Transaction Costs in Milk coordination Mechanisms : Marketing Board vs. Direct-Contracting

Abstract

This study measures the magnitude of transaction costs faced by milk producers associated with the selling of their production to dairy processors in two different marketing channels: marketing boards and direct contracting. Interviews and surveys were conducted to estimate transaction costs associated with the Québec milk marketing board in Canada and direct marketing contracts in England and Wales in the United Kingdom. The difference in transaction costs magnitude in both coordination mechanisms is significant. Our results show that the importance of transaction costs incurred by producers seems to be much lower in a marketing board setting. Our study also reveals a strong heterogeneity of transaction costs magnitudes among farmers contracting directly. In that respect, the milk marketing board would act as a collective insurance, pooling transaction costs and sharing them among producers.

Key-words: transaction cost; marketing board; contracts; measurement methodologies, milk sector.

JEL: L14, Q13, B41

1. Introduction

For the last two decades, we have been assisting in many Agrifood sectors in Canada and the United States to the tightening of vertical linkages in supply chains (Hobbs and Young [2001] p.3). This phenomenon is at the origin of a growing interest among economists for questions related to vertical coordination and the organisation of transactions in supply chains. In Canada, coordination of agricultural products in the supply chain is partly done through marketing boards in many sectors. In the province of Québec for instance, 90% of the total agricultural receipts were marketed through marketing boards in 2006.[1] Canadian marketing boards are generally defined as "legislatively specified compulsory marketing institutions which perform any of the functions of marketing on behalf of the producers of a particular agricultural commodity" (Veeman [1987] p.992).

There exist unnumbered studies on the economical efficiency of boards but none of them have focused on the role of these organizations on vertical coordination or their influence

[1] In 2004, there were sixteen agricultural, three fishing and sixteen private timber marketing boards in that province.

on transaction costs.[2] Some scholars have mentioned the potential advantages of boards in economizing on transaction costs and rationalizing some marketing operations (Westgren [1994], St-Louis and Proulx [1978], Johnson [2000]) but to the best of our knowledge, we are not aware of any study that has been done to clarify the issue. The recent interest for vertical coordination efficiency is a good occasion to revisit the performance of marketing boards with a different perspective. In their study on vertical linkages within Agri-food supply chains, Hobbs and Young [2001] suggest to analyze the role of these organizations in the vertical coordination of transaction. The authors make the hypothesis that if marketing boards do not have market power and thus no effect on market prices, then rents obtained by producers through boards could come from boards' ability to "lower transaction costs in the supply chain and to pass these cost savings back to farmers in the form of higher returns […]" (Hobbs and Young [2001] p.62).

The objective of this paper is to contribute to the debate on whether or not marketing boards have the capacity to decrease transaction costs faced by producers with an evaluation of the magnitude of transaction costs incurred by producers when selling their milk through a marketing board. The dairy sector is quite interesting for the purpose of our analysis since raw milk is a very perishable good. Hence, milk possesses a temporal specificity that creates interdependency between traders, and potentially higher transaction costs than storable goods.

Since all milk produced in Canada has to be marketed through a board, direct contracts prevalent in England and Wales are examined for comparison purposes. That way, our paper overcomes a transaction costs economics' basic selection problem. Generally, one observes costs for the organizational arrangement chosen and so direct comparisons with costs of an alternative organization are impossible (Masten et al. [1991] p.3). Unlike earlier studies, this article compares two existing alternative coordination mechanisms. Using transaction cost economics (TCE) (Coase [1937], Williamson [1985]) and developing a methodology based on previous similar works (Hobbs [1997], Kuperan et

[2]Past economical studies on marketing boards' efficiency focused mainly on their social welfare implications. See Brunstad et al. [2006], Lavoie [2005], Beck, Hoskins and Mumey [1994], Clark [1994].

al. [1998], Benham and Benham [2005]), this study identifies transaction costs associated with alternative marketing channels in order to 1) estimate the magnitude of transaction costs and 2) explain the disparity among marketing channels.

Results show that the difference in transaction costs magnitude in both coordination mechanisms is significant. The magnitude of transaction costs incurred by producers seems to be much lower in a marketing board setting than direct contracting. The *ex post* transaction costs seem to be the main differentiating costs between the two settings. Our analysis also puts forward a strong heterogeneity of transaction costs magnitude among producers in the direct contracting setting. Finally, as a percentage of the average dairy farm revenues, transaction costs magnitudes remain very low which indicates that both hybrid organizational forms allow transaction costs minimization.

The paper is organized as follow. We begin in section 2 with a description of the milk marketing coordination mechanisms under consideration. Section 3 introduces briefly the theoretical insights used in the paper and a literature review of transaction costs measurement. Section 4 presents the analytical framework developed for evaluating transaction costs in milk marketing. Section 5 explains the methodology used for measuring transaction costs and the analysis. Section 6 discusses the results, and section 7 concludes.

2. Coordination mechanisms

The milk marketing channels considered in this paper are the milk marketing board of the province of Québec (Canada) and direct contracting in England and Wales (Britain). The Canadian and British experiences constitute appealing comparative grounds since both countries have similar milk industries (production, processing, consumption) but adopted quite different milk marketing organizations in recent years. In Canada, all milk producers are constrained to sell their milk through provincial marketing boards, which negotiate a contract with milk buyers. In Great Britain until 1994, producers were also constrained to sell to a marketing board but the marketing of milk has been totally

deregulated since then and now, producers contract directly with private processors or cooperatives to sell their production. Also, both countries have similar public institutions such as a parliamentary political regime.

