

## COMPERATIVE STRATEGY AND EFFICIENCY ANALYSIS OF MILK PRODUCTION CHAINS IN DIFFERENT EU COUNTRIES

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### **ABSTRACT – Comparative strategies and efficiency analysis of milk production chains in different EU countries**

The reforms of the EU dairy sector raise concerns about the further functioning of the sector at the EU and regional level. The objective of this paper is to evaluate the total efficiency of milk production chains in different EU countries in relation to the business competitiveness obtaining strategy applied. There are different strategies applied among the countries. The most value adding oriented dairy industries are in Spain, Belgium and Italy, but the dairy industries of Ireland and the United Kingdom are the most outstanding representatives of cost leadership. On farm level also different strategies may be observed. Comparing the efficiency levels for the whole milk production chain, representatives of the both main strategies are present - the Netherlands and Ireland with their cost leadership strategy and also Belgium with its value adding strategy. When to evaluate the labour efficiency, Spain, Belgium and also Italy demonstrate a strategy based on the use of labour intensive higher value adding approach, whilst the Netherlands, Ireland and Belgium, also the United Kingdom, Germany and Sweden seem to maintain higher capital intensive cost efficiency strategies.

**Keywords:** value added, dairy chain, milk price, strategy, efficiency

### **INTRODUCTION**

Already almost 10 years reforms are taking place in the EU dairy sector, not excluding even complete liberalization of the sector – and in 2016 completely giving up the quantitative limitations on the production, including at the regional level. This raises concerns about the further functioning of the sector both at the EU and its different region level. At this paper we assume that the whole business volume of the EU dairy sector is sufficient enough not to significantly lose its share on the world market due to the ongoing reforms of the sector.

The *objective* of this paper is to evaluate the total efficiency of milk production chains in different EU countries in relation to the business competitiveness obtaining strategy applied.

The following questions are to be answered: 1) weather similar competitiveness obtaining strategies are used within the whole EU market area; 2) how does the dairy sector efficiency differ in the range of EU countries.

In economic and management literature, there are two widely used business competitiveness obtaining strategies – cost leadership (cost advantage) and differentiation (value advantage) (for example, CHRISTOPHER, 2005; LIPCZYNSKI et al., 2004; PORTER, 1998). The cost leadership focuses on production costs, ensuring that they are as low as

possible. This strategy is based on the supply-side approach. There are varied sources for the cost efficiency, including the pursuit of economies of scale, proprietary technology, preferential access to raw materials and other factors (PORTER, 1998). The differentiation, in its turn, focuses on the giving some unique product characteristics for the products which appeals to the customers and distinguishes these products from the products of the competitors. This strategy sometimes is also called the value-added strategy (ANDERSON et al., 2000), which the authors would like to specify as the value adding strategy. The uniqueness of the product is rewarded with a premium price (PORTER, 1998). The additional value of the product can be tangible or intangible (product brand), as well as it can be in the form of additional service (CHRISTOPHER, 2005). This strategy is based on the demand-side approach. The costs are reduced in all areas that do not affect differentiation (PORTER, 1998). Nowadays scale and scope effects are still important in dairy industry, but looking at the big international players, differentiation becomes more important (EWERWAND et al., 2007).

One of the widely used indicators of the competitiveness and efficiency is value added. 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). As the value added created by sector is the source of income of the persons employed in the sector and also of further investments to increase the production efficiency, the amount of the value added determines business sustainability and competitiveness in attracting labour force, as well as ensuring competitive products on the market.

