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## COMMODITY PRICE VOLATILITY: INTERNATIONAL AND EU PERSPECTIVE

Although prices of agricultural commodities decreased from their peaks of 2007 – 2008, price volatility<sup>1</sup> remains on the agenda. Concerns about increased price volatility are usually voiced by producers and processors who in the absence of risk management tools are exposed to changing prices. Due to price transmission issues and relatively low percentage of raw commodity in the processed products, consumer prices do not necessarily follow commodity prices directly.

**Objective:** The note looks at price time series in the EU and on international agricultural commodity markets 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.

**Methodology:** The note uses a rather intuitive approach to determining price variability using monthly prices series. Two indicators are calculated:

1. A percentage of price observations lying outside the 20% tunnel around the price trend line. Using this method, observations just slightly over the trend line are counted the same way as peaks.
2. A coefficient of variation as a ratio of standard deviation over mean as a measure of dispersion of data points. The higher the coefficient of variation, the larger the dispersion of series and higher the price volatility.

**Data:** EU data were taken from AGRIVIEW's EU market prices for representative products, international commodity prices from international benchmarks from the World Bank or FAO. The study follows data from August 1997 to May 2010. 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.

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<sup>1</sup> "Volatility" and "variation" are used interchangeably in this note.

## **Results:**

Tables 1 – 4 summarise the results. Tables 1 and 2 deal with relatively comparable products. Table 1 shows percentage of observations lying outside the 20% tunnel around the trend line, table 2 shows coefficient of variations. Tables 3 and 4 show both number of observations outside the 20% tunnel and coefficient of variation for world and EU prices for which respective equivalents were not found. Price charts are presented in the Annex for products discussed in tables 1 and 2.

Table 1: 20% tunnel, comparable products

20% tunnel Commodity	World prices			EU prices		
	08/97- 05/10	08/97- 12/03	01/04- 05/10	08/97- 05/10	08/97- 12/03	01/04- 05/10
Barley	58.82%	58.44%	59.74%	57.89%	29.87%	87.01%
Wheat (Int. HRW, EU bread)	62.34%	63.64%	61.04%	55.92%	31.17%	81.82%
Maize	59.09%	61.04%	57.14%	49.34%	20.78%	79.22%
Butter	76.62%	83.12%	70.13%	21.43%	0%	42.86%
SMP	70.13%	75.32%	64.94%	31.17%	18.18%	44.16%
Chicken	9.74%	10.39%	9.09%	17.53%	12.99%	22.08%
Beef	22.73%	22.08%	23.38%	6.49%	6.49%	6.49%

Table 1 shows that over the studied period from April 1997 to May 2010, the percentage of observations outside the 20% tunnel was higher on the world markets than on the EU markets (with the exception of chicken) although for barley and wheat the differences were not particularly high. However, differences are noticeable in case of butter and SMP where percentage of observations outside the 20% tunnel was significantly higher on the world markets than in the EU (70+% compared to 20 – 30%). Dividing the data interval into two equally sized intervals (August 1997 – December 2003, and January 2004 – May 2010), we note that the percentage of observations outside the 20% tunnel on the world market exceeded the percentage of observations outside the 20% tunnel on the EU market for barley, wheat, maize, butter, SMP, and beef during the first time period. During the second time period from January 2004 to May 2010 which also included price hikes, the absolute percentage of observations outside the 20% tunnel on the world market did not increase significantly for any product. On the EU market the percentage of observations outside the 20% tunnel increased significantly for all commodities except beef.

Table 2: Coefficient of variation, comparable products

Coef. of variation Commodity	World prices			EU prices		
	08/97- 05/10	08/97- 12/03	01/04- 05/10	08/97- 05/10	08/97- 12/03	01/04- 05/10
Barley	34.59%	15.99%	31.98%	21.32%	6.34%	26.94%
Wheat (Int. HRW, EU bread)	38.76%	14.78%	32.60%	21.87%	6.23%	28.24%
Maize	33.91%	10.79%	30.48%	18.75%	6.38%	23.79%
Butter	44.75%	17.71%	34.86%	10.67%	3.58%	12.30%
SMP	40.43%	18.28%	34.06%	14.89%	8.63%	19%
Chicken	13.53%	5.88%	8.17%	10.62%	6.36%	9.23%
Beef	20.42%	10.22%	12.40%	6.85%	4.22%	5.38%

Table 2 summarises coefficients of variations for the products discussed in Table 1. Comparing coefficients of variation on the world and EU markets covering period from August 1997 to May 2010 we observe that the prices on the world markets were more dispersed than prices on the EU markets, with meats being less dispersed than crops and dairy. On both the world and EU markets the coefficient of variation increased between 1997 – 2003 and 2004 – 2010, indicating increased dispersion of prices. However, with the exception of chicken, world markets experienced more dispersed prices in the first period between 1997 and 2003 than EU markets did. Even in the second time period, with the exception of chicken, the coefficient of variation in the world price series exceeded the coefficient of variation in the EU.