(i)The milk marketing board in Québec, Canada

Better known for their horizontal coordination than their vertical activities, marketing baords are granted with delegated powers from the state that allow them to intervene in the exchange of raw agricultural products between producers and purchasers. For many agricultural sectors in Canada, these organizations constitute the exclusive and mandatory contractual intermediary between producers and purchasers of agricultural products. The legislation enabling marketing boards provides for statutory safeguards against boards acting contrary to the public interest through the creation of a public regulatory body (RB) supervising boards' activities. This authority acts also as a quasi-judicial specialized tribunal when disputes among parties arise. The board considered in this study is the Quebec milk marketing board. It displays a wide array of functions ranging from promotional activities to negotiation, centralized selling and supply management functions. The milk board was created in 1981 and has thus been operating for more than 25 years. In 2005, 7422 producers marketed their milk through the provincial board, with an average of 52,5 cows per farm having a productivity of 7339[*] liters/year, and received a farm gate receipt per liter of 0,64 dollars (FSL [2007]).[3] There were 114 processing enterprises in the province in 2007 and the three major players processed 83% of the total milk produced (FPLQ [2006]).

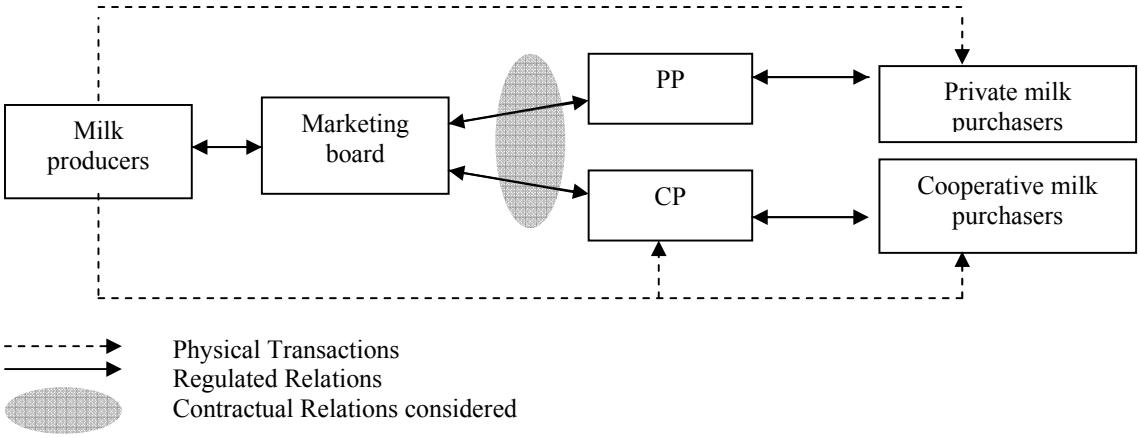
The Québec milk marketing board alters substantially the individual process of milk marketing at the producer level. Indeed, instead of contracting directly with their buyer, producers delegate all their contractual operations to a representative organization composed of elected producers and professional staff. Dairy cooperatives and processing investor-owned firms (IOF), hereafter called private purchaser, use a similar delegated configuration. Thus, three main agents take part in the contractual process: the marketing

[*] For 2006.

[3] Farmgate receipt equals farm milk total receipts divided by total volume of milk sold.

board, the organization representing private purchasers and the organization representing cooperative purchasers. The board contracts with the two purchasers' organizations, which implies that only two contracts are signed to coordinate the whole Québec milk production. Both negotiated contracts are signed for a three-year period but are often extended. Contracts are also regulated since they have to be approved by the regulatory body to become legal and enforceable. This contractual arrangement is atypical since parties contracting are not the economical agents themselves but the organizations representing them (figure 1). Transaction costs generated by milk transactions are therefore basically bore by the three organizations aforementioned. The relation linking producers to the marketing board is essentially of a regulated and political nature. Commercial transactions are not observed at this relation level and thus, we do not find the typical commercial transaction costs items, as we will present in section 3.

Figure 1. Representation of physical transactions, and contractual and regulated relations in the Québec milk MB.



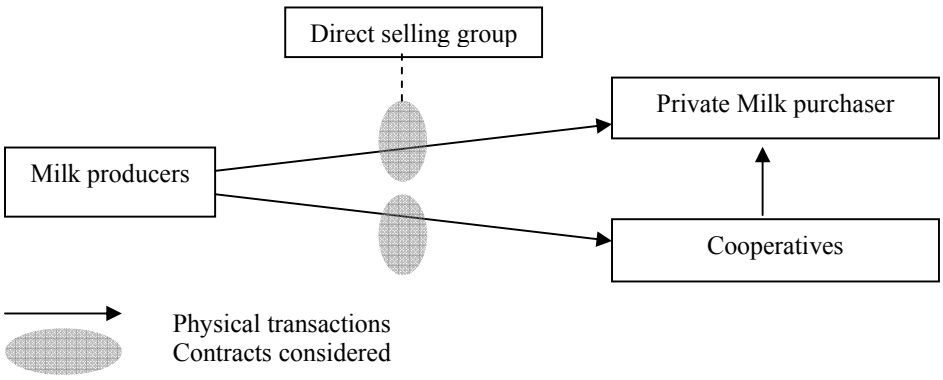
(ii) Direct contracts in England and Wales, United Kingdom

Since the dismantlement of the milk marketing board in 1994, milk marketing in England and Wales is done through direct contracts between producers and purchasers. Three marketing channels are possible for producers to sell their milk (Franks [2001] p.633): direct contracting with a milk purchaser; direct contracting with a milk purchaser through a direct selling group; and contract with a cooperative as a member.

The most common marketing channel is the cooperative with a share of 70% of all milk sold in 2007. Processing activities are however concentrated in the hands of private firms. Cooperatives process only 43% of all milk produced in England and Wales but they act as brokers to sell unprocessed milk to private processors. There are thus theoretically two types of contractual relations here: contracts between producers and buyers, and contracts between cooperatives and private milk purchasers. We will not take into account the latter relation since these costs are not bore directly by milk producers but by cooperatives. Besides the fact that their evaluation would necessitate further investigation, we really want to limit our analysis to "directly-faced" transaction costs in this coordination mechanism. A more complete evaluation of transaction costs faced by milk producers in this region should however take into account these costs.