## **MATERIAL AND METHOD**

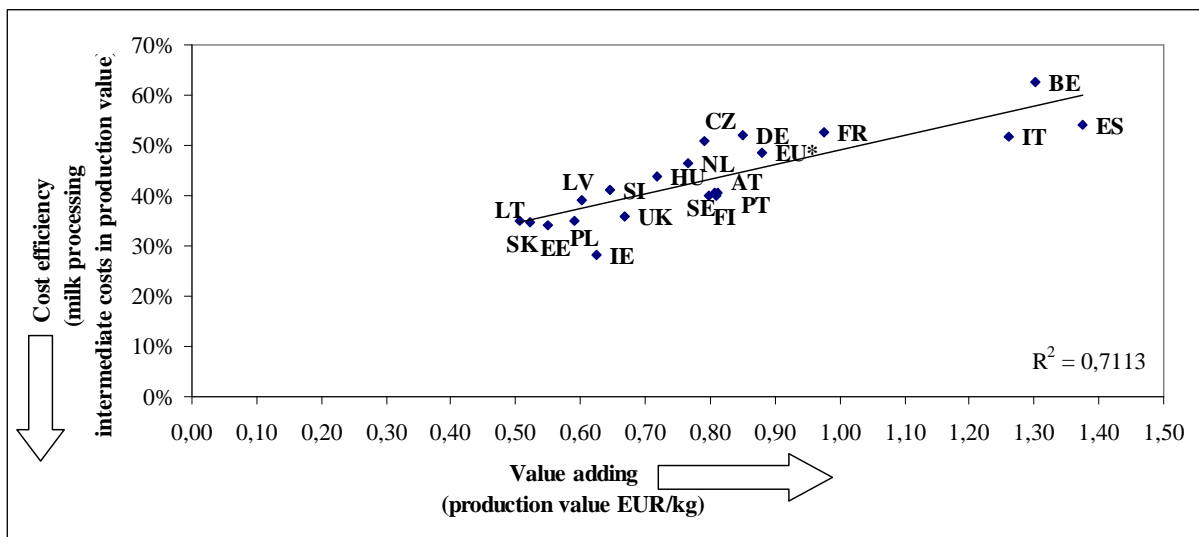
For doing analysis the data from the Eurostat public database on manufacture of dairy products were used, along with the data on milk production and external trade, combined with milk statistics of DG Agri. The analysis at the farm level is based on the data from FADN (Farm Data Accountancy Network) public database on dairy specialisation farms. The comparison and the EU average indicator includes those EU countries for which data were available to make summary dairy chain calculations (in total 20 EU countries, except Cyprus, Malta, Bulgaria, Romania, Denmark, Luxembourg and Greece). For calculations and the analysis, the data of 3-year average have been used for the latest available years (2006-2008).

In the context of the paper, the value added is production value at producer prices less intermediate consumption; to obtain the value added at factor costs, the value added is corrected with the balance of current subsidies less taxes. The value added and other indicators used are calculated per milk quantity processed (obtained as the total milk deliveries less raw milk export plus import) or produced, as well as per employee full time equivalent (labour input as 40 hours a week) in dairy industry and per AWU (annual work unit – 1,840 hours within a year) in milk production.

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

## RESULTS

First we tried to recognise, whether dairy industries in all the countries do belong to the similar strategic approach in maintaining the competitiveness. For this we calculated the average production value per kg of raw milk and also the share of the processing intermediate costs (total intermediate costs subtracted by the raw milk purchase value) in the total production value. The comparison of the value EU dairy industries attract from the market per kg of raw milk shows that there are different strategies applied among the countries. According to the available data, the most value adding oriented dairy industries are in Spain, Belgium and Italy (Figure 1). The dairy companies in these countries created 1.37-1.26 EUR per milk kg processed on average in 2006-2008. Generally all new Member States (except Czech Republic, Hungary and Slovenia) attract smaller value from the market than the old Member States, with Lithuania, Slovakia and Estonia being at the bottom of the list (0.51-0.55 EUR/kg). In a separate position from other older Member States stand Ireland and the United Kingdom – with almost 20 % less priced milk on the market as compared to the EU-20 average, which clearly indicates on different strategy applied in these countries.



**Figure 1: The position of the EU dairy industries in terms of the value attained from the market and the share of the milk processing costs on average in 2006-2008**

Source: own calculations, based on Eurostat, DG Agri data (2011)

When comparing cost efficiency, the cost leader is Ireland, followed by Estonia and Slovakia. The dairy companies in these countries on average had lower share of the milk processing costs in the product value, and along with Lithuania also had the lowest absolute costs per milk quantity processed. Other new Member States (except Czech Republic, Hungary and Slovenia) can also be considered as countries currently applying cost leadership strategy. The highest absolute costs per milk quantity processed and the highest relative costs can be observed in those countries that are focused on the value creation (Belgium, Spain and France). The correlation analysis shows that there is quite strong relation between the value attained from the market and the share of the industrial intermediate costs in the total production value.

