

Transaction costs in milk marketing: a comparison between Canada and Great Britain

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Abstract

This study measures the magnitude of transaction costs incurred by milk producers in their contractual relations with dairy processors in two different coordination mechanisms: centralized contracting through a marketing board and decentralized bilateral contracting. Interviews and surveys were conducted to estimate transaction costs faced by producers marketing through the Québec milk marketing board in Canada and bilateral contracts in England and Wales in the United Kingdom using the measurement methodology of the cost of exchange. Our results show that the relative magnitude of transaction costs incurred by producers across both settings is quite low, which indicates that both hybrid coordination mechanisms minimize transaction costs in the dairy sector. However, results from the bilateral contracting setting indicate a strong heterogeneity of transaction costs levels among farmers. In that respect, the milk marketing board and its institutional setting would act as a collective insurance, pooling transaction costs and sharing them among producers. Our analysis leads to recommendations on bilateral contracting.

JEL classifications: B4, D02, L14, Q13

Keywords: Transaction cost; Marketing board; Contracts; Measurement methodologies; Institutions; Dairy sector

1. Introduction

For the last two decades, vertical linkages in the value chains of many agrifood sectors have tightened. This phenomenon is at the origin of a growing interest among scholars and practitioners for questions related to vertical coordination and the organization of transactions. In Canada, the vertical coordination of products between producers and their downstream partners is done through marketing boards in many agricultural sectors. In the province of Québec, for instance, 90% of the total agricultural proceeds were marketed through marketing boards in 2008.¹ 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 is a large number of studies on the economical efficiency of boards (Barichello, 1981; Beck et al., 1994; Fulton and Tang, 1999; Richards, 1996) but to the best of our knowledge, it seems that none of them have focused on the role of these organizations on vertical coordination or their influence on transaction costs. Some scholars have mentioned the potential advantages of boards in economizing on transaction costs and rationalizing some marketing operations (Johnson, 2000; St-Louis and Proulx, 1978; Westgren, 1994) but we are not aware of any empirical study that has been done to clarify the issue. The recent interest in vertical coordination efficiency is a good occasion to revisit the performance of marketing boards from a different perspective. In their study on vertical linkages within agrifood value chains, Hobbs and Young (2001) suggest analyzing 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

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Data Appendix Available Online

A data appendix to replicate main results is available in the online version of this article. Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting information supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.

¹ In 2008, there were 21 marketing boards involved in the marketing of agricultural, fishing, and timber products in Quebec.

costs in the value 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 article 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. Since all milk produced in Canada has to be marketed through boards, bilateral contracts prevalent in England and Wales are examined for comparison purposes. That way, our article overcomes a transaction costs economics’ basic selection problem. Generally, one only 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 evolving in similar technological, economic, and institutional environments. Using transaction cost economics (TCE) (Coase, 1937; Williamson, 1985) and developing a methodology based on previous similar works (Benham and Benham, 2005), this study identifies transaction costs associated with alternative marketing channels in order to: (1) estimate the magnitude of transaction costs incurred by producers and (2) explain the disparity among marketing channels.

Results show that transaction costs incurred by Québec producers are slightly lower than English producers but also, that the relative magnitude of transaction costs across coordination mechanisms remains very low. The genuine advantage of marketing boards, as far as transaction costs are concerned, would rather lie in their ability to pool transaction costs among producers so as to act like a collective insurance against circumstantially high transaction costs. Indeed, our analysis shows that bilateral contracting leads to a strong heterogeneity of *ex post* transaction costs magnitudes, which may threaten the survival of dairy farms facing major contractual hazards. Although applied to specific contexts, our study may bring some useful insights to the current policy trend in Europe. As a matter of fact, considering the growing interest of the European authorities toward contracting as a regulation tool in substitution to dairy quotas, our results highlight the possible future producers’ challenges and the importance of an adequate institutional framework to minimize producers’ transaction costs in a bilateral contracting setting.

2. Coordination mechanisms

The two coordination mechanisms considered in this article are the milk marketing board of the province of Québec (Canada) and bilateral contracts in England and Wales (Great Britain). The Canadian and British cases provide appealing comparative grounds since both countries have comparable public institutions and similar milk industries. They show relatively similar technology levels, production modes, consumption patterns, and market structures. Both dairy regions are

Table 1

Socioeconomic characteristics of the Québec and Great Britain dairy sectors, 2005

	Québec	England and Wales
Number of producers	7422	14,732
Number of processors	117	81
Processor concentration ¹	8%–65%	21%–87.5%
Cow productivity	7549 ⁵	6983 ²
Cows per farm	51.6	(111 ³ /96 ⁴) ⁵
Liquid milk consumption <i>per capita</i>	94.7 ⁶	111.2 ²

¹Since data available on processing firms were aggregated, we could not calculate a Herfindahl index. We present the calculation of the concentration of the most important firms processing more than 100 million liters of milk per year. In Québec, these firms account for 8% of total firms and process 65% of all milk. In Great Britain, they account for 21% and process 87.5% of total milk.

