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The functioning of the food supply chain and its effect on food prices in the European Union

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European Commission

Directorate-General for Economic and Financial Affairs

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THE FUNCTIONING OF THE FOOD SUPPLY CHAIN
AND ITS EFFECTS ON FOOD PRICES IN THE EUROPEAN UNION[1]

Abstract

The sharp fluctuations in food price inflation at a time of great uncertainty about the economic outlook have raised questions about the functioning of the European food supply chain. While the observed changes in food prices in EU Member States can be linked to developments in the global demand and supply for agricultural commodities, inefficiencies in the functioning of the food supply chain, in terms of competition and regulation, may have played an important role as well. In particular, an analysis of the transmission mechanisms linking agricultural commodity prices with producer and consumer prices shows that the shock caused by the upsurge in agricultural commodities and energy prices in the second half of 2007 and the first half of 2008 was absorbed differently across EU Member States. Cross-country differences in the regulatory framework appear to have contributed to this fragmentation of the European Single Market. Moreover, there are indications of differences in the conditions of competition across Member States. Finally, consolidation is taking place throughout the food supply chain. While such consolidation can lead to efficiency gains, it may also worsen the conditions of competition to the detriment of consumers and businesses.

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In the second half of 2007 price increases of many agricultural commodities accelerated rapidly and by early 2008 reached exceptional levels. These increases have been mainly driven by a temporary imbalance between demand and supply – against the background of a structural increase in demand for food products across the globe. The agricultural commodity price surge generated a rapid increase in consumer food prices, which peaked in July 2008. Since then, agricultural commodity prices have decreased sharply. However, structural factors like the growth in global demand and the decline in food crop productivity growth are likely to hold up these prices in the medium term.

This paper aims to better understand how the degree of competition in the food industry and the downstream retail markets may have affected price developments and to identify regulatory practices that may help to lessen the impact on consumers of price volatility on agricultural commodity markets. Improving the functioning of the food supply is particularly important in the present economic circumstances. In order to sustain the purchasing power of European households it is essential that the downward price movements in commodity markets are transmitted without delay to consumers. Households devote, on average, one sixth of their expenditures to food and beverages. This share is even higher for low income households.

This investigation into the functioning of the food supply chain is the first in-depth market monitoring exercise organised as a follow-up to the November 2007 Single Market Review[2]. Such market monitoring exercises aim to analyse the functioning of markets and sectors along different dimensions, such as regulation, integration, competition and innovation. By investigating the dynamic interactions between market structure, firms' conduct and economic performance the in-depth monitoring of the food supply chain permits the derivation of more evidence based policy recommendations.

The paper is organised as follows. Section 1 provides a description of the food supply chain. The focus of analysis is on the food processing industry and the distribution sector. Section 2 gives an overview of the economic performance of the sectors belonging to the food supply chain. Section 3 makes an analysis of the food price transmission mechanism, looking in particular at the pass-through of price developments along the food supply chain. The structure of the different markets along the food supply chain is discussed in section 4 while section 5 analyses the impact of regulation and business practices on the functioning of this chain. The concluding section 6 presents some policy recommendations which can be drawn from this work.

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[2] The European Commission (2009) provides detailed information on the market monitoring tool.

1. DESCRIPTION OF THE FOOD SUPPLY CHAIN

The food supply chain is composed of a wide diversity of products and companies which operate in different markets and sell a variety of food products. The regulatory framework affects the food supply chain at all levels from the agricultural sector down to the retail sector. The degree of market power held by the firms along the chain varies by product category, depending on the relevant markets in which these firms operate. It has an impact on the contractual relationships between the main players along the chain and can influence the degree of transmission of the increase in agricultural commodity prices to consumer prices. Given this complexity, general conclusions regarding the functioning of the food supply chain have to be drawn with caution. Therefore, this analysis will not necessarily come up with concrete policy recommendations but will rather identify a number of issues that merit further investigation. This better understanding of the functioning of the food supply chain will also contribute to a more informed debate on policy proposals with stakeholders.

The food supply chain connects three main sectors (see Figure 1): the agricultural sector, the food processing industry and the distribution sectors (wholesale and retail). Basic agricultural commodities undergo, to varying degrees, an often substantial series of intermediate alterations before they are sold as final food products to consumers. A description of the food supply chain may improve the understanding of how prices are formed along this chain, how input costs are passed on, where interactions between firms take place and where different regulations may have an impact. However, since specific food supply chains exist for every single food item purchased by consumers, the following description is a necessary simplification.

The first sector considered in the food supply chain is the agricultural sector. Its activities include crop production and the raising of livestock. As agricultural commodities comprise of very different products, the sector's distribution channels are equally diverse. Firms in the agricultural sector primarily sell their output to the food processing industry and to itself (e.g. animal feed), but also sell directly to retailers, final consumers or alternative markets (e.g. biofuels). The food processing industry is very heterogeneous and comprises of a number of varied activities. These include for example refining (sugar), milling (cereals), cleaning, cutting or drying (fruit and vegetables) and slaughtering and disassembling (livestock). The different inputs are processed in successive stages and to different degrees, packaged and dispatched to customers (e.g. distributors, food service). Another important activity of food manufacturers is to carry out market and product research leading to the development of new products, and to engage in marketing. The distribution sector (and retail in particular) is the principal outlet for food products and, being the final link in the supply chain, it interacts directly with final consumers. While the sector's main activity is the sale of products, in doing so, retailers may also carry out services for food manufacturers, such as promotional activities.

The transfer of intermediate goods can be directly between firms involved in production or sale to consumers or, as is often the case, via specific wholesalers. Such transfers can be analysed from both a contractual and a technical perspective. The contractual aspects essentially refer to buyer-seller interactions and are influenced by the relative market power of the firms along the chain. On the technical side, the transfer involves a series of activities which generate additional costs, such as those incurred for transport, storage and logistics. Therefore, besides the raw material – which in general accounts for only a small share of total costs – the cost structure of food production comprises of a number of other cost factors, most

notably transport energy and labour, which are reflected in the final consumer prices. In addition, the functioning of the food supply chain is also affected by a number of external factors such as regulation, public policy and the macroeconomic environment, which impact cost structures and price developments across Member States.

Figure 1:   Schematic representation of the food supply chain
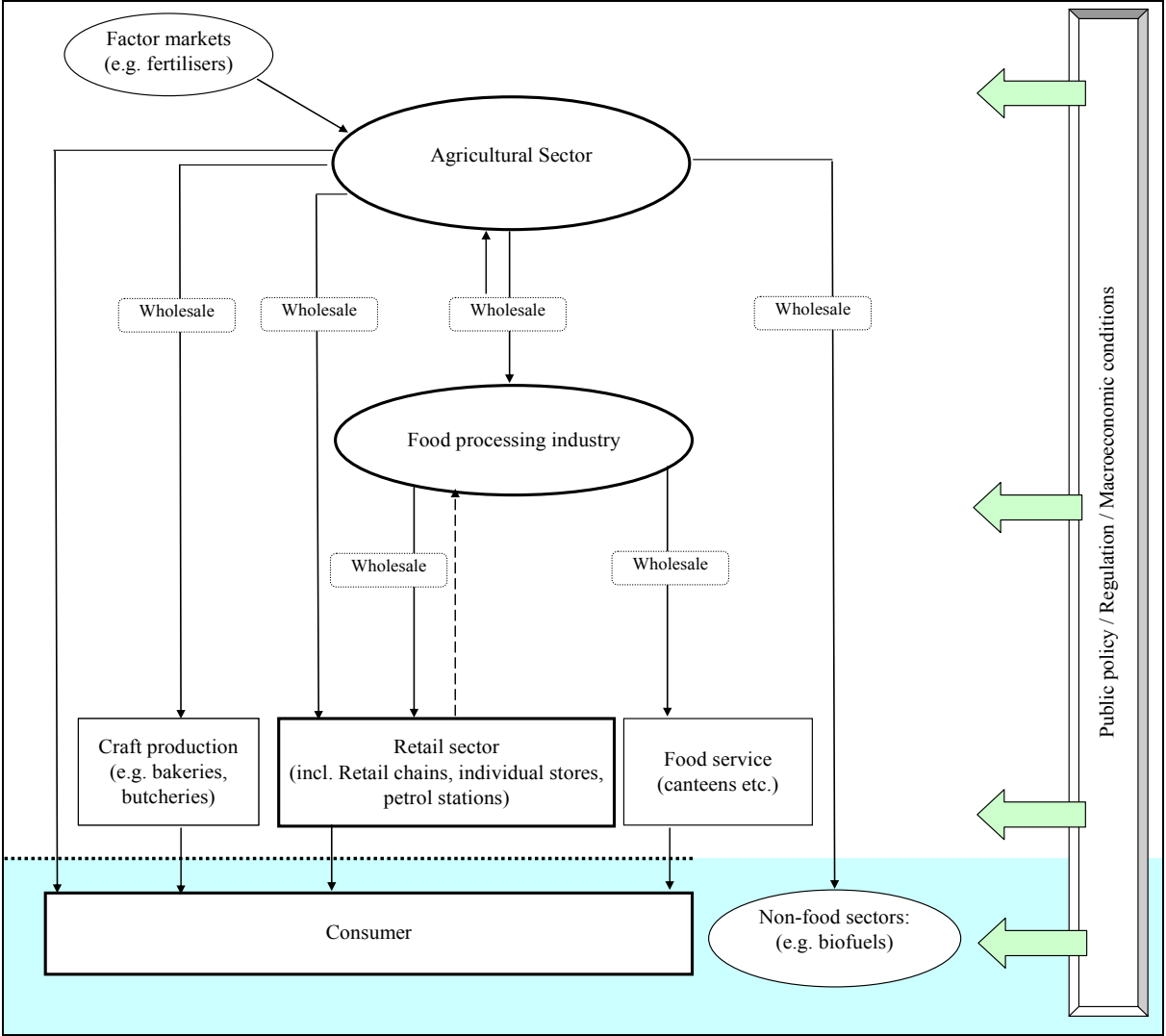
2.   ECONOMIC PERFORMANCE OF SECTORS ALONG THE FOOD SUPPLY CHAIN

The sectors belonging to the food supply chain are economically important and have many interactions with other sectors of the economy, either as purchasers or as suppliers of intermediate inputs. This means that the performance of these sectors (in terms of productivity, price, quality, variety etc.) has immediate repercussions elsewhere and in particular for final consumers. The analysis also shows that there is a room for improving the efficiency of the food supply chain.

2.1 Share in EU value added, employment and consumption expenditure

The sectors making up the food supply chain – agriculture, the food processing industry and the food wholesale and retail distribution sectors – jointly account for approximately 6% of EU value added and 12% of EU employment. The size of the food and beverages industry and the wholesale and retail trade sectors (including the distribution of non-food products) is typically larger in new Member States (see Table 1). The value added share of the food and beverage industry is particularly high in Ireland and Lithuania. Amongst EU Member States, the wholesale trade sector has the highest share in value added in the Baltic States, the Netherlands and the Slovak Republic. The value added share of the retail trade sector is largest in Poland, Lithuania and Greece.

The European food and beverage industry employs around 4.5 million persons, accounting for 2.3 % of total EU employment in 2005. The European distribution sectors (including non-food items) employ over 26 million persons or 13% of total EU employment, with the wholesale trade sector accounting for 4.4% and the retail sector representing 8.5% of total employment. More than a third of them (3% of all employees) are active in food retail. The share of employment in the food and beverage industry and of in wholesale trade is higher in the new Member States than in the EU-15.

Table 1   **Sector shares in total valued added and total employment (in %), 2005**

	Sector share in total value added				Sector share in total employment				
	Agriculture	Food and beverages	Wholesale trade*	Retail trade*	Agriculture	Food and beverages	Wholesale trade*	Retail trade*	Total Food Retail
Austria	1,1%	1,8%	6,5%	4,4%	11,1%	1,9%	5,0%	7,6%	2,6%
Belgium	0,9%	2,2%	7,1%	4,2%	1,9%	2,2%	5,2%	7,3%	2,9%
Bulgaria	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cyprus	3,5%	2,7%	5,3%	5,6%	7,1%	3,7%	6,6%	8,5%	2,4%
Czech Republic	2,3%	2,7%	6,9%	4,4%	3,1%	2,8%	4,8%	7,6%	2,9%
Denmark	1,2%	2,1%	6,7%	3,6%	2,7%	2,5%	6,2%	7,4%	2,8%
Estonia	2,1%	2,6%	7,9%	5,2%	3,3%	3,6%	5,6%	5,9%	3,2%
Finland	1,1%	1,7%	5,3%	3,5%	4,1%	1,6%	4,2%	6,5%	2,2%
France	2,0%	1,9%	4,6%	4,3%	3,3%	2,2%	4,1%	7,4%	2,8%
Germany	0,8%	1,7%	4,4%	4,1%	2,1%	2,4%	4,1%	8,7%	2,2%
Greece	4,8%	2,3%	3,7%	7,3%	11,8%	2,9%	2,6%	10,5%	4,1%
Hungary	4,2%	2,5%	4,8%	4,8%	4,4%	3,5%	2,4%	10,5%	3,6%
Ireland	2,5%	4,1%	4,4%	4,4%	5,4%	2,8%	3,5%	7,8%	4,1%
Italy	2,1%	1,8%	5,5%	4,4%	3,8%	1,9%	4,7%	7,5%	2,6%
Latvia	2,4%	2,7%	12,4%	5,4%	4,9%	3,3%	5,1%	9,6%	4,2%
Lithuania	5,1%	3,6%	7,6%	7,4%	10,0%	3,4%	6,5%	6,8%	3,8%
Luxembourg	0,4%	0,9%	4,7%	3,2%	1,3%	1,4%	4,9%	6,2%	1,6%
Malta	2,1%	2,4%	6,2%	4,7%	2,3%	2,6%	6,2%	7,2%	0,0%
Netherlands	2,1%	2,1%	7,8%	3,3%	3,2%	1,6%	5,8%	9,0%	3,2%
Poland	4,2%	2,8%	7,4%	7,8%	18,6%	3,5%	5,2%	8,3%	3,9%
Portugal	2,1%	2,3%	5,6%	4,6%	11,2%	2,2%	6,1%	8,3%	2,8%
Romania	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Slovak Republic	3,1%	2,2%	7,7%	6,5%	3,2%	2,3%	7,4%	9,1%	1,2%
Slovenia	2,3%	1,9%	5,4%	4,7%	9,9%	2,3%	4,8%	5,8%	2,8%
Spain	2,9%	2,0%	4,4%	4,7%	4,7%	2,4%	3,5%	8,9%	3,4%
Sweden	0,5%	1,5%	5,9%	3,7%	1,6%	1,4%	5,0%	5,6%	2,3%
United Kindgom	0,9%	1,9%	4,4%	5,7%	1,3%	1,5%	4,2%	10,5%	4,4%
Euro Area	n.a.	1,9%	5,1%	4,3%	4,1%	2,2%	4,4%	8,2%	2,7%
EU27	1,2%	1,7%	3,8%	4,5%	4,6%	2,3%	4,4%	8,5%	3,2%
NMS	3,1%	2,6%	6,9%	6,3%	11,1%	3,3%	5,0%	8,4%	3,4%

Source: ESTAT (food retail) and EUKLEMS
Note: (*) Wholesale and retail excludes motor vehicles and motorcycles

The economic importance of the food supply chain can also be gauged by the share of its final products – food and beverages – in household expenditure (see Figure 2). On average 16% of EU household spending is devoted to food and beverages. This share typically falls as per capita GDP rises and vice versa. Consequently, the share of food expenditure is typically higher in the new Member States, where in many cases it exceeds 20%.