Table 3: World prices:

Commodity	20% tunnel			Coef. of variation		
	08/97-05/10	08/97-12/03	01/04-05/10	08/97-05/10	08/97-12/03	01/04-05/10
SRW wheat	64.29%	58.44%	70.13%	39.43%	16.87%	33.95%
Rice Thai 5%	94.16%	93.51%	94.81%	48.12%	21.17%	41.04%
Sorghum	53.25%	40.26%	66.23%	31.69%	11.45%	28.89%
Soybeans	70.78%	72.73%	68.83%	35.60%	14.83%	28.36%
Soybean oil	71.43%	80.26%	64.47%	42.24%	25.03%	34.25%
Soybean meal	72.73%	61.04%	84.42%	38.20%	17.81%	31.74%
Cheese	55.84%	55.84%	55.84%	37.86%	10.43%	28.16%
WMP	74.68%	68.83%	80.52%	40.59%	13.61%	34.84%

Table 3 looks at world prices for products for which counterparts were not identified. The percentage of observations outside the 20% tunnel increased significantly for SRW wheat, sorghum, soybean meal, and WMP. Rice and cheese prices did not change, while soybeans and soybean oil decreased. However, starting values were quite high. Coefficient of variation increased for all products between the time periods, indicating higher dispersion of prices.

Table 4: EU prices:

Commodity	20% tunnel			Coef. of variation		
	08/97-05/10	08/97-12/03	01/04-05/10	08/97-05/10	08/97-12/03	01/04-05/10
Feed wheat	58.55%	32.47%	85.71%	23.89%	8.22%	30.47%
Durum wheat	58.55%	36.36%	81.82%	34.87%	12.56%	40.64%
Malting barley	57.24%	28.57%	87.01%	24.13%	6.05%	28.57%
Cheddar	46.75%	29.87%	63.64%	17.73%	5.69%	17.11%
Eidam	26.62%	10.39%	42.86%	9.28%	4.55%	10.24%
Young bovines	11.04%	20.78%	1.3%	9.07%	7.30%	6.50%
Cows	28.57%	48.05%	9.09%	9.60%	8.03%	6.18%
Heifers	1.95%	3.90%	0	7.35%	4.72%	5.32%
Piglets	55.84%	75.32%	36.36%	18.76%	23.92%	12.01%
"Regules"	29.22%	46.75%	11.69%	12.76%	16.36%	7.68%
Eggs	40.26%	35.06%	45.45%	16.62%	14.51%	13.92%

Table 4 summarises the same results for the EU. The percentage of price observations outside the 20% more than doubled between the time periods for crops and dairy, increased by 10% for eggs, and decreased for meats. The coefficient of variation increased significantly for crops and cheeses while decreased for meats and eggs and remained relatively stable for eggs.

Shortcomings: Further analyses are needed as currently used intuitive methods suffer from a series of shortcomings: trend is determined by data themselves, seasonality is not taken into account, price peaks could be disregarded as outliers.

