Pricing of food products

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1 Introduction

Food prices have exhibited large fluctuations worldwide in the past years. In 2007 the prices of grain and related products like rice rose to record levels and subsequently collapsed in 2008. The prices of foods such as meat, dairy produce and eggs followed this development. The increase in food prices occurred at various levels in the chain, i.e. at ex-farm level, at global market level and other wholesale levels and at consumer level.

On account of the importance of basic foods to Dutch consumers, NMa is interested in the relationship between food prices at various levels in the chain. Therefore, NMa commissioned an investigation into pricing of basic foods. The purpose of the investigation is to obtain an insight into the development of the relationship between food prices in the various links of the food supply chain. The investigation must further explain price patterns that may indicate a lack of competition. A lack of competition can manifest itself as a weak relationship between the prices at the different levels in the chain and a large difference between the ex-farm and consumer prices.

This report gives an account of the investigation. The investigation was carried out for eight products, i.e. bread, potatoes, unsliced and sliced onions, cucumbers, paprikas, apples and eggs. These products were chosen because, with the exception of bread and sliced onions, they do not undergo any processing and remain the same throughout the supply chain.

1.1 The analysis consists of the following elements:

1. A comparison of the development of producer and consumer prices of food in the Netherlands and those in a number of large and small neighbouring countries in Europe, i.e. Belgium, Denmark, Germany, France, Austria and the United Kingdom.
2. A description of the seven examined chains according to the structure of the chain, the activities of companies, the market structure, the economic significance and the method of pricing.
3. A description of the contractual conditions that supermarkets and suppliers agree with each other and of the negotiation process. This description was written based on in-depth interviews.
4. A description of the development of prices at ex-farm, ex-wholesaler and ex-supermarket based on weekly figures. The purpose of the description of the development of prices is to check the dynamics in price developments at the three different levels and to find out whether the dynamics at those three levels are interrelated.
5. A breakdown of the price structure of the eight products in each link into costs and margins.
6. An econometric time series analysis of the relationship between prices at the levels of ex-farm, ex-wholesaler and ex-supermarket. This analysis examines the statistical relationship between the different prices and also relates the relationship to explanatory factors such as the concentration in the supermarket channel.

The report has the following structure. Chapter 2 compares the development of prices in the Netherlands with the price developments in other European countries. Chapter 3 describes the chains of the eight products examined in the investigation. Chapter 4 describes the contractual conditions that supermarkets and suppliers agree with each other and also the negotiation process. Chapter 5 shows the development of prices over the 2005-2008 period and how the prices of the examined products are composed. Chapter 6 analyses the time series relationship between the prices. Chapter 7 closes with conclusions.

2 Price developments in the Netherlands and the EU

In this report we compare the development of producer and consumer prices in the Netherlands with those in a number of other European countries. The comparison concerns six large and small neighbouring countries, i.e. Belgium, Denmark, Germany, France, Austria and the United Kingdom. These countries were selected because they have a consumption pattern and income level similar to the Netherlands and also a similar retail trade structure. In all of these countries foods are distributed mainly through a small number of large supermarket chains. The purpose of this chapter is to check whether or not the development of consumer prices in the Dutch food retail trade differs from the development in similar countries.

The development of prices in the selected countries was compared using two price indices, i.e. the producer price indices that indicate the yield prices in the agricultural and horticultural sectors and the consumer price indices. The data was obtained from Eurostat. As the indices that Eurostat gathers and compiles concern a relatively high level of aggregation, the analysis presented in this chapter is at a higher aggregation level than the analyses in the other chapters. The analysis in this chapter concerns vegetables instead of onions or paprikas, for example.

The examined product groups for the producer are wheat, potatoes, vegetables, fruit and eggs. The examined product groups for the consumer are food total[1], bread and grains, vegetables and fruit. At consumer level, eggs are included in the dairy produce and egg product category, so we have disregarded them in this chapter. This product category is dominated by dairy produce.

The producer price indices were obtained from Eurostat, which expresses producer prices in prices of 2000. Consequently, the indices are based on the production shares of the underlying products in that year. The reference year chosen for consumer price indices was 2005. This means that the consumer price indices are based on the consumption shares of the underlying products in that year. As we do not have the underlying weightings of the products, it is not possible to adjust the product price indices for the year 2005 or conversely the consumer price indices for the year 2000.

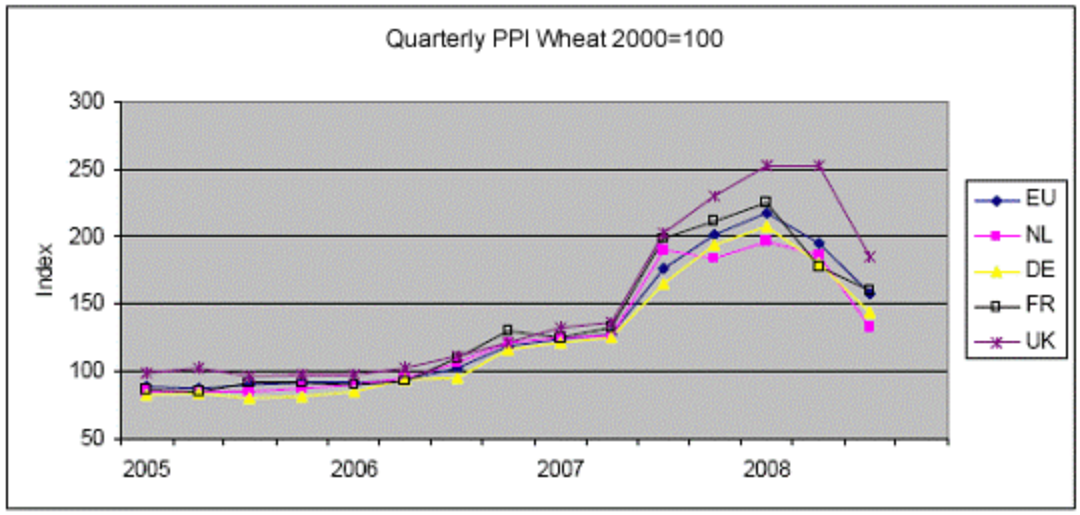
Section 2.1 compares producer prices. Section 2.2 compares consumer prices. To keep the illustrations clear we have compared the Netherlands separately for each product with the large and small neighbouring countries.

2.1 Developments in producer prices

Wheat
The development of the producer price index (PPI) in the Netherlands corresponds with the development in the EU-25 and the neighbouring countries of the Netherlands. Due to the low grain harvest, the prices increased sharply in 2007, but during 2008 the price level fell significantly worldwide due to the sizeable harvest. Over the past year, the development of prices has been strongly influenced in the United Kingdom by the weak value of the pound against the euro. The price index in the UK is therefore higher than the 'European mainland' (figures 2.1 and 2.2).

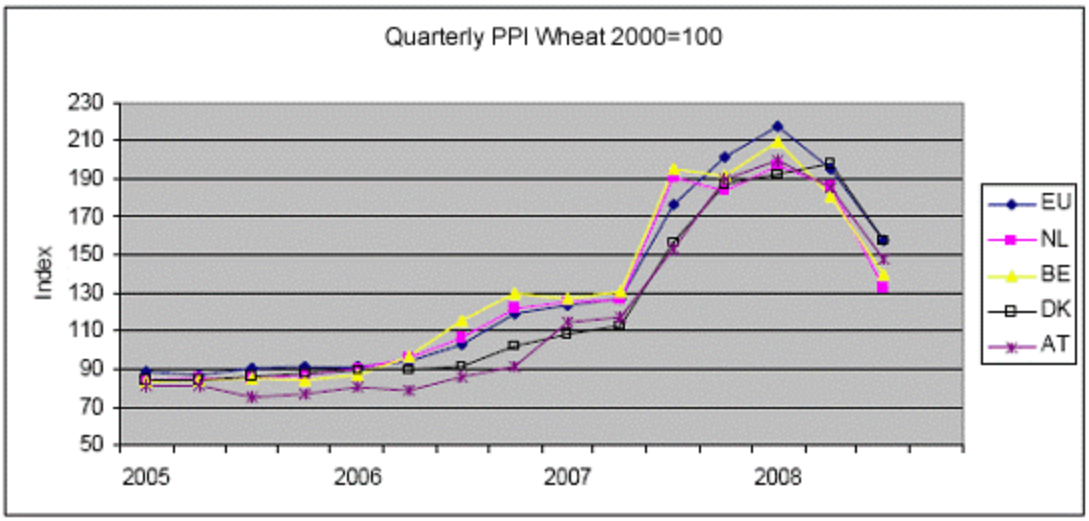
[1] Grain products, meat and prepared meat products, fish, potatoes, vegetables and fruit, dairy produce and eggs, oils and fats and other food.

Figure 2.1 **PPI for wheat in the Netherlands and large neighbouring countries**



Source: Eurostat

Figure 2.2 **PPI for wheat in the Netherlands and small neighbouring countries**

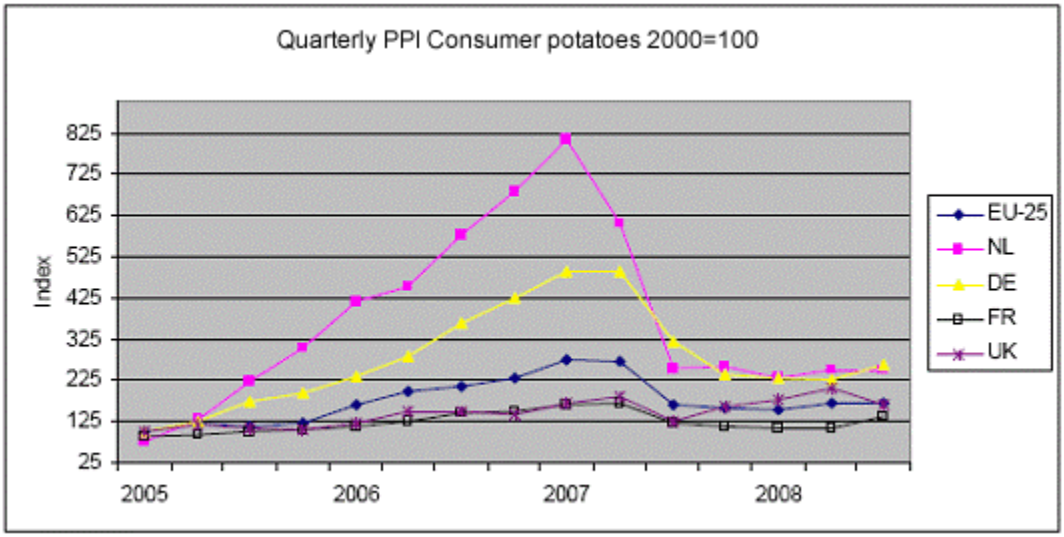


Source: Eurostat

Consumer potatoes

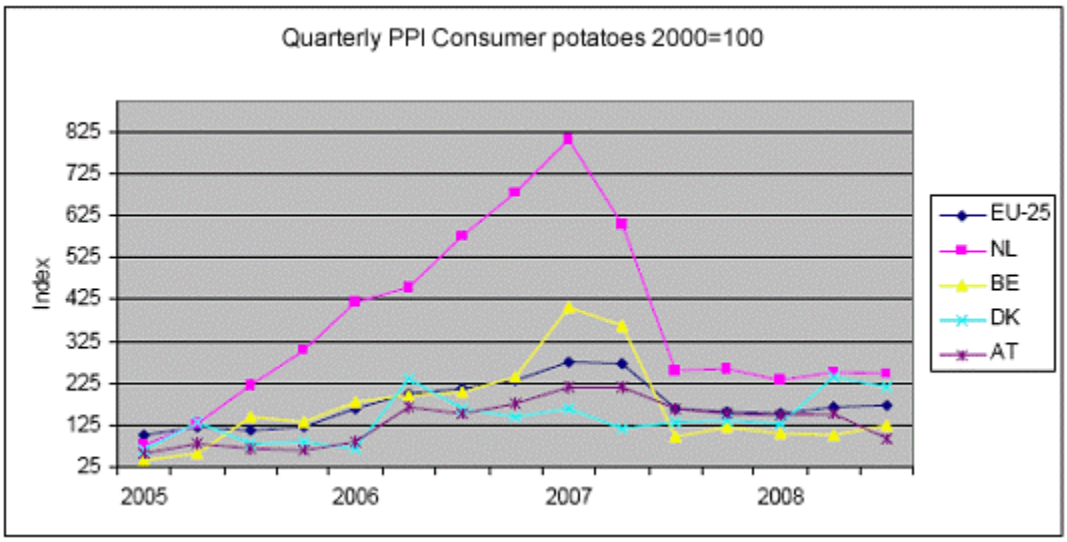
The producer price index (PPI) of consumer potatoes rose gradually in the EU until the first quarter of 2007 and then fell. Since the final quarter of 2007 the consumer potatoes PPI has been stable. It is noticeable that the PPI in the Netherlands rose more in the 2005-2008 period than in other Western European countries. The Dutch index concerns spot market prices. Delivery contracts that set the price – 40% of the output – were disregarded. We do not know how the foreign indices are determined. Additionally, the Dutch potato industry is relatively large. As the industry wants to maximise utilisation of processing capacity, the pressure on prices in the Netherlands in the event of a shortage is relatively large. The Dutch potato output was low in 2005 and in 2006. The output was low in 2005 and was hampered by quality problems (thorow wax) in 2006 (LEB 2006, 2007). The development of prices in Belgium and Germany comes closest to the development in the Netherlands. Belgium, the Netherlands and parts of Germany and northern France can be regarded as a (large) growing area for table potatoes (figures 2.3 and 2.4).

Figure 2.3 **PPI for consumer potatoes for the Netherlands and large neighbouring countries**



Source: Eurostat

Figure 2.4 **PPI for consumer potatoes for the Netherlands and small neighbouring countries**



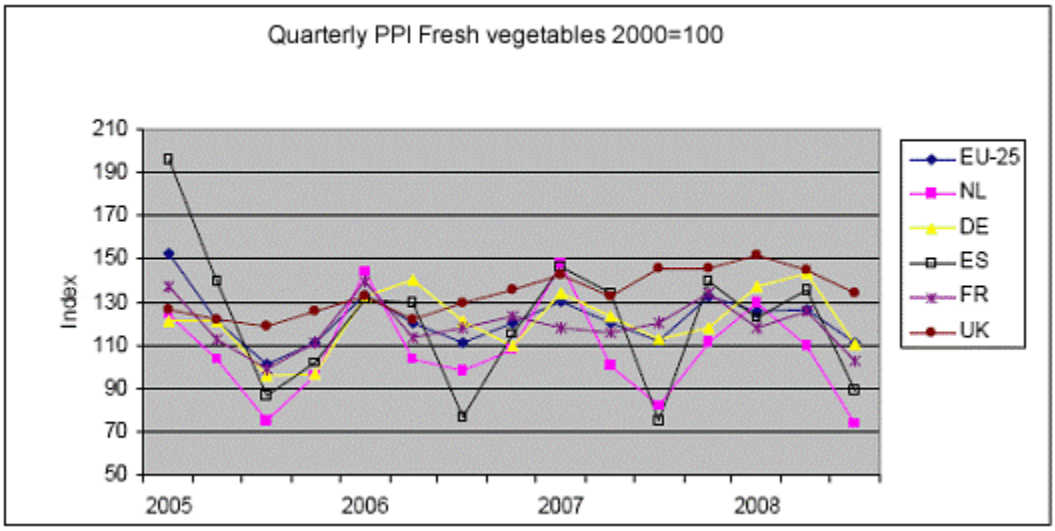
Source: Eurostat

Vegetables

The producer price index for fresh vegetables exhibits strong fluctuations throughout the year. These fluctuations are particularly large in Spain, Belgium and the Netherlands, which are all countries that depend greatly on the export of vegetables. The fluctuations are caused by the seasonal nature of production, but also by a variable weight per product. Tomatoes in the Netherlands are heavier in summer than in winter. The price development differences between countries are related partly to a difference in the weights of the individual vegetables. The weight of fruit and vegetables (cucumbers, paprikas and tomatoes) in the Netherlands is relatively large compared with the other examined countries, for example. Over the past years the development of prices in the Netherlands has lagged behind the developments in the EU-25 and in Belgium, Germany, France, Austria and the UK.

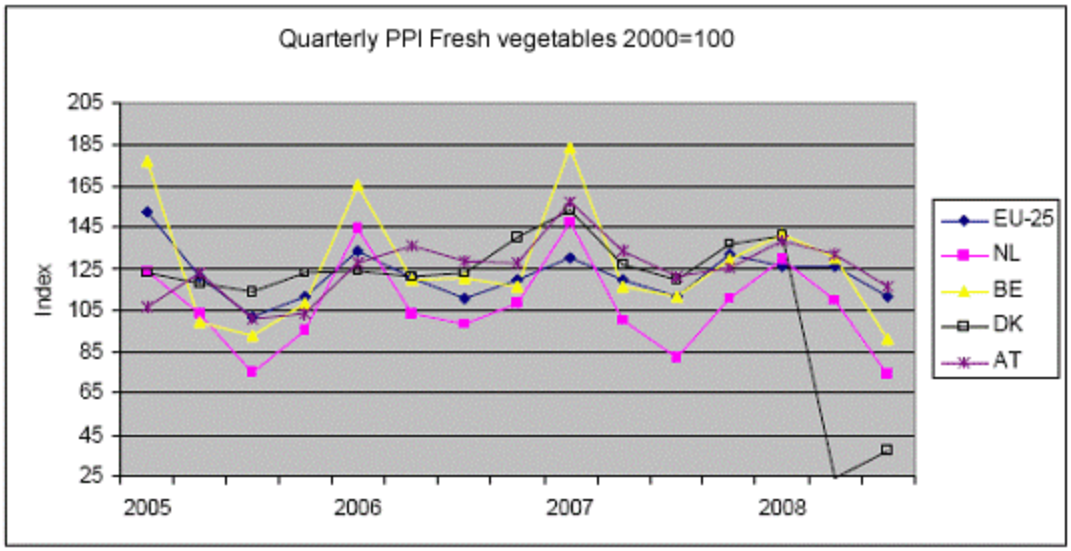
In this respect the Netherlands also trails Denmark with the exception of the last two quarters. An explanation for why the price development in the Netherlands lags behind the development in the other western European countries lies in the global prices for fruit and vegetables over the past few years plus the large weighting of fruiting vegetables in the Dutch price index (figures 2.5 and 2.6).

Figure 2.5 **PPI for vegetables for the Netherlands and large neighbouring countries**



Source: Eurostat

Figure 2.6 **PPI for vegetables for the Netherlands and small neighbouring countries**



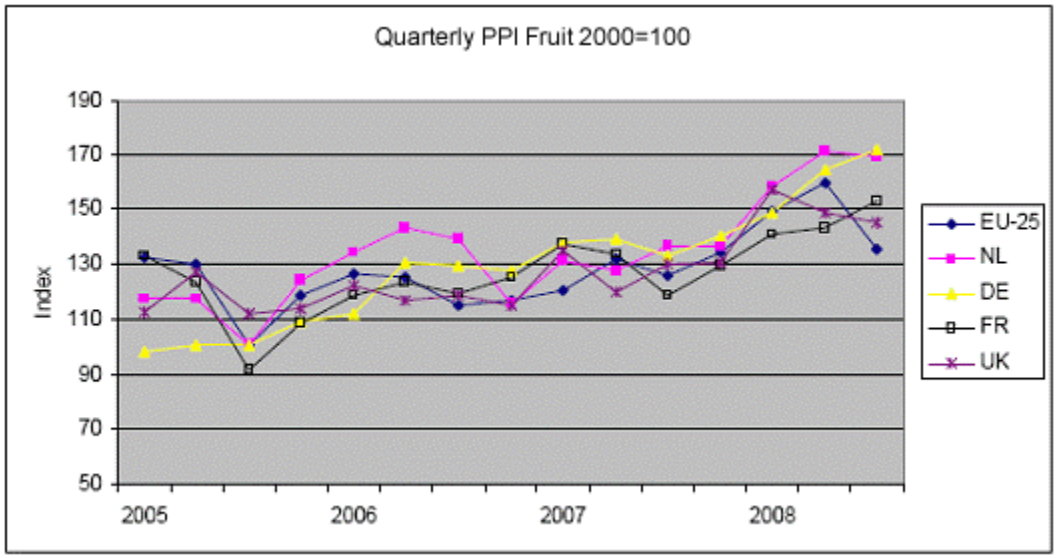
Source: Eurostat

Fruit

The development of the producer price index for fruit in the Netherlands exhibits many similarities with the average development in the EU-25 and the large EU countries. The producer prices in the Netherlands have risen slightly faster since 2000 than in France and the UK. The producer prices for fruit in the smaller EU countries exhibit a strongly fluctuating picture.

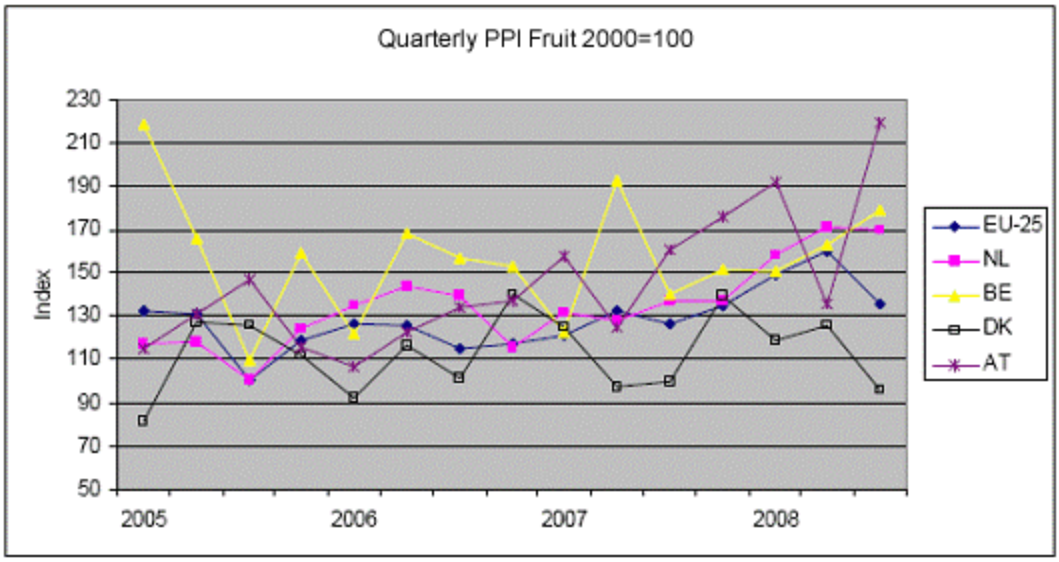
This is due in part to dependency on the weather, but also to the circumstance that fruit cultivation in these countries consists of a small number of products (apples and pears) that are grown in a small number of regions. By way of illustration, the index in the Netherlands depends on three products, i.e. apples (40%), pears (30%) and strawberries (30%). In France and also in Germany, the number of products counted in the index is larger. Moreover, there is less dependency on the weather in large countries; bad weather does not often occur throughout France or Germany (figures 2.7 and 2.8).