The food price increases of 2007 and early 2008 reduced household purchasing power in the EU by around one percent[3]. Households in the new Member States were hit especially hard. The decline in purchasing power led to changes in consumer behaviour (e.g. switching to discounters) and sales reductions.

Figure 2: Composition of food consumption basket by Member State, 2008
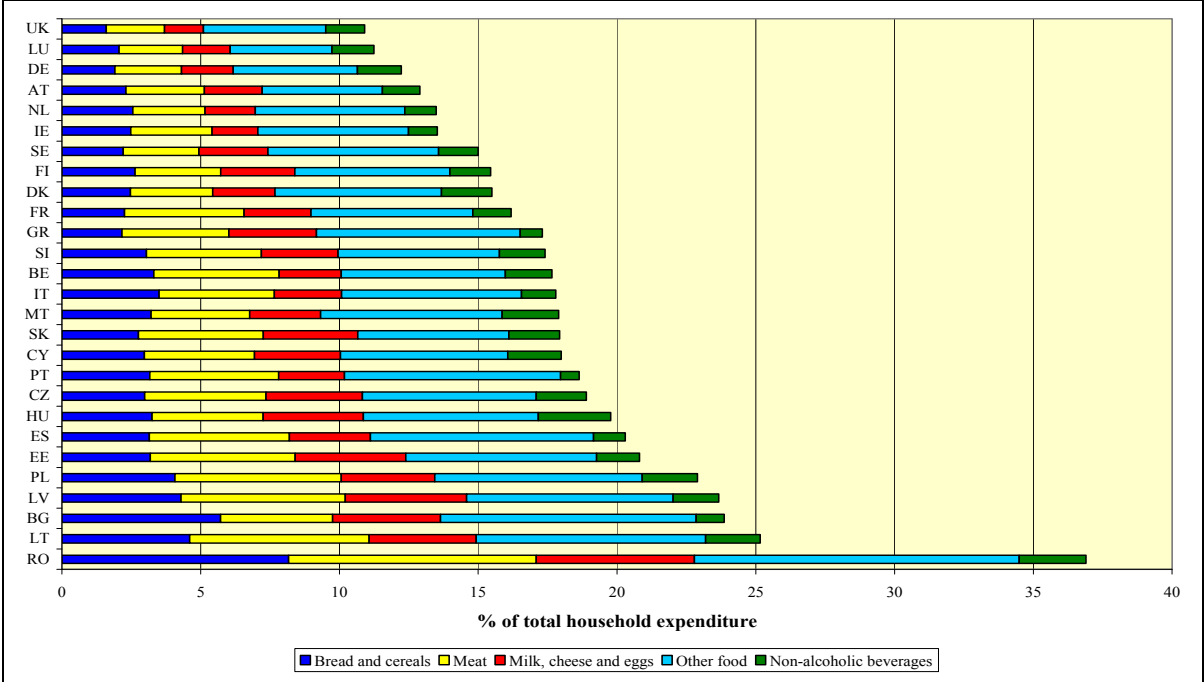
Source: Eurostat (based on HICP weights)

2.2   Productivity

The average annual growth rate of labour productivity in the food processing industry and the wholesale and retail trade sectors over the period 1995-2005 was lower in the EU than in the US (see Figure 3). The EU-US gap is significant in the case of the food-processing (2.1 percentage points) and retail sectors (3.5 percentage points), but relatively narrow in wholesale trading (0.3 percentage points). Such differences could indicate that there is room for further improvement in the efficiency along the food supply chain.

In the food and beverages industry, the labour productivity growth over the period 1995-2005 has been particularly slow (or even negative) in Cyprus, Denmark, Italy, Luxemburg, Malta and Spain. Among the old Member States, high productivity growth in this sector has been

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[3]   The reduction of household purchasing power is calculated as the percentage point difference between increase of HICP-all food and the rest of HICP items, multiplied by the weight of food in the consumers' consumption basket.

observed in Austria, Finland and Ireland and among the new Member States in Latvia, Lithuania, Poland and the Slovak Republic. In the wholesale and retail trade, the dispersion in the labour productivity performance among the Member States is larger than for the food and beverage industry. The countries having recorded the lowest labour productivity growth rates over that period are Spain (wholesale), Cyprus (retail) and Malta (wholesale and retail). The highest rates in both distribution sectors have been observed in the Czech Republic, Estonia and Lithuania.

The productivity gap with the US in the retail sector[4] has been associated with a lower use of information and communication technologies (ICT) and the continued market fragmentation in the EU. It is plausible that different degrees of ICT adoption contribute to explaining cross-country productivity gaps in the EU as well. Other possible causes of the productivity differentials observed across countries include differences in the intensity of competition, in the regulatory framework and in labour market policies. Labour productivity growth in the three sectors considered here has generally been higher in the new Member States. To a large extent this reflects catching-up effects and lower initial productivity levels.

Figure 3:   Labour productivity growth in the EU food and beverages industries, wholesale and retail trade, 1995-2005
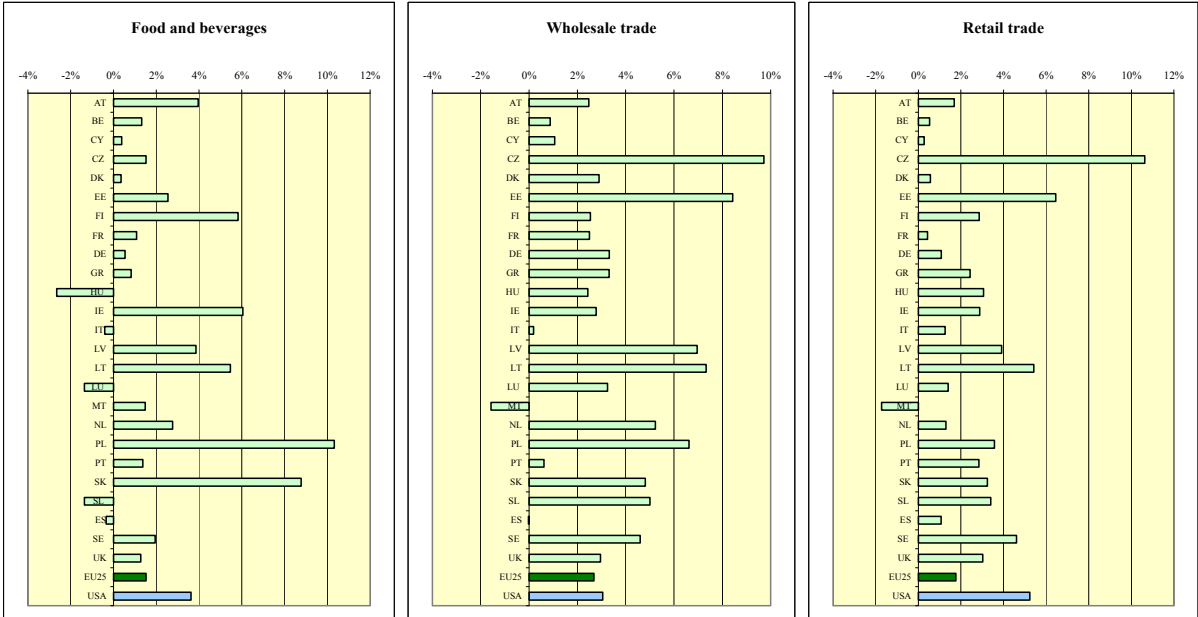
Source: Own calculations based on EUKLEMS

3.   DETERMINANTS OF CONSUMER FOOD PRICE DEVELOPMENTS IN THE EU

This section presents and discusses the results of an empirical analysis of the determinants of consumer food price developments in the EU. It starts by presenting recent developments in food prices. Thereafter, it investigates the price transmission mechanism along the food supply chain (from agricultural commodity prices and producer food prices to consumer food prices). While global and supply developments have been one of the main determinants of the

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[4]   It should be noted that these indicators apply to the retail and wholesale sectors as a whole, and may not fully reflect developments in the distribution of food.

rapid increase in food prices[5], problems in the functioning of the food supply chain, may have played a role as well.

3.1   Recent developments in food prices

In the second half of 2007, price increases of many agricultural commodities accelerated rapidly and reached exceptional levels by the end of the year. The agricultural commodity price surge generated a rapid increase in producer and consumer food prices within the EU (see Figure 4).

Figure 4:   Consumer, producer and raw material food price increases in the EU over the period 2002:1-2008:8 (y-o-y growth rates)
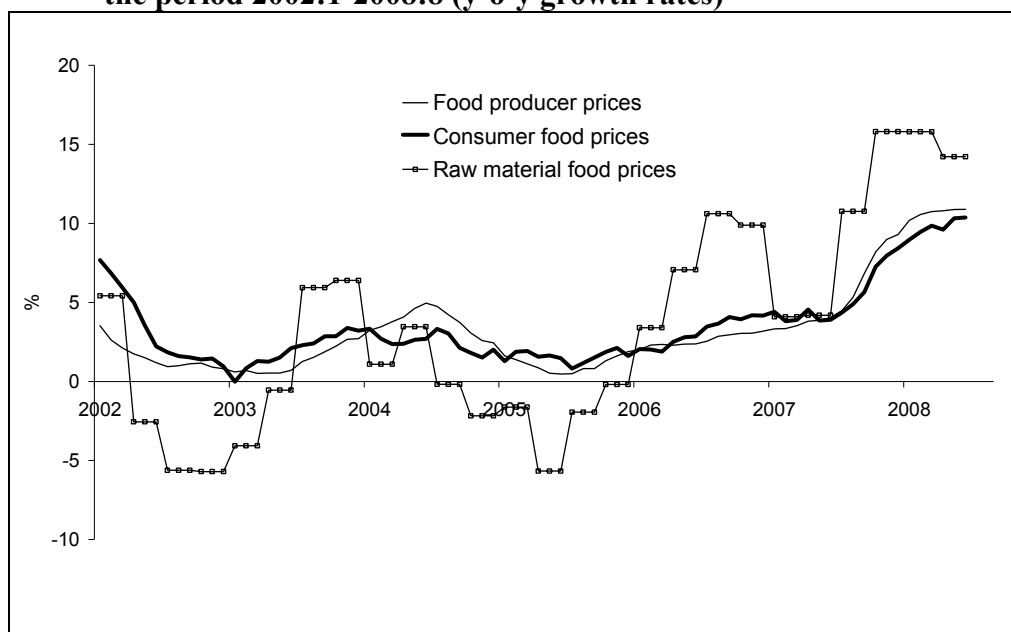
Source: Own calculations based on ESTAT.

Member States have reacted very differently to the strong increase in agricultural commodity prices. In particular, the largest food price increases have occurred in the new Member States (see Figure 5). In Bulgaria, Latvia and Lithuania price levels increased by more than 15% between July 2007 and August 2008. Among the old Member States, consumer prices rose by more than 6% over this period in Austria, Denmark, Ireland and the UK.

The relatively large increases in price levels in the new Member States may be explained not only by the generally higher levels of wage and price inflation in these countries, but also by the fact that agricultural commodities take up a greater share of the production costs of food items (see Section 3.2). Consumer food prices in new Member States could therefore be expected to be more sensitive to increases in the prices of agricultural commodities. Moreover, the weight of food in household consumption baskets is typically higher in new Member State and therefore, the contribution of food inflation to overall inflation is also higher in these countries. Prices and price changes may also be affected by the functioning of downstream market conditions in these countries. Currency appreciation, on the contrary,

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[5]   See European Commission (2008a and b).

appears to have had a dampening effect on food price inflation in countries such as the Czech Republic, Poland, Romania and Slovakia.

After having reached its peak in May-June 2008, consumer food price inflation has been on a decreasing trend in all Member States with the exception of Slovenia. This decrease in consumer price inflation followed the declines in producer and agricultural price inflation. Differences between Member States in terms of the transmission of downwards price movements can also be observed. While in some countries consumer food prices appear to have adjusted downward rather quickly following the decline in agricultural price levels, in others, consumer prices have reacted more slowly (see Section 3.3 (iii)).

