

Pricing in the Farming Cooperative CALU: the Dilemma of Milk Production

Abstract

Context and objective: This teaching case is intended to stimulate the understanding of cost management aspects and the approaches used for sales pricing. Elaborated for discussion in Management Accounting subjects, specifically in Cost Management, as part of undergraduate programs, the case addresses a problem faced in a milk cooperative, in which the members are responsible for providing the main raw material in the production: the milk. Thus, these members consider that they should be paid according to their expectations, as that was why they created the cooperative, but this has not happened.

Method: The data to elaborate the case were collected by means of the semistructured interview technique, applied to the managers. In addition, a visit to the cooperative's factory took place to get to know the production process. Also, documentary research was applied with the company's authorization.

Expected results: The case is expected to encourage the participants to reflect on cost management and proposed approaches to the establishment of sales prices involving consumers and the competition. In addition, the case proposes the analysis of the products' contribution margin in the studied organization's decision process.

Key words: Price management. Cooperative. Costs.

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Published in Portuguese and English. Original Version in Portuguese.

Received in 3/19/2016. Ask to Revise on 10/31/2017. Resubmitted on 11/23/2017. Accepted on 12/18/2017 by Dr. Orleans Silva Martins (Editor).
Published on 3/29/2017. Organization responsible for the journal: Abracicon

1. Introduction

Founded in the 1960s by a group of 40 milk producers, Cooperativa Agropecuária Ltda. of Uberlândia (Calu) emerged to solve problems related to the commercialization of milk in the region. The city of Uberlândia is located in the region of Triângulo Mineiro, State of Minas Gerais, which, at that time, was already prominent in milk production. At the start of its activities, this cooperative received support from class entities, authorities and politicians and, in return, contributed to the economic development of the city of Uberlândia, considering that it was one of the first companies to generate jobs in the city.

Currently, Calu has a wide range of dairy products sold, including milks, dairy drinks, yoghurts, butters, cheeses, curd cheese, as well as a light line for milks and cheeses. The cooperative has approximately 350 employees and 3,000 cooperative producers. In addition to the headquarters in Uberlândia, Calu also has four branches in the Triângulo Mineiro region, specifically in the cities of Monte Alegre de Minas, Tupaciguara, Gurinhatã and Ituiutaba.

2. Context

Since that morning, Marcos, the director of Calu, kept thinking about what he had heard on a Monday in November when he was working, as usual, always very committed to what he was doing. On that day, something happened that intrigued him: Mr. Joaquim, one of the member producers who founded the cooperative, appeared there, with his usual tranquility, but not very satisfied, as he had received his payment for the milk and did not like the amount, so he went to Marcos to try and understand what was going on. Marcos was uneasy about the situation and thought about what he could do, as the Cooperative had high costs and was paying the producers what it could, but it seems that was not pleasing. So this was a difficult situation.

At the moment Mr. Joaquim arrived, Marcos could not imagine what the producer wanted, but gently summoned him to sit down in his office so they could talk better.

– Good morning, Mr. Joaquim, good to see you here, for I have not seen you for a long time!

– “Good morning, Marcos, it’s been a while. This city life is not for me, I prefer my tranquility of the countryside, I only come when I really need to.

– “I understand, I know how peaceful the countryside is, but what has brought you here today?”

– “So, Marcos, I received my payment this month and I was saddened by what I saw, because the price of milk has dropped a lot and even more this month. We come to the city to buy feed and medicine for the cattle and everything continues expensive; only the price of our milk is dropping.

– Mr. Joaquim, I think I understand what you mean, but the Cooperative also has very high costs and, during this rainy season, the supply is larger. You know that more than I do.

– “But something is not right, because some time ago it was not like that. A few years ago, we received a good price for the milk and we still had a good share in the results of the Cooperative. For some time now, however, the price of the milk has been dropping and the cooperative has not distributed profits anymore either. You should know that. What is going on?

Marcos was a bit confused by Mr. Joaquim’s questions, finding it better to ask for help.

– Mr. Joaquim, I’m going to call someone who can explain better, just a minute.

Marcos left the room. Despite being a calm person, he was very worried because he always tried to solve all the problems that were happening in the Cooperative, even those beyond his competence. But at that moment, he thought it would be better to ask for help, so he went to the room of Paulo, the comptroller of the Cooperative, who was responsible for managing the costs and the price of the products. He knocked on the office door and there was Paulo.

– Paulo, how are you? I need your help.

– “Well, Marcos, what can I do for you?”

– “I’ve got one of the cooperative members in my office, Mr. Joaquim. He has provided us with milk for a long time and we have always had a good professional and also personal relationship. He came here today though because he did not like the payment this month at all, so I thought it would be good for you to talk to him, after all, we need the members on our side.

– “Well ... Actually, Marcos, this month, really, the pay was a little lower, because this time of the year is always harder, you know, right? But let’s see, I’ll talk to him; I think he will understand our situation.

