

Conditions for structural change in the Macedonian dairy industry The dairy farmers' choice of processors

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Abstract

Dairying is an important agricultural industry in Macedonia. It is, however, not competitive internationally seen. If a development of this industry is to take place, new governance structures are required. Hence the aim of this study is *to identify the conditions for behavioural changes by Macedonian dairy farmers as concerns their choice of dairy processors*. Transaction cost theory provides the analytical toolbox. The empirical data are collected through structured personal interviews with 30 dairy farmers.

The findings indicate a general pattern; smallholders tend to sell to small processors and large farmers more often sell to large ones. This pattern has transaction cost economic explanations. For example, there is human asset specificity in the form of personal relations between the smallholders and the small processors. Physical asset specificity exist as the smallholders' production facilities give rise to low quality milk, which can not be sold to large processors as these pay according to hygienic standards. Small processors pay a per-litre price.

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1. Introduction

In transition economies, such as many of the countries on the Balkan Peninsula, considerable changes in the economic life are taking place and still more can be expected. New institutions are established, many industries are being restructured, and consumers adopt new buying habits and consumption patterns. This applies also to the Republic of Macedonia (henceforth only “Macedonia”), which is in the focus of this study.

One of the most important agricultural industries in Macedonia is dairying. Milk has the largest share in the total animal output (49%) and 13% of the total gross agricultural output (SSO, 2009). Consumers have a large consumption of dairy products, predominantly cheese (11.6 kg/head and year) and fresh dairy products (58 kg/head and year).

Prior to Macedonia’s independence in 1991, the main markets for the country’s dairy products were other parts of Yugoslavia but since then these markets have shrunk significantly, which has created major problems for the Macedonian dairy industry. It has not fully adapted to the new market conditions.

These observations give rise to a query about whether the dairy farmers and the dairy processors are prepared to adapt to modern market conditions. The aim of this article is to *identify the conditions for behavioural changes by Macedonian dairy farmers as concerns their relations of dairy processors*. The study concerns only cow milk, not sheep and goat milk.

All dairy farmers sell their milk to a dairy processor (except for small volumes retained on the farms), and all dairy processors buy milk from dairy farmers. If these actors should be willing to change their behaviour it is necessary that at least one of them changes its sales or purchasing pattern. However, it is not evident that the actors would make such changes easily. They might be locked into a specific trading partner, i.e. some vertical integration may prevent the development of new trading relations. Various transaction specific assets of the farmers and the processors might inhibit behavioural changes. Moreover, the actors might experience uncertainties if they were to exchange their existing trading patterns. The concepts of vertical integration, lock-in situations and uncertainties indicate that transaction cost theory may be a promising theoretical basis for the subsequent analyses.

The article is structured as follows. Section 2 comprises an overview of the Macedonian dairy industry. Section 3 presents some of the core concepts of the transaction cost theory. Methodological considerations are presented in Section 4, while Section 5 presents the results in terms of the dairy farmers’ links to the dairy processors. Finally, conclusions are presented in Section 6.

2. The Macedonian dairy industry

The dairy industry as a whole

Dairy farming is spread all over Macedonia except for the high mountainous regions where the costs of milk collection would be very high. The largest milk production areas are found around the perimeter of the northern, western and eastern boundaries of the country near the cities in which dairy plants are located.

The volume of milk produced has tripled since Macedonia's independence. Especially there was a sharp rise (59%) in 2007 (SSO, 2008). The number of milking cows increased until 1999 whereupon their number decreases steadily up to present (SSO, 1995, 2000, 2008). One trend is that the number of dairy farmers is declining; another one that a growing number of large farms have cows with much higher productivity.

The average size of a dairy cow herds is about three cows, which could be compared to Sweden's 52 and Denmark's 115 cows, to mention just a few examples. The average milk volume per cow in 2007 is 2880 litres, compared to 9412 litres in Sweden and 8919 litres in Denmark.

The poorly structured dairy farming causes high costs for milk collection and bad raw milk quality. The low quality hinders processors to develop modern products and to have an efficient production of dairy products. Further, the fragmented industry structure creates conditions for opportunistic behaviour from both the processors' and the farmers' side; for example delayed payments are not uncommon. Contracts between the two parties are fairly rare, and when such exist, contract enforcement through courts rarely occurs as it is too costly. Under such conditions one party can easily deceive another one.

