

# The use of controlling in agricultural enterprises and their competitiveness

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**Abstract:** The article aims at the evaluation and comparison of the structure of costs linked to the milk production in the Czech Republic and the Slovak Republic. The paper focuses on the potential of the cost controlling in agricultural production. The analysis is based on data from the comparable sample surveys of costs and yields of agricultural commodities carried out by the Institute of Agricultural Economics and Information, Prague, and the Research Institute of Agricultural and Food Economics, Bratislava, in the period 2007–2012. The authors apply the contribution margin calculation and the gross margin calculation. Using target costing, the upper limits of variable and fixed costs are set to reach the break-even point. One of the main findings is that the average costs per litre of milk are by 15.3% higher in Slovakia than in the Czech Republic. It is caused by a significantly lower milk yield in Slovakia. Cost controlling based on the knowledge about the structure of the average costs of milk production can help farmers to better manage their business.

**Key words:** controlling, costs, cost controlling, fixed costs, milk, price, specific costs, variable costs

Let us to introduce the paper by the idea of the founder of modern macroeconomics John Maynard Keynes who aptly formulated his life experience: “The biggest problem is not to let people accept new ideas, but to let them forget the old ones.”

The second idea that impressed us is: “Behind every great accomplishment is a great story of education, training, practice, discipline, and sacrifice. You have to be willing to pay the price.” (Jack Canfield).

The reason for putting these ideas in the introduction to this paper is that they are highly relevant to the behaviour of Czech and Slovak farmers. The first idea refers to those farmers who do not want to accept new things, do not risk, and the farmers without fundamental changes in the structure of production. They usually do business at a loss. The second idea refers to those farmers who have enthusiasm and interest in successful company, who can adapt it easily to the situation, do not engage in what they cannot change, but in what they can change. Farmers must not forget that they live in a social system that reinforces the strong ones and

weaken the weak ones. It is up to them which group they want to belong to.

Such approach requires setting priorities in the scale of life values. Everybody must be convinced of the correctness of his/her decision only when feeling the freedom of decision-making. If somebody is able to bear responsibility, then he/she becomes free. Being free and independent people is the greatest victory in life. However, it also requires being responsible for ourselves.

The most valuable elements for each company are people who develop it. If people in the company are happy and free, the company is blooming and fulfilling the expectations of its stakeholders. This is not only the main objective but also the path that companies need to follow.

Milk is one of the export pillars of the Czech Republic and Slovakia (Svatoš et al. 2013). Dairy farmers in the Czech Republic and Slovakia, but also farmers in other European countries, hardly seek to solve a sharp decline in 2009. The milk output price decline triggered the reduction of dairy cows

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in both countries. Consequently, a decrease in the consumption of feed in the livestock production together with the above-average cereal harvest in 2009 in Western countries resulted in a drop of the cereal output prices. A quite different situation was in 2010, when the cereal prices became to grow due to the bad weather, floods and a low grain quality. Despite the more favourable output prices in agriculture since 2010, many agricultural commodities have been unprofitable so far. The loss is partially mitigated by the current subsidies.

Revenues from agricultural production are mostly out of the farmers' control. Yields, especially in the crop production, are substantially affected by weather. Output prices are determined by the market (Kita et al. 2012), because farms in the Czech Republic and in Slovakia operate in the market with the monopolistic competition, with a minimal ability to increase prices. Farmers can influence the output price only through a higher quality of production and possibly by negotiations within the agro-food verticals. It is necessary to seek hidden reserves in costs and consumption. Čuba and Hurta (2004) have already published a guide how to cut costs in the agricultural production by thirty percent. The research on the energy efficiency (Jelínek et al. 2010) of wheat producers in the Czech Republic shows that in the surveyed farms would actually be able to save around 35% of the direct and indirect energy input to keep the same wheat production.

Enterprises should continuously plan costs and evaluate the deviations of the actual costs from the plan. The business information system must be at such level that allows the management to use accurate information on any farm costs, causes of the cost formation and cost structure for the individual performances. The availability of such information is essential for the effective financial and operational management. One of the ways how to manage costs quickly and effectively is controlling.

