Issues and Policy Solutions to Commodity Price Volatility in the European Union

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Abstract: Increased price levels – and related elevated price volatility – have been discussed in the policy arena at least since the price hikes of 2007-08. While a number of studies looked at volatility levels on the international markets, current paper looks in detail on the EU and compares developments in price volatility on the EU and international markets. As market environment is changing, policy is adjusting. The paper illustrates instruments available to deal with volatility, indicating advantages and disadvantages based on implementation experience. The role of market instruments as a product safety-net and that of decoupled payments is to make farms less vulnerable to fluctuations in prices and to provide an income safety net independent of the market situation. Current CAP instruments need to be adjusted to achieve the objectives of market stability in light of the medium-term market perspectives, in the most effective and efficient way. A concluding paragraph indicates broadly what type of instruments could be suitable in a future CAP context.

1 Reasons to address volatility

Price levels and price volatility gained spotlight following the "food crises" in the late 2007 and early 2008 highlighting issues of food security and replacing previous concerns about low commodity prices. Although price volatility is a normal feature of markets given the seasonal production cycle and discontinuity of supply in the face of a continuing demand, a greater uncertainty of rapidly changing economic and natural environments contributes to and magnifies its occurrence.

The issue of volatility is central to today's EU policy debate. The reason is twofold. On the one hand, the medium-term perspectives for EU agricultural commodity prices are expected to stay firm over the medium term, supported by factors such as the growth in global food demand, the development of the biofuel sector and a prolongation of the long-term decline in food crop productivity growth. High prices at world level would support EU agricultural exports in spite of the decline in competitiveness, particularly with the assumed appreciation of the EUR. But this market outlook faces a number of uncertainties regarding future market developments as well as the macroeconomic and policy settings,

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1 This paper is an updated and revised version of Tothova (2011), "Main Challenges of Price Volatility on Agricultural Commodity Markets," and Velazquez (2011) "Dealing with Volatility in Agriculture: policy issues" in Isabelle Piot-Lepetit and Robert M'Barek (editors), *Methods to Analyze Agricultural Commodity Price Volatility,* Springer.

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for example, the impact of a policy-driven slow down in economic growth in China in order to curb price inflation or the impact of yield variations, e.g. due to weather conditions, and the impact of increasing production costs in the EU. Other factors, such as future changes in agricultural and trade policies, e.g. with a possible agreement within the current Doha Development Round negotiations and/or in bilateral/regional trade discussions, or renewable policies could have far reaching implications for the future pattern of EU agricultural markets.

On the other hand, the move towards greater market orientation has exposed European farmers to higher market volatility, and they are also more sensitive to changes in the macroeconomic environment (like GDP and/or exchange rate fluctuations). Instability on world commodity markets may also permeate to European Union (EU) markets as a consequence of greater trade openness.

The fist part of this paper sets the scene for the policy discussion. It explores some theoretical aspects of volatility and looks at increased volatility on international agricultural commodity markets. Analyses focus on price developments on the EU and international markets to identify whether one or another was more affected by increases in price volatility. Based on the previous analysis and on literature review, factors influencing price volatility are illustrated in paragraph 3. The second part of this paper is devoted to the possible role of policy instruments in dealing with volatility. It starts by presenting existing and past policy instruments which have been used to deal with volatility (paragraph 4), outlining their advantages and disadvantages, then it shows how volatility is currently dealt with within the CAP. Based on experience from implementation, the concluding section highlights implications from increased volatility, including suitable instruments for a future context.

2 A close look at price volatility

Volatility provides a measure of the possible variation or movement in a particular economic variable. Prices change as rapid adjustments to market circumstances. Wide price movements over a short period of time typify the term "high volatility". What constitutes a volatile market or an "excess volatility" can be subjective, sector and commodity specific.

While two measures of volatility – historical (realised) and implicit are used in the literature, this paper focuses on historical price volatility which reflects the resolution of supply and demand factors in the past. Historical volatility can also serve as an indicator of the possible price changes of the assets – including commodities – in the future. Assets – commodities including – that have high volatility are likely to undergo larger and more frequent price changes in the future, possibly attracting market participants benefiting from frequent price changes. Casual link between volatility and uncertainty is not clearly defined: volatility thrives in the environment of uncertainty, and volatile prices themselves contribute to uncertainty to producers, processors, and consumers.

2.1 Has price volatility increased?

The G20 and other international discussions aim to discuss increased price volatility and available policy options. The G20 report prepared by a group of international organisations for the French presidency in 2011[3] states:

"When looked at in the long term there is little or no evidence that volatility in international agricultural commodity prices, as measured using standard statistical measures is increasing and this finding applies to both nominal and real prices5. Volatility has, however, been higher during the decade since 2000 than during the previous two decades and this is also the case of wheat and rice prices in the most recent years (2006-2010) compared to the nineteen seventies. Another conclusion that emerges from the study of long term trends in volatility is that periods of high and volatile prices are often followed by long periods of relatively low and stable prices. "

Many calculations of long term volatility rely on monthly data which are averages of more variable higher frequency (often daily) data. Data with higher frequency exhibit higher volatility. Volatility decreases with decreasing frequency. Cash (spot) prices such as c.i.f. (cost, insurance, freight) can bring additional uncertainties to the analysis since transport prices in their own are very variable, influencing the result. F.o.b. prices (free on board) are better candidates for analysing volatility.

Commodity exchanges provide a steady stream of daily settlement prices making them ideal for analysis. However, futures markets do not exist or are not used for all commodities. In addition, some contracts may suffer from lack of convergence between cash and future prices.

There might not be agreement on whether the price volatility of agricultural commodities increased over the long run. While correct on the technical grounds, the findings are not of immediate relevance to producers who were faced with lower price variability in the preceding two decades. There seems to be an agreement that recent levels of price volatility are rather high. In addition, what matters for producers and operators in business is whether price volatility increased over the shorter period of time, and whether they have the necessary tools and ability to confront it.

The analysis presented in the paper does not aim to analyse whether price volatility increased in the long term. Rather, it compares price developments on the world and EU markets using monthly data, and considers policy options in the EU.

2.2 An intuitive approach using spot prices

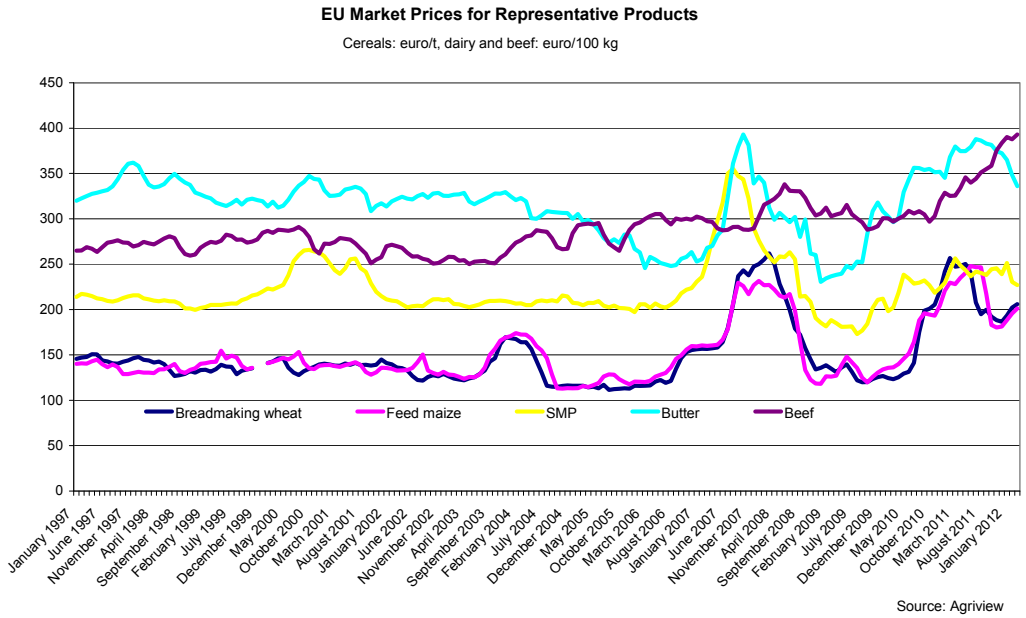
For illustrative purposes we used a simple coefficient of variation to describe price variability from January 1998 to December 2011 to determine whether:

(1) world markets experienced higher price variation than EU markets

(2) price variation on international and EU commodity markets increased over time

[3] http://www.oecd.org/dataoecd/40/34/48152638.pdf

Figure 1 Monthly price developments on the EU internal market from January 1997 to March 2012.



EU data were taken from DG Agriculture EU market price datawarehouse (Agriview) for representative products, and international commodity prices from international benchmarks from the World Bank or FAO. Some commodities might not be directly comparable in terms of quality and in some cases price data were not available on both world and the EU markets. Data and sources are described in Annex 1.

A coefficient of variation is defined as a ratio of standard deviation over mean as a measure of dispersion of data points. The higher is the coefficient of variation, the larger the dispersion of series and higher the price volatility.

Table 1 shows coefficient of variations for comparable products on the world and EU markets. Comparing coefficients of variation on the world and EU markets covering period from January 1998 to December 2011 we observe that the prices on the world markets were more dispersed than prices on the EU markets, with meats being less disperse than crops and dairy. On both the world and EU markets the coefficient of variation increased between 1998 – 2004 and 2005 – 2010, indicating increased dispersion of prices. However, world markets experienced more dispersed prices in the first period between 1998 and 2004 than EU markets did. Even in the second time period the coefficient of variation in the world price series exceeded the coefficient of variation in the EU.