Contracts signed between English producers and processors are said to be evergreen since they are automatically renewed until one party wants to terminate the contract. Contracts are usually elaborated by purchasers and offered to producers. These later are thus contract takers. Some contracts between producers and private buyers are negotiated through a direct selling group (DSG). The principal role of these groups is to rationalize commercial partners' communications and simplify the renegotiation of contracts. No statistics on their prevalence are available to appreciate their importance. Franks notes however that approximately 12 to 15% of the producers would negotiate their contracts through dairy groups (Franks [2001] p. 632).

Figure 2. Representation of physical transactions, and contractual and regulated relations in England and Wales.



There were 14 732 dairy farms in England and Wales in 2005 with an average of 92 cows per farm having an average productivity of 6749 liters/year and getting an average farmgate price of 0,185 £ per liter (MDC [2007]). As for the processing sector, it is a bit less concentrated than Québec. According to DairyUK calculations, there were about 100 dairy processing enterprises in UK and the four major players processed 50% of total milk produced in 2007 (DairyUK [2007]).

3. Theoretical Framework

Transaction Costs

Transaction cost economics (TCE), unlike neoclassical economics, makes the assumption that exchanges are not costless. Transaction costs are the costs resulting from property rights transfers between agents. Organizational forms that are more successful in reducing production and transaction costs in a given environment tend to become dominant there (Williamson [1981]). The process of cost minimizing is based on what Williamson calls the discriminating alignment hypothesis. This hypothesis states that depending on the dimensions of transactions (asset specificity, uncertainty and frequency) and behavioral assumptions (bounded rationality and opportunism), economical agents will choose institutions, organizational forms and transaction that minimize the cost of exchange.

One of the major critics addressed to transaction cost economics concerns the gap between remarkable theoretical developments and the poverty of results in terms of direct measurement of transaction costs. Very few studies focus on evaluating the magnitude of transaction costs and some scholars even consider this deficiency as a theory's strength (Saussier and Yvrande-Billon [2007] p.61). By using propositions based on characteristics of transactions and not directly on the level of costs, TCE escapes a hazardous comparative exercise of governance structures, which is not relevant in many cases. Other scholars persist in developing methodologies for measuring transaction costs

because, to cite a widespread axiom in the business world, "what gets measured, gets managed" (Benham and Benham [2005] p.373, McCann et al. [2005] p.527). Transaction costs are an important component of the economy but yet, how substantial are they? The lack of transaction costs empirical estimates on their magnitude and variation across settings is puzzling and filling this deficiency could surely improve transaction costs empirical research.

Beyond these divergences, the lack of empirical evaluations of transaction costs is not surprising. Many difficulties are waiting the researcher that tries to evaluate directly the magnitude of transaction costs.[4] First, there is no theoretical consensus over what are precisely transaction costs (Allen [1991], Hobbs et Kerr [1999]). The many coexisting definitions "offer powerful conceptual insights, but they have not been translated into widely accepted operational standards" (Benham and Benham [2005] p.368). Second, estimating transaction costs is complicated by the difficulty to separate transaction and production costs. Third, if transaction costs are very high, some transactions might not take place. Opportunity costs of alternatives have to be taken into account and these costs are not easily identifiable or quantifiable. Finally, some agents, because of their characteristics or identity, do not face the same transaction costs. These differences may be difficult to identify by researchers. This list of difficulties is extended if we consider the efforts that have to be undertaken to create original data since transaction costs are usually not collected in governmental census or in the standard accountancy practices of firms.

Transaction Cost Measurement Literature Review

The lack of theoretical consensus over what are transaction costs has unsurprisingly given birth to a heterogeneous collection of empirical works in terms of their measurement. Some studies consider transaction costs as the difference between prices paid by the buyer and received by the seller. The most well known piece of work done in this area is probably the article written by Wallis and North (1986) on the analysis of the

[4] For a more complete description of transaction costs estimations difficulties, see Benham and Benham [2005].

United States transaction sector. Our present research falls within another research program, which consider transaction costs as the "value of resources used in locating trading partners and executing transactions" (Wang [2003] p.2). Many works of this research program have been made in the environmental and ecological economics' fields (Kuperan et al. [1998], Falconer [2000], McCann et al. [1999], McCann et al. [2005]). These studies focus on evaluating the magnitude of transaction costs associated with the conception and implementation of diverse public policies. Transaction costs are either evaluated for private agents aimed by the policy, or public agencies applying it. Another set of studies are investigating the costs of transaction that private traders face. Alexandra and Lee Benham [2005] and their research team are carrying out a series of studies on the cost of exchange (COE) based on a standardized methodology that they have developed. Defining the COE as "the sum of production costs and the specific transaction costs faced by the individual", studies related to this research program have attempted to evaluate the costs of starting up a new business, obtaining a business telephone, buying an apartment or importing a physical asset (Benham and Benham [2005] p.371).

When it comes to the measurement of transaction costs generated by inter-firm relations within agrifood supply chains, studies are relatively scarce. The study that resembles the most to what we intend to do here is the one done by Gabre-Madhin [2001] who measured the costs of labour time required in searching trading partners and the opportunity cost of working capital during search for grain traders in Ethiopia. Her results demonstrate that transaction costs incurred during the information search period represented 19% of total exchange costs.