The literature contains various definitions of controlling (Mann and Mayer 1992; Volmuth 2002; Fibírová 2003; Eschenbach 2004; Foltínová et al. 2011; Sedláčková et al. 2012; Havlíček and Břecková 2013). In the article, controlling can be defined as “a method how to increase the effectiveness of management using a continuous and systematic comparison of the facts and the desired (predetermined, planned) state of the business processes, the evaluation of anomalies observed, finding their causes, proposing measures for their remedy, or to update the targets” (Fibírová 2003). Cost controlling is a partial method of controlling focused primarily on the overhead

costs. Cost controlling includes all measures, analyses and tools which consist in the purposive creation of cost structures. Cost controlling focuses on the cost structure, the roots of costs and the cost flexibility with an emphasis on the future.

The paper deals with cost controlling in agricultural production. As already mentioned, the farms adopt the output price from the market. The appropriate procedure for cost controlling in agriculture is target costing. Target costing deducts the profit margin from the output price. Then the controller gets the upper limit of specific and overhead costs, which the company should not exceed if it wants to produce profitably. Moreover, it is necessary to add the current subsidies to the sales revenues. Besides target costing, the controllers can also manage the cost structure through the Actively Based Costing (Chrenková 2011), cost benchmarking (Janotová and Boudný 2013, Bošková 2008) and Zero Base Budgeting. Poláčková et al. (2008) focus on the cost structure of the selected agricultural commodities in the Czech Republic.

The article aims at the evaluation and comparison of the structure of costs linked to the milk production in the Czech Republic and the Slovak Republic. The paper focuses on the potential of cost controlling in agricultural production.

## MATERIAL AND METHOD

The analysis is based on data from the sample survey of costs and yields of agricultural commodities. The survey has been carried out by the Institute of Agricultural Economics and Information, Prague (IAEI) and the Research Institute of Agricultural and Food Economics, Bratislava (RIAFE). Both institutions collect specific and overhead costs in agricultural enterprises.

In the Czech Republic, the methodology of the costs and revenues calculation (Poláčková et al. 2010) in agriculture is recommended by the Ministry of Agriculture for the application in agribusiness entities with accounting. The methodology establishes the calculation formulas for the main and supplemental activities in agribusiness enterprises including their description. Simultaneously, the calculation methods for the particular activities including the range of the calculated outputs have been determined. This enables to check the comprehensiveness of cost allocation into outputs. The report for each commodity has a standardized structure. The sample survey collects not only financial data but also natural variables

Table 1. Number of respondents with the available data on milk production (2007–2012)

	2007	2008	2009	2010	2011	2012
Slovakia	74	66	67	63	68	58
Czech Republic	187	189	171	156	156	145

Source: authors based on the IAEI and the RIAFE

such as the sowing and harvesting agricultural area, the number of feeding days, the produced and sold quantity of production, etc.).

In Slovakia, Cenigová (2000) published a similar methodology of cost and revenues calculation in agriculture. The reports keep the same structure as in the Czech Republic. The overview of the methodologies for costs calculations of ruminants in Slovakia was published by Krupová et al. (2012).

The paper focuses on the cost structure in agriculture in the period 2007–2012. Table 1 refers to the number of respondents with the available data on the cost of milk production. The sample reflects the fact that there is an important role of large mixed crop and livestock agricultural enterprises (joint-stock companies and cooperatives).

Overhead costs per one costing unit in dairy farms are calculated through the same method in both countries. Specific costs are directly convertible per costing unit, whereas the overhead costs are common for more outputs at the same time. The calculation formula and the definition of cost items in livestock production are almost the same in both countries. Milk production requires cost calculation of different animal categories. The subtracting calculation,

the budgeting calculation or the composite method is used. Costs of main products can be calculated by subtracting the value of by-products (manure) from the total costs of keeping dairy cows. The comparison of the average costs per litre of milk and the price per litre of milk gives information about the profitability of milk production.

There are two main products – milk and calves. Let us assume that 94% of total costs relate to milk and 6% refer to calves. The costs are expressed per 100 feeding days and per litre of milk.

Because of different currencies used in the Czech Republic and Slovakia, all costs and revenues in the Czech Republic and Slovakia are converted into EUR using the annual average of the daily exchange rates CZK/EUR announced by the Czech National Bank and the exchange rates SVK/EUR in 2007 and 2008 by the Slovak National Bank.

