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MILK MARKET AND ITS VOLATILITY – A REGIONAL APPROACH

PIAŢA LAPTELUI ŞI VOLATILITATEA ACESTEIA – O ABORDARE REGIONALĂ

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Abstract: *After a boom in the year 2007 – year characterized by high prices of foodstuffs in general – milk prices decreased in 2008 and a stronger decrease followed in 2009, impacting farmers' incomes. By a long-term analysis (January 2005 - August 2010) of the evolution of the average procurement prices by years, months and across regions for cow milk, ewe milk, cow and ewe "telemea" and fresh cow cheese it was possible to calculate the variation coefficient that permitted to determine the price volatility for the above-mentioned products.*

Key words: *prices, standard deviation, variation coefficient*

INTRODUCTION

In value terms, milk production is on the second place as importance in animal production, after meat production. In the year 2009, cow and buffalo cow milk accounted for 22.7% of the animal production value and 7.9% of the agricultural output value, while ewe and goat milk 0.8% of the animal production value and 0.3% of the agricultural production value.

Total milk production decreased by 4.5% in the period 2007-2009, while the cow and buffalo cow herds were also down by 10%. In the year 2009, cow milk production was obtained on 850 thousand holdings, with an average size of 1.76 heads, which is a much lower size compared to that of the European countries, and 64 % of total cow herds were found on very small-sized holdings (1-2 heads). As the cow herds are scattered on small-sized farms, it is very difficult to provide an adequate management of quality and hygiene-sanitary conditions. This is the reason why at present, only 67% of the milk processed in Romania is milk conform to the EU standards, as compared to 32% two years ago.

MATERIAL AND METHOD

In order to determine price volatility, we used monthly time series of average procurement prices for cow milk, ewe milk, as well as of dairy prices (cow *telemea,* fresh cow cheese and ewe *telemea*) in the period January 2005 – August 2010, per total country, by months and by development regions, calculating the variation coefficient, as indicator that expresses the volatility level of the market for these products. The average price analysis for the raw ewe milk had as time series the same period 2005-2010, with the specification that the processed data covered the period April – September of each year, due to lactation specificity in the sheep species. The variation coefficient was calculated as ratio of standard deviation to the mean, making it possible to identify the dispersion points. The higher the variation coefficient, the higher the dispersion and the price volatility. The information source was represented by the official data published by the National Institute for Statistics (NIS), through the Tempo-online database.

RESULTS AND DISCUSSIONS

General considerations on domestic milk production

Total milk production reached 56383 thousand hl (including calves consumption) in 2009, out of which cow and buffalo cow milk 50570 thousand hl. By development regions, cow milk production decreased in the regions Center (-0.4%), North-East (-3.5%), Bucharest-Ilfov (-5.1%), South-East (-5.7%), North-West (-6.3%), West (-10.5%) and South-West (-12,5%) and it increased in the region South Muntenia (+0.3%).

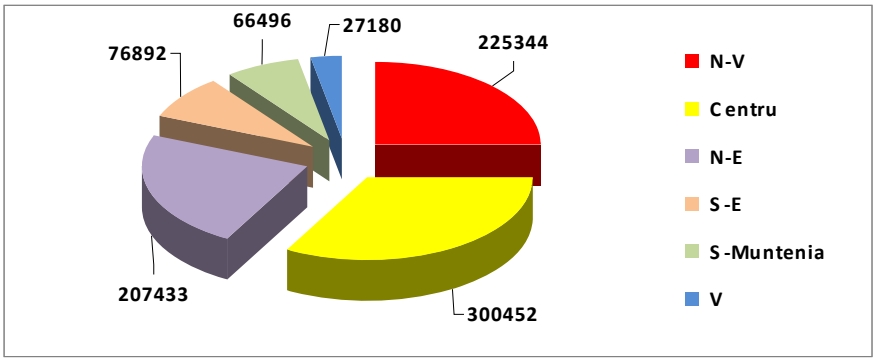
Both milk quality and quantity are affected by the high fragmentation of milk production. Thus, about 76% of the milk production comes from small holdings with 1-2 heads each, which account for 92 % of total dairy farms.

In the period 2007-2009, the total production of raw milk collected by the processing units (from Romania and from imports) decreased by 109675 tons (- 9%); this decrease was twice as great in the period 2007-2008 (-77389 tons), than in 2008-2009 (-32286 tons). Thus, while in the year 2007, compared to previous year, the cow milk quantity collected by the processing units increased by 10975 tons (1.0%), in 2008 the collected

milk quantity was down by 21327 tons (1.9%), compared to previous year, and in 2009 down by 68105 tons (6.5%), as against previous year.