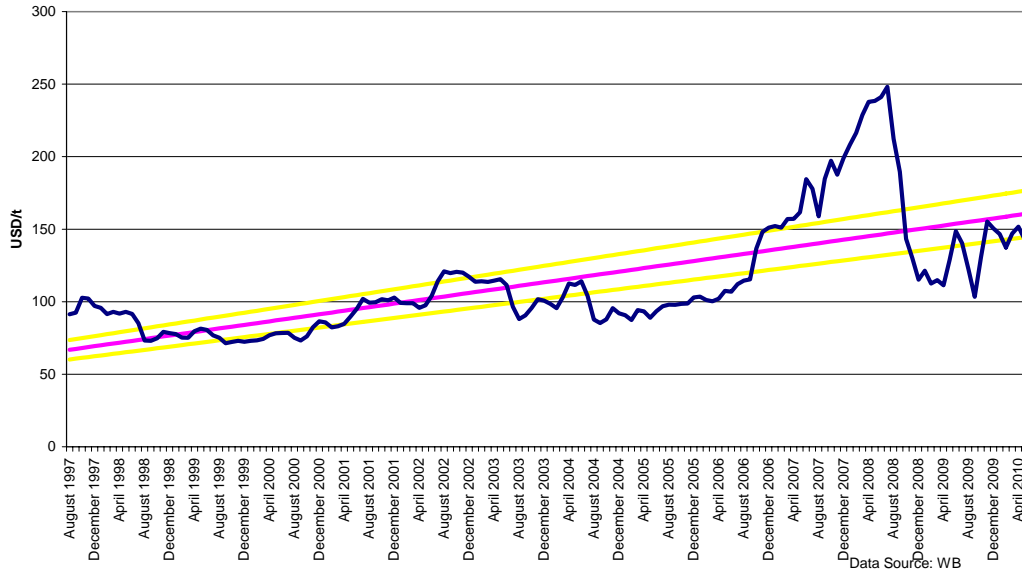
**Summary:**

- Using coefficient of variation as a measure, from August 1998 to May 2010 world commodity markets experienced more volatility than EU markets. Coefficient of variation increased both on the world and EU markets between 1997-2003 and 2004-2010, with the EU recording more dramatic increases. However, in absolute terms the coefficient of variation remains higher on the world than on the EU markets during 2004 – 2010 for all products but chicken where the levels are comparable.
- Compared to 1997 – 2003, dispersion of prices in 2004 – 2010 measured by coefficient of variation increased for all commodities studied both in the EU and world, with the exception of some meat products. However, compared to crops and dairy, volatility of meat prices is relatively low. Note that 2004 – 2010 time period includes price peaks, significantly shifting the mean of the time series.

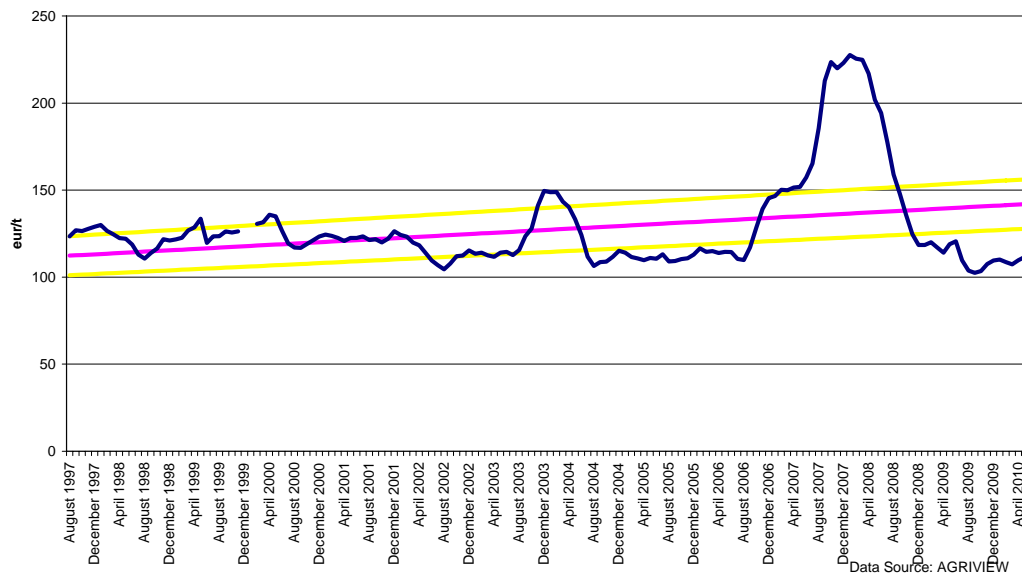
## Annex 1: Charts accompanying tables 1 and 2

