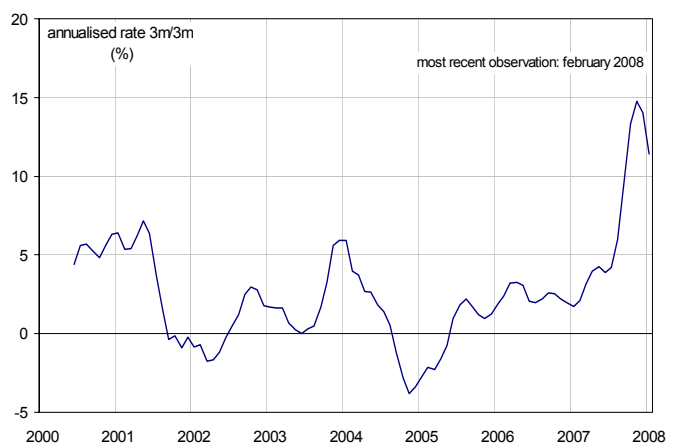


Do rising food prices pose a risk of persistent inflationary pressure?

- Prices of agricultural commodities rose sharply in 2006 and 2007. The causes of the trend are both cyclical and structural, which means prices could remain durably high and very volatile. Several exporting regions, especially Australia and Europe, have recently suffered climate events. Cereal and dairy production have fallen as a result, reducing inventories and causing tension in world markets. Moreover, new health crises have disrupted the markets for animal products by modifying trade flows. From a more structural standpoint, global demand for food products has risen steeply in recent years. This stems from growth in the emerging economies, which is changing people's eating habits, and from the development of biofuels.
- Rising commodity prices have gradually diffused to production costs of the agri-food industry, and production prices in turn accelerated significantly in the second half of 2007. Ultimately, this acceleration has spilled over into the prices paid by consumers. French food prices were rising at an annual rate of 0.8% in summer 2007, but spurted to nearly 5% p.a. in February 2008. This price surge is largely due to rising prices of agricultural commodities, but it may also reveal changes in marginal behaviour, although it is not possible to quantify their impact.
- In France, the new reform of business relationships between suppliers and the supermarket chains, introduced by the "Chatel" Act, which took effect on March 1, ought to alleviate the upward pressure on prices. Moreover, the recent slower growth in production prices for the agri-food industry suggests that the peak of the shock is behind us (see chart).

Source: DGTPE calculations, seasonally adjusted.

Short-term variations in agri-food industry production prices



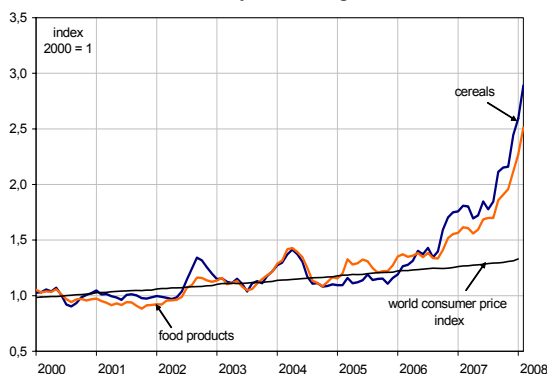
This study was prepared under the authority of the Treasury and Economic Policy General Directorate and does not necessarily reflect the position of the Ministry of the Economy, Industry and Employment.

1. The recent rise in agricultural prices stems from an imbalance between a structurally fast-growing demand and a volatile supply that has difficulty adjusting

1.1 Agricultural prices are rising all over the world, but the rise is affecting plant products more than animal products

After rising moderately over the previous fifteen years or so, world prices for agricultural commodities accelerated in 2006.