By species, in the investigated period, only the collected ewe milk had a slightly increasing trend from one year to another, the collected quantity increasing by 1121 tons (+9%); the buffalo cow milk, as well as the goat milk had decreasing trends, with the buffalo cow milk the collected quantity being down by more than half in the year 2009 compared to 2007. This adds to the differences by species with regard to the share of milk from total production, which goes to processing. Thus, in the year 2009, out of total cow milk production (calves consumption excluded), only 21.3% was delivered to processing, 7.7% buffalo cow milk, 3.2% ewe milk and only 2.4% goat milk. The difference is the self-consumption and sales on the peasant market.

Figure 1. Structure of collected cow milk by development regions, in the year 2009 (liters)



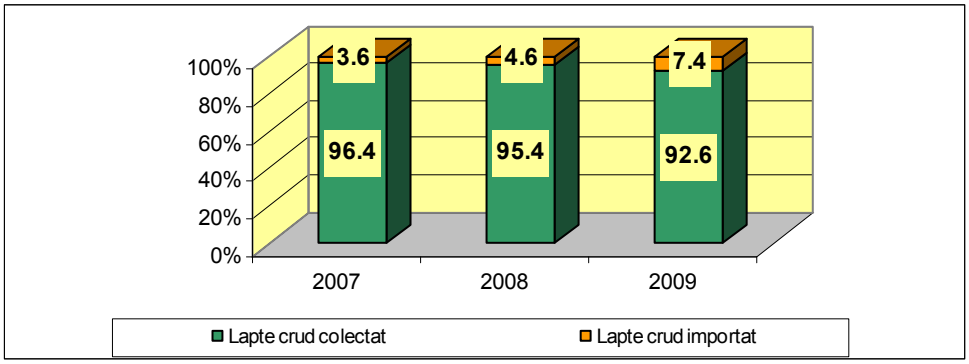
Source: processing of data provided by the National Institute of Statistics

The analysis of the two milk origin sources, i.e. milk collected in Romania and imported milk, reveals that the imported raw milk share increased from 3.6% in 2007 to 7.4% in 2009, while the share of raw milk collected from the Romanian holdings and collection centers was down from 96.4% in 2007 to 92.6% in the year 2009.

As regards cow milk collection in the 8 development regions, it is mentioned that 91% is supplied by 6 regions (North-West, Center, North-East, South-East, South-Muntenia, West), and 9% by the 2 regions (South-West Oltenia and Bucharest Ilfov). These two regions do not report the

collected quantity to the National Institute for Statistics, considering it "confidential data". By regions, it can be noticed that the largest quantities were collected in the regions Center (30.3%), North-West (22.7%) and North-East (20.9%).

Figure 2. Evolution of raw milk collected for processing by processing units, by origin sources (%)



Source: processing of data provided by the National Institute for Statistics

The dairy products are supplied to the **domestic market** by economic operators with transport and/or storage activities, wholesale and retail activities, farmers (raising dairy cows) who come with fresh dairy products directly to final consumers.

The sales on the peasant market and self-consumption are the most important from the point of view of milk flow volume. From this point of view, it can be specified that about 77 % of total milked cow milk, 87% of the total milked buffalo cow milk and 97% of total milked ewe and goat milk is sold through this channel.

As regards the **foreign market**, in the last 3 years, Romania constantly had a deficient balance of trade in the trade with milk and dairy products. The trade balance deficit ranged from 112869 thousand euro in 2007 to 157134 thousand euro in 2009. Thus, the trade balance decline was by -33 % in 2008, compared to 2007, while in 2009 it was by only -4% lower than in 2008. Thus we can say that Romania is a net importer of milk and dairy products.

Price volatility analysis

In order to determine the volatility of average procurement (farm gate) prices for raw cow milk, raw ewe milk, cow and ewe *telemea* and fresh cow cheese we calculated the variation coefficient as ratio of standard deviation to the mean. As it can be seen from the tables below, there are significant differences between the variation coefficients of cow milk and of ewe milk. It can be concluded that in the case of cow milk there is a greater market stability compared to the ewe milk market. We can mention that the annual average variation coefficients for raw cow milk indicates quite similar values in the investigated period 2005-2010, with limits ranging from 4.94% (2008) to 6.82% (2005).

Table 1. Cow milk – variation coefficient %, prices per total country and by regions

Specification	Total	North-East	South-West Oltenia	North-West	South Muntenia	South-East	Center
2005	6.82	7.23	11.83	6.02	9.56	12.68	4.72
2006	5.94	7.46	11.79	5.48	13.80	7.63	4.75
2007	5.37	8.42	5.04	9.34	12.14	5.30	5.59
2008	4.94	4.10	5.97	9.11	13.92	6.83	2.77
2009	5.85	5.27	8.30	12.61	15.39	8.58	5.24
2010	6.32	5.34	28.95	5.56	9.42	4.46	6.96

Own calculations on the basis of NIS tempo on-line prices

By comparing the variation coefficients across regions by years we can notice that the average raw cow milk procurement prices were more dispersed in the region South West Oltenia (counties: Mehedinți, Gorj, Olt, Vâlcea, Dolj), where the highest variation coefficient was found (28.95%), compared to the other development regions. It is in this region that the highest milk procurement prices were found, even since the second half of the year 2009, the prices continuing to be high in the period January - August 2010. The most stable region from the point of view of price volatility, with variation coefficients under the country average, is the region Center, where in the year 2008, the variation coefficient reached only 2.77%. A high price dispersion is also found in the region South Muntenia, where the variation coefficients throughout the period 2005-2010 are by more than half higher than the country average.

