EVALUATION OF RESOURCE PRICE PREFERENCES AND RESOURCE UTILIZATION EFFICIENCY IN DAIRY SECTOR

Agnese Krieviņa
Latvia University of Agriculture, Latvian State Institute of Agrarian Economics
agnese@lvaei.lv

Abstract. The paper deals with the evaluation of resource price preferences and resource utilization efficiency in Latvian dairy sector that shows Latvian relative competitive position both in terms of producing competitive products for the market, as well as ensuring competitive salaries and a general rise in living standard for the employees. The evaluation is carried out through analyzing price levels of the main production resources and the utilization efficiency of these resources, based on the comparison with other EU countries. The efficiency indicators in Latvian primary milk production sector are considerably lower and despite resource price preferences the cost level per production value in Latvia is higher than in other countries. The analyzed resource utilization efficiency is low in Latvia also at the processing industry level, though the current price level of the main production resources helps to ensure competitive positions of Latvian dairy products. But considering large differences in compensation levels for labour force between Latvia and other EU countries, without increase in productivity, the situation is not sustainable in long-term.

Key words: dairy sector, resource prices, resource utilization efficiency, the value added, competitiveness.

Introduction

Dairy sector is one of the main agri-food sectors in Latvia, accounting for almost ¼ of the total agricultural goods output and 20% of the total output in food industry (EAA, 2010; CSB of Latvia, 2010).

Compared to other European Union (EU) countries, Latvian primary milk production and processing sectors are characterized by low value added per employee, but the value added forms the basis for the compensation/income of the production factors. Generally the value added refers to the total return earned by the team of workers, capital providers and the government, and it shows the total amount of money available for reinvestment and retained earnings (Riahi-Belkaoui, 1992).

The value added or the additional value created by the production factors is determined by price (also product subsidies), production volume and intermediate consumption of goods and services used in the production process. Considering that output prices are generally determined by the development on the markets, producers have more limited possibilities to influence product prices (especially for base or commodity products), compared to the level of production costs.

The analysis carried out by the author has shown that the development of the value added has been mainly determined by the changes in prices in recent years. Resource prices have increased considerably in Latvia since 2003, though it was compensated by the rise in milk prices. But generally it would not be reasonable to count on milk price above the levels observed in the period before milk price surge in 2007 (at the same time, the risk of price volatility has increased), contrary to resource prices that still have growth potential in Latvia. Under these circumstances the resource utilization efficiency right now becomes crucial to ensure sustainability of the sector that includes increase in the value added and competitive remuneration for the labour force.

Production costs in Latvian dairy sector have been widely studied (e.g, Bratka and Prauliņš, 2009; Latvietis and Priekulis, 2006; Miglavs et al., 2006); however, the studies have mainly focused on the primary milk production level, the analysis has been scarce at the dairy processing industry level. The author also wanted to combine the analysis of differences in resource prices with the analysis of resource utilization efficiency.

The objective of the paper is to evaluate resource price preferences and resource utilization efficiency in Latvian dairy sector. In order to reach the objective, the following tasks were set – 1) to determine the main production costs in dairy sector both at the primary and processing level; 2) to compare the main resource price levels between Latvia and other EU countries; 3) to calculate efficiency indicators and evaluate resource utilization efficiency in dairy sector in Latvia, compared to other EU countries.

The object of the study is primary milk production sector (represented by the average dairy farm) and dairy processing industry in Latvia and other EU countries, and the subject – resource prices and efficiency.

Materials and Methods

Analysis of the efficiency at the primary production level has been carried out using FADN (Farm Data Accountancy Network) data on dairy specialization farms. The EU average corresponds to the average level observed in the countries covered by FADN database (EU-27 countries, except Cyprus). To make evaluation and comparison among countries, 6 leading EU milk producing countries that produce more than 2/3 of the total milk in the EU (Germany, France, the United Kingdom (UK), Poland, the Netherlands and Italy) and 3 Baltic States were selected. The latest available comparative data cover the year 2007.

