Economic and social impacts of price volatility in the markets of agricultural products

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Abstract

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The globalization of the economy has triggered a progressive process of innovation in the markets and communication, through direct and indirect effects, in the primary sector and particularly in the agribusiness sector. The demand and supply of agricultural and above all agri-food products is centred worldwide and no longer only at national or local level. Within these contexts, the individual agricultural companies are increasingly expelled and unable to compete and influence the performance of the markets themselves and are significantly exposed to the volatility of the prices of unrefined agricultural materials. The purpose of this article is to examine the impacts of the volatility of agricultural commodity prices from a macroeconomic and microeconomic perspective. This theme, due to its importance and urgency, has entered the debate on European and International Agricultural policy. The research, conducted through the analysis of the data provided and published by FAO (2018) revealed that the price fluctuation represents a gap for the entire economic system of a country and in recent years to consolidated changes of the past, on average around 20%, in the short term we have witnessed percentages that have reached almost 100%.

Keywords: agriculture; price; volatility; agricultural products

Introduction

The global concern for volatility and consequently for price levels are two of the main problems related to food "safety", not only under the "safety" quality profile, but mainly under the quantity "security" profile. While producers can often reap benefits and opportunities from a high level of food commodity prices, on the other hand consumers, particularly those belonging to the poorer social classes and residing in the least developed countries, are severely affected by the consequences. The poorer families, in fact, have a high marginal propensity to consumption, so they spend a large part of their budget, in some cases all of it, on food spending, consuming mostly non-elaborate goods. As a result, these families see the possibility of adequate food and other necessities compromised. Producers, on the con-trary, are more disadvantaged in a scenario of low prices, in fact, investments are reduced, they are produced in poor conditions and they are forced to change their own standard of living. In addition, price volatility in some cases involves taking adverse risk actions such as inefficient investment decisions (Lanfranchi et al., 2015; D'Amico et al., 2013).

The Volatility of Agricultural Products: An Overview
The volatility of agricultural prices is a phenomenon that has frequently occurred in the past, but it had never reached the current numbers. Today this condition has become a structural element of the World and European agricultural markets. According to Ceballos et al. (2017), the problem of the instability of agricultural prices can be attributed to two main factors, one linked to the evolutionary dynamics of world markets and the other to the elimination of EU price

support policies. According to Chevallier & Ielpo (2013), the most important factor is the instability of world agricultural markets, caused by globalization and the imbalance between supply and demand. Jin and Kim (2012) argue that volatility has grown from the moment when the Common Agricultural Policy (CAP) abandoned the traditional instruments of control and price support. Compared to the past, the phenomena of price volatility have ever more influenced the internal markets of the European Union in fact, until a few years ago the EU market was strongly protected and guaranteed by the EU protectionist policy (Chang et al., 2018; Boccia et al., 2017). Volatile prices create significant problems for small entrepreneurs as they cannot plan their investments and as a result, the consumer tends to buy less nutritious and cheaper food (Clapp et al., 2017). The increase in world population and consumption, contributes to the growth of food prices, but not enough to explain the volatility, which is affected by other factors such as policies to support biofuels, climate change, financial speculation on food (futures) (Kenyon & Gene, 1998). A further phenomenon that may have influenced the dynamics of commodity prices in recent years is the depreciation of the US dollar (Clapp et al., 2017; Asciuto et al., 2008). Starting in 2002, the dollar began to depreciate in respect to the currencies of the more developed countries and against the main currencies of the less developed countries. There could be many solutions to mitigate this phenomenon. One example could be to review the policies

on biofuels, regulate the financial activity of food markets, invest in local production and avoid restrictions on exports, implement a policy for global food reserves, support services such as health, education, sanitation, social protection (Lanfranchi et al., 2014; Rezitis & Stavropoulos, 2011).