Figure 5: **Consumer and producer food price changes 2007:7 - 2008:8 (average annual growth rate)**
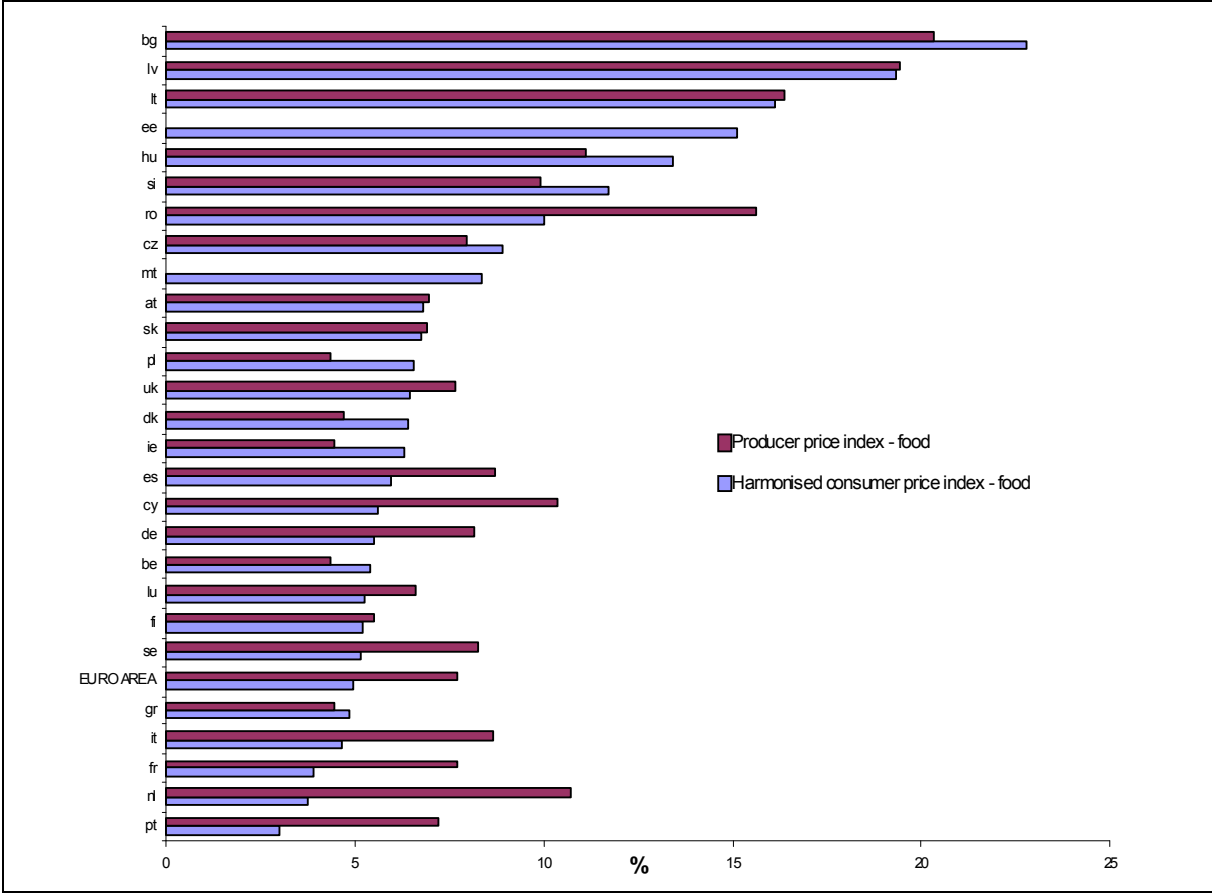
Source: Eurostat

3.2 Production costs and producer prices in the food processing industry

This section aims to assess whether the observed changes in producer prices, i.e. the prices that the industry charges to wholesalers and retailers, reflect changes in the production costs in the food and beverages industry. As no direct information on production costs is available, price changes of the main inputs categories (i.e. compensation of employees, agricultural inputs, energy and transport, inputs coming from food processing industry itself, as well as other intermediary products) are summarised using input-output tables in a weighted cost index for the food and beverage industry of individual Member States. The changes in this

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calculated cost index are then compared to the observed changes in the producer price index for the food and beverage industry.

As the cost structure of the food and beverages industry[6] differs quite substantially between Member States (see Figure 6), the impact of a change in input prices will be different as well. Factors that play a role include the degree of technological advancement of a country and the composition of its food industry. In the new Member States, the input share of the agricultural sector and the food process industry itself tends to be higher, while in the old Member States the share of business services (including advertising) and compensation of employees is relatively large.

Figure 6:   Cost structure of the food and beverage industry by Member States
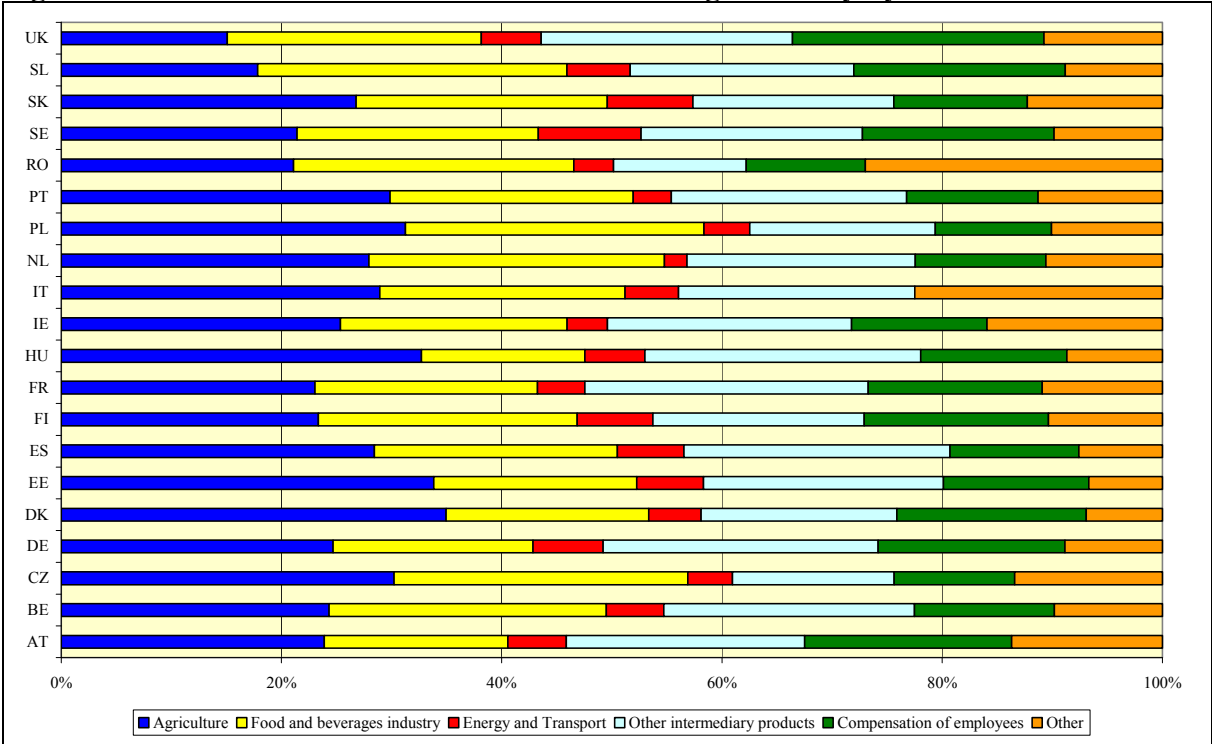
Source: own calculation and sub-aggregations based on ESTAT. Only Member States included where Input/Output tables for 2003 or after are available.

Figure 7 compares the evolution of changes in the calculated cost index with changes in the observed producer price index over the period 2005-2008 in the larger EU Member States. In all countries, the rise in input costs was relatively moderate early on but rose to higher levels later within this period before slowing down most recently, suggesting that the order of magnitude of observed price changes is to a large extent justified by changes in the underlying input costs. However, there seem to be differences between countries, which are more apparent in the recent period. While in the UK and, to a lesser extent, in the case of France and Poland, changes in producers prices seem to track changes in input prices, albeit with a small time lag, in the other large EU Member States, such as Germany, Italy and Spain, this seems to be much less the case.

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6   Due to data limitations the analysis has been carried out at the level of the food and beverages industry as a whole.

Figure 7:   Comparison between changes in the food and beverages producer price index and the production cost index
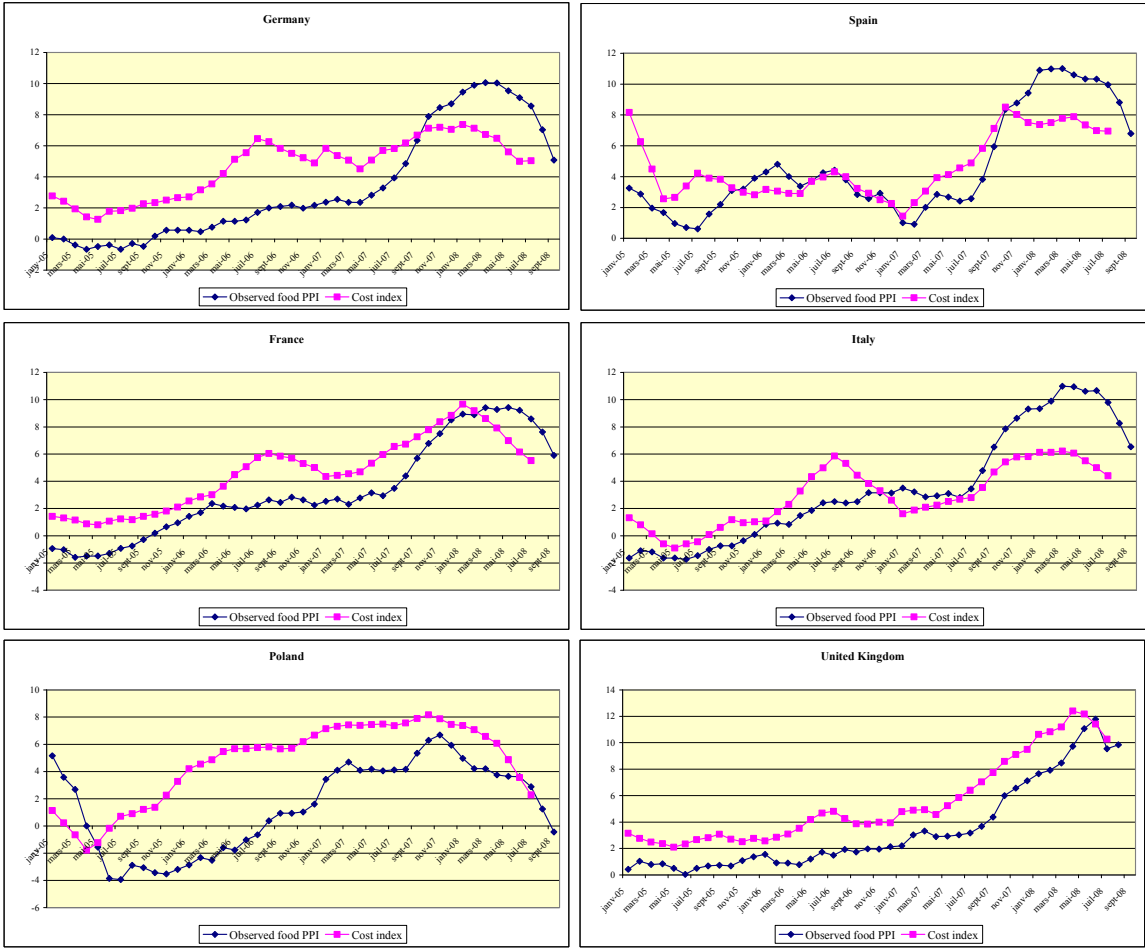
Source: Own calculations based on ESTAT data

3.3   The pass-through along the food supply chain

This section aims to assess whether there are differences regarding the magnitude, speed and nature of the pass through of agricultural commodity prices into producer and consumer prices (see Box 1 for a definition of these concepts) along the food supply chain.

Box 1: Magnitude, speed and nature of pass through

Price transmission along the food chain has attracted considerable interest in the economic literature. During recent years the number of studies on the subject has grown rapidly. However, given the recent changes in the structure of food markets and evolving business practices, new questions are still emerging.

Vertical price transmission may be characterised by the magnitude, speed and nature (downwards or upwards) of the price pass-through between different segments of the supply chain. The magnitude of the pass-through measures how much of the initial price change is reflected in the changes in consumer prices observed. The shorter the lag with which consumer prices follow commodity and producer prices, respectively, the higher the speed of pass-through. Finally, if the speed and the magnitude of the pass-trough differ depending on whether there is a price decrease or increase, price transmission is considered to be asymmetric. In order to raise their profit margins, actors along the food supply chain would have an interest in passing on price increases more rapidly than price decreases. As a result the measured pass-through would be higher in the case of price increases than in the case of price decreases.

The magnitude of the pass-through has typically been the focus of attention in the economic literature investigating the price transmission along the food supply chain. In more recent work, the issue of asymmetric price transmission has attracted an increasing interest (see Vavra and Goodwin (2005)). The magnitude, the speed and the degree of asymmetry in the pass-through are influenced, among others, by cost structures and market conditions (see Zachariasse and Bunte (2003) and Azzam (1999)). In particular, Röller *et al.* (2006) suggest a link between pass-through and the degree of market power held by firms, making reference to the finding by Feenstra *et al.* of a U-shaped relationship between market share and magnitude of the pass-through.

(i)   The pass-through from agricultural commodity prices to producer prices

This section investigates the extent to which agricultural price increases have been passed through to producer prices. This analysis is based on a simple OLS regression[7]. The estimated elasticity of producer prices to agricultural commodity prices ranges between 1% for Portugal and 22% for Poland (see Figure 8). This suggests that agricultural commodity price increases/decreases tend to be transmitted to producer prices at a rate that varies across countries. The low rate of pass-through in Portugal and Spain could indicate that the increases/decreases in agricultural commodity prices tend to be absorbed by the food producer sector through a reduction of profit margins, whereas the opposite might be true in the case of Poland. However, the relatively high rate of pass-through in Poland could also be explained by macroeconomic factors (see Section 3.1). Nevertheless, this analysis provides a first indication that upstream factors can help explain why consumer food prices in different EU Member States have reacted very differently to the agricultural price shocks encountered in 2007 and 2008.