²For United Kingdom.

³For England.

⁴For Wales.

⁵For 2006.

⁶For Canada.

Sources: Ageco (2007) and Milk Development Council (2007).

supported by well-developed extension services, research and development institutions, and union organizations. Table 1 displays some of the socioeconomic characteristics of the milk sector in both regions.

The general institutional framework of both countries is also similar since Canada has adopted most British public institutions. The Constitution of Canada, the parliamentary and judiciary system, and the commercial law are all derived from the British ones. However, when it comes to the milk sector, important differences appear. In Canada, all milk producers are constrained to sell their milk through provincial marketing boards, which negotiate contracts with milk buyers. To be effective, these boards have to be framed by a specific institutional setting. In the United Kingdom, producers were also constrained to sell to a marketing board until 1994. Milk marketing boards were, however, dismantled after a decrease in their efficiency following a series of institutional and organizational changes imposed by the European Union to fit the Common Agricultural Policy in 1973 and by the introduction of quotas in 1984 at the European level (Doyon et al., 1999). Since then, producers contract directly with private processors or cooperatives to sell their milk.

2.1. The milk marketing board in Québec, Canada

Better known in the economic literature for their horizontal coordination effects than their vertical coordination activities, marketing boards are granted with delegated powers from the state allowing 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 supervising boards' activities. This authority also acts as a quasi-judicial specialized court when disputes among parties arise. The Québec milk marketing board, created in 1981, displays a wide array of functions ranging from promotional activities to negotiation, centralized selling, and supply management.

The Québec milk marketing board alters substantially the individual process of milk marketing at the producer level. Instead of contracting directly with a dairy processor, producers delegate all their contractual operations to a producer board composed of elected producers and professional staff. Marketing milk outside the board is illegal and is liable to lead to a dissuasive fine. Dairy cooperatives and processing investor-owned firms, hereafter called private purchaser, use a similar delegated configuration. Thus, three main agents take part in the contractual process: the producer board, the organization representing private purchasers, and the organization representing cooperative purchasers. The producer board contracts with both purchasers' organizations simultaneously, which implies that only two contracts are signed to coordinate the total milk production of the province of Québec. Both negotiated contracts are signed for a three-year period but are often extended. Contracts 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 (Fig. 1). Transaction costs generated by milk transactions are therefore basically borne by the three organizations aforementioned.

2.2. *Bilateral 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 bilateral contracts between producers and purchasers. Producers can choose to sell their milk through three alternative marketing channels: direct contracting with a milk purchaser; direct contracting with a milk purchaser supervised by a direct selling group (DSG); and contract with a cooperative as a member (Franks, 2001, p. 633). Since processing capacities of cooperatives are limited, they sell their milk surplus to private processors. There are thus two types of contractual relations down the dairy chain: contracts between producers and private processors, and contracts between cooperatives and private processors (Fig. 2). We will not take into account the latter relation since it belongs to a secondary channel and it concerns only 27% of total milk marketed. Moreover, in this article, we seek to compare two significantly different organizational forms while cooperatives' organizational nature is similar in many respects to marketing boards.

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 developed by purchasers and offered to producers. These latter are thus contract takers. Some contracts between producers and private buyers are negotiated through a DSG. The main role of these groups is to rationalize producers' and processors' communications, and simplify the renegotiation of contracts. No statistics on their prevalence are available to appreciate their importance. Franks (2001, p. 632) notes, however, that approximately 12% to 15% of the producers would negotiate their contracts through dairy groups.

3. Theoretical framework

3.1. *Transaction costs*

TCE makes the assumption that exchanges are not costless. Transaction costs are the costs resulting from property rights transfers between agents. Transaction costs theory is based on what Williamson (1985) 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 transactions that minimize the cost of exchange.

One of the major critics against TCE concerns the gap between remarkable theoretical developments and the paucity 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). By using propositions based on characteristics of transactions and not directly on the level of costs, the transaction costs theory 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).