In the case of ewe milk, price volatility is much higher, compared to cow milk. By comparing the variation coefficients by years and across regions, a very high price dispersion is found in the region North East, where, mainly in the years 2005 and 2006, the variation coefficients (244.95%) reveal an unstable market. The same can be said about the region South Muntenia in the year 2010. Quite a balanced region with regard to price dispersion and stability is the region South East, where the variation coefficients are quite close to the country average.

Table 2. Ewe milk - variation coefficient %, prices per total country and by regions

Specification	Total	North East	South West Oltenia	North West	South Muntenia	South East
2005	3.45	244.95	155.11	49.18	1.84	2.03
2006	51.29	244.95	0	49.33	77.46	77.56
2007	3.84	49.77	0	5.93	0.00	48.99
2008	12.36	77.46	0	4.72	77.46	24.49
2009	49.48	109.80	0	50.41	110.63	49.05
2010	49.49	53.70	154.92	78.03	244.95	49.90

Own calculations on the basis of NIS tempo on-line prices

The variation coefficients for cheese (cow *telemea*, ewe *telemea* and fresh cow cheese) by years reveal that the prices for these products are less dispersed that the raw milk prices. The highest values are found for *telemea* from ewe milk, with limits ranging from 3.73% in 2009 to 8.88% in 2008. It is worth mentioning that in the year 2009, in all the three products, the variation coefficient reveals the highest price dispersion; this situation is the result of the difficulties in the respective year (economic crisis, unfavourable weather conditions, low yields in cereals).

The analysis of average procurement prices for cow milk in the period January 2005 – August 2010 reveals the following:

- as compared to an average increase of 39% in the period January 2005-January 2010, an increase above the average and the largest increase was found in the region South West Oltenia, i.e. 64% and in the region Center of 59%;

- below the country average, with a price increase by only 4%, 17% and 25% respectively, are the regions South Muntenia, South East and North West;

- in all the years under investigation, the highest prices are found in the cold winter months, and the highest in very hot months, i.e. in July and August;

- the regions with the highest volatility throughout the investigated period are North East and South Muntenia

Table 3. Variation coefficient (%) in cheese, in the period January 2005 - August 2010

Specification	*Telemea* from cow milk	*Telemea* from ewe milk	Fresh cow cheese
2005	4.62	6.42	4.17
2006	3.90	5.72	4.94
2007	3.07	3.98	3.40
2008	9.05	8.88	7.64
2009	4.39	3.73	5.51
2010	4.19	3.87	4.70

Own calculations on the basis of NIS tempo on-line prices

CONCLUSIONS

- agricultural price volatility is influenced by the volatility of crop production; the most dispersed and volatile the crop production is, the most volatile are the prices of agricultural products;

- in the case of cow milk, there is a higher market stability as compared to the ewe milk market;

- the average raw cow milk procurement prices were more dispersed in the region South West Oltenia (counties: Mehedinţi, Gorj, Olt, Vâlcea, Dolj), where the highest variation coefficient was found (28.95%), compared to the other development regions;

- the variation coefficients in cheese (cow *telemea*, ewe *telemea* and fresh cow cheese) by years reveal that the prices for these products are less dispersed than the raw milk prices;

- compared to a 39% increase of average cow milk procurement prices, in the period January 2005 - January 2010, an increase above the

average and the largest increase was found in the region South West , i.e. 64% and in the region Center, 59%; a price increase under the country average, by only 4%, 17% and 25% respectively was found in the regions South Muntenia, South East and North West.

BIBLIOGRAPHY

1. **ZAHIU, LETIȚIA., TOMA, ELENA., ALEXANDRI, CECILIA., DACHIN, ANCA.,** (2010), Agricultura în economia românească – între aşteptări şi realități, Editura CERES
2. ***Commodity Price Volatility: International and EU Perspective, European Commission, Brussels, June 2010
3. *** Romania's Statistical Yearbooks 2007-2009, National Institute of Statistics
4. *** Efectivele de animale şi producția animală obținută 2007-2009, Institutul Național de Statistică
5. *** Coordonate ale nivelului de trai în România. Veniturile şi consumul populației în perioada 2007-2009