### Barley

Barley, feed, spot, Canadian

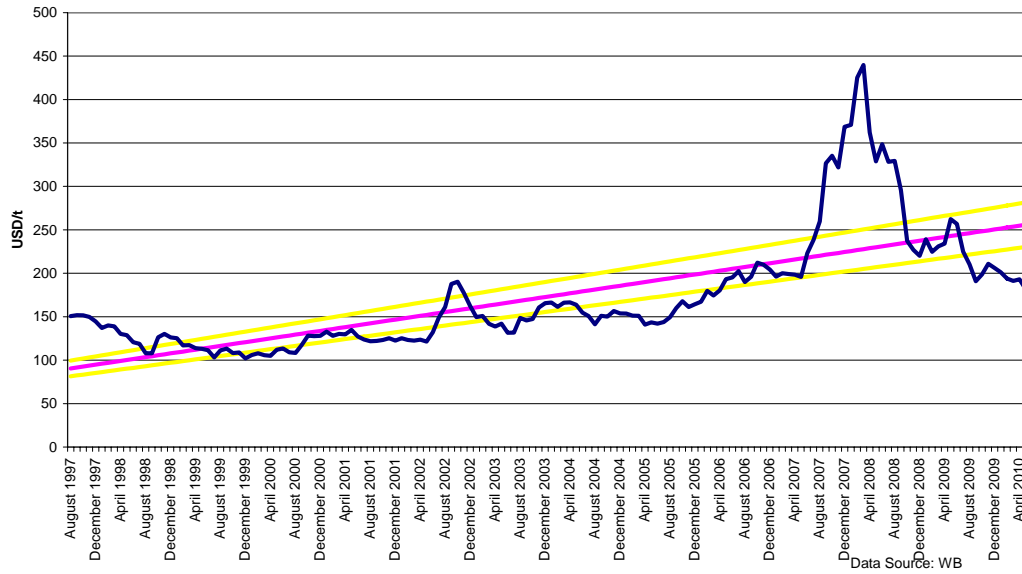


Feed barley EU market price

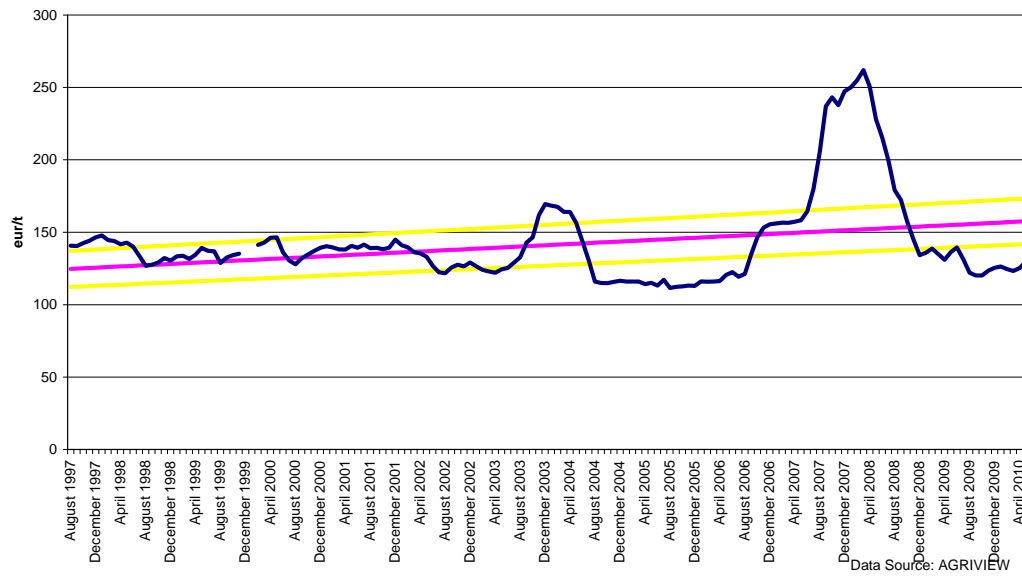


# Wheat

Wheat, US HRW, export Gulf