Figure 2.7 **PPI for fruit for the Netherlands and large neighbouring countries**



Source: Eurostat

Figure 2.8 **PPI for fruit for the Netherlands and small neighbouring countries**

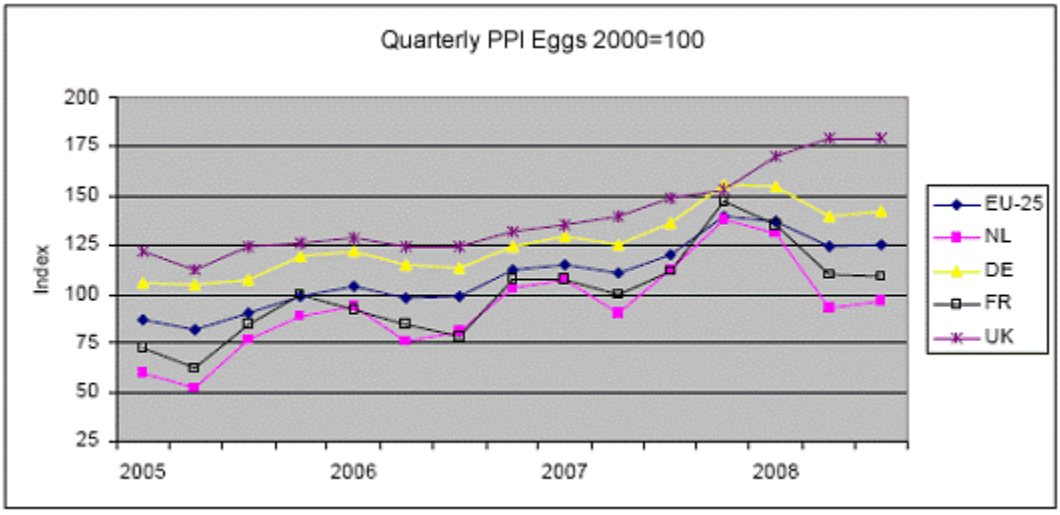


Source: Eurostat

Eggs

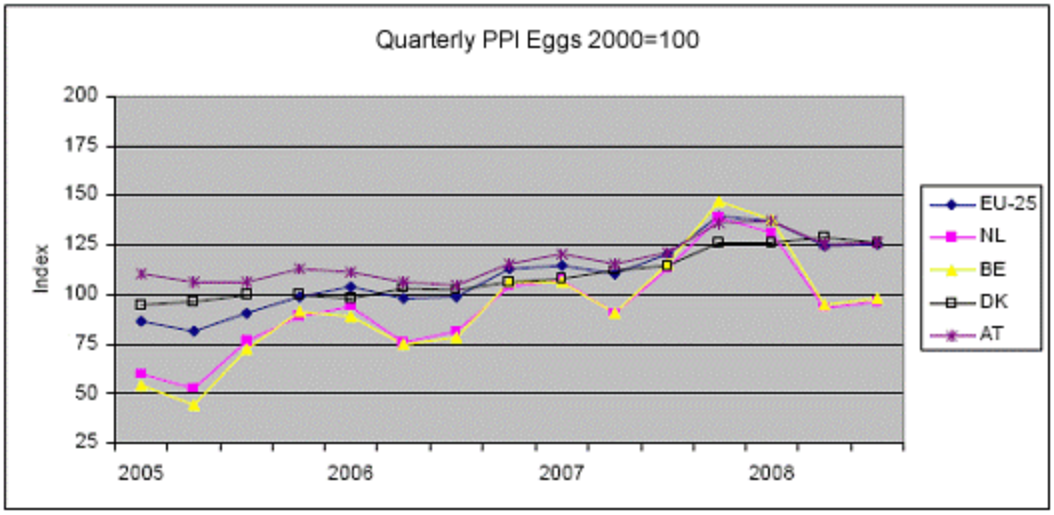
As in Belgium and in France, the producer prices of eggs in the Netherlands have risen less quickly relative to 2005 than elsewhere in the EU. A possible explanation as regards the Netherlands lies in the outbreak of avian flu in 2003. This resulted in the Netherlands temporarily losing a large part of its output and the country subsequently had to regain positions in the market. This explains in part why prices of Dutch eggs were relatively low early 2005. In contrast with most other European countries -– except Belgium and to a lesser extent France – the producer prices were far below the level in the reference year (2000). The producer prices of eggs in the Netherlands have remained relatively low, although the prices of eggs early 2008 expressed as prices of the reference year were at the same level as elsewhere in Europe. The prices in Belgium, France and the Netherlands fluctuate more than in other European countries. France and the Netherlands are large exporters of eggs and depend greatly on developments in the demand for imports in other European countries (figures 2.9 and 2.10).

Figure 2.9 **PPI for eggs for the Netherlands and large neighbouring countries**



Source: Eurostat

Figure 2.10 **PPI for eggs for the Netherlands and small neighbouring countries**



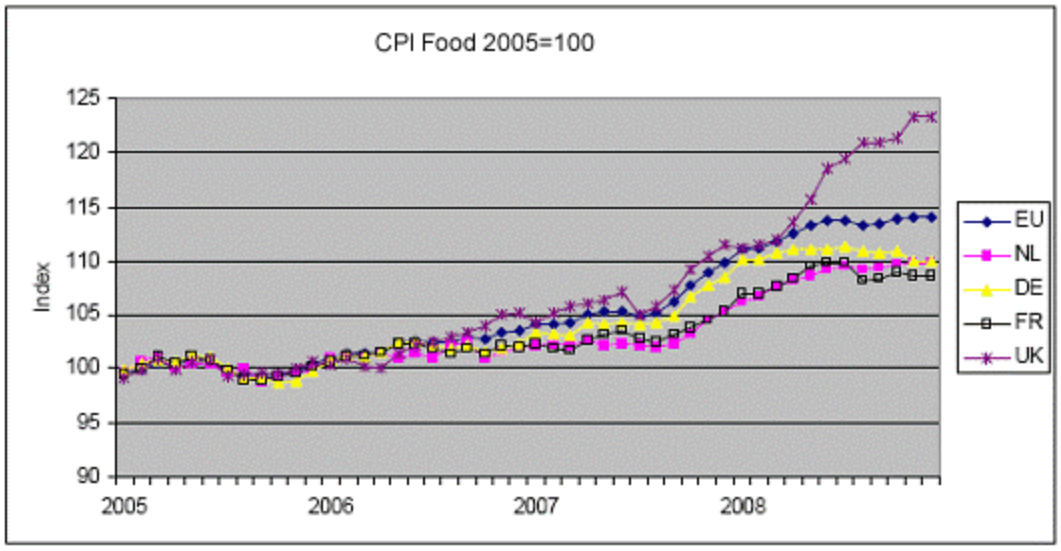
Source: Eurostat

2.2 Developments in consumer prices

In this section we will show the development of the consumer price index (CPI) for food, bread and grain, vegetables and fruit. The CPI for eggs is part of the CPI for cheese, milk and eggs. Due to the weighting of dairy produce in this index we will disregard it.

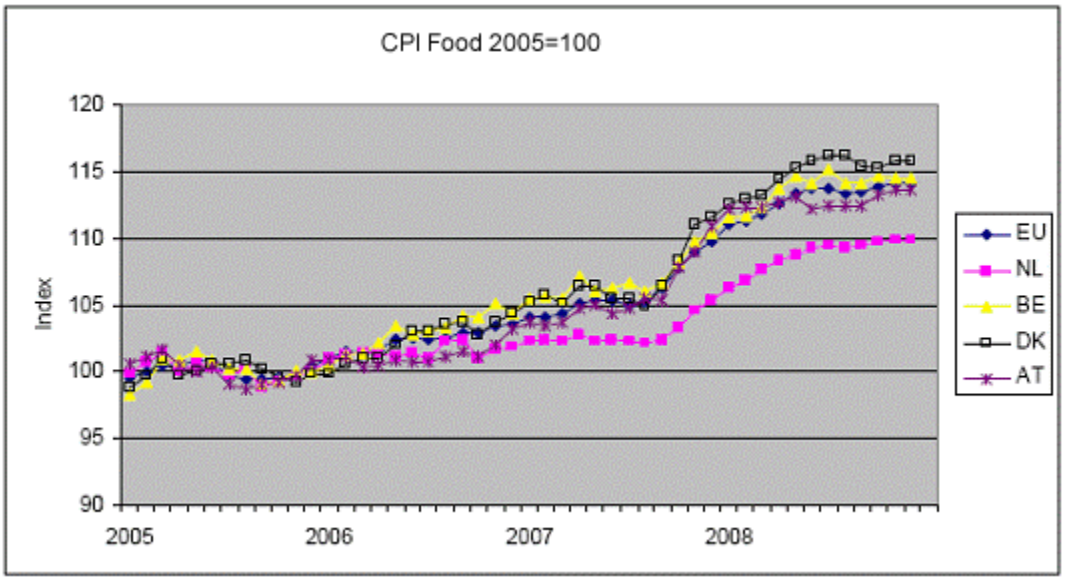
Food
The CPI of foods in the EU-25 has exhibited a sharply rising line since the second half of 2007, mainly due to the high prices of grain and milk and increasing energy costs. As in France and Germany, the price rises in the Netherlands have been significantly more moderate than in the UK, Belgium, Denmark and Austria. In Germany, the prices in 2007 increased a few months earlier than in the Netherlands. In the wake of the producer prices, the consumer prices in Germany have since fallen again, while this is not yet the case in the Netherlands. It should be noted that the prices in Germany and in the Netherlands are at the same level, at least in relation to the reference year. The strong increase in the CPI in the UK has been caused in part by the fall in the value of the pound against the euro (figures 2.11 and 2.12).

Figure 2.11 **CPI for food in the Netherlands and large neighbouring countries**



Source: Eurostat

Figure 2.12 **CPI for food in the Netherlands and small neighbouring countries**

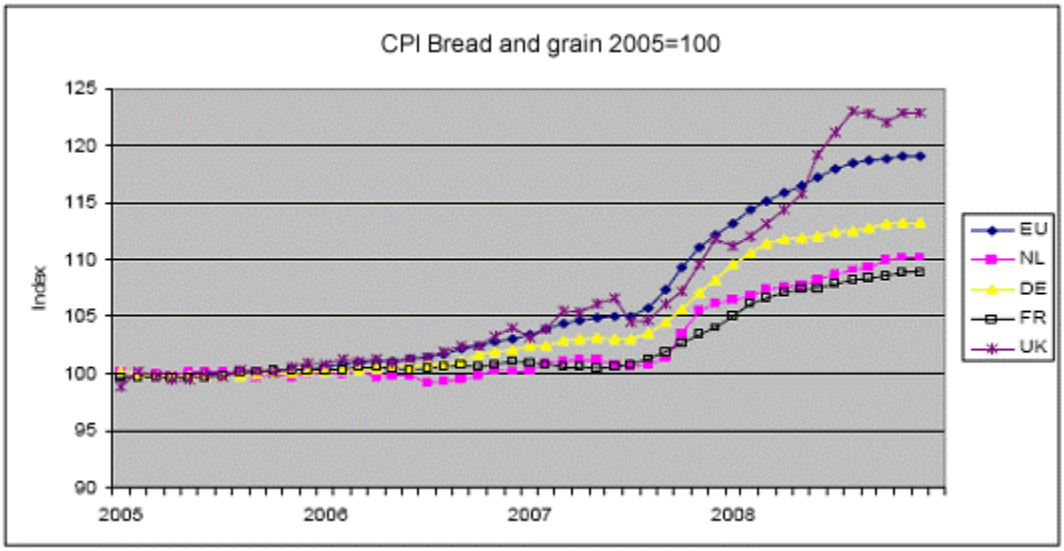


Source: Eurostat

Bread and grain

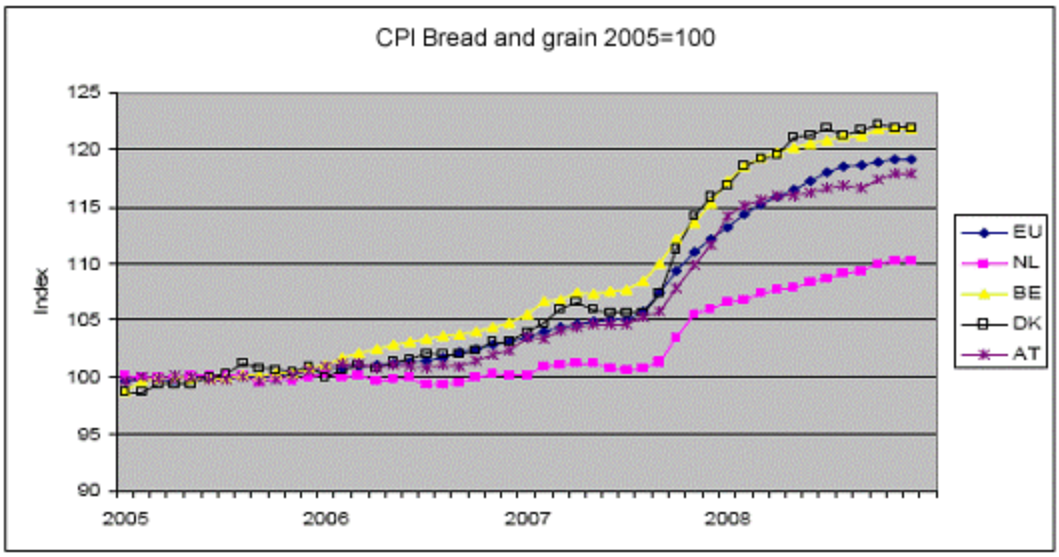
The CPI for bread and grain has risen relatively quickly in the EU-25 over the past 18 months. The Netherlands and France both exhibit a moderate price development. In Germany, but also in Belgium, Denmark, Austria and the UK, the prices of bread and grain products have increased significantly faster than in the Netherlands and France. Grain for Dutch bread consumption comes principally from France. The weak pound can be considered the most important cause of the strong increase of consumer prices for bread and grain products in the UK in 2008. It is noticeable that the CPI for bread and grain in France and the Netherlands remained the same until in the second half of 2007, while it exhibited a rising line in other Western European countries from 2006. There are large differences between the examined countries in terms of the development of the CPI. There might have been differences in purchasing policy and stock policy, which might have caused the diverging time span between price increase of the raw material (wheat) and of bread (figures 2.13 and 2.14).

Figure 2.13 **CPI for bread and grain in the Netherlands and large neighbouring countries**



Source: Eurostat

Figure 2.14 **CPI for bread and grain in the Netherlands and small neighbouring countries**

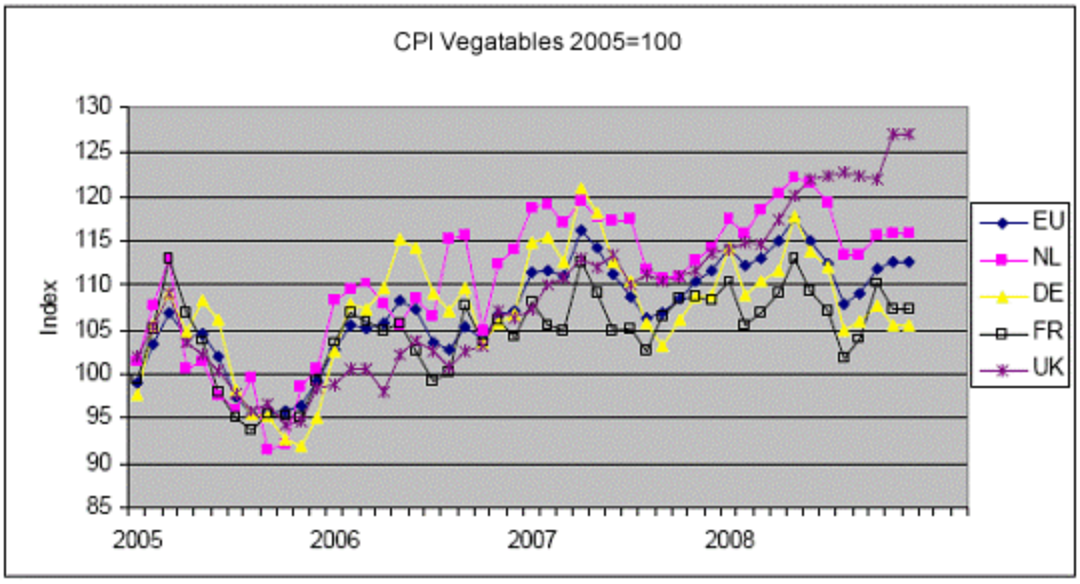


Source: Eurostat

Vegetables

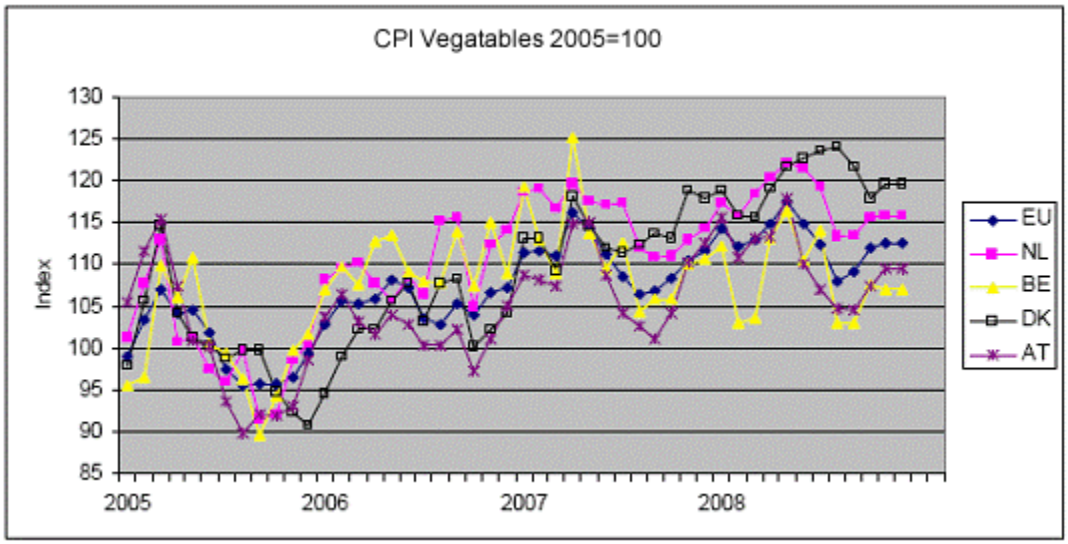
The development of the CPI for fresh vegetables in the EU-25 exhibits strong fluctuations, among other things because of the strong seasonal patterns of production. The underlying trend shows a rising price level. Consumer prices have risen faster in the Netherlands than in neighbouring countries with the exception of Denmark and the UK (because of the pound). It is noticeable that consumer prices have risen relatively fast in the Netherlands but producer prices have not (section 2.1). Part of the price development differences between the examined countries is explainable by differences in consumption patterns. The share (weighting) of one individual vegetable in the price index for vegetables depends on the budget share of the vegetable. These shares differ from country to country and even from season to season (figures 2.15 and 2.16).

Figure 2.15 **CPI for vegetables in the Netherlands and large neighbouring countries**



Source: Eurostat

Figure 2.16 **CPI for vegetables in the Netherlands and small neighbouring countries**

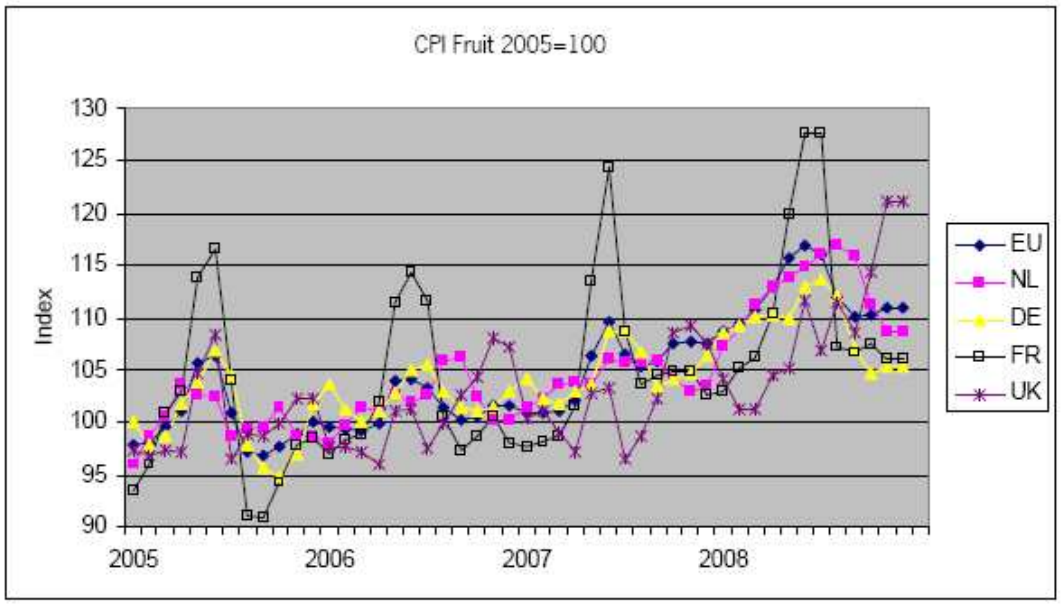


Source: Eurostat

Fruit

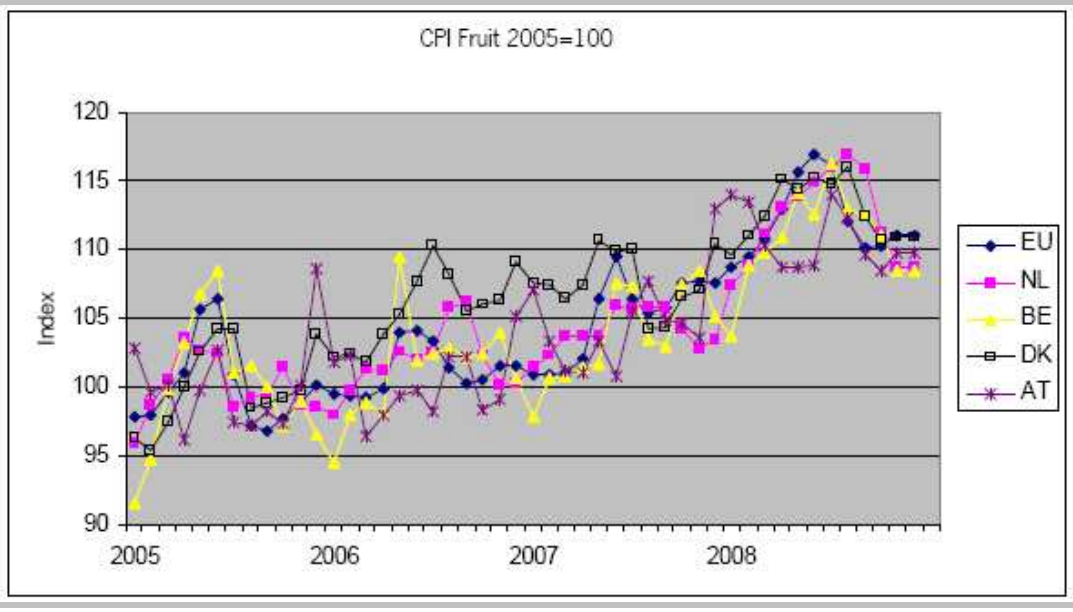
The CPI for fruit exhibits a similar picture to the one for vegetables. The price level is rising gradually in the EU and shows a clear seasonal pattern. The degree to which the consumer prices vary during the year differs from country to country. Particularly in France, consumer prices are subject to strong variances throughout the year. It should be noted that the composition of fruit consumption differs between the examined countries. The price development in the Netherlands is similar to that in the EU. Compared with 2005, the CPI in Germany rose slower on balance (year-end 2008) than in the Netherlands (figures 2.17 and 2.18).