Beyond this debate, it remains that the lack of empirical evaluations of transaction costs is nevertheless not surprising. Researchers that try to evaluate directly the magnitude of transaction costs have to overcome many difficulties.² First, there is no theoretical consensus over what are precisely transaction costs (Allen, 1991; Hobbs and 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 of separating transaction and production costs. Third, if transaction costs are very high, some transactions might not take place. Opportunity costs of alternatives would preferably have to be taken into account and these costs are not easily identifiable or quantifiable.

² For a more complete description of transaction costs estimations difficulties, see Benham and Benham (2005).

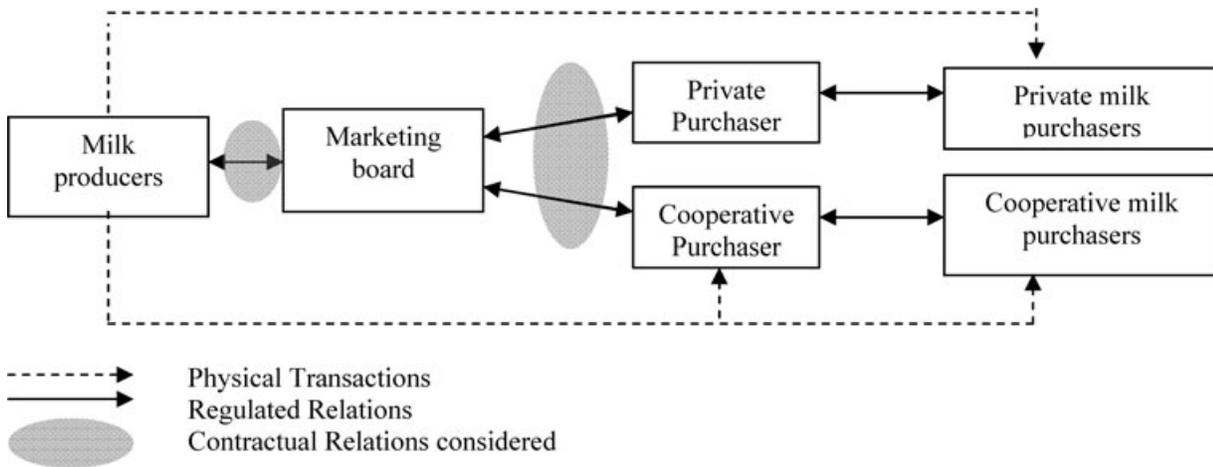


Fig. 1. Representation of physical transactions, contractual and regulated relations in the Québec milk marketing board.

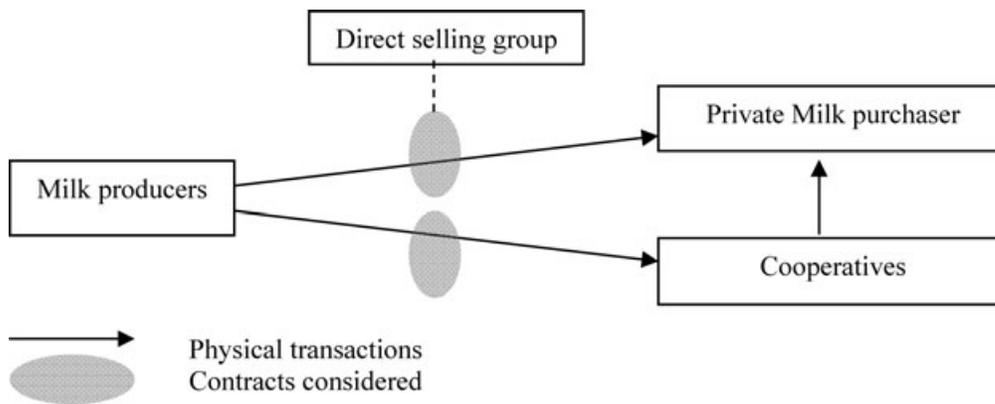


Fig. 2. Representation of physical transactions, and contractual and regulated relations in England and Wales.

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 firms' standard accountancy practices. The lack of transaction costs empirical estimates on their relative magnitude and variation across settings is puzzling. Filling this deficiency could surely improve transaction costs empirical research and it would broaden our understanding of various coordination mechanisms.

3.2. Transaction cost measurement in the literature

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. This methodology is especially suitable for the financial and transactional sectors. 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 U.S. transaction sector. Our present research falls within another research program, which considers 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 (Falconer, 2000; Kuperan et al., 1998; McCann and Easter, 1999; McCann et al., 2005; Mettepenningen et al., 2009). These studies focus on evaluating the magnitude of transaction costs associated with the conception and implementation of diverse public policies. Another set of studies are investigating the costs of transactions that private traders face. Benham and 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 interfirm relations in the agricultural sector, studies are relatively scarce.³ The study that resembles most what we intend to do here is the one done by Gabre-Madhin (2001) who measured the costs of labor 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 transaction costs. Although applied to a developing country with a different institutional setting, this article suggests that transaction costs faced by private traders can 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 used in developed countries. 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 through different coordination mechanisms.