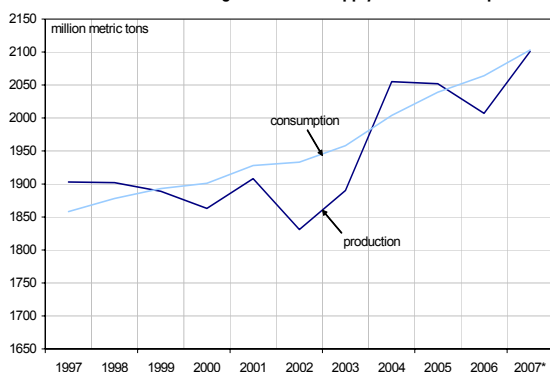
Chart 1: index of world prices for agricultural commodities



Source: IFW, IMF.

There are two reasons for this development: first, a number of exceptional events—climate events in particular—have affected the world in recent years; second, the market for agricultural commodities is increasingly a global one. There is no consensus over the linkage between trade opening and volatility—a larger market helps to cushion against shocks, but the impact on prices is amplified when several important trading countries are liable to suffer swings simultaneously.

Chart 2: global cereals supply and demand equilibrium



Source: FAO.

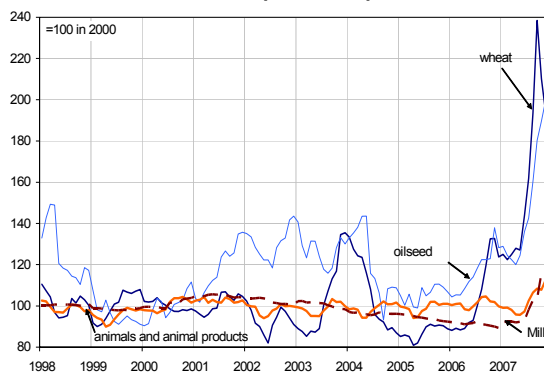
Overall, agricultural prices are rising because of a persistent imbalance between supply and demand since the late-1990s. There are several reasons for this imbalance: some are cyclical and mainly concern supply, while others are more structural and concern demand (see chart 2). The

current situation perfectly illustrates "King's law"¹ whereby, if there is a supply deficit in the agricultural sector, the ensuing price variation will be more than proportional to the change in production, in absolute terms, owing to the inelasticity of consumers' demand to the price of these products.

Europe, including France, is no exception to this trend, chiefly in the cereals and oilseed sectors, with prices rising 105% and 92% respectively between June 2006 and December 2007 in France. The rise in the price of animal products concerns only certain products (milk and poultry), on the other hand.

In Europe, this steep increase comes after a lengthy period of falling prices due to productivity gains in the sector and to EC policies aimed at pushing down intervention prices². Today European prices have practically caught up with world prices.

Chart 3: production price trends in France



Source: INSEE.

1.2 Cyclical factors concerning major exporting countries are affecting the global supply-demand equilibrium

• Climate events depressed cereals supply in 2006 and 2007

Climate uncertainties have a major impact on agricultural output and consequently on market equilibriums and prices. In 2006, climate events in several major cereal-exporting countries (in Oceania and Western Europe) severely curtailed the availability of cereals on the world markets. The world wheat crop for 2006 was down 4% (with an estimated production of 593 million metric tons), resulting in a deficit of 17 million metric tons relative to potential demand. Rapeseed production is flat and inadequate to keep up with the demand in growth, due notably to the growing use of biofuels.

(1) Named after a British genealogist and senior civil servant (1648-1712), one of the modern world's first economic statisticians.

(2) The guaranteed minimum public purchase price set by the Commission for agricultural products.

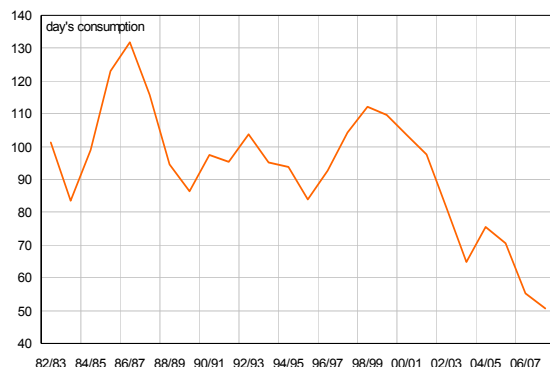
The World Meteorological Organisation reports that 2007 witnessed the most "extreme" climates on record, with cold spells in South America, severe monsoons in Asia, drought in Australia, heat waves in Eastern Europe, and heavy rainfall in Great Britain. So far, these events are considered to be cyclical (see 1.4 on climate change).