Figure 8:   Elasticity of producer prices to agricultural commodity prices (OLS estimates)

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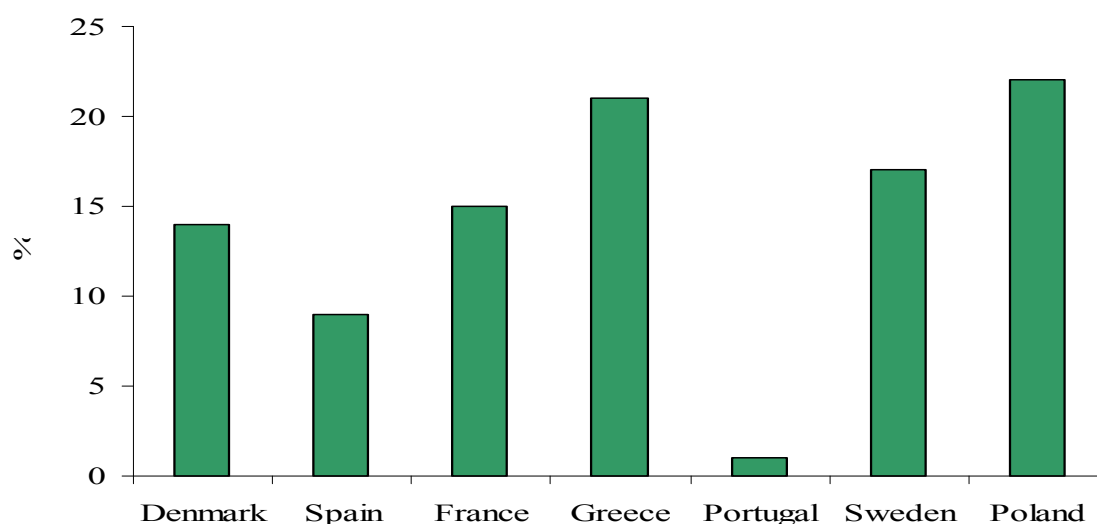
[7]   Given the limited availability of quarterly data series for aggregated agricultural commodity prices, the econometric analysis was only carried out for the countries, where the starting date of the time series available was 2001 or earlier. In order to apply an error correction mechanism, the non-stationarity of price series was examined using the ADF test. It was found that the available series (for Denmark, Spain, France, Greece, Italy, Poland, Portugal and Sweden) are non-stationary. The existence of the co-integration relationship between agricultural commodity prices and producer prices was confirmed only for Spain and Poland. Therefore, the model containing an error correction mechanism would only be applicable to these countries. In light of these results, the pass-through estimates presented here are based on a simple OLS regression.

(ii)   The pass-through from producer to consumer prices

This section considers the transmission from producer to consumer prices. In most of the euro area countries producer food prices started to rise faster than consumer food prices from mid 2007 onwards, whereas the opposite had been true in the period from 2002 to mid-2007 (see Figures 9 and 10). This could suggest that the more recent producer price increases were not fully transmitted to consumer food prices and that they were partially absorbed by the food retail sector through a reduction of profit margins. This hypothesis is confirmed by preliminary data for 2007 showing a decrease in profit margins in the euro area retail sector[8]. In most of the new Member States, on the contrary, the increase in consumer food prices over the period July 2007 – July 2008 exceeded the producer price increases observed during that same period, which could be indicative of increased margins in food retailing.

Figure 9:   Percentage point difference between inflation of consumer and producer prices (January 2002-June 2007)

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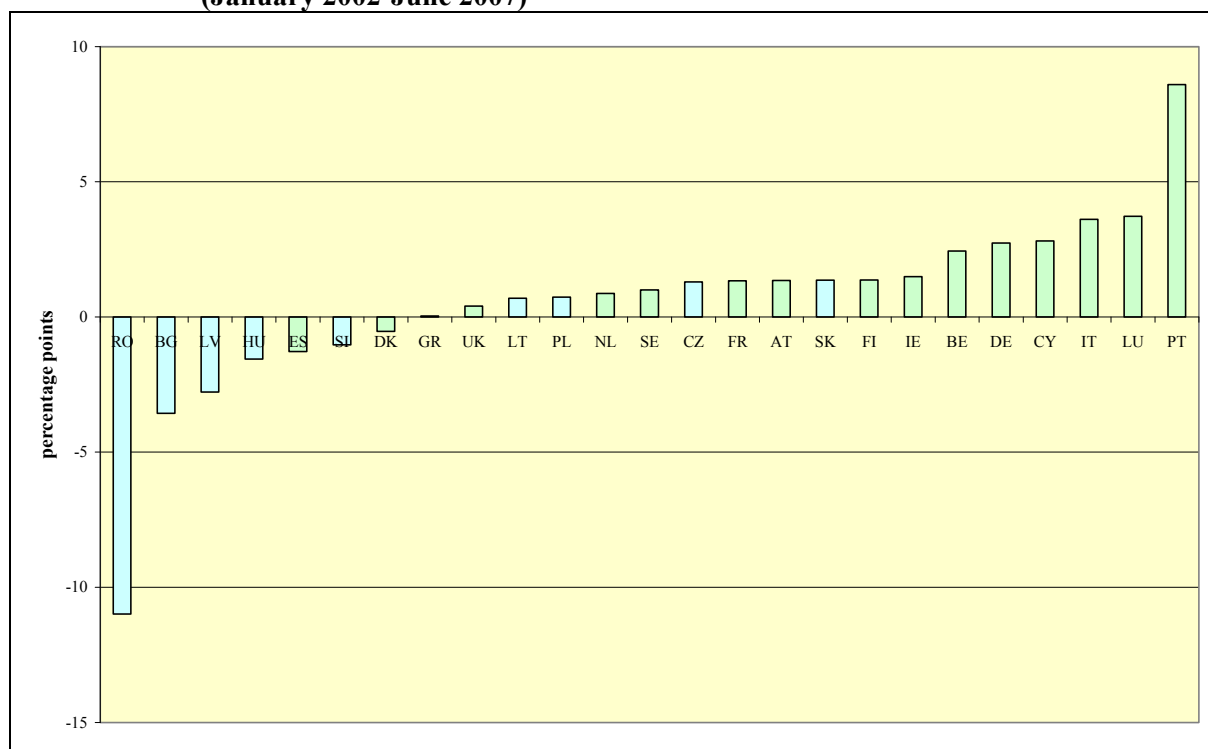
8   Profit margins were calculated as the ratio of earnings (before interest and taxes) and operating revenue (Amadeus database).

Figure 10:   Percentage point difference between inflation of consumer and producer prices (July 2007-July 2008)
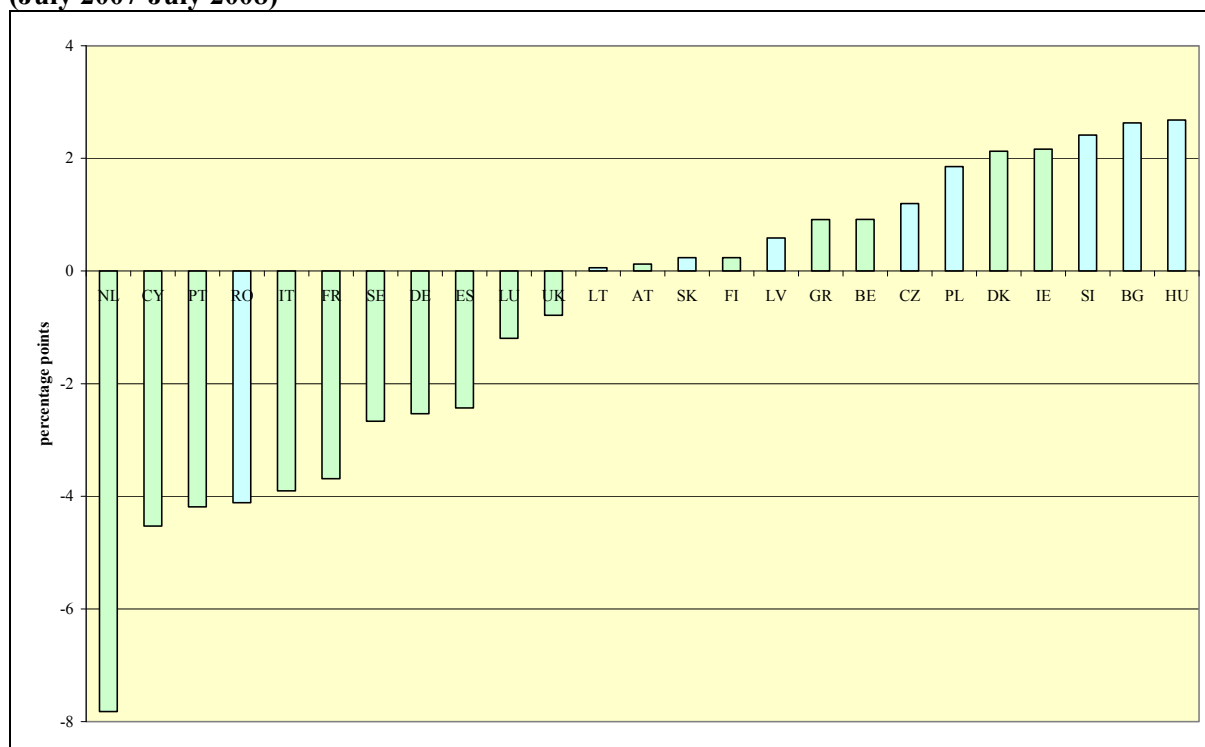
A further investigation of the link between consumer and producer food prices reveals differences in terms of the magnitude and speed of the pass-through across the EU countries. Two methods have been used to investigate this link: an error correction model (see Box 2) and a simple OLS regression. Both methods give converging results, as shown by Figure 11.

Box 2: The error correction model

The empirical analysis is conducted in three main steps:
- First, the non-stationarity of all price series was examined using the augmented Dickey-Fuller test (ADF). It was found that all the series in logarithm were non-stationary.
- Second, the existence of a cointegration relationship between consumer food prices and producer prices was established by applying the standard Engel-Granger two-step procedure.
- Finally, the model containing an error correction mechanism was estimated for two groups of countries, namely the new EU Member States and the euro area countries. In addition, this model was estimated separately for Denmark, Romania, Sweden and the UK, due to the heterogeneity of theses countries compared to the countries in the two above mentioned groups. We consider Romania separately, as the observed percentage point difference between inflation of consumer and producer prices was negative in Romania, whereas it was positive in the other new EU Member States. Moreover, consumer food price increases were lower in Romania compared to the other new EU member States. Denmark, Sweden and the UK are not euro area countries and they have experienced on average higher consumer food price increases than the euro area. Thus, the model was estimated separately for these countries.

The key feature of the chosen error correction model is that it postulates an underlying long-run equilibrium relationship between the food producer and consumer prices. This long-run equilibrium corresponds to a situation whereby consumer prices will remain unchanged if there is no change in producer prices.

The estimated error correction model is specified as:

$$\Delta f_t = \alpha + \sum_{k=1}^{p} \beta_k \Delta f_{t-k} + \sum_{k=1}^{p} \varphi_k \Delta p_{t-k} + \delta(f_{t-1} - \theta p_{t-1}) + \varepsilon_t$$

where f_t denotes the monthly index (log) of the consumer food prices; p_t is the monthly index of producer food prices, and ε_t is an error term.

In this equation, the variation in consumer food prices depends on their past rates of variation, the past rates of producer price variations as well as deviations from the long-run equilibrium. The coefficients β and φ measure the short-run pass-through (i.e. the impact of consumer and producer prices respectively). The term $(f_{t-1} - \theta p_{t-1})$ represents the long-run equilibrium relationship between consumer and producer prices.

The coefficient θ is the long-run elasticity of food consumer prices to food producer prices (i.e. how much the change in the producer price is passed on to the final consumer). For example a value of 0.6 for θ means that 60% of the producer price change is passed on to the final consumer or in other words that a 10% increase in producer prices eventually leads to a 6% rise in the consumer prices. The coefficient δ is the long-run adjustment parameter and represents the speed of adjustment to the long-run equilibrium. It shows how rapidly consumer food prices approach the long-run equilibrium after a deviation from this equilibrium. For example, a value of 0.1 implies that the deviation from the long-run equilibrium is reduced by 10% per month.

Finally, the robustness of the results obtained with the error correction model is tested by comparing these results with those obtained with simple OLS regressions carried out for individual countries. In these equations, consumer food price variations are regressed against lagged values of the dependent variables (and seasonal dummies) and of the producer food prices:

$$\Delta f_t = \alpha + \beta_k \Delta f_{t-1} + \varphi_k \Delta p_{t-k} + \varepsilon_t$$

where Δf_t corresponds to the monthly growth rates of the consumer food prices, Δp_t are the annual growth rates of the producer food prices, and ε_t is an error term.

Figure 11 shows the estimated elasticities of consumer prices to producer prices resulting from the application of the error correction model and the simple OLS regression, respectively. The results obtained with the error correction model reveal that the estimated long-run elasticity ranges between 10% and 30% for the group of countries examined. The lowest long-run elasticity is found for Romania and the euro area and the highest for the new Member States and Sweden. The estimates obtained by the OLS method confirm these results. This suggests that changes in consumer prices resulting from movements in producer prices vary across countries. The low pass-through in Romania and the euro area is an indication that the observed changes in producer prices are absorbed to some extent by a reduction in profit margins in the food retail sector. These results seem to be broadly in line with the hypothesis of U-shaped curve relationship between the degree of market power and the size of the pass-through, since the market power of retailers in the euro area appears to be neither particularly high nor especially low (see Section 4.2). On the contrary, the high rate of pass-through in the new Member States and Sweden is a sign that changes in producer prices are rather more fully transmitted to consumer prices.

Finally, the magnitude of the pass-through from producer to consumer prices appears to be higher than the pass through from agricultural commodity prices to producer prices. A

possible explanation for this observation could be that agricultural commodities represent only a small share of the total food production costs (see Figure 6).