The three of them sat down to talk about the price of the milk. Paulo tried to explain things to Mr. Joaquim. He was not very convinced yet, however, and in his simplicity he decided to ask a question:

– Paulo, I heard what you have said about all these problems. I think I do not understand much of this, but I got curious: what do you do to put the price on the milk and other products manufactured by the Cooperative? How do you know if product X or Y is generating profit? How do you pay us? We send the milk, which is the main product of Calu, and we earn little, but who buys the products in the supermarket pays very, very much. I do not think that’s right.

Paul immediately responded:

– Mr. Joaquim, the price is formed according to the market practices. It’s simple.

– But how so? What if the market prices are not feasible, what then?

Paul started to reflect, saying to himself. And is not Mr. Joaquim right?! We price the milk bought from the producer and the products according to the market, but we do not know how much each product costs for the Cooperative ... Even less how much profit or loss each product generates for the company.

In that short time they were talking there, there were other members waiting to talk to Mark, who did not seem too pleased either. The secretary, a little apprehensive, interrupted the conversation of the three and reported that there were more members waiting. Marcos was a little startled by the movement, he thought and made a decision.

– Mr. Joaquim, let’s do this: I need to talk to Paulo and set up a meeting here at the Cooperative with all the producers. Let’s find a way to solve this problem.

And so it happened. Marcos spoke with the cooperative members and everyone agreed. Everything was fine, but only for now. And now, what were they going to do?

Paulo was worried about the situation. “Perhaps Mr. Joaquim is right about our price. If it really is not fair, maybe we’re doing something wrong. I think we have a lot to think about.” Marcos foresaw changes in the Cooperative.

3. Production Process at the Cooperative

The confusion that had happened at the Cooperative that morning worried Marcos and Paulo. They looked at each other without knowing what to do, but they had promised the cooperative members a solution, knowing that the situation could not remain as it was. After the shock, they thought more calmly and decided that they needed help, a consultancy perhaps.

The next morning, Marcos, Paulo and Eduardo, the consultant they had hired to help and solve the problem, were in the meeting room. They talked for a long time, analyzing the situation of the Cooperative. As the milk price was floating, it was clear that the supply would be greater in the rainy season and that, therefore, the price would fall, but was there any way to ease the situation so that the cooperative members would not feel dissatisfied? Eduardo, a consultant with many years of experience, suggested:

– I think that, at first, we will have to do a more thorough cost analysis of the products you are making. Subsequently, we will evaluate the pricing mechanisms the company uses.

“But there are many products and how will we go about?” asked Paul.

– At first, we will use a product, preferably one with a more detailed manufacturing process. After the mapping of this product, it will be easy to work on the others.

“Um ... I think I already know which. We can use ricotta cheese!

That day, they decided what they would do. Paulo felt better and, believing that it would be easy to solve the problem, chose the product he thought would be the ideal to analyze. In addition, he imagined that the solution was near.

Not everything was as easy as it seemed though. Marcos, Paulo and Eduardo started to analyze the ricotta cheese and realized that many factors could influence the price. According to the consultant, all costs and expenses of this product in each stage of the production process should be surveyed and classified as fixed or variable. Eduardo commented:

– It will be a time consuming process, but, so, we will check if the product is being properly priced.

Eduardo spoke with great propriety and demonstrated a profound understanding of the subject, but he did not imagine the countless challenges lying ahead. Therefore, he decided to get to know the Cooperative's productive process. He visited the dairy and made a first map of the general product manufacturing process, with a detailed description of each stage of the ricotta cheese production process (Figure 1).

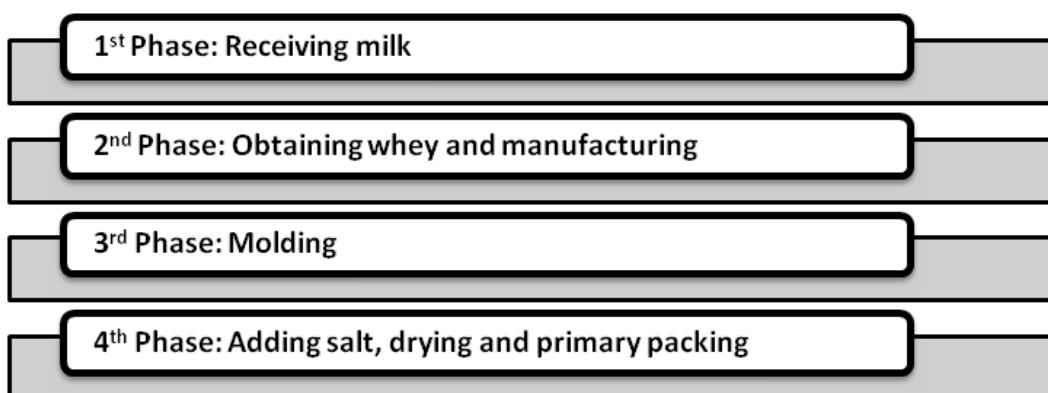


Figure 1. Production process at CALU

Source: elaborated by the authors

1st Phase) Receiving milk: the milk collected from the cooperative members reaches the company Calu, where it is initially stored in tanks. Then, the milk is tested to check the quality and acidity of the product. Next, the milk is distributed to reservoirs through the pipes to manufacture each product: fresh cheese, mozzarella cheese, butter, ricotta etc. Each product receives the proper treatment in its own tank to start the manufacturing.