Table 1 - Coefficient of variation, comparable products (%)

Commodity	01/98-12/11	01/98-12/04	01/05-12/11	01/98-12/11	01/98-12/04	01/05-12/11
	World prices			EU prices		
Barley	37.05	15.86	29.22	24.15	7.90	27.79
Wheat (Int. SRW, EU bread)	42.26	17.70	32.14	25.30	8.65	29.60
Maize	44.21	12.08	35.88	22.45	9.31	26.17
Butter	47.97	19.47	34.55	11.53	3.54	15.74
SMP	39.85	18.96	31.46	14.33	8.44	17.74
Chicken	15.62	9.10	10.50	11.61	6.26	9.03
Beef	25.98	13.94	18.68	8.87	4.26	7.15

Price charts with trend lines for comparable products are presented in Annex 2. Note different units: world prices are quoted in USD/t while European ones in euro.

Table 2 shows coefficient of variation for EU prices for which respective world equivalents were not identified. The coefficient of variation increased significantly for crops and cheeses while decreased for meats and remained relatively stable for eggs.

Table 2 - Coefficient of variation in EU prices: (%)

Commodity	01/98-12/11	01/98-12/04	01/05-12/11
Feed wheat	26.86	11.68	31.15
Durum wheat	34.58	11.28	36.88
Malting barley	26.69	7.62	28.32
Cheddar	17.62	6.17	14.44
Edam	9.18	5.88	10.69
Young bovines	10.53	6.94	6.36
Cows	10.81	7.62	5.60
Heifers	8.80	4.56	5.52
Piglets	18.18	22.82	12.28
Pork	12.18	15.19	7.44
Eggs	16.30	15.13	14.18

Preliminary conclusions can be drawn using the coefficient of variation: from January 1998 to December 2011 world commodity markets experienced more volatility than EU markets. Coefficient of variation increased both on the world and EU markets between 01/1998 – 12/2004 and 01/2005 – 12/2011, with the EU often recording more dramatic increases. However, in absolute terms the coefficient of variation in many cases remains higher on the world than on the EU markets during 2004 – 2010.

2.3 Volatility on the futures markets

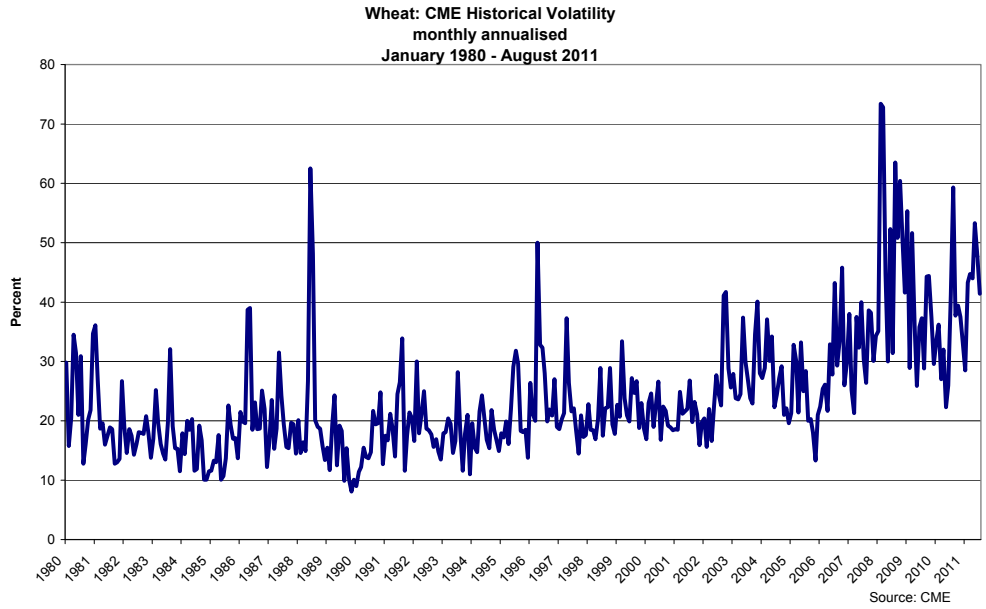
Commodity exchanges produce a stream of daily settlement data. The use of nearby futures is also justified by frequently using nearby futures as international reference prices. The CME Group offers already calculated measures of volatility[4]. For consistency in the case of

[4] http://www.cmegroup.com/market-data/reports/historical-volatility.html. Data available up to August 2011. To annualise their volatility figures, the CME group uses an average of 252 trading days each year. Due to

European exchanges we used settlement prices and formula applied in the CME calculations for milling wheat (from September 1998 to March 2012) contract on MATIF. The formula outlined in Annex 3.

Although different products on the CBOT (wheat, maize, oats, soybeans and derived products) show different price and volatility patters, there are commonalities across them. Although increased volatility can occur in any given period, actual peaks differ on the basis of the commodity and developments of their fundamentals. Due to space limitation we focus on wheat. Figure 2 shows historical volatility of wheat on CBOT on a monthly basis from January 1980 to August 2011. Wheat volatility has had an increasing trend over the observed period, ranging between 30 and 73. In the last four years the average volatility has increased.

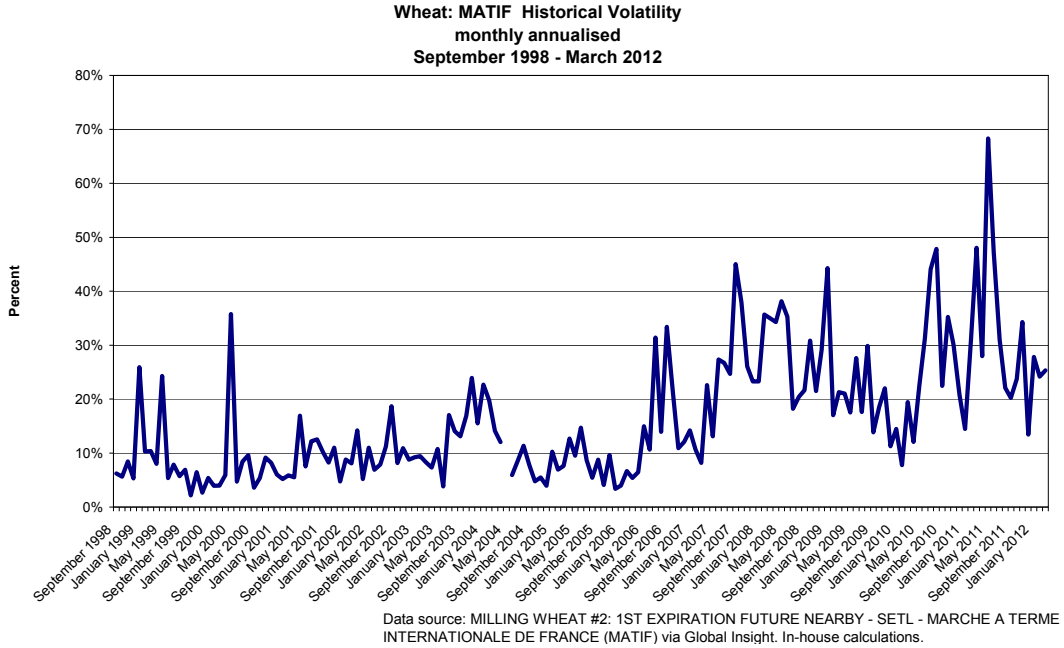
Figure 2 - CME Wheat Historical Volatility, monthly annualised



Agricultural commodities traded on European exchanges, although smaller in terms of volume, were not shielded from increased volatility. Figure 3 show the development of historical volatility for milling wheat on MATIF.

holidays and weekends the number of actual trading days each year can differ, and as such volatility results can differ.

Figure 3 - MATIF Milling Wheat, Historical Volatility, Monthly annualized



MATIF wheat experienced the highest volatility in September 2007, January 2009, and July – August 2010 when it reached around 44 - 48 . The summer 2010 high volatility episode accompanied poor harvest prospects in Russia and consequent export ban. However, in between those peaks, the volatility was as low as 8 (February 2010). Although experiencing peaks, wheat volatility on MATIF was relatively stable between 1998 and mid-2006 when it started increasing.

3 Factors influencing price volatility

Factors driving price volatility have been studied in detail during and following the price hikes of 2007-2008 (e.g. EC, 2008; Meyers, 2009; Trostle, 2008; Baffes and Haniotis 2010). Among those underlying market fundamentals we can cite, among others, yields and stock levels; weather and changing weather patterns with their related impacts; cycles in key markets; policy driven developments including large purchases by the governments; developments outside the agricultural sector such as exchange rate and oil price movements; trade policies and their transmission; investment in agricultural production. Commodities for which the demand is inelastic (such as agricultural products) tend to be more volatile. Long-term structural changes are also responsible for the increase in price variability, although their effects are not immediate. Only some of the factors contributing to greater volatility are described below.

Low levels of stocks in their own right do not result in high price but provide in a limited buffering capacity should increasing demand or short term supply challenges occur. There is no single answer to the question of "what normal stocks are". In addition, stock management, such as stock creation and release, can affect market fundamentals and impact prices.

Climate change and weather related events impact production variability, and thus impact market fundamentals. So far on the EU level, no correlation has been established between the warming of the last decades and the level of crop yields, which have generally increased (EC, 2009). However, impact of climate change might be already visible in other, more vulnerable countries.

A frequent culprit of increased price volatility is "speculation" based on investing in futures contracts on commodity markets to profit from price fluctuations. The wider and more unpredictable price changes are, the greater the possibility of realizing large gains by speculating on future price movements of the commodity in question. Although a presence of "speculators" on the derivatives markets is a necessary condition for functioning markets and efficient hedging, volatility can attract significant speculative activity and destabilise markets, which are both the cause and effect of increased volatility. In thinly traded markets where only small quantities of physical goods are traded, the value of speculative trades may create false trends and drive up prices for consumers. Arguments both for (e.g., Irwin and Sanders, 2010) and against (e.g., Robles et al, 2009) "speculation" are ample although evidence is inconclusive. While other factors and fundamentals are at play and have to be considered, there is a time overlap between increased volatility and increase in open interests on the commodity markets. While increase in open interests and inflow of investment money increases the liquidity on the market, increased liquidity could come along with increased volatility.

