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CHAPTER 5.3

# WHY FOOD PRICES ARE LIKELY TO BECOME MORE UNSTABLE

Franck Galtier[1]

## SUMMARY

Extreme food price volatility is extremely damaging to food and nutrition security. It is likely to increase in the future because: (i) food markets will probably become more vulnerable to shocks; (ii) supply shocks can be expected to increase because of climate change, emerging diseases and armed conflicts that could affect production and trade; (iii) demand shocks are predicted to rise due to the growing links between the food, energy and financial markets.

Many food prices are already unstable, both on international and national markets. Since food products account for a large share of household expenditure in many low-income countries, especially the poorest ones, sharp price increases have a very negative impact on food and nutrition security. Some households need to reduce their food consumption level or diversity, causing possible calorie or nutrient deficiencies, with possibly irreversible effects, especially for young children (Glewwe, Jacoby and King, 2001). Equally, price collapses affect food production and investment: as farmers are facing a huge market risk, they are not willing to invest and banks or microfinance institutions are not willing to lend them money. Food price volatility is likely to increase in the future for the reasons explained below.

## Increased vulnerability to shocks

Food markets are already highly vulnerable to shocks. This is because there is no mechanism to guarantee that stock levels are adequate to absorb significant shocks in supply or demand. Stocks usually have a stabilising effect on prices because storers usually buy when prices are low (thereby reducing the quantity available on the market and exerting an upward pressure on the price) and sell when prices are high (thereby releasing quantities on the market and exerting a downward pressure on the price). This mechanism applies to both private storers and the food reserve agencies that manage public stocks. However, if stock levels are sometimes sufficient (after successive good harvests), they are sometimes too low, allowing for sharp price increases, as illustrated by the international grain markets (European Commission, 2018).

The trends analysed in Chapter 5.2 are likely to increase the vulnerability of food markets. Some world regions, especially Africa, will become more dependent on food imports and therefore more vulnerable to trade shocks. We note here that WTO disciplines on export restrictions are extremely weak and export bans were enforced by many exporting countries during the 2008 crisis, thereby penalising countries which import rice and wheat.

## Increased supply shocks

### *Climate change*

Although climate change impact studies have mainly focused on changes in mean climate, IPCC (2012) acknowledges the fact that "a changing climate leads to changes in the frequency, intensity, spatial extent, duration, and timing of weather and

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climate extremes, and can result in unprecedented extremes." Changes in extreme events have been observed since 1950. Further changes may occur in the future, although there is no certainty about this in the IPCC projections. Current knowledge on the impacts of increased climate variability and extreme events have been reviewed by Thornton *et al.* (2014). Temperature extremes are expected to reduce yields: *"rice yields [would be] reduced by 90% with night temperatures of 32°C compared to 27°C," [whereas] "in maize, each degree day spent above 30°C can reduce yield by 1.7% under drought conditions." "High temperature extremes during grain filling can affect the protein content of wheat grain"* (Thornton *et al.*, 2014). Changes in rainfall variability or seasonal patterns (both droughts and floods) are the principal cause of inter-annual yield variability (*cf.* Section 2). The probable increase in the frequency of extreme climate events is likely to render food production more unstable, at least in some parts of the world, thereby increasing price instability on national and international markets.

#### *Emerging diseases*

Emerging infectious diseases are diseases whose incidence has increased in the past 20 years and could increase in the near future (*cf.* Chapter 2.4). Climate warming may contribute to boosting their development (for more details on this, see FAO 2018). Emerging diseases can affect plants, animals and humans. They could lead to more unstable food prices by affecting production and trade. For example, it is estimated that by generating labour shortages, the Ebola virus disease outbreak that affected West Africa in 2014 led to reductions in rice production of 11.6 percent in Liberia, 8 percent in Sierra Leone and 3.7 percent in Guinea (FAO, 2016). In addition, it disrupted the local rice trade both within and between countries because of traders' fears of harvesting rice in affected areas and government decisions to close markets and borders. This resulted in worse connections between surplus and deficit areas, leading to both increases and decreases in prices.

#### *Conflicts*

Armed conflicts are already a huge problem in some regions of the world, including the Sahel. The probability of future conflicts is likely to increase with the growth of climate-driven migration and rising pressure on resources such as land and water. Analysis of existing conflicts shows that they can affect food supply by reducing production, disrupting trade or causing stock theft or destruction (as occurred with jihadist movements in northern Mali). The way in which Boko Haram's attacks affect agricultural market activity has been studied in 112 markets located in northern Nigeria and in 2,429 reported conflicts for the period July 2009 to November 2016 (Van Den Hoek, 2017). Conflicts have been found to reduce market activity even though less than 2 percent of them occurred at or near markets.