For making analysis at the processing industry level, Eurostat data on manufacture of dairy products were used. The Eurostat does not provide EU average figures and due to the lack of data for some countries, the average indicators could not be calculated either.
The latest available comparative data also cover the year 2007. The main sources for price data include Eurostat, DG Agri as well as calculated data from FADN. Generally the data for the year 2009 were used or in case of lack of such data – the latest available year.

In the context of this paper, the value added is assumed to be the gross value added, i.e., production value at producer prices less intermediate consumption. Production efficiency is considered to be the ability to balance production costs with the revenue in the most rational way. The resource utilization efficiency is perceived to be input productivity in yielding output.

Methods of statistical analysis and logically constructive analysis were employed in data analysis.

**Results and Discussion**

The share of intermediate consumption in the total production value of dairy specialization farms was 72.9% in Latvia in 2007, compared to 58.9% in the EU on average. The level of intermediate consumption is important in determining the gross value added - the remaining part of revenues gained from the market that forms the basis for the compensation/income of the production factors.

The main intermediate cost position is feed that comprises almost half of the total intermediate consumption (46.2% in Latvia, 42.4% in the EU on average). Energy costs are the second most important intermediate consumption cost position in Latvia, accounting for 17.6% of the total intermediate costs. The share of energy costs is lower in other EU countries mainly due to higher share of costs of contract works that is largely associated with lower relative labour input.

Considering the costs associated with maintenance of machinery and buildings, as well as fixed capital consumption, important expenditures of the dairy farms are associated with capital items.

Although the value added is the source of income of production factors, the actual level of factor costs is important in determining the overall cost level and return on farm produce and consequently the competitiveness of the farm both on the product market and also labour market. Wages forms the most part of factor costs in Latvia. In other EU countries factor costs are split almost evenly between wages, rent and interest paid.

However, paid labour constitutes a small part of the total labour input of dairy farms due to large family labour contribution that gives rise to opportunity costs. If costs of all labour input are considered, feed costs along with labour costs are the main costs positions of dairy farms in Latvia (Bratka and Prauliņš, 2009).

The analysis carried out by the author on marketing margins in dairy supply chain revealed that the share of farm gate price in liquid milk ex-farm price during 2004-2009 comprised 52%, the respective share for cheese is 62%.

Available information on intermediate costs in dairy processing enterprises reveals that these costs account for 81.3% of the production value in Latvia and 84.6% in the EU on average (Eurostat, 2009). Personnel costs account for 10.9% of the total intermediate and personnel costs in Latvia and 9.4% in other EU countries.

---

Table 1

| Cost structure of dairy farms in Latvia and other EU countries in 2006-2008 |
|---------------------------------|---|---|---|---|---|
|                                 | Latvia | EU-average |
|                                 | 2006 | 2007 | 2008 | 2006 | 2007 |
| Intermediate consumption        | 77.5% | 75.9% | 73.9% | 69.2% | 70.7% |
| Livestock specific costs        | 42.8% | 40.9% | 38.7% | 34.4% | 36.7% |
| - feed                          | 37.7% | 36.2% | 34.1% | 27.5% | 30.0% |
| Farming overheads               | 2.0%  | 26.8% | 27.4% | 27.4% | 26.6% |
| - machinery and building current costs | 7.2% | 7.6% | 6.8% | 7.5% | 7.3% |
| - energy                        | 12.1% | 12.0% | 13.0% | 6.4%  | 6.3%  |
| - contract work                 | 2.3%  | 2.1%  | 2.2%  | 5.9%  | 5.8%  |
| Depreciation                    | 12.5% | 14.1% | 15.1% | 17.0% | 15.8% |
| Factor costs                    | 10.0% | 9.9%  | 10.9% | 13.8% | 13.5% |
| - wages paid                    | 7.1%  | 6.7%  | 7.3%  | 4.4%  | 4.4%  |
| - rent paid                     | 0.6%  | 0.4%  | 0.5%  | 4.7%  | 4.4%  |
| - interest paid                 | 2.2%  | 2.9%  | 3.2%  | 4.6%  | 4.8%  |
| TOTAL INPUTS                    | 100%  | 100%  | 100%  | 100%  | 100%  |