Dairy farmers

The dairy sector encompasses a large number of small, subsistence-oriented farm households and a decreasing number of the large, specialised milk producing enterprises that originate from the former socially owned large-scale agricultural enterprises, the so-called agro-combinats. Hence, milk production takes place in a diversity of farms. One classification is according to size and type of operations:

- *Traditional cattle breeders* own one or two cows, which produce only little milk as they are not well taken care of and not well fed. Most dairy farms are of this type, and more than half of the national milk production takes place in these farms. The farmers have no cooling equipment. They deliver the milk to a collection place that is used by all small-holder farmers in the vicinity.
- *Family farms* own 10 – 15 cows and have a production of 4,000 – 5,000 kg per year. The cows are kept both for milk and for meat.
- *Specialised dairy farms* are those with larger herds (over 50 cows). The yearly productivity per cow is 7,000 – 8,000 kg of milk. These farms have cooling tanks and their operations resemble those of milk producers in Western Europe.

In this study only two categories of dairy farmers are analysed, namely small farmers or smallholders (the first group above) and large or larger farmers (the two other groups). The reason is that the third group is so small that it can not be analysed separately.

Dairy processing

In 2009 there are 85 registered dairy plants in the country but not all are actually in operation. There are also a number of not registered dairy plants. Industry experts estimate the actual number of dairy plants to be between 50 and 120.

The dairy processing firms can roughly be divided into two categories. One can be labelled professional dairies. These are fairly large and expanding firms. These dairies have laboratories to check the fat, protein and dry substance content, and thus pay the farmers according to the quality of the milk. These dairies process the milk into a wide range of products, such as cheeses, yoghurts, sour milk, and quark. The two largest dairy processing firms control about 40% of the raw milk market.

The other group are the semi-professional ones, which consist of small plants (so-called mini dairies), processing less than 5000 litres per day. The mini dairies pay a flat rate for the raw milk, without checking for the hygienic and other quality standards. These dairies compensate the low quality of milk by focusing on a few simple products only, generally yoghurt.

On average 50% of the dairy processors' production capacity is lying idle. Seven dairy processors export to the neighbouring countries, but just two have an EU export licence.

3. Theoretical framework

As this study is devoted to an analysis of conditions for changing structural arrangements in the Macedonian dairy industry the transaction cost theory may be a good choice of theoretical basis. Given the fact that milk production takes place in widely varying farms and that also the processing firms are of quite different kinds, one may expect that the industry is characterised by significant differences in many respects, for example as concerns the actors' transaction costs. The transaction costs that economic actors have are generally regarded to decide which trading partners they choose (Williamson, 1975; Williamson, 2000; Grover and Malhotra, 2003; Kaufman, 2003).

Transaction costs are all the costs associated with conducting a transaction – contacting a trading partner, contracting with this partner, and controlling that the transaction was conducted as agreed upon. According to Coase (1937) transaction costs is associated with *information, negotiation, monitoring, coordination, and enforcement of contracts*. Information costs arise *ex ante* of exchange. Negotiation costs are the costs of physically carrying out the transaction, while monitoring costs occur *ex post* and include the costs of ensuring that the terms of the transaction are adhered to by the others parties involved in the exchange.

The main determinant for transaction costs is the actor's *transaction specific investments* (or *relationship specific investments*). An actor may have invested in assets which have a high value in a specific use but may have a lower value if they were deployed in any other use. Such investments have the effect of limiting the actor's range of alternative trading partners. For example, a farmer may be linked to one specific dairy processor or "locked-in".

To the extent that a processing firm is aware that the farmer's choice is limited, the processor has the possibility of exploiting this weakness of the farmer by offering poor trading conditions. So the farmer will experience higher transaction costs, though lower ones that would be the case if the farmer were to choose another processor. In situations like these, where farmers consistently find themselves be subject to opportunistic behaviour by their trading partners, they would prefer another governance structure rather than a pure market, i.e. some type of *vertical integration*. One possible kind of vertical integration would be a *farmer cooperative* but also *joint ownership, contracting or networks may be forms of vertical integration*.