4. Analytical framework for milk marketing

4.1. Determinants of transaction costs

Milk producers face numerous transaction costs when contracting with their downstream partners of the value chain but very few works have investigated the possible determinants of transaction costs in the case of milk marketing. There are even fewer empirical studies that examine their relative importance. Previous studies (Compres Lopez, 2007; Dieye, 2006) and our empirical observations of the sector indicate that transaction costs in milk marketing arise mainly from various uncertainties and the temporal specificity of milk transactions. Partners may engage in costly activities in order to attenuate uncertainty, thus generating transaction costs.

Milk producers face different 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 receive before final milk delivery. Producers also face behavioral uncertainty from unbalanced negotiating power due to a generally oligopsonistic market structure in the milk sector and temporal specificity due to the perishable nature of milk, which translate into contractual commitment and enforcement uncertainties. The partners' bilateral dependency created by transactions temporal specificity is an important determinant of transaction costs in the presence of potential opportunistic behaviors. Finally, producers have to deal with information asymmetry over quality grading and classification since dairy processors usually perform these tasks.

Based on the determinants of transaction costs in milk marketing, we make the hypothesis that the milk marketing board, by reducing producers' environmental and behavioral uncertainty, should be more effective in minimizing transaction costs faced by producers than bilateral contracts. As a matter of fact, the Québec milk marketing board sets a range of prices to negotiate with buyers, which decrease price uncertainty; the collective negotiation decreases the uncertainty related to the unbalanced partners' bargaining powers; the board has created diverse mechanisms to monitor buyers' utilization of milk, mitigating information asymmetry over product grading and weighting; and the regulatory body operates a payment guarantee program that protects producers against buyer insolvency. The collective coordination mechanism should therefore have a greater producers' transaction costs minimization's capacity than bilateral contracting.

4.2. 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. We decided to use this methodology because it is the one that best suits our needs for measuring transaction costs incurred by private agents in an exchange. In that methodology, a subset of the total costs generated in a transaction is examined. This subset, designated as the COE, 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). Also, similar to 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. On the one hand, these costs are often very difficult to quantify, and on the other hand, we make the hypothesis that these costs offset each other in the comparison. Moreover, the cost of developing the framing institutions such as courts in England and the marketing board legislation in Canada have most likely been paid off since their inception. We are aware that this is a strong and arguable hypothesis and that our results must be interpreted accordingly, but measuring these costs would have been a colossal and often impossible task to perform.

In order to structure our analysis, we divided the milk marketing contractual transaction into three main direct transaction costs items: information (I), negotiation (N), and monitoring/enforcement (M) costs. Information costs occur *ex ante* to an exchange and include information search on products, trading partner, and market conditions. Negotiation costs also

³ A few papers have estimated transaction costs in the agrifood sector (see Hobbs, 1997; Key et al., 2000) but the methodologies used are different from what we intend to do in this article.

occur *ex ante* and consist of the cost of realizing the transaction, which may include the cost of the negotiation process, contract redaction, etc. Monitoring and enforcement costs occur *ex post* to the signature of the contract and consist of monitoring, renegotiation, maladaptation, termination, and enforcement costs.

5. Methodology and analysis

5.1. Data collection

When transposed in an empirical investigation, the methodology used in this 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, conducted during the fall 2006 and 2007, consisted of interviewing representatives from key organizations involved in the marketing of milk and collecting 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 marketing board's income statement is available, we could have estimated transaction costs based on internal organization expenses. However, this method would not have been accurate enough since expenses consist mainly in costs that are not transaction costs *per se* such as lobbying and milk promotion costs. 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 1. 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. Second, there is the representation relation between producers and the marketing board. Transaction costs at this level are observed when the marketing board validates and transmits requests from producers encountering problems with their milk deliveries to purchasers, as well as when there are litigations between producers and the board. In order to investigate transaction costs magnitude, we interviewed, during fall 2007, key marketing board employees involved in the contracting process concerning time and monetary expenses they incurred for each cost item during the last contracting period.

For the bilateral contracting setting, we undertook a telephone survey of 62 milk producers in England and Wales throughout spring and fall 2008. A few socioeconomic and contractual statistics from our survey are presented in Table 2. The sample was drawn randomly from a list of dairy producers in the United Kingdom Yellow Pages. Interviews with a DSG and a cooperative were also conducted.

