COMPARATIVE ANALYSIS OF THE PRICE OF RAPESEED AND SUNFLOWER DURING THE PRE-ACCESSION AND POST-ACCESSION TO THE EUROPEAN UNION

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Abstract

Rapeseed and sunflower are the crops that recorded the largest increase in the selling price, in the analyzed period, determined by significant increases in demand for such products and determined by Romania's accession to the European Union, when new markets opened for the sale of agricultural production. In this paper was analyzed the evolution of the selling price of rapeseed and sunflower, for two distinct periods, respectively 1998-2006 and 2007-2019, calculating the main statistical indicators. The averages of the two periods were also compared, using the Student Test method, in order to determine from a statistical point of view the dependence of the averages of the two periods.

*Key words***:** *price, rapeseed, sunflower*

INTRODUCTION

The market for agricultural products is the economic system where agricultural products and services are produced, distributed and consumed. The market for agricultural products has undergone substantial changes over time, and is now characterized by a decrease in labor costs, which is gradually being replaced by modern equipment and technology and an increase in the costs of selling and distributing agricultural products.

Price is an important component of the marketing mix, and for agriculture, price is the monetary expression of the products that the farmer obtains on the farm. Price formation in agriculture in particular, but also in general is the confrontation of supply and demand for certain products [5, 6, 8]. Agriculture is considered an industry in developed countries at the European level, being supported and sustained from public sources to achieve a high level of performance and stability. The price for agricultural products is much different from other areas of activity. The cereals are traded on the stock exchange, and the prices on the stock exchange are relevant for the big players in the market, while for the smaller players on the market such as Romania the price of cereals is slightly influenced by the stock market prices, being most often influenced by the time of sale, the quantity sold and the distance of the producer from the Port of Constanta, the place where agricultural products are exported [3, 9]. In developing countries, where access to information is difficult, the lack of price information is particularly acute in agricultural markets and primarily affects small farmers. The lack of market and price information mainly affects small farmers living in remote areas, often isolated and where financial education is lacking. In the absence of essential information, small farmers sell their agricultural products to intermediaries and most of the time the price is set by the intermediary and depends on the quantity sold and the distance of the producer from the Port of Constanta, the main place where Romanian cereals are exported [1, 2, 7]. As farmers sell their products to intermediaries, they face

(among other things) a considerable disadvantage: more informed traders can exploit this information asymmetry and pay lower prices to the farmer. Agriculture is essential for economic growth and poverty reduction, and the cost of production is an important element in determining production prices. The selling price of agricultural products is important in terms of business profitability, greatly influencing the rural environment, investments and available jobs [4]. Internationally, in order to have a greater bargaining power in relation with traders, farmers have organized themselves into farmers' associations and cooperatives, which not only work their land together, purchase machinery, equipment and inputs together, but sell their production together and to have a certain predictability of the price obtained after one year of work. In Romania, cooperatives and farmers' associations are still developing, most of them specialize more in the joint purchase of the necessary inputs and less in the joint sale of the obtained productions [11]. Price fluctuations in Romania for agricultural products can also be attributed to the fact that most farmers choose to sell their produce from the time of harvest, sometimes directly from the field, when demand is declining, while supply it is quite high on the market and the sales price obtained is lower [12].

MATERIALS AND METHODS

The processed data were obtained from the platform of the National Institute of Statistics, accessed on 21.02.2021, being processed quantitatively and qualitatively. The main statistical indicators were also calculated: minimum, maximum, average, growth rate, standard deviation and coefficient of variation.

The Student Test was used which is a decision method that helps us to validate/invalidate a statistical hypothesis (with a certain degree of certainty), using the following formula:

$$Tcal = \frac{(M2-M1)}{\sqrt{\left(\frac{var1}{n1}\right)} + \sqrt{\left(\frac{var2}{n2}\right)}}$$

Also, to estimate the selling price of rapeseed and sunflower until 2030, the Forecast function from the SPSS Statistical program was used.

RESULTS AND DISCUSSIONS

For rapeseed cultivation, the basic price registered a significant evolution in the period 1998-2006.