Transaction specific assets may be of many kinds. There are investments in *physical assets* such as milking equipment and a dairy herd. Furthermore, as the location of a farm is fixed one may identify *site specificity*, which means that the farmer due to transportation costs will have a limited range of trading partners. Transaction specific investments are also *human resources*, i.e. the farmer has an education or has acquired specific skills, or he or she has social relations to individuals within a specific partner firm, limiting the choice of alternative partners. Furthermore, there are *dedicated assets*, implying that an actor may sometimes have to make investments, which are made for trading with a specific trading partner.

If an economic actor becomes deceived by a trading partner only sporadically this actor may not find it worthwhile to undertake measures to prevent deception. Every measure that an actor undertakes in order to protect him or her is in itself costly and hence avoided. In other words, the *frequency* of the transactions is another determinant for the transaction costs. When actors make transactions daily, which dairy farmers do, they are more vulnerable to the partners' eventual opportunism.

A third category of factors that affect the transaction costs of economic actors is *uncertainties*. Every actor finds uncertainties in his exchanges with business partners to be a plague. The uncertainties most often results in higher costs as the trading partner can easier behave deceitfully. Hence, high uncertainties will drive economic actors to prefer vertical integration. The uncertainties may concern whether deliveries or payments will be made as agreed upon, if the trading partner can be trusted, if production and distribution will function without major technical disturbances, etc.

4. Methodological considerations

In order to assess the farmers' transaction costs in relation to the dairy processors, empirical data must be collected from the farmers. The data should comprise the farmers' view of alternative processors, their transaction specific investments in relation to the processors, the problems that farmers face when dealing with the processors, the farmers' eventual collaboration with each others, etc. – all with the purpose of revealing the farmers' transaction costs.

Primary data was collected from farmers of all types and all sizes. Considering the relative complexity of the data needed, personal interviews were conducted. The major reason for this choice of data collection technique is, however, that most farmers would probably not fill in any questionnaire as they are not acquainted with this procedure. The drawback of this kind of data collection is that it is very resource consuming as it requires not only much time for each interview but also for travels around the countryside in different parts of Macedonia.

The population was decided to be all Macedonian dairy farmers. However, for practical reasons farmers in only three of the country's eight administrative regions were interviewed (Pelagonia, Northeastern and Skopje) (see Table 1). These regions have a large production of milk and have also fairly large cities, so the consumption volume of dairy products is large.

Table 1: The regions under study

Region	Population	Area	Character
Pelagonia	106,000	1800 km ²	Mainly urban
Northeastern	105,000	432 km ²	Urban
Skopje	287,000	118 km ²	Mainly urban

A total of 30 personal interviews were conducted, but not equally distributed among the three regions. For instance, the largest number of farms was interviewed in Pelagonia since the milk production there is the most intensive. The farm visits were carried out during the period from September until November 2007. Supplementary data were acquired from governmental representatives and experts in the field. Interviews with dairy processors were not carried out, because the study is focused on dairy farmers.

Most dairy farmers are not registered, so there is no database from which a sample can be drawn. Therefore, it was not possible to obtain a random sample and thus representativeness. Instead, the respondents were chosen by people employed in governmental and non-governmental organizations for agricultural development.

A standardized questionnaire was used at all interviews. Given the aim of the study, most questions in the questionnaire concern the farmers' relations to the dairy processors, and these questions had a focus on revealing the determinants of the farmers' transaction costs. There were 38 questions in this category. Some of these questions were: Satisfaction with price, Transparency of the milk price policy, Delay with payment,

Frequency of rejected milk deliveries, Trust in the processor, Eventual contracts, Kind of contract, Dairy farmers' information sources, Membership of any dairy association, Assistance from the dairy processor, Means of contact with the processor, Type of relationship with the processor, Previous buyer of milk, Potential buyers of the milk, Reasons for changing dairy processor, Road conditions, Distances to the dairy processors.

To provide background data the questionnaire contained nine questions about socio-economic data such as age, gender, education and income sources. Other questions concerned the inputs factors at the farms, i.e. cattle, land, labour and feed as well as the dairy operations.