Methodology

Price Volatility of Agricultural Products

In the last fifty years, periods of extreme urgency linked to the volatility of agricultural commodity prices have been reduced. The highest levels reached globally from the 60's up to today refer, in fact, to two precise historical moments: the food crisis of 1970 and today's situation of major turbulence and instability, which began in 2007 and has lasted until today. It is also important to remember three other periods of sudden price increases, namely in the years 1978-1979, 1986-1987 and in 1995, but these have never proved to be as critical as those mentioned above. The Food and Agriculture Organization (FAO), which uses the benchmark to assess the stability of the market for agricultural commodity prices, the FAO Food Price Index (FFPI), measures the monthly change in world prices of a basket of food products. This indicator is the product of the average price indexes of five groups of products (cereals, dairy products, oils or fats, meat and sugar) and is calculated as follows:
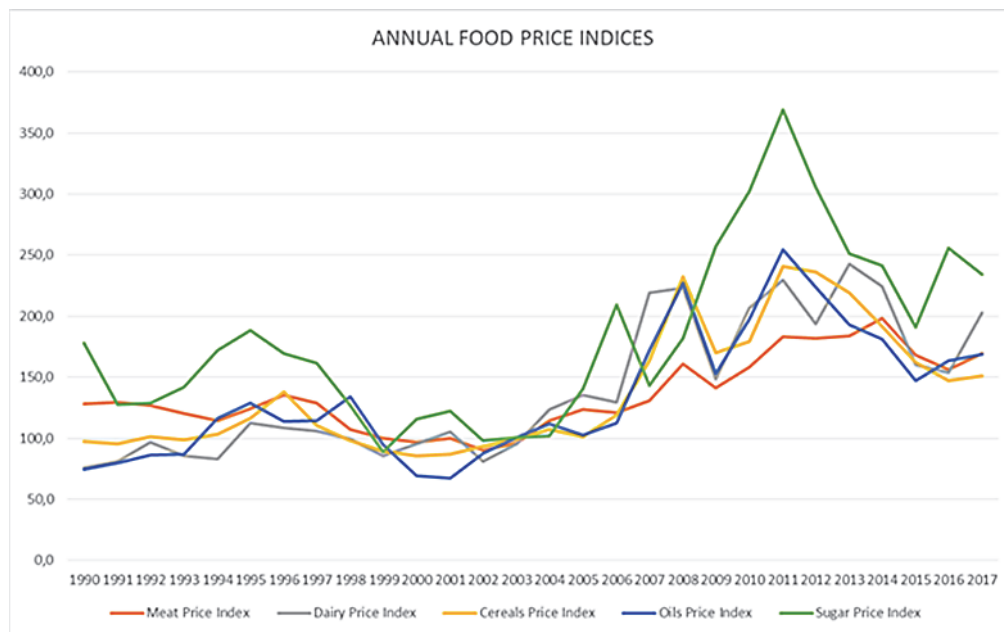
Fig. 1. Annual Food price indices
Source: Our elaboration

– the price index of oils and fats is calculated on the average price of 11 different types of oil;

– the sugar price index;

– the meat price index is calculated taking into consideration the average price of the four most common types of meat;

– the price index of dairy products is calculated taking into consideration the prices of butter, skimmed milk powder, whole milk powder and cheese;

The cereal price index is calculated taking into account the cereal and rice price indexes (Figure 1).

In the second half of 2010 commodity prices grew very rapidly: in particular between July 2010 and February 2011 the FAO Food Price Index grew by 38%, exceeding the peak recorded during the 2008 food crisis. From June 2010 to June 2011, the price of cereals grew a lot, around 71%. In addition, a worrying increase in price volatility was visible, with marked and sudden up and down oscillations within the same day, all of this generated uncertainty and instability. Even the standard deviation, shows worrying data, because in the last 5 years it has been more than double compared to the previous 15 years (Figure 2).

In today's complex global economic system, such phenomena, the causes and above all the consequences could lead to a situation of serious criticality for families (in particular we refer to the food security of low-income earners) and to the development of the agro-food chain and the economy as a whole. The consequences arising from instability and uncertainty in the markets have attracted the attention of international communities. For example, in Italy the price of corn, before the economic and financial crisis of 2007, went from 13 euros per quintal of 2006 to 29 euros in 2008 (+119%) and then collapsed in 2009 to 14 euros per quintal (-51%) and rose again by about 110% in 2011 to a price of 30 euros per quintal.

Results

The Macroeconomic Effects of the Volatility of Prices of Agricultural Products

At the macro-economic level, for the purpose of a careful analysis of the volatility of commodity prices, it is possible to distinguish the long and short-term effects and the differences between exporting and importing countries. As far as exporting countries are concerned, the least developed countries are more exposed to the risk of negative macroeconomic impacts generated by price volatility, because exports of unrefined agricultural materials or imports of foodstuffs bear significant weight on the public finances of these countries. In the exporting countries where GDP is strongly linked to the agricultural sector, a large reduction in the prices of unrefined materials causes serious consequences to the national economy. In these situations, in fact, the impact is immediate on the balance of payments, cuts in investments and decrease in the use of inputs.

