source: Canadian Financial Markets Research Centre Database (CFMRC/TSX).

non-normality problems associated with the daily stock returns may persist even in large samples (Corrado and Zivney, 1992; Peiro, 2002; Brooks, 2002; Bai et al., 2002). When using daily reruns and small samples, a bootstrap technique becomes relevant since it does not require any assumption about the underlying distribution (Barclay and Litzenberger, 1988).

*Bootstrapping* is a nonparametric approach that can be employed to obtain standard errors of estimates when the population distribution is not known. The approach relies on the assumption that the original sample represents the population and the distribution function can be estimated using a bootstrapping technique. The empirically estimated sample distribution will then represent the true distribution of population. The desired estimates can be obtained as empirical estimates of the true parameters from infinite numbers of random samples (Mooney and Duval, 1993).

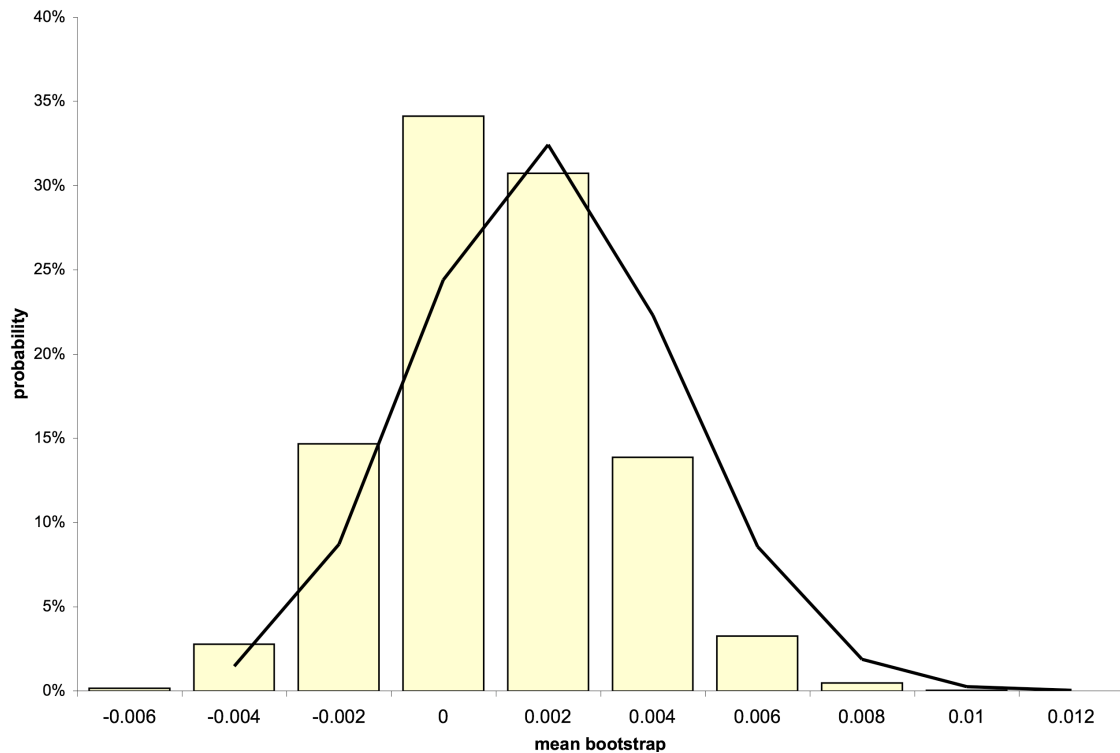
The nonparametric analysis uses a bootstrap technique as described in Efron and Tibshirani, 1993; Zoubir, 1993; Zoubir and Boashash, 1998. Matlab 7, R and MS Excel were used for the resampling stage that involved from 1,000 to 10,000 bootstrap resamples. The bootstrap procedure involves choosing random



**Figure 4.4:** AR and CAR twenty days around the acquisition day.

samples *with replacement* from the data set and analyzing each sample separately. Sampling with replacement means that every sample is returned back to the data set after sampling. So a particular data point from the original data set may well appear multiple times in a given bootstrap sample. The number of elements in each bootstrap sample equals the number of elements in the original data set. The range of sample estimates allows the calculation of the bootstrap distribution. The latter gives information about the shape, center, and spread of the sampling distribution of the statistic and hence enables one to establish the uncertainty of the quantity under estimation.