Most often the interviews were conducted at the farmer's kitchen table. The atmosphere during all the interviews was calm and relaxed.

The facts that the sample can not be made random as well as the small sample size imply that no statistical calculations can be provided. Moreover, the data collection procedure means that the study suffers from some uncertainties.

5. Results

Choice of dairy processors

The Macedonian dairy farmers can sell their milk to either large or small processors. More than half of the farmers (60%) sell to large dairies. Looking at the size of the farm operations, there is a pattern (Table 2). The small farmers seldom sell to large processors, and the large farmers seldom sell to small processors. In some cases small farmers sell to the large processors but if so the deliveries are indirect, i.e. the farmers first deliver to collection stations at which the processors' cooled tank vehicles collect it.

Table 2. Dairy farmers' choice of dairy processor in relation to farm size

Herd size	Type of dairy		
	Small	Large	Total
1 – 5	5	2	7
6 – 10	3	3	6
11 – 30	4	11	15
> 30	-	2	2
Total	12	18	30

The chosen type of buyer differs between the three regions, mainly due to the accessibility of the different type of dairies in the neighbourhood. All farmers from the Pelagonia region sell milk to large dairies, since there are no mini dairies in this region. The reverse situation is found in the Northeastern region, which has a multitude of mini dairies. Farmers from Skopje sell to both types of processor. The general pattern is that small-holders sell milk to small dairies.

The large farmers most often sell their milk to the larger dairy processors. Unlike the small producers, the large ones store the milk in cooling tanks at the farm for a couple of days and hence the storage tank is emptied into a milk transport truck or a tanker and thereafter transported to the milk processor. This is the system that is used in the Western countries.

Not only does the farmers' choice of processor differ between the regions – so does also the collection and transportation of milk. In Skopje and the Northeastern region, milk is collected in milk cans, and is therefore every morning picked up at the farm with refrigerated trucks owned by the processors. In the Pelagonia region, the small producers collect the milk in a can and take it with small barrows to the collection centre. This procedure is practiced early in the morning and in the late afternoon. Afterwards, the cooled milk is picked up daily at the collection centre by a milk tanker and transported to the processing plant.

View on small and large dairy processor

According to the farmers there are considerable differences between the small and the large dairy processors. Table 3 provides an overview. The table's letters a) – k) are explained below.

Table 3. Farmers' statements about small and large dairy processors

Variable	Unit	Type of dairy processor	
		Small	Large
a) <i>Negotiate the price</i>	1-5 (1=always accept)	1.08	1.11
<i>Monitoring and control</i>			
b) Monitor the farm (by dairy)	% yes	17	6
c) Milk control (by dairy)	% yes	25	89
d) Confirm test results (by farmers)	% yes	-	11
<i>Coordination</i>			
e) Collaboration with other farmers	1-5 (1=not at all)	3.9	4.2
f) Members of association	% yes	58	33
<i>Enforcement of contracts</i>			
g) Type of contract	% formal	8	56
h) Pay on time	% always	58	72
i) Do not pay	1-5 (1=no chance)	1.3	1.5
j) Satisfied with the agreement	1-5 (1=not at all)	2.5	2.1
k) Satisfied with the price	% yes	8	11

- a) Irrespective of size the farmers have a low propensity to negotiate with the processors over the milk price. On a scale from 1 (always accept the offered price) to 5 (always negotiate over the price) the average figures were 1.08 for those supplying a small dairy and 1.11 for the ones selling to large dairy processors.
- b) There is a significant difference between the small and the large processors as concerns the monitoring of their suppliers. Some of the small processors (17%) who do not measure the quality of the milk compensate this by visiting the farms, while

only few of the large processors do so (6%). Another explanation to this difference is that the small processors are eager to have social contacts with their suppliers, while the large processors do not have this possible because of their large number of suppliers.

