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ANALYSIS OF THE PRODUCER PRICE OF HUNGARIAN RAW MILK IN INTERNATIONAL COMPARISON

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Abstract: Although the dairy market crisis eased in 2011, Hungarian dairy farmers still find it difficult to produce milk profitably. As a result of the crisis, many dairy farmers abandoned milk production or reduced the size of their dairy herds in 2009 and 2010. Today, many of farmers are also considering ceasing production, in spite of the fact that the global dairy industry is facing an upturn.

A dairy farm can operate profitablyy in three ways: 1) if it can reach a relatively high level of producer price 2) if it can increase milk production per cow 3) if it can achieve a relatively low cost of production. In the present study, I primarily analyse the development of the Hungarian producer price of raw milk in international comparison. Next, I list those factors which directly or indirectly influence the producer price of raw milk. Finally, I examine the relationship among disposable income, milk consumption and milk price.

Since the start of 2009, the dairy market has been confronted with a period of extraordinary law prices. After bottoming out, prices had begun to slowly stabilise during the second half of 2009. By the end of that summer, international prices had started to strengthen and the last quarter of 2009 was characterized by a steady rise in prices. The strong recovery in prices experienced after 2009 was triggered by increased demand, mainly from oil exporting countries, but also from China.

The price increase, however, reflected a significant increase in input costs in Hungary; the high level of feed prices and the unfavourable change in the macroeconomic environment must be stressed. The rising excise duty on diesel fuel and the VAT increase had a direct impact on Hungarian dairy farmers. These negative factors have increased the costs of the sector, narrowing the ability of those active in it to operate efficiently

Keywords: producer price of raw milk, influencing factors, disposable income, international comparison, Hungary

1. Introduction

For many dairy farmers and companies, 2009 was a remarkable year. The financial crisis in the global economy caused international demand for dairy produce to decline in late 2008 and had a dramatic impact on product prices during the first half of 2009. For the first time since the mid-Nineties, global consumption per capita declined. The financial crises had an impact on every aspect of the dairy business: production, trade, consumption and prices (Bulletin of the IDF, 2010). Nevertheless, the second half of 2009 and all of 2010 brought changes. World trade increased rather slowly during the first part of 2009, but showed a remarkable recovery during the second part. During the first half of 2010, prices recovered and, in addition, production also improved (Blaskó, 2011).

The number of the world's dairy cows is around 250 million head. More than two-thirds of all herds can be found in developing countries, although developed countries account for only one-third of total world milk production. The reason for this is the higher yields in developed countries (FAO-OECD, 2010).

On the basis of market assessments made by FAO-OECD (2011), world milk production was 701.4 million tonnes in 2009, reaching 713.6 million tonnes in 2010, and is estimated to grow by 2 per cent, to 730 million tonnes, in 2011. Production is forecast to increase by 2.7 per cent, to 750 million tonnes, in 2012. Much of the growth is likely to ensue in Asia, due to increasing consumer demand. In addition to the EU-27 The top ten milk producer countries of the world are India, the USA, China, Pakistan, the Russian Federation, Brazil, New Zealand, Turkey and Ukraine (Blaskó, 2011).

Global demand for liquid milk is expected to grow by about 30% in the coming decade. This means that the current 270 billion litres of annual global milk consumption will reach 350 billion litres by the end of the decade. However, this increase in consumption will be not detectable everywhere. It is estimated e.g. that in the United States and in the European Union, a slight decrease in milk consumption can be expected (TETRA PAK, 2011). In Europe, people will consume 2.5% less milk products in 2020, in comparison with the current 63 litres/capita/year average. On the other hand, the milk consumption of the Asia-Pacific region, is forecast to experience very high growth, at almost 45% (Szarvas, 2011). The average level of milk and milk product consumption is forecast to reach 103.1 kg/capita/year globally in 2011. As regards the consumption of developed countries, the average level is expected to approach 233.7 kg/capita/year, while in developing

countries, this figure is only 69.4 kg/capita/year (FAO-OECD, 2011).