To make a complex view on the economic efficiency of milk production, the FADN network is used as a data source. The article compares the specific and overhead costs, other costs (costs on the external factors and depreciation), and total production with and without current subsidies per livestock unit. The FADN analysis focuses on the specialized milk farmers (code 5 in TF8 FADN grouping).

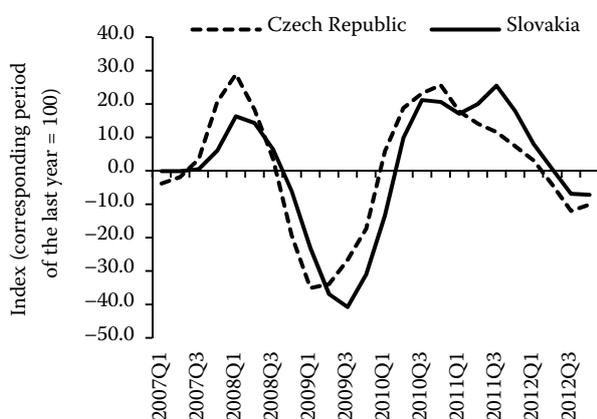


Figure 1. Producer price index in 2007–2012 (corresponding period of the last year = 100)

Source: authors based on the Eurostat data

### Application of cost controlling in agricultural production

As we already mentioned in the introduction, the surplus of milk production in the global market led to lower output prices of milk in 2009. Figure 1 shows the annual producer price index of cows' milk. The indices refer to the same period of the previous year and are in nominal terms.

The deepest drop in output prices is evident in 2009. In Slovakia, there has been a decline in milk prices with a quarterly delay against the Czech Republic. Farmers were losing between 0.10 and 0.20 EUR per litre in average. At the end of 2009, the price rose to around 0.27 EUR per litre. Since the end of 2010, milk processors in Slovakia concluded contracts with the producers under the assumption of gradu-

ally increasing prices. However, even higher prices fail to cover the costs. A gradual increase in prices encourages farmers to produce more. The second wave of the price decline was recorded in 2012, but it was not so dynamical.

The crisis in the milk market in combination with the financial and economic crisis forced the final consumers to reduce the demand for dairy products. Exports from the EU to third countries decreased by half.

This situation forced farmers to think about ways how to reduce costs and how to sale at higher prices. In this respect, the producers need to assess the feasibility of the first-hand sale. Everything also depends on the situation in the region. The potential sellers of milk should take into account the additional investments to ensure the point of sale, the staff remuneration, keeping sales records on the file, etc. Milk vending machines seems to be a practical solution of this problem, especially for small milk producers.

Raw cow's milk is consumed in almost all European countries. Especially Italy has a great power in direct sales of milk through the milk vending machines. One of the most important benefits of the direct sale (first-hand sale) is the elimination of trade interfaces, which has the effect of price reduction for the final consumer. Experiences of agricultural enterprises confirm that the installation of milk vending machines in densely populated areas can increase the milk consumption by 4%. Milk from the vending machines is healthy and safe because it can be offered only by farmers with food safety certificates. Milk is tasty and of a higher quality. Besides the dietary point of view, there are also better output price relations for both manufacturers and consumers. Moreover, packaging of the raw cow's milk sold through milk vending machines is more environmentally friendly because the consumers mostly carry their own bottles.

If someone wants to do business efficiently and be competitive in the 21<sup>st</sup> century under the globalization of the world market, the entrepreneur cannot use obsolete methods and tools (Krause and Javor 2006). Instruments providing the in-depth, relevant, timely and accurate information should be applied. Controlling provides such a tool. Medium-sized and large companies, especially with the foreign capital involvement, use controlling as the management tool.

One of the main tasks of operational controlling is to manage profit within the company. Profit is commonly quantified as the difference between revenues and costs. If we assume that the essence of revenues in the manufacturing business consists of the sales

of own products, then profit/loss is determined by the revenues and costs on own products. Moreover, the current subsidies significantly increase the economic results in agricultural enterprises in the EU. Under the assumption of the monopolistic competition, enterprises can hardly set a price and therefore the enterprises must focus on the consumption and production costs.