The literature review suggests that transaction costs faced by producers within the Agrifood supply chain are likely to be significant and that they may affect their competitiveness. Our study contributes to this neglected literature while focusing on the comparison of two distinct hybrid coordination mechanisms. In the following sections, we develop an analytical framework and a methodology for evaluating empirically the magnitude of transaction costs incurred by producers when selling their milk production through very diverse milk coord

4. Analytical framework for milk marketing

Determinants of Transaction Costs

Milk producers face a number of transaction costs when contracting with their downstream partners of the supply chain but very few works have investigated the possible determinants of transaction costs in the case of milk marketing. There are even less empirical studies that examine their relative importance. Empirical observations of the sector and previous studies (Compés López et al. [2007], Dieye [2006]), indicate that transaction costs in milk marketing arise mainly from various uncertainties and temporal asset specificity. Partners may engage in costly activities in order to attenuate uncertainty and protect their specific assets, thus generating transaction costs.

Milk producers face various potential types or sources of uncertainty in raw milk transactions: price uncertainty, behavioral uncertainty and information asymmetry. Producers face price uncertainty since they may not know in advance what price they will pay or receive before final milk delivery. This uncertainty is especially high for producers selling milk with particular characteristics (organic, high protein milk, high quality) since they probably invested in specific assets to gain their specificity. Producers also face behavioral uncertainty stemming from unbalanced negotiating power and translating in contractual commitment and enforcement uncertainties. Finally, producers have to deal with information asymmetry over quality grading and classification since these tasks are usually performed by buyers. The magnitude of transaction costs might also be influenced by the presence of temporal and site asset specificities. Producers are bound to a specific production site that cannot be moved without incurring important costs. Also, they sell a perishable product that looses value if not refrigerated and processed within a few days. The lock-in effect created by these asset specificities is an important determinant of transaction costs' increase in the presence of an opportunistic behavior potentiality.

Hypothesis

Transaction costs theory suggests that traders will adopt exchange coordination mechanisms that minimize transaction costs. The optimal mechanism would thus minimize transaction costs created by uncertainty and asset specificities. In this paper, we make the hypothesis that the milk marketing board, by reducing environmental and behavioral uncertainty, should be more effective in minimizing transaction costs faced by producers than the direct contracting setting. Both organizational arrangements are considered in this paper as hybrid organizational forms but the coordination of transaction within a board is closer to hierarchy coordination, whereas direct contracting tend be closer to market coordination. From the producer's perspective, the quasi-hierarchical coordination used by the milk marketing board allow to decrease the uncertainty related to outlets search, prices, contract enforcement and purchasers' opportunistic behavior more effectively than direct contracting.

Transaction costs components

In order to compare transaction costs' magnitude of both marketing channels under consideration, a quantitative measure of transaction costs is needed. Although there is no officially recognized methodology for examining the magnitude of transaction costs, the recent works of Benham and Benham (2005) propose a standardized methodology that many authors have applied to comparative analysis. In that methodology, a subset of the total costs generated in a transaction is examined. This subset, designated as the cost of exchange C_{ijkm}, is defined as "the opportunity cost in resources - money, time and goods - for an individual with characteristics *i* to use a given form of exchange *j* to obtain a good *k* in an institutional setting *m*" (Benham and Benham [2005] p. 370). This methodology seeks to evaluate the opportunity cost faced by an agent that undertakes a specified exchange in a specified institutional environment.

Like the methodology developed by Benham and Benham [2005], our analytical framework does not account for indirect transaction costs related to the creation of institutions framing commercial exchanges, the development of a reputation, personal networks or specific abilities necessitated by the transaction. Although costs of creating

institutions may prove to be relatively higher in a marketing board setting, we consider that they have been written off since institutions underlying the milk marketing board in Québec have existed for many decades.

In order to structure our analysis, we divided the milk marketing contractual transaction in three main direct transaction costs items: information (I), negotiation (N) and monitoring/enforcement (M) costs (Hobbs [1997]). Information costs occur *ex ante* to an exchange and include information search on products, trading partner and market conditions. Negotiation costs also occur *ex ante* and consist of the cost of realizing the transaction which may include the cost of the negotiation process, contract redaction costs, etc. Monitoring and enforcement costs occur *ex post* to a transaction and consist of the costs necessary for the agreement to be respected. These costs include monitoring, renegotiation, maladaptation, termination and enforcement costs.

The cost of exchange faced by producers when selling their milk to purchasers is represented by the sum of direct transaction costs (C), composed of information (I), negotiation (N) and monitoring (M) costs, for a specific coordination mechanism *j* over a given time period *t*. The variables *i*, *k* and *m* where dropped from the original model since we consider these variables as similar in both coordination mechanisms. The major input is labor as represented by the board staff and farmer time.

$$C_{jt} = \sum (I_{jt}, N_{jt}, M_{jt})$$

5. Methodology and analysis

Data collection

When transposed in an empirical investigation, the methodology used in the present work suggests to choose and define some transaction in detail so that one can measure all resources used to carry out the transaction. In both marketing channels investigated, milk is sold to purchasers on a contractual basis, be it individual or collective. Therefore, we consider the contract used in both settings as the analytical unit. Data collection has been

conducted in a two-step procedure. The first step consisted of interviewing agents from key organizations involved in the marketing of milk and collect information about the contractual process. This first step enabled us to outline the transactional process by determining what happens and when, who is involved and how does it proceed. Given the fact that the amount of administrative costs is available from the marketing board, we could have calculated an estimation of transaction costs based on internal organization expenses. But this method is not precise enough since administration costs encompass many other costs, such as lobbying and promotion costs, having nothing to do with transaction costs as such. We thus undertake the measurement of transaction costs specifically generated when the marketing board contracts with its partners.