The FAO estimates that 2007 cereal production was still up sharply (+4.6%) relative to 2006. Even so, these climate events have pushed production down, below the level forecast based on areas sown.

- **Cereal stocks are at a record low**

The imbalance of supply and demand is illustrated by the sharp fall in world cereal stocks since the beginning of the 2000s. Relative to global consumption, these stocks have fallen 55% in 10 years (chart 3). The current low level of stocks has amplified the reaction of prices to the imbalance.

Chart 4: world cereal stocks



Source: US Department of Agriculture.

- **Several health crises have affected the meat market**

Meat is traded intensively in the international market, but the trade is subject to limitations as a result of severe health constraints and rules on the "traceability" of products. Robust global demand kept beef and veal prices high in 2006, partly because people switched from poultry to beef and veal at the time of the bird flu outbreak. In 2007, trade was again disrupted for health reasons, with foot and mouth in Brazil and ovine catarrhal fever (or bluetongue) in Europe. These events had an impact on prices, particularly in the affected countries. Domestic market prices in those countries came under downward pressure, whereas price of products imported from unaffected exporting countries (such as Argentina) rose significantly.

- **Exceptional factors affected trends in the dairy sector**

The situation in the dairy sector in 2007 was exceptional, with prices for industrial dairy products (butter and powdered milk, making up the bulk of dairy products traded on world markets) rising by nearly 70% between March and July in France. There is a similar trend at work in world prices. This stems from buoyant demand (see below) and particularly low supply in the major exporting countries, chiefly due to:

- drought in Oceania,
- a reduction in the dairy herd in Europe in 2006 as a result of high meat prices (at the time), and relatively unattractive prices for milk.

The supply and demand imbalance has narrowed considerably since December 2007, however, due to increased supply under the stimulus of high prices.

1.3 Structurally rising demand versus supply constraints

World demand is being driven by economic development in the emerging countries.

- **The economic development of the emerging countries coupled with still high population growth is having a major impact on world demand, as these countries import more agricultural commodities and reduce their exports. For example, China has been a net importer of agricultural products since 2004.**

In most of the emerging countries, economic development is changing the eating habits of people whose incomes are rising. Increasingly they are replacing vegetable-origin calories with calories of animal origin (meat and dairy products). Yet the production of one calorie of beef or veal entails the consumption of 9 to 12 vegetable calories per head of cattle, and this is sharply boosting demand for cereals and oilseed proteins for animal feed.

- **The expansion in non-food applications of agricultural products is contributing to the rise in demand**

The worldwide expansion of biofuels is mobilising the agricultural sector's capacity to supply energy: cereals and sugar-based plants for ethanol, and oilseed for vegetable oil ester. This expansion of biofuels is being encouraged by means of public subsidies. Other non-food outlets too are stimulating the demand for agricultural products, including the use of biomass³ for energy, and green chemicals.

(3) Biomass is now being used to produce non-market electricity and heating (e.g. dendroenergy, pure vegetable oil, methanisation, burning farm waste to produce heat).

Half of Brazil's sugarcane production goes to produce ethanol, as does 20% of American corn production⁴. The American bioethanol business was expected to increase its consumption of corn by 60% in 2007, rising from 54 to 86 million metric tons, thereby sharply reducing amounts available for corn exports. In Europe, production of biodiesel now absorbs half of the production of rapeseed.