Source: FADN, 2010
Considering the available information on production cost structure in dairy sector, the main cost items that determine the actual cost price of dairy products and the profit margin, and consequently the competitiveness of the sector include animal feed, compensation for employees, energy, depreciation and maintenance of machinery and buildings, as well as the interest associated to the purchase of capital items, rents and the value of purchased land, the value at which raw milk is available for processing industry, as well as other dairy product ingredients and materials. The cost level per product item is determined both by the prices at which resources necessary for production are available for a producer and also by the resource utilization efficiency. Consequently, the resource prices show the potential competitiveness, but the actual competitiveness is achieved by the knowledge, managerial abilities, technologies and techniques by which the resources are turned into marketable product. At the same time it has to be acknowledged that productivity is closely connected with higher compensation levels for production factors that is logical considering that the same production factor creates more value added.

To compare feed price levels between Latvia and other analyzed countries, the data availability aspect has determined that feed barley prices were used. The comparison of the average prices in 2009 shows that feed prices were about 30% higher in Italy, 20% higher in the Netherlands, and almost 10% higher in France, as well as in the United Kingdom and Germany than in Latvia (see Figure 1). As France and Germany are the largest cereal and also barley producers in the EU, the average EU price is generally determined by the prices in these countries. Prices in Estonia were 4% higher than in Latvia, but the price level in Lithuania and Poland was below Latvian price level (accordingly by 7% and 3%). Although, the general trend in recent years has been that Latvia has one of the lowest prices in the EU that are below price level in Lithuania and Poland. The available data for electricity prices (with excise tax, but without VAT) in 2009 reveal that Latvia has the lowest price level among the countries compared (see Figure 2). The prices in compared old Member States (except France) are from almost twice to more than two times higher than those in Latvia. Electricity prices in Poland are 22% higher than in Latvia, in neighbouring Estonia and Lithuania the price level was also slightly higher. The difference between prices of diesel is not so pronounced, with prices (with excise tax, but without VAT) ranging from 4% higher level in Estonia to 37% in the UK, and lower price level in Lithuania and Poland. However, if diesel prices excluding taxes and duties are compared, the price level in Latvia and other new Member States are even to 8% higher than in the old Member States (except Italy). This has to been taken into account considering that in some countries farmers can apply for excise tax compensation.

According to the latest available FADN data on labour compensation, the average wages paid per AWU (annual work unit – 1,840 hours within a year) by dairy farms in Latvia in 2007 were more than 6 times below the level observed in the UK and the Netherlands, and about 5 times less than in Germany, Italy and France. Also in Estonia persons employed by the dairy farms received twice as much as in Latvia. The compensation level in Latvia and Lithuania were almost on the same level, with 5% higher wages in Poland. The average level in the EU was 3.5 times above the level observed in Latvia.

The average monthly labour costs in Latvian dairy industry were lagging behind some other countries even more than on dairy farms (see Figure 2). If the monthly minimum wages in the second half of 2009 between countries are analyzed, employees in the Netherlands and France are guaranteed to receive 5 times more than the level observed in Latvia; however, minimum wages were lower in Lithuania and Poland (by 13% and 6% respectively).
The information on the prices of land and rents is scarce; however, from the available sources it can be concluded that the price level in old Member States is considerably higher than in Latvia. For instance, in the Netherlands that is characterized by very intensive land use, agricultural land costs about 30,000 EUR/ha.