The previously studied series AR and CAR are re-examined using the bootstrap procedure (subscript  $b$  denotes bootstrap results). The bootstrap analysis is again applied over the last 120 trading days before the announcement, that is from June 23, 2000 to December 14, 2000. Accordingly, the mean value of the  $AR_b$  series is calculated using 10,000 bootstrap resamples. Its empirical distribution is shown in Figure 4.5, while Table 4.4 reports the derived probabilities of the  $AR_b$  mean for each bin.

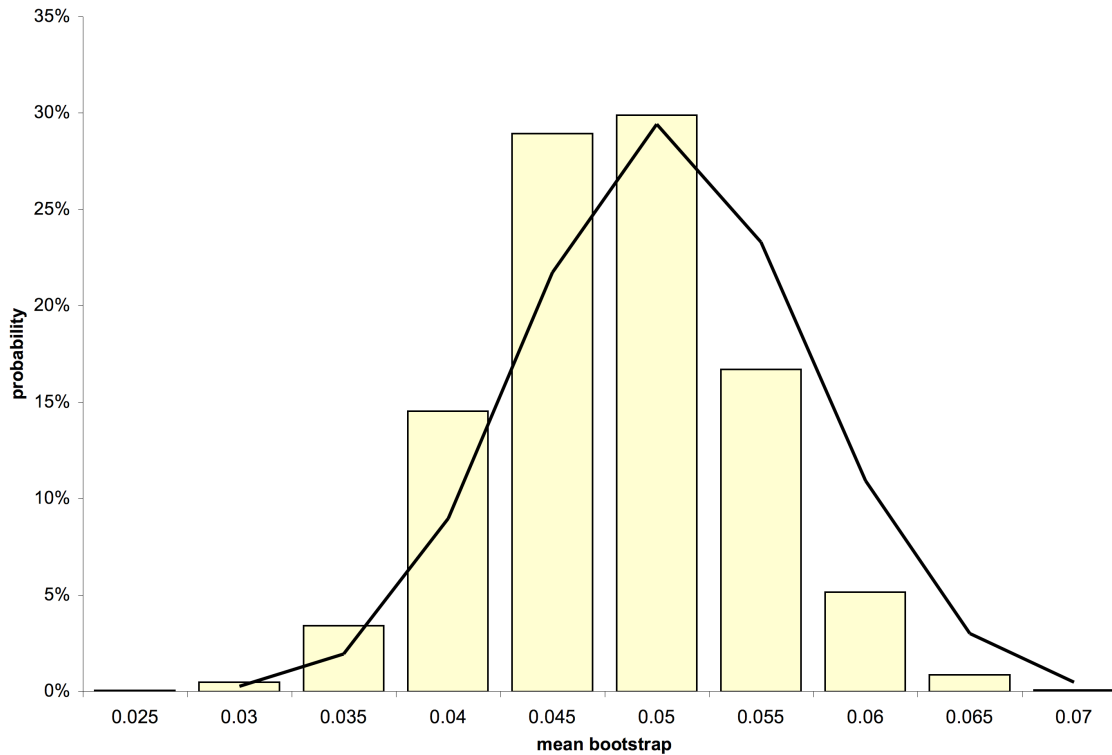


**Figure 4.5:** The bootstrap distribution for the  $AR_b$  mean.

The 95% and 90% confidence intervals for the  $AR_b$  mean are calculated as (-0.00408, 0.004482) (10,000 bootstrap samples) and (-0.0042, 0.0042) (1,000 resamples) respectively. The mean of the AR over the estimated event window is 0.034074 and hence  $H_0$  is rejected.

Similar analysis results in the bootstrap distribution for the  $CAR_b$  mean (Figure 4.6, Table 4.5). The 95% and 90% confidence intervals for the  $CAR_b$  mean are calculated as (0.033711, 0.057466) (10,000 bootstrap samples) and (0.0339, 0.0580) (1,000 resamples) respectively. The mean of the CAR over the estimated event window is 0.0729016 and hence  $H_0$  is again rejected.

Thus, the prediction-error analysis rejects the hypothesis that the event under examination had no impact on bidder's returns. There is sufficient statistical evidence to suggest that there was a positive effect on Saputo's stock at the time of the announcement of Dairyworld's takeover. The later is consistent with the



**Figure 4.6:** The bootstrap distribution for the  $CAR_b$  mean.

limited liquidity and limited competition hypotheses, as well as the yardstick of competition hypothesis.