Policies. Greater market orientation of agricultural policies (CAP including) relies on a greater transmission of market signals, and results in more variable prices. Policy instruments (described later) are in place to mitigate effects of price variability. Trade restrictive policies also play a role in limiting supplies, thus increasing uncertainty on the markets and price variability.

Strong co-movements with energy and other agricultural prices. Linkages with energy markets before the emergence of biofuels were one-way: oil and energy as inputs to agricultural production. Increased connection between energy and agriculture raises questions about volatility transmission from more volatile energy and oil markets in addition to changing market fundamentals, or at times without a significant change in market fundamentals. The strength of the link is not yet determined, although Du et al (2009) found evidence of volatility spillover among crude oil, maize, and wheat markets after the autumn 2006 and explain it by tightened interdependence between these markets induced by ethanol production.

Figures 4 and 5 show scatter chart of daily settlement data for maize and crude oil for periods 2000-2004 and 2005-2010. An OLS line fitted to the data reveals stronger correlation in the 2005-2010 time period with an R-squared of over 53 when not including a trend variable, and 56 when including a trend variable to avoid spurious regression, with all estimates significant at 5 level of significance. Scatter charts for data before 2000 (not included) resemble that of 2000-2004, with no significant correlation.

Figure 4 - Scatter charts of maize and crude oil settlement prices, 2000 – 2004.

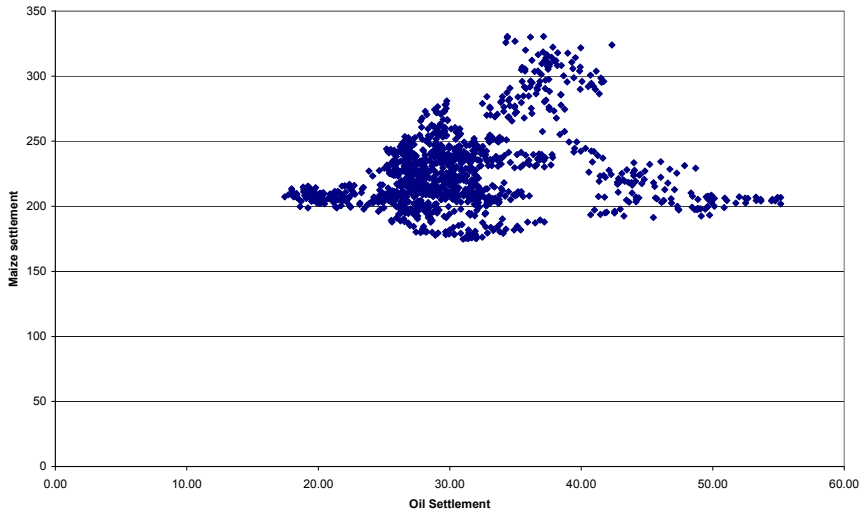
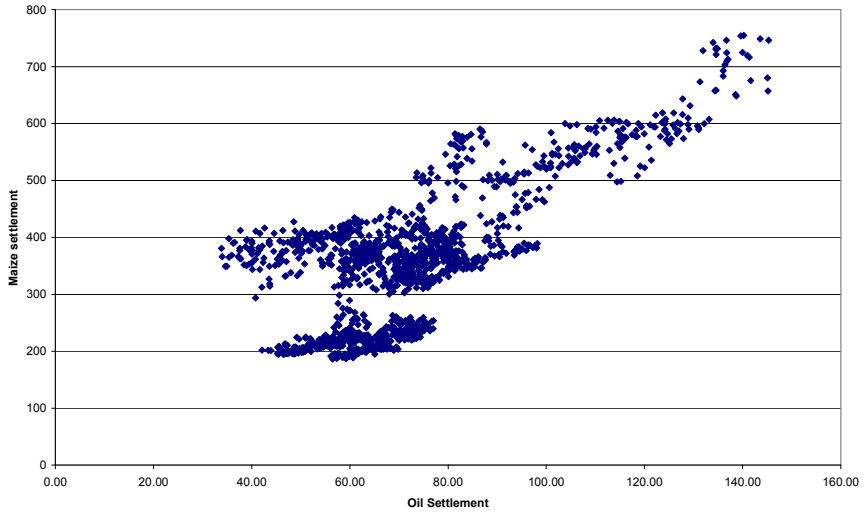


Figure 5 - Scatter charts of maize and crude oil settlement prices, 2005 – 2010.



4 Policy instruments to deal with volatility

There exist institutional reasons for addressing volatility, and they lie within the original Common Agricultural Policy (CAP) objectives of stabilizing agricultural markets and ensuring a fair standard of living for farmers from the Treaty of Rome. These objectives have been left untouched by the Lisbon Treaty and thus remain valid for the future, but the policy mix in place to achieve these objectives has been regularly adapted over the last decades in line with a changing economic, social and political environment.

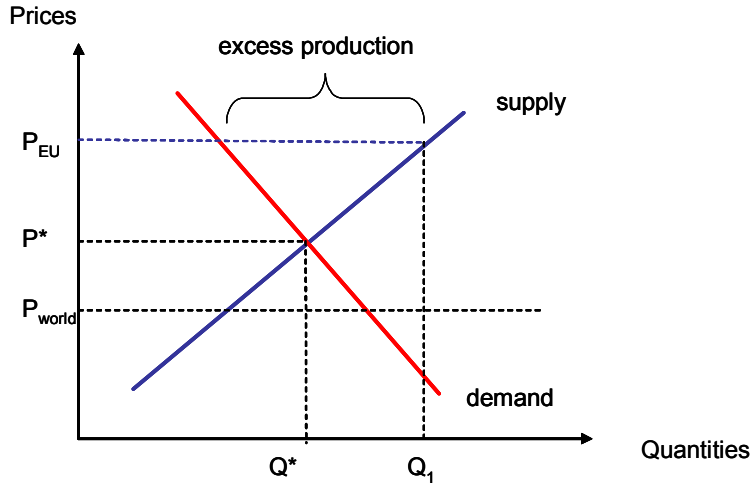
4.1 Price support

For a long time guaranteed institutional prices were the main tool within the CAP to ensure support for farmers. Institutional prices set for agricultural products enabled domestic prices to be kept relatively high and stable in comparison to those in the world market. Moreover, in order to avoid increasing competition from imports, support prices had to be accompanied by a certain degree of border protection (for example tariffs). If on the one side EU markets were isolated − and thus protected − from external shocks, on the other,

high domestic prices boosted production, which in many cases exceeded domestic uses. As a consequence, increasing amounts of production put market balances into risk (see Figure 6).

To re-establish equilibrium, quantities had to be withdrawn from the domestic market through public intervention or exported to third countries. In such cases export refunds were paid to bridge the gap between EU and world market prices. Increasing stocks cumulated for many sectors (e.g. cereals, butter, wine). As a result, budgetary costs increased steadily, leading to the budgetary crisis of the 1980s and the ensuing reform in the mid-1990s.

Figure 6 - Price support



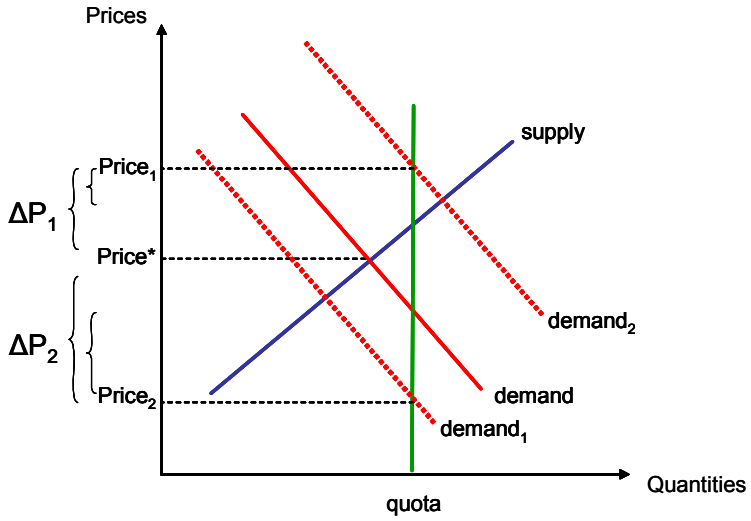
Through the various reforms (1992, 1999 and 2003), and with support switching from product to producer support through decoupled payments, intervention systems have been reviewed accordingly, with intervention prices being progressively reduced and aligned to world prices. Public intervention today represents a targeted product safety-net (namely private and public storage). Institutional prices are set at a level that ensures they are used only in times of real crisis. However, intervention is justified under conditions of *force majeure* (e.g. extreme weather) to compensate farmers for high income variability due to extreme variations in prices (e.g. Arts 70-71 of Reg. 73/2009 on direct payments).

4.2 Supply control

Quantitative restrictions, for example sugar and dairy quotas, had to be introduced in order to deal with market imbalances – including those created by high price support – as well as to contain budgetary costs.

Although it is true that in period of over-production quotas contributed to reduce budgetary costs and to improve market balance, the rigidity they create has detrimental effects on price stability. The impact on prices of any shock on the demand (or supply) side is swelled by the fact that supply cannot adapt to these changes (see Figure 7). This drawback is of particular importance for agricultural markets.

Figure 7 - Quotas



The recent dairy crisis provides a good example. Agricultural prices declined sharply from September 2008 until May 2009 following the demand drop resulting from the economic crisis and dairy farmers suffered more than other actors in the dairy food chain. This can be explained mainly by the rigidity of the sector, in particular by constraints hampering supply response to price signals.