Figure 2.17 **CPI for fruit in the Netherlands and large neighbouring countries**



Source: Eurostat

Figure 2.18 **CPI for fruit in the Netherlands and small neighbouring countries**



Source: Eurostat

2.3 Conclusion

The Dutch producer price indices (PPI) for wheat, potatoes, vegetables, fruit and eggs differ from the PPI elsewhere in Europe in the following respects:

- in the 2005-2007 period the Dutch PPI for potatoes exhibited a larger peak than the PPI in other western European countries;
- the Dutch PPI for fresh vegetables is below that of the other western European countries for almost the entire period from early 2005 to year-end 2008;
- the Dutch PPI for fresh eggs was below that of other West European countries almost throughout the entire period from early 2005 to year-end 2008. The Dutch PPI for eggs fluctuates relatively strongly.

The Dutch consumer price index differs from developments elsewhere in Europe in the following respects:

- the CPI for food, bread and grain products has risen significantly slower in the Netherlands and France than in other Western European countries;
- in the 2005-2008 period the CPI for vegetables increased faster in the Netherlands than in the other western European countries in the euro zone. This development contrasts with the development of the PPI for fresh vegetables.

3 Description of production and distribution chains

In this chapter we will describe the chains of the seven products examined in this report. They are the chains for bread, potatoes, onions, paprikas, cucumbers, apples and eggs. We will outline for these products the chain structure, the activities of companies, the market structure, the economic significance and finally the method of pricing. The description is focused more specifically on the following matters:

- description of the chain structure: which links make up the chains and how large are the streams in the chain?
- activities undertaken by companies, including alliances like purchasing and selling organisations;
- description of the market structure in each link: number of companies and distribution of turnover among the companies;
- description of the scale of production and added value in each link;
- relationship between the links concerned, in particular the method of pricing.

The chain diagrams were produced using production data in agricultural and horticultural figures (LEI), the Eurostat trading figures, input-output tables (IO tables), consumption data of a research agency supplemented by industry reports and data from Statistics Netherlands (Statline).
The distribution of turnover was measured according to the C4. C4 indicates the 'market share' of the four largest companies in the Netherlands. It should be noted that the Netherlands is not necessarily the relevant geographical market. In this study we will determine the market structure in the Netherlands. For the supermarkets, the C4 was determined using the turnover data provided by the research agency. This covers almost all supermarkets in the Netherlands. The turnover of one of the supermarket chains outside the panel of the research agency was requested by NMa and included in the analysis.
The added value was determined based on the chain diagrams and supplemented by information about incomes in the IO tables. The added value is equal to the wage bill and the profit: the remuneration for the production factors of labour, capital and land, or in other words the income that the chains generate for the Netherlands (Compaijen and Van Til, 1988).
The description is based on sector studies, industry reports, databases, information on internet sites and telephone calls with companies.
In the first seven sections, we will deal with the chains of the seven products. In the final section, we will devote more attention to the food retail trade.

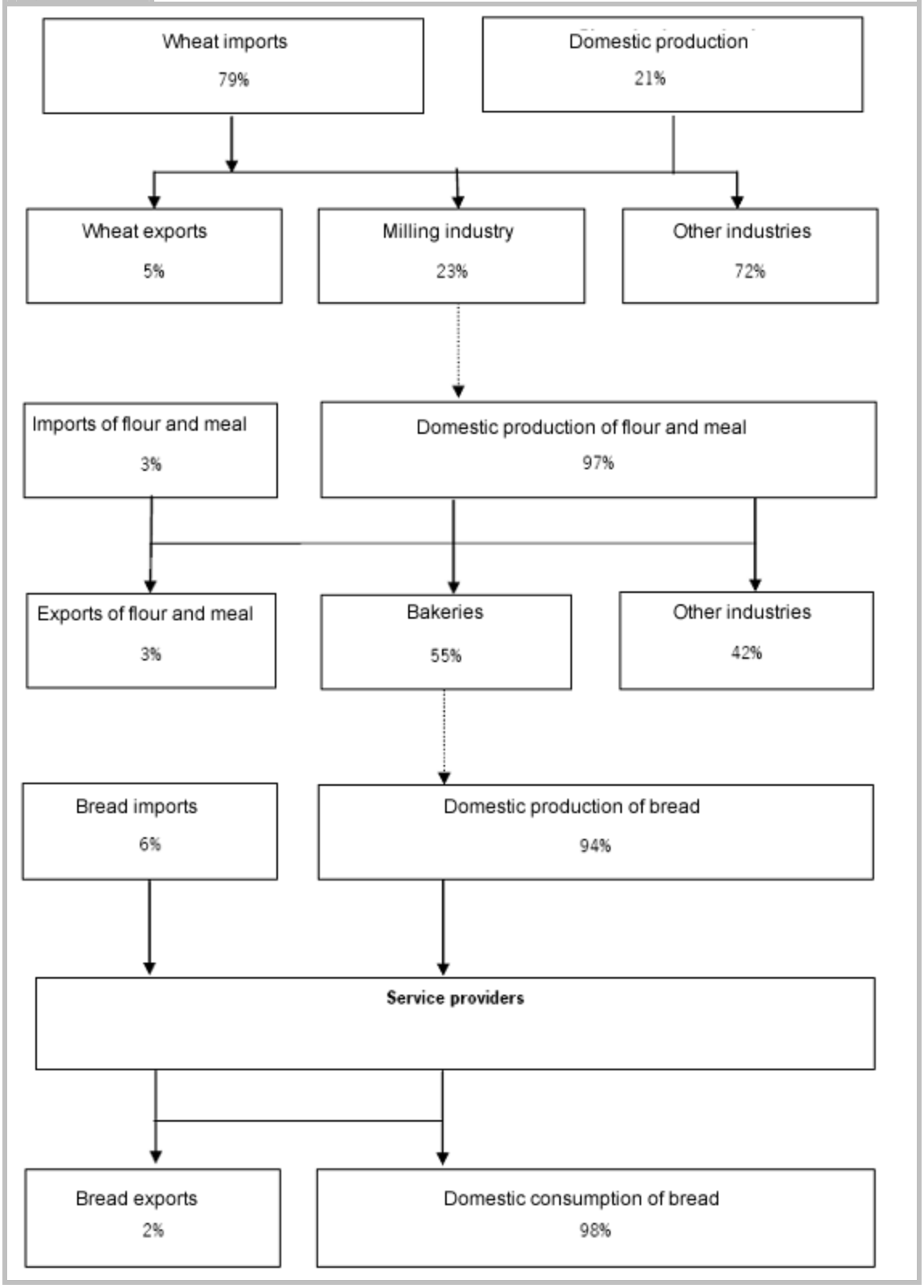
3.1 Bread

The bread chain has seven links. They are the production of wheat, the wholesaling of wheat, the production of flour, the wholesaling of flour, the production or bread, the wholesaling of bread and finally the bread retail trade.

The chain
The Netherlands is a net importer of grain (figure 3.1). Almost 80% of the domestic supply (5.6 million tonnes), the sum of imports and production, is obtained from other countries. One quarter of the supply is intended for the milling industry. Sixty percent of the supply is for the animal feed industry. Generally speaking, Dutch wheat is suitable as milling wheat to a limited extent. Therefore, the wheat for the milling industry comes mainly from other countries. It is estimated that one-quarter of the domestic wheat output is sold to Dutch millers (LEI, 2008, IO table). The Dutch wheat market is closely interwoven with the wheat markets in Belgium, France and Germany. The price differences differ hardly at all at the grower and wholesaler levels in the markets concerned on account of the intensive trading within north-western Europe (figure 3.1).
Producing meal and bread are primarily national activities. Imports and exports of meal and bread are both small. Meal is used in part for products other than bread.

Wheat imports, Domestic production, Wheat exports, Milling industry, Other industries; Imports of flour and meal; Domestic production of flour and meal; Exports of flour and meal; Bakeries; Other industries; Bread imports; Domestic production of bread; Service providers; Bread exports; Domestic consumption of bread

Figure 3.1 **Bread distribution diagram**



Activities

Wheat is produced by arable farms that grow a number of arable farming products with a view to the cropping plan and price ratios. Wheat is supplied to grain collectors including Agrifirm, CZAV, Agrarische Unie/Agerland and Blonk. The working area of the collecting companies is usually confined to a certain region of the Netherlands. Farmers and grain collectors both keep stocks. The time of sale depends on current and expected prices, storage and interest costs and the risk attitude adopted by the seller. Bread wheat is supplied to millers that in turn supply the bread and confectionery industry but also other companies in the food industry. Each day the bread industry delivers to supermarket branches. Unsold bread is taken back. This occurs largely via service providers.

Market structure and economic significance

A total of 13,000 agricultural farms produce wheat (see the Production link in table 3.1). While a large number of other companies are also active in the other links in the chain, the degree of concentration is reasonably high, particularly when sub-markets are taken into consideration. This applies in particular to the millers, where Meneba dominates production with a market share of more than 65% (source: Meneba and IO tables). There are still numerous bakeries in the Netherlands (2,500; CBS, 2009). However, in the industrial production of bread for sales to supermarkets, Bakkersland and Bake Five have a joint market share of 50-70% in the market for fresh bread and of 40-60% in the market for non-fresh bread (NMa, 2008). Both companies rely greatly on Dutch supermarket chains and vice versa. This is illustrated by the fact that one of the two interviewed bakeries obtains 65% of its turnover from its two largest customers and the other bakery 40% of its turnover.

Table 3.1 **Economic significance of bread chain**

	Number of companies	C4 (%)	Production value mln. €	Added value mln. €
Production	13.000	<2	200	50
Wholesalers	100	60-70	-	-
Millers	10	> 90	575	100
Bread industry	2.500	-	750	300
Chain stores a)	50	64	750	175
Retail traders b)	3.600	-	250	125

a) Supermarkets with 100 or more employees; b) bakers and confectioners and supermarkets with fewer than 100 employees.

The economic significance of the production of wheat and meal is small compared with the significance of the other links in the chain. The added value comes to only €50 million and €100 million, respectively. The economic significance of the bread and confectionery industry and the retail trade is large with an added value of €175 million and €125 million, respectively. Sales of brown, white and wholemeal bread loaves by supermarkets come to €550 million.

Pricing

Pricing is now virtually free of government intervention as a result of the dismantling of the EU agricultural policy. Grain prices increased sharply in 2007 for the first time in decades and then fell again in 2008. The grower can respond to this situation by holding grain stocks and by speculating. Growers are also able to limit the price risk by participating in a sales pool of the customer, which yields an average price for the selling season concerned. Growers that sell grain in a pool receive an advance price and a final settlement after the closure of pool depending on the financial results. Grain growers and customers can cover themselves against price fluctuations on (international) forward markets, within the EU in Hanover or Paris and outside the EU in Chicago.

Exchange committees issue price quotations on the growers' exchanges at Groningen, Goes and Middenmeer. Representatives of growers and traders sit on the committee. The price quotation of feed wheat on these exchanges provides a good reference point for arable farmers[2]. On the Rotterdam wholesale exchange, too, weekly quotations are set for wheat. However, the Rotterdam quotation for domestic grain was recently ended on account of the small number of transactions.

[2] Also see www.productschapakkerbouw.nl/teelt/marktprijzen/9.

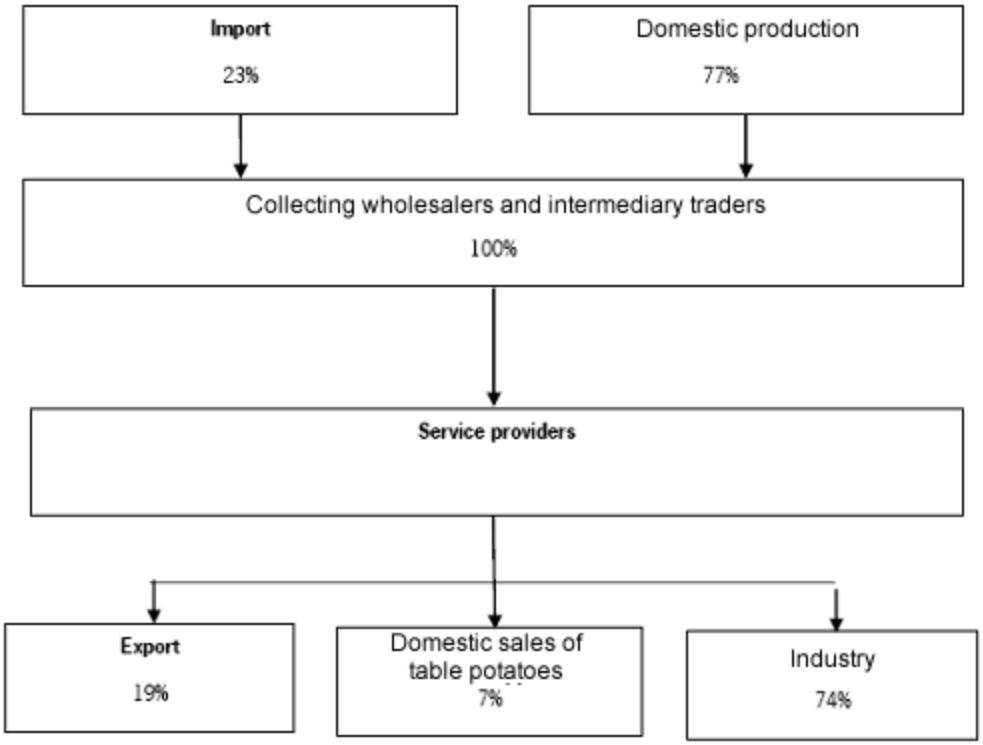
Supermarket chains agree annual contracts with the bread industry. In these contracts the supermarkets and bread industry agree product specifications, prices and other conditions of delivery. The prices are set for half a year or for a full year. The nature of the contracts differs, however. Some are in the form of a master contract, but some supermarket chains set down everything in exhaustive detail.

3.2 Potatoes

The table potatoes chain has three links. They are the production link, the wholesale link and the table potatoes retail link.

The chain
The Netherlands is a large producer of consumer potatoes. More than three-quarters of the domestic supply (5.1 million tonnes), the sum of imports and production, is produced in the Netherlands (figure 3.2). The rest is obtained from other countries. Three-quarters of the domestic supply is processed by the potato processing industry into products like French fries and crisps. One-fifth of the domestic supply is exported and 7% is sold in the Netherlands as table potatoes. The Dutch consumer potatoes market forms a single entity with the ones in Belgium, northern France and north-western Germany at the grower and wholesaler levels. Table potatoes have a limited shelf life so there are imports of table potatoes from the Mediterranean area from spring to summer.

Figure 3.2 Distribution diagram for consumer potatoes



Imports;Domestic production;Collecting wholesalers and intermediary traders;Service providers;Exports;Domestic sales of table potatoes;Industry

Activities
Like wheat and onions, consumer potatoes are produced by arable farmers that market a number of arable farming products with a view to the cropping plan and crop alternation on the one hand and price ratios on the other. Consumer potatoes are supplied to cooperative and private wholesalers like Agrico, Nedato, Werkman, Jansen Dongen and Schaap. Farmers and wholesalers both keep stocks. They sell and supply potatoes based on the expected price developments and the storage and interest costs. Apart from storage, other important activities of wholesalers are sorting, washing and packing. Some wholesalers, including Agrico, also refine and trade seeds and market a number of varieties. The collecting traders supply the distribution centres (DCs) of supermarkets largely via service providers, but also directly.

Market structure and economic significance
In the agricultural sector there are 7,000 farms that produce consumer potatoes (table 3.2). While a large number of other companies are also active in the other links in the chain, the degree of concentration is reasonably high. The market share of the four largest wholesalers amounts to 50%, while that of the four largest supermarkets comes to 60%. If the individual supplier/customer relationships are examined, the interdependency is greater. One of the three interviewed wholesalers sells 60% of its products to its largest customer and 20% to the second largest. Another wholesaler obtains 80% of its turnover in potatoes and onions from its two largest customers. The third wholesaler sells 30% of its products to its largest customer.

There are almost 4,900 potato retailers (specialist shops, market traders and small supermarkets). Consumers buy table potatoes more than other vegetables at the supermarket.

The agricultural sector has a relatively large share in the added value in the Dutch table potato chain. This stems not only from exports, but also from the processing of consumer potatoes. Three-quarters of Dutch output is processed. Nevertheless, the added value in arable farming is relatively low, because the sector supplies only unprocessed bulk products (LEB, 2006).

Table 3.2 **Economic significance of table potato chain**

	Number of companies	C4 (%)	Production value mln. €	Added value mln. €
Production a)	7.000	< 2	280	100
Wholesalers a)	205	50	425	30
Chain stores b)	50	68	180	40
Retail traders c)	4880	-	40	10

a) Consumer potatoes, including potatoes for the processing industry; b) Supermarkets with 100 or more employees, c) PVF specialist shops, market traders and supermarkets with fewer than 100 employees.

Pricing
Approximately 75% of consumer potatoes are sold under contract or on the free market via a pool or otherwise. The sale of potatoes via the free market or a pool yields on average a higher price than the contractual price (average 1999-2006 according to research commissioned by Countus, see Agrarisch Dagblad of 15 January 2009). As with grain, however, an evaluation of potato prices during a market year must take into account the costs of storage (interest, cooling, quality and weight loss).

In common with grain, the growers' prices are set weekly at regional exchanges and a wholesale price is set at the Rotterdam exchange. At regional exchanges the names given to the quoted products differ. They include potatoes suitable for chips, suitable for washing, and suitable for export (Emmeloord and Goes). The quotations of the Emmeloord exchange are the leading ones for the price level of consumer potatoes in the Netherlands.

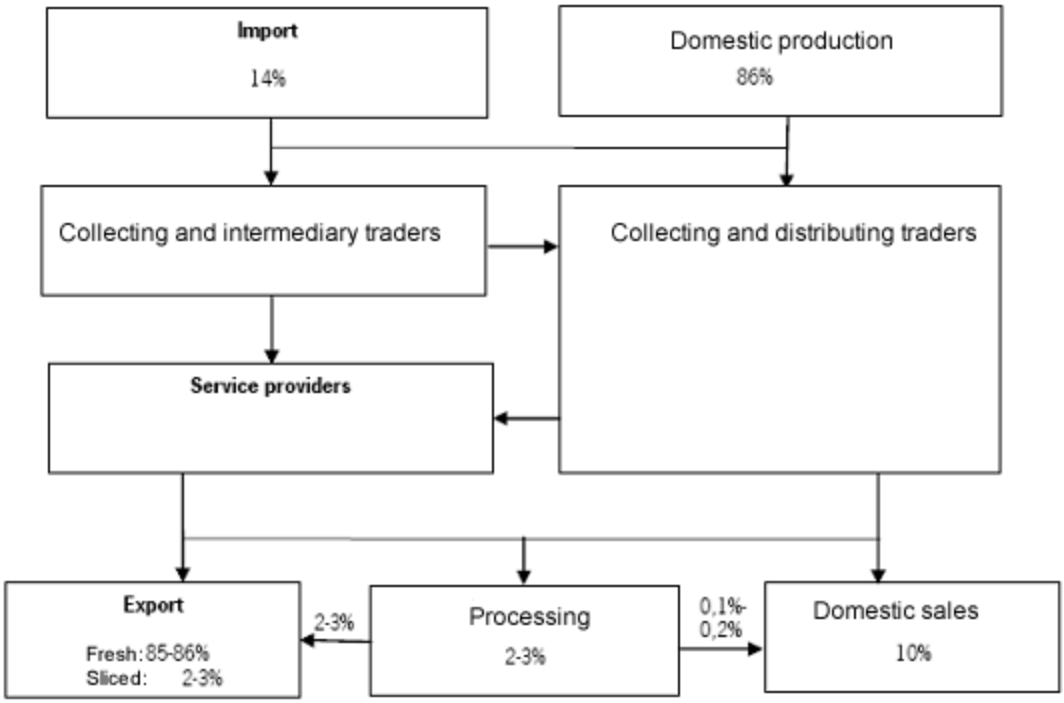
The purchasing price of table potatoes at supermarkets is established weekly. Supermarkets select a price and supplier based on the offers made by suppliers. Supermarkets and suppliers often agree a master contract for the period of the harvesting season (July-March) without setting a price. However, some supermarkets also set the purchasing price for a longer period of time.

3.3 Onions

There are three links in the chain for fresh onions. They are production, wholesale and retail. For sliced onions there is the additional link of processing.

The chain
The Netherlands is an important producer and exporter of seed onions (figure 3.3). Ninety percent of the domestic supply (880,000 tonnes) is exported. Imports make up less than 15% of the domestic supply. Seed onions are sold mainly on the fresh market (98%). Each year 15,000 to 25,000 tonnes of onions are processed. In the Netherlands 1.5 tonnes of sliced onions are sold via supermarkets (0.1-0.2% of the domestic supply). The rest (1.7% of the domestic supply) is mainly exported[3].

Figure 3.3 **Distribution diagram for seed onions**



Imports; Domestic production; Collecting and intermediary trade; Collecting and distributing trade; Service providers; Exports – Fresh – Sliced; Processing; Domestic sales

Activities
Like wheat and potatoes, seed onions are produced on arable farms. Onions are among the small arable farming crops in the Netherlands. A relatively large number of intermediary traders are active in the onion chain. They purchase at their own risk to resell onions to distributing wholesalers. Intermediary traders also sort and pack onions. The intermediary traders distribute some of the onions or resell them to the distributing wholesalers. Crucial variables for the distributing traders are volume, management of the accounts receivable risk and paperwork. Some distributing wholesalers are the same ones that distribute table potatoes, like Jansen Dongen. Other customers are Wiskerke Onions, Waterman and TOP Onions. Onions are processed by a few relatively large processing companies, but there are also some growers that clean and pack onions themselves, particularly for the local market. Some wholesalers deliver onions directly to supermarket chains. Supermarket chains like Albert Heijn that have contacted service providers to deliver potatoes, vegetables and fruit to the DCs leave this to the contracted service providers.