During the year 2009, the average raw milk purchase price in Latvia was among the lowest in the EU, except Lithuania where farmers received even less. The highest milk price among the compared countries could be observed in Italy (by 72% higher than in Latvia), followed by France (+67%), the UK and the Netherlands (both +44%). The difference between Latvia and Poland was also 21% in favour of the latter. It has to be marked that Latvian raw milk prices have been the second lowest during all the EU membership period, with the price gap between Latvia and other EU-25 countries decreasing till 2006, and widening again afterwards. In 2007, the difference between Latvia and the EU average level was 21%.

No comparative data are available on capital items and also materials used in milk processing, but, considering that Latvia is importing these items, the prices should generally be at the EU level. Though, higher costs of capital are distributed in a couple of years. It is known that cattle prices are considerably lower in Latvia.

It can be concluded from the resource price comparison that generally Latvia has resource price preference that gives preconditions for a lower cost level and consequently higher production efficiency.

The calculation results show that efficiency indicators in Latvian primary milk production sector are considerably lower (see Figure 3) and despite resource price preferences the cost level per production value in Latvia is higher than in other countries. It can be argued that Latvia has one of the lowest farm-gate price of milk; therefore, indicators based on costs per output value are increased in Latvia due to low milk price. Nevertheless, it shows the poorer ability to balance costs with the revenue and generally milk price is associated both with quality of milk supply and also farmers' bargaining power. The large differences compared to other countries and also generally better efficiency indicators in Lithuania (the country with the lowest milk price), confirm that Latvia has low resource utilization efficiency.

Referring to the calculation results at the main production costs level, the total feed costs per produced animal output in analyzed farms are EUR 0.30 in the EU on average; in Latvia, however, the cost level reaches EUR 0.55. The highest efficiency level can be observed in France and the Netherlands (EUR 0.20), that is almost 3 times better indicator than in Latvia. The ratio of feed costs and obtained animal output is also good in Poland; it is better in Lithuania as well and also slightly better in Estonia than in Latvia.

Energy efficiency is also the lowest in Latvia among the analyzed countries in relation to the obtained output. The energy costs per production value are EUR 0.12 in Latvia, compared to EUR 0.05 in the EU on average, EUR 0.06 in Poland, EUR 0.07 in Lithuania and EUR 0.08 in Estonia. The differences between the cost level in Latvia and other countries exceed the differences that could be explained by various price levels, consequently indicating on low energy utilization efficiency in Latvia. There is a tendency that southern countries have generally lower energy costs (e.g., Italy despite high prices); nevertheless, Estonia that is situated further north than Latvia achieves better results.

Differences in labour productivity of dairy farms between the analyzed countries are even more pronounced than the differences in compensation levels. Although the average output per labour force input (AWU) in the EU is 3.7 times Latvian level, in the Netherlands, labour productivity exceeds Latvian indicator almost 11 times, but in the UK – 9.4 times. Considering the very high productivity, compared to the average level, it seems logical that employees in the Netherlands and the UK are rewarded with the
highest salaries among the analyzed countries. Labour productivity in Estonia is also 2.1 time higher than in Latvia, Poland excels by 22%, but in Lithuania it is almost at the same level as in Latvia.

When the gross value added (at producer prices) per AWU of dairy farms is analyzed, Latvia lags the efficiency of other countries very considerably – the EU average indicator exceeds Latvian level 6.1 times, but the Dutch productivity is almost 21 times than in Latvia (see Figure 3). Due to higher efficiency of intermediate consumption, Estonia, Poland and Lithuania have also considerably higher value added per employee.

There is also small production value per UAA in Latvia, compared to other countries (especially, the Netherlands). Considering the availability of land resources in Latvia, the low land utilization intensity currently is not a direct threat to future competitiveness of the sector, and it can have also some environmental benefits. At the same time, higher production value per UAA would compensate potential rise in land prices.

Latvian dairy farms are not in a good competitive position in terms of the intermediate consumption per production value. The indicator exceeds the average EU level by almost 30%, but the difference with Lithuania and especially Poland is more explicit, indicating that these countries have been able to use the lower resource price preference to some extent.