2nd Phase) Obtaining whey and manufacturing: in the specific case of ricotta, the two main ingredients are whey and milk, with lactic acid as the secondary ingredient (preservative). The whey is obtained in the manufacturing process of mozzarella cheese. In that production process, the whey, which would be discarded, turns into an input for the ricotta production. Next, milk and lactic acid are added and the tank is warmed to 90°C. As informed, the milk is transferred to the ricotta tank through pipes. The lactic acid is added for the destabilization and flocculation of the protein, as well as to form the mass of the ricotta.

3rd Phase) Molding: in the same tank where the ingredients are mixed, the mass is drained, collected with the help of a stainless sieve and transferred to the molding table, where it is placed in tubes for the ricotta to gain its cylindrical shape. Each tank results in 160 to 200 units, and the remaining whey is disposed of for animal feed.

4th Phase) Adding salt, drying and primary packing: next, the ricotta is refrigerated to gain consistency and be cut into smaller units. After being cut in smaller and regular sizes, the ricotta is immersed in brine for approximately one hour. After the brine bath, the product is stored on shelves in a drying room for 24 hours. Finally, after the drying period, each unit is vacuum packed in EVA plastic, and then wrapped and stored in a cold room. The product is ready!

4. Main management dilemmas faced

After knowing the production process and the formula for making the ricotta, Eduardo thought: "What am I going to do with this information? Hmm ... I can now discover the manufacturing cost of ricotta cheese. Then, just think about how much profit the cooperative expects to make and that's it! So what would be the ideal selling price for this product? Are we making a profit or a loss in the sale of ricotta?"

As mentioned earlier, the dairy industries are faced with the problem of the "unstable" availability of the raw material milk, which means that, in certain circumstances, there is a surplus and, in others, insufficient milk. This fact may influence the price determination for the cooperative members and, consequently, for the manufactured product.

Observing the production process of ricotta, Eduardo discovered that this cheese is made from the whey of the mozzarella cheese, also identifying that ricotta is low in fat. This whey derived from the production of mozzarella intrigued him because, how would the value of the whey be calculated if, in other manufacturing lines, it could be "discarded" and, for the production of ricotta, it is essential? Also, how can the fat be treated that is extracted from the milk and used in ricotta? Is this fat a raw material for other products, such as butter and curd cheese? There were many doubts!

Eduardo kept thinking, "But does ricotta produce a profit or loss? Um ... He would have to analyze its individual cost, starting with variable costs, and then analyze the contribution margin of that isolated product. But what about the costs that are fixed and general for the entire company? How can they be assigned to each product? We have lots of work and research ahead !!!"

With the information on costs and expenses of the product, Eduardo managed to do some analyses. Table 1 shows the quantities and costs of the raw material used in the production of ricotta.

Table 1
Cost projection – Ricotta

Raw material	Unit	Quantity	Unit cost
Cooled milk	Liter	2.42	0.78
Whey	Liter	30.25	0.06
Raw material A (lactic acid)	Unit	0.00073	325.57
Raw material B (refined salt/Kg)	Unit	0.02	0.95
Carton box	Package	0.11	0.68
Packing tape	Roll	0.00010	3.49
Packing pouch	Unit	2.09	0.20
Outsourced services	Unit	Quantity	Unit cost
Cheese factory	Kilogram	1.00	0.17
Cheese packing sector	Kilogram	1.00	0.06
Reception and cooling	Liter	2.42	0.005
Refrigeration	Liter	35.09	0.01
Boiler	Liter	2.42	0.01
Milk standardization and pasteurization	Liter	2.42	0.0024
By-products	Unit	Quantity	Unit cost
Fat cream	Liter	0.01	6.2774

Source: elaborated by the authors based on the data from the Cooperative

Regarding the costs of the ricotta, as already pointed out, Eduardo identified two very interesting situations. The first concerns the whey, which is one of the items that make up the raw material of the ricotta, being obtained in the production process of mozzarella, that is, it is a by-product of mozzarella. If sold on the market, the whey would have a unit cost of 0.06 cents, a figure that could be considered as a transfer price to the ricotta manufacturing process. In other words, the value of the whey considered as raw material for ricotta would be deducted from the cost of the raw material of mozzarella. This procedure was adopted for the Cooperative to know the results of each area and, later, the overall result of the Cooperative.

