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What Happened to the Fluid Milk Market After the Sale of the Dairyland Co-operative

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Abstract

What Happened to the Fluid Milk Market After the Sale of the Dairyland Co-operative

Recently the Canadian Dairy processing industry has evolved into a highly concentrated marketplace. Explanation of the industry concentration is primarily due to firms striving to make best use of company objectives such as maximizing profits. Motivated to fulfill company objectives has lead to numerous dairy industry acquisitions and consolidations. Accompanying many of the Dairy industry acquisitions has been an economic structural shift from cooperative based firms to privately owned firms. In the tightly controlled Canadian Dairy market, changes in economic structures to key industry players will result in different marketing approaches and strategies to milk pricing, which can ultimately decide production levels for operating firms. By analyzing and determining pricing policies amongst new industry players this study will examine whether farmers can expect to experience a decrease in milk sales due to differing pricing strategies at the processing level between firms such as privately owned company - Saputo, purchasing a cooperative company - Dairyland.

Statement of Problem

The current global economy has observed an increase in industry consolidation. This phenomenon has not been specific to any one sector or country, and includes the Canadian dairy industry. The worldwide trend of dairy consolidation, acquisitions, leveraged buyouts and divestitures has significantly affected the operation of today's dairy industry. Dairy cooperatives have been no exception to acquisition and consolidation activity. In fact, in the period from January 1 1998 to April 30 2001 the dairy industry globally witnessed the total of 490 mergers that was equal to approximately 2.5 dairy mergers per day (Voobergen et al 2002).

Domestically, Canadian dairy firms have been closing their doors or merging in order to stay or increase competitiveness and productivity. Over the past 35 years over 1000 processing plants have disappeared within Canada's borders (Canadian Government 2003). And since 2000 three organizations within Canada have controlled 28% of industry plants and 67% of the manufacturing shipment, it should be noted that only one of the three firms is a cooperative (Canadian Government 2003).

A prime example of dairy industry consolidation recently occurred in Western Canada. In the early months of 2001, Montreal based Saputo Inc. struck a deal with Agrifoods International Co-operative for over 400 million dollars. The Saputo purchase of Agrifoods International Co-operative consisted primarily of fluid milk manufacturing and processing assets, with Agrifoods International still responsible for collecting raw milk (Western Producer 2001). Because of the Agrifoods International buyout; Saputo now

markets milk throughout Canada under the brand names Dairyland (Western Canada), Nutrilait (Quebec) and Baxter (Maritimes). Up until this point Dairyland was a producer owned and controlled co-op with approximately 1,800 members spanning across Western Canada and Maritimes.

Originally, Agrifoods International was created with the merger of two small co-ops in British Columbia and Alberta and eventually grew into a nation wide company that was processing around 1.21 billion litres of fluid milk before the Saputo takeover (Western Producer, 2001). Before the takeover Agrifoods International was ranked as or the top dairy cooperative in Canada and the second largest dairy processor in the country with revenues exceeding one billion dollars, twenty-four plants and 3200 staff (Globe and Mail 2001). Clearly this takeover is significant to the industry and may have the capacity for price repercussions regionally.

Throughout the nineties the dairy industry was dominated by cooperatives who were responsible for processing over 64% of the Canadian milk (Canadian Government 2003). However due to a variety of reasons the dairy industry is no longer dominated by cooperatives but rather Investor owned firms (IOFs) such as Saputo and Parmalat (Canadian Government, 2003). One factor why cooperatives no longer dominate is due to their growth dilemma. Business cooperatives operate under a distinctive set of economic limitations, which can yield both advantages and disadvantages. Factors such as exhausting member investment capacity and slim earnings to reinvest present a competitive disadvantage for cooperatives seeking economic growth (Henehan 2002).

This limited ability to capitalize makes it difficult for cooperatives to finance acquisitions. Here is where privately owned operations seem to have the upper hand since obtaining capital is readily available and firms operate in at a level generating greater profits thus a greater capacity to finance acquisitions (Henehan 2002).

One possible explanation for the Federal competition bureau not opposing the Dairyland takeover, according to Saputo, is because the two companies operated for the most part in different businesses (Globe and Mail, 2000). Before Saputo purchased Dairyland it had primarily operated as a mozzarella cheese company within the North American pizza industry with no business in the Canadian fluid milk processing market (Globe and Mail, 2001). What the bureau failed to investigate was possible pricing results due to discrepancy between co-operatives and IOF's pricing and production strategies that stem from economic structural differences between Saputo (IOF) and Dairyland (co-operative).