Table 2
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 = 62	42%	58%	100%
Average cows/farm	154	181	169
Yield/cow/year (liters)	6924	8031	7341
Number of full-time workers including producer	2,4	2,4	2,4
Contract duration (years)	8,6	5,7	6,9

Source: Data obtained from our survey, 2008.

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 potential omissions 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 (Huber and Power, 1985; Miller et al., 1997). Our work does not escape this limitation but we tried to reduce its impact by combining more than one source of information when possible and by only using data from recent years (<5 years). Moreover, in the case of England and Wales, we believe that individual producers are more disposed to better remember their own business experience than civil servants or employees for instance. Besides these limits, the measurement of direct transaction costs remains a relevant exercise. It opens the black box of the contracting process' and allows us to pinpoint many contracts' strengths and flaws that other methodologies cannot provide.

Time data collected were translated into monetary terms. In the marketing board setting, we differentiated salaries according to the position held by the staff interviewed. Per-day wages of 350 Canadian dollars (CAD) for technician, CAD600 for professional, CAD1,500 for a lawyer, and CAD500 for elected producers were used. These wage data encompass the salary as well as work material costs.⁴ In England and Wales, we used the 2005 report of the Royal Association of British Dairy Farmers on costs of farmers' own labor. We considered contracting as a farm management task and thus used a per hour average wage of £13.70 (RABDF, 2005). As for the time horizon delimitation, we considered a five-year period, from 2003 to 2008. This period corresponds to the last marketing board contracting period.⁵ In order to compare the magnitude of costs in both

⁴ These data were provided by the Fédération des producteurs de lait du Québec.

⁵ The initial marketing board's contracting period started in 2003 and was supposed to end in 2006. However, this period was extended and both contracts were still valid in 2008.

Table 3

Information costs faced by producers in milk marketing through marketing boards in Québec and bilateral contracts in England and Wales, in CAD and British Pounds, 2003–2008

Transaction cost	Description	Marketing board Total amount/number of producers	Individual contracting
Information search	Information search	–	$(94.92/62) \times 13,70$ £20.97
	Get in touch with a buyer	–	$(36.75/62) \times 13.70$ £8.12
	Documenting the strategy and locating new stakes	(6000/7133) \$0,84	–
Strategy development	Determining and denouncing problems encountered in the former contract	(8800/7133) \$1.23	–
	Developing an initial strategy	(9500/7133) \$1.33	–
	Board members' agreement if necessary	\$0	–
	Total	\$3.40	£29.09
Purchasing power parity 2005		US\$2.81	US\$44.82

Source: Marketing board, our survey, and our calculations.

countries, we converted the results with the 2005 purchasing power parity exchange rate.⁶

5.2. Results

5.2.1. Information costs

Before negotiating a contract, sellers must usually first collect some information on the transaction such as prices, selling conditions, and potential purchasers and second, get in touch with the chosen partner. In the bilateral contract setting, producers incur price and purchaser discovery costs. Source of information are numerous: newspaper, word of mouth, Internet, and dairy advisors. Results from our survey indicate that most producers were either approached by a particular buyer or obtained 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 the purchaser and assisting to sessions organized by the buyer.

In a marketing board, parties do not have to search for a contractual partner or a price. The contracting partner is known in advance and prices are partly regulated; traders are given 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 negotiation strategy is important and may generate substantial costs. The development of a strategy consists of determining problems encountered in the former contract, locating new stakes, and developing an initial negotiation strategy.

Table 3 shows the information costs magnitude obtained from our calculations. In the marketing board setting, we added up transaction costs amount for each type of cost generated over

the five-year period, and divided it by the number of producers in 2007 (7,133 producers) 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 bilateral contracting setting, we added individual time 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. For instance, the 62 English farmers interviewed spent a total of 94.92 hours in information searching, which average 1.53 minutes per producer ($94.92/62$ producers) and represents £20.97 ($1.53 \times £13.70$). We only took into account transaction costs incurred after 2003 so as to keep only costs incurred during the five-year period. Some producers that have been contracting for more than five years with the same buyer might incur very low or no transaction costs at all.

5.2.2. Negotiating costs

Once the information search step is finished, parties begin to negotiate contractual terms and enter the negotiation phase. This second step differs quite a lot among marketing channels, as shown in this article. In 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, and *ex post* sessions analysis, which includes the elaboration of a counterstrategy. 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

⁶ The purchasing power exchange rate equalizes the purchasing power of different currencies in their home countries for a given basket of goods. In 2005, the coefficients for the Canadian dollar and the U.K. pound sterling relative to the U.S. dollar (1.0) were respectively, 1.21 and 0.649.