The position is also not good when the total input costs are considered - Latvia has by about 20% higher total costs per production value than in the EU on average; furthermore, they are almost at the same level as the total output value meaning that there is no place left for profit margin. It has also to be mentioned that in 2007, which is used for the comparison, milk prices were exceptionally high; in 2008 the total input already exceeded production value. Therefore, rising production costs can be only compensated by higher resource utilization efficiency, because the other option – increase in milk prices – should not be reasonable to count on as generally milk prices depend on the situation in dairy markets and even in this situation processing industry has higher bargaining power in setting prices, but in other cases rise in milk prices would cause problems for processing industry due to limited possibilities to absorb it and, therefore, is unlikely.

Latvia has comparatively high depreciation level per production value, compared to the EU level. The total interest paid has also increased in Latvia in recent years reaching the level of most of the old Member States, but the labour productivity as described before is far behind the EU average level that indicates on problems in providing reasonable ration between borrowed money and output. When looking at endowment of dairy farms with capital, Latvia has the lowest level of fixed capital among the compared countries. But the previous analysis shows that generally capital and labour are substituted which is a precondition for rise in productivity.

Although production efficiency in other EU countries is higher, generally the average EU dairy farm cannot generate from the market enough value added to fully cover all factor costs – both actually paid and opportunity costs (for family labour) - and those which are determined by the necessity to compete with other sectors of the economy. If only family labour force is considered as the only opportunity costs, then all costs from the market are compensated in all observed countries, except Germany, Estonia, France and Latvia. The costs in these countries are fully covered only by the contribution of subsidies. And despite lower support level per UAA, Latvia has the highest subsidies per production value that used

Figure 3. Efficiency indicators in Latvian primary milk production sector, compared to other EU countries.

Source: calculations by the author based on FADN, 2010; ADC, 2010
to correct total input costs ensures that Latvia has the overall costs at the EU average level.

The analyzed resource utilization efficiency is low in Latvia also at the processing industry level, though the current price level of the main production resources helps to ensure competitive positions of Latvian dairy products. But considering large differences in compensation levels for labour force between Latvia and other EU countries, the current situation is not sustainable in long-term.

When looking at milk utilization efficiency, the comparison shows that other countries can add higher value to raw milk than Latvia. The gap between Latvia and other countries is more pronounced if the total collected milk in the country is considered, because none of the analyzed countries has such a high export of raw milk that does not make any contribution to the local processing sector. The corrected (by foreign trade data) milk intake volumes indicate that the leaders among the compared countries in producing value-added products are Italy and France (see Figure 4). These countries have the highest milk price that facilitates creation of higher value added at the primary milk production level, and it generally should be related to the possibilities to obtain higher value from the market which is demonstrated by the higher production value per milk volume. Besides, the calculated ration of milk purchase and production value confirm that despite higher milk purchase costs the processing sector in these countries add higher value to milk. The lowest created additional value among the analyzed old Member States could be observed in the UK, where the majority of raw milk goes into the production of liquid milk (DairyCo, 2009), and cheese accounts for comparatively smaller share in the total production than in other countries (IFCN, 2008). The new Member States demonstrate comparatively low productivity; the data on processing profile (IFCN, 2008) and calculated indicator show that these countries could be described as producers of base products.

The results of the comparison of labour productivity in dairy industry reveal that Latvia has lower efficiency than other countries. In terms of the production value per person employed, only Lithuania has comparative level, in other countries it is from 1.5 times (Estonia, Poland) to even 8.8 times (the Netherlands) of Latvian level. In Germany the indicator is 7.6 times that of Latvian level.

Contrary to the situation at the primary level, the differences between Latvia and other countries in gross value added per employed person are generally smaller than shown by the previous indicator (except Lithuania and the UK) suggesting that generally there is better ratio between intermediate consumption and production value in Latvia, though the differences with most of the countries are still considerable.