Figure 11:   Elasticity of consumer food prices to producer food prices
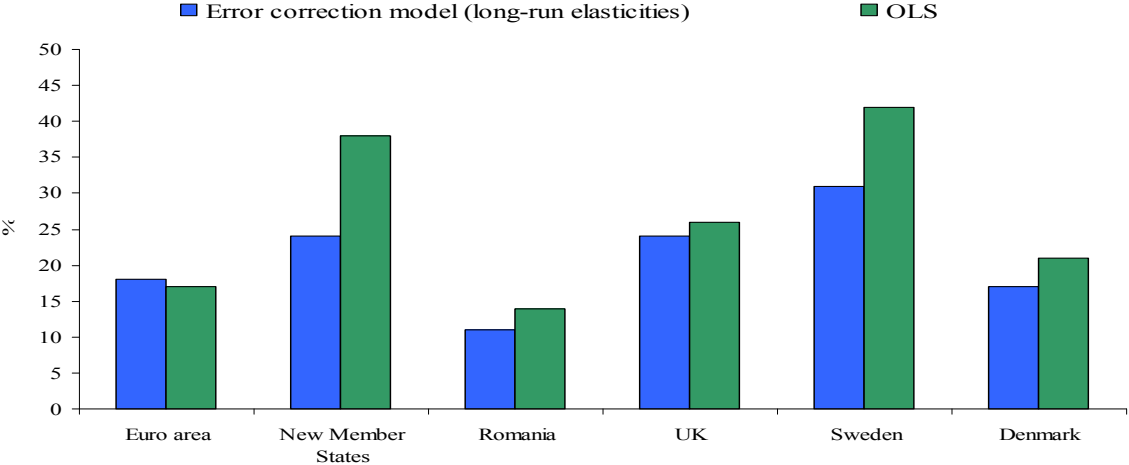
Turning to the speed of adjustment, Figure 12 shows by how much the deviation from the equilibrium level is reduced after one month. The larger the reduction the faster the consumer food prices approach their long-run equilibrium level. The results indicate that, on average, the deviation from the equilibrium level is reduced by 21% per month for consumer prices in the euro area. Prices appear to adjust somewhat faster in the new Member States, with an average reduction of 27% per month. More rapid adjustment is estimated for the UK and Sweden. These results show that the speed of adjustment varies across countries.

Figure 12:   Speed of adjustment to long-run equilibrium for consumer and producer food prices

However, several caveats should be kept in mind when comparing the size and the speed of the pass-through in the new Member States and in the euro area. There are a number of factors which may explain higher pass-through in the new Member States compared to old Member States. First, in the new Member States with the lowest price levels, the contribution of (unprocessed) food to the (final) retail price tends to be greater. Second, increases in indirect taxes during the period under investigation contributed to the relatively higher consumer food price increases in most of the new Member States. Third, energy price increases were stronger in most new Member states. Fourth, price arbitrage within the EU may have taken place and exerted upward pressures on food prices in the Member States with the lowest price levels. Finally, the increases in food prices may simply reflect the catching up process in the new Member States with the remainder of the European Union. Such a process may be reflected in changes in the retail market structure and increases in wage levels. Issues related to changes in market structure are analysed in more detail in Section 4.

(iii)   The asymmetry in the transmission of producer prices to consumer prices

For the euro area, the magnitude of the transmission is similar in the case of a price increase and a price decrease. Moreover, price decreases are transmitted quite rapidly. Thus, the results seem to indicate that downward price stickiness is not an issue in the euro area. In the new Member States, on the other hand, there appears to be some evidence of downward price stickiness, as the magnitude of the pass-through of producer prices to consumer prices is larger when prices go up. The observed elasticity in case of price increases is even larger than one, which would seem to suggest that margins increase in this case. On the other hand, when producer prices decrease, the estimated elasticity is less than one and there are lags (see Box 3). This would lead one to conclude that there is an asymmetry in the transmission of producer to consumer prices in the new Member States. While it is difficult to generalise and these results should be interpreted with care, they suggest that the retail markets in the euro area are relatively competitive whereas this seems to be less the case for new Member States.

Box 3: The analysis of the asymmetric price transmission from producer to consumer food prices

The analysis of the asymmetric price transmission from producer to consumer food prices is based on the following simple OLS regression:

$$\Delta CP_t = \alpha + \beta \Delta P_t + \varepsilon_t$$

with

$$\beta = \begin{cases} \beta^+ & if & \Delta P_t \geq 0 \\ \beta^- & if & \Delta P_t < 0 \end{cases}$$

where ΔCP is a change of the consumer food prices, ΔP_t is a change of the producer prices[9] and ε is an error term.

The reaction of the consumer prices is symmetric to increases and decreases in P if $\Delta \beta = \beta^+ - \beta^- \approx 0$.

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[9]   Given that we observe very few ΔP_t with negative value, we define ΔP_t as second order differences or $\Delta P_t = \Delta P_{t-1} - \Delta P_t$.

The estimates of β (and hence of Δβ) may be biased if the entire reaction of consumer food prices to changes in producer prices is delayed. In order to account for this possibility a regression with three lags is estimated:

$$\Delta CP_t = \alpha + \beta_1 \Delta P_{t-1} + \beta_2 \Delta P_{t-2} + \beta_3 \Delta P_{t-3} + \varepsilon_t$$

with

$$\beta_i = \begin{cases} \beta_i^+ & if \quad \Delta P_{t-i} \geq 0 \\ \beta_i^- & if \quad \Delta P_{t-i} < 0 \end{cases}$$

for i=1, 2, .., 6.

According to the Wald test, the difference between the coefficients β⁺=1.08 (instant reaction) and β⁻=0.85 (3 lags) is significant at 1% test level in the case of the new Member States. Thus, the results show that the magnitude of the pass-through of producer prices to consumer prices is relatively large in most of the new Member States when prices go up. In fact, in this case, the elasticity is larger than one suggesting that margins increase. Interestingly, when producer prices decrease, the estimated elasticity is less than one and there are lags. In the euro area, on the contrary, the combination of the coefficients β⁺=0.48 (1 lag) and β⁺=0.47 (3 lags) does not differ significantly from the β⁻=0.95 (instant reaction). This is an indication that within the euro area the transmission mechanism of producer prices to consumer prices is symmetric.

Table 2: Price stickiness: Transmission of producer price decreases and increases into consumer prices in the new Member States

Dependent Variable:		Consumer food prices increases			
Estimation sample		2005 January - 2008 August			
Explanatory variables		producer price decreases (-3 lag)	producer price increases (instant reaction)	R-squared	Adjusted R-squared
	Coefficient	0,85**	1,08***	0,53	0,50
	Std. Error	0,42	0,18		
	t-Statistic	2,04	5,99		

(***) - indicates significance at 1% test level.

(**) - indicates significance at 5% test level.

(*) - indicates significance at 10% test level.

Table 3: Transmission of producer price decreases and increases into consumer prices in the euro area

Dependent Variable:		Consumer food prices increases				
Estimation sample		2005 January - 2008 August				
Explanatory variables		producer price decreases (instant reaction)	producer price increases (-1 lag)	producer price increases (-3 lag)	R-squared	Adjusted R-squared
	Coefficient	0,95***	0,48***	0,47***	0,40	0,36
	Std. Error	0,29	0,18	0,18		
	t-Statistic	3,31	2,65	2,59		

(***) - indicates significance at 1% test level.
(**) - indicates significance at 5% test level.
(*) - indicates significance at 10% test level.

4. THE STRUCTURE OF MARKETS ALONG THE FOOD SUPPLY CHAIN

The observed differences in food price developments across countries may be due partly to differences in the conditions of competition in national markets. The more intense the level of competition, the lower price levels are likely to be, as firms face competitive constraints that compel them to lower their costs and bring prices down. The effect of competition on price

changes resulting from increasing input costs is more difficult to assess as, on the one hand, firms operating at low margins in competitive markets will be forced to increase output prices and, on the other hand, firms in less competitive markets may use the occasion to exploit their market power and raise output prices as well.

This section discusses two specific characteristics of the food processing industry and the food retail sector which may have an impact on the conditions of competition and more generally on the functioning of the food supply chain. The first is that the EU food supply chain is relatively fragmented between Member States. The second is that some parts of the food processing industry and the food retail sector exhibit a relatively high degree of concentration. Moreover, a consolidation is taking place throughout the food supply chain. This consolidation can have an impact on the existing balance between the bargaining power of food producers and retailers.

4.1   Fragmentation of the food supply chain

As shown in the previous section, the shock caused by the recent upsurge in agricultural commodity prices has been absorbed differently across Member States. In particular, the analysis has shown that the food price increases have been stronger in most of the new Member States than in euro area countries. While some of these differences in national consumer food price increases can be explained by macro-economic factors or differences in cost structures, they are also an indication that the EU single market in food remains fragmented.

This conclusion is supported by other evidence as well (see European Commission, 2009). The import penetration rate in the food and beverage industry (0.28) is well below the EU average for manufacturing (0.63). Moreover, the share of cross-border M&A deals in the total number of deals (0.25) is lower than the average for manufacturing industries (0.29). This indicates that there are still barriers to trade and cross-border investment in this sector, particularly for SMEs. The relatively high degree of dispersion[10] between food prices in different EU Member States is another indication of the fragmentation of food markets, which may be explained on the one hand by the diversity in national preferences of European consumers and on the other hand by cross-country differences in the regulatory environment and the behaviour of food processors.

For wholesale and retail trade, the only available indicator of market integration is the share of cross-border mergers. This indicator is below the EU average of services for the retail trade but not for the wholesale trade. Different factors may help explain the relatively low amount of cross-border investment in retail trade. For example, the high market share of large retailers in some countries makes market entry more risky and reduces the expected return of foreign investment because the national market is already saturated.

Cross-country differences in the regulatory framework and business practices appear to contribute to the fragmentation of the EU single market in food. Addressing these issues, which are examined in more detail in section 5, could contribute to a reduction in the fragmentation of the food supply chain, which in turn could lead to improvements in efficiency through a better exploitation of economies of scale and scope achieved for example

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[10]   The coefficient of price variation between EU Member States in the food and beverages industry (0.33) exceeds the median value for all manufacturing sectors (0.30).

in logistics. Such a development should put a downward pressure on prices, while increasing the variety of products offered to consumers.

4.2   Concentration and consolidation along the food supply chain

Consolidation is taking place throughout the food supply chain. The retail sector in particular is characterised by an increased presence of large food retailers. Within a larger and increasingly integrated European Single Market, consolidation can lead to efficiency gains and put a downward pressure on prices. However, a vigilant competition policy is required to ensure that the beneficial effects of this consolidation process are not outweighed by potentially negative side effects (such as anti-competitive agreements or abuses of dominant positions) which might impede effective competition.

In the food processing sectors, concentration levels vary strongly across food categories and by extension food sub-industries[11]. Table 4 shows that in sectors such as biscuits and confectionery, the concentration ratio is above 60%. In general, the firms that are active in these most concentrated food categories operate at global level and typically offer internationally branded products. A strong brand may serve as a signal of quality, thus helping to secure consumer loyalty. At the same time it may make it harder for potential rivals to compete, dissuading them from entering the market and making it difficult for retailers not to carry the product (the so-called 'must-stock' products)

Table 4 also indicates that food products that are less differentiated such as bread, meat or flour are typically produced by food sub-industries that are less concentrated, including craft production (e.g. bakeries, butcheries). The incidence of private label and no-label products is more widespread in the latter categories. However, the geographic scope of these products is also likely to be narrower.

The EU food retail sector is characterised by a high degree of concentration: in most Member States the five largest retailer chains account for over 50% of the market (see Figure 13). Concentration levels are higher in the old Member States.

A process of consolidation in the food retail sector is on-going across the European territory, but the consolidation movement is particularly strong in the new Member States. In these countries consolidation has gone hand in hand with an increase in food retail surface area, which can be explained both by a larger number of individual stores and an increase in average store size. The increase in the number of outlets appears to have offset to some extent the increase in food prices associated with surge in agricultural commodity prices (see annex 1).

In many of the old Member States, the consolidation movement has been accompanied by a switch from smaller to larger store formats (i.e. hypermarkets, supermarkets and discounters) as well as an overall reduction in the number of stores (see Figure 14). With the exception of Sweden, the total food retail surface area has increased in all countries. Even though higher concentration levels may *prima facie* suggest weaker competition and therefore may lead to

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[11]   Given the large number and the heterogeneity of food products, the food processing industry needs to be analysed more narrowly on the basis of groups of similar products. Table 4 displays the 4-firm concentration ratios (CR4) for 20 food product categories in the EU15, Switzerland and Norway taken together (first column).

higher prices, the larger store formats may lead to increased economies of scale and scope resulting in lower prices. Nevertheless, the presence of more than one retail store in a catchment area is crucial for competition to occur (see Box 4).

Table 4:   **Market share of top four producers (CR4), retailers' private labels, craft production and no-label products in Europe, 2001**

Products	CR4 (%)	Private label (%)	Craft production (%)	No-label products
Chewing-gum	75,8	1,6		
Savoury biscuits	68,5	20,1		
Articifial sweeteners	66,0	12,6		
Soft drinks	64,0	15,7		
Ice cream	58,3	14,7	11,2	
Dairy spreads	56,3	8,8		
Melted cheese	54,3	12,6		
Sweet biscuits	47,9	22,4	0,3	
Sugar	41,7	15,9		
Dry pasta	38,2	23,7	2,4	
Sugar confectionery	35,1	14,7	0,1	0,2
Frozen prepared meat	31,2	19,7	1,1	
Natural cheese	30,1	16,7	1,0	1,8
Delicatessen	26,1	20,4	15,1	13,4
Butter	26,5	21,2	3,1	
Flour	25,6	32,1	9,7	
Beef	19,4	15,2	69,1	
Poultry	18,1	14,8	31,9	
Pork	14,0	10,3	69,6	
Bread	12,1	22,7	53,6	

Notes: Craft production is defined as direct sales from producer to consumer (e.g. bakeries, delicatessen). No-label products are low-cost generic products sold without any branding. Countries covered are the EU15, Switzerland and Norway.
Source: 'Food for Thought' database (2003), reproduced in Palpacuer and Tozanli (2008)