Other factors played a part as well, among them a low price transmission along the food chain, lack of transparency, and lower bargaining power with respect to other actors in the chain. These elements have been examined by the dairy High Level expert Group on milk (HLG) of experts, which in its final report (European Commission, 2010) identified, in contractual and inter-professional arrangements, a way to increase the bargaining power of farmers and to improve the food chain organization.

4.3 Stability through price guarantee – counter cyclical payments

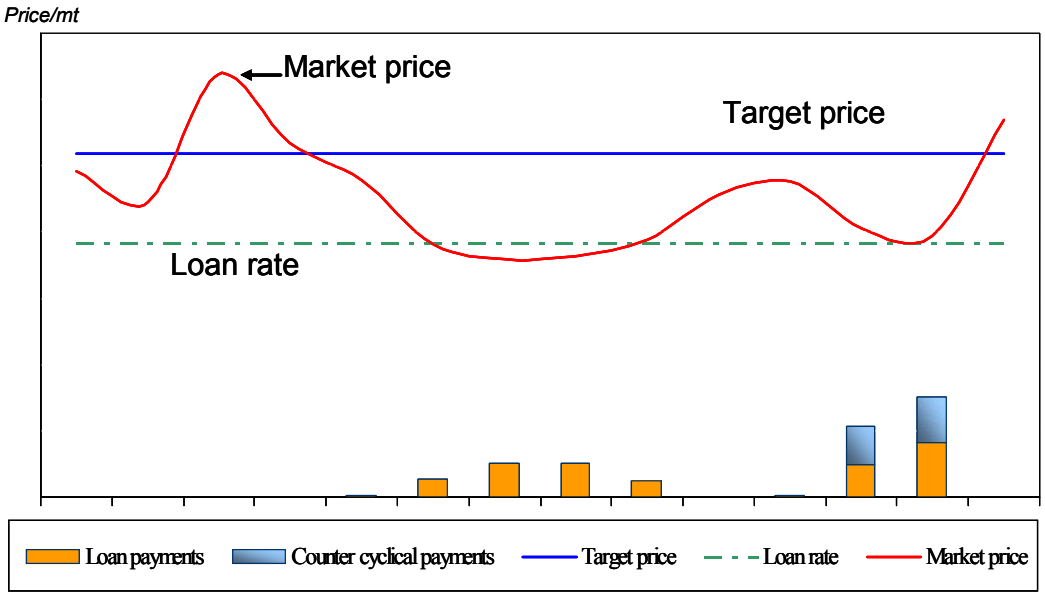
Counter cyclical payments are implemented in the United States. They have been designed to support and stabilize product-specific revenue, and indirectly income, in years when current prices for historically produced commodities are lower than target prices (Dismukes and Coble 2007). Thus, when market prices fall, payments increase. These programmes provide a payment when the actual price falls below a certain reference level, protecting farmers against price risks. A farmer gets no compensation through this scheme for low yields, as the price compensation is only paid for the actual yield.

Counter cyclical payments have several major drawbacks. The unpredictability of budgetary expenditures and insulation of farmers from market signals are two of the best known. They are also problematic from a WTO point of view as they are linked to current prices, and thus trade distorting.

The biggest drawback is the lack of any link to real farm income, since they do not take into account the total yield and the farm cost of production. When the yield is low, or when input costs increase but the market price of the related crops does not increase proportionally, the programme fails to deliver its targeted aim - it guarantees price for a specific crop but not income.

Figure 8 below shows how counter cyclical payments work in the US model, introduced as an additional safety-net to the Loan Payments Programme by making up the difference between low commodity prices and pre-determined target prices.

Figure 8 - Counter cyclical payments



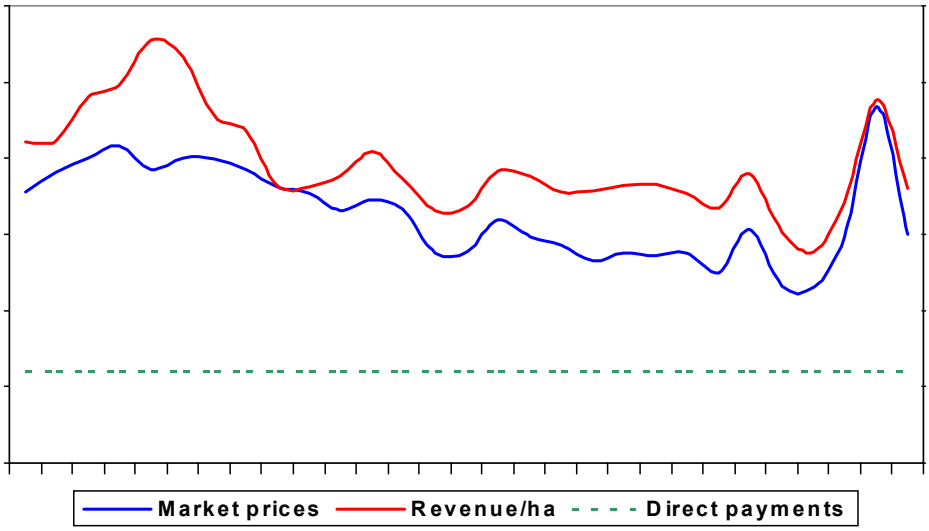
4.4 Stability through decoupled support

Decoupled direct payments have been introduced with the 2003 CAP reform. They can be seen as a way to stabilize and enhance farm income by guaranteeing a basic fixed income support to farmers and as such representing a producer safety-net. This is illustrated in Figure 9, where real prices and revenues per hectare in the EU during the last thirty years are put together with the EU average value of direct payments.

This type of income stabilization through direct payments makes farms less vulnerable to fluctuations in prices providing an income safety net independent of the market situation. Without such stabilization many farms, including economically viable enterprises that could potentially respond to the long-term demands of the sector, may come under threat and could be forced out of business. Reducing the income variability gives these farms the necessary liquidity to survive crises, reduces investment risks, and, thereby, contributes to maintain economically sound farms in the sector in the long run.

Results from simulations (ECNC, LEI, ZALF 2009) showed that a sudden termination of direct payments would lead to disruptive income losses that could force a large number of farmers out of the sector. This supports the idea that income support smoothes out the structural adjustment process and allows a gradual adaptation of the sector and the rural areas to the new conditions, avoiding disruption to existing structures.

Figure 9 -Decoupled support



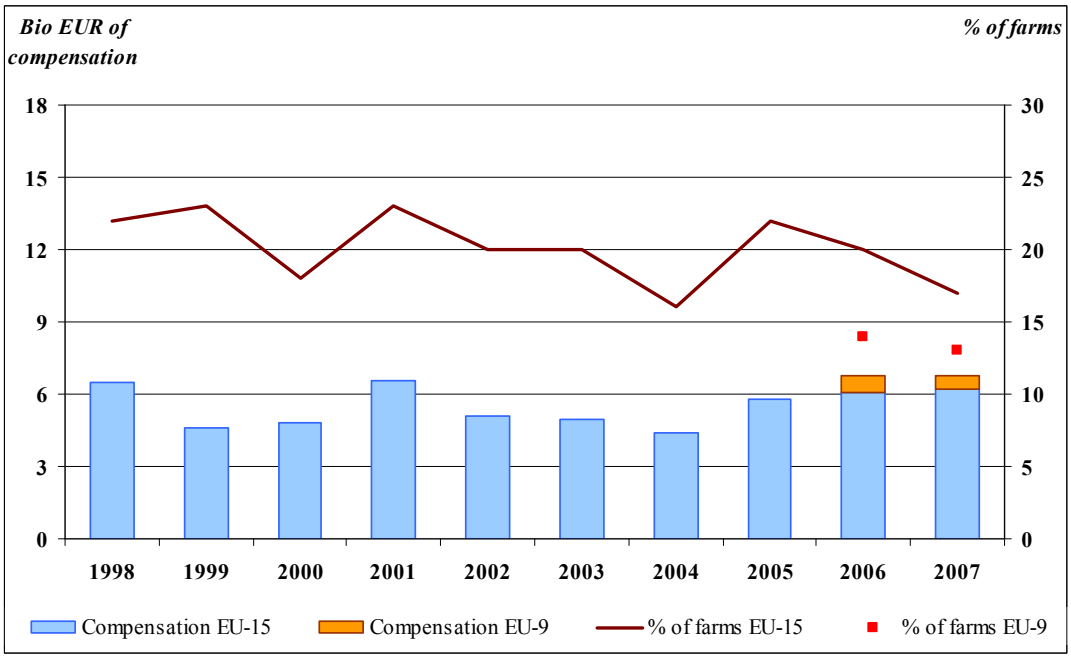
4.5 Stability through income guarantee

In the EU the idea of an income stabilization tool has been floating since the 2003 CAP reform. One option put forward in the 2005 Communication on risk and crisis management in agriculture examined an income stabilization tool. Under this option farmers would be compensated for a serious fall in income, in particular a fall of more than 30%.

The Commission[5] made an analysis of the income stabilization tool using FADN data for EU25 in the period 1998-2007. The farm net value added (FNVA) was used as income indicator. Estimates have been calculated on the share (%) of farms that would be eligible for compensation, and the budget needed for EU25 in the period 1998-2007 (see Figure 10).

[5] Directorate for Agriculture estimates calculated using FADN data.

Figure 10 - Income Stabilization tool: Share of farms eligible for compensation, and compensation need over time



Note: Gross Farm Income used as income indicator; Average yearly compensation for EU-15 for 1998-2007, for EU-10 (without Malta= EU-9) average 2006-07

Source: European Commission – DG Agriculture and Rural Development (FADN data)

As can be seen in the graph, the implementation of this instrument may be subject to a high yearly variability in terms of expenditure, which may also have an impact on potential recipients in terms of production behaviour. Other challenges for applying an income stabilization tool at EU level are related to budgetary needs - this tool would require on average approximately 10 billion Euros per year for EU25 - also the organizational arrangements could also be complex to implement, both at EU and MS levels. Certainly, these challenges invite the comparison between such a scheme and decoupled support in terms of transfer efficiency.