The ratio of global trade of milk and milk products to production was 6 per cent, i.e. 44.3 million tonnes in 2009. This value increased to 47.8 million tonnes in 2010. In 2011, the amount of milk and milk products in international trade is estimated to reach 50.7 million tonnes, which represents 6.9 per cent of total milk production. In 2012, the trade share of total milk production is forecast to be 52.7 million tonnes. Purchases by Asian countries are anticipated to be moderately higher, with import demand being maintained or increasing in China, Indonesia, the Republic of Korea, the Philippines, Singapore and Thailand. Imports by Algeria and Egypt are also expected to grow substantially. On the export side, sales of dairy products are expected to increase in Argentina, Belarus, the EU, New Zealand and the United States (FAO-OECD. 2011).

The European Union is the largest contributor to world milk production, providing approximately 10% of the world's dairy cows, which means almost 25 million head. The EU-27 produced 153 million tonnes milk in 2010 and this figure is estimated to reach 157 million tonnes in 2011, which represents a 1% growth in production (FAO-OECD, 2011). France, Germany, the United Kingdom, Italy, Poland and the Netherlands give 67% of total milk production within the EU-27. Hungary, with its 1% contribution to EU-27 production, ranks 19th. Predictions for the milk production of the EU-27 are moderately optimistic. According to these predictions, milk production in the EU-27 will expand by approximately 4% until 2020, which will arise mainly from the so-called "old" Member States, from the EU-15 (Fórián, 2011).

The average liquid milk consumption in the EU-27 was 32.2 million tonnes and 64.5 kg/capita/year in 2009. These values show a 1.2% decrease in comparison with the year 2008. Within the EU-27, the top six consumers are Estonia, Ireland, Finland, the United Kingdom, Sweden and Denmark. As with liquid milk consumption, butter consumption also decreased in the EU-27 in 2009. Its average value was 1.7 million tonnes or 3.5 kg/capita /year. France, Germany, the Czech Republic, Austria, Poland and Estonia are at the top of butter consumption list. Cheese consumption of the EU-27 was almost 8.3 million tonnes in 2009 and this figure increased by almost 1% in comparison with 2008. Average per capita cheese consumption was 16.6 kg/capita/year. Greece, France, Germany, the Netherlands, Italy and Finland consumed cheese in the largest quantities.

The second major exporter of milk and milk products in the world is the EU-27, with 9.9 million tonnes, following New Zealand. The level of import is much lower the EU-27 imports 1.2 million tonnes of milk and milk products. Both in the export and import structures, cheese represents the highest proportion.

In the last two decades, the number of Hungarian dairy cows declined from 630 thousand to 309 thousand animals. In the beginning of this process, the decreasing number of cow livestock was not perceptible in the amount of raw cow milk production, which was around 1.9–2.1 million tonnes. In the last years, the increasing yield per cow was not able to compensate for the decline in national milk production, thus Hungarian raw milk production has been continuously falling for ages. Currently, national milk production is 1 641 thousand tonnes (HCSO[1] Hungarian Central Statistical Office, 2011).

1987 was an outstanding year in per capita consumption, because Hungary then managed to approach the consumption level of Western European countries. Currently, the average level of milk and milk products consumption is about 145–165 kg/capita/year, which is only half of the average of the most developed European countries.

EU accession was defining in all aspects; it had significant impact on our foreign trade position (*Figure 1.)*. After 2004, Hungary become a net importer of milk and milk products. Currently, Hungary primarily exports liquid milk to Italy, Romania and Slovenia, while milk products with higher added value are imported into Hungary from Germany, Poland, Slovakia and the Czech Republic. Our foreign trade balance is negative.

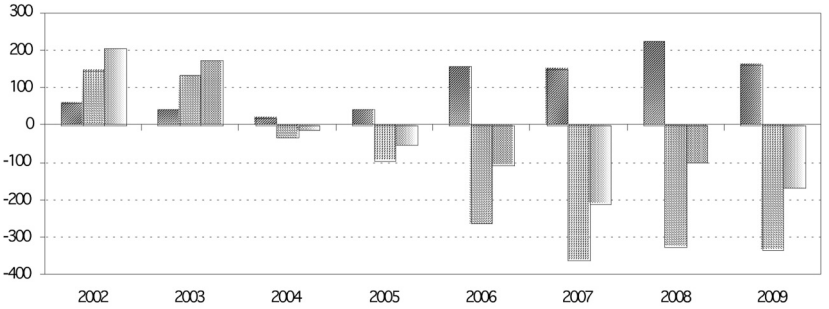

Figure 1: Foreign trade position of Hungary in the field of milk and milk products
Source: HCSO, 2011

2. Materials and methods

The general objective of the present study is to answer the following three questions:

- What is the development of the producer price of Hungarian raw milk in international comparison?
- What are the factors that directly or indirectly influence the evolution of raw milk price?
- What kind of relationship can be observed among disposable income, milk consumption and consumer milk price in Hungary?