## 4.8 Concluding remarks

The industrial organization literature views the co-operative enterprise as a pro-competitive force that helps drive the market closer to a more efficient outcome. This *yardstick effect* of co-op involvement is the main underlying assumption for the public support of co-ops. Despite the popularity of this theory there has been little empirical evidence of its accuracy. An opportunity for an empirical test of the theory is the replacement of a co-op (Dairyworld) by an IOF (Saputo) that occurred in the Canadian dairy market in 2001.

A vast literature on corporate control proposes several general hypotheses regarding the share price effects of acquisition announcements. Some hypotheses argue in favor of a positive effect on the bidder, while others propose a negative effect. Three of them, along with the yardstick of competition, are applicable for the examined case. The first two hypotheses – the limited competition and the limited liquidity hypotheses – predict a positive effect on the stock price of the acquiring firm, while the hubris hypothesis argues that



managers may undertake acquisitions for their own interest, and thus result in a negative effect on the stock price of their firm. The yardstick of competition hypothesis suggests that the firms that acquire co-operatives may experience a rise in their stock price. For Saputo, the effect on its stock price may be positive partly because the acquisition of a co-op decreases the overall competition in the market and positively affects the future profits of the remaining firms.

The analysis shows that the news of the acquisition had a significant positive impact on Saputo's stock price suggesting that Dairyworld's acquisition was interpreted as *good news* by Saputo's shareholders. Therefore the outcome of the empirical analysis is consistent both with the limited liquidity and limited competition hypotheses, as well as the yardstick of competition hypothesis.

Overall, the results of this study are not consistent with the negative effect on the bidder that most of the literature on mergers and takeovers suggests (see literature review in section 4.4). Our results are consistent however with part of the literature that deals with cases where the target is a private firm. The unique nature of the examined case and the wide variety of results reported in the relevant literature make difficult to accurately contrast and quantify the reported results with those in other studies.

The theoretical arguments presented in section 4.5 and the empirical evidence of section 4.6 support the proposition that the takeover of a co-operative will have a positive impact on the stock price of the acquiring company. Since the co-operative mentioned in the study is hypothesized to result in increased competition in the industry, the removal of the co-operative can be expected to result in greater profitability for the firm making the acquisition. As well, the co-operative structure, which is different than a privately held company, can result in limited liquidity and limited purchasers, both of which give greater bargaining power to the IOF. The consequence is that co-operatives make highly desirable takeover targets for IOFs.

The *yardstick effect* has been a central part of the literature on co-ops. However, very little empirical research has been undertaken to test this hypothesis. The current essay presents one way to quantitatively and indirectly test the co-op effect on a market. In doing so the analysis combines elements from different parts of the economics literature namely industrial organization, corporate control and finance. The presented methodology can be considered as a first step towards a more comprehensive understanding of co-ops and their effect on market outcomes.

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**Table 4.3:** Residual tests: Correlogram, Q-statistics.

	AC	PAC	Q-Stat.	Prob.
1	0.016	0.016	0.0306	
2	0.080	0.080	0.8235	
3	-0.013	-0.016	0.8463	0.358
4	-0.144	-0.151	3.4587	0.177
5	-0.069	-0.064	4.0608	0.255
6	-0.128	-0.105	6.1684	0.187
7	-0.058	-0.052	6.6007	0.252
8	0.080	0.080	7.4364	0.282
9	-0.066	-0.083	8.0087	0.332
10	0.094	0.046	9.1892	0.327
11	0.182	0.176	13.641	0.136
12	-0.057	-0.077	14.080	0.169
13	0.037	-0.010	14.270	0.218
14	0.087	0.145	15.318	0.225
15	-0.061	-0.032	15.838	0.258
16	-0.030	-0.048	15.963	0.316
17	-0.137	-0.070	18.640	0.231
18	-0.099	-0.097	20.040	0.218
19	-0.063	-0.072	20.613	0.244
20	-0.115	-0.065	22.548	0.209
21	0.054	-0.016	22.983	0.238
22	0.103	0.042	24.575	0.218
23	0.062	0.060	25.154	0.241
24	0.131	0.048	27.784	0.183
25	0.038	-0.002	28.009	0.215
26	-0.004	0.023	28.012	0.260
27	-0.079	-0.048	28.992	0.264
28	-0.139	-0.075	32.068	0.191
29	0.051	0.121	32.494	0.214
30	-0.106	-0.067	34.313	0.191
31	0.026	0.036	34.427	0.224
32	0.070	0.053	35.247	0.234
33	0.000	-0.048	35.247	0.274
34	0.095	0.046	36.792	0.257
35	-0.107	-0.148	38.746	0.226
36	0.053	0.015	39.244	0.246