[3] Onions are sown or planted. The yellow 'bulk onion' and also red onions are sown. Shallots and spring onions are planted.

Market structure and economic significance
There are 3,500 farms in the agricultural sector that produce seed onions (table 3.3). The wholesale trade in onions is concentrated to a small extent. The five largest traders jointly have a market share of approximately 35%. The concentration in the retail trade is large, however. As with table potatoes, consumers buy onions more than other vegetables at chain stores. Supermarkets sold €31 million of unsliced onions (30 million kg) and €8 million of sliced onions (1.5 million kg) in 2008.

In the Dutch seed onion chain, the agricultural sector and the wholesalers have a relatively large share in the added value on account of the large volume of exports.

Table 3.3 Economic significance of seed onion chain

	Number of companies	C4 (%)	Production value mln. €	Added value mln. €
Production	3.500	< 5	100	25
Wholesalers	-	35	175	15
Chain stores a)	50	69	40	10
Retail traders b)	4.880	-	10	2

a) Supermarkets with 100 or more employees, b) PVF specialist shops, market traders and supermarkets with fewer than 100 employees.

Pricing
Relatively few onions are grown at a fixed contractual price, i.e. less than 10%. The largest proportion of onions is grown for the free market, but there are also pools for average pricing in the same way as occurs with potatoes. However, contractual prices do give the producer greater certainty. The contractual prices for onions in the 1999-2006 period would have been lower than the free market and pool prices, respectively (Countus, 2009).

Weekly price quotations are set for onions at the exchanges of Goes, Emmeloord, Dronten, Middenmeer and Leeuwarden. A distinction is made between two qualities, namely 30% coarse and 60% coarse. A quotation for class I onions is also set in Goes. Emmeloord recently started giving a quotation for biological onions[4]. The quotations are usually ended in the month of June (end of season) and resumed after a break of one-and-half to two months in the second half of August.

Supermarket chains generally agree a master contract that stipulates the price and a weekly minimum volume for a season (July-March). Additional orders are placed at the agreed price. The transaction costs for the onion bulk product are too high to negotiate week in, week out on the price of onions.

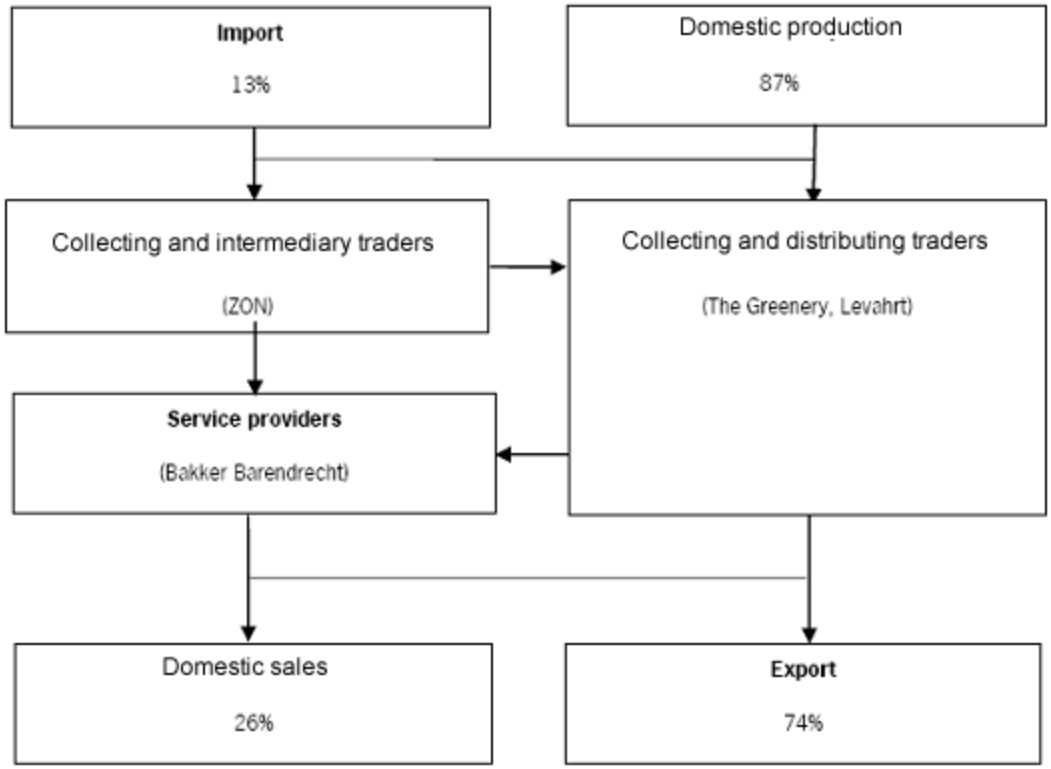
3.4 Cucumbers

The cucumber chain has three or four links. They are production, collecting and distributing wholesalers and retailers.

The chain
The Netherlands is an important producer and exporter of cucumbers. Three-quarters of the domestic supply (500,000 tonnes) is exported. Imports are less than 15% of the domestic supply (figure 3.4). Imports occur mainly in winter because production is not profitable in that season on account of the cold weather and the small number of daylight hours. Cucumbers are sold mainly on the fresh market. Unlike products such as paprikas, cucumbers are a homogenous product.

[4] Also see www.productschapakkerbouw.nl/marktprijzen/7.

Figure 3.4 **Distribution diagram for cucumbers**



Imports; Domestic production; Collecting and intermediary traders (ZON); Collecting and distributing traders (The Greenery, Levahrt); Service providers (Bakker Barendrecht); Domestic sales ;Exports

Activities

Cucumbers are one of the major products grown in greenhouses. Growers sell their products through growers' associations and/or sales organisations. Komosa, the largest growers' association for cucumbers, arranges sales itself. Most growers' associations have an exclusive relationship with one sales organisation, but there are also growers' associations that allow the growers freedom to choose a sales organisation (Friskom and Westveg).

Growers' associations are responsible primarily for two activities:

1. In consultation with their customers, they take care of the logistics and marketing of their products. This includes such activities as collecting, sorting and packing products, quality care, certification, stock management and supply planning. Some growers' associations actively develop products and market brands.
2. The associations protect the interests of growers in relation to wholesalers and retailers. The object of growers' associations is to achieve better purchasing and selling prices for their members. Growers' associations try to eliminate intermediary traders as far as possible. One-quarter of the associations deliver directly to the distribution centres of Dutch supermarket chains.

Wholesalers act as a link between growers' associations and supermarket chains. The primary task of wholesalers is to collect vegetables and fruit from a large number of specialised growers and to distribute a total package of vegetables and fruit to a small number of large customers. Wholesalers generally have a take-up obligation towards growers. For example, Versdirect.nl UA and wholesalers Combilo, Levahrt and Scherpenhuizen determine from year-to-year from which growers of growers' association Versdirect.nl UA the wholesalers will collect cucumbers during the year. Deliveries to supermarkets are handled primarily by the general food wholesalers and the service providers that specialise in vegetables and fruit. Other activities of wholesalers include packing vegetables and fruit, quality control, product development and public relations.

Market structure and economic significance
There are 250 companies in the horticultural sector that produce cucumbers (table 34). They are organised into eight growers' associations that account for 90% of the Dutch crop area. Apart from the primary production, there is a high degree of concentration throughout the chain. The four largest growers' associations (Friskom, Komosa, Versdirect Teelt and Westveg) bundle 67% of the Dutch supply. The four largest sales organisations (The Greenery, Haluco, Komosa and Vers Direct Nederland) sell an estimated 65% of the Dutch supply. Over the past 15 years major changes have occurred in the market shares of the sales organisations. Concentration in The Greenery was followed by de-concentration mainly in favour of new sales organisations concentrated around one product or a small number of products.

The added value is earned primarily in the horticultural sector. The added value is relatively large compared with the added value in the wholesale and retail trades on account of the large volume of exports.

Table 3.4 Economic significance of cucumber chain

	Number of companies	C4 (%)	Production value mln. €	Added value mln. €
Production	250	5	250	100
Growers' associations	8	67	250	-
Sales organisations	-	65	250	-
Wholesalers	90	-	330	25
Chain stores a)	50	72	65	10
Retail traders b)	4.880	-	15	3

a) Supermarkets with 100 or more employees, b) PVF specialist shops, market traders and supermarkets with fewer than 100 employees.

Pricing
There are a number of differences in the way that sales organisations and wholesalers determine payout prices for cucumbers. The differences relate to whether the sales organisations and wholesalers sell the products on the day that the products are supplied or later, and to the party that bears the price risk.

1. Veiling ZON sells the entire supply of products on the day of delivery through an auction clock and mediation and determines the payout price based on the obtained revenues. ZON does not keep any stocks and after the sale the customers are the owner of the product.
2. In the case of parties such as The Greenery and Versdirect.nl UA, the payout price is set on the day that the growers deliver the cucumbers based on the expected revenues. The stock risk rests with the customers that sell the stocks based on brokering. The supplied cucumbers are stocked for up to five days. The role of the auction clock is virtually finished. Sales organisations generally consult with the growers' associations on the bandwidths within which the sales organisations are allowed to agree prices with supermarket chains. The sales organisations deduct commission from the payout prices to cover selling and logistical costs.
3. In the case of growers' associations that arrange sales themselves, the stock risk rests with the growers. The payout price is the outcome of the obtained revenues.

Supermarket organisations ask the cooperative sales organisations and wholesalers to make an offer. The supermarket organisations choose the cheapest suppliers based on the offers. Price and delivery arrangements are of a short-term nature. The week trade and day trade flourished as never before in 2008. A small number of supermarket chains conclude long-term contracts with service providers and growers. The situation in this chain is probably that the price is not set for a prolonged period of time.

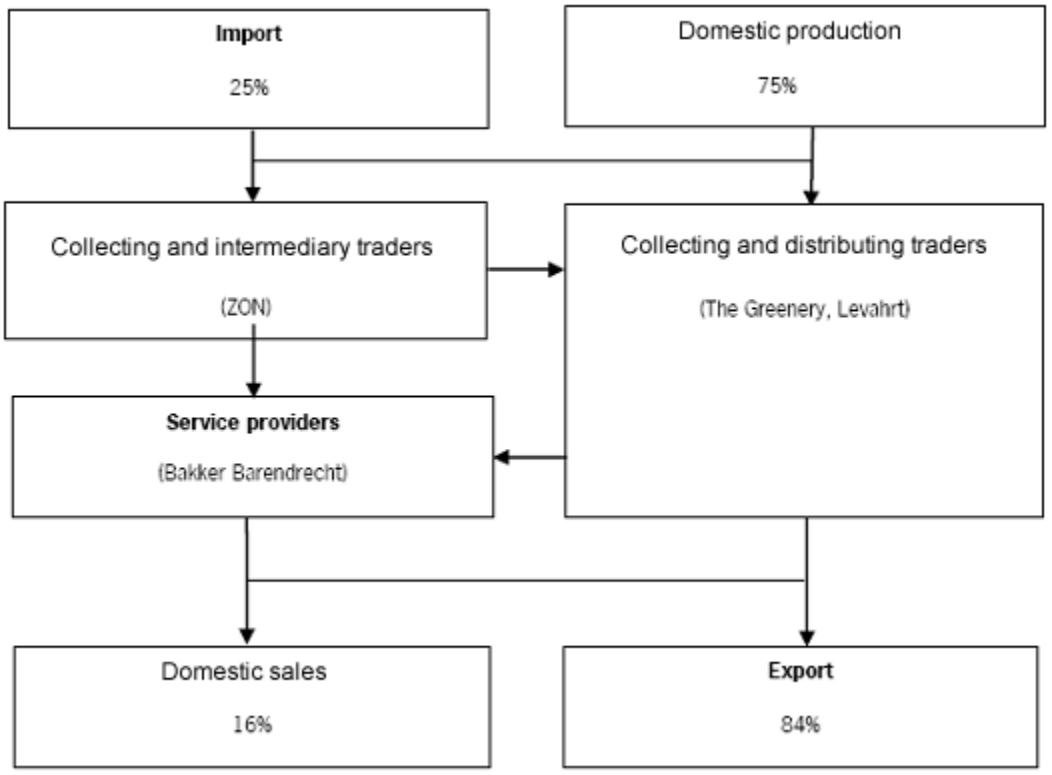
With the disappearance of the auction clock at the large sales organisations, especially The Greenery, there are now only a small number of public cucumber quotations. They represent only a small part of the market.

3.5 Paprikas

The paprika chain has three or four links. They are production, collecting and distributing wholesalers and retailers. The description of the paprika chain is slightly shorter than the one given for the cucumber chain because of the similarity between the two chains.

The chain
The Netherlands is an important producer and exporter of paprikas. Almost 85% of the domestic supply (425,000 tonnes) is exported (figure 3.5). Imports make up one-quarter of the domestic supply. As in the case of cucumbers, imports of paprikas occur mainly in winter, when production is not profitable in the Netherlands. Paprikas are sold mainly on the fresh market. Paprikas are differentiated according to features like colour.

Figure 3.5 **Distribution diagram for paprikas**



Imports; Domestic production; Collecting and intermediary traders (ZON); Collecting and distributing traders (The Greenery, Levahrt); Service providers (Bakker Barendrecht); Domestic sales; Exports

Activities
Paprikas are one of the major products grown in greenhouses. They are sold via growers' associations and (cooperative) sales organisations. The growers' associations sell paprikas themselves or via a sales organisation. FrEsteem and Rainbow handle sales themselves. Most growers' associations have an exclusive relationship with one sales organisation, but there also some that allow growers the freedom to choose a sales organisation (such as Westveg). Refer to the previous section for a description of the activities of growers' associations and sales organisations.

Market structure and economic significance
There are 350 companies that grow paprikas (table 3.5). The paprika supply is bundled into 19 growers' associations that account for 94% of the Dutch crop area. Apart from primary production, there is a high degree of concentration throughout the chain. The four largest growers' associations (FrEsteem, Pamosa, Quality for U and Versdirect.nl UA) account for 50% of the supply. The four largest sales organisations (FresQ, The Greenery, Versdirect.nl UA and ZON) sell three-quarters of the Dutch output.

The added value is earned primarily in the horticultural sector. The added value is relatively high compared with the added value in the retail trade on account of the large volume of exports. The added value is relatively high compared with the wholesaler trade because production is labour-intensive and capital-intensive.

Table 3.5 Economic significance of the paprika chain

	Number of companies	C4 (%)	Production value mln. €	Added value mln. €
Production	350	5	425	175
Growers' associations	19	50	425	-
Sales organisations	-	75	425	-
Wholesalers	90	-	625	45
Chain stores a)	50	61	45	10
Retail traders b)	4.880	-	15	3

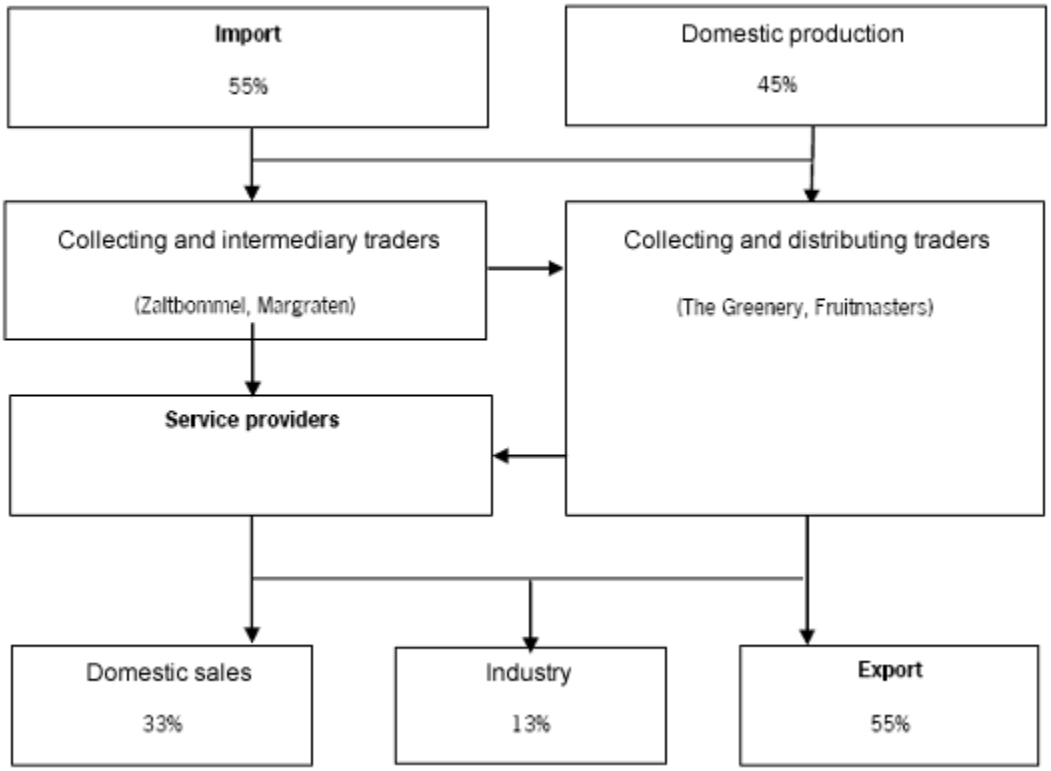
a) Supermarkets with 100 or more employees, b) PVF specialist shops, market traders and supermarkets with fewer than 100 employees.

3.6 Apples

The chain for fresh apples has three links. They are production, wholesalers and retailers.

The chain
The Netherlands is self-supporting for apples because imports and exports balance each other. Nevertheless, imports and exports are relatively large on account of transit, seasonal patterns and differences in varieties. Of the domestic supply, 55% is imported and exported (figure 3.6). Imports come from the southern hemisphere in spring and summer. Apples are imported from European countries in autumn and winter.

Figure 3.6 **Distribution diagram for apples**



Imports; Domestic production; Collecting and intermediary traders (Zaltbommel, Margraten); Collecting and distributing traders (The Greenery, Fruitmasters); Service providers; Domestic sales; Industry; Exports

Activities

The apple is the most important product of the Dutch fruit growing sector. A large proportion of the growers of hard fruit combine the production of apples and pears. Growers supply apples to cooperative auctions and trading houses, including Fruitmasters (35%), The Greenery (30-40%), Veiling Zaltbommel (5-10%) and CFV Zuid-Limburg (10%). The growers usually supply the fruit directly to the auctions and do so in an unsorted, sorted or packed condition. Sorted and packed apples are offered for sale directly. There are a small number of growers' associations. They are organised around new varieties and carry out such activities as joint storage and refrigeration. In this respect, the apples chain differs from the cucumber chain or the paprika chain where growers' associations bundle 90% of the supply and undertake numerous activities. The cooperatives carry out activities like sorting, packing, logistics, storage and refrigeration, quality policy on food safety and hygiene and promotional activities. Fruitmasters Holland has its own varieties and brands, but also supplies products marketed under house brands. The trading houses delivery to the distribution centres of the supermarket chains and agree such matters as packing, brand policy, quality policy and promotional activities with the supermarket chains. The trading houses engage in customer loyalty by providing services in respect of these matters. The Greenery and Fruitmasters supply apples to the DCs, but sometimes there are also service providers between these two links.

Market structure and economic significance

There are more than 1,600 apple producers in the Netherlands. The wholesale trade is concentrated. Fruitmasters and The Greenery collect and distribute three-quarters of the apples. The rest is handled by small cooperatives. However, there is fragmentation in deliveries to Dutch retailers. Delivery takes place via a large number of service providers. The market share of one of the larger wholesalers in sales to large retailers amounts to only 10-15%, for example. The smaller cooperatives do less in the way of exports and sell primarily in the Netherlands. Roughly half the added value is earned in the growing of fruit (table 3.6).

Table 3.6	Economic significance of the apple chain			
	Number of companies	C4 (%)	Production value mln. €	Added value mln. €
Production	1.600	< 5	110	55
Wholesalers	10	85-95	450	30
Chain stores a)	50	75	140	30
Retail traders b)	4.880	-	40	8

a) Supermarkets with 100 or more employees, b) PVF specialist shops, market traders and supermarkets with fewer than 100 employees.

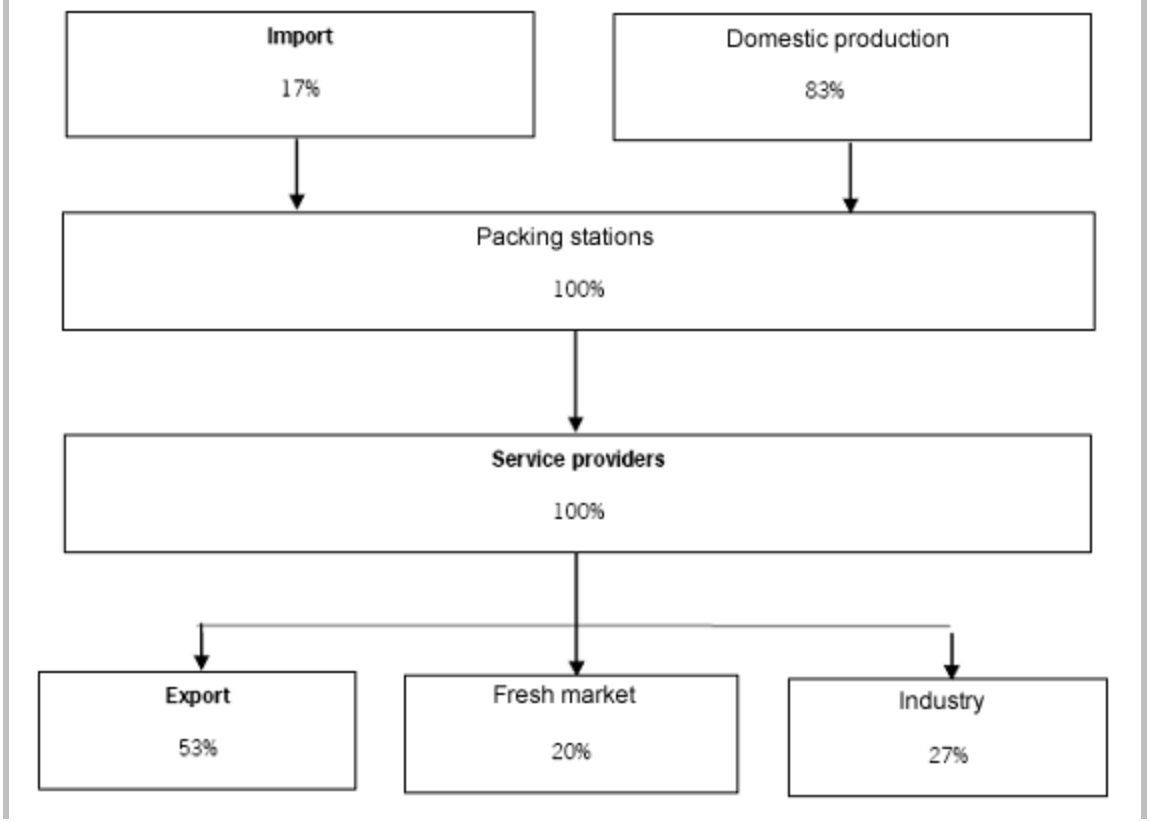
Pricing

Prices are determined through negotiations conducted by telephone between the cooperative trading houses and the supermarket chains. These cooperatives are benchmarked week in, week out. Long-term contracts play a modest role. The growers' prices are a derivative of the revenues of the cooperatives. The auction clock plays a larger role in the selling of apples than in the selling of fruiting vegetables, particularly at Zaltbommel. The apples remain the property of the grower until the time of shipment, even if the grower has given the apples to the cooperative for safekeeping. Decisions on sales are taken by the sellers of the cooperatives in consultation with the growers.