Latvian dairy processing sector has comparatively good overall costs level of intermediate consumption (represented by the total purchase of goods and services) per production value; only Lithuania and the UK has slightly better indicator. Based on the available data, the positions of Latvia is also good when intermediate costs together with personnel costs are calculated per production value; the situation is slightly better in Lithuania, the UK and Poland, as well as at the same level in Estonia and Italy. However, it has to be reminded that it is achieved at lower prices of some of the main production resources. If it is assumed that just salaries rise by 50% (the difference with the EU average level is considerably higher) or just milk purchase price rise by 15%, Latvia already starts to lose its competitive positions. But generally Latvian processing industry already has to compete with other countries in terms of labour force, a lot of people have used the possibility to go for work in countries with higher salaries, farmers also want a better price for their milk and are looking for other options that include export of raw milk to Lithuania.

With the present production structure, organization and efficiency Latvian processing industry cannot ensure higher milk purchase prices and competitive...
salaries that would contribute to the increase of the living standard of the employees. Without increase in the resource utilization efficiency any global rise in prices of the production resources will be more felt by Latvian industry as it means higher transmission of costs per produced unit. Since 2007 with the latest comparative data for dairy industry available, the average salaries in food processing have increased by almost 20%, but the milk average purchase price has decreased by 30%. Although prices of milk dropped in all EU countries, the decline in Latvia was among the sharpest, and the author assumes that it was already the indicator of weakening competitive position.

Although there are no available comparative data on costs associated with consumption of fixed capital, it has been suggested that production capacity in Latvia considerably exceeds the current production volumes increasing the fixed costs per produced unit (Miglavs, 2006) that further weakens Latvian competitive positions.

Conclusions
1. The main cost items in dairy sector include animal feed, compensation for employees, energy, depreciation and maintenance of machinery and buildings, as well as the interest associated with the purchase of capital items, rents and the value of purchased land, the value at which raw milk is available for processing industry, as well as other dairy product ingredients and materials.

2. Latvia has considerable price preference in compensation for labour force and land; the price level in Latvia is generally lower for energy and should be also for feed. Latvian processing industry also buys milk at comparatively low prices.

3. The efficiency indicators in Latvian primary milk production sector are considerably lower, with the largest difference in labour productivity (output is 3.7 times lower than in the EU on average), and despite resource price preferences the cost level per production value in Latvia is higher than in other countries (intermediate consumption is 28% above the EU average level).

4. The total inputs on Latvian dairy farms are at the same level as production value or even exceed it, leaving no place for profit margin.

5. Although production efficiency in other EU countries is higher, generally the average EU dairy farm cannot generate from the market enough value added to fully cover all factor costs – both actually paid and opportunity costs (for family labour) - and those that are determined by the necessity to compete with other sectors of the economy.

6. The analyzed resource utilization efficiency is low in Latvia also at the processing industry level, though the current price level of the main production resources helps to ensure competitive positions of Latvian dairy products.

7. There is low labour productivity in Latvian milk processing sector (for example, output is 7.6 times lower than in Germany); Latvian dairy industry also adds comparatively small value to the purchased raw milk and can be described as a producer of base products.

8. Considering the large differences in compensation levels for labour force between Latvia and other EU countries (3.5 times lower in primary production than in the EU on average, and, for example, 5.4 times below the indicator in the German processing sector), the current competitive position that is achieved mainly by lower resource prices and not high resource utilization efficiency is not sustainable.

To maintain the competitive position of Latvian dairy sector, the increase in resource utilization efficiency should be achieved. The increase in the share of high value added products would also ensure higher production efficiency in the sector. It is also important that the whole sector increases its bargaining power that would help to attract more value from the market, but on the condition that the efficiency distribution of the value among the players of the sector are ensured.

Acknowledgements
The paper has been supported by the European Social Fund within the project „Support for the implementation of doctoral studies at Latvia University of Agriculture” (sub-activity 1.1.2.1.2. Support for the implementation of doctoral studies), agreement Nr. 2 009/0180/1DP/1.1.2.1.2/09/IPIA/VIAA/017, contract Nr. 04.4-08/EF2.D2.03.

References