A series of other questions needs to be addressed on its implementation: should it be an EU-wide tool or a more targeted one, articulated according to different situations across the EU and across sectors?; should it be a fixed or variable (for example like a top-up to compensate income variability)?; should it be financed exclusively by the EU or also by MS' own money?

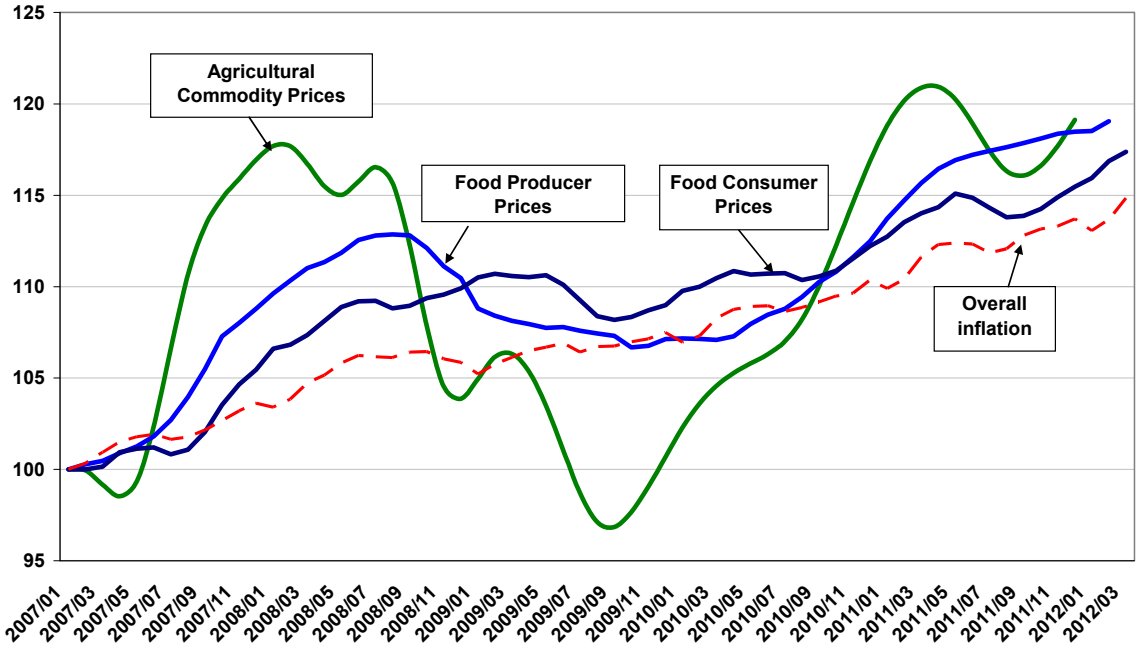
4.6 Improving the food chain

The improvement of the functioning of the whole supply chain could be seen as an alternative way to address the issue of volatility because it may contribute to market stability. This is possible improving transparency and allowing an efficient price discovery along the supply chain.

Figure 11 illustrates how price transmission along the food chain is channelled through the different actors. Using price indexes (January 2007=100) it exclusively shows variations in

the recent past. It should be noticed that after a steep positive trend, commodity prices at farm level already started a downward trend in February 2008, but prices paid by the industry and retailers showed a lag of 6 and 12 months respectively. These time lags indicate that during the crisis period farmers were the actors along the food chain to have suffered most the price crisis since its very beginning.

Figure 11 - Short-term price evolution along the food supply chain



Source: European Commission, based on Eurostat (Food Supply Chain Monitor) and DG Agriculture and Rural Development data

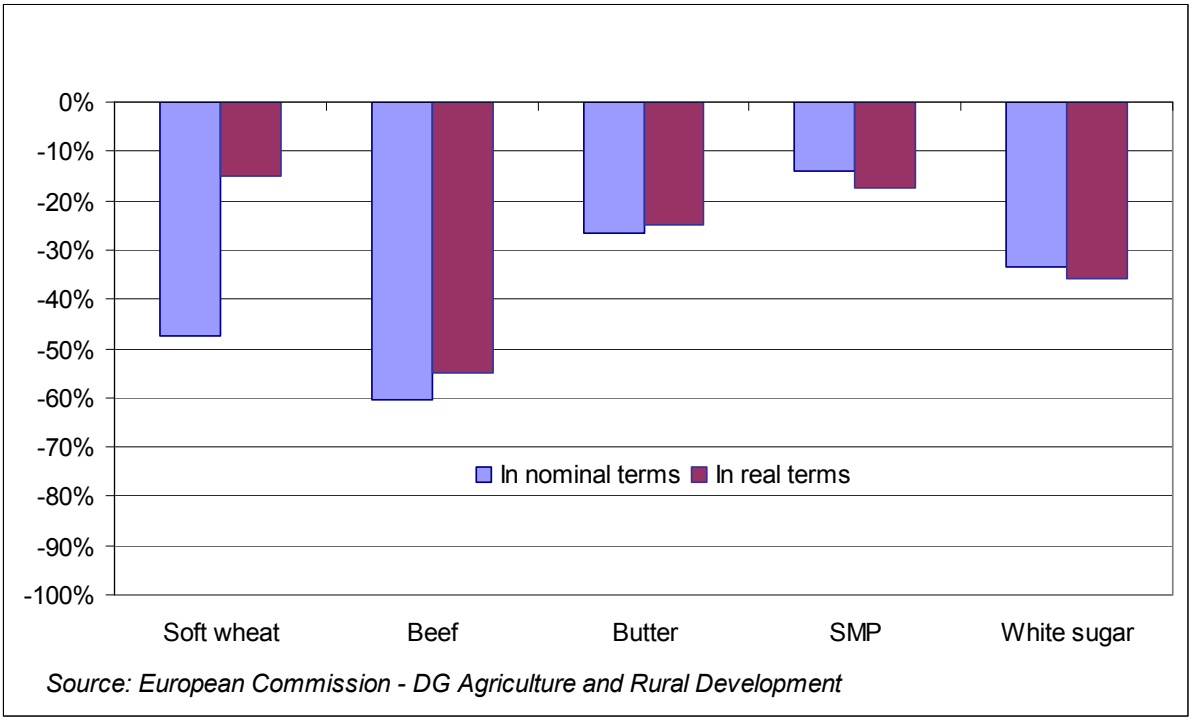
These instruments have been successfully implemented in certain sectors (fruit and vegetables and wine) for a long time. In particular, measures aiming to promote the creation of farmer producer organizations (POs), inter-branch organizations (IBOs), as well as co-financing operational programmes. A series of competition rule derogations are granted. Such instruments tend to have strong sector-specific characteristics, reflecting the structure of the industry.

5 Volatility and the CAP of today

The core element of the latest CAP reform process has been the greater emphasis placed on competitiveness and market orientation, with a decline in support for products and their prices in favour of support for producers and their income. Effectively, it meant the separation of the income support component (through de-coupled payment) from the market stabilization component (through intervention). Intervention became less relevant with the increased role of world markets, flexibility in farmers' production choices, and changes in supply chains and demand patterns. In this context, market stability is ensured, allowing the efficient functioning of markets, stimulating its development and transparency and facilitating participation of actors. The reform process also implied a move from policies concentrated mostly on commodity markets to horizontal instruments, which can benefit differentiated niche markets and a wide range of market actors.

Historical trends in EU prices highlight the results of this market orientation process. In most commodities, EU market prices have been decreasing over the last 15 years and today they are close to world prices.

Figure 12 - Reductions in EU price support, bringing EU prices in line with world prices



Source: European Commission - DG Agriculture and Rural Development

In the same fashion, trends in EU prices for most commodities mirror those of world prices because markets are much more connected, but this higher "exposure" to market changes and trends increased beyond what was previously foreseen. This was obvious during the commodity price boom in 2007 and then during the price slow-down that followed the economic crisis in 2009. On both occasions prices showed a historically high volatility, with very sharp variations in short periods of time.

From the perspective of increased price volatility and climate change, active risk management will be increasingly important for farmers. There are several tools in the CAP that address risks that farmers face. Firstly, there exists the possibility of subsidies for farmers that subscribe to crop, animal and plant insurance against adverse climatic events, and animal and plant diseases, creating mutual funds for combating animal and plant diseases, and environmental incidents. Secondly, there are special risk and crisis management measures for fruit and vegetables and wine: supporting (through producer organizations or national envelopes) production planning; concentration of supply; promotion of products; green harvesting; non-harvesting, harvest insurance, market withdrawals, free distribution, promotion and communication, mutual funds, potable alcohol distillation, crisis distillation, by-product distillation. Lastly, two measures address production risks among those of a Rural Development toolkit: introducing appropriate prevention measures against natural disasters in agriculture and forestry; and restoring agricultural and forestry production potential damaged by natural disaster (Measure 126 and 226) , and "Vocational training and information", where risk management could be addressed as one topic (Measure 111).

Based on what has been examined in preceding paragraphs, we can assert that thanks to progressive reduction of support prices, intervention systems today represent a targeted product safety-net, which is triggered only in exceptional circumstances and is no longer a structural outlet for farmers (e.g. dairy crisis experience). However, there is still room for improvement of the various intervention systems in place, to render them more efficient, and easy to implement promptly and control in case of crisis.

Other instruments may complement intervention since they address sources of uncertainties and farm income variability, such as farmers' low bargaining power and transparency.

Decoupled direct support, which constitutes the bulk of our agricultural support, provides a producer safety-net to farmers, which is essential for farm economic viability. Effectively, it contributes to ensure a certain farm income stability which, in combination with cross-compliance, promotes sustainable farming activity.