The other peculiar situation Eduardo found in the analysis of the costs of ricotta refers to the level of fat of the milk used in the production. Generally, the milk purchased from the cooperatives reaches the industry with approximately 3.6% fat (cream). The production process of ricotta requires only 3.2% of fat though. Thus, the milk goes through a standardization process (skimming) to extract the excess fat (0.4%). The fat represents the noble part of the milk, being the basic raw material of other dairy products, such as curd cheese and butter. Hence, the treatment is the opposite of that given to the whey. The extracted cream would be considered as raw material for other products (such as butter and curd cheese) and would represent a reduction in the price of the raw material milk used in the manufacturing of ricotta. This would be the proper treatment for a by-product such as whey according to Eduardo.

Eduardo was able to verify that the monthly quantity of ricotta sold in the analyzed period was 8,300 kilos, with an average sales price of R\$ 5.70. The consultant was able to identify the following percentages of the expenses related to ricotta, after many calculations: tax expenses (7%); commission expenses (2%); freight expenses (0.3%); and financial expenses (2.4%). Eduardo also identified that, in the case of ricotta, there are no expenses with the freight to discard the whey, as the producers themselves withdraw this at the cooperative.

After many surveys, Eduardo needed to calculate the contribution margin of ricotta to compare it with that of other cooperative products, in order to better analyze the price and contribution margin of ricotta in relation to the other products.

Table 2
Contribution Margin – Comparative Table

Product	Low-fat milk	Full-fat milk	Large mozzarella	Small mozzarella
Volume	112.500	514.000	255.200	2.300
Sales Price	R\$1.75	R\$1.65	R\$9.00	R\$8.90
Invoicing	R\$196,875.00	R\$848,100.00	R\$2,296,800.00	R\$20,470.00
Total Variable Costs	R\$165,729.45	R\$716,865.19	R\$2,244,977.80	R\$20,687.72
Total Variable Expenses	R\$23,034.38	R\$99,227.70	R\$270,103.68	R\$2,407.27
Tax Expenses	R\$13,781.25	R\$59,367.00	R\$160,776.00	R\$1,432.90
Commission Expenses	R\$3,937.50	R\$16,962.00	R\$45,936.00	R\$409.40
Freight expenses	R\$590.63	R\$2,544.30	R\$6,890.40	R\$61.41
Financial expenses	R\$4,725.00	R\$20,354.40	R\$55,123.20	R\$491.28
Disposal freight expenses	R\$0.00	R\$0.00	R\$1,378.08	R\$12.28
Revenues from by-products	R\$26,694.81	R\$124.09	R\$127,229.91	R\$1,146.66
Contribution Margin	R\$34,805.98	R\$32,131.20	(R\$91,051.57)	(R\$1,478.33)
Unit Contribution Margin	R\$0.31	R\$0.06	(R\$0.36)	(R\$0.93)

Source: elaborated by the authors based on the data from the Cooperative

Table 2 shows the results achieved with regard to the contribution margin of the products “low-fat milk”, “full-fat milk”, “large mozzarella” and “small mozzarella”. In addition, it will be important to identify the contribution margin of ricotta for the sake of comparison with the other products, in order to verify which product is more profitable.

It is important to highlight that the company has a high fixed cost. Therefore, the contribution margins generated should be enough to dilute this cost and present a positive result. The consultant verified, in his projections, that two products analyzed have a negative contribution margin. Thus, he will need to develop various analyses to identify solutions to the problem.

5. Teaching Notes

5.1 Educational objectives of the case

This case is indicated to study the subject Costs, discussing the classification of costs, variable costing method, contribution margin and sales price formation. The objective is to encourage students to understand cost management and the approaches used to determine the sales price, such as costs, consumers and competition.

The case also shows a practical situation that demands decisions of the organizational managers. Thus, it allows the students to experience a scenario in which they will have to act as managers, to find ways that lead to the solution of the problem. Therefore, the application of the case can contribute to the development of skills needed in the performance of a manager or comptroller, such as the ability to make decisions (leadership), teamwork, information management and conflict solution.

5.2 Recommended use

The application of this case is recommended for undergraduate and postgraduate courses in disciplines in the area of Costs, Cost Analysis, Management Accounting and Comptrollership, focused on cost management. In this sense, the students are confronted with a real situation and should contribute and propose possible solutions for the Cooperative under analysis.

5.3 Suggestion for teaching plan

This teaching case could be applied in two classes (50 minutes each) and, if necessary, the teacher can extend the term depending on the classroom discussions. It is important that the theoretical part about the terminology and cost classification (fixed and variable, direct and indirect), and about the approaches to the determination of the sales price, has already been addressed in the classroom, so that the teaching case is a time to apply the content in practice.

To solve the case, the teacher needs to offer the material and request individual background reading. When it comes to solving the case in the classroom, working in groups of four to six people is suggested.

In the first part (50 minutes), students should read, discuss in groups and propose solutions for the case. In the second part (50 minutes), all students should be arranged in a circle to discuss possible solutions they have found. Also, it is important for the teacher to conclude on the main ideas the students addressed and present the possible solution to the case.