- **Supply under constraint and relatively unresponsive**

Yields have risen sharply in the developed countries and in the major cereal producing countries over the last few decades. More recently, however, they have been declining in Europe (EU 15 cereal yields have reverted to their 1995 level). A number of factors can account for this, including relatively unattractive cereal prices until 2006, which encouraged farmers to limit their use of inputs; greater allowance made for environmental considerations in the Common Agricultural Policy; and societal choices, reducing the use of pesticides and the virtual absence of genetically modified organisms (GMOs)⁵. In addition, there is only a relatively limited stock of land in the world capable of being pressed into service without harming the environment.

Finally, the length of the agricultural production cycle precludes rapid adjustments of supply. Small adjustments can be made rapidly, but any significant increase in supply (entailing bringing new land under the plough, changing crop patterns and methods, and expanding livestock numbers) would take several years.

1.4 The supply-demand imbalance is likely to last, albeit less acutely than now

- **Public policies in the EU are seeking to limit the rise in agricultural prices**

The European Commission has taken a number of measures to tackle market tensions, namely:

- compulsory land set-asides have been cut from 10% to 0% for the 2007/2008 season, which could boost cereal harvests by 4%, or an additional 10 million metric tons according to the European Commission;
- more than 8 million metric tons of public stocks of cereals in the EC were put on sale in 2006/2007⁶;
- customs duties on cereals were abolished for one year in December 2007;

– in the dairy sector, the European Council recently adopted the Commission's proposal to raise quotas by 2% starting in April 2008.

- **Agricultural prices are expected to stabilise in the coming years at a higher level than in the past ten years**

The weight of structural factors in the rise in global demand for agricultural products should sustain this growth in the coming years. Michel Griffon⁷ reckons that agricultural production will have to double between now and 2050 in order to satisfy the demands of 9 billion humans.

Similarly, demand for agricultural products for non-food purposes is expected to continue to grow. According to the OECD, given the current targets set for inclusion of biofuels in motor fuels, especially by the United States and the European Union, America's corn crop for ethanol production will have to double between 2006 and 2016.

In the face of sustained demand, supply is expected to rise in the coming years in response to several factors, including:

- the introduction of new farming techniques, particularly in the developing countries. According to some experts⁸, these should help to double yields for half of the world's farmers, and should help Sub-Saharan Africa to catch up partially;
- the rise in cereal prices, making it profitable to bring more land into cultivation;
- accelerating progress in seed technology.

Prices should therefore tend to fall below their 2007 level. In the case of wheat, the average 2007 price (in dollars) is 40% above the average for the past 10 years (in real terms). Over the next 10 years, the OECD expects this price to be nearly 30% higher than for the previous 10 years, or 10% lower than their level in 2007.

- **Climate change is expected to create significant volatility in commodity prices**

Climate change could increase the frequency of exceptional climate events and also contribute to the emergence of new health problems in the world, in tandem with the globalization of trade. These phenomena are thus liable to affect the broad equilibriums described above, for both plant and animal products. For as long as global stocks have not been replenished, any imbalance between supply and demand will have a powerful impact on prices.

(4) See Berger (2007): "Les marchés agricoles en 2006 : envolée des prix" (Agricultural markets in 2006: prices take off), *INSEE Première* no.1141, June 2007.

(5) A substantial proportion of research into improving plant varieties utilises GMO technology.

(6) There is now very little room for manoeuvre since these stocks amounted to only 2.4 million metric tons at the start of the 2007/2008 season (i.e. 1% of the harvest).

(7) Head of the Department of "Agriculture and Sustainable Development" at the French National Research Agency, and author of "Nourrir la planète" (Feeding the planet), *Odile Jacob, Paris, 2006*.

(8) See in particular Mazoyer (2006): "La facture agricole et alimentaire mondiale" (The world agriculture and food bill), *Ed Universalis*. Marcel Mazoyer is Professor Emeritus at AgroParisTech.

Box 1: The contribution of food products to the price index

In France, food products for consumption account for 16.3% of the total price index and are split into three broad sub-headings, namely: fresh food products, consisting of fruit and vegetables; meat; and food products "excluding fresh produce and excluding meat", consisting of processed foods (essentially bread and cereal products, dairy products and beverages).