6 Concluding remarks

Although references are often made to "excess volatility", it is generally accepted that a certain degree of volatility is desirable, and price volatility is a normal feature of the markets. Without price adjustments, markets would come to a stall. Volatility across the commodity markets is not consistent. Although active participants on agricultural commodity markets are finding prices to be volatile, compared to energy market, volatility remains rather low. Energy returns have been significantly more volatile than other commodity sectors. Other markets, such as metals, have experienced higher volatility than energy markets; these episodes have been brief and transitory.

In macroeconomic terms, while price hikes are beneficial for net exporting countries that benefit from improved balance of payments, they increase the import bill of net importing countries.

Food security considerations play an important role. Variable prices lead to an uncertain food import bill, and high prices impact the ability of poor consumers to purchase necessary food. On the other hand, producers and net sellers benefit from increased prices.

Concerns about increased price volatility are usually voiced by producers and processors who, in the absence of risk management tools, are exposed to unpredictability and uncertainty associated with changing prices. High fluctuations in prices may limit the ability of consumers (processors) to secure supplies and control input costs. Due to price transmission issues, contracting and relatively low percentage of raw commodity in the processed products, consumer prices do not necessarily follow commodity prices directly. While we focus on the volatility of output prices, volatility of input prices (oil, fertilizer, etc) also affects agricultural production and decision making.

The biggest drawback of volatility is the associated uncertainty of marketing production, investment in technology, innovation, etc. The persistence in volatility reflects the continued uncertainty in how market fundamentals have unfolded and how they are likely to unfold this to go together with effects of volatility. Higher price volatility means higher costs of managing risks (such as higher margins on futures contracts and higher premiums for crop revenue insurance). It is likely that higher cost of risk mitigation would eventually translate into higher consumer prices. Commodity shocks in the form of increased prices

and increased volatility can also have impact on inflation, although this chapter abstains from analysing the link.

A distinction has to be made between the effects of volatility itself (such as unstable prices and their impact on food security) and effects of policy reactions. Short term policy reaction can contribute to market instability and consequently volatility, as we observed in the case of rice in spring 2008 when in the wake of increasing price levels some major exporting countries introduced export restrictions, and again in summer 2010 following an export ban in Russia.

The EU past experience of implementing tools that tried to stabilise market using price or supply controls has proved inadequate to today's context. The pressure on agricultural income is expected to continue as farmers are facing more risks, a slowdown in productivity and margin squeeze due to rising international prices. There is therefore a need to maintain income support and to reinforce instruments to better manage risks and respond to crisis situations.

The European Commission has tabled a set of proposals for reforming the CAP in October 2011 (EC, 2011, 2011a, 2011b), based on the Communication on the CAP towards 2020 (EC, 2010) that outlined broad policy options in order to respond to the future challenges for agriculture and rural areas. Some of the proposed policy changes represent themselves policy solutions to the issue of volatility:

- Measures for improving the food chain functioning and transparency, e.g. the expansion of product coverage for the recognition of producer organisations and their associations, and basic conditions if Member States make written contracts compulsory, with a view to strengthening the bargaining power of milk producers in the food chain.

- A risk management toolkit including support to mutual funds and a new income stabilization tool offers new possibilities to deal with the strong volatility in agricultural markets that is expected to continue in the medium term.

- Changes in the way decoupled income support is granted to farmers, briefly:

    - A single scheme across the EU, the basic payment scheme, replaces the Single Payment Scheme and the Single Area Payment Scheme as from 2014. The scheme will operate on the basis of payment entitlements allocated at national or regional level to all farmers according to their eligible hectares in the first year of application. Thus the use of the regional model that was optional in the current period is generalized, also effectively bringing all agricultural land into the system.

    - With a view to a more equitable distribution of support, the value of entitlements should converge at national or regional level towards a uniform value. This is done progressively to avoid major disruptions.

    - An important element is to enhance the overall environmental performance of the CAP through the greening of direct payments by means of certain agricultural practices beneficial for the climate and the environment that all farmers will have to follow, which go beyond cross compliance and are in turn the basis for rural development measures.

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Annex 1: Description of the price series used

World grains, oilseeds and meats: compilation of various sources by World Bank Commodity Price Data (Pink Sheet), available at http://go.worldbank.org/2O4NGVQC00

Barley (Canada), feed, Western No. 1, Winnipeg Commodity Exchange, spot, wholesale farmers' price

Wheat (US), no. 2, soft red winter, export price delivered at the US Gulf port for prompt or 30 days shipment

Maize (US), no. 2, yellow, f.o.b. US Gulf ports

Wheat (US), no. 1, hard red winter, ordinary protein, export price delivered at the US Gulf port for prompt or 30 days shipment

Rice (Thailand), 5 broken, white rice (WR), milled, indicative price based on weekly surveys of export transactions, government standard, f.o.b. Bangkok

Sorghum (US), no. 2 milo yellow, f.o.b. Gulf ports

Soybeans (US), c.i.f. Rotterdam

Soybean oil (Any origin), crude, f.o.b. ex-mill Netherlands

Soybean meal (any origin), Argentine 45/46 extraction, c.i.f. Rotterdam beginning 1990; previously US 44

Meat, beef (Australia/New Zealand), chucks and cow forequarters, frozen boneless, 85 chemical lean, c.i.f. U.S. port (East Coast), ex-dock, beginning November 2002; previously cow forequarters

Meat, chicken (US), broiler/fryer, whole birds, 2-1/2 to 3 pounds, USDA grade "A", ice-packed, Georgia Dock preliminary weighted average, wholesale

World dairy prices: FAO compilation of average of mid-point of price ranges reported bi-weekly by Dairy Market News (USDA). Available at http://www.fao.org/es/esc/prices/PricesServlet.jsp?lang=en

Butter, Oceania, indicative export prices, f.o.b.

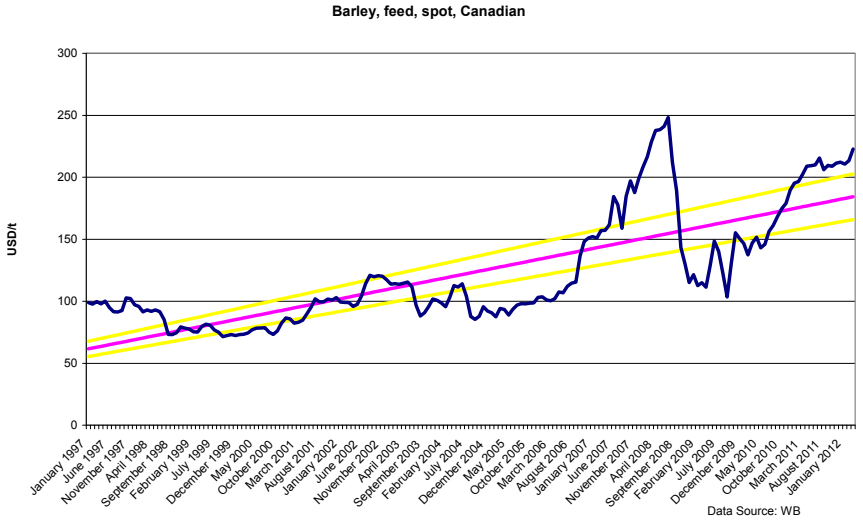
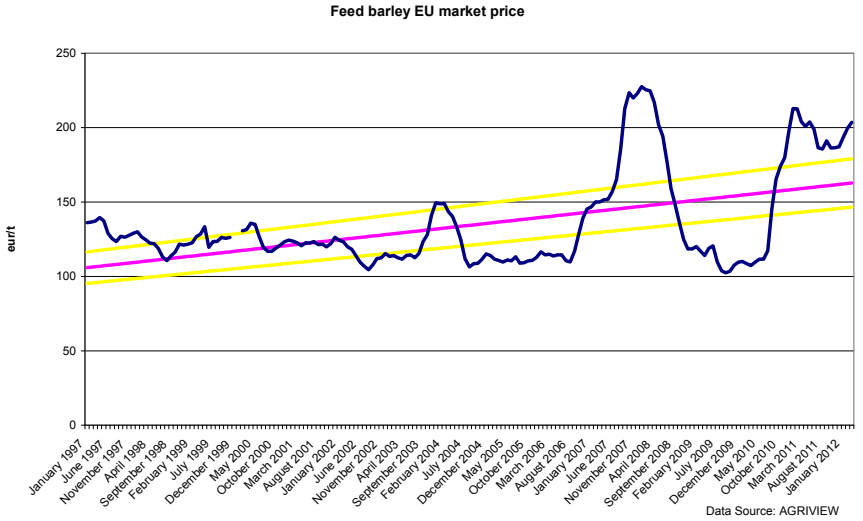
Cheddar Cheese, Oceania, indicative export prices, f.o.b.

Skim Milk Powder, Oceania, indicative export prices, f.o.b.

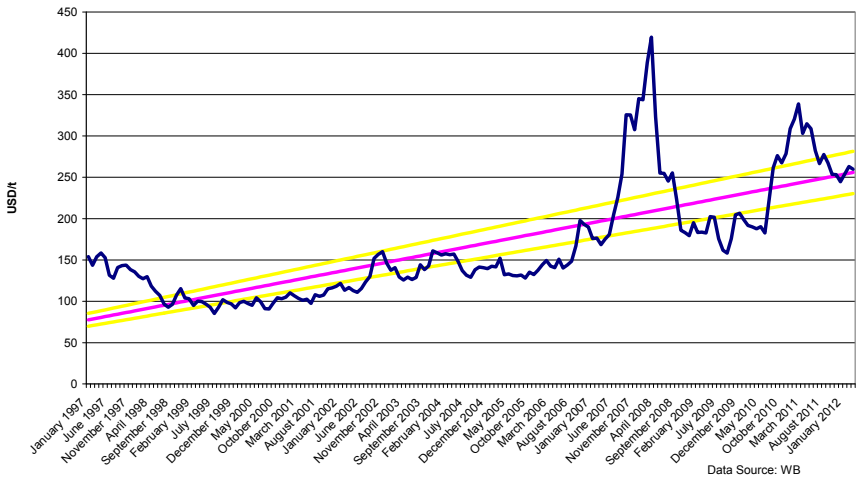
Whole Milk Powder, Oceania, indicative export prices, f.o.b.