3.7 Eggs

There are basically three links in the production of eggs. They are production, wholesaler and retailer. However, production is subdivided into laying hen farms and parent and grandparent companies that supply the laying hens.

Figure 3.7 Distribution diagram for eggs



Imports; Domestic production; Packing stations; Service providers; Exports; Fresh market; Industry

The chain
The Netherlands is a net exporter of fresh eggs. Only 17% of the domestic supply (11.4 million eggs), the sum of imports and production, is obtained from foreign countries (figure 3.7). More than 50% of the domestic supply is exported. One-quarter of the supply goes to the food industry and one-fifth to the domestic fresh market. Eggs are differentiated according to colour, size and production method (farm, cage, biological and free range). Dutch supermarkets no longer sell cage eggs.

Activities
Eggs are generally produced by specialised owners of laying hens. Virtually all eggs produced in the Netherlands are delivered to Dutch packing stations. The eggs for the fresh market are packed by the packing stations and then delivered to supermarket chains and the distributing wholesalers. There are a number of mixed feed companies that are forward-integrated in the production and the packing stations. The farmer provides labour and buildings in return for payment. Some laying hen farms are forward-integrated in the packing stations. These are small packing stations that fulfil a regional function. Service providers transport the eggs to the DCs, but this is also done by repacking stations.

Market structure and economic significance
There are 1,250 laying hen farms (table 3.7), including 500 that specialise in the production of eggs. There is a large degree of concentration in the packing stations. The four largest packing stations for farm eggs (Kwetters, Van Beek, Weko and Van Zetten) jointly have a market share of 60-65%. The dependency of an interviewed repacking station on Dutch supermarkets is small. The largest two customers account for 13% of the sales.

The economic significance of the distribution of eggs is small. The added value is earned mainly in the agricultural sector. It should be noted, however, that 80% of the produced eggs are sold to Dutch industry and abroad. The farm eggs turnover of supermarkets amounts to €135 million.

Table 3.7 **Economic significance of the fresh egg chain**

	Number of companies	C4 (%)	Production value mln. €	Added value mln. €
Production	1.250	< 10	325	75
Wholesalers	100	60-65	450	25
Chain stores a)	50	66	135	30

a) Supermarkets with 100 or more employees.

Pricing
Eggs are generally supplied at weekly prices (Tacken et al, 2003). In the past some of the produced eggs were auctioned weekly at the egg auctions of ESB Ei-service and Evadag. Today the physical trading of eggs occurs only at the Barneveld market. After the ending of the egg auction in 1995, the Nederlandse Organisatie van Pluimveehouders [the Netherlands Organisation of Poultry-farmers] ('NOP') started issuing a weekly price quotation for cage eggs. Since 2004 there has also been a weekly quotation for farm eggs.

The weekly quotation is the maximum price that will be paid out to the poultry-farmer. Depending on the scale of the weekly delivery, the quality of the eggs and the distance relative to the packing station, a discount will be deducted from this price.

NOP's weekly target price is based on the German Weser-EMS quotation for eggs, the Amsterdam wholesaler quotation and market information of packing stations and of manufacturers of egg products. A large proportion of the produced farm eggs are sold based on NOP's weekly target price. Some poultry-farmers have a fixed-price contract with a packing station. These contracts usually run for the duration of the laying period (14 months) and sometimes there is also a fixed-price contract with a feed price correction.

The wholesale prices are established via tendering. Suppliers can tell the supermarkets the price at which they are willing to deliver. Contracts are concluded for eggs for terms of six months to a full year, under which the price is set for the agreed term.

3.8 Food retail trade

This section examines activities in and the market structure of food retailing. The descriptions of activities and market structure are of a generic nature and not product-specific.

Activities
On the purchasing side the core tasks of food retailers are purchasing, logistics and stock management. Suppliers deliver products to the distribution centres of the supermarket chains, from where the supermarkets deliver to their branches. Distribution nowadays depends not only on managing logistics, but also on managing information. The supplying of branches and distribution centres is linked to the data scanned at the cash desk. On the selling side, the core tasks include the layout of the shop floor and shelves, the choice of product ranges, price determination and promotional activities. Supermarkets are providing more and more service to consumers, such as home delivery, electronic ordering and a wide array of payment possibilities and other financial services. The profiling of supermarket chains is being strengthened by the selling of house brands. Supermarkets are issuing an increasing number of more stringent product specifications for house brands and also for other products. This occurs particularly with respect to food safety.

Market structure
The food trade is dominated by 25 purchasing organisations to which 40 supermarket formats are affiliated. These chains together have 5,240 branches. Additionally, there are 460 'independent' supermarkets. Purchasing and selling in the supermarket channel has been concentrated (table 3.8). The largest four purchasers hold a market share of 87%. On the selling side the supermarkets are less concentrated. The top four have a market share of only 60%.

Great differences exist between Dutch supermarket chains. Albert Heijn is centrally organised to a significant degree. Super de Boer and C1000, on the other hand, are franchise organisations that allow their franchisees a great degree of autonomy. The franchisees decide such matters as the product range that they sell and the selling prices.

Table 3.8 Market share of purchasing organisations and supermarket formats

Purchasing		Selling	
Format	**Market share**	**Format**	Market share
Superunie	34,4	Albert Heijn	29,5
Albert Heijn	29,5	C1000	14,3
Schuitema	14,3	Aldi	8,9
Aldi	8,9	Super de Boer	7,3
Others	12,9	Others	40,0

Superunie handles purchasing for 20 small supermarket chains. The Koop-Consult formats (Dirk, Bas and Digros) joined Superunie in 2008. Schuitema (C1000) will probably follow in 2009. Superunie is the most important alliance in purchasing by Dutch supermarkets. The other chains (Albert Heijn, Super de Boer, Aldi and Lidl) handle purchasing independently. Superunie negotiates prices, draws up master contracts, sends out invoices and carries out quality control. All other matters are determined by the purchasing managers of the members of Superunie. But the supermarkets that purchase via Superunie also have some freedom with regard to purchasing. For example, the independent companies that fall under an interviewed supermarket chain have an obligation to make 90% of their purchases from the parent organisations, but are free to purchase 10% elsewhere. The independent companies make use of this possibility and this keeps the central purchasing organisation alert.

This means that purchasing is less concentrated than the above figures suggest. The small supermarket chains that purchase via Superunie are supplied to a significant extent by national and regional wholesalers.

Superunie bundles the demand of a number of supermarket formats. Superunie gets suppliers to submit an offer, evaluates the received offers, sometimes conducts a last lap and sends the participating supermarkets an overview of the offers. Based on this overview, the participating supermarkets choose a supplier, volume and price. Some of the purchasing conditions are regulated under the master contract with Superunie. This process takes place for seasonal, weekly and daily arrangements.

The difference between Superunie members – from discounter all the way through to convenience supermarket – manifests itself mainly in the selection of products (size, quality). There are also differences between supermarket chains and formats in terms of their wishes for transport, containers, packages, packaging, packaged quantity and so on.

Suppliers of potatoes, vegetables and fruit are selected on a weekly and daily basis, based on the price that the supplier offers. Supermarkets agree annual contracts with suppliers of bread, milk and eggs.

4 Contractual conditions

Ten in-depth interviews were conducted to establish what the conditions of delivery are that suppliers and supermarkets agree with each other and how those conditions are established, or in other words how negotiations take place. This chapter was written on the strength of ten interviews with five representatives of supermarket chains and five representatives of suppliers. There were also short telephone conversations with suppliers.

The questions in the interviews centred on four themes:
1. General information;
2. Negotiations;
3. Prices, discounts, other financial contributions and risks;
4. Ending of the relationship and differences of opinion.

4.1 General information

Dutch supermarkets obtain the products examined in this report mainly from the Netherlands except in periods when few if any Dutch products are available on the market. Cucumbers and paprikas come from Spain in winter. Onions, potatoes and apples come from the Mediterranean Sea area in spring. Bread and eggs are obtained from the Netherlands all year round.

The geographical market for the products in question is larger than the Netherlands. The market is a national one only for bread because it is fresh each day and also because bread in the Netherlands differs from that in neighbouring countries.

The supermarket chains have a limited number of suppliers for all products. The number varies from one to five. Supermarkets use a limited number of suppliers to guarantee security of supply, quality and competition.

The share of the largest Dutch customer (supermarket chain) in turnover varies among the interviewed suppliers from 7% to 60%. The share of the two largest Dutch customers in the turnover varies from 13% to 80%.

Given the two findings above it may be concluded that the interdependence between suppliers and supermarket chains is great and becoming greater all the time in view of the consolidation in the food industry, agriculture/horticulture and wholesaling.

Service providers provide much of the transport from supplier to distribution centre. The largest supermarket chain in the Netherlands, Albert Heijn, has contracted a number of service providers to perform transport and other activities. There are also suppliers that provide their own transport. This applies, for example, to the large fruit and vegetable cooperatives. The smaller supermarket chains get the vegetable and fruit cooperatives to transport the products to the DCs in many cases. In this respect the cooperatives have a comparative advantage on account of the high utilisation of capacity that they can achieve. Unlike the other products, bread is transported directly from the bakeries to the supermarket branches. Bread is fresh every day and is removed from the shelves after one day.

A large and growing proportion of the eight selected fresh products are delivered under the house brands of a supermarket chain. In the case of bread this development is being promoted by the concentration among the bakeries. As a result of concentration the importance of competing on price is decreasing and competition on quality is becoming possible between the supermarket chains, partly due to the scale that the bakeries now have. The suppliers deliver some of their products under their own name or brand. This applies particularly to apple and potato varieties for which suppliers hold a licence.

Besides possible price and volume arrangements, the suppliers and supermarkets agree arrangements about the width of the range of products, logistics and planning, peak supply, brands and packaging.

The purpose of such arrangements is to increase product quality, accessibility, traceability and supply chain transparency and to differentiate the supermarket chain from other chains. Chain stores determine to a significant degree the product specifications and other conditions of delivery.

They do so for such purposes as developing house brands (see above). These arrangements are agreed with the direct supplier, but increasingly also with a chain of suppliers. Agreements are concluded both with growers and with service providers in the vegetables and fruit chains. In the bread chain there are agreements both with producers of meal and bread and with service providers.

Arrangements for product specifications, packaging and logistics are made under master agreements, but also in detailed written contracts. All types of supermarket chains agree these arrangements, i.e. discounters, convenience and value for money supermarkets. Large supermarket chains agree arrangements throughout the entire chain. Small supermarket chains confine themselves to arrangements with relatively large parties in the chain. Backward integration is difficult, because wholesaling is not part of the core competence of chain stores.

On account of these arrangements, the interdependence between suppliers and supermarket chains is increasing all the time. This increases the switching costs for supermarkets. The arrangements for packaging, house brands, product specifications and logistics mean that it is no longer possible to replace a supplier by an arbitrary competitor.

Generally speaking, there are no major differences regarding the conditions of delivery between suppliers on the one hand and supermarket chains on the other.

4.2 Negotiations

Supermarket chains and their suppliers agree in writing or otherwise the supply of bread and egg products for a period of six months to a full year. The prices for bread and for eggs are agreed in writing for this period. One supplier says that the value of a written contract is limited, however. Supermarket chains are said regularly to reverse arrangements.

Prices for potatoes, vegetables and fruit are generally set weekly. However, there are some supermarkets (value-for-money supermarkets) that agree volume and price arrangements for the duration of the harvesting season. The purchaser of a supermarket chain said that a fixed contractual price is risky. The supermarket chain concerned does not want to incur a loss on a product for the whole season. The same applies to the agreeing of price arrangements when planning and marketing special offers. The purchaser said that he regularly paid informal visits to agree price arrangements for promotional campaigns.

Supermarkets get a number of suppliers to submit offers for the price at which they are willing to deliver. Based on such offers, suppliers are selected for one week, six months, one year or a season. However, the freedom of choice of supermarkets is limited for some products, particularly if the supermarkets want to have several suppliers of a certain size. In the case bread this limits the freedom of choice. When there is limited freedom of choice the prices are established by consulting with each other.

The volume in long-term contracts depends on the required (minimum) weekly quantity and the price. If the contractual price is too high, the contractual quantity will be smaller. The rest will be purchased on a weekly or daily basis. These purchases will be made with the same supplier as the one with whom the seasonal contract exists with a view to the logistical costs and the monitoring of quality. For a bulk product like onions there is no negotiation on weekly or daily prices. Additional orders are placed at the contractual price.

Consultations are held to agree the contractual conditions. According to the interviewed suppliers, however, supermarket chains have great influence over the conditions. This has to do with the wish of supermarket chains to define in increasing detail the product specifications of products, in particular

house brands. It is also in the interests of supermarkets to organise the logistical process as cheaply as possible. Logistics is the crucial point in controlling costs in the chain.

The contractual conditions that suppliers and supermarket chains agree with each other are similar. However, there are some differences that are related to differences in quality, volume, order size and frequency and the total range taken.

4.3 Price, discounts, financial contributions and risks

The prices that suppliers and supermarkets agree depend in the first instance on supply and demand. To a significant extent this also explains why the negotiating position of suppliers is weak in relation to the supermarket chains. This was indicated both by the interviewed suppliers and the supermarket chains interviewed. In virtually all markets areas there is an oversupply and overcapacity. This enables supermarket chains to play-off suppliers against each other.

Suppliers underbid their competitors in every possible way in order to market an oversupply. Supermarket chains and also independent branch owners take advantage of this situation. Particularly for vegetables and fruit, but also for bread, suppliers regularly do business with branch owners outside the central purchasing organisation of supermarket chains. Franchisees and independent companies are free to make some of their purchases themselves.

The negotiating position of suppliers is relatively strong, however, if they hold a licence for a new variety. This occurs in the case of new varieties of potatoes and apples. The exclusive sales rights result in sales being monopolised and competitors can be pushed out via the back door. The cooperatives earn particularly through new varieties. For these varieties the suppliers are able to determine the selling price based on a cost price-plus method.

There are differences in the prices that suppliers and supermarket chains agree with each other. The differences are related to a significant extent to differences in quality, variety, order frequency and volume and the total range of products. When determining the price some supermarket chains agree one price for all suppliers. Price differences occur more frequently in the case of bread on account of quality differences.

Supermarkets regularly negotiate discounts on deliveries. Volume and graduated discounts in particular are given. The purpose of both kinds of discounts is to get the supermarket chains to take up as many products as possible from the overall range and to stimulate repeat purchases. Discounts are also regularly given for early payment. The interviewed suppliers stated that the supermarket chains regularly lengthen the payment term, unilaterally or otherwise. Discount arrangements are set down contractually, but are also negotiated between the parties while a contract is in force. Discounts and payment arrangements are important to preservation of the supplier-customer relationship.

The discounts correspond in part with cost savings, but are also unrelated to cost savings to a significant extent. Indirectly, volumes play a large role due to the effect on the logistical costs, i.e. full versus half-full lorries and pallets.

Discounters do not negotiate discounts or other financial contributions and concentrate on price.

Supermarkets negotiate with suppliers on contributions towards promotional activities, i.e. costs for a leaflet and sometimes a lower purchasing price. Such arrangements are agreed contractually, but in some cases they are also negotiated in the interim. Payments for such matters as shelf space, inclusion in the range of products and introduction of a new product occur seldom if at all. In the case of generic fresh products, negotiations revolve around the price (including discounts). The supermarkets carry out pilots if they foresee risks in introducing new product varieties. There are also suppliers that require financial contributions from supermarket chains, although they are exceptions.

The product and sales risks attached to bread, potatoes, vegetables and fruit generally shift at the time of sale of the product from the supplier to the customer. The risks attached to perishable and unsold products therefore rest with the supermarket chains after delivery. The loss is great at relatively small supermarket chains. This risk is particularly large with potatoes and onions at the end of the growing season. Potatoes and onions may sprout if stocked too long. Unsold potatoes, vegetables and fruit are dumped by the supermarket or by the service providers.

There are no buyback arrangements for potatoes, vegetables and fruit and especially for Dutch products a product recall is not an issue. Unsold bread is taken back by the bakeries (or by the service providers) after one day and is resold for processing into bread crumbs, animal feed and similar. The bakeries sometimes buy back the unsold bread, but it also happens that they take it back for nothing.

4.4 Ending of the relationship and differences of opinion

According to the interviewed supermarkets, ranging from discounter to service supermarket, there is adherence to the 'contract is contract' principle. Prices are not adjusted to changed market conditions, unless the prices jeopardise quality or security of supply or the market conditions have changed dramatically. This occurs occasionally. It can prove necessary for the supermarkets to agree to a price increase to safeguard supplies. One supplier stated that a supermarket chain had on one occasion unilaterally reduced the prices as a result of an acquisition.

A threat not to deliver or not to take a product is used occasionally as a way of getting a better price. Supermarkets do this, but so do suppliers. According to the interviewees, supermarkets sometimes threaten to remove a product from the range and occasionally actually do so. This usually concerns either a single product or a small number of products, but not the entire range or discontinuation of the relationship.

Most of those interviewed said that differences of opinion about fulfilment of contractual conditions occur to a limited extent. Where differences of opinion exist they are settled amicably. Cancellation of a contract while it is in force occurs seldom if at all. Differences of opinion may arise about the quality of a product. Quality control is not complete, but based on random samples. Growers can take advantage of this situation by wrongly trying to sell products as Class I products. A dispute will exist if the customer discovers this during checks. Conflicts of this kind are resolved commercially.

5 Price and cost developments

In this chapter (section 5.1) we will provide a graphical overview of how prices developed in the years 2005-2008. For this purpose the prices of bread, potatoes, onions, cucumbers, paprikas, apples and eggs were gathered on a weekly basis for three levels in the chain, namely ex-farm, ex-wholesaler and ex-supermarket. The purpose of the graphical representation is to check whether there are short-term and long-term dynamics in the prices and whether such dynamics are interrelated at the various levels in the chain. The next chapter contains a formal econometric test of the relationship between the prices at the three levels. Section 5.1 shows in two ways how prices have developed. The actual price development is shown plus the development of the gross margin, i.e. the difference between the selling price and the purchasing price. The figures that present the gross margin clearly indicate how the difference has developed between the selling price and the purchasing price. In this chapter (section 5.2) we also provide an overview of the price structure of the eight examined products. The purpose of this analysis is to explain the price structure, i.e. the costs and margins of the different links in the chain. Both sections are preceded by a description of how the data was collected and processed.

5.1 Price developments

To identify the price developments at the levels of ex- farm, ex- wholesaler and ex- supermarket, LEI, NMa and a market research agency gathered prices. LEI gathered the ex-farm prices based on the price statistics that it keeps. The research agency supplied weekly figures about consumer sales in Dutch supermarkets. This data concerns turnover and volumes. On this basis the consumer prices were determined. The agency gathers turnover and volume data based on data scanned at almost all supermarket chains. However, the agency has no insight into the volume data of separately packed products. The agency was asked to submit only data concerning packed products. For these products we determined the prices and also the market shares of the supermarket chains. For the purposes of the study this means that the supplied turnover and volume data cover part of total turnover. Table 5.1 shows that the supplied turnover figures concern 39% of total turnover in apples, 62-68% of turnover in red paprikas, 75-82% of turnover in cucumbers and 90-100% for the other products.

Table 5.1 Coverage of supplied turnover figures

Product	2007	2008
Sliced onions	100,0	100,0
Onions	90,6	93,7
Red paprika	62,5	68,8
Cucumber	75,5	81,8
Apples	39,3	39,5
Elstar apples	42,3	42,8
Bread	94,4	97,5
Farm eggs	100	100,0
Potatoes	97,5	97,7
Bildstar potatoes	92,7	92,1

NMa obtained purchasing and selling prices from vegetable and fruit cooperatives, wholesalers, the bread and meal industry and supermarkets. Table 5.2 provides an overview of the number of companies that provided purchasing and selling figures.

Table 5.2	Number of companies that provided purchasing and selling figures
Products	**Number of approached companies**
Cucumbers	10 companies
Paprika	9 companies
Apples	6 companies
Potatoes	8 companies
Onions (sliced and unsliced)	5 companies
Bread	7 companies
Eggs	5 companies

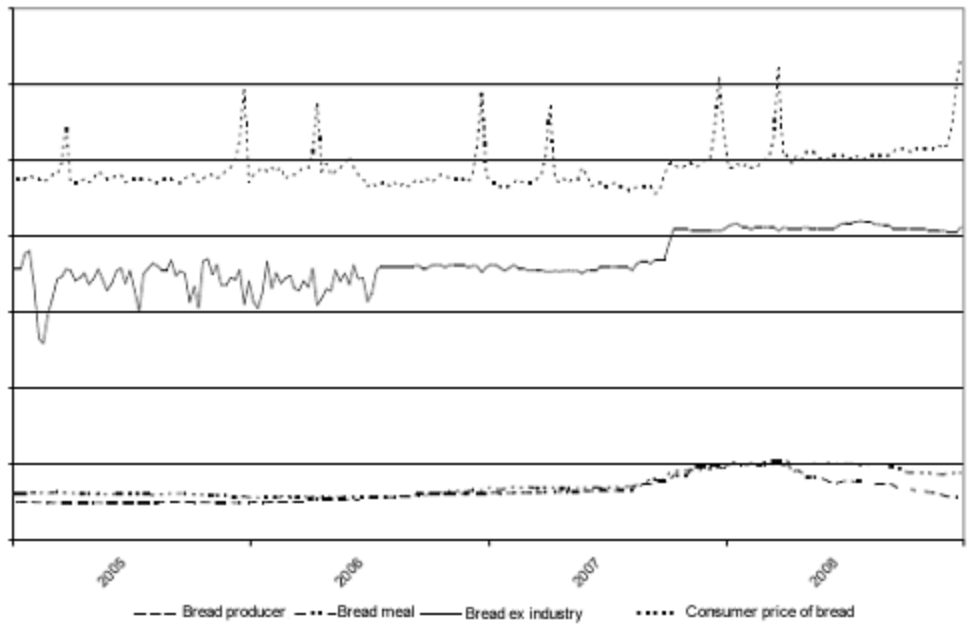
The available price data was used to compile aggregated series for the levels of ex-farm, ex-wholesaler, and ex-supermarket and for meal and bread ex-industry. The aggregated prices were determined as a weighted average based on the supplied prices. A volume index was not complied. With a view to the confidentiality of the supplied data, the values on the vertical axis in all figures of this chapter have been omitted.