To reach the above-mentioned objectives, I primarily used national (RIAE[2] Research Institute of Agricultural Economics, HCSO) and international (FAO, OECD, FAPRI, EUROSTAT, DG AGRI) databases. The major trends in time series prepared by the databases and relating to national and international producer prices of raw milk were analysed by

[1] Hungarian Central Statistical Office
[2] Research Institute of Agricultural Economics

the application of chain- and base-ratios. By using the latest available references, I tried to explore the reasons behind the aforementioned major trends.

3. Results and discussion

3.1. Global, European Union and Hungarian price trends

Since the start of 2009, the dairy market was confronted with a period of extraordinarily low prices. The financial crisis in the world economy had a dramatic impact on product prices during the first half of the year 2009. After bottoming out, prices slowly stabilised during the second part of 2009. At the end of that summer, international prices started to strengthen. The strong recovery in prices was triggered by increases in demand, mainly from oil exporting countries, but also from China. The last quarter of 2009 was characterized by a steady rise in prices (Blaskó et al, 2011). The trend described above is illustrated by *Figure 2.*, which introduces the changes in the producer price of raw milk from year to year. *Figure 2.* demonstrates the change in milk producer price for the EU-27, the USA, New Zealand and Hungary. Ranking first, New Zealand provides almost half of the international trade of milk products; thus, the world market price of milk essentially depends on the milk production of New Zealand. The EU-27 is the second major exporter on the global milk market, followed by the USA. My objective is to compare the international changes with the changes in Hungarian milk price. The deepening crisis in the year 2009 can be investigated in the evolution of the producer price of raw milk, from which, regarding prices, the dairy sector managed to recover in 2010 (*Figure 2.*).

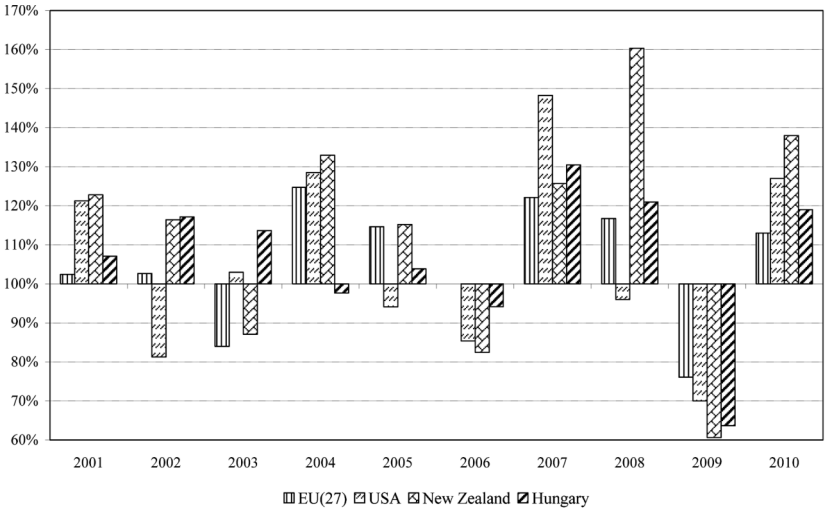

Figure 2: The changes in the producer price of raw milk in the world between 2001 and 2010 (previous year=100%)
Source: Own calculation on the basis of FAO-OECD, RIAE-MPIS[3] Research Institute of Agricultural Economics – Market Price Information System