Prices of fresh products are more volatile, being seasonal and directly subject to climate variations. But they account for a relatively small proportion of the total price index (3.9% in 2007, versus 12.4% for the rest of the food component). Consequently, it is meat (4.4%) and processed food products (8%) that count for most in the consumer price index.

However, comparing international structures of consumption shows that rising food prices pose distinctly less of an inflationary risk in the developed countries, Europe in particular, given food's relatively small contribution to the total price index (table 1). Food products have a far greater impact on total inflation in developing countries such as China.

Table 1: the relative weight of food products in the price index

	Relative weight of food products in total price index
Euro zone	16%
France	16%
Germany	12%
Italy	18%
Spain	20%
United Kingdom	11%
United States	15% ^a
Japan	20%
China	approx 40% ^b

- Including tobacco and alcohol, which account for around 4% of total euro zone inflation.
- Information on the weighting of the different goods in the Chinese index is not publicly available. Here we give an order of magnitude derived from the structure of consumption spending of urban and rural households (source: National Bureau of Statistics).

2. The diffusion of rising agricultural prices throughout the processed foods production chain resulted in a sharp increase in consumer prices in late-2007-early-2008

2.1 Whereas since 2004 the contribution of food prices (excluding fresh products) to total inflation was low, it tended to rise perceptibly in France and more widely in the euro zone in the second half of 2007

In the euro zone, including France, food prices were a major contributor to headline inflation (see box 2) in the early 2000s (contributing 0.5 percentage point on average to inflation between 2000 and 2003, charts 4 and 5). This unusually high impact was especially powerful in 2001, half of it being attributable to dearer meat prices in the wake of the food crises brought on by bovine spongiform encephalopathy (BSE) at the end of 2000, and the outbreak of foot and mouth disease in early 2001.

After reverting to the long-term trend in 2002 and 2003, food price inflation slowed from 2004 onwards. In France, and thanks in particular to the "Sarkozy agreements" of July 2004 aimed at lowering supermarket prices, and thanks to a succession of reforms in the method for calculating the threshold for selling below cost in supermarkets (see the "Galland Act" reforms, box 3), food prices "excluding fresh produce and excluding meat" (*i.e.* all processed food produced by the agri-food industry) actually contributed negatively to headline inflation in 2005.

The end of 2007 saw a break with this period of moderate food prices, with the impact in the autumn of soaring prices of agricultural commodities such as cereals and dairy products. This surge in food prices also occurred in the other European countries notwithstanding the

possible moderating effect of the euro's appreciation on world prices for these products, most of which are denominated in dollars.

Chart 5: contribution of food products to headline inflation

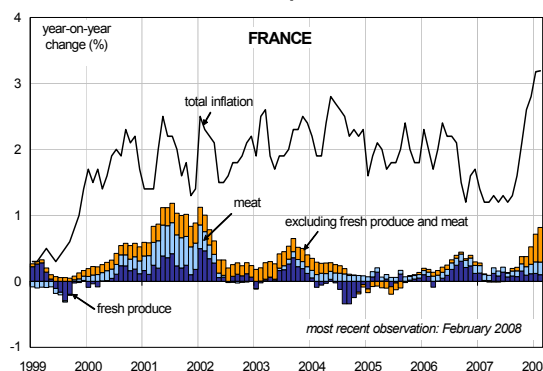
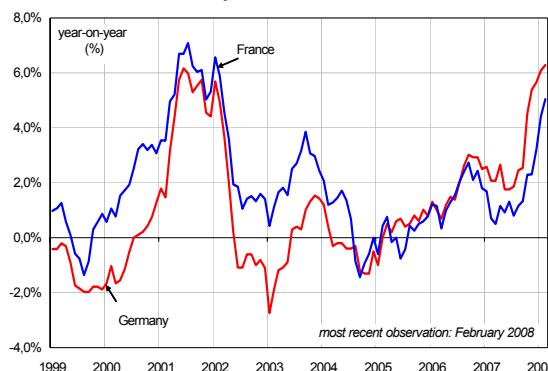


Chart 6: food price inflation in France and Germany



Source of 2 preceding charts: HIPC, Eurostat data.