- c) Only one-fourth of the suppliers (25%) to the small dairies say that their milk is controlled by the dairies as to quality, whereas the ones selling to large dairies have normally their milk controlled (89%).
- d) Information about the milk quality at farm-gate is seldom available for the farmers. They recurrently receive milk test results which are considered unreliable. The farmers believe that the independent laboratories operate on behalf of the dairies. Relatively few (11%) of the suppliers to the large dairies have the possibility of investigating whether the dairies are cheating when it comes to the measurement of the milk quality. This issue is not relevant for farmers selling to small processors as these do not assess the quality.
- e) It happens often that dairy farmers collaborate with each others, especially among suppliers to large dairies (4.2 on a five-level scale where 1 is “not at all”) but also among the ones supplying small dairies (3.9). The difference is, however, quite small. One possible reason for this interaction may be that fact that there are few other information channels which are considered reliable.
- f) Fairly many of the dairy farmers are members of associations. More than half of the smallholders (58%) are so, while one-third (33%) of the large farmers belong to an association. The difference is easy to understand as the small ones are village-dwellers and not professional producers.
- g) The farmers, who sell to the small dairies, seldom (8%) have any written contract. The large processors in more than half of the cases (56%) sign delivery contracts with their suppliers.
- h) The milk payment from the processors is often subject to considerable delays. All farmers claim that their dairies do not always pay for the milk on time. More than half (58%) of the ones who deliver to the small dairies say so and almost three-fourth of the ones who are supplying large dairies (72%). It is not clear why the processors do not pay on time.
- i) In case that the dairy does not pay for the milk that the farmers supply, the farmers consider that they have very little possibilities to claim that money. The difference between the two categories of farmers is small (1.3 and 1.5 on a five-digit scale where 1 stands for “no chance”).
- j) When asked whether they are satisfied with their agreements with the dairy farmers in general express some dissatisfaction. Those who sell to a small dairy are somewhat

more dissatisfied than the ones supplying a larger dairy (2.5 and 2.1 on a five-digit scale, where 1 is “not at all”).

- k) No matter if the farmers sell to small or large dairy processors, by far most are dissatisfied with the milk price, but the former group is more dissatisfied (8% vs. 11% declare themselves satisfied).

Values

The smallholders are family businesses where the dairy activities are usually taken cared of by women and the on-field activities by men. Both genders are generally poorly educated. Their values are traditional, i.e. they want to run their dairy operations as they have always done and as their parents once did. These personal attributes are highly resistant to change, so they have the effect of limiting the farmers' range of potential buyers.

The traditional values and the limited educational level also imply that the smallholders tend to appreciate personal relations rather than business relations. They have personal acquaintances among the small dairies. Even though they have not very much trust in the owners of the small dairies, at least they know the person, while their potential contact person at a large dairy processing firm would be unknown and anonymous. If there are more women in the household, the general decision is to sell to the small dairy. Women spend more time to socialise with other farmers, and also have time for different sources of information.

Information channels

Given the fragmented market with a large number of both farmers and processors and the weak farmer organizations, the farmers have information problems. They have limited knowledge about what the market price for milk is, how alternative processors work and how other farmers are handling their buyer relations.

Farmers, who sell the milk to a small dairy, enjoy governmental services, as well use NGOs as a source of information (70% say that this information source is the most important one). Those who sell to large dairies, obtain information from individuals to whom the milk is delivered, either collection centre or the dairy. Other information is the informal one, usually transferred between farmers with common interests or disseminated from veterinarians (see Table 4).

The farmer associations, as a potential source of information, perform activities with different efficiency between regions. However, no farmer expressed full trust in associations and perceived the membership as useful. Although farmers collaborate mainly for producing feed and for information sharing, they are not coordinated. This is a result of the mistrust between them and the farmer associations. They cannot rely on associations, because their principals take advantage of the position they have and operate primarily for their own behalf.

Table 4: Information sources for farmers supplying different types of processors

Region	Information source	Suppliers to large dairies	Suppliers to small dairies	Total
Northeastern	Buyer	1	1	2
	Governmental org. and NGOs	-	6	6
	Other farmers	-	1	1
	Veterinarians	-	1	1
Pelagonia	Buyer	5	-	5
	Collection centre	2	-	2
	Other farmers	5	-	5
	Veterinarians	2	-	2
Skopje	Governmental org. and NGOs	3	1	4
	Other farmers	-	2	2

6. Analyses

The small dairy farmers' choice of processor

The fact that the small dairy farmers tend to deliver to the mini dairies and that the large dairy farmers deliver to the large dairies can be explained by the transaction cost theory. These links express that there are two types of vertical integration, even though this integration is quite loose. In many cases there are delivery contracts, especially between the large farmers and the large processors, but these contracts are not very strict. Furthermore, the two parties have only meagre possibilities to enforcement in case a contract is not kept to. It never happens that one of the parties bring the other one to a court with an accusation of a broken contract.