Table 4
Negotiation costs faced by producers in milk marketing through marketing boards in Québec and bilateral contracts in England and Wales, in CAD and British pound, 2003–2008

Transaction costs	Description	Marketing board Total amount/number of producers	Direct contracting
Negotiation	Contract reading	–	$(41.50/62) \times 13.70$ £9.17
	NFU legal services		£87/62 £1.40
	Negotiation preparation	(8900/7133) \$1.25	–
	Negotiation sessions	(22 000/7133) \$3.08	–
	<i>Ex post</i> session analysis and counterstrategy	(8800/7133) \$1.23	–
	Validation by MB board of directors	(2950/7133) \$0.41	–
	Contract writing	(9000/7133) \$1.26	£0
Redaction	Contract signing	–	$(31.25/62) \times 13.70$ £6.90
	Conciliation	(6600/7133) \$0.93	–
Conflict during the negotiation process	Arbitrage	(13450/7133) \$1.89	–
	Provincial superior court	(6700/7133) \$0.94	–
Total		\$10.99	£17.47
Purchasing power parity 2005		US\$9.08	US\$26.92

Source: Marketing board, our survey, and our calculations.

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 is written.

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 into 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 reached by the regulator is not satisfactory for one of the parties, resort to the Québec provincial Superior Court is possible. This solution is nevertheless much more expensive for the parties, which must then call upon legal services.

In England and Wales, private and cooperative purchasers propose contracts to producers. 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. We expect negotiation costs to be very low in that setting. Moreover, purchasers assume contract-writing costs. Direct-selling groups are not involved in this contracting phase. Negotiation costs shown in Table 4 have been calculated with the same methodology as the information-phase costs.

5.2.3. Enforcement/monitoring costs

The monitoring of the collective contract in the milk marketing board is carried out through four committees (negotiation, technical, quality, and supply) created in order to make

regulated contracts more flexible.⁷ Renegotiations *ex post* can prove to be very long and expensive for parties because of the regulated nature of the agreement and the disputes’ settlement process. 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.

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 fails, parties go into arbitration and follow the disputes’ settlement process as described in the negotiation costs section (Section 2). There have been two arbitrations

⁷ 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.

⁸ Objections of producers against purchasers are not directly conveyed to them. They are initially subjected to the marketing board and if considered relevant, the board notifies the purchaser.

Table 5

Monitoring/enforcement costs faced by producers in milk marketing through marketing boards in Québec and bilateral contract in England and Wales, in CAD and British Pound, 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	–
Enforcement	NFU legal services	–	(£87/62) £1.40
	Private solution	–	(22/62) × 13.70 + £10387/62 £172.39
	<i>Status quo</i>	–	Opportunity cost
	Objections	(4650/7133) \$0.65	–
	Mediation	\$0	–
	Arbitrage	(3400/7133) \$0.48	–
	Provincial superior court	(7288/7133) \$1.02	–
Contract termination	Contract termination procedure	–	With bonus losses (48/62) × 13.70 + £123,170/62 = £1997.22
			Without bonus losses (48/62) × 13.70 = £10.60
Total		\$7.29	£2171.01
Purchasing power parity 2005		US\$6.02	US\$3345.16

Source: Marketing board, our survey, and our calculations.

that ended up to the Québec Superior court during the last five years.⁹ Resort to the Superior Court can prove to be a quite expensive solution for both partners. Also, there have been five conflicts involving producers and their board over the same period.

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 financial resources to safeguard their contractual arrangement in courts. Legal assistance for producers that subscribed to the National Farmer Union (NFU) legal assistance service is, however, available to partly overcome this difficulty. Renegotiations do not occur frequently since the purchaser can modify the price or the selling conditions without the agreement of its suppliers. The main contractual hazards occurring during the *ex post* phase of the transaction in England and Wales are dissensions over prices paid, notification periods, changes brought to level the annual production, cases of purchasers' bankruptcies, and breaches of contract due to processors' fusions.¹⁰

Finally, some producers may want 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 in which they notify their will to terminate the contract. In a few cases, producers mentioned that they had to pay considerable penalties or compensations when terminating their contracts. Since considering bonus losses as transaction costs might be subject to debate, we decide to present the results with and without these costs. When taken into account, bonus losses rise up substantially the enforcement phase costs over the five-year period. We computed the NFU legal assistance services' cost whenever producers used them. The calculation procedure used to obtain transaction costs magnitude in Table 5 is the same as the one used in previous tables.