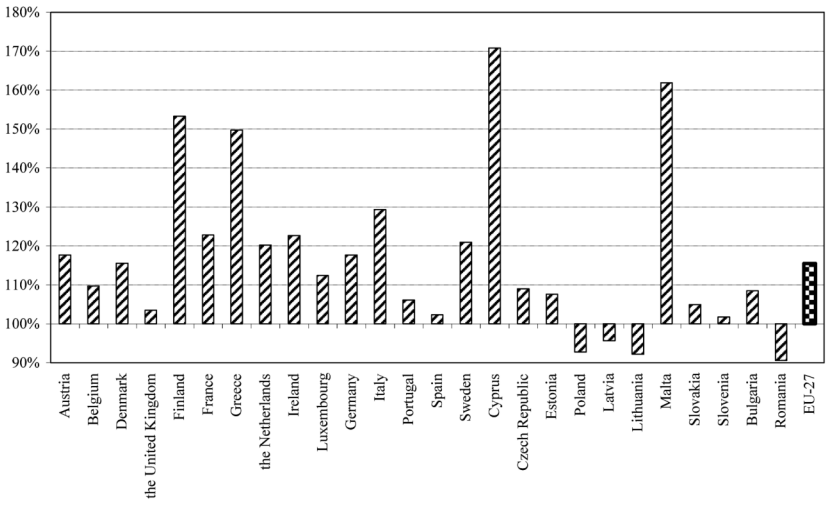

Figure 3: The evolution of the producer price of raw milk in the EU-27 Member States in September 2011 (Hungary=100%)
Source: Own calculation on the basis of RIAE database

Figure 3. illustrates the evolution of the producer price of raw milk in the Member States of the EU-27. In accordance with *Figure 3.,* based on the Hungarian raw milk price, which is considered 100%, the EU-27 average is 15% higher than the Hungarian producer price. The most outstanding positive differences can be investigated in the cases of Cyprus (+71%), Malta (+62%), Finland (53%) and Greece (+50%), whereas lower levels of producer prices for raw milk can be experienced only in Romania (-9%), Lithuania (-8%), Poland (-7%) and Latvia (-4%), as compared to Hungary.

The Hungarian dairy market can be characterized by rising raw material prices. *Figure 4.* also illustrates that the price of raw milk after its bottoming out in 2009 – it was 54-55 HUF/kg – start to approach the peak of the year 2008, when the price was above 94 HUF/kg. The reason for the high level of milk prices experienced in 2008 was that in the growing financial crisis, stock market transactions and other activities had an indirect impact on the agricultural sector, among others on the dairy sector. Thus, the dairy industry was not directly affected by the financial crisis, but the sluggish global economy in 2009 indirectly influenced the dairy sector in a negative way, which can be observed in *Figure 4*. In addition to the aforementioned stock market transactions, the financial crisis also had an impact on consumption and the decreasing demand directly influenced prices. In the background of the upward trend experienced after 2009 was the increase in EU prices and the devaluation of the Hungarian Forint. The price increase, however,

[3] Research Institute of Agricultural Economics – Market Price Information System

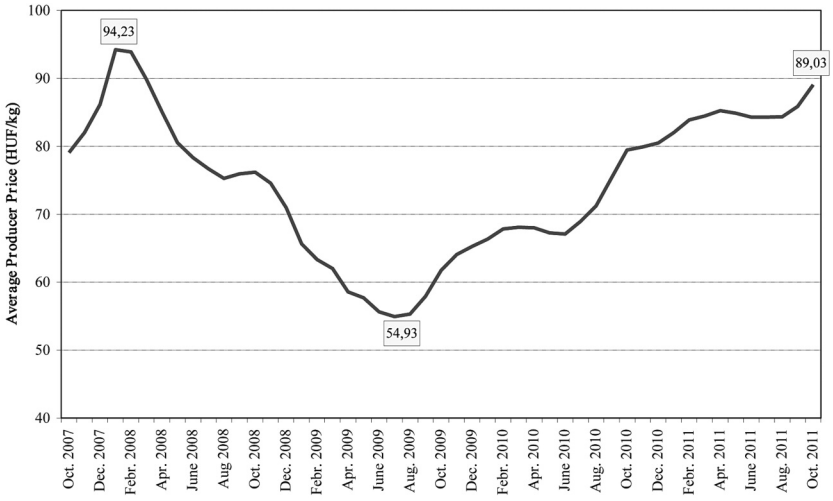

Figure 4: The evolution of the average producer price of domestic raw milk between October 2007 and October 2011
Source: Own construction on the basis of RIAE-MPIS

reflected a significant increase in input costs; the high level of feed prices and the unfavourable change in the macroeconomic environment must be highlighted. The rising excise duty on diesel fuel and the VAT increase had direct impacts on the situation of Hungarian dairy farmers. The above-mentioned negative factors, which have increased the costs of the sector, narrowed the scope of the sector's stakeholders in conducting efficient operations.

The profitability of dairy plants decreased to a critical point, since the exports of raw milk increased significantly and dairy plants had to face with the shortage of domestic raw materials. All these factors negatively affected their production efficiency.