The second step consisted of collecting data about resources spent during the transactional process determined in step one. In the case of the marketing board setting, producers may incur transaction costs in basically two contractual relations. First, there is the delegated contractual relation between the marketing board and the purchasers. In order to investigate transaction costs magnitude, we interviewed key marketing board employees involved in the contracting process concerning time and money costs they incurred for each costs items during the last contracting period. Second, there is the representation relation between producers and the marketing board. As we have explained in section 2(*i*), we do not observe commercial transactions at this level and although some transaction costs might be observed, we suppose they are negligible.[5] For the direct contracting setting, we have undertaken a survey of 54 milk producers in England and Wales. A few socio-economic and contractual statistics from our survey are presented in Table 1. The sample was drawn randomly from a list of dairy producers in the *United Kingdom Yellow Pages* and proportionally to the percentage of dairy producers from each region considered. Interviews with a direct selling group and a cooperative were also conducted.

[5] Transaction costs at this level might be observed when the marketing board validates and transmits requests from producers encountering problems with their milk deliveries to purchasers. But these situations are very rare.

Table 1. Statistics from our survey of dairy farms in England and Wales, 2008.

	Producers selling to a cooperative	Producers selling to a private purchaser	Total sample
Observations = 54	43%	57%	100%
Cows/farm	155	189	174
Yield/cow/year (liters)	6451	7815	7202
Number of full-time workers including producer	2,4	2,4	2,5
Contract duration (years)	8,4	5,5	6,8
Notification period (months)	12	9,7	10,7

There are a number of limitations to the transaction costs direct measurement methodology. Some costs may have been omitted because they were difficult to identify or quantify such as opportunity costs. However, our two-step methodology reduces omission since it allowed us to have a good understanding of the two marketing channels and their potential sources of costs. Another limit concerns the use, in studies, of perceptual items evaluated *ex post*. A number of authors in the management literature have noted that retrospective researches are subject to inaccuracies due to the fallibility of informant. Possible biases "*can result from inappropriate rationalizations, oversimplifications, faulty post hoc attributions, and simple lapses of memory*" (Miller et al [1997], Huber and Power [1985]). Our work does not escape this limit but we tried to reduce its impact by combining more than one source of information. Moreover, in the case of England and Wales, we believe that individual producers are more disposed to better remember their own business experience compared to civil servants or employees for instance. Besides these limits and difficulties, the measurement of direct transaction costs offers a precise analysis of the transactional process and allows pinpointing many contract's strengths and flaws that other methodologies cannot provide.

As for the question of how precise estimates of transaction costs need to be, McCann et al. suggest that orders of magnitude should be precise enough since they constitute an improvement over current research (McCann et al. [2005] p.532). They add that when having to choose between precision and accuracy of measurements, researchers should

favour accuracy. Taking into account all types of transaction costs would thus be more valuable than getting precise estimates and ignoring other types of costs.

Time requirements were translated into monetary terms. In both cases, we differentiated salaries according to the position held by the personnel interviewed. In Québec, we used data provided by the marketing board (FPLQ [2008]). These approximations reflect the true costs in Canadian dollars of an employee, that is they encompass the salary as well as work material costs. A per day wage of 350$ for technician, 600$ for professional and 500$ for elected producers were used. In England and Wales, we used the 2005 report of the Royal Association of British Dairy Farmers on costs of farmers' own labour and the Incomes Data survey (IDS) pay benchmark services. We considered marketing as a farm management task and thus used a per hour average wage of £13,70. As for the time horizon delimitation, we considered a five-year period, from 2003 to 2008. This period corresponds to the last MB contracting period.[6]

Results

(i) Information costs

Before negotiating a contract, sellers must usually collect some information about variables of the transaction such as prices, selling conditions and potential purchasers. In the direct contract setting, sellers incur price and purchaser discovery costs. Source of information are numerous: newspaper, word of mouth, Internet information and dairy advisor. However, our results indicate that most producers were whether approached by buyer or got information from word of mouth. These two sources of information imply very low transaction costs. The steps to get in touch with an eventual buyer vary from a simple phone call to individual meetings with purchaser and organized sessions with other producers.

In a marketing board, parties do not have to search for a contractual partner or a price. Contracting partner is known in advance and prices are partly regulated, traders are given

[6] The initial marketing board's contracting period started in 2003 and ended in 2006. However, partners did not consider yet pertinent to renegotiate the 2003 contract.

a range to negotiate. Some professionals have mentioned during interviews that time spent on information search is not very important. On the other hand, the development of a negotiating strategy is important and may generate substantial costs. The development of a strategy consists of determining and denunciating problems encountered in the former contract, documenting the strategy, locating new stakes, and developing a formal initial strategy of negotiation. The renewal of the agreement allows however to recoup these costs.

Table 2 shows the costs results obtained from our calculations for the information phase. In the marketing board setting, we added up transaction costs amount for each type of costs generated over the five-year period, and divided it by the number of producers in 2007 in order to get an average magnitude of transaction costs faced by an individual producer. Empty boxes indicate that no costs are associated with the transaction costs description specified. In the direct contracting setting, we summed up individual data collected and divided them by the number of respondents to get an average amount for an individual producer. We multiplied results obtained by the hourly wage to obtain a monetary data when needed. We only took into account transaction costs incurred after 2003 so as to keep only costs incurred during the five-year period. Hence, some producers that have been contracting for more than five years might incur very low or no transaction costs at all.

Table 2. Information costs faced by producers in milk marketing through marketing boards in Québec and direct contracting in England and Wales, 2003-2008.

Transaction cost	Description	Marketing board Total amount/number of producers	Individual contracting
Information search	Information search	-	(87,42/54)*13,70 22,18£
	Get in touch with an eventual buyer	-	(34,75/54)*13,70 8,82£
	Documenting the strategy and locating new stakes	(6000/7133) 0,84$	-
Strategy development	Determining and denunciating problems encountered in the former contract	(8800/7133) 1,23$	-
	Developing an initial strategy	(9500/7133) 1,33$	-
	Board members agreement if necessary	0$ (no need)	-
Total		**3,40$**	**31,00£**

Source: Marketing board, our survey and our calculations.