**Table 4.4:** Bin, frequency and probability for the  $AR_b$  mean.

Bin	Frequency	Probability
-0.006	21	0.2%
-0.004	242	2.4%
-0.002	1,550	15.5%
0	3,331	33.3%
0.002	3,062	30.6%
0.004	1,422	14.2%
0.006	330	3.3%
0.008	39	0.4%
0.01	3	0.0%
0.012	0	0.0%

**Table 4.5:** Bin, frequency and probability for the  $CAR_b$  mean.

Bin	Frequency	Probability
0.025	3	0.0%
0.03	35	0.4%
0.035	363	3.6%
0.04	1,430	14.3%
0.045	2,875	28.8%
0.05	3,002	30.0%
0.055	1,713	17.1%
0.06	489	4.9%
0.065	81	0.8%
0.07	9	0.1%

## CHAPTER 5

### SUMMARY AND CONCLUSIONS

This thesis contains three essays related to the economics of agricultural co-operatives. Essays One and Two share a focus on the decision making process of co-op's members and leaders, respectively, while essay Three discussed the real financial value of co-ops and its implications for takeover cases involving them as targets.

Chapter One identified some of the most important issues currently in agriculture. The economic liberalization of the industry and international trade agreements like the NAFTA changed the economic environment of the agri-food market. Agricultural co-operatives struggled to adapt to the new reality and in a number of cases their attempts were unsuccessful, partly due to false beliefs regarding member support. The presented in chapter One decline of several prominent agricultural co-operatives highlights the relationship between a co-op and its local community, since it is the commitment of their members that effectively differentiates co-ops from other organizational forms and enables them to successfully compete in the market (Fulton 1999; Fulton and Giannakas 2001). Changes in consumers' perceptions regarding the role of co-operatives and their contribution, especially with respect to local communities, can affect members' commitment and thus the co-op's market share.

Organizations are driven by a dominant paradigm (Johnson, 1992) or dominant logic (Bettis and Prahalad, 1995), which is a collective interpretive device that the organization uses to process information, understand interconnections and finally gain knowledge. Prolonged periods of financial success and stability re-enforce this paradigm and make it harder for decision makers to deviate (Bettis and Prahalad, 1995). In that sense the changes in the agricultural industry described in previous chapters can be seen as an effective test for an organization's ability to adapt. The thesis addresses this issue by offering two essays on cognition and explicitly modeling the effects that cognitions and beliefs can have on market shares. Our results are largely consistent with those of Shimuzu and Hitt (2004) in that rapid change that follows

prolonged periods of success can severely undermine organization's performance.

Essay One examined the relationship between a co-op and its membership in a local community from an economic psychological point of view. More specifically, the analysis examined the impact of changes in the economic environment on consumers' cognitions and their buying behavior. A theoretical model was constructed to demonstrate how previous cognitions can create a bond between a consumer group and the local co-op; breaking this bond and switching to the investor-owned firm (IOF) results in cognitive dissonance and hence added (psychological) costs for the individual. Analytical results highlight the importance of the added psychological (switching) cost in the demand curves faced by the co-op and the IOF, showing that a significant cognitive cost can act as an effective safeguard to preserve co-op's consumer base. The higher the cognitive cost the harder it is for consumers to abandon the co-op and the more difficult it is for the IOF to attract new customers.

The new economic environment as described in chapter One introduced novel challenges for the agri-food firms. Agricultural co-operatives had to face the new competition, while the transformation of the transportation industry made the positioning of the processing facilities of vital importance. Several agricultural co-operatives failed to change and adapt in the new environment and in many cases co-op leaders seemed blinded to the new economic reality. One interpretation for this can be given through the frame theory that was the focus of the second essay.

Essay Two shows how mental framing can influence a co-op CEO's decision making and thus affect the market share and profitability of the firm. The essay presents a game theoretic model of duopoly between a co-operative and an IOF where mental framing is explicitly incorporated in the model. The two CEOs are assumed to have a particular mental frame through which they make an inference on the co-op's member support. The model allows the two CEOs to either hold the same or different beliefs regarding member commitment and thus two scenarios arise: the first is a consistent beliefs scenario while the second is an inconsistent beliefs scenario where the co-op CEO holds an unrealistically high belief whereas the IOF CEO holds a correct belief. Analytical results of the model show that when the co-op CEO holds an incorrect belief then the co-op is generally going to invest more than the IOF. Moreover, the co-operative experiences lower market shares and profitability relative to the case where the CEO holds the correct belief. The latter results illustrate a situation similar to the SWP case examined earlier in the essay.

