PRICE VOLATILITY ALONG THE ROMANIAN AGRI-FOOD CHAINS

VOLATILITATEA PRETURILOR PE FILIERELE AGROALIMENTARE DIN ROMANIA

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Abstract: *The present paper investigates price volatility along the agri-food chains, using the monthly series of agricultural, processor and consumer price indices, in the period January 2006- December 2010. The analysis is made at sectoral level and is particularized for wheat and bakery products chain. The main characteristic of price volatility from the different levels of the food chains is the apparent stability of consumer and processor prices and the strong volatility of agricultural prices.*

Key words**:** *price volatility, agri-food chains*

1. INTRODUCTION

Agricultural price volatility is not a new phenomenon, yet it experienced unprecedented growth in the second half of the year 2007 and early 2008, under the background of increased disequilibria between demand and supply also amplified by the ongoing economic-financial crisis. Price volatility generates instability on agricultural markets and puts under question the population's food security, which is the most important objective of the Common Agricultural Policy. The recent incidents generated by the climate excesses in the years 2007/2008 and even in 2010 increased instability and brought about incertitude with regard to the European Union's capacity to ensure food security for the population from the European countries and its capacity to contribute to global food security.

2. THEORETICAL FRAMEWORK

The relation between price volatility and price transmission along the agri-food chains has been thoroughly investigated in recent years, taking

into consideration the general instability manifested on the agricultural markets and the pressures that appeared at consumer level through the purchasing power diminution as an effect of the economic crisis. The analysis of the agri-food price volatility at European level produced a series of conclusions that we shall next present.

In the first place, agricultural prices are volatile. In the last years, agricultural prices experienced two growth cycles and then diminution. In the first cycle, which began in the year 2007 with a maximum in late 2007 and in early 2008, agricultural prices significantly varied in both directions, in a relatively short period of time.

In the second place, the consumer prices are more stable, having a relatively constant variation rate. In essence, consumer prices have a slow growth tendency over time, while agricultural prices have very great fluctuations from one period to another.

In the third place, agricultural prices had a decreasing trend on long term, due to the increase in the productivity of the production factors in agriculture, which led to the agricultural production increase and diminution of specific costs. This situation lasted until 2007, when agricultural prices practically exploded. Most specialists consider that in the next period we shall continue to experience instability on the agricultural markets, under the background of food demand increase in the emerging countries (Brazil, China, India), as well as of the climate changes. The trend of agricultural prices evolution will probably be reversed, and we shall experience a period of agricultural prices growth, at least on the medium run.

The agricultural prices and the consumer prices *per se* follow divergent trends: consumer prices follow a constant growth trend, while agricultural prices feature great fluctuations, both on the medium and long term. The consumer prices and the processor prices have the role to attenuate, to level off the excessive variations of agricultural prices.

3. METHODOLOGY

This paper contains an analysis of the evolution of aggregated prices along the agri-food chains from Romania, namely the agricultural prices, food processing prices and consumer prices. The monthly series of price indices were analyzed, from the period January 2006–December 2010. For the evaluation of price volatility, the variation coefficient was calculated for

the agricultural, processor and consumer price series. The variation coefficient measures the dispersion level of a statistical series and is calculated as ratio of standard deviation to the statistical mean. The higher the value of this coefficient, the series is more dispersed and price volatility is higher.

At the same time, the mechanism of price transmission from farmer to final consumer is investigated per total agri-food sector and along the chains of several important food products, in order to identify the amplitude, the asymmetry and delay of price transmission from the primary levels to the final consumer.

4. DISCUSSION OF RESULTS

4.1. Analysis of price transmission along the agri-food chains

The transmission of agricultural price variation caused by the agricultural price crisis, which in Romania was manifested in the period March 2007 – May 2008, had an asymmetric character, in the sense that the process of agricultural price increase was almost simultaneously accompanied by the increase of processor and consumer prices (transmission with attenuated amplitude). In the period when agricultural prices decreased, which followed after May 2008, the processor and consumer prices continued to slowly increase or stagnated in the best case.