Another trend which may contain retail prices is the increase in the market share of discounters, who typically focus on low prices at the expense of other product dimensions (see Figure 15). The presence of discounters exerts pressure on other retailers to increasingly focus on the price dimension and affects the profitability of other retail formats (see Cleeren *et al.*, 2008). Their growing presence may also have been spurred on by changing household purchasing habits and a higher price sensitivity. Over the period 2002-2007, the share of discounters increased in almost all EU Member States and in particular in some of the new Member States (Slovakia, Romania and the Baltic States). With a market share of over 30%, discounters are by far most successful in Germany and Austria, where they have a long-established presence. In the new Member States, discounters are particularly strong in Poland, Hungary and the Baltic States, where they account for a significant market share (over 20%) and continue to grow at a high rate.
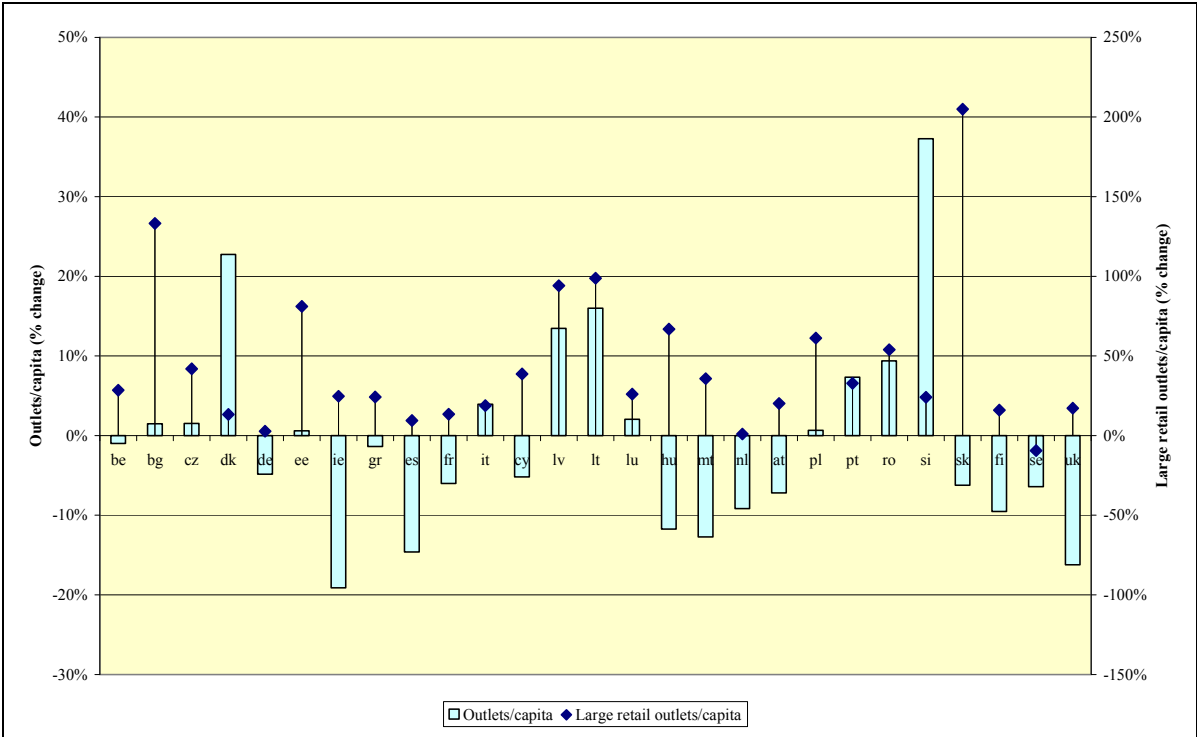
Figure 13:   Combined market share of the five largest retailer chains (2007) and change (2004-2007)
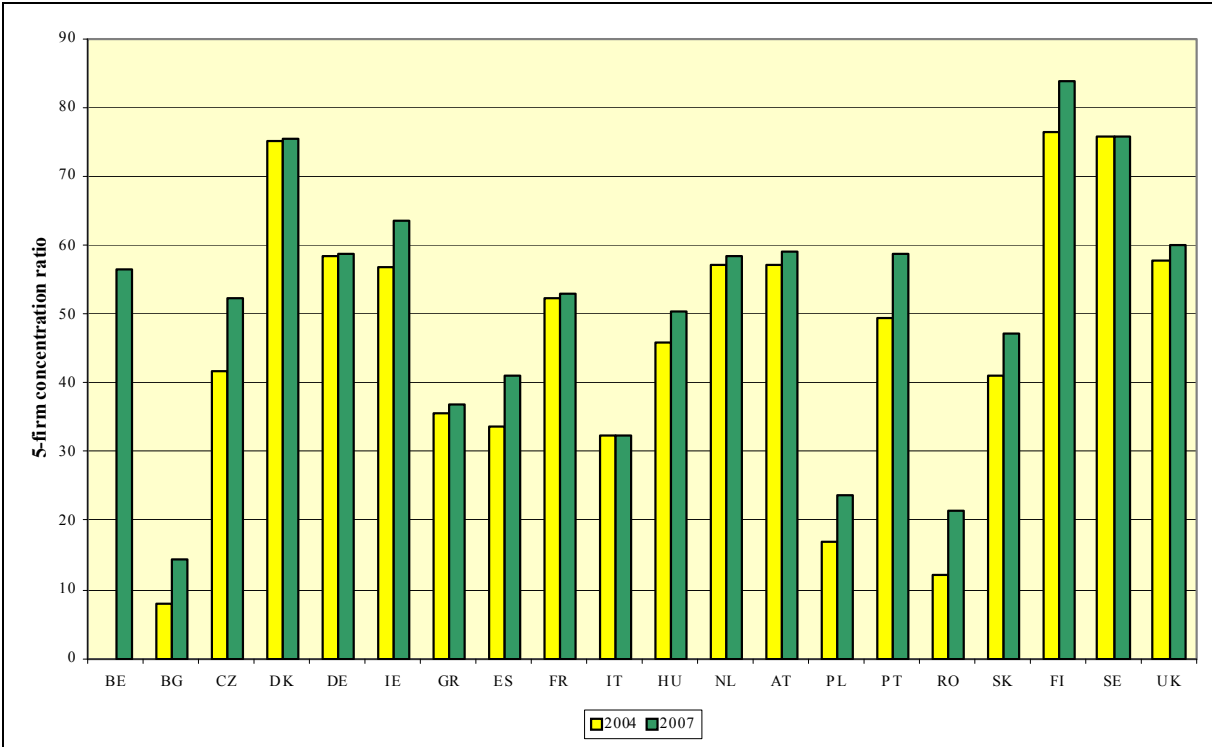
**Figure 14:   Change in number of outlets per capita, 2002-2007**

Box 4: Concentration and competition along the food supply chain

The assessment framework for competition between firms is the relevant market. It is defined according to a product and a geographic dimension at a moment in time. Food retail markets typically involve bundles ("food baskets") sold by individual stores and are local in scope – encompassing a so-called catchment area. In the presence of entry barriers, the competitive constraints faced by a particular retail store thus depend on the presence of other nearby stores. The geographic size of a food retail market also depends on the substitutability of stores from a consumer perspective, which is influenced by the stores' formats and by consumers' valuation of time and travel. Finally, retailer chains themselves act as buyers of food products on a large number of upstream markets. These markets tend to have a much narrower, product-specific, delimitation and are typically much larger in terms of geographic scope – often country-wide or international.

The degree of concentration is only one of the characteristics of the market structure which can affect the level of competition. Other characteristics include elements such as the number of players, the rates of entry/exit, characteristics of the production in terms of differentiation and technological content and the importance of brands. These characteristics should preferably be analysed at the market level. However, for practical reasons, the current analysis of the functioning of the food supply chain has been carried out at the broader industry level of sectors. It may be complemented at a later stage by a deeper analysis at the level of relevant markets.

Consumer behaviour may also affect the degree of competition, particularly in the downstream portion of the food supply chain. Consumer decision-making is based on consumers' characteristics and preferences. The so-called 'retail offers' among which they can choose consist of many dimensions (e.g. quality, range, services, proximity) – the price being just one of them. As a consequence of this, different retailers are likely to focus to a different extent on these respective dimensions. All of these are equally valid dimensions of competition. Even though the focus of this analysis is on prices, it is important to bear in mind that retailers compete on 'retail offers' rather than on product price only. Depending on the heterogeneity of consumers' valuation of the different dimensions and the response of different retailers to this heterogeneity, prices for similar products are likely to vary substantially across retail chains within the same country. A similar argument can be made to help explain the price differentials observed between countries.

Figure 15:   Combined market share of retail discounters, 2002 and 2007
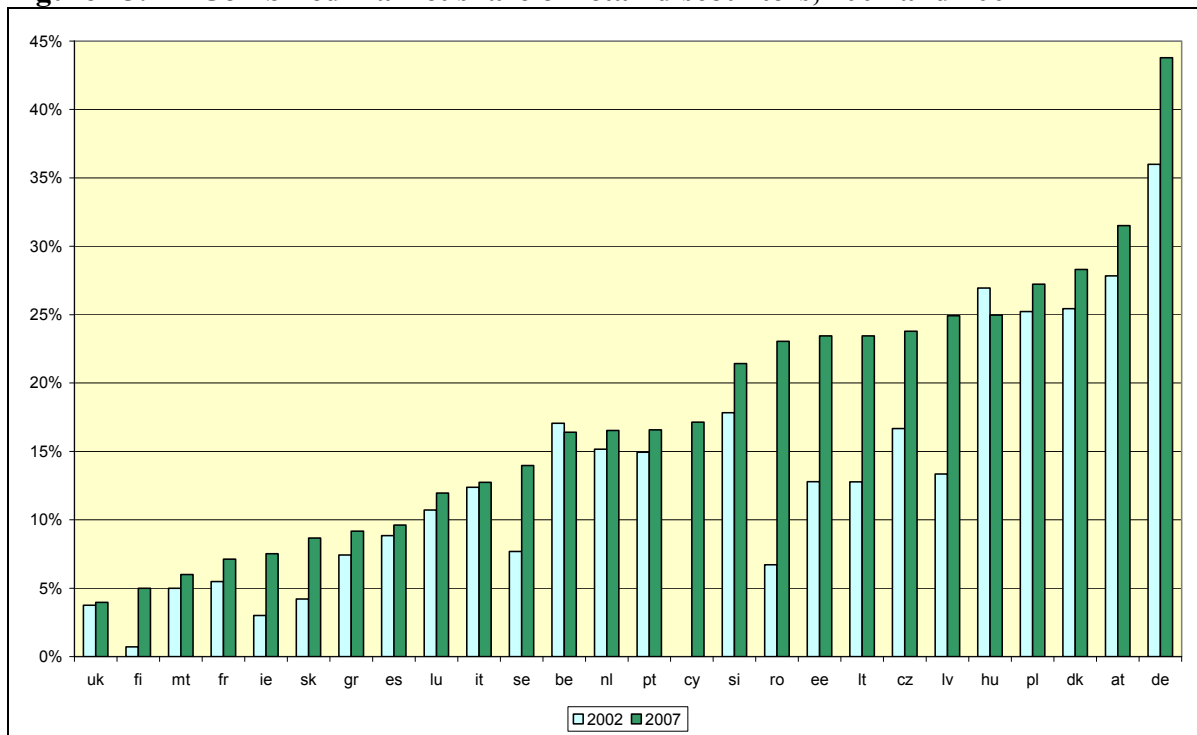
Note: Market share calculated as the share of discounters' turnover in turnover of large retailers (hypermarkets, supermarkets and discounters).
Source: Euromonitor International

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4.3   Bargaining power along the food supply chain

The degree of bargaining power held by the firms in vertically-related markets varies by product category and can potentially lead to imbalances in the food supply chain. It is influenced *inter alia* by the position of firms in the markets in which they operate, be it as suppliers or as buyers. For example, in the case of biscuits and confectionery, retailers seem to be in a much weaker bargaining position than in the case of dairy products where the upstream food producers are more fragmented as seen in Table 4. Consolidation in a sector may allow firms to thwart market or buyer power in a vertically-related market, but may also result in foreclosure.

In particular, the fact that many large retailers increasingly operate in more than one Member State and thus have access to a wider potential consumer base strengthens their position. A potential upstream consequence of consolidation at the retail level is that suppliers are limited in the number of alternative outlets. Analogously, when concentration occurs in the food industry, retailers themselves face a reduction of alternative sources of supply. Ultimately, excessive concentration may result in anti-competitive developments leading to price increases. For this reason the developments in the sectors along the food supply chain and the behaviour of market participants need to be monitored closely to pre-empt anti-competitive situations that would fuel price increases.

A number of features other than the market share of firms involved in a vertical transaction may affect their bargaining power or already be a reflection of it. These features include product attributes, for example the relative importance of branded products, as well as contractual terms between vertically-related firms. These features are by and large legitimate activities, but deserve consideration in any deeper assessment of the food supply chain. Some of these practices are discussed in the next section.

Another trend that may affect the relationships between food producers and retailers is the growth in the share of private label products introduced by food retailers. The market share of such products varies by country, product-category and store format. In some Member States they now account for more than 40% of products sold (see Table 5) and for many store formats, in particular discounters, they represent the quasi-totality of listed products.

Table 5:   Share of retailer brands (all products) by Member State, 2008

AT	BE	BG	CY	CZ	DK	EE	FI	FR	DE	GR	HU	IE	IT	LV	LT	LU	MT	NL	PL	PO	RO	SK	SL	ES	SE	UK
22%	42%	n.a.	n.a.	27%	27%	n.a.	25%	32%	40%	n.a.	25%	n.a.	16%	n.a.	n.a.	n.a.	n.a.	23%	21%	31%	n.a.	33%	n.a.	34%	27%	43%

Source: Private label manufacturers association http://www.plmainternational.com/en/private_label_en2.htm

While private labels widen the range of available products and thus represent an additional source of competition, they may lead to foreclosure effects as supplier of branded products become a direct competitor to the retailer (Dobson and Waterson, 1999). Similarly, although they provide opportunities for their producers to have access to a large customer base, they may also reinforce their dependency on a particular retailer. Given the different motivations for introducing own brands, it is difficult to predict their long-term impact on prices. However, recent evidence tends to show that they exert a downward influence on the price level of a given product category. For example, a recent market analysis by Planet Retail

(2007) comparing the prices of branded products and corresponding retailer brands finds that the latter are generally lower priced: in most cases analysed more than 30%. Analysing the impact of retailer brands in 35 product categories (30 of which are food products) on the basis of consumer household panel data for Sweden, Anselmsson *et al*. (2008) find that the market share of retailer brands exerts a negative effect on the average price levels in the respective categories. This downward price impact is strongest immediately following the introduction of these products.

The increased bargaining power of retailers resulting from the introduction of private label products may be offset by the strong bargaining power of firms offering (internationally) branded products due to the 'must-have' status of such products. Producers of homogeneous products, for which brand awareness is not high, are likely to be in a much weaker position. A stronger brand image results from product differentiation through investment in product innovation, quality and advertising. Ultimately strong brands may constitute entry barriers, as new entrants would be faced with high levels of upfront costs they could not recover subsequently (endogenous sunk costs).