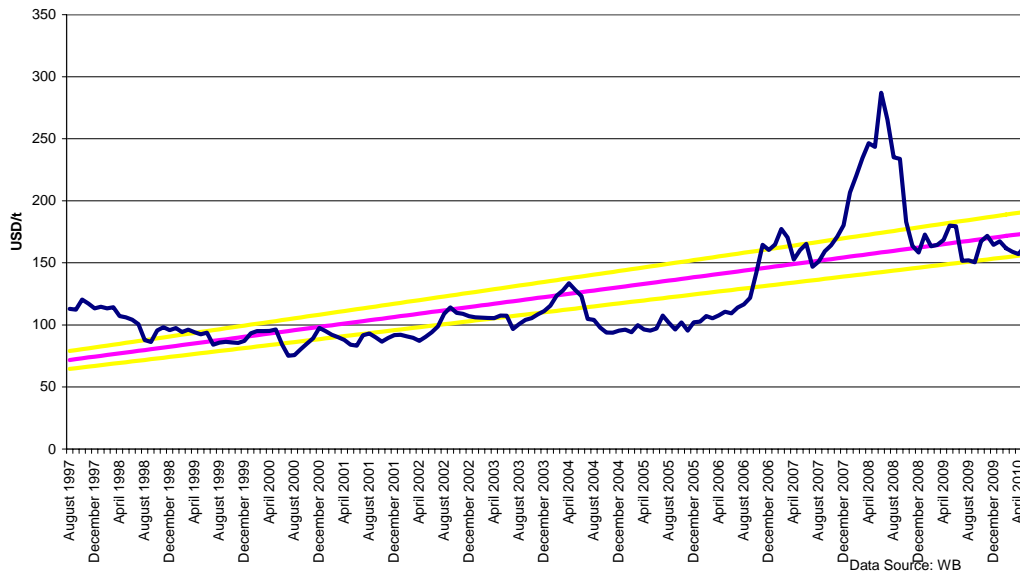


Breadmaking common wheat, EU market price

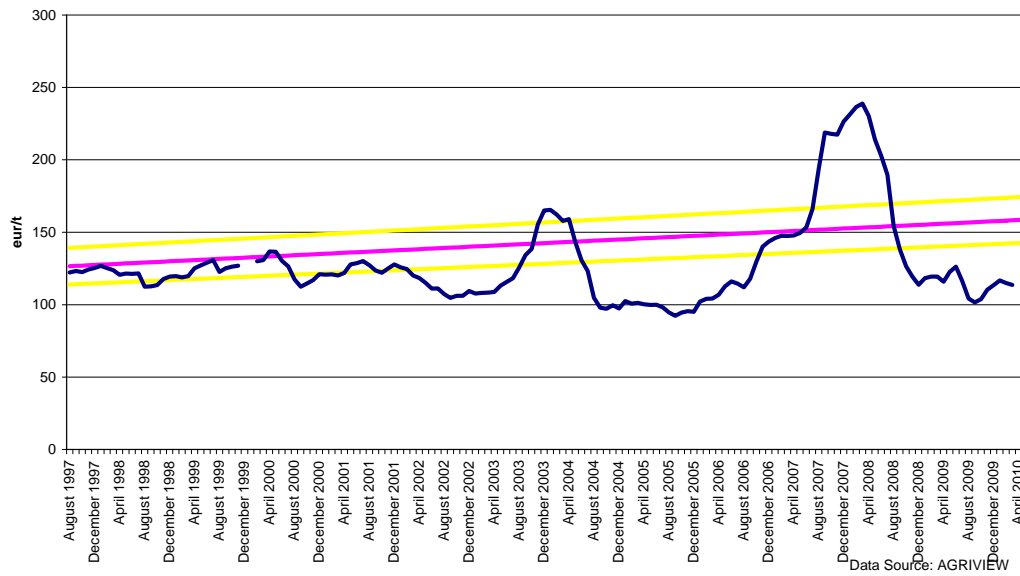


# Maize

Maize, #2 yellow, fob Gulf

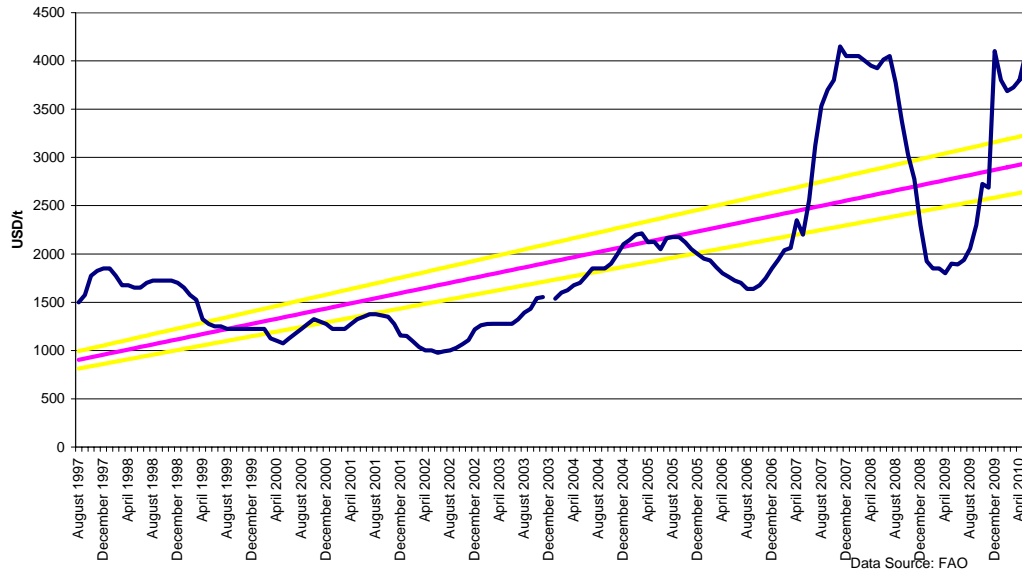