(ii) Negotiating costs

Once the information search step finished, parties begin to negotiate contractual terms and thus enter the negotiation cost phase. This second step differs quite a lot among marketing channels, as we shall see.

Within the milk marketing board, parties meet within a negotiation committee composed of the three organizations aforementioned (marketing board, cooperative purchaser organization and private purchaser organization) and supervised by representatives of the Québec Ministry of Agriculture and the regulatory body. The negotiation process can be divided in three phases: negotiation preparation, negotiation sessions as such, and *ex post* sessions analysis, which includes the elaboration of a counter-strategy. Contract negotiation may turn out to be very laborious since parties are engaged in a trilateral negotiation, which introduces important strategic aspects and adds to the task's complexity. Many negotiation sessions are necessary to achieve a final agreement. Twenty-two hours were necessary to conclude contracts signed in 2003. As the negotiation process leads to consensuses, parties draft the contract. Once written,

proposed amendments are submitted to the negotiation committee for validation before the final draft.

During the negotiation process, dissensions can occur. When disagreements arise, parties are first invited to use a process of conciliation. If this stage fails, parties go in arbitration, a more time and resources consuming solution. Costs are however controlled by the use of the regulatory body as an arbiter. If the decision emitted by the regulator is not satisfactory for one of the parties, resort to the provincial superior court is possible. This solution is nevertheless much more expensive for the parties, which must then call upon lawyer services.

In England and Wales, the negotiation process varies upon marketing channels. For contracts negotiated directly with the purchaser, contracts are proposed to the seller. The result is a "take it or leave it" proposition, where the terms of the agreement are set by the purchaser and offered to producers. In the case of farmers contracting through direct selling groups (DSG), the "negotiation" process is rationalized. Concretely, DSG act as "a conduit for communication, and engage as a representative body where changes are desired". [7] These groups do not negotiate contracts as such but they represent their producer-members when contracts are reviewed for instance. Contracts are always signed on an individual basis, which limits the negotiation power of these groups. Finally, cooperative members do not face direct negotiating costs because the cooperative producers' council decides of contracts' terms. However, since contract writing and reviewing creates transaction costs, indirect costs are bore by producers financing the internal administration of the cooperative.

Negotiation costs shown in table 3 have been calculated with the same methodology as the information phase costs.

[7] Source: interview with Dairy Crest Direct, March 2008.

Table 3. Negotiation costs faced by producers in milk marketing through marketing boards in Québec and direct contracting in England and Wales, 2003-2008.

Transaction costs	Description	Marketing board Total amount/number of producers	Direct contracting
Negotiation	Contract reading	-	(28,30/54)*13,70 7,17£
	DSG negotiation	-	(3380£/54) 62,06£
	NFU legal services		87£/54 1,61£
	Negotiation preparation	(8900/7133) 1,25$	-
	Negotiation sessions	(22 000/7133) 3,08$	-
	Ex post session analysis and counter-strategy	(8800/7133) 1,23$	-
	Validation by MB board of directors	(2950/7133) 0,41$	-
Redaction	Contract writing	(9000/7133) 1,26$	0£
	Contract signing	-	(32,50/54)*13,70 8,25£
Dissensions during the negotiation process	Conciliation	(6600/7133) 0,93$	-
	Arbitrage	(13450/7133) 1,89$	-
	Provincial superior court	(6700/7133) 0,94$	-
Total		**10,99$**	**79,09£**

Source: Marketing board, our survey and our calculations.

(iii) Enforcement/Monitoring Costs

The monitoring of the collective contract in the milk marketing board is carried out through various committees created in order to make both regulated contracts more flexible. The negotiation committee involved in the negotiation process is also involved in the supervision of the contract's realization. The technical committee makes sure that the technical aspects (dairy products classification, system adaptation and billing) of the milk transactions are well coordinated. The quality committee is responsible for maintaining and improving the quality of milk throughout the transaction. Finally, the supply committee is in charge of coordinating the supply of milk between producers and

buyers. Renegotiations *ex post* can prove to be very long and expensive for parties because of the regulated nature of the agreement and the process of disputes' settlement. Consequently, the law enabling marketing boards prohibits *ex post* renegotiations. Adaptation to the institutional environment translates into contract quasi-completeness: the parties try to safeguard against all unforeseen possibilities ex ante while inserting additional clauses in the contract at each renewal. The role of committees becomes in that sense essential for the good realization of the agreement, but also for transaction costs minimization purposes.

Most conflicts arising from the realization of the agreement concern the divergences of interpretation on clauses and application of the contract. When these situations occur, parties are invited to undertake a good agreement procedure.[8] If the conciliation process fail, parties go in arbitration and follow the disputes' settlement process as described in the negotiation costs section (*ii*). There have been two arbitrations that ended up to the Québec Superior court during the last five years.[9] Resort to the Superior court constitutes a very expensive solution for both parties.

Monitoring and enforcing costs are not expected to be very high for producers in England and Wales since they do not have the bargaining power or the resources to safeguard their contractual arrangement. Changes made to contracts are not negotiated since the purchaser can modify the price or the selling conditions without the agreement of its suppliers. Renegotiations do not occur frequently but this does not mean that no transaction costs are generated during this phase. In fact, producers might get imposed contractual clauses and conditions that are not always favorable. They may thus be confronted with an opportunity cost because they cannot obtain optimal contractual clauses.

[8] Objections of producers against purchasers are not directly conveyed to them. They are initially subjected to the marketing board and if judged founded, the board notifies the purchaser. As mentioned earlier in this paper, this situation occurs very rarely. The board is in charge of supervising contracts' realization and is often in a better position to detect problems.
[9] RMAAQ Internet website consulted in November 2008.