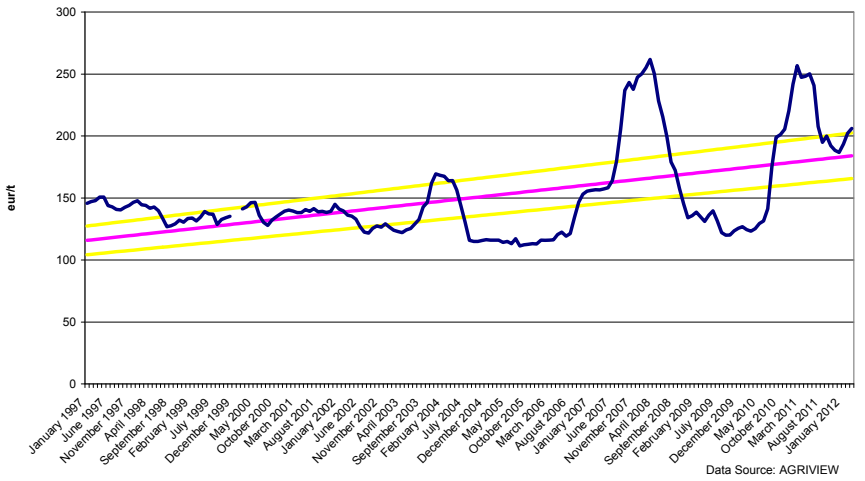
EU market prices for representative products (monthly) Available at http://ec.europa.eu/agriculture/markets/

Annex 2 - Price charts with trend lines in prices of comparable products

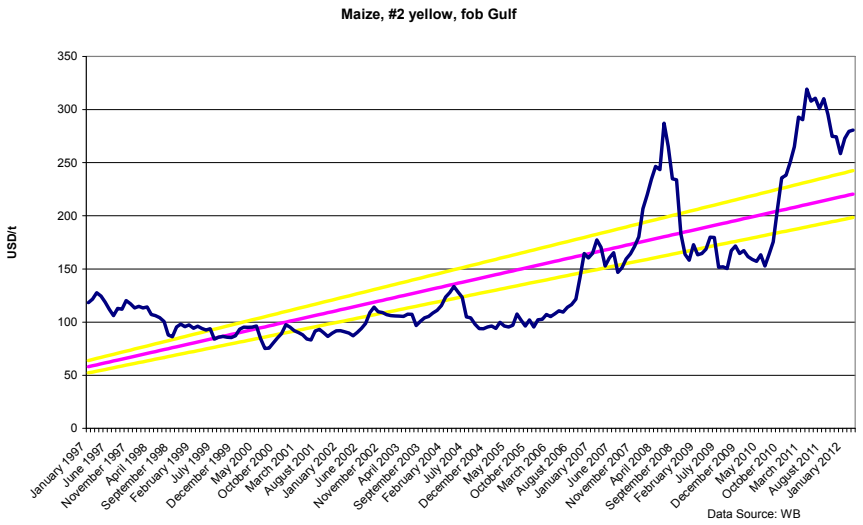
World	EU
Barley	
	

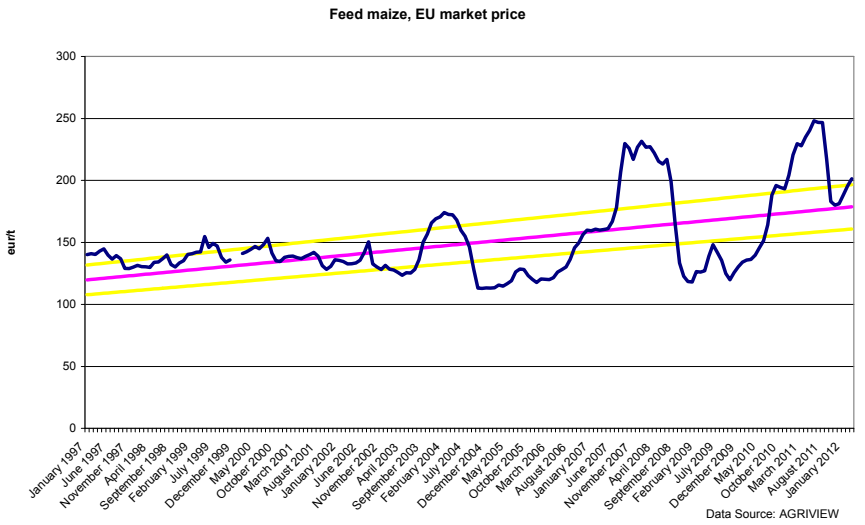
Wheat (Int. SRW, EU bread)



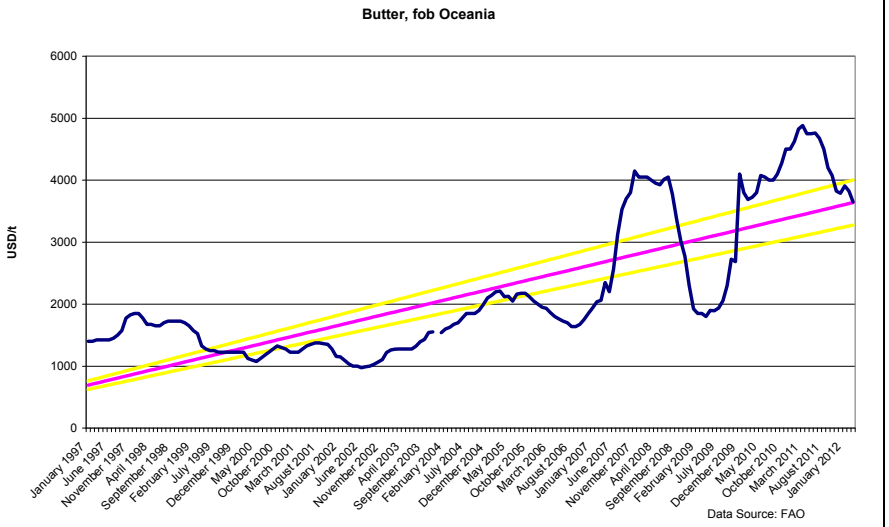


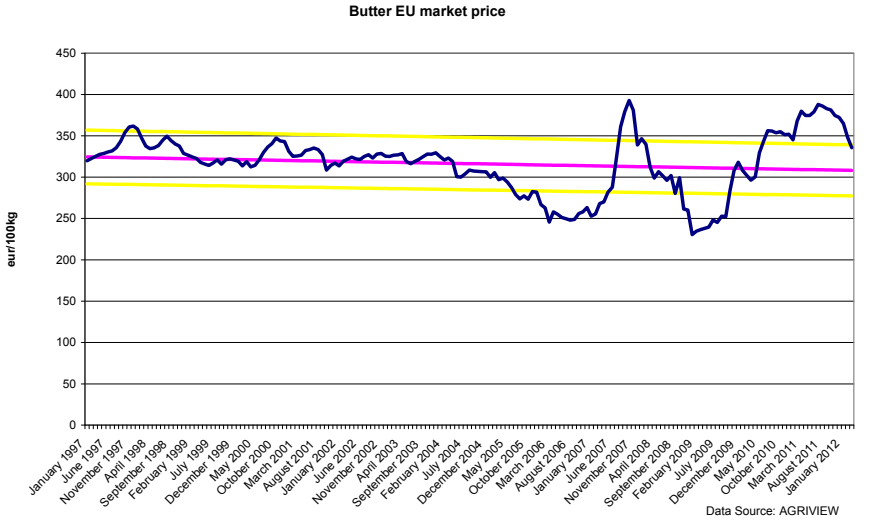
Maize





Butter


Butter, fob Oceania
USD/t
6000
5000
4000
3000
2000
1000
0
January 1997
June 1997
November 1997
April 1998
September 1998
February 1999
July 1999
December 1999
May 2000
October 2000
March 2001
August 2001
January 2002
June 2002
November 2002
April 2003
September 2003
February 2004
July 2004
December 2004
May 2005
October 2005
March 2006
August 2006
January 2007
June 2007
November 2007
April 2008
September 2008
February 2009
July 2009
December 2009
May 2010
October 2010
March 2011
August 2011
January 2012
Data Source: FAO


Butter EU market price
eur/100kg
450
400
350
300
250
200
150
100
50
0
January 1997
June 1997
November 1997
April 1998
September 1998
February 1999
July 1999
December 1999
May 2000
October 2000
March 2001
August 2001
January 2002
June 2002
November 2002
April 2003
September 2003
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July 2004
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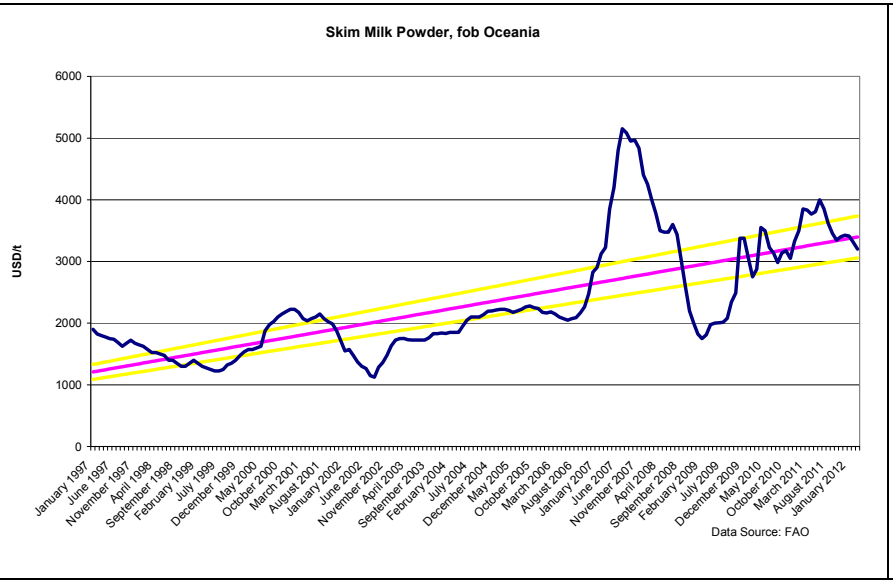
May 2005
October 2005
March 2006
August 2006
January 2007
June 2007
November 2007
April 2008
September 2008
February 2009
July 2009
December 2009
May 2010
October 2010
March 2011
August 2011
January 2012
Data Source: AGRIVIEW