For paprikas it was assumed that five pieces make up one kilogramme. For bread it was assumed that 75 kg of flour is produced based on 100 kg of wheat and that one loaf of bread is produced based on 500 g of meal (Voedingsmiddelenjaarboek, 2009).

5.1.1 Bread

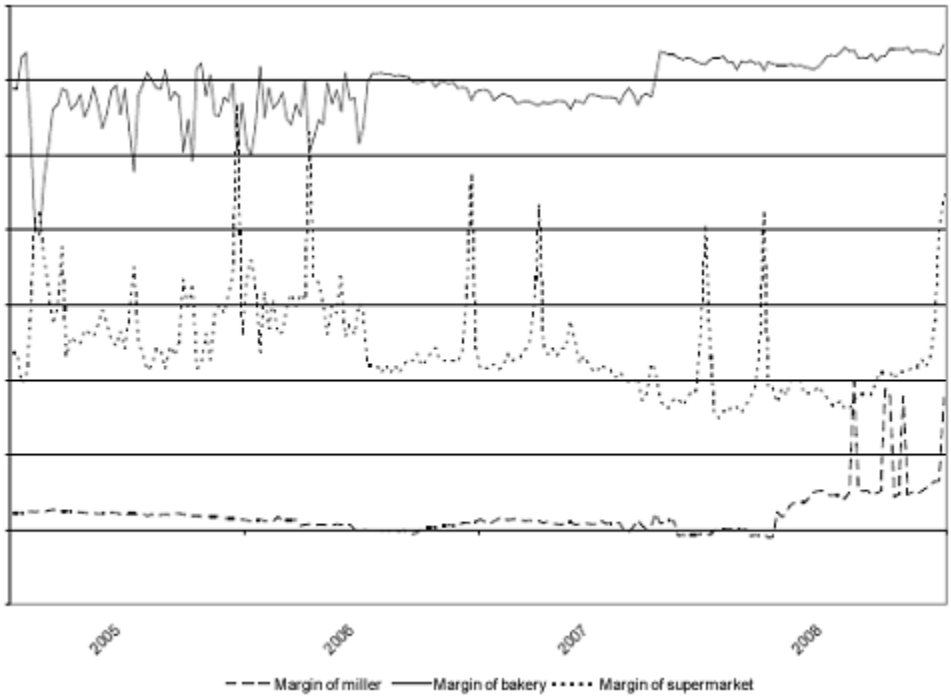
Bread prices are stable throughout the chain with one exception (see figure 5.1a). The ex-industry prices of bread exhibit relatively large dynamics until mid-2006. Consumer prices peak around Christmas and Easter, probably because consumers purchase more expensive bread in these periods. The prices of wheat, meal and bread increased throughout the chain in autumn 2007. The price of wheat collapsed in spring of 2008 and the wholesale price of meal fell slightly. Bread prices ex-industry and ex-supermarket have not yet decreased.

Figure 5.1a **Development of the price of bread**



Supermarkets saw the gross margin on bread fall in the 2005-2008 period. This was due to the fact that the prices had not yet adjusted chain-wide to the fall in grain prices. This was caused by the long duration of contracts between bakeries and supermarkets. Bakeries were able to improve the gross margin and the same applies to millers that significantly improved the gross margin in 2008 (figure 5.1b). Gross margin is highest at the bakeries, where most value is added (see section 5.2.1).

Figure 5.1b **Gross margin on bread**



5.1.2 Potatoes

This section outlines the development of prices of potatoes of the Bildstar variety. One variety was selected to ensure that the prices at the three different levels in the chain concern the same product. Bildstar was chosen because it is the variety for which we have most observations at the level of the agricultural sector. Bildstar is one of the numerous potato varieties sold in Dutch supermarkets. The market share of Bildstar in Dutch supermarket turnover of table potatoes was 3.0% in 2005 and 4.2% in 2008. When analysing figure 5.2a it is necessary to take into account that the underlying volumes can be small in some weeks. The prices at the ex-farm level concern spot market prices.

Major fluctuations occur in potato prices throughout the year. The fluctuations from week to week are limited. Figure 5.2a shows that potato prices gradually fall chain-wide throughout the harvesting season and then sometimes rise again. The consumer price of Bildstar potatoes from the 2006-2007 harvest year has been at a higher level than in the preceding period. This applies particularly to the summer peaks, when new potatoes come on to the market. This is visible in the gross margin of the supermarkets (figure 5.2b).

The gross margin of supermarkets on Bildstar potatoes since the 2006-2007 harvest year has been above the gross margin in the preceding period. The variation in the gross margin also seems greater. Wholesalers have achieved higher gross margins too since the 2006-2007 season. However, the number of observations has been increasing since 2006.

Figure 5.2a **Development of the price of potatoes (Bildstar)**

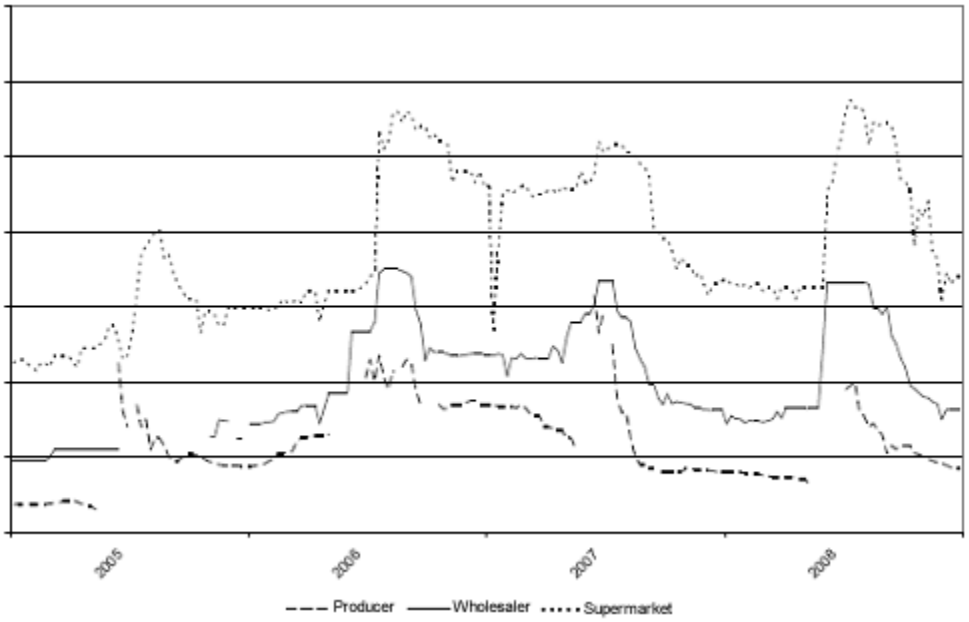
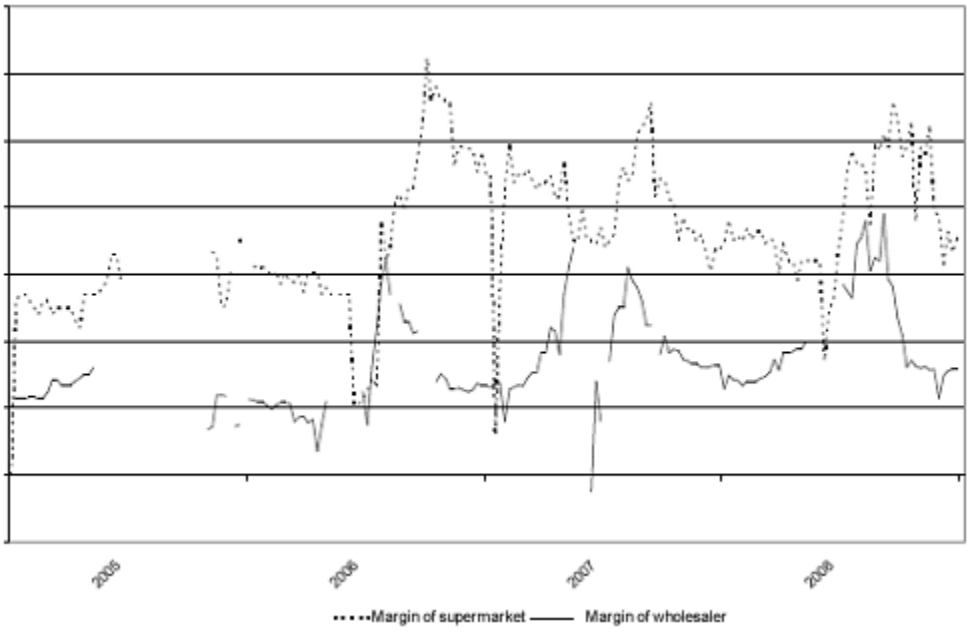


Figure 5.2b **Gross margin on potatoes (Bildstar)**



5.1.3 Onions

Figure 5.3a shows that also for unsliced onions there is a seasonal pattern. The prices peak at the end of the import season (June). Expressed in euro this peak is greater for the wholesaler and supermarkets than for the agricultural sector. This is visible in the gross margin (figure 5.3c). In 2005 the prices of onions were lower throughout the chain than in the 2006-2008 period. There was an oversupply on account of overproduction in 2005.

Figure 5.3a **Development of the price of onions**

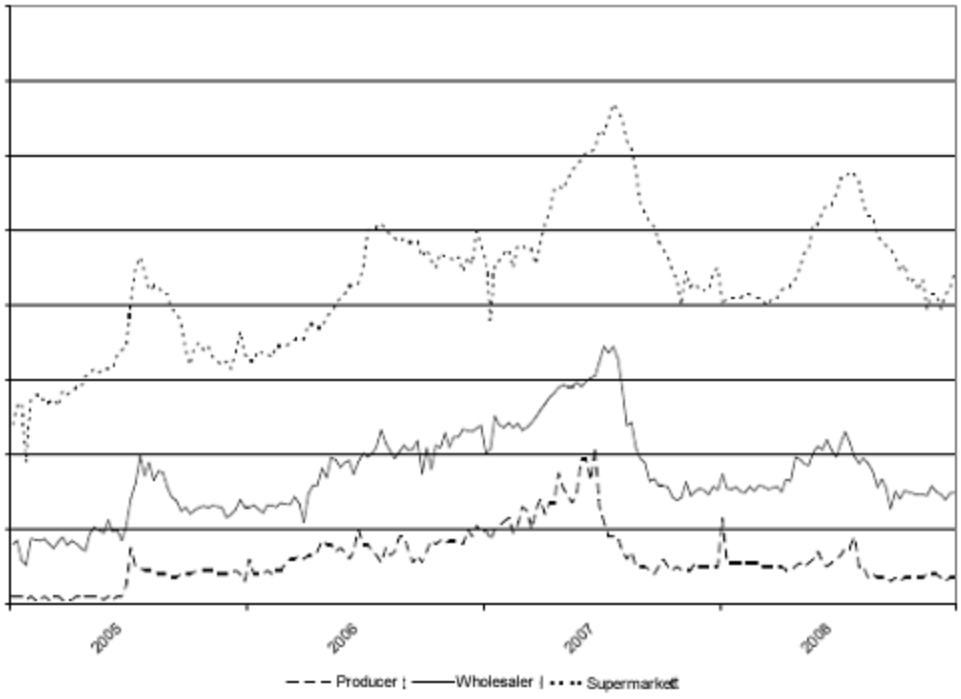
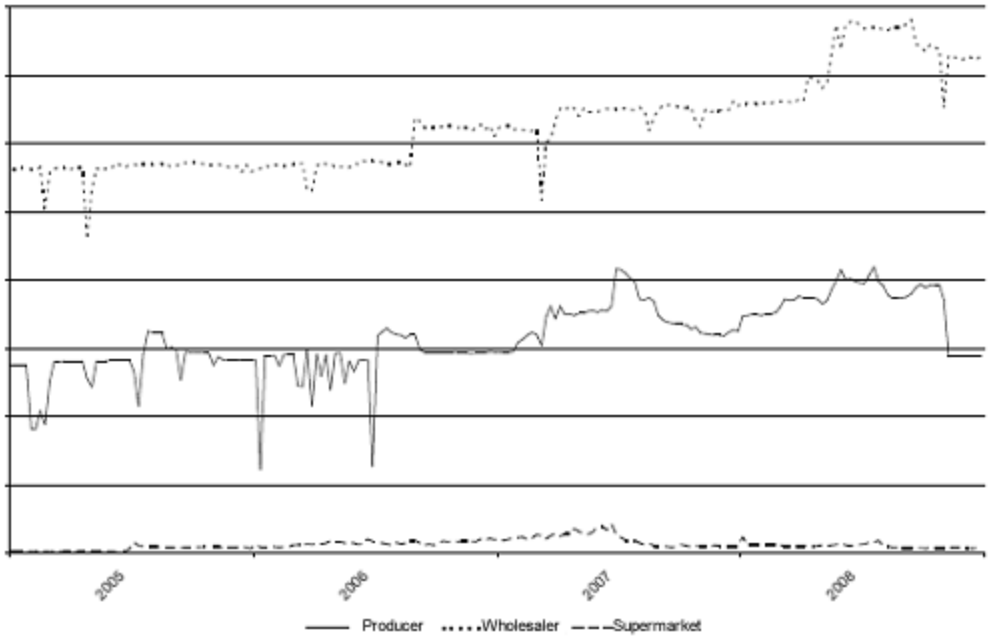


Figure 5.3b **Development of the price of sliced onions**



The consumer price for sliced onions is significantly above the purchasing price of the supermarkets (figure 5.3b). The purchasing price of supermarkets is also well above the ex- farm price. The gross margins of the wholesalers and supermarkets do not differ much from each other (figure 5.3d). The consumer price and the wholesale price of sliced onions both increased significantly in the 2005-2008 period. The prices are reasonably constant in the short term, albeit that wholesale prices do exhibit strong price changes from week to week.

It seems as though wholesalers conduct special offers with the price of sliced onions. The wholesale prices were fairly rigid until 2007, leaving aside short-term special offer prices, and changed more gradually from early 2007.

Figure 5.3c **Gross margin on onions**

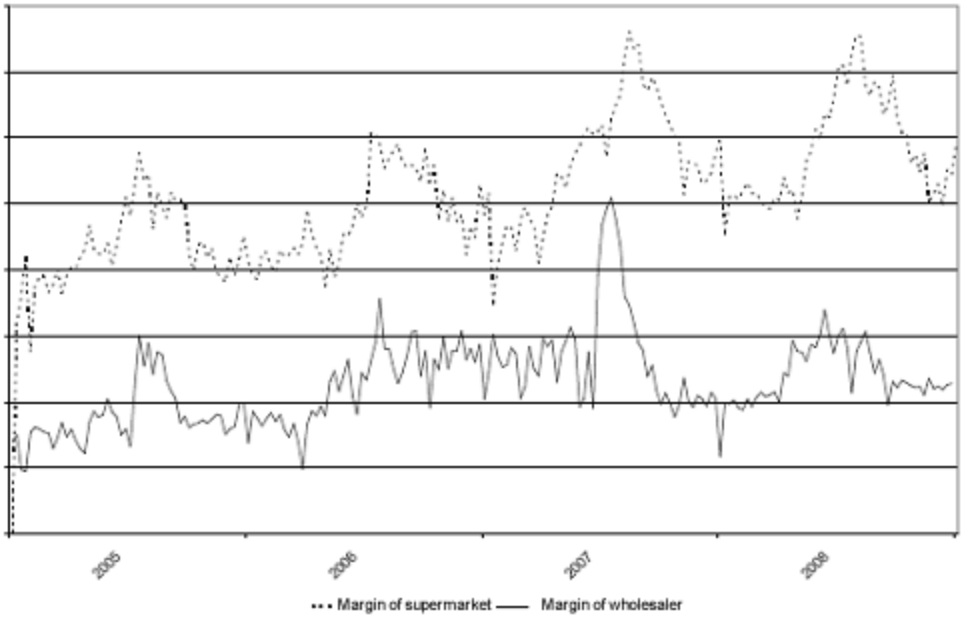


Figure 5.3d **Gross margin on sliced onions**

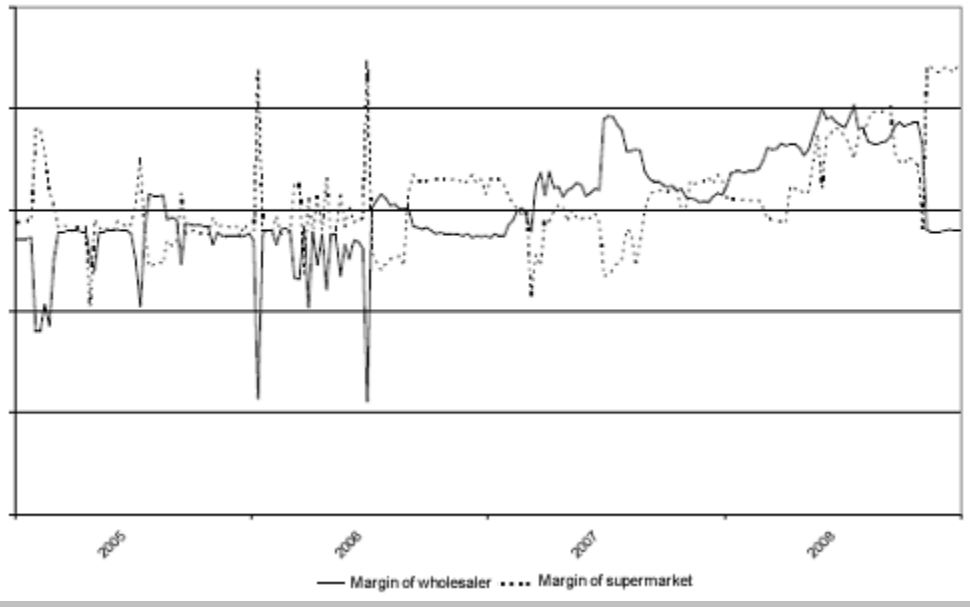


Figure 5.3c shows that the wholesaler benefits from price fluctuations more than the agricultural sector does. Therefore the gross margin of the wholesaler – calculated as the difference between the wholesale price and the Dutch ex-farm price – exhibits peaks in 2005 and in 2007. The margin of the supermarkets peaks after the margin of the wholesalers: price reductions at wholesaler level are passed on with a delay.

Figure 5.3c also makes clear that the gross margin on onions in the supermarket channel exhibited a rising line in the 2005-2008 period.

The gross margin on sliced onions at supermarkets and wholesalers is approximately the same and exhibits a mirrored picture (see figure 5.3d). As the ex-farm price is very low relatively speaking, the fluctuations in the wholesale price form a zero-sum game, i.e. the profit of one party is the loss of the other party. The gross margin has been increasing significantly since mid-2007.

5.1.4 Cucumbers

The price of cucumbers peaks in the first weeks of the year, the period when imports decline and Dutch production starts, and generally decreases gradually from April. The prices fluctuate strongly from week to week throughout the chain. The price fluctuations ex-supermarket are probably caused by promotional campaigns. The prices appear to follow each other.

Figure 5.4a **Development of the price of cucumbers**

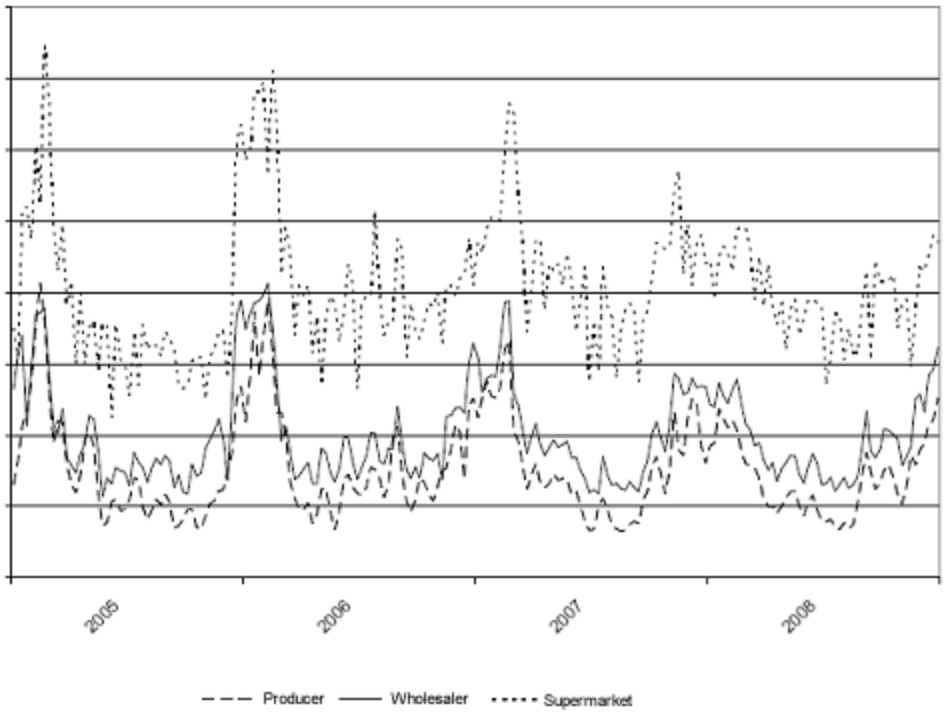
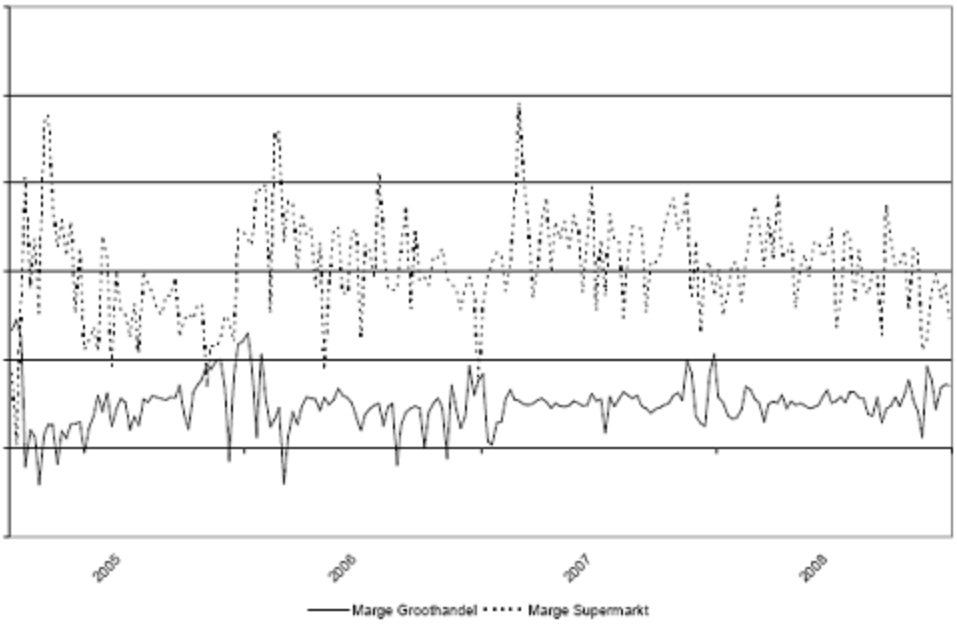


Figure 5.4b does not show prominent patterns in the development of gross margins. The gross margins of wholesalers and supermarkets in 2005 were slightly lower than in the preceding years. Wholesalers and supermarkets earn more at the start of the season (year) than in the Dutch harvesting season (from week 14 to week 40). Wholesalers also earn relatively a lot at the end of the season, but the variation in gross margin is relatively large in winter. The margins of wholesalers became relatively stable in 2007 and 2008. The gross margins of the supermarkets fluctuate strongly from week to week due to the numerous promotional campaigns.