As a result of the changes described in chapter One several agricultural co-operatives experienced sharp decrease in their market shares and poor financial performance that forced some of them to either



demutualize or sell part of their assets. In some cases co-ops were forced to completely cease their operations. An example of the later is the case of Dairyworld that the last essay examines.

Essay Three examines the takeover of a co-op and its replacement with an IOF. The co-operative in question was Dairyworld, an open-membership dairy-processing co-operative that was acquired by the Saputo Group, a publicly traded IOF. A vast literature on corporate control offers a number of general hypotheses regarding the share price effects of acquisitions; the results however are not unanimous but instead depend on an array of factors including the method of payment, competition among the bidders, and the nature of the target firm. Our analysis takes into account the distinct characteristics of the examined case and uses a prediction-error technique along with non-parametric econometrics to evaluate the impact of the acquisition on Saputo's share price by examining the behavior of its stock before and after the takeover. The empirical results show that the takeover announcement had a positive effect on Saputo's return and thus was conceived as a wealth maximizing decision by the stock market. These results are consistent with a number of theoretical hypotheses, including the hypothesis that co-op's real financial value is greater for an IOF bidder. This is a result of co-op's lower bargaining position and the expected positive effect that the co-op's removal will have to the future profitability of the remaining IOF firms – also known as the yardstick of competition hypothesis.

A common ground in the three essays is the presumption that co-operatives in general are different than for-profit firms. Aspects of this difference are their democratic structure, the focus on member welfare as opposed to profitability and the dual role of their members that not only differentiates co-ops from other forms of incorporation but also impacts their governance. In addition, their traditionally close connection with small communities and their focal role in local development makes them potentially more responsive to local needs than the typical IOF. When used properly, this unique nature and their characteristics can offer particular advantages that co-operatives cannot afford to ignore.

Theories in psychology referred to in essay One argue that people have the tendency to identify with organizations that provide positive cognitions that agree with their self-image. Cognitions that are consonant to the archetypal perceptions of ourselves as being nice, smart and caring persons are especially strong and have a significant impact on individual's decision making. This is something that can be applied to the case of co-operatives. The special relationship of co-operatives with their members, especially in the case of local communities, is a strong cognitive source that can be used to establish and further strengthen customer support for the co-op. When dealing with local communities or markets characterized by strong localism, co-operatives could undertake a series of advertising campaigns, public outreach and community

programs so that the organization can gradually build an image to differentiate itself from competition and create consonant cognitions for the consumers.

If co-ops would like to take advantage of cognitive dissonance effects then they should try to create the cognition that they differ from IOFs (especially non-local businesses) because they actively and openly support the local economy by re-investing, developing and supporting other local activities. In the case of bigger urban centers the idea of the community may get weaker so the co-op can choose to adopt a more generic advertising approach for the general population. However, the theory of cognitive dissonance described in essay One also argues that no matter what advertising methods are chosen the messages need to be compatible with the average consumer, avoiding signals that might create opposing cognitions or confusion. Creating dissonant cognitions gives rise to additional costs that the consumers will have to incur if they decide to no longer support the organization. Finally, the analysis in essay One is predicated on perception that it is not important if the difference between the two firms is real or not, but rather how the consumer perceives the two firms. If the co-op manages to create strong consonant cognitions that relate to the typical consumer then it can gain a competitive advantage against its rivals.

When examining business organizations it is always important to consider not only their characteristics but also the distinctive characteristics of the industry in which they operate. This is particular important when dealing with firms in agriculture, since the radical changes over the last twenty years dramatically transformed the industry. The gradual disappearance of the family farm and its replacement by the commercial farm, the production of highly standardized products, new technologies and innovation (biotechnology and nutritional technology), and the extensive use of information technology have had a significant impact on the dynamics and the structure of the agricultural industry. Even though these changes were easily observed, many agro-food firms and co-ops either didn't responded promptly or based their response strategies on unfounded grounds.