Another suggestion is that the case be conducted outside the classroom environment, encouraging students to research and make decisions more autonomously. Thus, it is suggested that groups of four to six people be formed and that each group finds the solution to the case and takes it to the next class. The moment in the classroom would be for all groups to discuss the ways they found to solve the dilemma.

5.4 Data sources

The data for the elaboration of this teaching case were obtained by the use of semi-structured interview technique with the comptroller, the production manager and the quality manager. The data collection was based on a visit to the Cooperative factory, in order to get to know the production process of ricotta through direct observation. Documentary research was also applied, authorized by the comptroller's office and production management, and the documents analyzed presented the description of the production process of ricotta, cost sheets and other information related to the productive process in the Cooperative. Information was also searched on the Internet, specifically on the Calu website.

5.5 Questions for discussion in the classroom

- What approaches are used to determine the sales price in a farming cooperative?
- What is the contribution margin of ricotta? Does it contribute to the company income?
- In view of the contribution margin of ricotta and the other products presented, which analysis could be developed on the use of the contribution margin for the cooperative's decision process?
- How can the cost management help to determine the sales price?

5.6 Analysis of questions

Question 1 – Which approaches are used to determine the sales price? Can these approaches be applied to a farming cooperative?

For Horngren, Datar and Foster (2006: 385), "the price of a product or service depends on supply and demand. The three influences on supply and demand are: customers, competitors and costs". Bruni and Famá (2004) emphasize that three different methods can be used in the process of determining the sales price: cost, consumer or competition.

Cost-based pricing involves measuring the costs of the products and, based on the costs established, a profit margin is added, that is, the sales price is the sum of the product cost and the profit margin the company expects (Bruni & Famá, 2008).

It is important to emphasize that the cost method, for several market segments, continues to be the driver in determining the sale price. Nevertheless, applying this method exclusively to the definition of the sales price is not advisable, as this may generate conflict and lead to a loss of competitiveness if (customer) demand and competition levels are not taken into account (Bruni & Famá, 2008).

In addition, consumers influence the price because they create the demand for a product or service. High-priced products and services can make customers replace them with more affordable ones. Thus, the company needs to know the price the customer is willing to pay for the product, but needs to stipulate the highest price in order to maximize the results (Bruni & Famá, 2008; Horngren, Datar & Foster, 2006).

The competition analysis method in the pricing process involves investigating the competitors who offer similar or substitute products. Normally, managers will set prices that are the same or similar to those of competitors and, in some situations, offer lower prices than the available alternatives (Canever, Lunkes, Schnorrenberger & Gasparetto, 2012).

The teacher should explain that it is possible to apply the approaches presented regarding the determination of the price in farming cooperatives. These companies should analyze the methods that best meet their objectives in terms of price and competitiveness. In some situations, price itself may be one of the competitive strategies and a market differential for cooperatives. Thus, the teacher can also emphasize the importance of the manager's role in the decision process, considering the objectives intended by the company.

Cost management in the price determination process can influence the decision-making process, especially in the case of farming cooperatives. These organizations compete for cost leadership, and the information they provide can help to improve operational efficiency and reduce costs and price.

Question 2 – What is the contribution margin of ricotta? Does it contribute to the company income?

To analyze the contribution margin of ricotta, the teacher can use the structure proposed in Attachment 1 of this case. Thus, after the presentation of the students' answers, the teacher can discuss with the students and present the proposed results to solve possible doubts.

Question 3 – Considering the contribution margin of ricotta and the other products presented, what analysis can be done on the use of the contribution margin for the cooperative's decision process?

Horngren, Datar and Foster (2006) define contribution margin as the revenue minus all costs, which vary in relation to the level of activities, that is, how much is left for the company to pay fixed expenses and make a profit.

Organizations offer products and services at different prices, costs and expenses, which makes it relevant to determine the contribution margin of each product or service. Therefore, it is of fundamental importance to measure the direct or variable cost of each product or service in order to calculate the contribution margin.

The sum of the unit contribution margins allows the managers to know how much they will have to cover the fixed costs and generate profit in the company (Maher, 2001). It is expected that no product or service presents a negative contribution margin, which occurs when the value of the sales price is less than the sum of the variable expenses and variable costs, thus not contributing to pay fixed expenses and generate profit.

In Calu, two products were identified with a negative contribution margin. This may be acceptable when the negative margin is related to some sales promotion strategy. Nevertheless, it should be assessed whether the sales of other products, whether or not added to the promotion, present positive contribution margins (selling price higher than variable costs and variable expenses) that can contribute to a positive company income.

Based on the analysis of the contribution margin, the company can enhance its decision-making process in order to reach the break-even point as appropriately as possible. Therefore, managers should not rest their decisions solely on the contribution margin, as long-term analysis may be unsuitable, considering that the company should seek revenues that cover variable and fixed costs and also a profit that satisfies the investors, according to Bruni & Famá (2008).