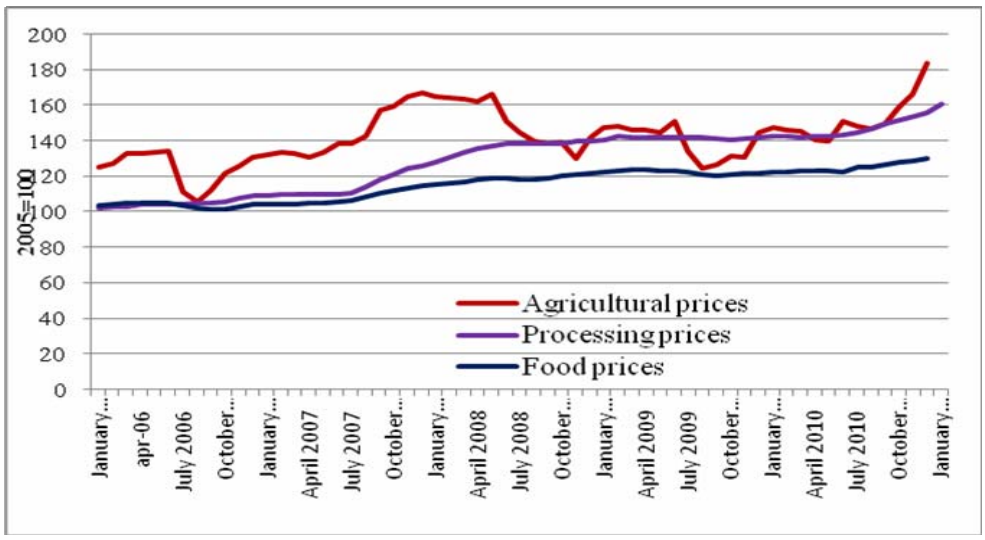
In the period of the 2007/2008 crisis, agricultural prices increased by 25.1% on the average, and this increase was relatively fast transmitted to the processing sector, where the output prices increased by 24.6% on the average, i.e. by a percentage quite close to that of agricultural price increase.

We mention that the European average of processing price growth in the period of the 2007/2008 crisis was only 9%. Logically, the processing price growth should be lower than the agricultural price growth as the agricultural product represents only one of the cost items in a processed food product. In EU-27, the agricultural raw material averagely accounts for 20% of the processed product cost. In Romania, the cost structure of processed food products is not transparent. Some disparate information would indicate very high shares of agricultural raw material (e.g. 65-70% in the case of bread), but we do not know how much of this information is true or whether it is disseminated in order to justify the excessive increase of prices following processing. But in any case, the increase in transparency

with regard to value added creation along certain chains would indicate whether these problems originate in the imperfect operation of markets along the chains (eventually concentrations in the processing sector for certain products), of the general economic background, of other input prices (energy, labour) etc. Anyhow, as we can see in Graph 1, price growth transmission to final consumers is much attenuated (13.6% in the period of the 2007-2008 crisis), as in the end, the final consumer's purchasing power constrains the continuous intention to increase prices from the part of operators in the agro-processing and primary sectors. Although foodstuffs are basic products, and the food demand is relatively inelastic, the consumer, in the situation of income diminution, looks for cheaper products or increase self-consumption (mainly in rural areas). In this way, food demand of more expensive products decreases, mainly in the case of products that are source of animal protein (milk and dairy products, meat and meat products), and also in the case of fruit. In the period following the crisis (May 2008 – October 2008), although agricultural prices were down by 16% on the average, processing prices stagnated, which reveals the asymmetric transmission phenomenon, i.e. in Romania the variations of prices at the higher levels in the chains of many products have only one direction: they grow. At EU-27 level, agricultural price depression was also followed by a modest decrease of processing prices. The same stability can be also noticed with regard to consumer prices (Graph 1).

Another price growth cycle along the agri-food chains was produced in the year 2010, under the background of natural disasters that affected the agricultural production in countries such as Russia and Ukraine, as well as of the economic crisis that led to great speculations on the markets of agricultural raw materials. This agricultural price escalation was felt in Romania as well, where in the period September 2009 - December 2010, the agricultural prices increased by 45.2%, while the final consumer prices by 8% (Graph 1). We can notice that in this second price growth cycle, the transmission of price variations along the chains to final consumer was much attenuated compared to the first cycle, under the background of ongoing economic crisis, which significantly affected most population's income forms.

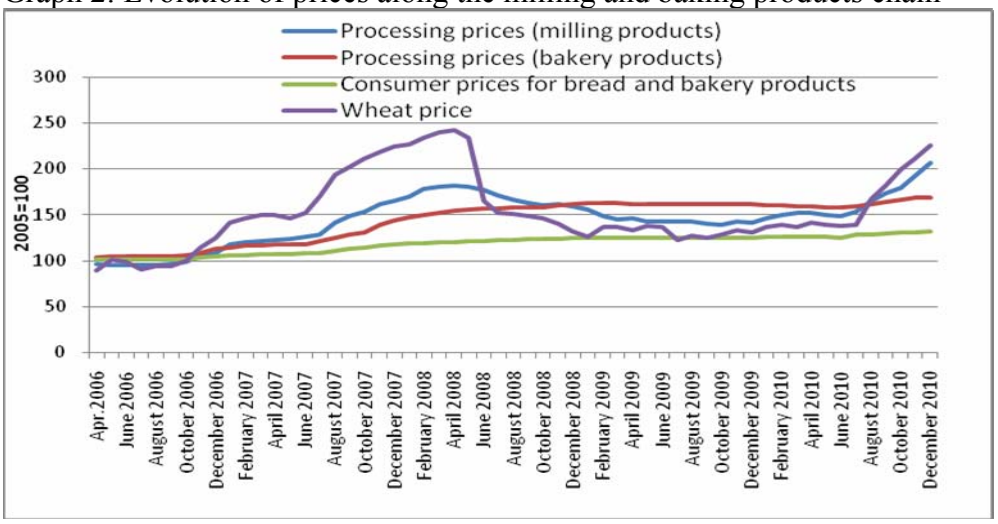
Graph 1: Evolution of agricultural products prices, of the processor products prices and of consumer food prices in Romania