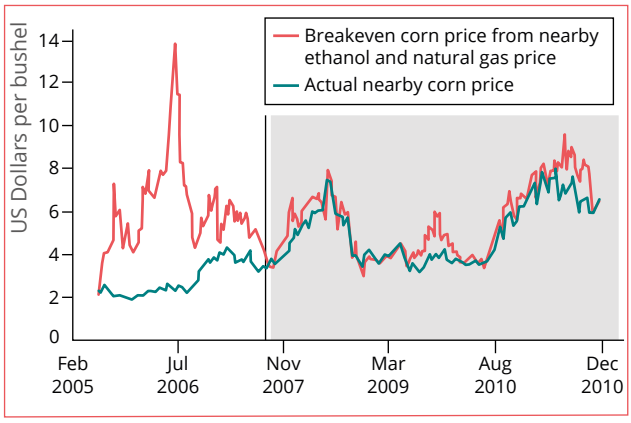


**Figure 22:** *Biofuel production capacities (since 2007) resulted in a strong relationship between maize prices and energy prices. Source: HLPE, 2013.*

## Increased demand shocks

As food markets will be increasingly linked to energy and financial markets, food prices will increasingly be affected by the shocks that occur on these markets.

#### *Growing links between energy and food markets*

Because of methodological challenges, the many econometrical studies carried out show diverging results regarding whether the instability of energy prices is transmitted to food prices (for a review, see HLPE, 2013). However, the more comprehensive and reliable approach (based on estimating the 'break-even point' for a given food product, i.e. the price level below which using it to produce biofuel is profitable) clearly shows that the price of maize is driven by its break-even point, which in turn depends on the dynamics of ethanol and natural gas prices (*cf.* Figure 22 and HLPE, 2013). This is not the case for vegetable oils because their price is higher than their break-even point. In the future, the role of energy prices as drivers for food prices is likely to increase because of the on-going development of biofuel production in many emerging countries (HLPE, 2013) and the likely increase in energy prices (*cf.* Chapter 5.2). The price of food products not directly used to produce biofuels may also become more unstable because when there are sharp increases in energy prices, land and scarce inputs are likely to be diverted from food products to energy feedstock crops.

Within a few decades, the phenomenon may go beyond energy. To solve the problems related to increasing pollution and emerging scarcity of resources, biomass will probably be increasingly used for materials, as had been the case since the beginning of human history until the industrial

revolution of the nineteenth century (Daviron, forthcoming). This return to a 'solar economy' (an economy based mainly on renewable energies) is likely to link food prices to the prices of all their non-food substitutes.

#### *Growing links between financial and food markets*

Food markets are being progressively linked to financial markets because agricultural futures markets are increasingly used by speculators following market deregulation at the end of the twentieth century. Indeed, the proportion of contracts held by speculators jumped from 23 percent in 1998 to 69 percent in 2008 (Masters and White, 2008). Although the responsibility of excessive speculation in the 2008 food price boom is controversial (Masters and White, 2008; Sanders *et al.*, 2008), the growing nexus between financial and food markets is likely to foster an increasing transmission of the instability of financial markets to food prices. ●

**BOX 15**

**GRAIN PRICE INSTABILITY IN THE SAHEL REGION: AN EXTREME CASE?**

Grain prices are already highly volatile in the Sahel region, causing huge food crises. In Sahel countries, poor households mainly consume coarse grains (millet, sorghum and local maize varieties), whose production is highly sensitive to natural hazards (mainly droughts and locust attacks). It is difficult to offset deficits with imports because these grains are not available on international markets and the grains available (rice and wheat) are much more expensive. Therefore, coarse grain prices spike when harvests are bad (they increased by 150 percent in 2005 and 80 percent in 2012), provoking food crises and famines.

Grain price volatility is expected to increase still further in the future for two reasons. The first is related to climate change. Over the past decade, *"the Sahelian rainfall regime [has been] characterized by a lasting deficit of the number of rainy days, while at the same time the extreme rainfall occurrence is on the rise"* (Panthou *et al.*, 2014). This more extreme climate is likely to increase the instability of food production. In addition, the seasonal pattern of rainfall has evolved: peak rainfall has shifted from late August (before the 1970s) to mid-August, therefore increasing the risk of water stress at the end of the millet production cycle. Projections for the late twenty-first century *"reveal an extension of torrid climates throughout West Africa. In addition, the Sahel, predominantly semi-arid in present-day conditions, is projected to face moderately persistent future arid climate. [...] Consequently, West Africa evolves towards increasingly torrid, arid and semi-arid regimes with the recession of moist and wet zones mostly because of the temperature forcing, although precipitation can be locally an important factor. [...] Such changes point towards an increased risk of water stress for managed and unmanaged ecosystems"* (Sylla *et al.*, 2016). These developments may have a very strong impact as Sahelian countries are often ranked among the countries most vulnerable to climate change. For example, Chad had the world's highest Climate Change Vulnerability Index in 2016 and Niger the third highest.

Another source of increased food price instability is the expected increase in the frequency and magnitude of conflicts. Armed conflicts are already a problem in the region, with the insecurity generated by jihadist or separatist movements disrupting production, trade and income (Van Den Hoek, 2017). The situation may worsen in the future because the likelihood of conflicts will rise with climate-driven migration. This kind of migration is already a reality (more than 500,000 people were displaced in Niger because of floods in 2012) and is likely to increase in the future (in terms of both people and distance). Another source of concern is related to the increasing pressure on land and water. This is a worldwide issue, but is likely to be particularly acute in the Sahel region due to the significant population growth that will occur over the coming decades.

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