If at the beginning of the analyzed period a ton of rapeseed was sold for 125 lei, in 2006 the price reached 740 lei/ton, representing an increase of 492%. The price obtained for a ton of rapeseed during the analyzed period maintained its upward trend, explained on the one hand by the increase in demand for this type of products and on the other hand by the access of Romanian agricultural products on international markets (Figure 1).
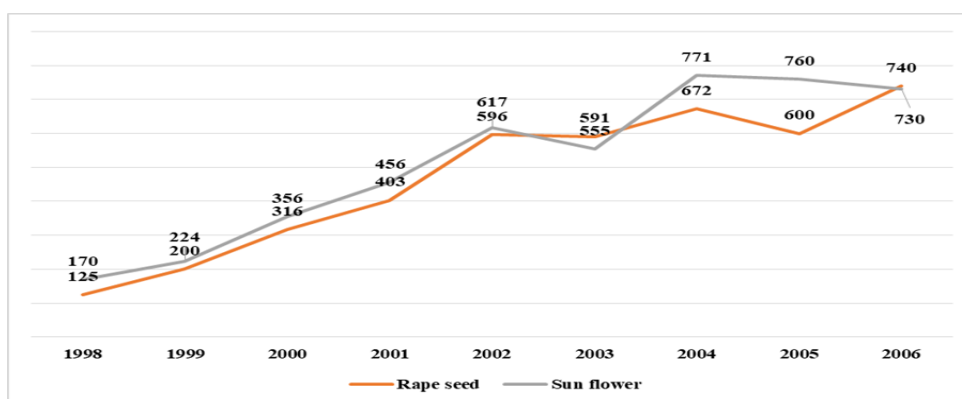

Fig. 1. Evolution of the basic price for sunflower and rapeseed in Romania during 1998-2006 (lei / ton)
Source: NIS data processing, Accessed on 21.02.2021 [10].

And in the case of sunflower cultivation, the price obtained for a ton of this product registered an upward evolution for the entire analyzed period. If in 1998 a ton of sunflower was sold at the price of 170 lei/ton, in 2006 a farmer received for the ton of sunflower sold a price of 730 lei/ton, increasing by 329.4% compared to the price obtained for a ton of sunflower in 1998. The maximum selling price of a ton of sunflower in Romania is registered in 2004, when a ton of sunflower was worth 771 lei (Figure 1).

The minimum of the period in terms of the basic price of rapeseed was 125 lei/ton, while the maximum of the period was 740 lei/ton, being determined an average price of the analyzed period of 471.1 lei/ton and a rate annually of 24.9% with a standard deviation of 218.3 lei/ton. Regarding the coefficient of variation, it has a value of 46.3%, which indicates a degree of heterogeneity of the analyzed data (Table 1).

Table 1. Analysis of the main statistical indicators regarding the evolution of the price for rapeseed and sunflower in the period 1998-2006

Product	Min	Max	Average	Annual rhythm	Standard deviation	Coef. of variation
	lei/ton	lei/ton	lei/ton	%	lei/ton	%
Rape	125	740	471.4	24.9	218.3	46.3
Sunflower	170	771	515.4	20.0	228.1	44.3

Source: NIS data processing, Accessed on 21.02.2021 [10].

In the case of sunflower, the minimum price was 170 lei/ton, while the maximum of the period was 771 lei/ton, being determined an average price of the analyzed period of 515.4 lei/ton and an annual rate of 20% with a standard deviation of 228.1 lei/ton. The coefficient of variation has a value of 44.3%, which indicates a degree of heterogeneity of the analyzed data (Table 1). At the level of 2019, a ton of rapeseed was sold at the price

of 1,510 lei, while in 2007 the price for a ton of rapeseed was 790 lei. The price recorded in 2019 for a ton of rapeseed was 91.1% higher than the price obtained in 2007. The highest price for the sale of a ton of rapeseed was obtained in 2012, when a farmer received 1,830 lei/ton, and the lowest price for selling rapeseed was obtained in 2007 - 790 lei/ton (Figure 2).
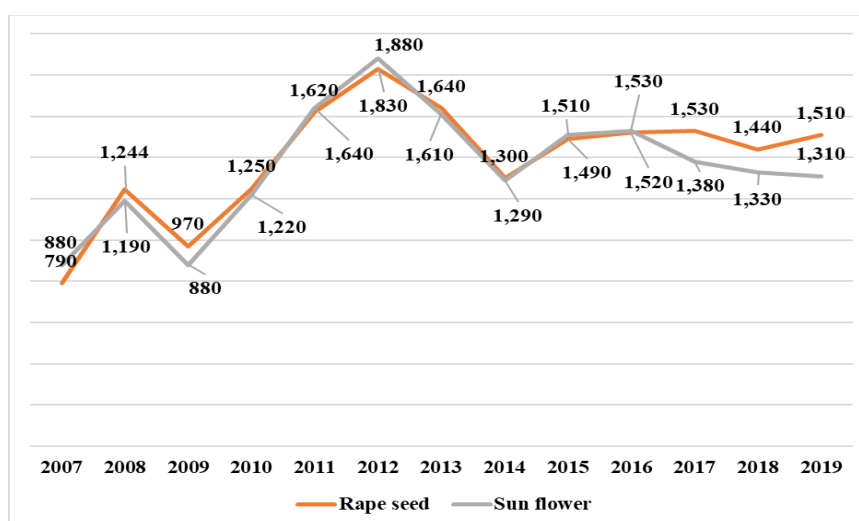

Fig. 2. Evolution of the basic price for rapeseed and sunflower in Romania during 2007-2019 (lei/ton)
Source: NIS data processing, Accessed on 21.02.2021 [10].