These authors cite as a disadvantage of the use of the contribution margin, through variable costing, "the existence of mixed costs (costs with a fixed and a variable portion), as it is not always possible to objectively separate the fixed from the variable portion" (Bruni & Famá, 2008, p.223).

The application of the concept of contribution margin to Calu may benefit the profitability analysis of sales prices of items produced and traded, such as: contribution margin indices help managers in deciding which products should deserve greater incentives or efforts by the sales team; and contribution margins are essential to aid decision making, that is, whether a productive segment should be abandoned or not; contribution margins can be used to evaluate alternatives to price reductions, special discounts, special advertising campaigns and the use of rewards to increase the sales volume.

The contribution margin approach helps to determine costs and helps managers to understand the relationship among costs, volume and profit, which influences pricing decisions. The adoption of the income statement that shows the contribution margin per product can be used to guide actions in relation to product sales and the promotional efforts to be made.

Thus, the use of the contribution margin for the cooperative's decision-making process may contribute to: indicate which products are the most profitable (both in monetary units and in profitability percentage); identify products that contribute insignificantly (small value or percentage) or with a negative contribution margin (which are generally tolerated in function of the benefits they provide with the sale of other products concurrently); to project the effects on the income resulting from the elimination or reduction of traded goods; provide supports to make choices, in the case of sales strategies (e.g. "tied-in sale"); to facilitate the definition of the goods that will be offered or that will have their prices changed; and verify the acceptance or rejection of sales proposals in a quantity higher than normal, but with a lower price than that adopted by the Cooperative.

Question 4 – How can cost management assist in determining the sales price?

Regardless of the cost strategy (method) the company adopts, according to Martins (2008), the market has a great influence in the determination of the prices, and not only the product costs. Therefore, the efficient management of costs will contribute to the maximization of profits. Measuring and properly analyzing costs in organizations provides informed decision-making in relation to the pricing of products or services.

The first step in determining prices is to identify the strategies adopted by the company and then determine which pricing methods will be used to achieve the proposed objectives, thereby involving cost management. Several authors discuss the importance of price decisions for the profitability and survival of each company in the long term (Bruni & Famá, 2008; Martins, 2008).

Pricing with improper settlements can considerably impair the sales performance of certain products and even reduce the company's market share. In this sense, pricing directly affects the competitiveness, sales volume, margins and profitability of companies.

In addition, managers who know the production cost can set attractive prices for customers, which may influence the maximization of the operating profit. The perceived price has a significant impact on consumer satisfaction, which will influence the conquest of the market.

6. Case analysis based on brief literature review

6.1 Approach used to determine the sales price

In order to set prices, in addition to costs, it is necessary to analyze the degree of elasticity of demand, the prices of competitors and substitute products, the conditions of the market the company is inserted in, the organization's marketing strategy, etc. (Martins, 2008).

Pricing is one of the main and most difficult functions performed within the company. To determine the sales price of a product, it is necessary to know factors internal and external to the company, such as direct and indirect costs, demand, competition, consumer market, among others (Horngren, Datar & Foster, 2006).

Bruni and Famá (2008) indicate three approaches that can be used to determine prices: costs, consumers and competition. First, in the cost-based process, "the lower the cost of producing a product in relation to the price paid by the customer, the greater the supply capacity of the company" (Horngren, Datar & Foster, 2006). This means that the lower the cost of production, the more companies are able to set prices that attract customers so that managers can make more profit for their organizations.

As for the consumer market, organizations use the value of the product perceived by customers, and not the production costs (Bruni & Famá, 2008). According to Horngren, Datar and Foster (2006), the customers influence prices, promoting the demand for a product or service.

For competitive analysis, firms should be alert, as alternative or substitute products may affect demand and influence the firm's decision to lower prices (Horngren, Datar & Foster, 2006).

In this sense, as observed, for the process of determining product prices, the first method is based on costs, being considered the most traditional in organizations. Subsequently, the competition and the characteristics of the market are analyzed, the price being established based on the value perceived by the consumer market.

6.2 Cost management in organizations

According to Martins (2008), the main function performed by Cost Accounting is to help decision making. The author discusses that:

(...) in relation to the decision, its role is extremely important, as it consists in the feeding of information on relevant values related to the short and long term consequences on measures to introduce or cut of products, administer sales prices, choose to purchase or produce, etc. (Martins, 2008, p. 22)

In this sense, the company manager, in order to make its decisions, needs detailed information about the costs of the products, using, for that purpose, the costing methods . According to Bruni and Famá (2008, p.181), one of the main objectives of costing systems is to “generate information about opportunities to improve the company performance in terms of economic results. As for the costing methods available in the literature, we can cite: Absorption Costing, Variable Costing and ABC.