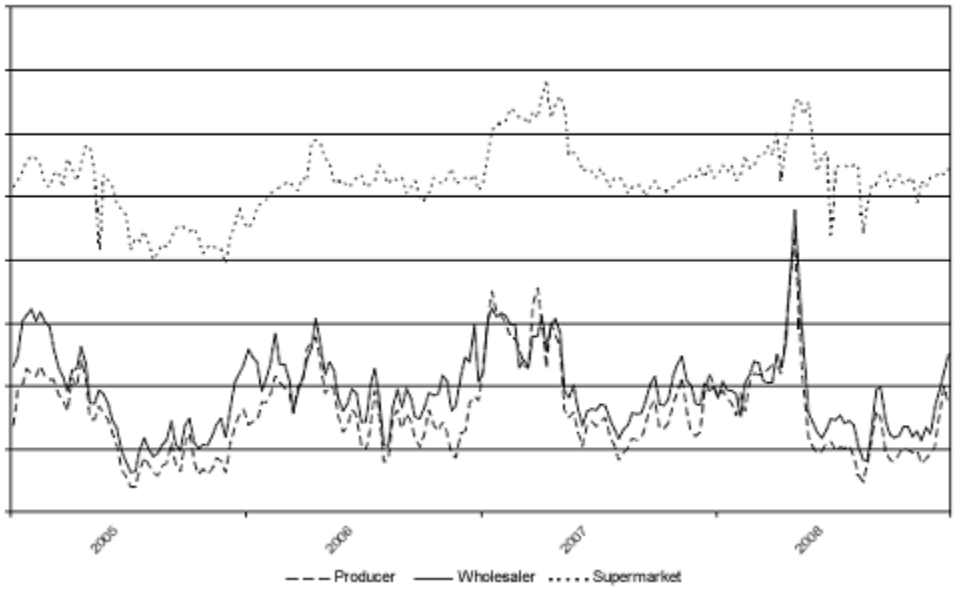
Figure 5.4b **Gross margin on cucumber**



5.1.5 Paprikas

The prices of red paprikas fluctuate significantly less than the prices of cucumbers. This applies especially to consumer prices. Relatively few special offers are carried out for paprikas. The prices at the three different levels follow each other broadly speaking, although perhaps with a slight delay.

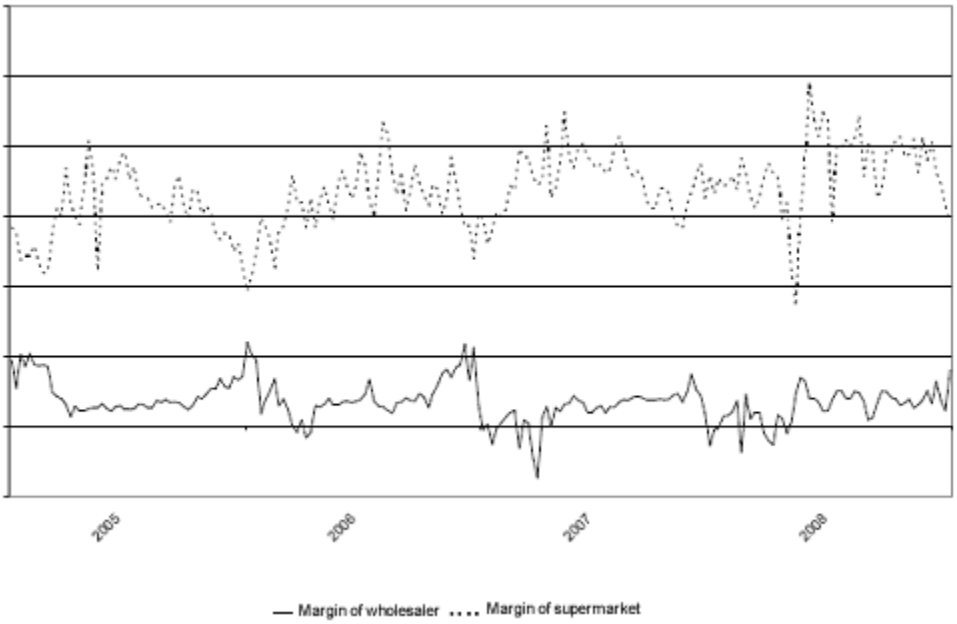
Figure 5.5a **Development of prices of red paprikas**



The gross margin on paprikas at supermarkets and wholesalers has not increased, or not significantly (figure 5.5b). The gross margin of supermarkets fluctuates with the variations in purchasing prices.

Figure 5.5b clearly shows that the gap between wholesaler prices and consumer prices is large for paprikas. Relatively speaking the wholesaler earns a lot from paprikas in winter.

Figure 5.5b **Gross margin on red paprikas**



5.1.6 Apples

The price fluctuations of Elstar apples at consumer level are stronger than at the producer and wholesaler levels. This is probably due to the fact that supermarkets often use Elstar apples for promotional campaigns. The prices of Elstar apples peak at the start of the Dutch harvesting season, after which they fall sharply and then slowly rise again. The peak is relatively large at producer level and wholesaler level (figure 5.6a).

The gross margin of wholesalers and supermarkets – leaving aside weekly fluctuations – remained roughly the same in the 2005-2008 period (figure 5.6b).

Figure 5.6a **Development of the price of Elstar apples**

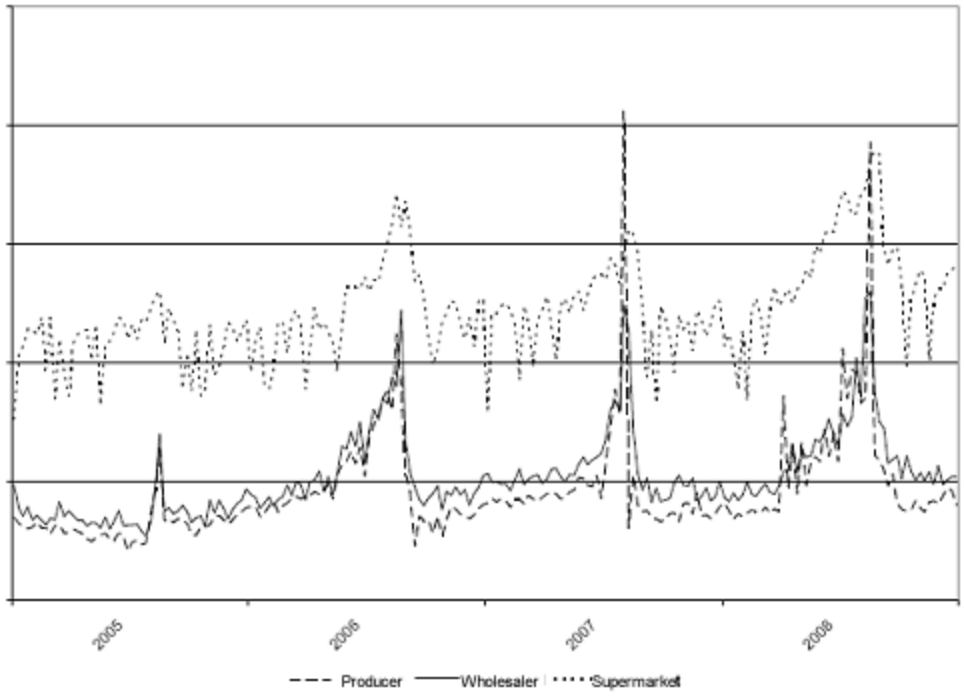
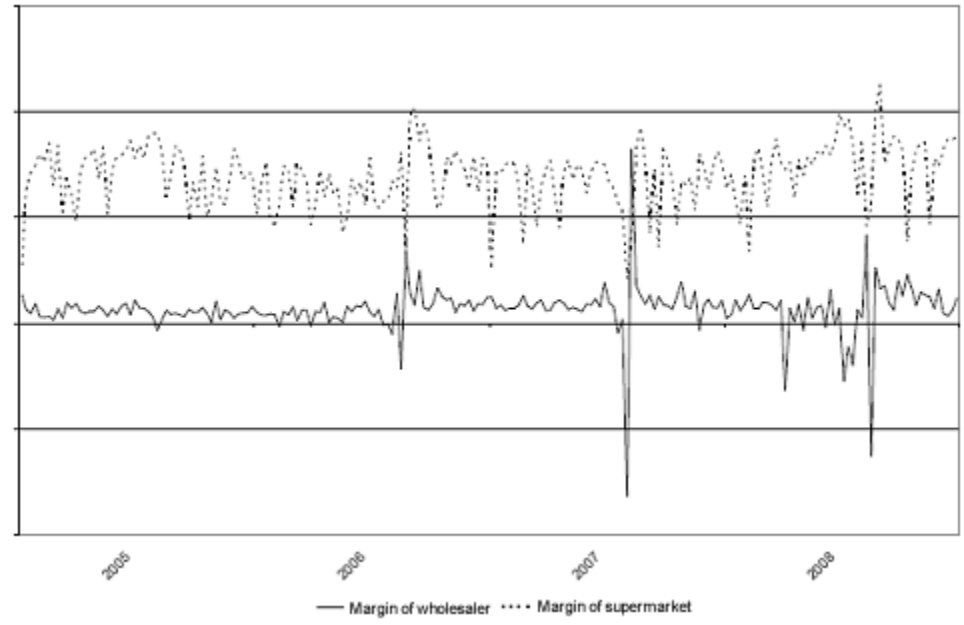


Figure 5.6b **Gross margin on Elstar apples**

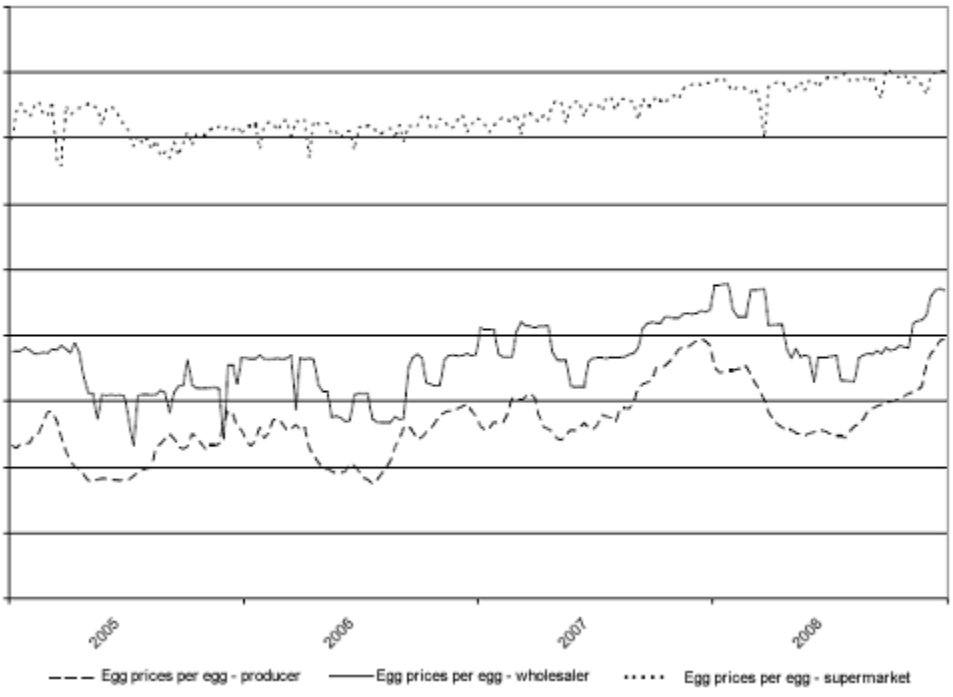


5.1.7 Eggs

Consumer prices for farm eggs are very constant with the exception of temporary peaks and dips that are probably related to promotional activities. At the ex-farm and wholesaler levels there are greater dynamics in the prices of farm eggs. Wholesale prices and ex-farm prices increased with the grain prices in the winters of 2007-2008 and 2008-2009. Consumer prices increased earlier in the winter of 2007-2008 than the wholesale prices did. The price fall at wholesaler level in 2008 was not passed on to the consumer. The consumer prices appear generally speaking to be fairly insensitive to changes in the wholesale prices (figure 5.7a).

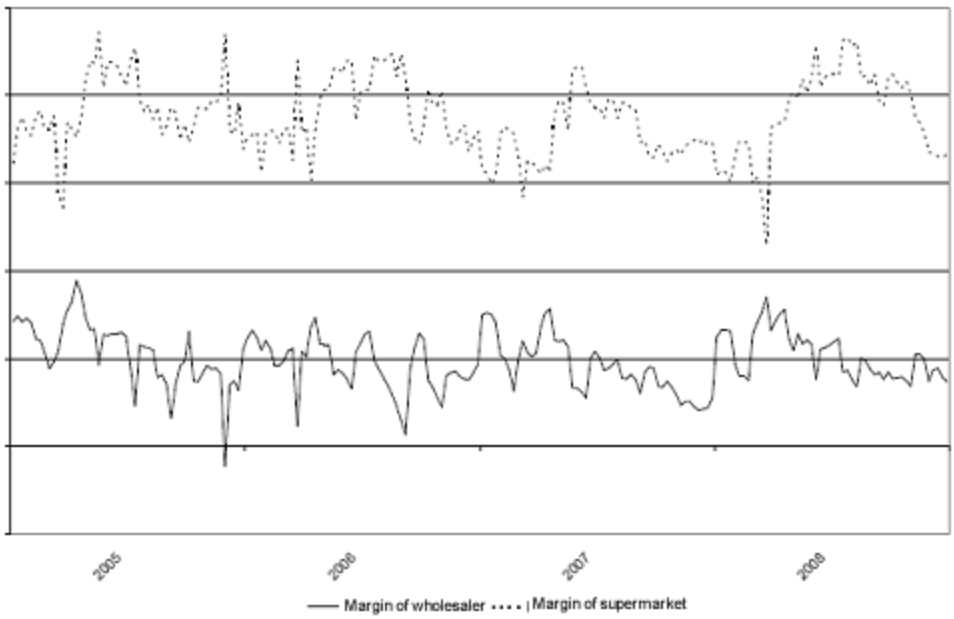
The gross margins of the wholesalers and supermarkets did not change structurally in the 2005-2008 period. However, the margins do vary with purchasing prices and selling prices from week to week, from month to month and from half-year to half-year (figure 5.7b).

Figure 5.7a **Development of the price of eggs**



Egg prices per egg – producer Egg prices per egg – wholesaler Egg prices per egg – supermarket

Figure 5.7b **Gross margin on eggs**



Margin of wholesaler Margin of supermarket

5.2 Costs and margins in the chain

In this section we will provide an insight into the price structure of the seven examined products, i.e. the costs that each link incurs and the net margins that remain for each link.

NMa asked a number of companies to provide for each product the revenues and the direct and indirect costs for the eight products concerned. Thirteen companies provided the requested data and six provided some of the requested data or other useful information. For the agricultural sector use was made of the data on Binternet (www.lei.wur.nl).

We have no insight into the costs and revenues for sliced onions. The calculations for cucumbers were made based on prices in weeks 14 to 40 inclusive, the period when Dutch products are on the market.

This data was used to identify the price structure of the eight products in the following way. Based on the price data we determined the selling price in each link and then broke down the selling price on the basis of the profit and loss account for each product into the purchasing price, other costs and a net margin. We compared the calculated purchasing price with the purchasing prices from the supplied price data. We assumed that the companies that supplied data allocate all fixed costs to products and that the calculated net margin is 100% profit. Purchasing prices, selling prices, cost shares and margins were determined as weighted averages of the companies that supplied data.

If there is a large difference between the selling price of a link and the purchasing price of the next link, this has been indicated. For some products there is a great discrepancy between the selling price of the wholesaler and the purchasing price of the supermarkets. For some products the difference can be roughly attributed to a service provider (transport). This difference requires further explanation in the case of onions, cucumbers, paprikas and apples. We will return to this matter later.

The difference between selling price and purchasing price is indicated in this chapter as being the net margin. In the primary sector this concerns family income: the profit plus remuneration for labour of the entrepreneur and his family. In the other sectors the net margin corresponds with the net profit.

The consumer price was determined as the weighted average of the consumer price according to the market research agency and the turnover and volume data gathered by NMa at one of the supermarket chains that is not in the panel of the research agency.

$$P^c = \frac{\sum_{i=1} P_i^c Q_i^c}{\sum_{i=1} Q_i^c}$$

where Pc = aggregated consumer price
P_i^c = consumer price of company i
Q_i^c = sales volume of company i

Next, the purchasing price was determined for each company by dividing the purchasing value by the selling value and by multiplying this ratio by the consumer price of company i:

$$P_i^w = \frac{W_i^w}{W_i^c} P_i^c$$

where Piw = purchasing price of company i
W_i^c= selling value (turnover) of company i
W_i^w= purchasing value of company i

Next, the weighted average purchasing price was determined as the weighted average of all companies that provided the purchasing price in euro or as a percentage of the consumer price.

$$P^w = \frac{\sum_{i=1} \left(P_i^w Q_i^c\right)}{\sum_{i=1} Q_i^c}$$

where Pw= aggregated purchasing price of supermarkets

Next, the cost margin and the profit margin were determined for each company.

$$c_i = \frac{C_i}{W_i^c} P_i^c$$

$$m_i = \frac{M_i}{W_i^c} P_i^c$$

where ci = cost percentage of company i
m_i = profit margin of company i
C_i = total costs of company i
M_i = total profit of company i

And Wic = Wiw + Ci + Mi. The turnover is equal to the sum of the purchasing value, the other costs and the profit.

A weighted average was then determined for the costs and the profit.

$$c = \sum_{i=1} \left(c_i \, w_i^c \right) / \sum_{i=1} \left(w_i^c \right)$$

$$m = \sum_{i=1} \left(m_i \, w_i^c \right) / \sum_{i=1} \left(w_i^c \right)$$

where c = aggregated cost percentage
m = aggregated profit margin

These aggregated percentages are related to the aggregated consumer price. The ultimate cost and profit percentages were adjusted because one supermarket chain did provide the purchasing prices as a percentage of the consumer prices but did not itemise the other costs. This means that the purchasing price and the gross margin were determined inclusive of the data of the supermarket concerned and that the subdivision of the gross margin into costs and net margin were determined without data of the supermarket chain concerned. For this purpose the cost margin and profit margin were normalised to take account of the fact that the supermarket chain concerned was no longer included.

One of the supermarket chains did not provide any cost or revenue data for bread and potatoes in 2008. The figures for potatoes concern potatoes in totality.

This procedure was repeated for wholesalers and the industry.

- For meal use was made of the price, cost and revenue data of a flour producer and for bread use was made of the data of two bakers, although only one of the two bakers provided price data.
- For potatoes use was made of the cost and revenue data of three wholesalers for the years of 2005-2007[5]. The purchasing and selling prices and also the costs and the profit margin per kilogramme were determined based on the unweighted average of the three companies. If the weighted average were to be taken, the data of one of the three wholesalers (including factory potatoes) would have dominated the results. The price differences between the companies are very large.
- For onions use was made of the overview of purchasing and selling prices that one wholesaler provided. The purchasing prices concern the purchase of domestic field crop onions. The selling prices concern domestic sales. We have figures for the chain as a whole only for 2005 and 2006.
- For cucumbers and paprikas use was made of the cost and revenue data of three wholesalers. Two wholesalers itemised the data for apples, cucumbers and paprikas. The figures of the third wholesaler are based on the annual reports covering all products. The results of two of the three wholesalers depend greatly on exports.
- For apples use was made of the cost and revenue data of one company and the price data and the annual reports of another company.
- For eggs the costs and profit margins for the repacking stations were determined based on costs and profit figures provided by one repacking station. This concerns a calculation of costs for the year 2008 on the basis of which we have expressed the costs and profit margin as percentages. The selling prices of the packing station were determined based on the purchasing price of one supermarket chain to which the packing station delivers, based on a box of ten eggs, the most frequently sold packaging unit. The selling prices of the packing station itself probably concern constant list prices.

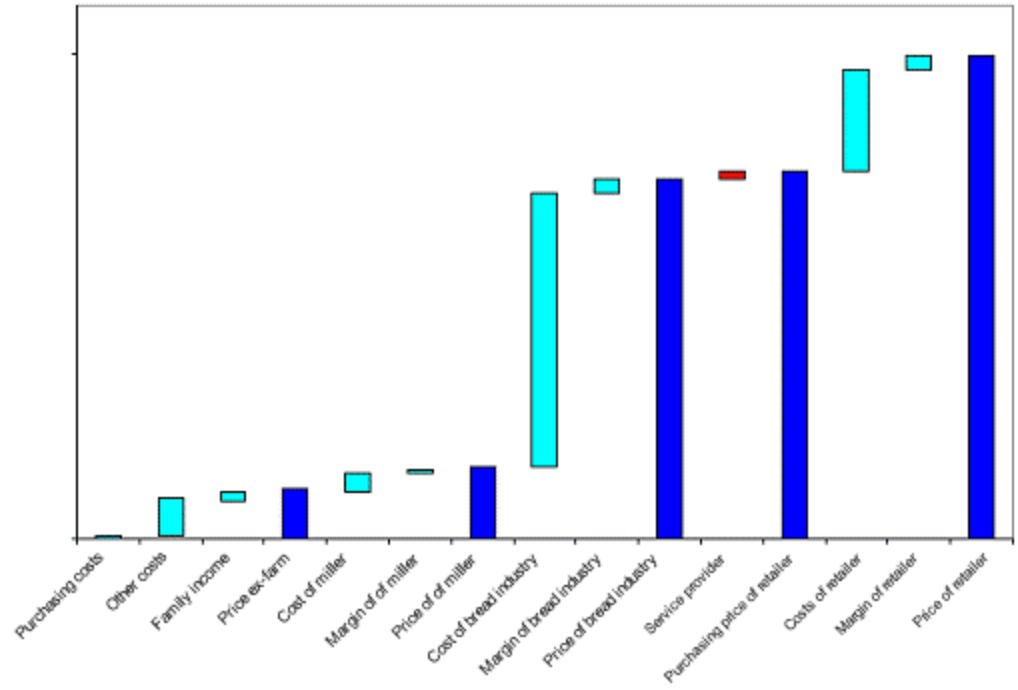
[5] For two of the three wholesalers there is no data for 2008.