The kind of vertical integration is rather of a kind where the parties have poor chances to choose another trading partner than the existing one. Because of their low quality of milk the smallholders can hardly deliver to a large processor as these differentiate the price according to the quality of the milk. The large dairy farmers could seldom imagine themselves as suppliers to a mini dairy as they thereby would not be compensated for the investments they have made in order get good quality of milk.

There are several types of asset specificity that may explain this pattern. The smallholders have physical assets which are specific for the existing production methods. Due to their small volume of milk they could not invest in production means which would result in better milk quality. The low quality follows from the fact that the handling of the milk is purely manual. The smallholders have no cooling equipment, and even though the milk is delivered twice a day, it is badly affected by the warmth of the air. Higher milk quality would require investments in milking equipment, a cooling tank, transport means, etc. Such investments could not be profitable for the smallholders.

Even though such investments were made, the smallholders' problems would not be solved, because then they would be locked in to a relationship with one of the larger dairies. Such investments are relationship specific, and thus the farmer might be subject

to opportunistic behaviour from the side of the large dairy. This is seen in the farmers complaining about the price, the payment delays, etc.

Milk cooling requires an adequate supply of electricity and water. These are available on all farms, but can only be arranged at relatively high costs. The volume of daily milk production may be too small to justify a cooling system, and it would be too expensive to cool a small amount of milk on the farm and too expensive to collect it. The collection of milk on farms also requires a good road access for the milk transport trucks, which is a problem among the small-scale raw milk producers.

The fact that the dairy processors often pay for the milk with some delay can be seen as relationship specific assets from the farmers' side, i.e. the farmers give credits to the processor. A consequence is that the farmers are locked-in with a specific processor. If they were to deliver to any other processor it is uncertain if they would ever get the payment for the milk they delivered a month ago or so.

The opportunistic behaviour of the dairy processors has the effect of creating risk aversion among the farmers. Hence, investments become smaller than they would otherwise be. This holds true for both small and large dairy farmers. Opportunistic behaviour and lack of trust is generally hampering for economic development, so also in the Macedonian dairy industry.

The market supporting institutions for disseminating market information, enforcing contracts and providing services are not performing well. This contributes to information asymmetry to the disadvantage of the farmers, and thereby higher switching costs (and higher transaction costs) in case they would like to get another processor to deliver to. The costs of searching trading partners and enforcing agreements are high. As a result informal contracting is widespread.

Moreover, the smallholders' human assets are characterized by relationship specificity. These assets include skills and habits, for example their knowledge about and interest in other production methods than the current ones. These assets comprise also values – the farmers are traditionally oriented. Furthermore, the social relations are a type of human assets, and they too contribute to a lock-in situation. One factor is that the smallholders to a large extent socialise with one another, whereby they probably confirm each other in their choice of a specific dairy processor, and another factor is the meetings they have with the staff of the dairy processor.

Site specificity has a large influence. Many smallholders have their farm in a place where there are no other buyers than their present processor, and the transportation creates problem, especially as the smallholders have no cooling equipment. Hence the farmers have limited possibility to switch to another processor than their present one.

The large dairy farmers' choice of processor

The situation for the large milk producers' relations to the large dairies is, in a way similar. These farmers have large investments in assets which are transaction specific – dairy herd, milking equipment, cooling tank, etc. As these investments would have a considerably lower value if they were deployed in any other kind of production the farmers are locked-in in the dairy industry.

Due to the size of these physical investments, the large farmers would not be attracted by small dairy processors because these pay only a low price for the milk. To get a reasonable return on the invested capital the large farmers need to get a higher price.

The large farmers are more professional in their production. Hence, personal relations do not have very much importance for their choice of dairy processor, i.e. the human assets are not to any major extent relationship specific, neither the relationships to other farmers nor the relationships to the processing firm.