Theory

A producer marketing co-operative objective function is to maximize profits and their producer surplus, whereas an IOF is concerned exclusively with maximizing profits. In general a producer cooperative position in the dairy industry is to purchase raw material (raw milk or X_0) from members/farmers at price p_0 , then process the raw milk into a finished product (fluid milk or y) then sell to retailers at price p_y . This version of vertical integration has replaced the purchasers of their output with an organization producers control themselves, by doing so; dairy producers are patrons of their own firm (Fulton

2001). Since regional dairy producers own and operate dairy processing cooperatives, primary objectives of the processing cooperative is to maximize both profits and welfare (or producer surplus) of their members. In short, a cooperative objective function is $\text{producer surplus} + \text{profits of cooperative} = \text{sales of final product} - \text{variable costs of producing} - \text{fixed costs of producing}$.

Intentions of IOFs or Saputo within the dairy processing industry may differ somewhat from their cooperative counterpart. This is primarily because IOFs are not concerned with maximizing producer surplus and focus solely on maximizing their investor's returns. Simply put the objective function of an IOF is to exclusively maximize investor profits, which is $= p_y y - p_o x_o - F$. Noticeably, objective functions between the two firms differ; IOFs are not concerned with producer's variable costs unlike cooperatives.

Fundamental differences between firms creates output variation, co-operatives produce where average revenue = marginal cost. This point of operation allows co-operatives to produce more in order to satisfy their producers with adequate producer surplus and profits. On the other hand IOFs not being concerned with producer surplus, produce where marginal revenue = marginal cost. This production shift away from average revenue to marginal revenue results in a decrease of production for producers who are controlled by an IOF rather than a co-operative. Cooperatives are still interested in maximizing profits, but in doing so the cooperative will produce where the benefit of an additional unit of raw material (Average Revenue) is equal to the marginal cost of producing the extra unit or $AR = MC$ (Goddard 2003).

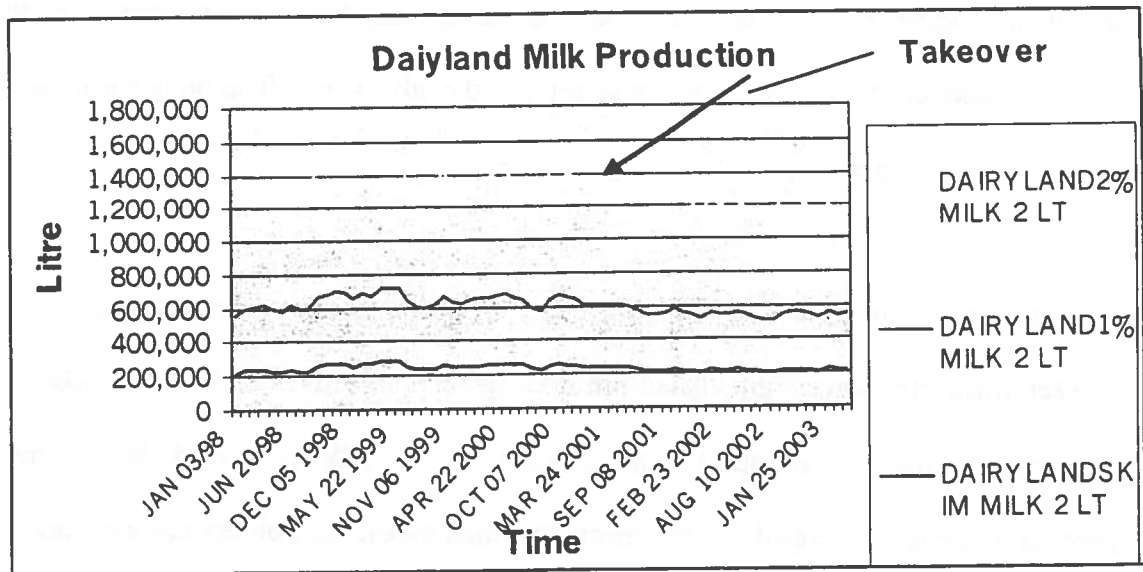
Clearly co-operative and IOFs structural difference can result in variations in each firm's production levels. What is not yet apparent is how co-operatives and IOFs contrasting structures can result in differing pricing strategies amongst firms in the dairy industry. Because of the uniqueness of the fluid milk market (costs of transportation, perishability) firms maybe able to use prices of products as a strategic variable to influence quantity sold, this type of model is commonly known as Bertrand pricing. A Bertrand pricing model essentially suggests that firms use pricing schemes to determine quantities sold. Because of this, a change in dairy industry ownership may permit differing fluid milk pricing strategies, which can result in an increase of pricing strategies amongst competing firms. In Western Canada the current dairy processing market is now dominated by IOFs (Saputo, Parmalat), which boast identical objective functions of maximizing profits. This issue may have resulted in different fluid milk strategies before and after the sale of Agrifoods International.