Box 2: Evaluating the impact of energy prices on food inflation

We have estimated the following model to evaluate the impact of energy prices on consumer food prices:

$$p^{alim} = c + \sum_{i=1}^4 \alpha_i \cdot p_{t-i}^{alim} + \sum_{i=0}^4 \beta_i \cdot p_{t-i}^{nrj}$$

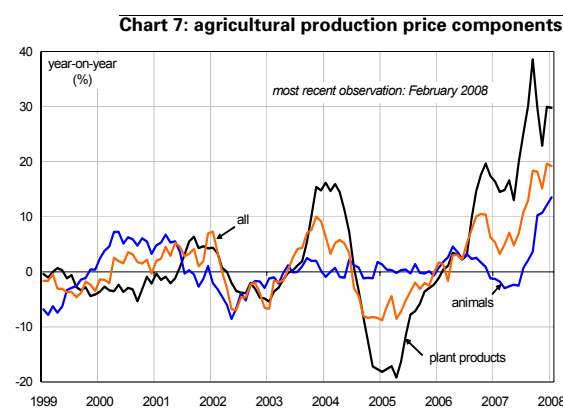
Where p^{alim} designates the quarterly change in the consumer food price index and p^{nrj} that of the energy price index. The two explanatory variables are completed by a series of dummy variables, either common or specific to each country, to take into account the effects of exceptional short-lived phenomena such as weather conditions or health crises. These dummy variables serve to identify some of these exogenous phenomena such as the October 2000 bovine spongiform encephalopathy (BSE) outbreak, foot and mouth disease in February 2001, and bad weather in the winter of 2001-2002. The equation is estimated for the period Q1 1999-Q4 2006.

The estimation results show that a 10% increase in energy prices ultimately raises food prices by around 3% after one year.

2.2 Agricultural production prices are rising mainly in response to dearer agricultural commodity prices

In December 2007, the production price for soft wheat in France rose 72.6% over one year (corresponding to the 70% rise in the world price for wheat over the same period). The price of oilseed (part of whose production is now being used to make biofuels) grew by 64.3%, and that of milk by 21.4%

Similarly, prices of meat, and especially of meat raised "off land" (poultry, pork)⁹, have been affected by the rise in the cost of intermediate consumption, since soaring cereal and oilseed prices have driven up the cost of animal feed (which had risen 23.3% year-on-year in December 2007).



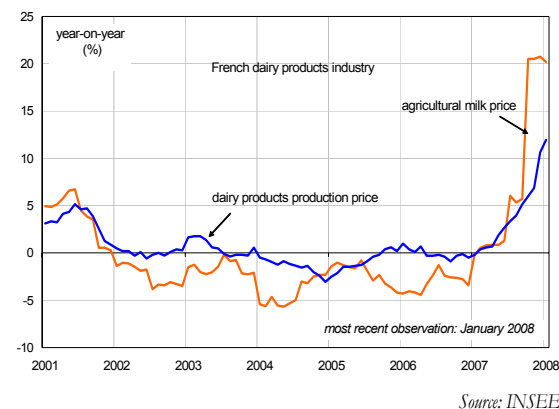
This phenomenon is further amplified by the rise in the price of oil, which has an impact on the cost of the means of agricultural production. The surge in petroleum product prices is not only driving up fertiliser prices (fertilisers are derived from oil, and their price rose at an annual rate of 24% in

December), but is also forcing up the operating costs of crop farming and of agricultural produce processing (transport in particular).

2.3 Rising agricultural production costs are impacting the prices of agri-food industry products via the rise in the price of some intermediate consumption prices

Soaring prices for agricultural commodity prices and energy are diffusing into the manufacturing costs of processed food products. The agri-food industry is passing on these costs in their sale prices to retailers, who then pass them on in their sale prices to consumers.