Advertising expenditure can be viewed both as a proxy for market entry barriers (i.e. an endogenous sunk cost) and a relative bargaining strength. Advertising by food producers help create a strong brand image, send signals of quality, differentiate the good from others and thus secure consumer loyalty. However, as indicated in the previous section, a strong brand image may also make it harder to compete against the concerned product.

Table 6: **Leading food industry and retail advertisers in the US, 2007**

Company	Headquarter	Main activity	Advertising rank	
			2007	2006
Unilever	UK/NL	Multi-product (including food)	10	10
Kraft Foods	US	Multi-product (food)	18	18
Anheuser-Busch Cos.	US	Brewing	22	24
PepsiCo	US	Soft drinks	26	23
Nestlé	CH	Multi-product (food)	27	25
General Mills	US	Bakery ingredients; Breakfast cereals	44	45
Kellogg Co.	US	Breakfast cereals	45	56
Coca-Cola Co.	US	Soft drinks	53	57
Mars Inc.	US	Confectionery	58	61
Campbell Soup Co.	US	Soups	63	69
SABMiller	UK	Brewing	86	84
Diageo	UK	Spirits	87	90
ConAgra Foods	US	Multi-product (food)	91	118
Molson Coors Brewing Co.	US	Brewing	92	87
Wal-Mart Stores	US	Retail	36	35
Kroger Co.	US	Retail	72	71
Safeway	US	Retail	79	72

Note: Ranking made according to total US advertising spending in media (magazines, newspapers, outdoor, TV, radio and internet) in 2007 and includes all industries. Own sector attribution.
Source: Advertising Age http://adage.com/datacenter/article?article_id=127791

Table 6 lists the firms belonging to the food industry or retail sector which were part of the hundred largest advertisers in the US. It also gives their rank in terms of spending. Since these are firms with global brands, this table is likely to be comparable for the EU. It shows that with a total of 14 firms, food and beverage producers are well represented in this ranking, in

particular, taking into account that the share of value added of the food and beverage industry in the US is 1.6% (1.7% in the EU). The product categories covered are essentially beer and spirits, breakfast cereals, soft drinks and confectionery – i.e. products that belong to relatively concentrated markets according to Table 4 above. The same applies to the multi-product food companies (Unilever, Kraft Foods, Nestlé, ConAgra Foods), which are *inter alia* active in many of the high concentration markets identified above. It is also noteworthy that retailers seem to spend less on advertising.

5. THE IMPACT OF REGULATIONS AND BUSINESS PRACTICES

This section discusses the effects of regulation and business practices on the functioning of the food supply chain. First, an attempt is made to identify regulations which either have contributed to the fragmentation of the Single Market or have hampered the functioning of the food supply chain by reducing efficiency or limiting competition. In making this analysis, it is important to keep in mind that these regulations can have an impact on other general policy objectives that must not been overlooked when assessing their overall impact. Second, a number of business practices, which merit a closer assessment because of their potential negative impact on competition, are identified, making a distinction between horizontal and vertical issues.

5.1 Regulatory issues

The regulatory framework affects the food supply chain at all levels from the agricultural sector down to retail. Regulation may affect the functioning of markets through industry/sector-specific regulation (e.g. urban planning regulations and opening hours in the case of the retail sector) or economy-wide provisions (e.g. labour market regulation, or competition policy). The regulatory framework can raise compliance costs for firms, which will be passed on to customers in the form of higher prices. Regulation can also directly affect prices through price regulation. Another aspect that needs to be taken into account is the level at which the regulatory framework is designed, decided and enforced (i.e. EU-wide, national, regional, local). To the extent that the applicable regulatory framework varies across countries (and even regions), the regulatory impact across the EU is consequently likely to differ as well and may explain price differentials to some extent.

While an analysis of regulation should take into consideration the costs imposed on firms and ultimately passed on to consumer prices, it should also take account of the regulatory benefits and the contribution of regulation to overall social well-being. For example, planning restrictions are often identified as competition-inhibiting regulations that raise entry barriers for potential entrants and protect incumbents. At the same time they may be devised to address congestion issues, noise pollution or considerations about the image of town-centres. Therefore, an in-depth examination of the impact of the regulatory framework on the functioning of the food supply chain needs to fully take into account the different objectives of regulations that are imposed on firms and whether those objectives are met in a proportionate way and in a manner consistent with other general policy objectives.

Three types of regulation affecting in particular the retail sector have been identified as potentially problematic for the functioning of the food supply chain: regulations creating entry barriers, regulations limiting price competition and regulations restricting shop opening hours.

The McKinsey Global Institute (2002) makes the argument that such regulations can explain a large share of the productivity growth gap between EU Member States and the US. The OECD regulatory indicators for the retail sector[12] reveal that price controls and operational restrictions on retail trade (including restrictions on shop opening hours) are more common in many EU Member States than in the US, while this is less the case for entry barriers (see Table 7). In total, Austria, Belgium, Finland, France, Greece, Luxembourg, Poland and Portugal seem to be more regulated than other EU Member States.

Table 7:   Regulation in the retail trade (2008)

Country	Barriers to entry	Price controls	Operational restrictions	Total
Austria	**3.6**	2.4	**4.3**	**3.6**
Belgium	**3.4**	2.6	**5.0**	**3.7**
Czech Republic	1.5	1.7	1.8	1.6
Denmark	2.8	0.7	**4.6**	2.9
Finland	2.8	1.5	**4.7**	**3.1**
France	2.6	1.7	**4.7**	**3.1**
Germany	2.1	2.4	2.9	2.4
Greece	**4.2**	**4.0**	**4.5**	**4.2**
Hungary	**3.5**	1.2	1.1	2.1
Ireland	0.9	2.8	0.1	1.1
Italy	2.6	2.3	2.8	2.6
Luxembourg	**4.3**	**3.9**	**4.5**	**4.3**
Netherlands	2.1	1.8	2.4	2.1
Poland	**4.0**	1.4	**3.5**	**3.2**
Portugal	2.4	**4.2**	2.9	**3.0**
Slovak Republic	2.4	1.2	0.7	1.5
Spain	**3.0**	1.4	**3.2**	2.7
Sweden	0.2	0.0	1.2	0.5
United Kingdom	2.3	1.0	2.5	2.0
United States	**3.7**	1.4	2.1	2.6

Note: Data for Greece, Ireland and the Slovak Republic are for the year 2003
Source: Conway and Nicoletti (2006)

(i)   Entry regulations

Entry regulations have the effect of potentially hampering competition if they constitute significant barriers to entry. Table 7 indicates that in 2008 entry regulations were relatively restrictive in Austria, Belgium, Greece, Hungary, Luxembourg, Poland and Spain. Such regulations, which effectively shelter incumbents from potential rivals, occur frequently, notably at the local and/or regional level, and tend to lead to increased margins, higher prices and lower productivity of retailers.

Schivardi and Viviano (2008) show that entry barriers exert a strong influence on incumbents' performance in Italian retail trade, increasing profit margins and prices and reducing productivity and ICT investments. Haskel and Sadun (2008) find a similar result for the UK and suggest that the planning regulation reduced retailing productivity growth between 1998 and 2003. Griffith and Harmgart (2008) also demonstrate that planning regulations represent an entry barrier in the UK, reducing the number of large supermarkets and leading to a

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[12]   The indicators presented in Table 7 concern the whole retail sector and not food retailing as such.

welfare loss for consumers. However, they also indicate that this cost could be offset against any benefits which may result from reduced congestion. Finally, Bertrand and Kramaz (2001) find that the zoning regulation introduced in France in the early 1970s to restrain the development of large retail stores has had a negative impact on employment. A similar result is obtained for Italy by Viviano (2008) who compares retail trade employment growth in regions with more or less restrictive entry regulations.

General regulations on commercial establishments, or land and urban planning regulations affecting the attribution of construction permits, which limit the establishment of new stores, can thus create entry barriers with a negative impact on the performance of the retail trade. An informal survey carried out by the European Commission in 2008 amongst national competition authorities suggests that planning regimes place more limited constraints on the extension of existing stores by retailers compared with new entry. This gives a greater incentive to incumbent retailers to expand and thus make it less attractive for rival retailers to open up competing outlets. In general, these urban planning regulations foresee authorisation procedures for shops above a certain size. The procedure can be based on a number of criteria (amongst them criteria of an economic nature, such as the impact of the establishment on competitors or on the "balance" between different forms of shop formats) which give a very large margin of discretion to the authorities delivering the authorisation. The procedure itself does not necessarily guarantee an objective or impartial application of the relevant criteria.

As shown in section 4.2, a consolidation is taking place in the retail sector and this sector is already highly concentrated, especially in the old Member States. This consolidation may, under certain conditions, give rise to efficiency gains leading to lower consumer prices. However, increased concentration levels may also have a potential negative impact on competition, particularly if entry barriers are high. Therefore, regulations that restrict entry in the medium-term need to be scrutinised with a view to ensuring that incumbents face a constant threat of rapid entry by newcomers. However, when examining such regulations, their social and environmental objectives must not be overlooked.

(ii)   Regulations limiting price competition

Some regulations contribute towards limiting price competition between retailers and may create distortions and a lack of transparency in the relationships between suppliers and retailers. Table 7 reveals that in 2008 such price controls were relatively restrictive in Greece, Luxembourg and Portugal.

Below cost selling restrictions and associated regulations fixing invoice price levels belong to this category of regulations limiting price competition. In many Member States restrictions on below costs selling are in place and aim to establish a certain threshold price under which operators are not allowed to sell except in a limited set of circumstances. However, the coverage of the prohibition of below cost selling varies widely across Member States (e.g. application of the prohibition to all retail sectors or only to certain firms or products; circumstances under which below cost selling would be allowed even if the practice is generally prohibited; elements included in the calculation of "costs", etc.).

Below-cost selling restrictions set a price floor limiting intra-brand price competition between retailers. As the price floor is often defined as the invoice price, such restrictions amount to resale price maintenance. Furthermore, they lead to higher stock-management costs as retailers may face more difficulties in selling excessive stocks. These costs are likely to be

higher for perishable products. Regulation defining how this price floor ought to be calculated can also exacerbate price stickiness. In market segments where food suppliers have considerable market power, these restrictions can lead to the establishment of relatively high price floors. Analysing the effects of below-cost pricing prohibitions, Collins *et al.* (2001) and Biscourp *et al.* (2008) find evidence of a reduction in intra-brand competition and an increase in grocery prices following its introduction.

If below cost sales and invoice price rules were relaxed, there should be sufficient safeguards in order to preserve competition and consumer protection. For instance, it should be ensured that such a relaxation does not result in price wars and predatory pricing. However, this risk can be covered by stringent competition monitoring. Furthermore the accessibility to food retailers for all consumers should be ensured.

(iii)   Operational restrictions

Various regulations restricting the operational conduct of retail trade, including in particular restrictions on shop opening hours, are in place all across Europe and often even vary even within Member States. These regulations seem to be generally more restrictive in Austria, Belgium, Denmark, Finland, France, Greece, Luxembourg, Poland and Spain. They may also have a potential negative impact on competition but to a lesser extent than planning regulations, according to the survey made amongst national competition authorities. Such regulations may also reduce retailers' efficiency by limiting the possibility of selling their products, and thereby increasing operational, logistics and wastage costs of retail outlets. However, the efficiency considerations of lessening restrictions, such as those on shop opening hours, should be seen in the light of the potential social impact, notably on smaller shops and shop-keepers.

5.2   Business practices

The functioning of the food supply chain is affected by the degree of competition at all stages of the chain. In particular, a higher degree of competition is associated with lower mark-ups, greater efficiency and therefore better performances in terms of innovation, quality, and prices. The degree of competition along the food supply chain may be affected by a number of business practices. A number of such practices which could give rise to competition concerns are listed in Table 8. However, it should be emphasised that very few practices can be considered anti-competitive *per se*. Cartels are the exception. Therefore, the business practices listed in Table 8 have to be examined on a case-by-case basis, always considering the context in which they take place.

The analysis of competition can be broken up into horizontal issues (i.e. referring to interactions between actors at the same level of the supply chain) and vertical issues (i.e. referring to interactions between actors at different levels of the supply chain), the two of which are interrelated. The consequences of interactions between firms are situation-specific and consequently need to be assessed in terms of their effect on competition as well as from an efficiency perspective – i.e. in terms of innovative performance, economies of scale and economies of scope.

Table 8   Overview of main practices that may give rise to competition concerns

Practice	Description	Main competition risk
Cartels	Agreements among competitors relating *inter alia* to price fixing, output restriction and market partitioning	Maintenance of high prices and stalling of innovation to the detriment of consumers. Cartels constitute very serious anti-competitive behaviour
Purchasing agreements	Agreements concluded by competing buyers for the purpose of jointly buying certain inputs	Under certain conditions, tool for foreclosing rivals' access to essential inputs at competitive conditions; collusive behaviour between competitors on downstream markets
Resale price maintenance	Restriction of the buyer's ability to determine the sale price for end consumers	Reduction of price competition
Single branding	Obligation or incentive scheme which makes the buyer purchase practically all of his requirements on a particular market from only one supplier, for a certain duration	Possible restriction of in-store inter-brand competition and/or foreclosure of the market to competing and potential suppliers
Private label products	Products made by third parties upstream in the supply chain and sold under retailers' brand	Possible foreclosure of suppliers' competing goods; restriction of in-store inter-brand competition
Tying	Purchase of a product (tying product) made conditional on purchase of other product (tied product)	Foreclosure on the market of tied product, and indirectly of the tying product
Exclusive supply agreements	Direct or indirect obligation causing a supplier to sell a good only to one buyer	Possible foreclosure of other buyers/ retailers
Certification schemes	Requirement to comply with a number of conditions set by individual buyers	Potential risks of foreclosing competing buyers

(i)   Horizontal practices

The functioning of the food supply chain may be affected by a lack of competition in the market. For instance, distortions of competition may arise from operations of concentration leading to dominant positions, anticompetitive unilateral conducts as well as from agreements between firms violating Articles 81 and 82 of the EU Treaty.