6. Discussion

6.1. Transaction costs calculations

The summary of our results and some additional calculations are presented in Table 6. We calculated the total amount of transaction costs incurred by an individual producer for both settings over the five-year period.

The difference in transaction costs magnitude across coordination mechanisms (US\$17.92 < US\$355.87/3, US\$3701.03 with bonus losses) seems to be significant. These results corroborate our insights on the potential ability of marketing boards

⁹ RMAAQ (2008).

¹⁰ Source: interview with the NFU October 2007, MDC (2005), and our survey results.

Table 6.
Transaction costs incurred by milk producers in the Québec milk marketing board and direct contracting in Great Britain, in CAD, British Pound and US\$, 2003–2008

Types of costs	Marketing board		Bilateral contracting			
			Without bonus losses		With bonus losses	
Information costs (I)	3.40\$CAN	16%	29.09£	12%	29.09£	1%
Negotiation costs (N)	10.99\$CAN	50%	17.47£	8%	17.47£	1%
Monitoring/enforcement costs (M)	7.29\$CAN	34%	184.40£	80%	2171.01£	98%
Total 2003–2008	21.68\$CAN	100%	230.96£	100%	2217.57£	100%
Purchasing power parity 2005	17.92\$US		355.87\$US		3416.90\$US	
As a percentage of dairy farms average annual revenues	(21.68/5)/CAD258,477		(230.96/5)/£118,659		(2217.57/5)/£118,659	
	0.0017%		0.039%		0.4%	

Source: Our calculations.

to decrease transaction costs. Moreover, although some transaction costs measures might be approximate, the importance of the cost difference between the two settings allow us to conclude on the capacity of the milk marketing board to reduce transaction costs faced by producers.

6.2. Contractual phases

A closer look at the magnitude of transaction costs at each contractual phase reveals the strengths and weaknesses of both organizational structures' ability to minimize transaction costs. In Great Britain, negotiation costs are the lowest transaction costs with a share of 8.5% of total transaction costs. We expected the negotiation costs to be rather low in Great Britain since there is no negotiation as such. Enforcement costs are the highest costs with 80% of total costs (98% if bonus losses are taken into account). The proportion of these costs is quite considerable and consists mostly of enforcement costs or contract termination costs if we consider bonus losses. Although English producers do not entail legal contract enforcement costs since they consider courts too expensive, they engage in costly private solutions.

In the marketing board setting, the lowest costs are information costs with 16% of the total costs. These costs are low since the marketing board forces producers to delegate their contracting operations, which rationalizes the number of interlocutors and time required to search for a contractual partner. The negotiation costs are the highest and account for 50% of the total costs. Contract negotiation in the marketing board setting implies developing negotiation strategies, which is a long and costly process. Enforcement cost (34%), although lower than negotiation costs, are according to market participants interviewed, seriously increasing. Considering that these costs may become higher in the future for producers selling their milk through a board, and considering the proportion of these costs in the bilateral contracting setting, we conclude that the enforcement phase is definitely the weakest link of the contractual process in both coordination mechanisms. Policy makers and authorities should therefore pay specific attention to these costs in the future.

6.3. Relative importance of transaction costs

Although transaction costs seem to be lower in the marketing board setting, the relative magnitude of transaction costs across organizational forms is nevertheless very low, which challenges the actual transaction costs minimization effectiveness of boards. Transaction costs account for 0.0017% of the annual revenues of an average dairy farm in Québec and 0.039% (0.4% when bonus losses are considered) in England and Wales over the five-year period.¹¹ The few studies that have measured private transaction costs indicate that these costs are generally considerable and that they are likely to affect agents' competitiveness. Our results indicate that transaction costs are quite low in both coordination modes meaning that they should not seriously affect the competitiveness of the dairy industry. This result is somehow surprising since the literature is rather unanimous on the issue: "transaction costs matter." Two reasons can be given to interpret this result. First of all, the methodology used to measure transaction costs and the difficulties associated with measuring some costs might underestimate their importance, notably opportunity costs and indirect transaction costs. Second, the low level of transaction costs might also mean that both organizational forms considered are adequate to coordinate raw milk transactions. Our results and observations lead us to conclude that transaction costs have most probably been underestimated in both settings but that they still remain very low compared to less coordinated settings or other agricultural sectors. The dairy sectors of both regions have reached a high level of institutional, technological, and behavioral stability that allows transaction costs minimization.