Feed maize, EU market price

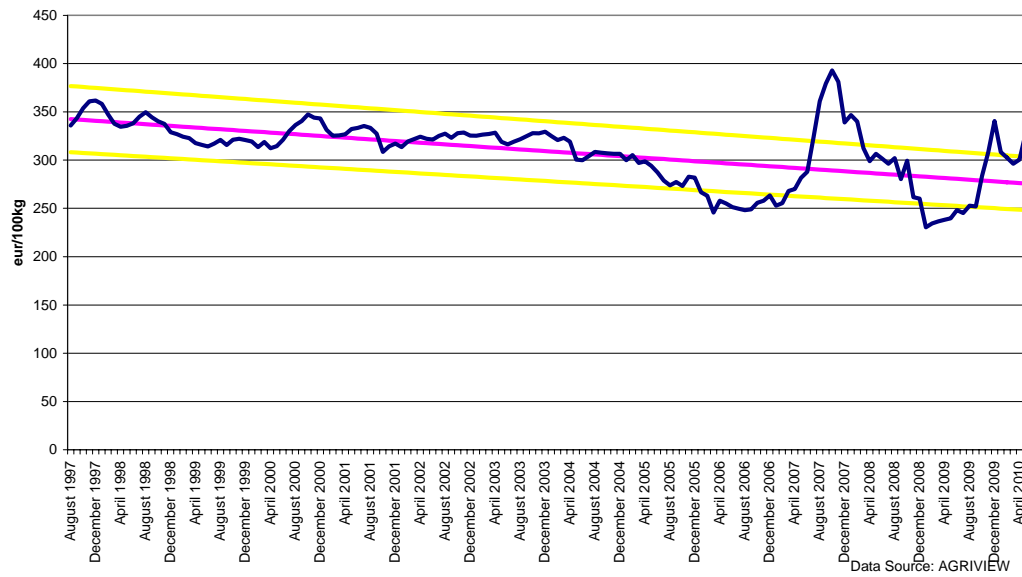


# Butter

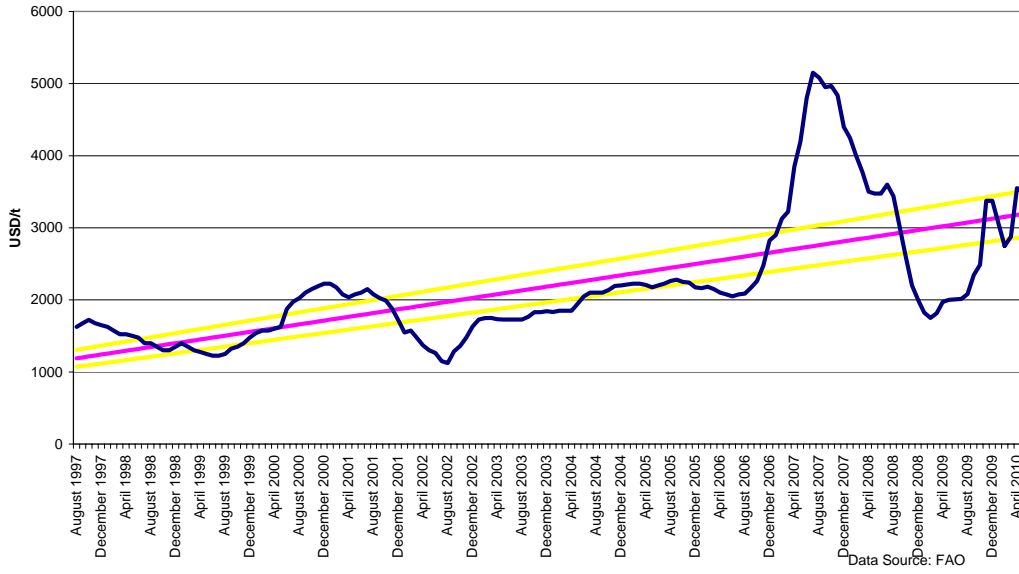
Butter, fob Oceania



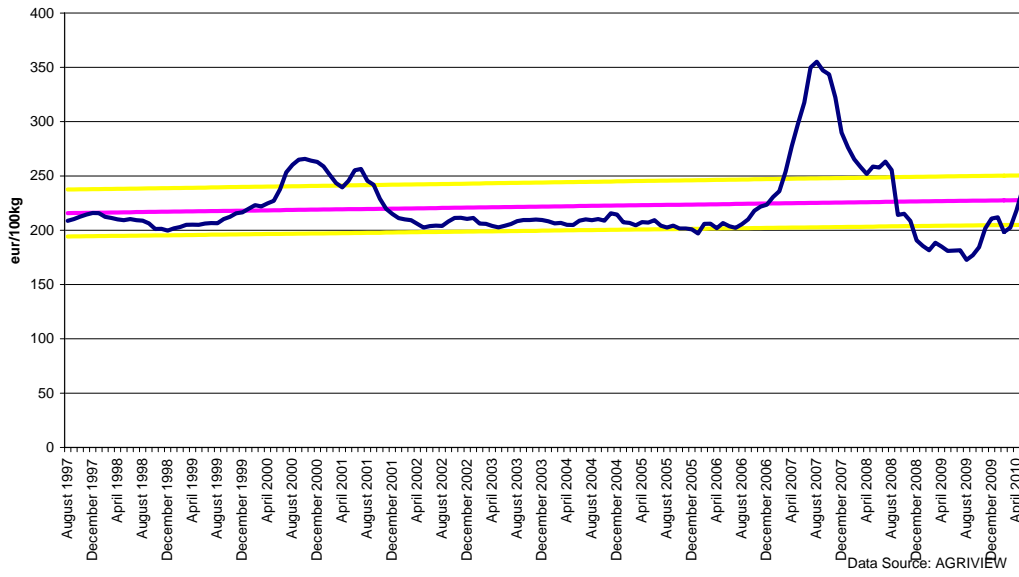