Cartels are hard-core restrictions of competition. Recent experience shows that cartels can occur in the food sector. These cartels tend to vary in terms of territorial scope. Special attention should be given by competition authorities to uncovering the most harmful cartels amongst suppliers of both processed and non-processed foods.

The size and number of *"buying alliances"* in the food sector have grown considerably throughout the EU. The involvement of larger buyers in such alliances has led to increasing concerns expressed by food producers. These joint purchasing agreements can be used as a tool for obstructing rivals' access to essential inputs at competitive conditions and/or for

competitors to engage in collusive behaviour on downstream markets. However, these purchasing agreements are often concluded by small and medium-sized retailers and wholesalers to achieve volumes and discounts similar to their bigger competitors. These agreements between SMEs are therefore normally pro-competitive since even if a moderate degree of market power is created, this is likely to be outweighed by efficiency gains resulting from economies of scale

(ii) Vertical agreements

The effects of vertical agreements on prices are ambiguous and may either foster competition by generating efficiency gains, or inhibit it by leading to vertical foreclosure and by facilitating collusion on any level of the supply chain. Besides resale price maintenance and some practices relating to market partitioning, which are considered hard-core restrictions of competition, a large number of vertical agreements (including exclusive distribution, single branding, tying, exclusive customer allocation, selective distribution, franchising, exclusive supply agreements and recommended and maximum resale prices) can be identified which, given their ambiguity, typically require a case-by-case assessment, for which detailed rules exist at Community level.[13]

Practices relating to *resale price maintenance* restrict the buyer's (i.e. the wholesaler or retailer's) ability to determine the price level at which the products are sold to customers. As a result, price competition in the downstream market is significantly reduced. Practices relating to resale price maintenance often appear local in scope and National Competition Authorities are well equipped to address them.

Other vertical agreements such as *single branding* obligations, which require retailers to sell a single product, and certain tying practices, which make the purchase of a product conditional on the purchase of another product, may have either pro-competitive or anti-competitive effects. In terms of negative effects, the main competition risks would be the foreclosure of the market to competing and potential suppliers or a loss of in-store inter-brand competition. Similarly, the increased use of private label products by retailers may lead to foreclosure of existing and potential competing suppliers. This could reduce the number of product items on the shelves, thereby limiting consumer choice.

Exclusive supply agreements, which oblige the supplier to sell the goods specified in the agreement to one buyer only, can lead to a foreclosure of other buyers/retailers within the food supply chain. The market position of competing buyers on the upstream market is thus crucial since competitors are only likely to be foreclosed if their market position is significantly smaller than that of the buyer benefiting from the agreement. If the buyer has market power downstream, significant negative effects for consumers can be expected. However, countervailing power of suppliers is also of relevance, since important suppliers will not easily allow themselves to be cut off from alternative buyers

Certification schemes can be mentioned as an example of arrangements that could indirectly compel the suppliers to sell to only one buyer These schemes may be useful for producers and consumers, as they guarantee quality and origin and therefore allow customers to make better informed choices. Furthermore, as many of these schemes are related to environmental standards their aim is to halt environmental degradation and to add to food security in the

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[13]   Regulation 2790/1999 on the application of the EU Treaty Article 81(3) to categories of vertical agreements and concerted practices, and Guidelines on vertical restraints 2000/C 291/01

long-term, for example by promoting sustainable farming practices. Nonetheless, the proliferation of schemes and labels in recent years has given rise to concerns about their transparency requirements, the credibility of the claims made and their possible effects on equitable commercial relations. In particular, the pressure to participate in more than one scheme because of different requirements entails a significant financial and administrative burden for agricultural producers, and especially small-scale producers. There is thus a need to analyse to which extent certification schemes act as barriers to market access and to the free movement of goods, thereby impeding the smooth functioning of the Single Market. The Commission has opened a debate on the various aspects of agricultural product quality policy, including certification schemes and their functioning in the EU market.[14] .

(iii) Mergers and acquisitions

Mergers and acquisitions are a normal business process. They essentially imply a pooling of assets or a reallocation of corporate control, through which firms want to achieve certain strategic goals. Mergers can take place at horizontal or vertical level. The motivations behind mergers are very diverse, ranging from efficiency considerations and cost savings to firm expansion or market access. The effects of mergers are also very diverse and only anti-competitive mergers have to be prohibited. Through rigorous merger control mechanisms, which include the obligation for all companies involved to notify proposed structural operations to the Commission or National Competition Authorities, European competition rules ensure that the increased concentration resulting from mergers does not significantly impede effective competition at any level of the food supply chain.

Among the mergers with a so-called 'Community dimension'[15] analysed by the European Commission since 2000 in sectors relating to the food supply chain, the large majority were unconditionally approved, indicating that they did not give rise to impediments to competition. Only a small number were approved subject to conditions. This distribution is fairly consistent with merger decisions in other sectors of the economy[16], suggesting that mergers in sectors along the food supply chain do not *a priori* give rise to higher anti-competitive risks than those in other sectors of the economy.

6. POLICY CONCLUSIONS

The sharp fluctuations in agricultural commodity and food prices at a time of great uncertainty about the economic outlook illustrate the need to improve the functioning of the European food supply chain with a view to enhancing its efficiency and competitiveness. The conclusions of the analysis presented in this paper are that the rapid increase in food prices was due mainly to global demand and supply developments. However, problems in the functioning of the food supply chain, in terms of competition and regulation, may have played an important role as well and there is room to improve the efficiency of the food supply chain.

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[14] COM(2008) 641 final, 15.10.2008, Green Paper on Agricultural Product Quality.
[15] Council Regulation (EC) No 139/2004 of 20.01.2004 on the control of concentrations between undertakings. A 'Community dimension' exists where the merging parties have an aggregate Community-wide turnover exceeding a certain threshold, of which two-thirds at most are achieved in one and the same Member State.
[16] http://ec.europa.eu/comm/competition/mergers/statistics.pdf

First, food price inflation differentials are a signal that the EU food market remains still fragmented. This fragmentation can be due to differences in regulation on market entry and pricing and to business practices such as exclusive supply agreements. Second, there are indications of differences in the conditions of competition across Member States. In particular, competitive pressures at the food retail level have absorbed some of the increase in producer prices in the euro area while this is not the case in the new Member States. Third, a consolidation is taking place throughout the food supply chain. This consolidation can lead to efficiency gains and hence to lower prices. However, it can also change the bargaining powers of actors in the different segments of the food supply chain and could deteriorate the competition conditions at the local level.

On the basis of this analysis, the European Commission has adopted a Communication (see European Commission (2008a)) proposing a roadmap for improving the functioning of the food supply chain, which will be implemented in 2009. This roadmap includes three main elements which aim to improve the functioning of the food supply chain. First, it is necessary to review potentially unjustified regulations and enhance regulatory harmonisation in cases where national regulations continue to fragment the Single Market. In particular, regulations that restrict entry, limit price competition and restrict shop opening hours should be examined, taking into account the wider policy objectives of these regulations. Second, the European Commission, the National Competition and Consumer Authorities and the Member States should ensure a vigorous and coherent enforcement of competition and consumer protection rules. In particular, investigations should be targeted at those restrictions of competition and specific practices which have been identified as potentially problematic in this analysis. Finally, it is crucial to provide better information to consumers, public authorities and market operators by setting up a permanent European monitoring of food prices and the supply chain. By the end of 2009 the European Commission intends to report on the follow-up of the roadmap.

LIST OF REFERENCES

Anselmsson, J., U. Johansson, A. Marañon A. and N. Persson (2008), "The penetration of retailer brands and the impact on consumer prices – A study based on household expenditures for 35 grocery categories", *Journal of Retailing and Consumer Services* 15, 42-51

Azzam, A. M. (1999). "Asymmetry in rigidity in farm-retail price transmission", *American Journal of Agricultural Economics* 81, 525–533

Ben-Kaabia M. and M. Gil Jose (2007). "Asymmetric price transmission in the Spanish lamb sector". *European Review of Agricultural Economics* 34, No. 1, 53-80

Biscourp, P., X. Boutin and T. Vergé (2008), "The effects of retail regulations on prices: Evidence from the Loi Galland", INSEE Working Paper G 2008/02

Bertrand M. and F. Kramaz (2002), "Does entry regulation hinder job creation? Evidence from the French retail industry", *Quarterly Journal of Economics* 107, No. 4, 1369-1413

Cleeren, K., M. Dekimpe, K. Gielens and F. Verboven (2008), "Intra- and inter-format competition among discounters and supermarkets", CEPR Discussion Paper, No. 6964, September

Collins, A., S. Burt and K. Oustapassidis (2001), "Below-cost legislation and retail conduct: evidence from the Republic of Ireland", *British Food Journal* 103, 607-622

Competition Commission (2008), "The supply of groceries in the UK – market investigation", London

Conway, P. and G. Nicoletti (2006), "Product Market Regulation in the Non-Manufacturing Sectors of OECD countries: Measurement and Highlights", OECD Economics Department Working Papers, No. 530

Dobson, P. and M. Waterson (1999), "Retailer power: recent developments and policy implications", *Economic Policy* 14, issue 28, 133-164

European Commission (2008a), "Food prices in Europe", Communication, COM (2008) 821

European Commission (2008b), "Monitoring price developments, Staff Working Document, SEC (2008) 2970

European Commission (2008c), "The functioning of the food supply chain and its effects on food prices", Staff Working Document, SEC (2008) 2972

European Commission (2009), "Market monitoring as a new tool to improve the functioning of markets in the EU economy", *European Economy*, Luxembourg: Office for Official Publications of the EC.

Feenstra, R.C., J.G. Gagnon and M.M. Knetter (1996), "Market share and exchange rate pass-through in world automobile trade", *Journal of International Economics* 40, No. 1-2, 187-207

Frey, G., and M. Manera (2005), "Econometric models of asymmetric price transmission", FEEM (Fondazione Eni Enrico Mattei) Working Paper, No. 100, September

Goodwin, B.K. (2006). "Spatial and vertical price transmission in meat markets", paper presented at the Workshop on Market Integration and Vertical and Spatial Price Transmission in Agricultural Markets at the University of Kentucky, April

Griffith, R. and H. Harmgart (2008), "Supermarkets and planning regulation", CEPR Discussion Paper, No. 6713, February

Haskel, J. and R. Sadun (2008), "Entry, exit and labour productivity in UK retailing", in *Producer dynamics: New evidence from micro data*, T. Dunne, J. B. Jensen, and M. J. Roberts editors

Leibtag E., A. Nakamura, E. Nakamura and D. Zerom (2007), "Cost pass-through in the U.S. coffee industry", United States Department of Agriculture, Economic Research Report, No. 38

Livanis, G. and C.B. Moss (2005), "Price transmission and food scares in the U.S. beef sector", paper presented at the American Agricultural Economics Association Meetings in Providence, Rhode Island

Maddala, G.S and I. Kim (1998), *Unit roots, cointegration and structural change*, Cambridge University Press

McKinsey Global Institute (2002), "Reaching higher productivity growth in France and Germany", Report, October

Palpacuer, F. and S. Tozanli (2008), "Changing governance patterns in European food chains: the rise of a new divide between global players and regional or multi-national producers", *Transnational Corporations Journal* 17, No. 1, April

Planet Retail (2007), *Private label trends worldwide,* report available at www.planetretail.net

Rey, P. and J. Tirole (2000), "Régulation des relations entre fournisseurs et distributeurs", Rapport du Conseil d'Analyse Economique, No. 29

Röller, L.-H., J. Stennek and F. Verboven (2006), "Efficiency gains from mergers" in *European merger control: Do we need an efficiency defence?,* F. Ilzkovitz and R. Meiklejohn, editors, Edward Elgar Publishing

Schivardi F. and E. Viviano (2008), "Entry barriers in retail trade", CEPR Discussion Paper, No. 6637

Vavra, P. and B.K. Goodwin (2005), "Analysis of Price Transmission Along the Food Chain", OECD Food, Agriculture and Fisheries Working Papers, No. 3

Viviano E. (2008), "Entry regulations and labour market outcomes: Evidence from the Italian retail trade sector", *Labour Economics* 15, No. 6, 1200-1222

Zachariasse, V. and F. Bunte (2003). "How are farmers faring in the changing balance of power along the food supply chain?", paper presented at the OECD Conference on Changing Dimensions of the Food Economy: Exploring the Policy Issues, The Hague

This annex presents the results of an econometric analysis[17] of the link between consumer food prices and the food market structure (see Table A.1). The analysis distinguishes between two groups of countries: new and old Member States. This choice is based on the heterogeneity of these countries as discussed above.

Table A.1   Results of the pooled data analysis

Dependent Variable:		Consumer food price increases				
Estimation sample		2003 - 2007				
Explanatory variables		Producer food prices increases	Unit labour costs increases	The increase in number of outlets per person	R-squared	Adjusted R-squared
Old member states	Coefficient	0,20***	0,45***	-	0,56	0,51
	Std. Error	0,06	0,11			
	t-Statistic	3,40	3,97			
New EU member states	Coefficient	0,91***	-	-0,32***	0,82	0,81
	Std. Error	0,10		0,08		
	t-Statistic	9,83		-3,88		

(***) - indicates significance at 1% test level.

Producer prices explain a high proportion of consumer food price developments in both the old and new Member States in the period from 2003 to 2007. Unit labour costs appear to have a significant impact on consumer food prices in the old Member States only. The reduction in the number of individual retail outlets does not appear to have had an impact on consumer food price development in the old Member States. This suggests that the consolidation of the food retail sector has not led to higher consumer prices in the old Member States. In the case of the new Member States, there seems to be some evidence of a negative link between the number of individual food retail outlets and consumer food prices. Indeed, the number of retail outlets per inhabitant is lower in the new Member States but has increased rapidly. A higher number of alternative outlets at the local level should in principle benefit consumers.

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[17]   The analysis is carried out by the application of a simple OLS regression on pooled annual data. The first pool consists of the following countries: Belgium, Denmark, Germany, Greece, Spain, France, Italy, Luxemburg, the Netherlands, Austria, Portugal, Finland, Sweden and the UK. The second pool consists of the Czech Republic, Latvia, Lithuania, Hungary, Poland and Slovenia. The other EU countries are not included due to limited data availability.