The transmission of prices along the particularized chains reveals certain aspects that do not appear at the agri-food sector level, considered as an entity and analyzed as such. For example, price transmission on the chain of milling and baking products reveals the price variation amortization in the first place, as we go upwards along the chain. From Graph 2, we can notice that the beginning of the agricultural crisis in the year 2007/2008 produced an increase of agricultural prices in wheat by 87%, of the prices of milling products by 66%, of the bakery produce prices by 37% and of consumer prices in the milling and baking products by only 16%. In the situation of agricultural prices decrease in the autumn of 2008, agricultural prices decreased by -38%, but this decrease was transmitted only in the first processing stage (i.e. milling) by -11%. The baking prices and consumer prices continue to increase, yet at a modest rate, under the probable influence of the population's purchasing power increase. The agricultural price depression tendency was also maintained in the next year (2009), in the sense that agricultural prices continued to decrease (by-14%), similarly to the milling prices (by-13%); however the prices in the final segments of the chain were maintained constant or slightly increased (by +1%). In the

period September 2009 - December 2010, wheat prices increased again, under the pressure of deficiencies on the regional markets (Russia).

Graph 2: Evolution of prices along the milling and baking products chain



We can notice from Graph 2 that wheat price increased by 81% in the last mentioned period, which was attenuatedly transmitted along the chains, so that the price increase at final consumer was only by 5%. We mention that this bread price increase at the final consumer may be also the effect of VAT increase, but the main cause was the pressure of price increase of the agricultural raw material.

4.2 Price volatility in the different stages of the agri-food chains

Price volatility analysis was based on the calculation of variation coefficients of the monthly series of fixed base price indices, namely agricultural prices, processor prices and consumer prices. The obtained results reveal that prices on the agri-food chains in Romania feature a higher volatility in the primary stage of chains (agriculture), while on the processing and consumer stage this volatility is lower. We can notice from the table below that the variation coefficient for the prices of crop products is 16.5% and for the prices of animal products 14.3%, in the period January 2006/December 2010. In the same period, price volatility in the case of processed foodstuffs was 13.1%, while in the case of the consumer prices of

foodstuffs it was only 7.5%. As we have mentioned in the previous chapter, the main characteristic of price transmission along the chains is the apparent stability of consumer and processor prices and the strong volatility of agricultural prices. As such, the agricultural prices and the consumer prices have different evolutions: the consumer prices have a much lower volatility and generally a constant growth trend, while the agricultural prices feature great fluctuations, both on the medium and seasonal term.

An explanation for this situation is that the food demand is conditional to the prices of products as well as to the consumers' incomes. Although foodstuffs are basic commodities and have a relatively inelastic demand, the budgetary restriction applies mainly to the more expensive products, i.e. consumers can opt for cheaper products in the case of the excessive price increase of these products. Most foodstuffs are perishable products, so that the operators in the retail sector have special strategies: they do not increase selling prices very much when the agricultural prices explode, and they do not decrease them either when the agricultural prices significantly decline.

Table 1: Price variability in the main stages of agri-food chains *

Name of product	Variation coefficient Jan.2006-Dec.2010	Variation coefficients					
		Jan.2006-Mar.2007	Apr.2007-May 2008	Jun. 2008-Oct.2008	Nov. 2008-Sep.2009	Oct.2009-Jul.2010	Aug.2010-Dec.2010
Crop products	16.5%	11.2%	10.8%	16.2%	9.4%	8.9%	13.1%
Animal products	14.3%	5.8%	8.4%	5.1%	3.4%	4.5%	4.6%
Total processing	13.1%	2.4%	8.8%	0.5%	0.7%	0.7%	2.3%
Total foodstuffs	7.5%	1.2%	4.6%	0.6%	1.0%	1.0%	1.4%

*) The price indices used are fixed base indices, 2005=100

Source: Own calculations on the basis of data from the Price Bulletins 2006-2010, NIS

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