Analyzing the basic price for sunflower cultivation in the period 2007-2019, it is noted

that the price fluctuated from year to year, influenced by international markets, but also

by the supply of such products in the Romanian market. Compared to 2007 when a ton of sunflower was 880 lei, in 2019 the registered price for a ton was 1,310 lei/ton, increasing by 48.9% compared to the price obtained in 2007. Also in the case of sunflower cultivation the maximum price obtained is registered in 2012, being 1,880 lei/ton, while the minimum price is registered both in 2007 and in 2009, being 880 lei/ton (Figure 2.).

The minimum of the period in terms of the basic price of rapeseed was 790 lei/ton, while the maximum of the period was 1,830 lei/ ton, being determined an average price of the analyzed period of 1,394.9 lei/ton and a rate annually of 5.5% with a standard deviation of 282.5 lei/ton. Regarding the coefficient of variation, it has a value of 21.1%, which indicates a degree of heterogeneity of the analyzed data (Table 2).

Table 2. Analysis of the main statistical indicators regarding the evolution of the price for rapeseed and sunflower in the period 2007-2019

Product	Min	Max	Average	Annual rhythm	Standard deviation	Coef. of variation
	lei/ton	lei/ton	lei/ton	%	lei/ton	%
Rape	790	1,830	1,394.9	5.5	282.5	20.3
Sunflower	880	1,880	1,357.7	3.4	285.9	21.1

Source: NIS data processing, Accessed on 21.02.2021 [10].

In the case of sunflower in the analyzed period 2007-2019, the minimum price was 880 lei/ton, while the maximum price of the period was 1,880 lei / ton, being determined an average price of the analyzed period of

1,357.7 lei/ton and an annual rate of 3.4% with a standard deviation of 285.9 lei/ton. The coefficient of variation has a value of 21.1%, which indicates a relatively heterogeneous degree of data analyzed (Table 2).

Table 3. Comparison of the averages for the periods 1994-2006 and 2007-2019 using the Student Test method regarding the price for rapeseed and sunflower

Product	N1	N2	A1	A2	DF	S1^2	S2^2	tcalc
Rape	9	13	471.4	1,394.9	20	47,654.0	79,791.7	8.6
Sunflower	9	13	515.4	1,357.7	20	52,032.0	81,719.2	7.7
Critical values of the distribution of T	Probab. 0.05		2.1	*	significant			
	Probab. 0.01		2.8	**	distinctly significant			
	Probab. 0.001		3.8	***	very significant			

Source: NIS data processing, Accessed on 21.02.2021 [10].

Analyzing the two averages calculated according to the two periods taken into account (1998-2006, respectively 2007-2019) the following can be deduced (Table 3):
• regarding the comparison of the averages of the two periods in the case of the price for rapeseed, we find that the H1 hypothesis is true in this case, as the data are related to each other (are dependent) from a statistical point of view, and in terms of critical value of the distribution of T is very significant with a value of 8.6 (probability of 0.001 ***).
• in the case of comparing the averages of the two periods in the case of the price for sunflower, we find that the H1 hypothesis is true in this case, as the data are related to each