Butter EU market price



**Skim Milk Powder, fob Oceania**

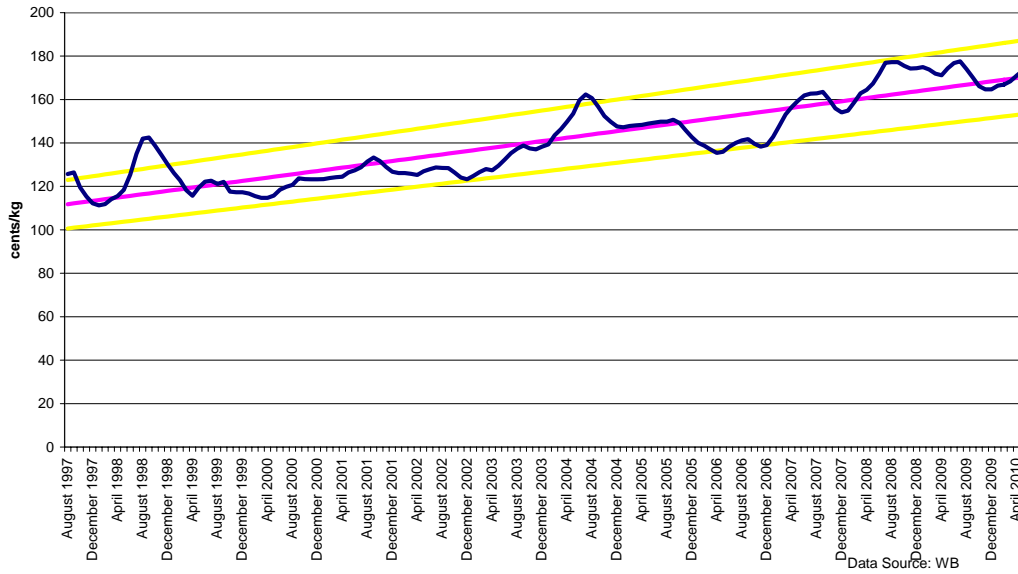


**SMP, intervention quality, EU market price**

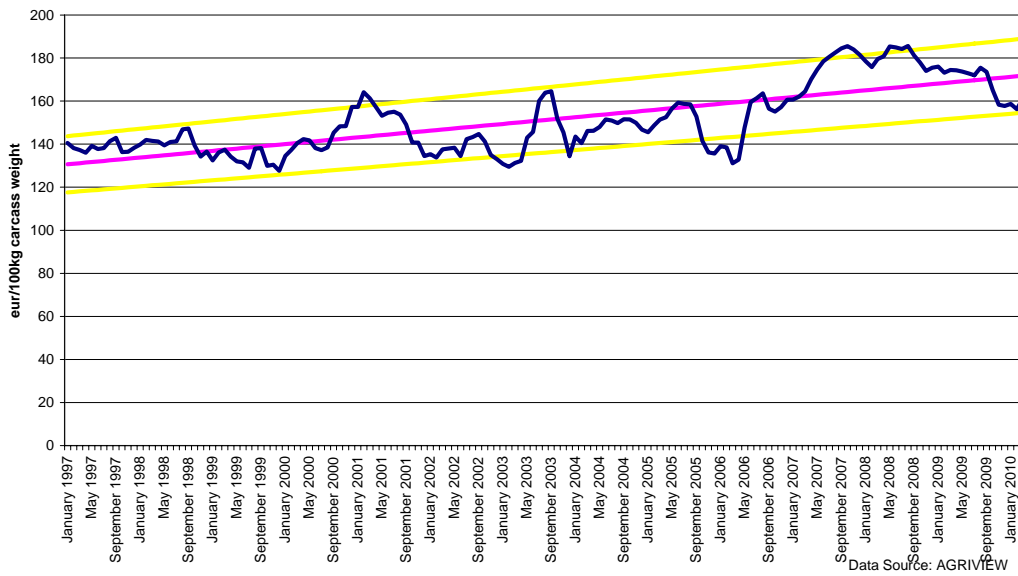


# Chicken

Chicken, US wholesale