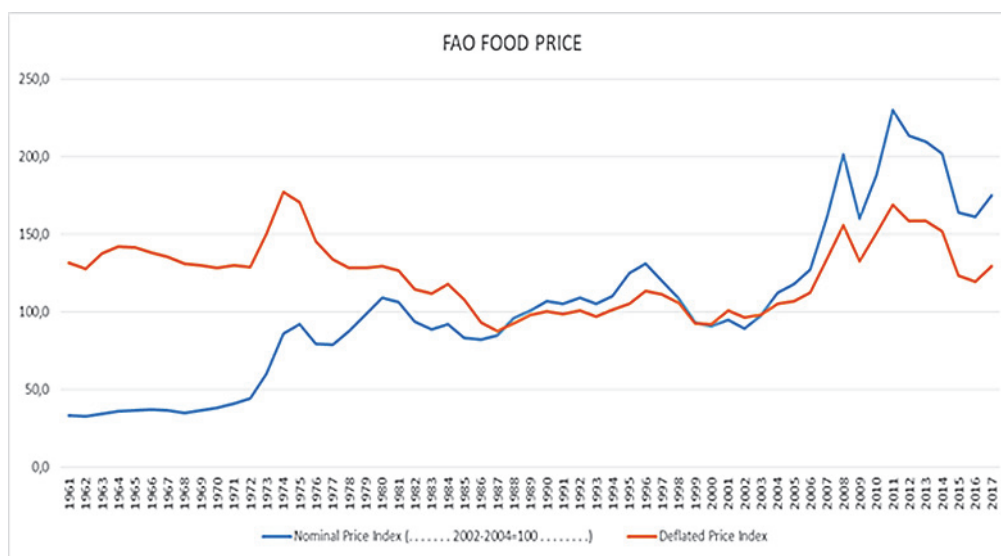These phenomena determine in the medium/long term a negative impact on the economic development of a coun-

Fig. 2. FAO food price
Source: Our elaboration

try. Furthermore, the excessive increase in prices causes protectionist reactions in exporting countries, such as the blocking of exports, with the aim of reducing domestic inflation. These effects often cause distortions in the national and international production chain, which, at the end of the period, backfire on the country that promoted the blockade. The most protectionist countries are Cameroon, Bahamas, Djibouti, countries where the GDP is strongly linked to the agricultural sector.

As for the importing countries, instead, when there is an exceptional rise in food prices, they may undergo a worsening of the balance of payments and public finances, affecting the entire economy. Particular attention should be paid to those countries importing foodstuffs defined as "low income", where the negative wave can cause inflation and import costs to rise, resulting in a worsening of the balance of payments. In addition, we are forced to increase exports to cover imports; these countries face a serious risk of currency depreciation. Finally, the volatility of agricultural product prices also has an impact on tax measures related to imports, taxes on food and subsidies.

The Micro-Economic Effects of the Volatility of Prices of Agricultural Products

At the microeconomic level, on the other hand, it is possible to analyse the main impacts generated by a situation of high volatility in the prices of unrefined food materials, both in terms of demand and supply. When considering the demand, a very high price level is painful for poor families, particularly those living in less developed countries. These, using most of their family budget for food, are forced to change their food and living standards. It is important to distinguish between the different socio-economic groups and the types of households in terms of impact. Net consumers of food products (consumers and non-producers) are hit hard by price increases, as food represents a very large share of their spending. In these situations, in fact, an increase in prices will severely curb the purchasing power of the families in question. Then, among these, the most affected families are the poorest urban ones, which buy food goods with the salary they receive, and those with women at the head of the family. After the net consumers of food products, another category that is deeply affected by the price increase is that which includes families living on subsistence farming. Families experiencing difficulties are supplied with lower quality products and in smaller quantities. In reference to this, further clarification is needed: the direct impact of the increase in consumption prices is usually expected to be negative, but in order to assess this effect, the direction of the prices of different foods must be considered. If the price trend of

all products moves in the same direction, the impact on the economy and on welfare will be the one just described. In the opposite case, it is possible that families replace the products of their basket and that this "replacement" in favour of less expensive products leads to the effect of the price increase of others. Those described above are referred to as short-term effects, the sharp increase in the prices of unrefined food materials, causes; however, also medium-long term affects even more worrying.

On a social/nutritional level, the subjects most affected by the volatility of food commodity prices are women and children. For children we refer above all to those in their first 1000 days of life, for which the type of diet determines important implications in the future psychophysical development. The consequences can therefore prove tragic and irreversible: many children cease to have a good education and nutrition, with serious loss of human capital and work, poverty and malnutrition increase globally and the mortality rate increases drastically. The growth of these phenomena generates serious problems of future sustainability in the developing countries. At the same time, a prolonged decrease in prices causes the depletion of less developed agricultural areas, areas that cannot benefit from subsidies similar to those of developed countries. One of the causes of the massive migration of the agricultural populations to the large developed cities is certainly due to this phenomenon. The effects of volatility and high prices are lower in developed countries. Although many families spend around half the family budget on food, these nations can enjoy greater flexibility to "adjust" spending based on contingencies. Furthermore, the more developed countries have efficient protection mechanisms that provide adequate assistance to those at risk.