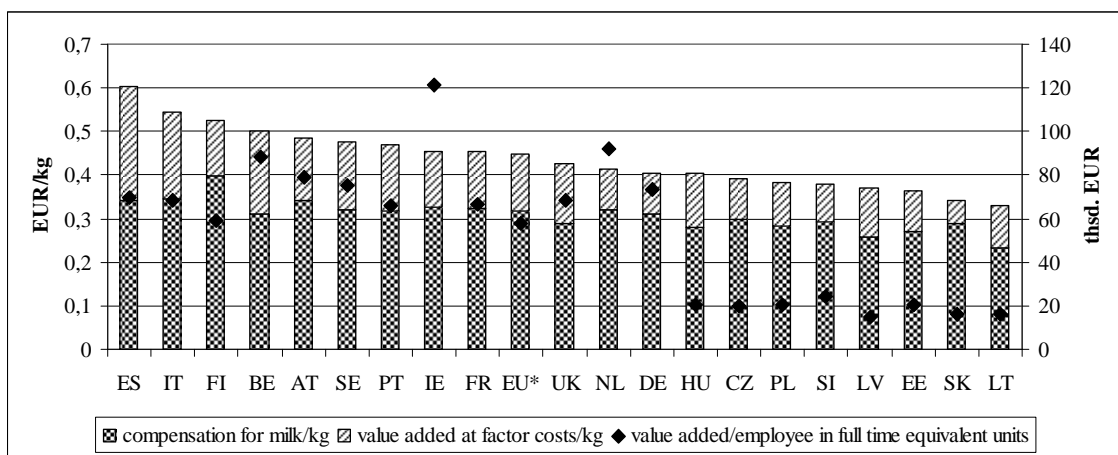
Does it mean the countries with higher value adding strategy are more efficient on the market? To answer this question, first we calculated the total income generated by the industry to compensate milk, labour and further capital, as well as the structure of sharing of this income between milk producers (as milk purchasing price) and the industry (as value added at factor costs). The results are presented in *Figure 2*.

The calculations shows that on general countries focusing on value adding strategy are successful in providing higher profit and compensation for labour and raw milk resources per processed milk quantity. All the leaders in value adding have this indicator above the EU average level. At the same time, the presence of Finland and Austria among the Top 5 indicates that by combining these two strategies dairy companies also may achieve high income level per milk kg processed.

Ireland and the United Kingdom, that also can be considered as oriented on cost leadership, have income at about and lower the EU average level, along with the Netherlands and Germany, and, according to the level of this particular indicator, they don't differ much from some new Member States – like Hungary, Check Republic, Poland.

However it's clearly visible, that all new Member States create incomes below the EU average level, with the lowest level in Lithuania, Slovakia and Estonia.

Comparing the labour efficiency measured as value added per full time employee, we can distinguish 3 groups – Ireland, Belgium and the Netherlands belonging to the top, all new Member States belonging to the bottom and rest ranging in between. It gives some basis to outline the Irish dairy industry as the brightest example of cost efficiency strategy in dairy industries of the whole EU.



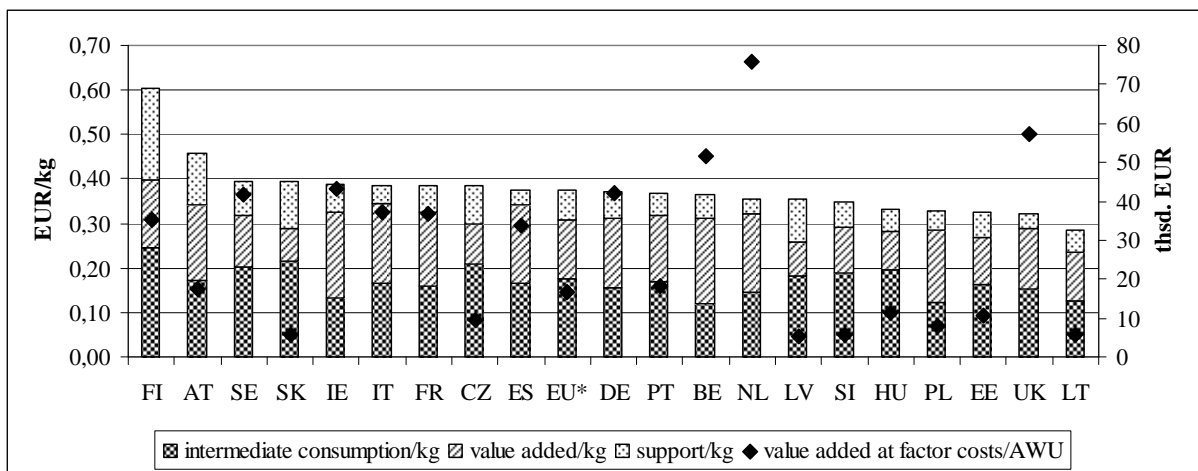
**Figure 2: Incomes of the EU processing industries to compensate for milk and production factors per milk and labour input on average in 2006-2008**

Source: own calculations, based on Eurostat, DG Agri data (2011)

Probably high cost efficiency level in Dutch and German industries due to their technological strategies which ensure lower labour input and consequently higher incomes of the persons involved in the sector (measured by the value added per full-time employee) does allow to ensure milk prices paid to the farmers above the average EU level despite on the lower level of the total incomes generated per processed milk kg.