The main contractual hazards occurring in the *ex post* phase of the transaction in England and Wales are dissensions over the notification periods, changes brought to level the annual production, cases of purchasers' bankruptcies and breaches of contract due to processors' fusions.[10] Recourse to public or private institutions to enforce the agreement is however more the exception than the rule. Reasons subjacent with this low level of recourse are multiple. First of all, the individual producer generally does not have the financial resources necessary to enforce his contract in public courts. Free legal assistance for producers that subscribed to the National Farmer Union (NFU) is however available to partly overcome this difficulty. Second, the fact that contracts are signed on an individual basis and notification periods are usually twelve months does not encourage co-operative behaviors among producers to make pressure on a opportunistic purchasers. In sum, most producers facing contractual hazards simply do not try to enforce their agreement.

Finally, some producers may have to terminate their contract in order to change purchaser. The contract termination process might imply penalties, compensation payments or resort to legal assistance. Termination costs consist in most cases of writing a letter to the buyer, notifying their will to terminate the contract. This task requires about half an hour. However, in a few cases, producers mentioned that they had to pay considerable penalties or compensations when terminating their contracts. In some cases, NFU legal assistance services were used. These services help to decrease individual producer's costs for those who have subscribed. The calculation procedure used to obtained transaction costs magnitude in table 4 is the same as the one used in previous tables.

[10] Source: interview with the NFU October 2007 and MDC 2005.

Table 4. Monitoring/Enforcement costs faced by producers in milk marketing through marketing boards in Québec and direct contracting in England and Wales, 2003-2008.

Transaction costs	Description	Marketing board	Direct contracting
Monitoring	Signature committee	(11 000/7133) 1,54$	-
	Technical committee	(3600/7133) 0,50$	-
	Supply committee	(10 400/7133) 1,46$	-
	Quality committee	(3900/7133) 0,55$	-
Renegotiation	Renegotiation	-	Opportunity cost
Enforcement	NFU Legal services	-	(87£/54) 1,61£
	Private solution	-	(22/54)*13,70+ 300£/54 11,14£
	Statu quo	-	Opportunity cost
	Objections	(4650/7133) 0,65$	-
	Mediation	0$	-
	Arbitrage	(2200/7133) 0,31$	-
	Provincial superior court	(7288/7133) 1,02$	-
Contract termination	Contract termination procedure	-	(37,5/54)*13,70+(39420£/54) 739,51£
Total		**6,03$**	**752,26£**

Source: Marketing board, our survey and our calculations.

6. Discussion

Transaction costs calculations

The summary of our results and some further calculations are presented in Table 5.[11] We calculated the total amount of transaction costs incurred by individual and total producers for both setting over the five-year period.

Marketing board = $C_{MB} = \sum (I, N, M) = 3,40\$ + 10,99\$ + 6,03\$ = 20,42\$$

Direct contracting = $C_{DC} = \sum (I, N, M) = 31,00£ + 79,09£ + 752,26£ = 862,35£$

[11] Detailed calculations are available on request.

In order to compare the magnitude of costs in both countries, we calculated the annual transaction costs' amount as a percentage of total average annual farm revenues. We also converted the results using the 2005 purchasing power parity index[12].

Table 5. Transaction costs incurred by milk producers in MB and direct contracting.

TYPE OF COSTS	MARKETING BOARD		DIRECT CONTRACTING	
Information costs (I)	3,40$	17%	31,00£	3,7%
Negotiation costs (N)	6,03$	54%	79,09£	9,1%
Monitoring/enforcement Costs (M)	10,99$	29%	752,26£	87,2%
Total 2003-2008	20,42$	100%	862,35£	100%
Total all producers 2003-2008	145 656$		11 095 857£	
Purchasing Power Parity 2005	16,88$US		1328,74$US	
Total as a percentage of total average annual farm revenues	(20,42/5)/255 901$ 0,0016%		(862,35/5)/122 329£ 0,14%	

Source: Our calculations.

The difference in transaction costs magnitude in both coordination mechanisms (0,0016% < 0,14%) is significant. The magnitude of transaction costs incurred by producers seems to be almost a hundred times higher for direct contracting than for a marketing board setting. These results corroborate the theory's insights on the potential ability of marketing boards to decrease transaction costs.

Contractual phases

A closer look to the proportion of transaction costs at each contractual phase shows that these proportions differ from one phase to another but relatively little from one organizational mode to another. The transaction costs supported by producers at the information phase are relatively weak in both forms. In Great Britain, these costs are definitively the weakest with 3,7% of the total costs, which tends to validate my observations on the fact that purchasers would be more active than producers during that phase and thus that the latter would support lower costs. In Quebec, these costs are also the weakest and count for 17% of the total costs. Several elements of the collective

[12] The purchasing power exchange rate equalizes the purchasing power of different currencies in their home countries for a given basket of goods.

setting can be evoked to explain this result. The marketing board obliges producers to delegate their contracting operations and the Legislation enabling boards allows the regrouping of the purchasers to negotiate with the board, which reduce the number of interlocutors and the search time of a contractual partner. The costs of searching for milk prices are also minimized because the board establishes price fixing methods. Also, the uninterrupted collection and diffusion of information by the board rationalize the information search costs.