It is important to highlight the Variable Costing method and the analysis of the contribution margin for the decision-making process. In this method, only variable costs will be part of the product cost; the fixed costs, together with the expenses, will be part of the income (Martins, 2008). According to Megliorini (2007), fixed costs originate in the maintenance of the productive structure of a given organization, so they exist even at times when the company does not manufacture or provide any service. Examples of fixed costs are: factory rent, fixed expenses on preventive maintenance, among others.

Martins (2008) explains that variable costs are all costs that vary in proportion to the volume produced. Thus, the larger the company's production volume in a given period, the greater the total variable costs. The consumption of raw material is an example of variable cost, as its oscillation depends on the volume produced.

The contribution margin, according to Martins (2008), is the difference between the sales price and the variable unit cost of the product, that is, through this margin, the variable cost method only settles the costs directly associated with the products. The sum of the unit contribution margins allows managers to know how much they will have to cover fixed costs and generate profits for the company (Maher, 2001).

In the contribution margin analysis, factors that limit production may occur. Insufficient raw material, for example, can put a constraint on the production process. In this case, the use of the contribution margin by limiting factor is suggested, “[...] if there is no limitation in productive capacity, the product that produces the highest contribution margin per unit is of interest, but if it exists, it is the product that produces a greater contribution margin by the limiting capacity factor that matters” (Martins, 2008, p.191). The contribution margin per limiting factor is obtained by dividing the unit contribution margin by the consumption of the limiting factor per produced unit. Thus, the constraint factor (such as the raw material for example) becomes the denominator in the equation, subordinating the remaining production phases to the available quantity of this factor. Another noteworthy aspect in the verification of dairy industries' costs is the joint production phenomenon. According to Martins (2008, p. 162):

Joint production is the emergence of several products usually from the same raw material. A number of joint products normally classified as co-products and by-products are produced from the same material. (Martins, 2008, p.162)

Products are not identified as separate individual products until a certain stage of production called a “separation point” is reached. The main products are called co-products and,

By-products are those items that, emerging normally and during the production process, have a relatively stable sales market, both as regards the existence of buyers and the price. These are items that are traded as normal as the company's products, but represent a tiny fraction of total sales (Martins, 2008, p. 122).

Joint production is complex in terms of the determination of unit costs per product, both for the purposes of inventory evaluation and for the determination of the sales price and analysis of gross margins per product. Martins (2008, p. 123) points out that the accounting treatment takes place as follows: the net realizable value is calculated, based on the market price of the by-product, is debited from the inventory account of the by-product and credited to the cost of the main co-product sold.

For Horngren, Foster and Datar (2000, p. 386), a second approach is possible, which allocates costs, employing physical data such as weight and volume. The authors emphasize, however, that the market price is generally, a better indicator of the advantages obtained than the physical measures.

Attachments 1 and 2 present the cost calculations, pricing and contribution margin related to the case under study.

6.3 By-product and transfer price

Some concepts are important to understand the process of costing and pricing in the dairy industry, such as the concepts of by-product and transfer price. For Martins (2008):

By-products are those items that, emerging normally and during the production process, have a relatively stable sales market, both as regards the existence of buyers and the price. These are items that are traded as normal as the company's products, but represent a tiny fraction of total sales (Martins, 2008, p. 122).

According to Carli, Marcello, Gomes and Hein (2012, p.6), by-products are “the items normally produced by the production process that have a stable market, but represent a very small portion of the company's revenues”. In the case of the company Calu, the by-product is generated from the manufacturing process of mozzarella, which in turn generates the whey (by-product), which is used in the production of ricotta.

This whey transferred to the ricotta needs to be measured at a certain value, which is the transfer price, so that the results of the sectors and of the company in general can be determined.

According to Catelli (2007, p.392), “transfer pricing is defined as the value by which goods and services are transferred between the activities and internal areas of an organization”. The author states that it is important to measure the contribution of each isolated area of the company to the overall result (Catelli, 2007).

The concept of transfer pricing is also related to the concept of opportunity cost, which, according to Catelli (2007:389), “corresponds to the value of a given resource in its best alternative use; represents the cost of choosing one alternative over another capable of providing a greater benefit, that is, it is the cost of the best opportunity that is waived when choosing an alternative”.

Based on the concepts presented, it is argued that the transfer price contributes to the determination and achievement of the results of the company as a whole and, at the same time, it supports the managers to determine the final price of the product and to know the result (profit or loss) of each department or area of the company. According to Catelli (2007), transfer pricing models adopted by companies can be based on: costs (total realized cost, variable realized cost, marginal cost, standard variable cost and cost plus margin); based on negotiation between managers; and models based on market prices (current market price and adjusted market price).