7. Conclusions

The analyses above indicate that both small and large farmers have good reasons for their choice of dairy processors. Some of the transaction costs that the farmers face are higher while others are lower. Both types of farmers have thus to find a balance which is good for them. Figure 1 is an attempt to specify how the various transaction costs express themselves for farmers choosing small and large dairy processors. The classification of transaction costs is the one suggested by Coase (1937). The six types of costs, pertaining to sellers who deliver to buyers of different size may be explained as follows:

Small buyer (dairy processor)	Large buyer (dairy processor)	
	High transaction costs for the seller (farmer)	Low transaction costs for the seller (farmer)
High transaction costs for the seller (farmer)	a) Monitoring and control costs	b) Coordination costs
		c) Maintaining contracts
Low transaction costs for the seller (farmer)	d) Search and information (entrance costs)	
	e) Bargaining costs	
	f) Enforcement costs	

Figure 1: Sellers' transaction cost levels in relation to small or large buyers

- a) *Monitoring and control costs:* No matter if the farmer sells to a large dairy processor or a small one the farmer may be deceived in different ways – at least that is what the farmers claim. They feel that the processors may pay for a volume that is lower

than the one that is delivered, that the quality is reported to be lower than it actually is, that the payment will be delayed, etc. In all cases the farmer can not make any control himself or herself.

- b) *Coordination costs*: The large dairy processors have well developed administrative systems which simplify the relations to the farmers and they have often contracts to the farmers. The situation is different in the small dairies, which implies that the coordination costs become higher for the farmers.
- c) *Maintaining contracts*: The large dairies have most often contracts with their suppliers, while the small dairies have no contracts. Even though the contracts are not always adhered to they give more safety for the farmers who deliver to the larger dairies.
- d) *Search and information costs (entrance costs)*: The small dairies have an advantage in the sense that the farmers have more proximity to the decision-makers. The farmers' level of knowledge is higher if they sell to a small dairy than to a large one. Another aspect is that the large dairies demand milk of good quality which may function as an entry barrier for many farmers, especially the small one.
- e) *Bargaining costs*: Again the closeness between the farmer and the small dairies' decision-makers imply that it is easier for the farmers to bargain about the milk price and other conditions.
- f) *Enforcement costs*: The proximity between the farmer and the small dairy, both geographically and socially, means that it may be easier for the farmer to force the dairy to remedy in case a mistake has been conducted. It is, though, not likely that a legal process will solve the dispute, but rather personal meetings.

The findings of this study might indicate that a farmer cooperative solution would solve the problems of the Macedonian dairy farmers (Nilsson and Ollila, 1997). As milk is a perishable product the sales must take place very frequently, and the farmers have evidently high transaction costs in their present exchange relations. There are, however, a few obstacles for the formation of dairy cooperatives. One concerns the fact that the farmers do not have capital enough to invest in a cooperative. The second factor is that there is very little trust between the farmers, i.e. they have high transaction costs also in their internal relations as well as high agency costs. Finally, the institutional arrangements in Macedonia are not yet sufficiently well developed – information channels, legal system, business legislation, etc.

The aim of this study is *to identify the conditions for behavioural changes by Macedonian dairy farmers as concerns their choice of dairy processors*. The overall conclusion of the study is that the dairy farmers have made choices of dairy processor, which are rational given the conditions under which the farmers live and work. It is not likely that the existing farmers will change their existing business partners. Both the small and the large farmers are to some degree locked-in into specific kinds of dairy processors. It would, for example, not be possible to persuade somebody to change his or her choice.

At the same time it must be realized that the structure of the Macedonian dairy industry is in need for major changes. Such changes must, however, follow from external forces.

One possibility is that the consumer demand shifts, for example such that the small dairies become threatened. Another one may follow due to the Macedonian desire to become a member of the European Union. If so the demands for hygienic standards in the country will rise considerably and neither the small farmers nor the small dairies can survive. Perhaps it would be a good idea for the Macedonian government to raise the quality demands on raw milk, thereby enforcing a restructuring of the dairy industry such that it will survive international competition.

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