The Negotiation phase's transaction costs count for 29% of the total costs in the marketing board setting and for 9% in direct contracting. In the direct contracting setting, producers do not negotiate their contractual terms as such so their negotiating costs are relatively low. In the marketing board setting, contract negotiation is a long process and implies developing negotiation strategies. These operations increase negotiation costs for the board and indirectly for producers. The outcome of the negotiation is however more favorable to producers than in the direct contracting setting.[13]

Lastly, transaction costs incurred during the enforcement phase are, in proportion, the most important costs of the contracting process in both organizational forms. Within the marketing board setting, these costs account for 54% of the total transaction costs. The high proportion of *ex post* transaction costs in the collective setting is not very surprising. By equilibrating negotiation power between partners, the marketing board gives producers the possibility to enforce their collective agreement with legal means. The resolution of litigations in arbitration with the regulator or at the Québec Superior court generates very high transaction costs, which explain the importance of costs generated at that phase. In Great Britain, the enforcement costs represent 87% of total costs. The proportion of these costs, mostly contract termination costs, is also very considerable compared to the totality of transaction costs. Although English producers do not entail costs of legally enforcing their contract, they face the costs of giving up the agreement enforcement. The Monitoring/enforcement phase is definitely the weakest link of the

[13] The marketing board allow a real negotiation of contractual terms, which is not the case in England and Wales where producers are contract takers.

contractual process and should deserve more attention in a vertical coordination effectiveness improvement's perspective.

Heterogeneity

Our results of transaction costs quantifications and calculations indicate that the extent of transaction costs supported by milk producers is undeniably higher in a direct contractual coordination than in a collective coordination through a marketing board. Another difference between these coordination modes relates to the heterogeneity of costs supported by producers. The collective setting, as its name indicates, is a collective mode of organizing transactions. It allows producers to act collectively to negotiate the conditions of sale of their products, but also to pool the totality of transaction costs among producers.

In Great Britain, the situation is very different. Some producers support very few transaction costs whereas others face very high costs. Producers who changed purchasers several times to get higher milk prices during the last years have to support high *ex ante* transaction costs, but these producers usually benefit from more favorable contractual terms. The heterogeneity of transaction costs found in Great Britain rather comes from *ex post* transaction costs. Producers implied in contractual litigations had important financial losses. In some cases, losses could reach 20.000£ for a single producer. By pooling transaction costs, the marketing board would act like a group insurance for producers.

Opportunity costs

One of the limits associated with the measurement of transaction costs relates to the difficulty of measuring all the costs. Several costs are difficult to identify or quantify like opportunity costs. Our empirical investigations tend to show that these costs indeed exist, especially in the direct contracting setting. More than half of producers contracting with a private processor (52%) have mentioned that they considered accepting whatever contractual terms as a problem or a major problem. The acceptance of an imposed contract can cause opportunity costs. Members of cooperatives probably do not support as high opportunity costs because the imposition of contracts is problematic for about

37% of them. Also, some English producers (10%) have declared that they had problems with their purchaser over sampling, weighing of milk and milk quality loss during transport. These problems can also be the sources of opportunity costs that are difficult to quantify. In the marketing board setting, complains about contracts or occurrence of contractual hazards are very rare. Moreover, the marketing board has developed a program that obliges purchasers to contribute to a specific insurance, managed by the regulator, which pays producers in case of a purchaser's bankruptcy or payment failure.

Low transaction costs

The last point that I would like to discuss here relates to the small proportion of transaction costs compared to the average annual incomes of dairy farms. Québec dairy producers face, on average, transaction costs equivalent to 0,0016% of their annual dairy incomes and English producers, 0,14%. The few studies that have measured transaction costs indicate that these costs are considerable and that they are likely to affect agents' competitiveness. Our results indicate that transaction costs are quite weak in both hybrid milk coordination modes meaning that they should not affect seriously the competitiveness of the dairy industry. This result is somehow surprising since the literature is rather unanimous on the subject: "transaction costs matters". Two interpretations can explain this result. First of all, the methodology used to measure transaction costs might underestimate the importance of these costs as well as opportunity costs. Second, the low level of transaction costs might also mean that both organizational forms are adequate to coordinate raw milk transactions. According to this assumption, collective and direct contracting, as hybrid forms, would both minimize transaction costs supported by producers.

A comparison between two very different coordination modes, such as the spot market and vertical integration for example, would undoubtedly have given more distinct results. The study of Gabre-Madhin, which measures transaction costs supported by producers coordinating their grains' sales on the spot market shows that the magnitude of transaction costs can be considerable through this coordination mechanism. In the dairy industry, the quasi-absence of market coordination and vertical coordination for raw milk

transactions is perhaps due to the fact that coordinating milk through a spot market or an integrated firm generates very high transaction costs. The widespread use of various hybrid forms such as co-operatives, short-term automatically renewable contracts, long-term contracts and marketing boards in the dairy sector might indicate that these coordination modes are the most effective in minimizing transaction and production costs.

7. Conclusion

Understanding the importance of transaction costs in raw milk marketing is interesting for at least two reasons: first, there is a paucity of literature on direct measurement of transaction costs in Agrifood marketing; and second, there is a need to assess the performance of different organizational arrangements in terms of vertical coordination efficiency. This last reason is especially true for marketing boards since their role in the vertical coordination of agricultural products and their related performances are controversial.

The objective of this study was to contribute to the debate on whether marketing boards have the capacity to decrease transaction costs faced by agricultural producers. Our main contribution would thus be the following: the Québec milk marketing board has the ability to decrease transaction costs faced by producers and to act as collective insurance against transaction costs. It allows a more transparent contract negotiation process and gives producers more persuasive enforcement tools than the direct contracting setting, but also spreads the amount of total transaction among producers which is by itself a contractual hazard mitigation.

There are still many open issues over milk marketing transactional performance not tackled in this paper, which may provide substance for subsequent work. The direct measurement of transaction costs faced by purchasers, by the government (through its ministry of agriculture) and the regulator also has to be scrutinized in order to evaluate the overall transactional efficiency of marketing boards. The stickiness of the marketing

board's coordination is another issue that deserve attention since many supply chain agents have mentioned that this type of transaction organization would greatly alter the market incentives and consequently the transactional performance of boards as coordination devices.

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