Speaking of the supply, on the other hand, a high level of prices generates benefits for the net producers of food commodities and pushes the increase in production. Regarding livestock farming, the profitability is affected, especially with reference to the increase in feed costs. On the other hand low or volatile prices can, create significant problems for farmers and operators in the food chain, as they risk losing their productive investments if prices fall during the implementation of investments, when profitability depends on the level of prices. A typical example of this is that of farmers who have already sown their crops and are facing a decline in prices: situations of this kind involve many difficulties for small farmers who cannot access credit to finance sowing or stay in business. This is a particularly serious and difficult problem to solve in many countries where women own small lots of land. Furthermore, it is important to consider how many farmers in developing countries fail to put aside money for the

following seasons because they operate on a limited scale (Lanfranchi et al., 2015).

Consequently, both the existence of the farm and the well-being of the family are subject to risk in a situation of excessive volatility. One of the company indicators to be monitored to stop the negative effects of price volatility is the level of reserves. The stocks in the agricultural business system represent that part of the production destined for conservation and not for direct sale in the markets. The flow of stocks of the main agricultural can be identified as not only a useful indicator to assess the supply capacity in the present, but also especially in the future perspective of these agricultural products (Burton, 2018). The importance of monitoring the level of stocks should not be seen exclusively from a business point of view, because of their function as market stabilizers, but as mentioned previously for the sociological implications that they can determine when it comes to necessities. In fact, stocks represent a guarantee of supply to cope with particularly urgent situations, such as events related to food alerts or the effects that progressively determine climate change.

After examining the negative impacts, it is important to consider some opportunities offered in such a scenario. Considering that in most developing countries, for most of the rural population, agriculture is the main source of income, a situation of permanently higher prices could contribute to alleviating rural poverty, but only on the condition that producers are fully integrated into the market. The extension of these opportunities is then linked to the size of farms and access to other resources that allow farmers to seize the opportunity when prices increase. Furthermore, in places where agriculture is crucial and necessary for rural growth, an increase in productivity generates notable multiplier effects on secondary rural activities/non-agricultural rural activities and on employment (Lanfranchi et al., 2016; Bernetti et al., 2006).

Conclusions

This research provides some contributions related to the effects that arise from the instability of agricultural commodity prices in a micro and macroeconomic perspective. The study can contribute to the future debate from the point of view of the management of business risks connected to this problem and on the causes of the lack of development of some rural areas of the world. The study has shown that one of the main causes to be attributed to the sensitive fluctuation of the price system is the level of reserves. Implementing international, forward-looking policies on the level of inventories allow, in periods of crisis, to sustain the offer by entering production quotas in the market and preventing price rises.

The stock-regulating function is also exercised, during the periods of overproduction; in this case, it would be necessary to transfer production quotas to storage warehouses or other markets, in order to avoid low prices.

Naturally, the limit of the regulatory role of stocks is significantly influenced by the perishable nature of fresh agricultural products. By analysing the volatility of agricultural product prices and understanding the relevant macro and micro economic consequences, it is appropriate to intervene in the medium and long-term structure factors and on short-term contingent factors. The factors analysed are subdivided according to the concrete possibility of intervention, with the possibility of reducing volatility and avoiding excessive price increases that would jeopardize global food security and the development of the sector. Context factors are constants on which it does not seem appropriate to intervene. Examples of this are population growth, the economic weight of emerging countries, currency markets and international geopolitical dynamics.

The factors of the structure of supply and demand, on the other hand, can be faced with actions that could only cause effects in the medium to long term. Reference can be made to agricultural productivity, waste and losses along the agrifood chain, to the limited nature of available natural resources, to the reuse of agricultural processing by-products and the effects of climate change for energy purposes. These are decisive factors in the long term.

The contingent factors can determine results in the short term through targeted interventions and solutions of a political and technical nature. The latter represent the action levers effective in the short term, necessary to deal with emergencies but they are not sufficient without interventions on the structural factors. Some examples are, the creation of a multilateral system of food reserves and improvement of the transparency on flows and stocks with the aim of keeping the level of stocks of unrefined agricultural materials low; the reduction of the various forms of commercial restrictions; the reduction of the support of the production of first generation biofuels in favour of those of second generation and the increase in investments in new technologies.

ricultural products" and "Conclusions"; Carlo Giannetto, wrote paragraphs "Results: the macroeconomic effects of the volatility of prices of agricultural products"; Ivanova and Dimitrova wrote paragraph "Introduction"; while Lanfranchi and Giannetto wrote the paragraph "Methodology: price volatility of agricultural products"; Giannetto, Ivanova and Dimitrova wrote the paragraph "The volatility of agricultural products: an overview "; Frank Rotondo oversaw linguistic translation and bibliographic research.

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