Although the dairy market crisis has eased, Hungarian dairy farms still find it difficult to produce milk in a profitable way. As a result of the crisis, many dairy farmers abandoned milk production or reduced the size of their dairy herds. Even more recently, many of them are also considering ceasing production, in spite of the fact that the global dairy industry is facing an upturn (Szarvas, 2011).

In regard to the unforeseeable market situation of the past years, the contractual relationship with stable and calculable price levels between the producers and the processors could be upgraded.

3.2. Factors influences producer prices

In this section of the present study, I list those factors, which directly or indirectly influences the evolution of the producer price of raw milk (Vágó, 2008).

The nutritional content of raw milk, i.e. its fat- and protein contents, directly affect milk prices. In the short term, the composition primarily depends on the nutrient content of forage and physiological changes resulting from the alternation of seasons. Thus, this factor fluctuates seasonally, contributing to the major part of the seasonal fluctuation of milk prices (*Figure 5.*).

After weather, the nutritional content of raw milk depends on foraging and bovine species (genetics). The Holstein-Friesian cow, which is main breed used on the Hungarian dairy farms, is a high yielding cow, producing milk with relatively low nutrient value in comparison with the Jersey, with produces lower yields, but with much higher fat contents.

The next most decisive factor is the quality of raw milk, which also directly influences producer prices. The quality is determined by hygiene aspects, independent of nutritional content, or example by plate count, somatic cell count, organoleptic, physical and chemical properties of milk. The quality parameters, similarly to those of nutritional content, show considerable seasonal fluctuation, mainly related to temperature.

In addition to the nutrient values and the quality parameters, the supply side, i.e. the disposable quantity of raw milk, also has an impact on the development of the producer price. Seasonal changes in production volume can also be observed, since in the summer months, raw milk has a lower nutritional content and quality, but it is produced in larger quantity. However, the evolution of the domestic average milk price is obviously determined by the change in export options, as well.

In addition to the supply side it is also necessary to examine the demand side, i.e. the level of consumption or the demand for dairy products. On the basis of the HCSO (2011), it

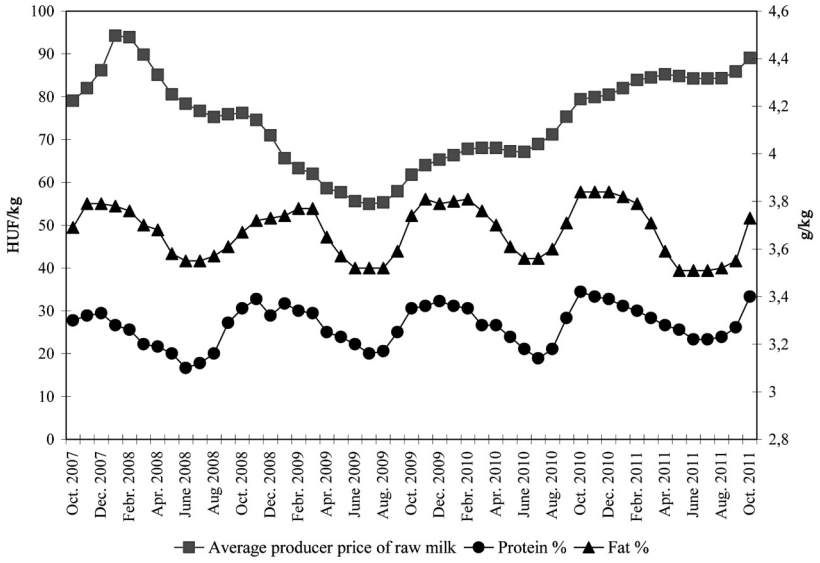

Figure 5: Evolution of the fat and protein contents of raw milk and their connection with the average producer prices between October 2007 and October 2011 in Hungary
Source: Own construction on the basis of RIAE-MPIS