Empirical evidence is needed to suggest that the milk processing market within Western Canada is involved in a Bertrand pricing strategy. Pricing strategies in a product differentiated market means that competing firms quantity is determined and/or a function of the others price (Carleton et al 1999). An algebraic model of a Bertrand pricing strategy between two competing profit maximizing firms appears as - $Q_1 = A - B_1P_1 + C_1P_2$ and firm 2 as $Q_2 = A_2 - B_2P_2 + C_2P_1$. Further breakdown of the algebraic model yields the price reaction curves that are a function of the other firm's price. An algebraic example of these reaction curves are $P_1 = a + bP_2$ and $P_2 = a + bP_1$, which in

short means $P_1 = f(P_2)$ and $P_2 = f(P_1)$. Due to this pricing framework it is essential that rival industry players constantly monitor, adjust and change their retail prices so they remain aggressive and profitable. This pricing strategy may have become more evident after the takeover of the co-operative than prior to the takeover. When one of the major players was a co-operative.

Since the quantity of fluid milk for firm 1 and 2 is developed from pricing games between firms, it is perceivable that a shift in ownership objectives within the market could possibly result in an impact on the amounts of fluid milk that is sold. Before the takeover, Dairyland operated as a co-operative which meant their objectives were not identical to rival firms. To look at the outcomes at the farm level from differentiated product Bertrand games by IOFs as compared to co-operatives sales patterns for milk by processor and in aggregate need to be examined. A brief examination of farm level implications from Bertrand pricing strategies between competing firms can be investigated by charting total sales of major milk containers and varieties for a number of processors. Figure 2.0 is total litres produced by Dairyland as a co-operative and as an IOF, the arrow indicating the takeover illustrates when Saputo took ownership. Results from figure 2.0 suggest that sales have decreased slightly since the Saputo takeover. The sales decrease may be a function of new pricing strategies between the IOF processing firms that need to pay close attention to profits in order to satisfy investors.

Figure 2.0



Objectives

The intention of the purposed structural analysis between milk processing firms is aimed at demonstrating how differing objective functions can possibly impact on market structure with different pricing and production strategies. To determine whether differing objective functions between co-operatives and IOF can possibly affect price and production of fluid milk products, market structure and pricing strategies need to be established, for this empirical evidence is needed. Once the milk market structure and pricing policy is established, it is possible to illustrate how the milk market reacted to shifts in firm ownership objectives (co-operative to IOF). According to theory and firm objectives, competing IOF's within the industry could possibly result in producer sales decreasing as a result of more aggressive pricing policies.

Methods

Study between cooperatives and IOFs will demonstrate how structural and behavioral differences between two firms can result in contrasting milk pricing strategies and reactions at the processing level. Largely unknown to the Canadian dairy industry and Canadian Competition Bureau is how regional retail milk prices have responded to changes in ownership.

One way to obtain new and valuable information regarding the recent dairy development/takeover is to undertake a thorough market structure analysis in order to further understand the milk processor market structure. To successfully examine the processing industry it can be assumed that fluid milk products by processor are imperfect substitutes and/or differentiated products whose owners participate in the Bertrand strategic pricing games. General assumptions of differentiated products in a Bertrand model are: the industry must have limited firms and costly barriers of entry, products must be similar but not identical with product sales affected by its own price and competitor prices. Lastly, both processing firms must consider their price to be strategic and changeable (Carlton et al 1999).

General concepts that accompany assumptions of differentiated goods within a Bertrand model are: products that are differentiated because consumers think that they differ. Secondly, pricing of one brand exerts a greater constraint on another brand's pricing

when the two brands are close substitutes (Carlton et al 1999). It is hypothesized that the dairy processing industry correspond to the criteria of the Bertrand pricing model.

Results

Differentiated product assumptions and concepts match the current market situation in the Western Canadian milk processing industry. It is now possible to measure effects in a change of firm ownership amongst industry players, for this to be successful an empirical model needs to be formulated. One way to further investigate a change in market structure is to test if price reactions of certain products and containers differ from the time period before (January 3, 1998 to February 24, 2001) and after (February 24, 2001 to March 22, 2003) the Saputo takeover. It may also be useful to formulate individual product price reaction elasticities for certain products before and after the Saputo takeover. Dairyland fluid milk product prices under co-operative and IOF management will be tested against Parmalat, which is regarded as a major competitor and is also an IOF. Product price reaction elasticities are determined by performing multiple regressions on Dairyland/Parmalat prices and seasonality variables. Calculation of product price reaction elasticities are developed by coefficients from performed regressions and are multiplied by the product of divided product average. Results of the formulated price elasticities before and after the takeover is useful since elasticity's are a measure which compares the ratio of two variable percentages. Elasticities can be examined for statistical significance at the 90% confidence interval.