Cost controlling is a special discipline of controlling. Cost controlling focuses on costs at the company level as well as at the output level. Controlling answers the entrepreneurs following questions:

- (a) What costs do originate in the enterprise?
- (b) Where do the costs originate?
- (c) Why are they so high?
- (d) Who pays the costs?
- (e) Are all costs effectively expended?

To answer these questions in the milk production, the analysis of the average price and costs of production of the raw cows' milk should be done. The analysis is based on data from the sample survey of the costs and yields of milk production in Slovakia and in the Czech Republic.

The reports from sample surveys classify the costs as follows: feed and bedding costs (on-farm or purchased), costs on the veterinary material, other material costs, specific personnel costs including the mandatory social costs of employer, machinery & building current costs, depreciation of fixed assets, depreciation of animals, veterinary services, other specific and service costs, costs of the ancillary activities, total specific costs, production overheads, administrative overheads, the average total costs per 100 feeding days (f. d.), the average total costs per 1 litre of milk.

This classification respects the typology of costs by the possibility of their assignment to the costing unit – specific costs can be assigned to the costing unit, whereas overhead costs cannot. Farms in Slovakia and in the Czech Republic usually do not distinguish variable and fixed costs. It is very difficult for them to decide about the short and long time period. The useful tools for the managerial decision making are the contribution margin calculation and the gross margin calculation.

The contribution/gross margin calculation helps to determine how each output covers fixed costs and generates profit. It helps to determine whether to keep or drop certain aspects of the business or product. Both methods try to set the price threshold to cover the unit variable/specific costs. Leinweber

Table 2. Specific and overhead costs on dairy farming (EUR/100 f. d.)

		2007	2008	2009	2010	2011	2012
Specific costs	CZ	509.26	599.35	524.07	556.62	612.38	625.26
	SK	487.52	586.85	542.17	548.06	629.50	600.38
Overhead costs	CZ	86.12	97.35	89.58	97.79	103.23	85.83
	SK	87.48	103.32	97.85	107.71	117.51	109.20
Sales of milk	CZ	517.07	598.11	414.33	534.32	626.90	587.36
	SK	489.80	561.25	368.34	448.05	531.07	495.51
Gross margin	CZ	7.82	-1.24	-109.74	-22.30	14.52	-37.90
	SK	2.28	-25.60	-173.83	-100.01	-98.43	-104.87

Source: authors based on the IAEI and the RIAFE databases

(2009) describes the principle of the contribution margin calculation. He concludes that almost half of Czech companies still do not use the contribution calculation method even though it is great for the sophisticated monitoring of the up-to-date situation in the company and as well it provides a much better information than the accounting system.

The basic difference between the contribution margin calculation and the gross margin calculation is that the contribution margin calculation seeks to separate out variable costs (included in the contribution calculation) from fixed costs (not included in the contribution calculation) on the basis of the economic analysis of the nature of the expense, whereas the gross margin is determined using the accounting standards.

Use of the contribution margin in agriculture is very questionable, either due to an impact of natural conditions on agricultural production, or due to the supplemental production and the consumption of own products and by-products. Last but not least, monitoring of fixed and variable costs is very difficult.

If agricultural enterprises do not distinguish variable and fixed costs, they can apply the gross margin calculation. The gross margin can be set as the unit gross margin or the total gross margin. The unit gross margin is the difference between the output price per unit ( $p$ ) and the specific costs per unit ( $sC$ ), i.e.  $GM = p - sC$ . The total gross margin is calculated as unit gross margin multiplied by the number of units sold. Specific costs include variable costs and fixed costs directly linked to the output, such as material costs, energy, labour etc. It does not include the overhead fixed costs like the office expenses, rent, administrative costs, etc. Gross margin can be set either as the unit/total margin or as the percentage margin.

Table 2 shows specific costs, overhead costs, sales and unit gross margin per 100 f. d.