can be stated that Hungarian consumption of milk and milk products lags behind the European Union average;, its level is only half of the average consumption of the most developed European countries. In Hungary, the average consumption level of milk and milk products is about 145–165 kg/capita/year, which not only falls behind the European consumption level, but is also really far from the healthy level of milk and milk product consumption, which is about 260–270 kg/capita/year. The target for our country is to reach the consumption level of 200 kg/capita/year, which was almost approached in 1987, when Hungarian consumers consumed 199 kg/capita/year milk and milk products on an average. Milk and milk products form a valuable and important part of healthy diet; they are the richest source of calcium. One half litre of milk a day can cover 60-70% of our calcium need. It is particularly important for children and adolescents to consume milk and milk products daily, since the normal bone mass develops in our first thirty years. In addition, it is also highly recommended for elderly people to consume milk daily, because late in life, they need more calcium (Rodler, 2004). The public health aspect of the low consumption level is the so-called "Hungarian silent epidemic", osteoporosis, which affects more than 1 million people in Hungary (Szakály, 2006). Dairy products represent the only category of food which contains more calcium than phosphorus. Earlier examinations of National Institute for Food and Nutrition Science related to the adult population prove that 80% of women and 70% of men do not reach the daily 800 mg calcium needed daily (Szakály, 2007). Hungary, as regards calcium consumption, ranks among the worst countries in the European Union Member States. If Hungary wanted to reach the average consumption level of the EU Member States, the domestic consumption of dairy products should be increased to 230 kg/capita/year, but this is very difficult to achieve in light of the distinctive Hungarian diet and the current average consumer purchasing power. Therefore, for the foreseeable future, a 180–200 kg/capita/year consumption level for milk and milk products could serve as a more realistic goal for Hungary (Szakály, 2007).

Investigating the relationship between family income and milk and milk product consumption, Vágó (2008) calculated that there is almost a 2.5 times difference in milk and milk product consumption between the tenth of the population with the lowest and the highest incomes. In particular, he determined that there is a 3.3 times difference in cheese consumption between the two aforementioned income categories. Within the structure of milk product consumption, the ratio of liquid milk decreases as household income increases, which is practically compensated by the increase in cheese consumption.

Overall, it can be concluded that the income situation considerably influences the quantity and structure of dairy consumption. With the increase in household income and the improvement in living standards, there is also a growth in the consumption level of milk and mainly milk products.

However, the expansion of consumption does not have a direct and automatic impact on the demand for domestic products and prices. The expansion of consumption is typically generated by the supply side, since imported milk products, pushing down prices, lead to an increase in the consumption of dairy products in favour of imports.

Costs arising from raw milk production do not directly influence producer prices, as the bargaining power of the producers and the processors is decisive in to what extent production cost is respected in producer prices. The change in costs affects the development of prices most of all in the long term, in the same way as any change in production technology does, which influences prices through average cost. The international market trends and the established international prices influence domestic prices through foreign trade. Moreover, the change in the bargaining power of market stakeholders is also able to cause change in the domestic price level. From the side of the producers, the bargaining power can be strengthened by producer organisations. In addition, prices are considerably influenced by the knowledge of the producers about the market prices, supports, market regulation tools and by their reactions to changes in prices.

4. Conclusions

In conclusion, a global increase in milk production can be observed, which is primarily motivated by the increase in demand in developing countries. In addition to the increase in milk production, there is growth in milk consumption, as well. In the developed countries, the consumption level of processed milk products is rising, while in the developing countries, people consume more liquid milk.

Predictions for the milk production of the EU-27 are moderately optimistic until 2020. According to these predictions, milk production in the EU-27 will expand by approximately 4%, which will mainly arise from the EU-15.

The situation of the Hungarian dairy market is still unfavourable, since even the increasing production prices can not compensate for the high feed and fuel prices. Thus, it is difficult for the Hungarian dairy farmers to produce in a profitable way. Domestic dairy plants are not in a better position either, since they have to cope with a rather increasing shortfall in raw material due to the growing amount of raw milk export. All these negative factors could induce the appreciation of the role of the contractual relationship between the producers and the processors.

Analysing prices, it can be concluded that the producer price of raw milk started to develop in the world market after it bottomed out in 2009, and that the crisis seriously affected the sector. In 2010, raw milk prices increased by 38% in New Zealand, 27% in the United States, 13% in the European Union and 19% in Hungary, in comparison with prices in 2009.

According to the prediction of the FAPRI (2011), the increase in the producer price of raw milk will come to a sudden stop in 2012, and a continuous decrease to a total 7% lower price is forecast by 2025, compared to the price for the year 2000.

In Hungary, the producer price of raw milk is currently 15% lower than the EU-27 average, although in relation to the price in July 2009, the actual price is almost 60% higher.

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