References

- Bruni, A. L. & Famá, R. (2008). *Gestão de custos e formação de preços: com aplicações na calculadora HP 12C e Excel.* 5^a. ed. São Paulo: Atlas.
- Carli, S. B.; Marcello, I. E.; Gomes, G., & Hein, N. (2012). Métodos de atribuição de custos conjuntos aplicados ao setor de laticínio: estudo de caso no laticínio Boa Esperança do Iguaçu Ltda. *Revista Custo e @gronegócio* (online), Recife, 8(1), pp. 02-23.
- Canever, F. P.; Lunkes, R. J.; Schnorrenberger, D. & Gasparetto, V. (2012). Formação de Preços: um estudo em empresas industriais de Santa Catarina. *Revista de Contabilidade do Mestrado em Ciências Contábeis da UERJ* (online), Rio de Janeiro, 17(2), pp. 14-27
- Catelli, A. (coordenador). (2007). *Controladoria: uma abordagem da gestão econômica – GECON.* São Paulo: Atlas.
- Horngren, C. T.; Datar, S. M.; Foster, G. (2006). *Contabilidade de Custos: uma abordagem gerencial.* 11^a. ed. São Paulo: Pearson Prentice Hall.
- Maher, M. (2001). *Contabilidade de custos: criando valor para a administração.* São Paulo: Atlas.
- Martins, E. (2008). *Contabilidade de Custos.* 9^a. ed. São Paulo: Atlas.
- Meglierini, E. (2007). *Custos: análise e gestão.* 2^a.ed. São Paulo: Pearson Prentice Hall.

Attachment 1

Cost calculation of ricotta cheese, suggested price and contribution margin

Raw material	Unit	Quantity	Unit cost	Total cost
Cooled milk	Liter	2.42	0,78	1,90
Whey	Liter	30.25	0,06	1,74
Raw material A	Unit	0.00073	325,57	0,24
Raw material B	Unit	0.02	0,95	0,02
Carton box	Package	0.11	0,68	0,08
Packing tape	Roll	0.00010	3,49	0,0003
Packing pouch	Unit	2.09	0,20	0,42
Total cost raw material				4,39
Outsourced services	Unit	Quantity	Unit cost	Total cost
Cheese factory	Kilogram	1.00	0,17	0,17
Cheese packing sector	Kilogram	1.00	0,06	0,06
Reception and cooling	Liter	2.42	0,005	0,01
Refrigeration	Liter	35.09	0,01	0,39
Boiler	Liter	2.42	0,01	0,03
Milk standardization and pasteurization	Liter	2.42	0,0024	0,01
Total cost outsourced services				0,67
By-products	Unit	Quantity	Unit cost	Total cost
Fat cream	Liter	0.01	6,2774	0,06
Total cost By-products				0,06
Total Direct Cost	Amount			
Total direct cost (Raw material + Outsourced services)	5.06			
Variable expenses	Amounts			
Taxes	0,40			
Commissions	0,11			
Freight	0,02			
Financial expenses	0,14			
Variable expenses - Total	0,67			
Sales price suggested by Cooperative	5,70			
Contribution margin = price - (variable costs + Variable expenses) + revenues from by-products	0,02			
Quantity sold	8300			
Total contribution margin	166,00			

Source: elaborated by the authors based on data provided by the Cooperative

Attachment 2

Comparative table of products studied

Product	Ricotta cheese	Low-fat milk	Full-fat milk	Large mozzarella cheese	Small mozzarella cheese
Volume	8,300	112,500	514,000	255,200	2,300
Sales price	R\$ 5.70	R\$ 1.75	R\$ 1.65	R\$ 9.00	R\$ 8.90
Invoicing	R\$ 47,310.00	R\$ 196,875.00	R\$ 848,100.00	R\$ 2,296,800.00	R\$ 20,470.00
Total variable costs	R\$ 41,960.60	R\$ 165,729.45	R\$ 716,865.19	R\$ 2,244,977.80	R\$ 20,687.72
Total variable expenses	R\$ 5,535.27	R\$ 23,034.38	R\$ 99,227.70	R\$ 270,103.68	R\$ 3,062.66
Taxes	R\$ 3,311.70	R\$ 13,781.25	R\$ 59,367.00	R\$ 160,776.00	R\$ 1,432.90
Commissions	R\$ 946.20	R\$ 3,937.50	R\$ 16,962.00	R\$ 45,936.00	R\$ 409.40
Freight	R\$ 141.93	R\$ 590.63	R\$ 2,544.30	R\$ 6,890.40	R\$ 61.41
Financial expenses	R\$ 1,135.44	R\$ 4,725.00	R\$ 20,354.40	R\$ 55,123.20	R\$ 0.00
Freight disposal	R\$ 0.00	R\$ 0.00	R\$ 0.00	R\$ 1,378.08	R\$ 12.28
Revenues from by-products	R\$ 521.03	R\$ 26,694.81	R\$ 124.09	R\$ 127,229.91	R\$ 1,146.66
Contribution margin	R\$ 167.00	R\$ 34,805.98	R\$ 32,131.20	(R\$ 91,051.57)	(R\$ 2,133.72)
Unit contribution margin	R\$ 0.04	R\$ 0.31	R\$ 0.06	(R\$ 0.36)	(R\$ 0.93)

Source: elaborated by the authors based on data provided by the Cooperative