Table 2 shows that the proportion of specific costs to the total cost of dairy farming in both countries is approximately 85–86%. Economics of production and marketing of milk is in the red. Sales of milk are not able to cover the entire specific costs. Moreover, overhead costs are not covered. In the

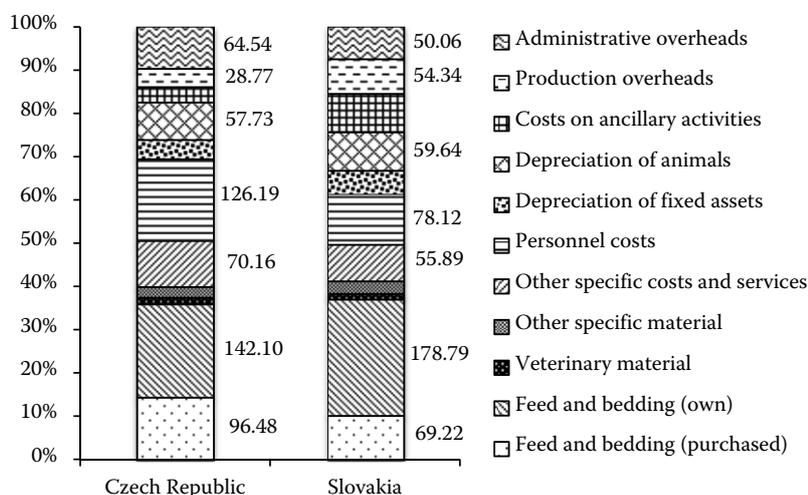


Figure 2. Structure of costs of dairy farming in the period 2007–2012

Absolute values are expressed in EUR/100f.d.

Source: authors based on the IAEI and the RIAFE databases

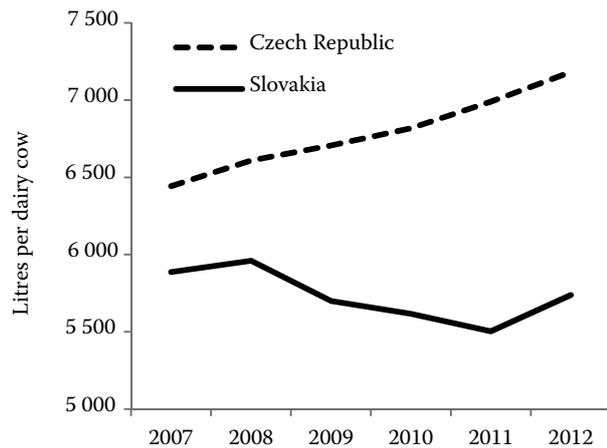


Figure 3. The Average annual milk yield in the Czech Republic and in Slovakia (2007–2012)

Source: Authors based on the IAEI and the RIAFE databases

period 2007–2012, the average unit gross margin of milk production was –83.41 EUR/100 f. d. in Slovakia and –24.81 EUR/100 f. d. in the Czech Republic. Figure 2 includes the detailed cost structure in the period 2007–2012.

Figure 2 indicates a higher proportion of the costs of the purchased feed and bedding in the Czech Republic in comparison with Slovakia. The total specific material costs account for 50% of the total cost of milk production in both countries. However, there are relatively large differences in labour costs between the two countries. Personnel costs, including the mandatory social expenses of employer, account for 19.0% of the total costs in the Czech Republic (126.19 EUR/100 f. d.) and 11.7% in Slovakia (78.12 EUR/100 f. d.). Thus, the specific labour costs correspond to the lower wage level of workers in Slovak agriculture.

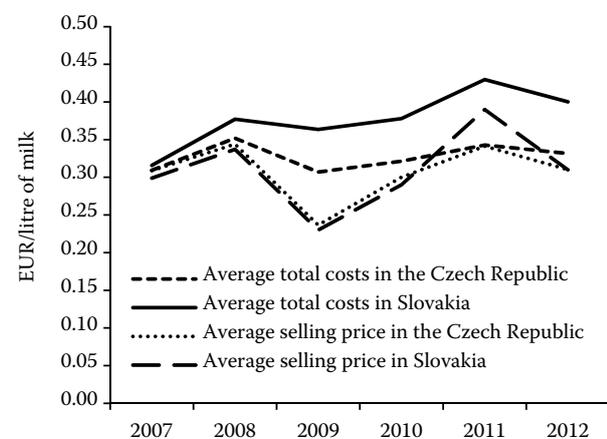


Figure 4. The average total costs and output price per litre of milk

Source: Authors based on the IAEI and the RIAFE databases

The economic performance of milk production is influenced not only by the specific and overhead costs per 100 f. d., but primarily by the milk yield per dairy cow which significantly affects the final average unit cost per litre of milk. Figure 3 shows the average annual milk yield in the Czech Republic and in Slovakia.