Chart 8: from agricultural products to processed products



Production prices of agri-food industry products spurred in mid-2007, accelerating from an annual rate of 2.9% in July 2007 to a rate of 8.5% in December 2007. This acceleration is especially visible in cereal and animal feed prices and in dairy product prices. The latter experienced a steep rise in world butter and powdered milk prices in 2007, followed by a belated rise in national agricultural production prices for milk.

(9) Off-land breeding is a form of intensive breeding that uses animal feed produced by the agri-food industry rather than produce from the farm on which the animals are raised.

The cost of agricultural commodities represents only a portion of the determinants of production prices for the agri-food industry, since these also depend on margins (which is ultimately dependent on competitive conditions) and on other industry costs such as wages and other intermediate consumption prices (as for farmers) and services provided.

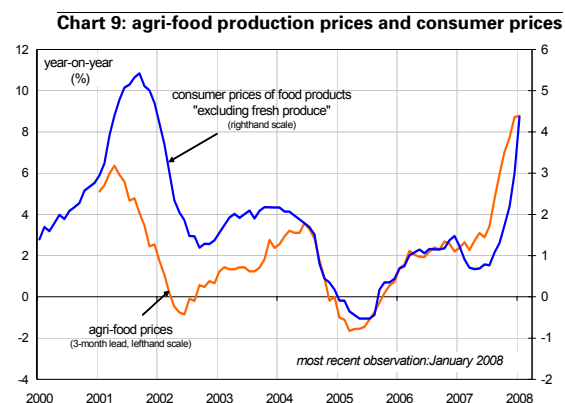
In 2004¹⁰, 34% of the agri-food industry's intermediate consumption consisted of products derived from the agricultural sector, 30% of which are themselves agri-food products, 9% intermediate goods (plastics, notably), 13.6% business services, with energy consumption (oil and electricity) accounting for a little over 3%. In finer detail, agricultural commodities account for a substantial share of intermediate consumption in meat production (60%), the dairy industry (41%) and cereals (33%).

2.4 Retailers have had to pay higher prices to industry for food products, leading to a steep rise in consumer prices at the end of 2007

In summer 2007, the already significant rise in agri-food production prices had not yet been passed on in consumer prices for food products. The latter only began to accelerate belatedly, in the second half of 2007 (chart 9). This surge was especially pronounced in dairy products and cereals in December. There is a risk in this delayed response that the steady upward trend in agri-

food prices will continue to show up in consumer prices in the first half of 2008. However, a closer look at the short-term dynamics of these production prices shows that the price shock appears to have peaked: prices are still rising sharply, but the momentum appears to have slowed since the end of 2007 (see chart p. 1).

Production and consumer prices are well correlated, but relationships between manufacturers and retailers, which ultimately determine their respective margins, also greatly influence the formation of the final price paid by the consumer.



Note: this chart reflects the fact that variations in the rate of change in agri-food production prices generally show up 3 months later in consumer prices for food.

Source: INSEE.

3. A succession of reforms affecting the supermarket sector in France since mid-2004

Following the introduction of a series of measures aimed at bringing down supermarket prices, French consumer food prices slowed significantly relatively to those of our European neighbours, in 2004-2006.

This occurred because the undertaking given in 2004 by retailers and their suppliers to cut supermarket prices (*via* the "Sarkozy agreements") was further strengthened by the entry into force of the "Dutheil Act" progressively reforming the method for calculating the threshold for selling below cost as defined in the "Galland Act" (see box 3 on integrating "rear margins" into the calculation of the threshold¹¹) in 2006 and 2007. As a result of these

measures, supermarket prices have risen far less than in the other forms of retailing¹². Between June 2004 and February 2008, the rise in prices in supermarkets was 3.7% less than that of prices in the other forms of retailing.

Together, these measures are reckoned to have had a 0.5 percentage point downward impact on consumer prices since mid-2004, cutting inflation by 0.15 percentage point per year (see chart 10¹³). The effects of these measures appear to have faded in the final quarter of 2007, when supermarket price trends were in line with those in the other forms of retailing.