Results of table 1.0 or the price elasticities indicate an insignificant relationship between all Dairyland products as related to leading competitor (Parmalat) products prior to the takeover. In other words neither firm practiced pricing strategies due to non-competing objective functions i.e. one cooperative and one investor owned firm. However after Saputo purchased the Dairyland Cooperative the elasticities on the same products indicate significant price relationships. Significant pricing relationships illustrate how differing economic structures between firms can lead to increased price reaction strategies amongst industry players. Competing IOFs are more involved in pricing strategies or games, this is demonstrated by significant results after the takeover. Repercussions of firms relying upon pricing strategies to dictate quantities can potentially lead to farmers selling less milk. By providing evidence of an increase in pricing strategies confirms previous assumptions and concepts of the milk processing market having differentiated products and participating in the Bertrand pricing model.

Table 1.0

Product name and container size	Elasticity Before Takeover	Elasticity After Takeover
Dairyland price reaction to Parmalat elasticity for 2% 2 litre containers	0.0840, not significant at 90% confidence interval	0.0300, not significant at 90% confidence interval
Dairyland price reaction to Parmalat elasticity for 1% 2 litre	-0.176, not significant at 90% confidence interval	-2.67, significant at 90% confidence interval
Dairyland price reaction to Parmalat elasticity for Skim 2 litre	0.25, not significant at 90% confidence interval	-0.700, significant at 90% confidence interval
Parmalat price reaction to Dairyland elasticity for 2% 2 litre containers	0.079, not significant at 90% confidence interval	0.00925, not significant at 90% confidence interval
Parmalat price reaction to Dairyland elasticity for 1% 4 litre plastic jug containers	0.194, not significant at 95% confidence interval	0.480, significant at 95% confidence interval
Parmalat price reaction to Dairyland elasticity for 1% 2 litre containers	-0.203, not significant at 90% confidence interval	1.11, significant at 90% confidence interval
Parmalat price reaction to Dairyland elasticity for Skim 2 litre containers	-0.024, not significant at 90% confidence interval	-0.499, significant at 90% confidence interval

To further verify the price elasticity reactions, chow tests were performed on the regression coefficients. This statistical test is necessary to analyze time series data that includes periods of change such as the Saputo takeover. It also tests for regression coefficient stability between two periods, in this case knowledge of the structural break is known therefore the test is deemed functional.

Chow test results are included in table 1.1. Results of the chow test are derived by $((e \cdot e - e_1 e_1) / n_2) / e_1 e_1 / (n_1 - k)$ where $e \cdot e$ is equal to residual sum of squares, $e_1 e_1$ is the restricted residual sum of squares. n_2 is number of observations, n_1 is degrees of freedom and k is the number of variables. This result is then compared to the F statistic which is $(n_2, n_1 - k)$. Outcomes larger than the standardized F test, indicate and confirm a structure shift over time within the milk processing market (Dinardo et al 1997). Assumptions that the time series experienced a structural shift during the period of time after the takeover is confirmed by testing regression results with entire time period and after the takeover. Chow tests were performed on both Dairyland and Parmalat product, with all but one resulting in a confirmed structural shift. A structural shift is confirmed when the derived chow test results are greater than standard F-test.

Table 1.1

Product Name	Time Period After (Feb 03 2001 to present)
Dairyland Skim 2Litre	4.77 > 1.91
Dairyland 1% 2Litre	2.35 > 1.91
Dairyland 2% 2 Litre	1.57 < 1.91
Parmalat Skim 2 Litre	9.6 > 1.91
Parmalat 1% 2 Litre	5.5 > 1.91
Parmalat 2 % 2 Litre	3.6 > 1.91

Conclusion

The present day Canadian dairy industry has evolved into a vital component of the Canadian economy and currently ranks fourth amongst Canadian agri-food industries, employing nearly 50,000 Canadians on dairy farms and at the primary processing level (Canadian Government 2003). Historically the Canadian dairy industry has relied upon cooperatives structures to play a prominent role in terms of products, manufacturing and distribution. The Saputo buyout marks a further increase of market concentration and results in fewer companies processing fluid milk and owning larger market shares. The decline of dairy companies within the industry results in multi-million dollar mergers and takeovers such as the Saputo takeover that can drastically affect dairy markets. One way these mergers and takeovers affect the marketplace is through companies buying others and continuing operations within economic structural differences. An example of differing structures is evident when observing privately owned companies (Saputo) takeover cooperative companies (Dairyland). Because of their unique user-oriented

ownership and control structure, it has been proposed that cooperatives employ different strategies than IOFs to achieve their goals thus leading to obvious differences in firm performance (Hudson et al 2002).

Consolidation within any industry requires lots of information and study to fully comprehend possible implications for producers and consumers. Takeovers at a significant scale such as the Saputo case need to be closely scrutinized by industry experts to ensure all stakeholders' perspectives are represented and protected. Performed statistical tests indicate differences in firm's pricing strategies before and after the Saputo takeover. The tests also show that farmer could potentially see a decrease in milk quantities sold cutting into their profits.

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