The average annual milk yield is significantly lower in Slovakia than in the Czech Republic. In Slovakia, the average annual milk yield does not exceed 6,000 litres per dairy cow. There is no obvious growing trend. In the Czech Republic, the average annual milk yield increased from 6443 litres in 2007 to 7181 litres in 2012. Michaličková et al. (2014) recommend the effective utilization of the production potential of animals as the main factor of the unit costs reduction as well as for the improvement of the dairy cattle farms profit in Slovakia.

Figure 4 confirms the negative profitability of milk production in the Czech Republic and in Slovakia without the influence of subsidies.

The average output prices per litre of milk, shown by the dashed lines, were approximately the same in both countries, with the exception of 2011. So, milk producers in both countries have comparable price conditions. Nevertheless, the average costs per litre of milk are significantly higher in Slovakia than in the Czech Republic. In Slovakia, dairy farms suffer from the lower milk yield per dairy cow. On the other hand, they have comparable total costs per 100 f. d. (664.5 EUR/100 f. d. in the Czech Republic, 669.6 EUR/100 f. d. in Slovakia in average 2007–2012). Thus, the average costs per litre of milk are by 15.3% higher in Slovakia than in the Czech Republic. Nevertheless, Figure 4 shows that the profitability of milk production was negative in all years.

The current subsidies significantly increase economic results of agricultural enterprises. In the period 2007–2012, the European budget provided a direct payment per hectare in the form of the Single Payment Scheme (SAPS); the national budgets increased the current subsidies by the additional payments Top-Up. In addition, agricultural enterprises receive the LFA payments when they farm in the less favoured areas, environmental subsidies when they farm in the areas with environmental restrictions and produce public goods.

It is possible to show the influence of the current subsidies on the economic performance of specialized dairy farms. The Farm Accountancy Data Network (FADN) provides information about costs and yields of specialized dairy farms in the Czech Republic and

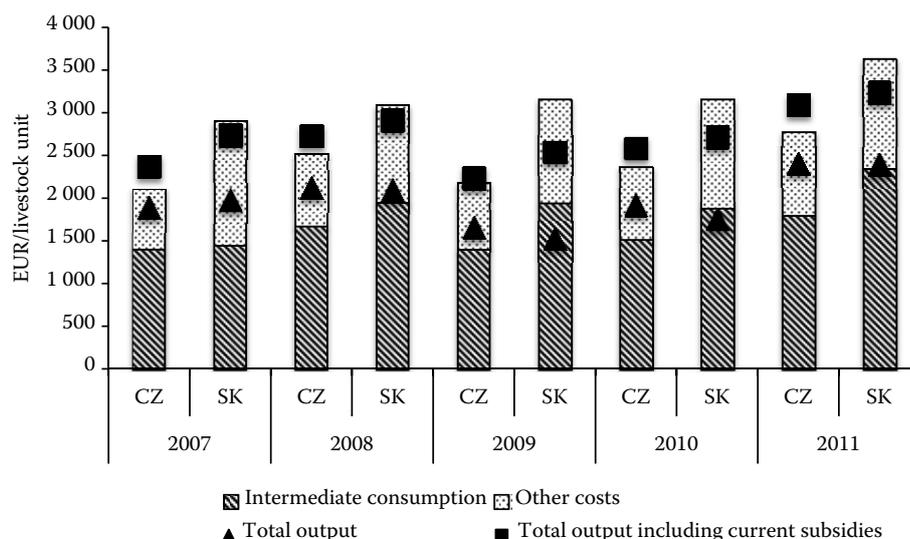


Figure 5. Determinants of economic results of specialized dairy farms in the Czech Republic and in Slovakia

Source: Authors based on the IAEI and the RIAFE databases

in Slovakia. All economic indicators are calculated per one livestock unit. Figure 5 shows the costs of intermediate consumption (specific material costs, energy costs, external machinery & building current costs, services), other costs (depreciation, wages, rents and interest paid), the total output, the total output including current subsidies.