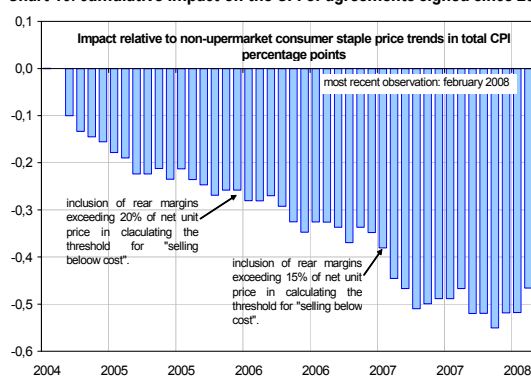
(10) Figures derived from the table for intermediate inputs in 2004 annual accounts. These are the most recent data permitting a fairly refined analysis of agri-food industry sub-sectors.

(11) See Borsenberger, Doisy (2006): "Business relationships between suppliers and retailers", *Trésor-Economics No. 3, DGTPE*.

(12) The other forms of retailing include small shops and hard discounters, which have been little affected by the reform on the whole.

(13) To measure the impact of the reforms on prices, we have compared trends in the price of consumer staples in supermarkets with those observed in the other forms of retailing, which were not covered by the 2004 agreements and the "Galland Act" reforms.

Chart 10: cumulative impact on the CPI of agreements signed since 2004



Source: INSEE.

The reform introduced by the "Chatel Act" (development of competition in the service of the consumer, see box 1) of 3 January 2008, which came into force on 1 March, is again expected to ease the upward pressure of soaring agriculture commodity prices on food prices.

Pierre-Emmanuel LECOQ, Benjamin RICHARD, Baptiste THORNARY

Box 3: method for calculating the threshold for "selling below cost" and inclusion of rear margins in the calculation

Rear margins (sometimes also called "back door margins") refer to the deferred remuneration or discounts granted by suppliers to retailers. Since 1997, in France, the "Galland Act" has defined the threshold for "selling below cost" as equal to the "effective purchase price", which comprises the price of the goods shown on the invoice and any price reduction obtained at the date of the sale. This is the price below which retailers are not allowed to invoice a product to the consumer, subject to heavy penalties. But it did not take account of the deferred remuneration granted by suppliers (in order to ensure favourable shelf exposure for their products, for example).

The "Dutreil Act" has amended the method for calculating the "selling below cost" threshold. As from 1 January 2006, it has been possible to deduct rear margins exceeding 20% of the effective purchase price from the latter, thereby lowering the threshold at which a retailer is deemed to be selling goods below cost. This Act also provided for the deduction of rear margins exceeding 15% of the purchase price as from 1 January 2007. The law on the development of competition in the service of consumers, known as the "Chatel Act", provides for the deduction of all rear margins in the calculation of the threshold for "selling below cost". As a result, the threshold for selling below cost is now strictly equal to the true cost paid for the product by the retailer (see table).

Here we assume normatively that the average level of rear margins has remained unchanged since 2004, the aim being not to arrive at a precise evaluation of the phenomenon but to illustrate its mechanism.

Example of the calculation derived from partial or total deduction of rear margins in calculating the threshold for selling below cost

	Galland Act 1996-2005	Dutreil Act January 2006	Dutreil Act January 2007	Chatel Act January 2008
Invoiced unit purchase price	100	100	100	100
<i>Rear margins (as % of unit purchase price)</i>	<i>33.5%^a</i>	<i>33.5%</i>	<i>33.5%</i>	<i>33.5%</i>
<i>Threshold above which</i>		<i>20%</i>	<i>15%</i>	<i>0%</i>
<i>% of rear margins deductible</i>		<i>13.5%</i>	<i>18%</i>	<i>33.5%</i>
Threshold for selling below cost	100	86.5	81.5	66.5

a. In 2004, rear margins among leading branded products represented 33.5% of the invoiced price, on average, versus 20% in 1996 before the "Galland Act" came into force.

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