6.4. Heterogeneity among farmers

Considering this outcome, it seems that the main difference between both settings would lie not in their respective capacity to decrease transaction costs but rather in the heterogeneity of

¹¹ The average revenue is based on the average values of prices, number of cows per farm, and cow yields in 2006 in both regions with the following calculation. In Québec: (\$0.6424/liter × 53.3 cow × 7,549 liters/cow) = CAD258,477 (Ageco, 2007). In England and Wales: (£0.1795/liter × 97 cow × 6,815 liters/cow) = £118,659 (MDC, 2007).

transaction costs magnitude incurred by individual producers. As a matter of fact, in bilateral contracts, the disparity of transaction costs faced by each producer is quite large. Some producers incur very low transaction costs, if not at all, whereas others face very high costs. For instance, producers implied in contractual litigations, which concerned 14 producers interviewed (23% of our sample), had financial losses varying from £29 to £10,000. Also, our survey reveals that 10 producers (16% of our sample) had to incur contract termination costs varying from £200 to £45,000. For these producers, transaction costs indeed matter. Producers incurring high contract termination costs show similar characteristics to the rest of the sample (150 cows; 7,355 liters/cow/year; 2.2 full-time workers), which does not allow us to conclude on possible socioeconomic determinants of these costs. This situation does not happen in the marketing board setting. Marketing boards being a collective mode of coordinating transactions, they allow producers to collectively negotiate the conditions of sale of their products, but also to pool the totality of transaction costs among them. By doing so, marketing boards provide a transaction costs insurance for producers against especially high *ex post* transaction costs.

7. Conclusion

Evaluating directly the importance of transaction costs is not a widespread approach for analyzing coordination mechanisms but it has the advantage of opening a black box that allows a better understanding of where and how the main contracting costs during the exchange process are generated. Knowing the precise sources of transaction costs and their magnitude might be useful for any agent that wants to improve the efficiency of a specific coordination mechanism or assist a specific category of economic agents. Our investigation demonstrates that by analyzing in detail the dairy producers' transactional process, we could find that the main difference between marketing milk through a marketing board and individual contracts in terms of transaction costs was the heterogeneity of transaction costs' levels borne by producers. While on average transaction costs were relatively low across both settings, a few English producers incurred very high transaction costs that could eventually threaten the farm's short-term viability. This issue has recently been very problematic for producers who had a contract with Dairy Farmers of Britain Limited (DFoB) when the cooperative faced serious financial problems and announced its liquidation in June 2009. Members supplying milk to DFoB had to incur very high transaction costs, notably the amount of their May milk deliveries, which averaged £10,000 to £15,000 per farm, and their investments in the cooperative, which approximated £50,000 according to NFU estimates (House of Commons, 2009). A farmer mentioned he had lost "circa £120,000 in terms of capital investment and bad debt," and added "Effectively, it means that [. . .] I would have to work for two years for nothing" (House of Commons, 2009, p. 27). In a marketing board setting, for instance, the payment guarantee program,

financed by all producers, acts as an insurance against such transaction costs.

Considering the potential advantages of marketing boards in reducing transaction costs and acting as insurance why are contracts more widespread than boards? Before answering this question, we must underline that our article does not pretend to conclude on the overall transactional effectiveness of marketing boards and that this issue represents potential further research topics. For instance, transaction costs faced by buyers should be assessed. Since marketing boards are producer-oriented organizations, it is not obvious that marketing boards can lead to a reduction of transaction costs borne by processors. Indirect transaction costs can also be more deeply investigated, notably the cost of using the regulatory body disputes' settlement services in the marketing board case. There are at least two major reasons that explain the prevalence of contracts over marketing boards. First, marketing boards need a specific institutional framework to be effective and this legislative setting requires support from politics as well as set-up costs that public leaders are no longer willing to assume considering their political and economic agenda. Second, a trade-off must be operated between transaction costs and governance costs, the costs of internalizing transaction costs. In that respect, marketing boards introduce some rigidities¹² in the value chain coordination process due to their hierarchical nature, and are facing several challenges to respond more quickly to market demands. Marketing boards are thus not the optimal economic solution for all settings.

Our results can bring some useful policy insights, especially in the context of the current agricultural policy trend in Europe. European authorities have recently shown a keen interest in contracting as a regulation tool substituting dairy quotas. If contracting should become the rule in milk transactions coordination, our study suggests that policy makers should design an institutional framework that will minimize *ex post* transaction costs faced by farmers since these latter tend to be locked by the temporal specificity of transactions in their contractual relations with buyers and have a lower bargaining power. Also, since negotiation might be more advantageous to buyers for the same reasons, information on prices and buyer reputation should be available to producers to choose from the best options to minimize their transaction costs.

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¹² According to many practitioners familiar with marketing boards.

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