The obtained result for Spain, Italy and France which (along with Belgium) created the highest production value per kg indicate that in these countries the creation of it is not only connected with additional use of intermediate goods, but also is based on higher labour input.

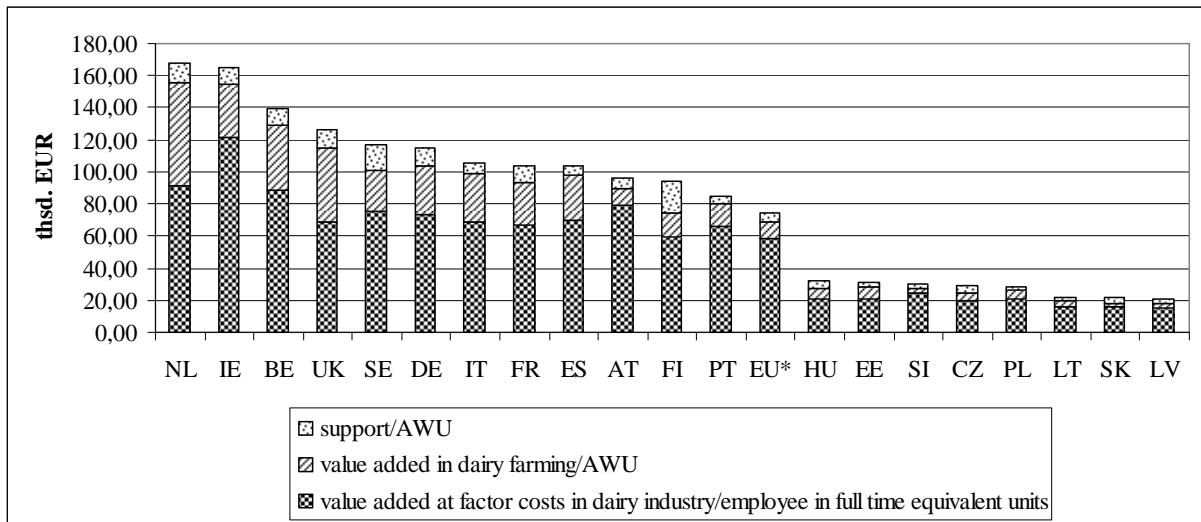
Among the new Member States, the highest value added per employee is created in Slovenia, Estonia, Hungary and Poland, but the lowest - in Latvia, Slovakia and Lithuania, with Latvia and Lithuania also having the lowest milk prices.



**Figure 3: Incomes and production costs of dairy farms per milk and labour input in the EU countries on average in 2006-2008**

Source: own calculations, based on FADN, DG Agri data (2011)

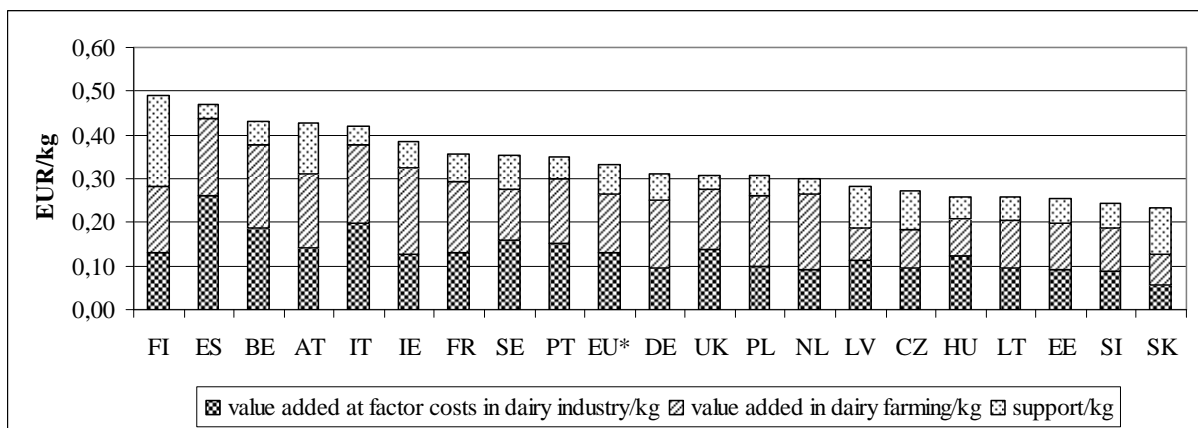
Turning to the primary milk production level (*Figure 3*), at the milk prices received from the dairy industry, available income support and the existing cost efficiency, the highest incomes of the dairy farms measured by the value added at factor costs per AWU can be observed in the Netherlands, the United Kingdom, Belgium, Ireland and Germany and also Sweden. Except Ireland and Sweden, in all of these countries incomes of the farmers from the milk price and subsidies per milk quantity produced are below or almost at the EU average level. So the high incomes are ensured by higher intermediate cost higher efficiency and lower labour input (also in Ireland and Sweden).