It is clear that agricultural enterprises are not able to cover the total costs by the total output without the current subsidies. So, dairy farms are not profitable without subsidies in both countries. It is important to stress, that the total output including the current subsidies covers the total costs in the Czech Republic, but not in Slovakia.

Here is an example. Let us assume that agricultural enterprises take over the output price from the market. The target costing method allows setting the upper limit of specific and overhead costs. In agriculture, the target costing method has to take into account the current subsidies. According to the RIAFE sample survey, dairy farms in Slovakia received price 0.31 EUR per litre of milk in 2012. The current subsidies per 100 f. d. were 158.57 EUR, the milk yield per 100 f. d. was 1 576.51 litres. So, the current subsidies per litre of milk were 0.1 EUR. Therefore, the total average revenues were 0.41 (0.31 + 0.1) EUR per litre of milk.

As already mentioned, agricultural enterprises do not distinguish between the specific and variable costs. Nevertheless, the farmers are able to identify the variable and fixed costs from the in-depth cost accounting. Production and administrative overheads can be considered as fixed costs. Fixed costs could also include the depreciation of long-term assets and the depreciation of animals. Variable costs include the specific material costs and the specific person-

nel costs. Costs of ancillary activities may be partly variable and fixed. Ancillary activities include the use of tractors and haulage for each livestock output, repairs and maintenance carried out on own account. Therefore, let us consider the variable nature of the costs of ancillary activities.

Let us continue with the case from Slovakia. When the fixed costs 0.13 EUR per litre of milk are subtracted from the total revenues 0.41 EUR per litre, it is possible to set the upper limit of variable costs at 0.28 EUR per litre of milk. Nevertheless, the real average variable costs were 0.32 EUR per litre of milk in 2012. Analogously, when the variable costs 0.32 EUR per litre of milk are subtracted from the total revenues 0.41 EUR per litre of milk, it is possible to set the limit of fixed costs at 0.09 EUR per litre of milk. However, the real average fixed costs were 0.13 EUR per litre of milk in 2012. In order to be at the break-even point, dairy farmers should receive 0.45 EUR per litre of milk.

In a situation when dairy farmers take the output prices from the market, it is necessary to look for reserves on the cost side, whether fixed or variable costs. They should also strive to improve the yield parameters of dairy cows, which significantly affect the contribution margin per litre of milk. The higher milk yield allows diluting the fixed costs and reducing their average amount per litre of milk.

## CONCLUSIONS

This article aims at the evaluation and comparison of the structure of costs linked to the milk production in the Czech Republic and in Slovakia. The paper

concentrates on the potential of cost controlling in agricultural production with a special focus on the target costing method. The objectives are carried out.

In this paper, the average costs of raw cow's milk production over 6 years are analysed. The period 2007–2012 includes the crisis years 2009 and 2010, when there was a sharp decline in the milk output prices. The results reveal that the output price of milk in Slovakia does not cover the total costs. The gross margin and contribution margin were negative.

Taking into account the current subsidies, the contribution margin is positive but the price still does not to cover all fixed costs. So, the milk production is unprofitable. The situation is better in the Czech Republic due to the lower average costs per litre of milk. It is caused by a significantly lower average annual milk yield in Slovak dairy farms, which does not exceed 6000 litres of milk per one dairy cow. Alternatively, the average annual milk yield in the Czech Republic exceeds 7000 litres of milk with an increasing trend. Such differences in the average annual milk yield generate differences in the average costs per litre of milk. In Slovakia, the average total costs per litre of milk were by 15.3% higher than in the Czech Republic in the period 2007–2012.

The results of the sample surveys help farmers to know the typical average cost structure of the milk production. Farmers can compare their cost structure and make decisions about each cost category. They can identify the break-even price to cover the specific and overhead costs. Alternatively, they can find the break-even point of production at which the costs and revenues are equal. Cost controlling also enables farmers to quantify how much the costs should be reduced to reach the break-even point.

The article does not cover all the possibilities provided by the cost structure analysis in the dairy farming under the assumptions of the current market price of milk and the demand for milk and milk products in Slovakia and the Czech Republic.

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