SMP


Skim Milk Powder, fob Oceania
USD/t
6000
5000
4000
3000
2000
1000
0
January 1997
June 1997
November 1997
April 1998
September 1998
February 1999
July 1999
December 1999
May 2000
October 2000
March 2001
August 2001
January 2002
June 2002
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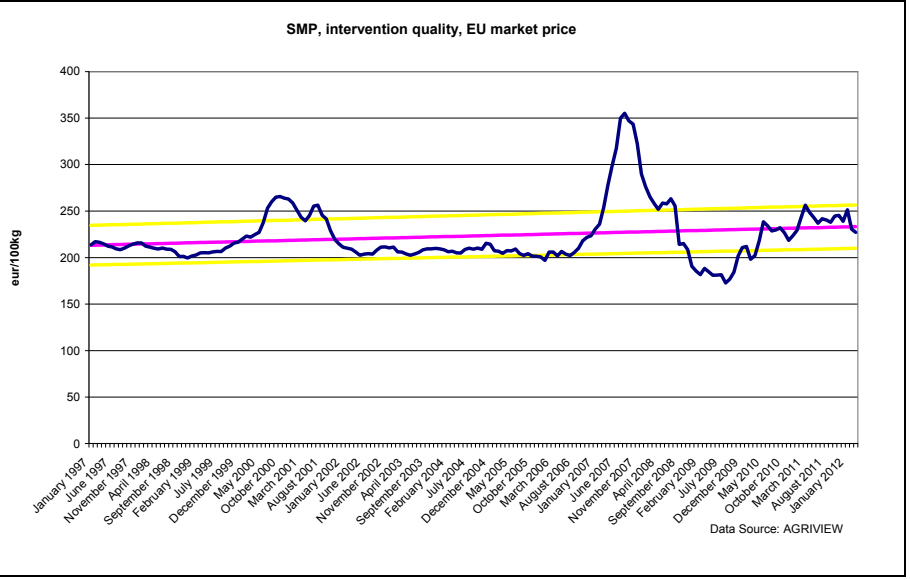
May 2010
October 2010
March 2011
August 2011
January 2012
Data Source: FAO


SMP, intervention quality, EU market price
eur/100kg
400
350
300
250
200
150
100
50
0
January 1997
June 1997
November 1997
April 1998
September 1998
February 1999
July 1999
December 1999
May 2000
October 2000
March 2001
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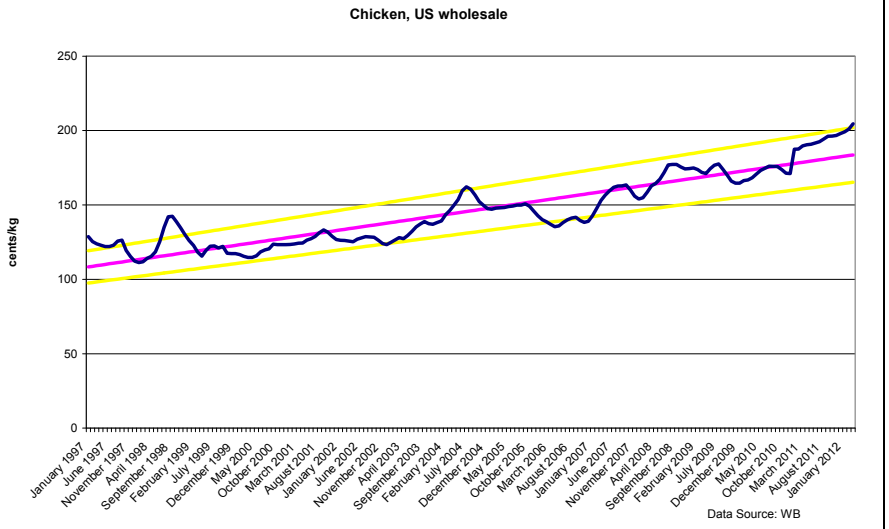
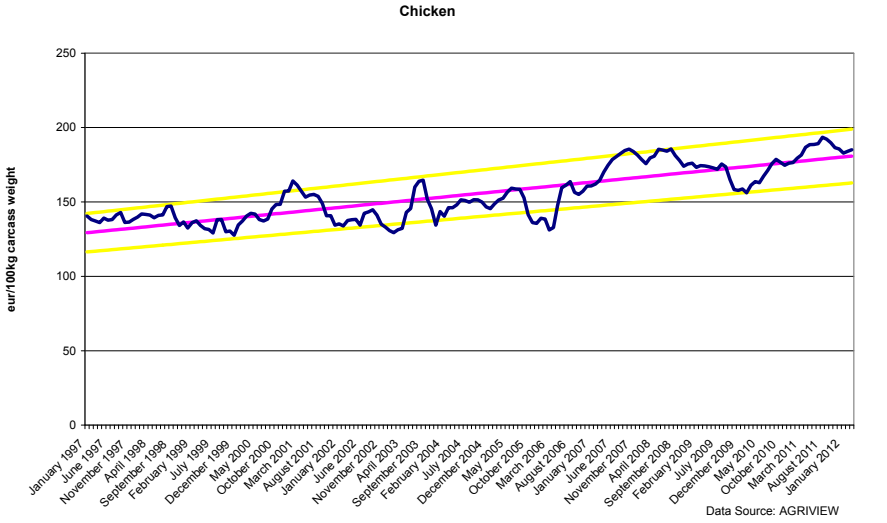
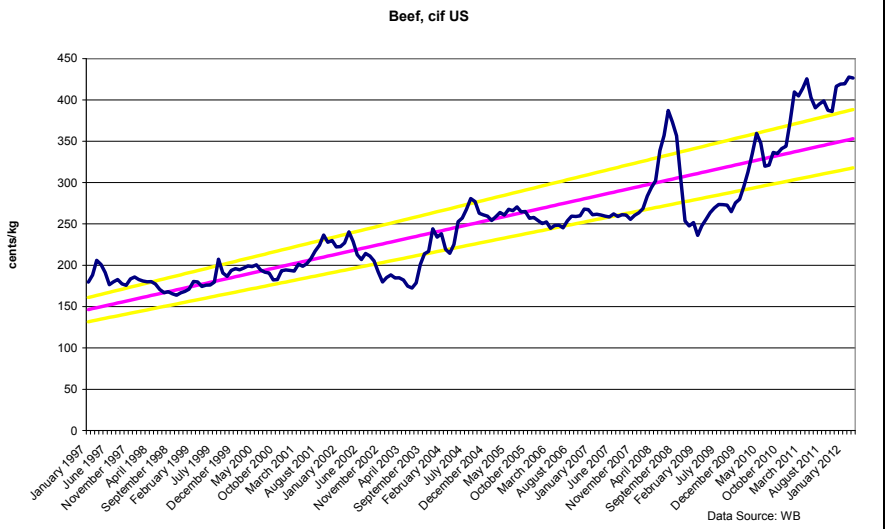
March 2011
August 2011
January 2012
Data Source: AGRIVIEW

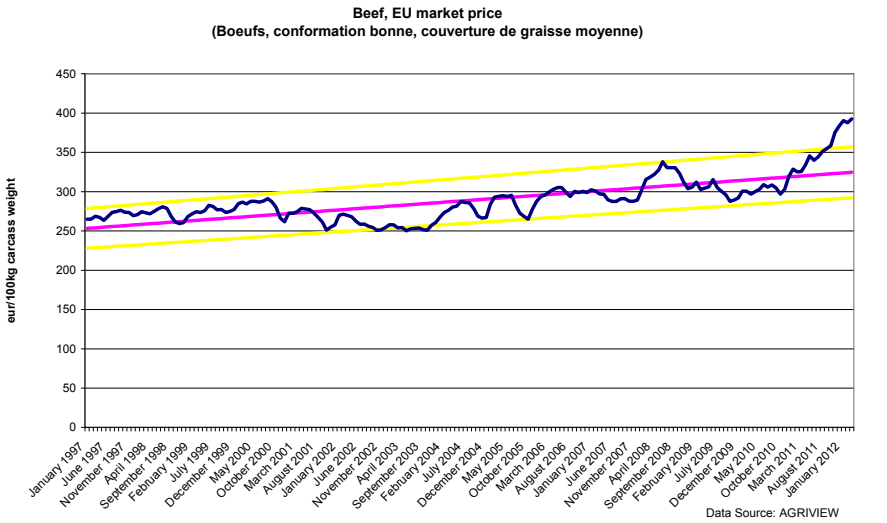
Chicken





Beef





Annex 3 - Theoretical consideration

The CME calculation of historical volatility calculation is the annualized standard deviation of the first difference in the logarithmic values of nearby futures settlement prices. Mathematically,

$$Volatility = STDEV_{Day1}^{Day} \left(LN \frac{SettlePx\,T}{SettlePx\,T-1} \right) * \sqrt{252}$$

Where 252 is the estimated number of trade days in a year to convert volatility into annualised terms.