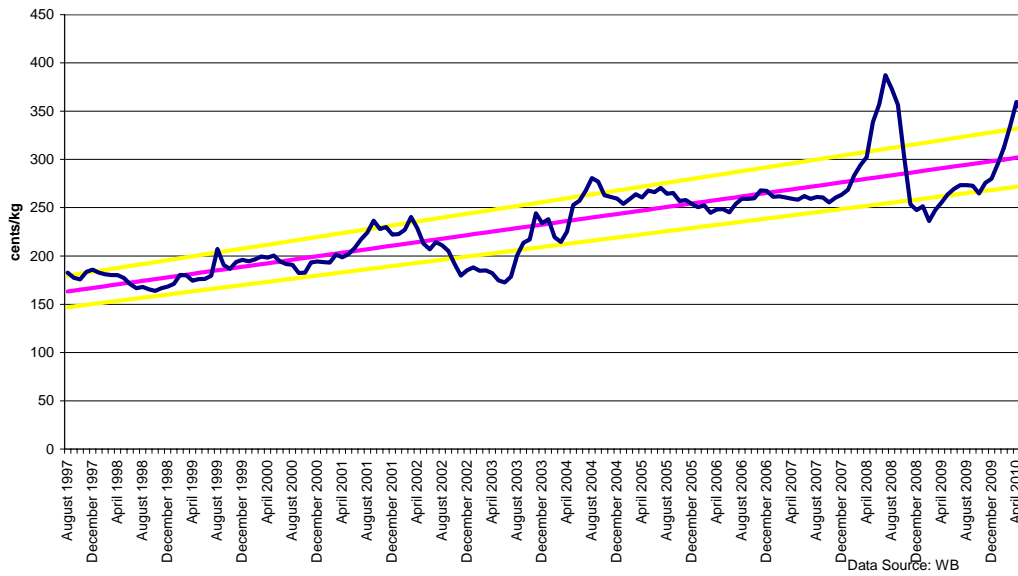


Chicken, all, EU market price



# Beef

Beef, cif US



Beef, EU market price  
(Boeufs, conformation bonne, couverture de graisse moyenne)