other (are dependent) from a statistical point of view, and in terms of critical value of the distribution of T is very significant having the value of 7.7 (probability of 0.001 ***).
Based on the data existing until 2019, it was possible to estimate the evolution of the basic price for rapeseed until 2030, which shows an increasing trend reaching the value of 2,235 lei/ton, increasing by 48% compared to the price recorded in 2019 (Figure 3).
Based on the data existing until 2019, it was possible to estimate the evolution of the basic price for sunflower until 2030, which shows an increasing trend reaching the value of 1907 lei / ton, increasing by 45% compared to the price recorded in year 2019 (Figure 4).
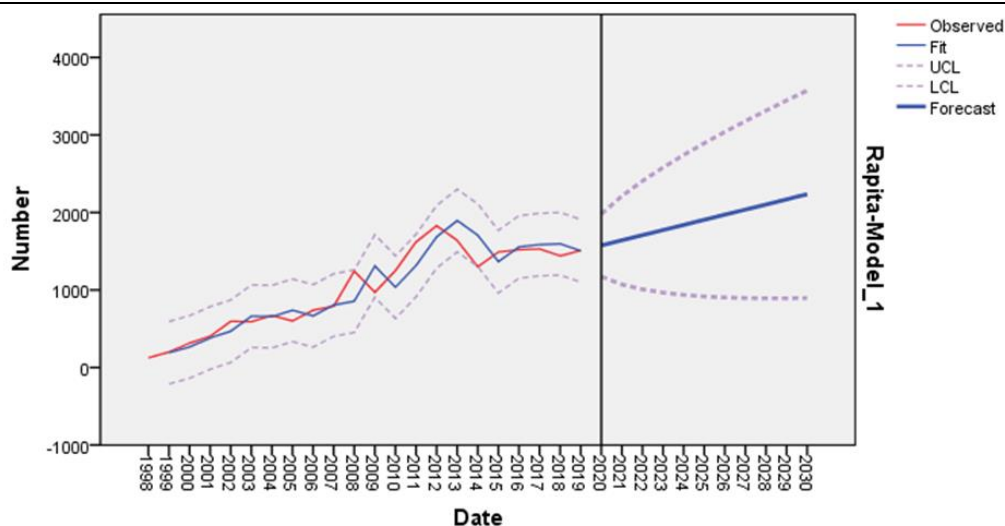
Fig. 3. Estimates on the evolution of the basic price for rapeseed by 2030
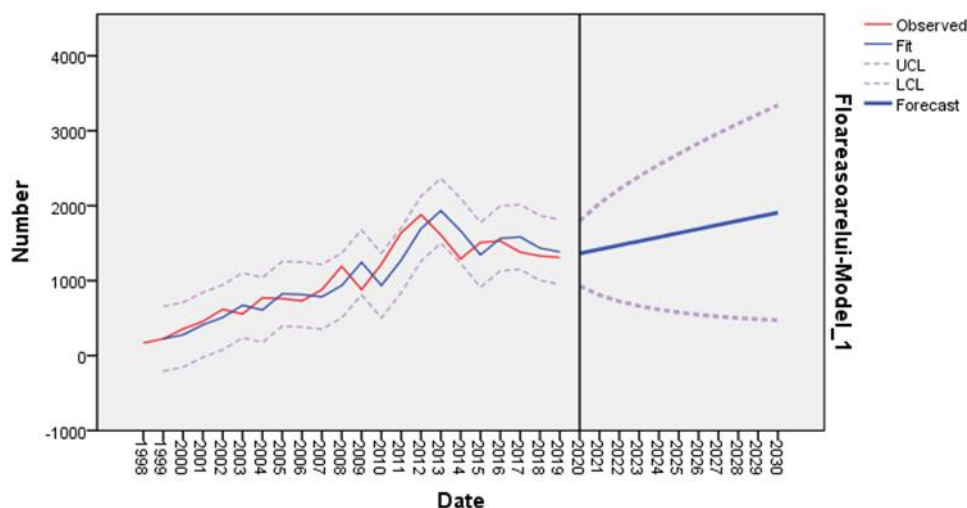Source: NIS data processing, Accessed on 21.02.2021 [10].

Fig. 4. Estimates on the evolution of the basic price for sunflower by 2030
Source: NIS data processing using SPSS, Accessed data on17.01.2021 [10].

CONCLUSIONS

International trade in oil products has grown substantially in recent years, influenced by an increase in demand for such products, both for human consumption and animal feed, or for obtaining renewable energy sources, such as biodiesel. Under the influence of these aspects, the price of oil products registered significant increases on the Romanian market as well.

If in the period 1998-2006 the price obtained for a ton of rapeseed or sunflower registered significant increases, reaching a ton of rapeseed to have a price in 2006 by 492% higher than the price obtained in 1998, the evolutions registered after Romania's accession to The European Union were somewhat more stable, reaching a ton of rapeseed to be sold in 2019 at a price of 1,510 lei / ton, an evolution of 91.1% compared to the price obtained in 2007. Thus, we can conclude that starting with 2007, the year of Romania's accession to the European Union, the price of agricultural products stabilizes, and the registered evolutions are not as significant as those registered in the period 1998-2006.

Analyzing the prices recorded for the marketing of sunflower and rapeseed crops until 2019, an estimate was made of the evolution of the selling price for these crops

until 2030. The results obtained indicated that in 2030 the price obtained for a ton of rapeseed could reach the value of 1,907 lei/ton, increasing by 45% compared to the price recorded in 2019, while for sunflower the value of one ton could reach 2,235 lei, increasing by 48% compared to the price recorded in 2019.

Oilseeds are much more perishable than cereal crops and for this reason the quality of the seeds is extremely important in setting prices. Thus, the storage of rapeseed and sunflower harvest in order to obtain the best price is justified only if the farmer has efficient storage spaces.

The rate of price increase for the two crops, recorded in the two periods analyzed, determines a high risk of price increase for the estimated period - 2030. Most likely a decrease in demand will moderate this momentum of the price increase recorded in the case of the two crops, but given the global population growth, it will be unlikely.

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