**Figure 4: Value added at factor costs per labour input of the dairy chains in the EU countries on average in 2006-2008**

Source: own calculations, based on Eurostat, FADN, DG Agri data (2011)

Considering the obtained results for the whole milk production chain, including the both - dairy industry and also farm level, the highest numbers of value added per labour input unit are achieved by the dairy chains in the Netherlands, Ireland and Belgium, but the lowest results do show Latvian, Slovakian and Lithuanian dairy chains (*Figure 4*), although they are not far away from other new Member States.



**Figure 5: Value added at factor costs per milk input of the dairy chains in the EU countries on average in 2006-2008**

Source: own calculations, based on Eurostat, FADN, DG Agri data (2011)

When to analyse the same amounts of the value added attributed towards kg of milk processed by the chain (*Figure 5*), we do observe a bit different picture – Finland, Spain, Belgium, Austria and also Italy are the leaders, well above the EU average levels, while Germany, the Netherlands and also the United Kingdom are even below the EU average level.

The range is concluded by the new Member States, indicating, they might do a lot to achieve efficiency levels comparable to the older EU Member States. Of course, Finland

and, partly - Austria stand separately, due to comparatively higher share of support payments in the total amount of value added.

However Spain, Belgium and also Italy demonstrate a strategy based on the use of labour intensive higher value adding approach. Whilst the Netherlands, Ireland and Belgium, also the United Kingdom, Germany and Sweden seem to maintain higher capital intensive cost efficiency strategies, and they may provide higher per person income levels to the people engaged in the dairy production chain.

## **CONCLUSIONS**

1. There are different strategies applied among the countries. According to the available data, the most value adding oriented dairy industries are in Spain, Belgium and Italy. The dairy industries of Ireland and the United Kingdom are the most outstanding representatives of cost leadership, when to analyse the price obtained from the market per unit of raw milk processed.
2. The correlation analysis shows that there is strong relation between the value attained from the market and the share of the processing intermediate costs in the total production value.
3. In general, countries focusing on value adding strategy are successful in providing higher profit and compensation for labour and raw milk resources per processed milk quantity.
4. Looking at the labour efficiency measured as value added per full time employee, we can distinguish 3 groups – Ireland, Belgium and the Netherlands belonging to the top, all new Member States belonging to the bottom and the rest ranging in between.
5. High cost efficiency level, like in Dutch and German industries ensure lower labour input and consequently higher incomes of the persons involved in the sector.
6. On farm level also different strategies may be observed. The highest incomes of the dairy farms measured by the value added at factor costs per AWU can be observed in the Netherlands, the United Kingdom, Belgium, Ireland and Germany, despite the prices paid to the farms are close to or below the EU average.
7. Comparing the efficiency levels for the whole milk production chain, representatives of the both main strategies are present - the Netherlands and Ireland with their cost leadership strategy and also Belgium with its value adding strategy.
8. When to evaluate labour efficiency, Spain, Belgium and also Italy demonstrate a strategy based on the use of labour intensive higher value adding approach. Whilst the Netherlands, Ireland and Belgium, also the United Kingdom, Germany and Sweden seem to maintain higher capital intensive cost efficiency strategies.
9. In general, our research provides the basis to the hypothesis that higher capital intensive cost efficiency strategy may provide higher per person income levels to the people engaged in the dairy production chain.

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