Frame theory prescribes that organizations, like people, built mental frameworks that help define their environment. When dealing with change, firms use their already established frames to interpret the new situation and decide on their optimal response. Even though this mechanism might work well for small changes, the adaptability of the organization may be compromised when dealing with drastic changes. New signals that are drastically different from the current beliefs will not fit the mental framework of operations and therefore are more likely to be ignored. This biased receptivity of new information makes the organization vulnerable to radical change by increasing its adoption time and making it harder to adjust to new environments. This was the case of several agricultural co-operatives in both the U.S. and Canada that

chapters One and Three discussed. Of course, this phenomenon is not found only in co-ops but it is common in other businesses as well.

One can argue that constant reevaluation and critical thinking can provide a solution for this problem. However, the latter actions are not easy to apply in a mental frame setting since frames are specifically designed to limit the need for such actions. So the very existence of the frame makes it harder to change it. The stronger the frame is and the more time that it has been used, the harder it will be to make any changes to it. This last result gives rise to another potential solution – discard the traditional model of the single frame/dominant logic, but instead keep a number of different but compatible frames open. Having multiple frames may allow for more flexibility and hence make the organization more adaptable to new signals. Of course, any of the proposed solutions implies certain costs since at least part of the efficiency that derives from having a single frame is lost. In this way, however, organization leaders may become more open-minded and adopt a “think out of the box” attitude that will make it easier to correctly identify and adjust to new situations.

The first two essays are about cognitions and perceptions/beliefs, and they specifically examine how different beliefs can affect the market share. Examining cognition offers a new insight in understanding the process behind the decline of agricultural co-ops described previously in the thesis. In essay One perceptions are partially flexible allowing for change at a cost, while in essay Two beliefs are inflexible because the cost associated with changing beliefs is very high. The cognitive cost in essay One acts as an effective switching cost for those consumers who wish to abandon the co-op and thus prevents the IOF’s expansion. These switching (cognitive) costs implicitly appear in essay Two where the co-op CEO believes that consumers think that they get more utility from the co-op. The co-op CEO was able to observe that historically the co-op members would stay with the co-operative and hence she made the inference that the switching costs must be large. More importantly, she formed the belief that the switching costs would remain high in the future even though new information signaled that this was not the case. The co-op CEO used this belief as a central part of her frame and build her strategy around it. In other words, in essay Two the co-op CEO implicitly relies on the strong effect of cognitive dissonance, which will restrict consumers from leaving the co-operative and thus it will help maintain the high market shares. As discussed in previous chapters, however, this did not happen, probably due to co-op actions that decreased cognitive dissonance and eliminated its effect.

The previous discussion established that co-operatives are unique business institutions that have a special relationship with their customers. So the next question that arises is how the typical IOF evaluates this

different business organization. Since the IOF is primarily interested in profits, its assessment should be reflected in its financial evaluation. An opportunity to see this is by examining a co-op takeover by an IOF.

Co-operatives are effectively private firms and thus can suffer from a weak bargaining position when negotiating their selling price to a potential buyer. The latter opens the possibility of underpayment by the IOF that should have a positive impact on its profits. At the same time, the co-op's removal from the market is expected to decrease market competition and therefore implies positive profits for the remaining IOFs – including the bidder. Both cases show that the real financial value of a co-op can be greater when the bidder is a for-profit firm and for this reason co-ops may be generally more attractive takeover targets for IOFs.

The yardstick of competition hypothesis argues that the presence of a co-operative should push the market closer to the competitive outcome and therefore lower consumer prices. The lower profit margins will affect the long-run profitability of the remaining firms and their future sustainability in the market. While all firms will have to face the same adverse economic situation, the co-op may be in a better position due to the cognitive dissonance effect as demonstrated in essay One. Establishing cognitions that easily relate the co-op to the consumer and re-enforcing consonant cognitions may give the co-operative a competitive advantage over the rest of the firms. The latter can effectively differentiate the co-op from the rest of the market and can thus potentially allow for higher profit margins making its survival easier than the other firms. Theoretically then, the combination of the yardstick hypothesis along with cognitive dissonance imply that co-operatives can not only perform a pro-competitive role and lower prices but that they can also be particularly resistant to competition by the IOFs.

Co-operatives have enormous potential when competing with IOFs as long as they follow strategies along the lines described above. However, it is crucial that the co-op leaders fully understand the fundamentals of these theories. Failure to properly implement them can result in financial difficulties and rapid losses in market shares. The organizations that the thesis discusses are co-ops that did exactly that – they failed to properly analyze their environment and they followed strategies that were inconsistent with their identity. The results, even though disastrous, may serve as an example for the rest.

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