For the agricultural and horticultural sector use was made of the cost and revenue data published on Binternet for arable farming, greenhouse vegetable cultivation, fruit growing and laying hen companies. The purchasing costs in agriculture and horticulture concern plants and seeds, other starting material and grains (laying hens). The egg prices were determined as the unweighted average of the prices in the LEI price statistics. For potatoes, the purchasing price in the wholesale trade as determined above was taken as the grower price.

5.2.1 Bread

Figure 5.8 shows that the large price difference between wheat and bread is explained largely by the costs of the production of meal and in particular bread. Supermarkets get a gross margin of 20 to 30% on bread. In net terms the supermarkets make a profit of 0 to 10% on bread according to our calculations. The prices of wheat, meal and bread increased in 2008 due to the shortage of grain on the world market. The costs in Dutch arable farming increased in 2008, because the price of sowing seed, fertiliser and energy and the costs of tangible fixed assets increased. The consumption of crop protection agents was also higher in 2008.

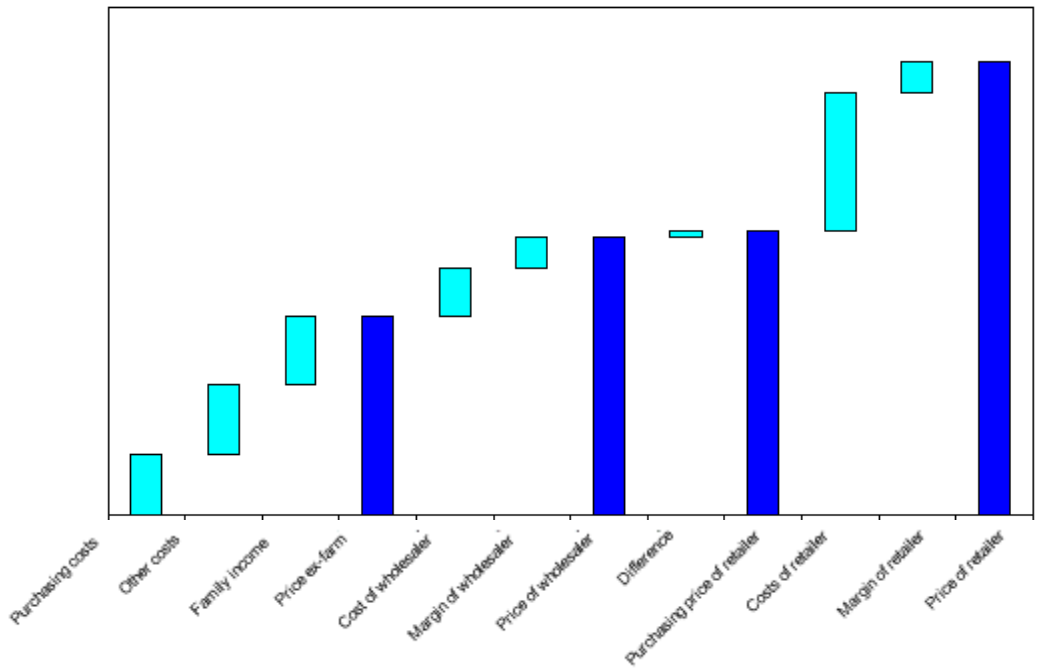
Figure 5.8 **Price structure of bread**



5.2.2 Potatoes

The share of arable farming in the consumer price of potatoes is 40 to 50%. The discrepancy between consumer and producer prices is small. However, figure 5.9 does indicate that the net margin of the chain store and the wholesaler on table potatoes is large. There is a great variation in the selling prices of wholesalers. This is related to large differences in quality and the portfolio of varieties including monopoly varieties. If supermarkets are not required to finance any fixed costs from the calculated net margin, they will retain between 0 and 10% of the consumer price as net profit. The net margin in the 2005-2008 period increased. This picture corresponds with the development of the gross margin presented in section 5.1.2. The yield prices and family incomes in arable farming are also high. The ex-farm prices of potatoes were relatively high in 2006 and in 2007.

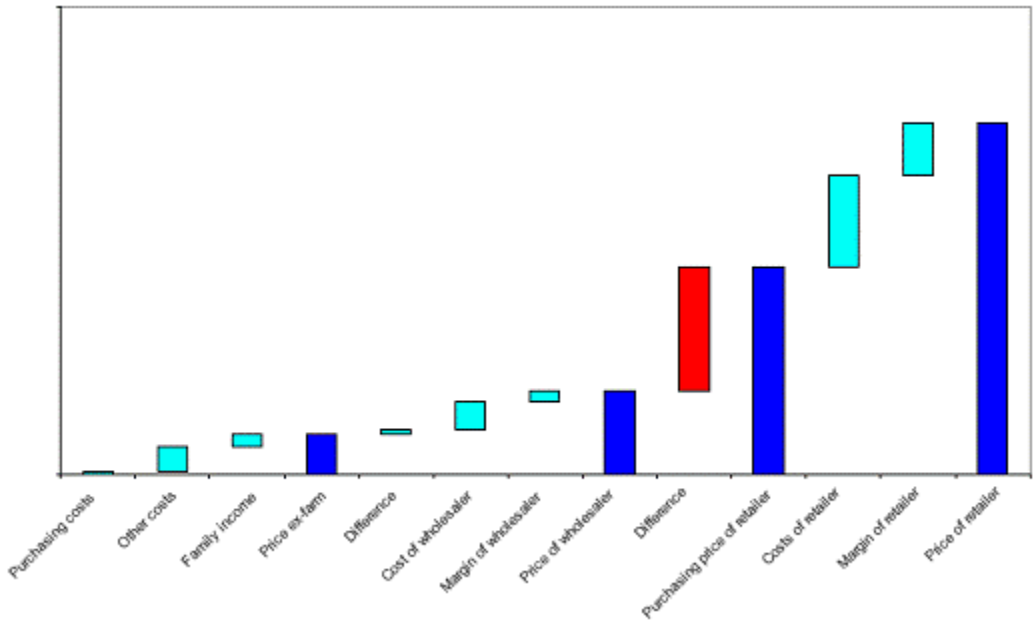
Figure 5.9 **Price structure of potatoes (2005-2008)**



5.2.3 Onions

We have not yet been able to provide a watertight picture of the price structure of onions (figure 5.10). The calculated purchasing prices of the supermarkets differ greatly from the selling prices of the wholesaler. The selling price of the wholesaler concerns domestic sales. So the difference is not explained by the bulk export of onions. The most logical explanation is that service providers absorb the difference between the two prices. The profit margin at the supermarkets is between 10 and 20% of the selling price. The profit of the wholesaler as a percentage of turnover (10 to 20%) is also significant.

Figure 5.10 **Price structure of onions**



5.2.4 Cucumbers

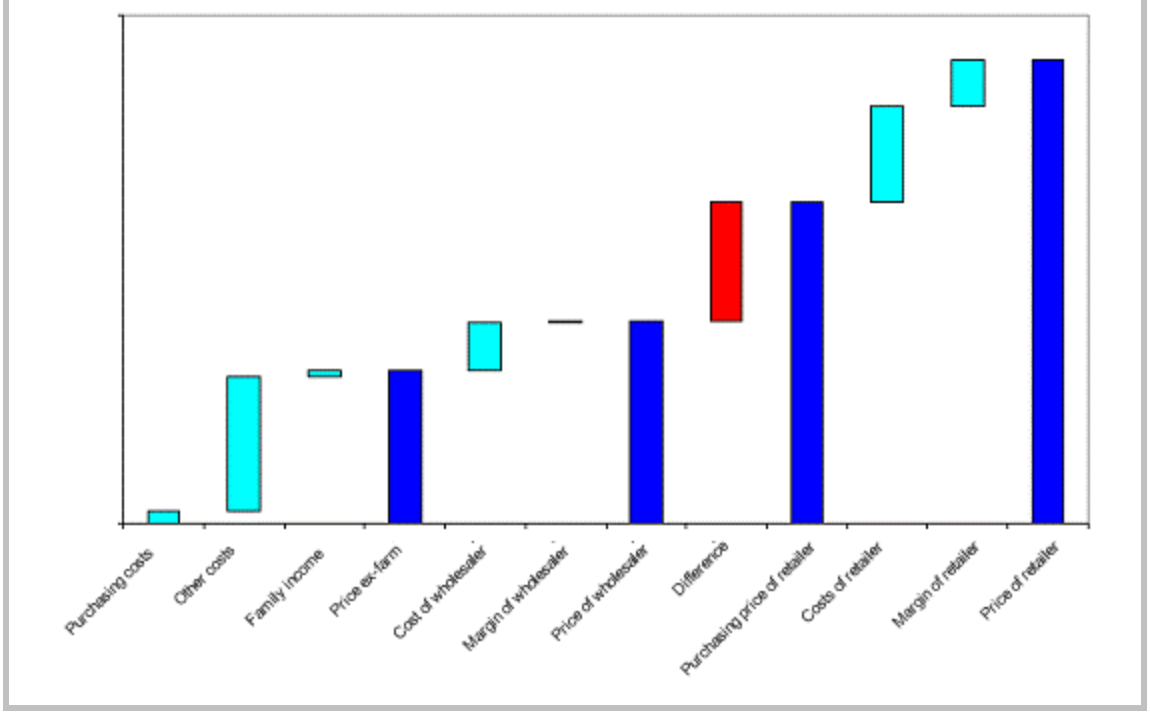
As with onions, paprikas and apples, we do not yet have a watertight picture of the price structure of cucumbers (figure 5.11). The purchasing price of the supermarkets differs greatly from the selling price of the wholesaler. But there are some explanations for this situation:

- The quality, weight and price of cucumbers can differ substantially from each other at wholesaler level. It is possible that the product package of the Dutch wholesale trade differs from the product package that Dutch supermarkets purchase. The Netherlands exports a large proportion of its cucumber output.
- The logistical costs might have been insufficiently factored in during the collection of data and in the analysis. A series of surcharges and commissions are calculated for logistical costs of containers and packages outside the pure production price.
- Wholesalers trade a lot of products among themselves. This means that the wholesaler should be included in the price structure in a layered way (also see section 4.4). However, the average yield prices of the wholesalers (section 5.1.2) do not substantiate this as a watertight argument. We will return to this matter in the next section.

Despite these explanations, the difference remains significant. It is greater than the gross margin in the wholesale trade. The net profit that supermarkets get on cucumbers is substantial at 10 to 20% of the consumer price. Margins in the horticultural sector and the wholesale trade are low.

Figure 5.11. Price structure of cucumbers (2005-2008, weeks 14-40)

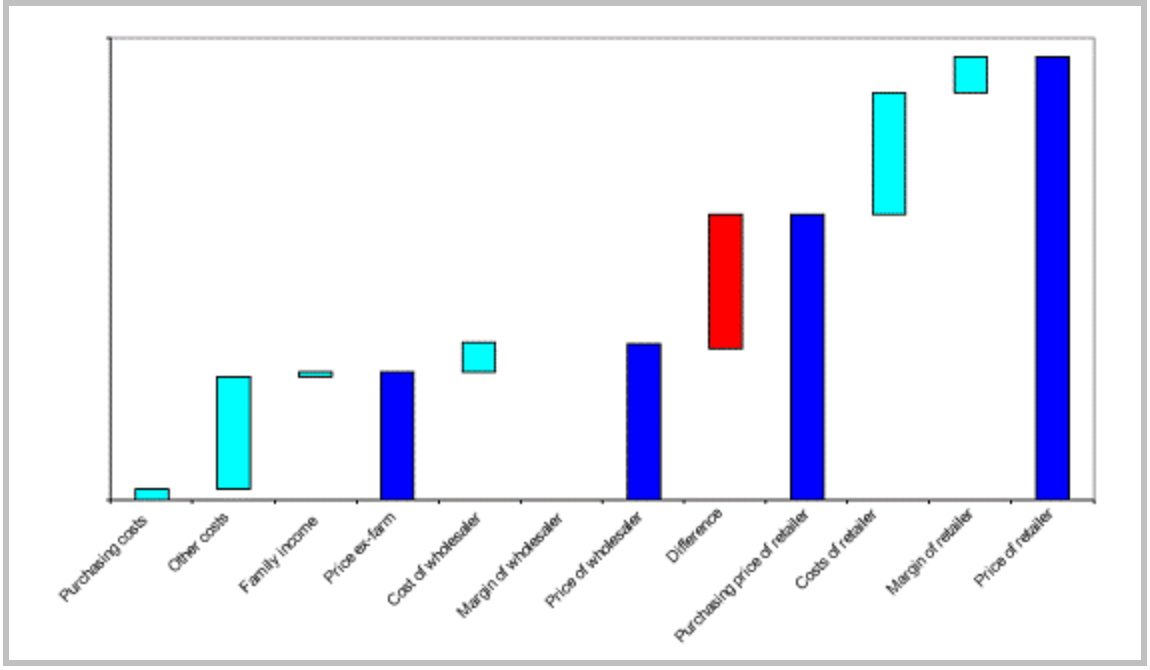
Figure 5.11 **Price structure of cucumbers (2005-2008, weeks 14-40)**



5.2.5 Paprika

As with onions and cucumbers, there is a difference for paprikas between the purchasing prices of the supermarkets and the selling prices of the wholesaler (figure 5.12). Possible explanations for this situation are the same as those mentioned in the previous section, i.e. differences in quality and weight, logistical costs calculated outside the pure production price and mutual trade among wholesalers. There are large differences in the purchasing and selling prices of wholesalers, among other things because of the geographical specialisation of wholesalers, i.e. the Netherlands, EU and elsewhere. This is an indication that the wholesale trade consists of a number of layers (links) including service providers.

Figure 5.12 **Price structure of paprika**

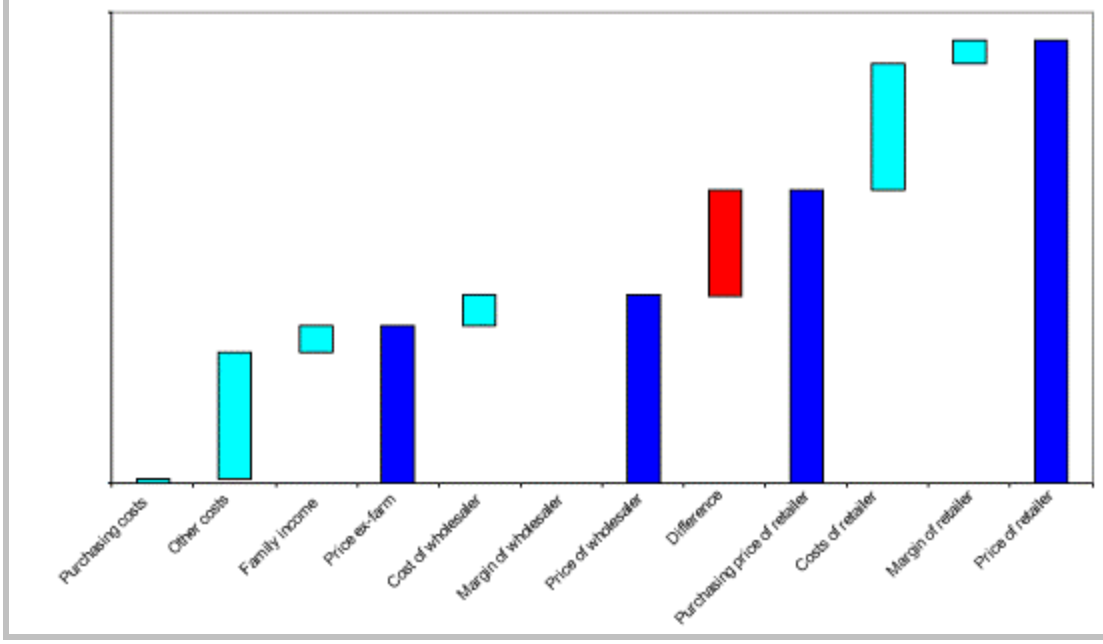


The net profit that supermarkets get on paprikas is between 0 and 10% of the consumer price. The profit margin in the wholesale trade and family income in the horticultural sector are low.

5.2.6 Apples

For apples, too, there is a discrepancy between the purchasing prices of the supermarkets and the yield prices of the cooperative wholesalers (figure 5.1.3). There are some service providers between the cooperative wholesalers and the supermarkets, but this is not a watertight explanation for the large difference between the prices. Supermarkets get a net profit of 0 to 10% on 1 kilogramme of Elstar apples. Family income in the horticultural sector amounts to 10 to 20% of the ex-market gardener prices.

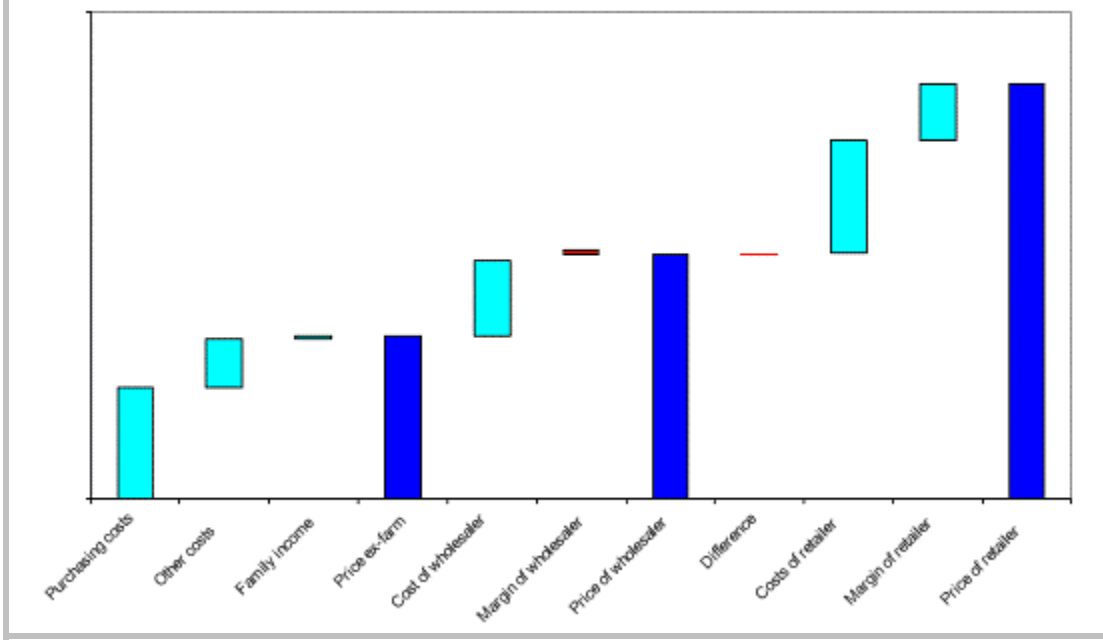
Figure 5.13 **Price structure of apples**



5.2.7 Eggs

Two observations can be made as regard eggs. Supermarkets make a profit on eggs (figure 5.14). There is a small difference between the purchasing prices of supermarkets and the selling prices of packing stations. The reason for this is (in part) that service providers provide transport between the packing stations and the distribution centres of supermarkets (section 4.7). The price of eggs in 2008 was above the 2005-2007 level on account of the high feed costs related to the higher grain prices in 2007-2008.

Figure 5.14 **Price structure of eggs (2005-2008)**



6 Relationship between producer and consumer prices

Based on the weekly prices at the levels of ex-farm, ex-wholesaler and consumer (supermarket) for the years of 2005 through 2008, we will check whether structural changes have taken place in the share of the different links in the consumer euro. Using a trend analysis we will give an impression of this matter in section 6.1. For that purpose we will derive the long-term price relationships in the chain to examine whether wholesalers and retailers apply absolute or percentage margins.

Unlike absolute margins, percentage margins in the chain lead to the enlargement of fluctuations in the price of commodities in the consumer prices, i.e. the bullwhip effect. In the case of a percentage margin, the retailer obtains a higher margin in euro if the purchasing price increases and a lower margin if the purchasing price decreases. This may be one of the explanations for why supermarket chains pass on increases in the purchasing price immediately to the consumer and price decreases with a delay. Therefore, we will test for the existence of percentage margins (section 6.1) before examining possible asymmetry in pricing (section 6.2).

We will then check in section 6.3 whether price changes are explainable by changes in the supply or changes in consumer demand, i.e. we will find out which price influences which other prices in the chain. Moreover, we will examine in section 6.4 which part of the long-term margin could be attributable to the C4 ratio in the supermarket sector. We will close this chapter with a summary in section 6.5 of the main findings of the previous sections.

6.1 Trend development of ratio between consumer and producer prices

Most economic time series exhibit the stochastic trend provided that they are examined over a sufficient number of periods. This trend is stochastic (sometimes called variable) because its curve is not constant. For example, the trend may rise for a prolonged period of time and then suddenly start to fall. Unfortunately, it is difficult if not impossible to predict such a turning point, as the economic consequences of 9-11 or the credit crisis have once again demonstrated. The stochastic trend dominates the progression of prices over time. While we see that in the short term prices differ from this pattern, these deviations are of a very temporary nature. For the purposes of the study into possible changes in the share of the different links in the consumer euro, it is interesting to examine whether the difference between purchasing and selling prices also exhibits a stochastic trend. It could be that a linear relationship exists between the purchasing and selling prices that no longer includes a stochastic trend, whereas the prices in that relationship do follow a stochastic trend. In such a situation, there is a common stochastic trend in the prices. The economic literature refers to this phenomenon as ‘co-integration’ (Engle and Granger, 1987). To find out how co-integration affects the market behaviour of a link in the chain, we will examine the following relationship:

Selling price (*t*) = (1 + *p*) * *purchasing price* (*t*) + *variance* (*t*)

where *t* indicates the week to which the price applies and *p* is the mark-up percentage. In the case of co-integration, the purchasing price and the selling price exhibit a common stochastic trend that causes the selling price to vary only briefly from what the selling price normally is, namely equal to (1+ *p*) * *purchasing price* (*t*), and these variances, falling under the variable *variance* (t), exhibit no stochastic trend, but vary around nil in a stationary way, 'stationary' pointing to the fact that the variances from nil are only of a very short duration. The absolute margin is the difference between selling price and purchasing price, which according to the relationship above boils down to:

margin (*t*) = *selling price* (*t*) – *purchasing price* (*t*) = *p** (*purchasing price* (*t*) + *variance* (*t*)

This implies that the stochastic trend in the margin originates from the purchasing price. This result is logical. It only becomes interesting if it the variances in *variance (t)* do not move stationarily around nil, but around a positive constant or a deterministic trend (i.e. a trend with a constant instead of a variable curve). These deterministic terms in the relationship between selling price and purchasing price necessitate further study into the relationship between the prices in the different links in the chain, because these terms are autonomous and therefore not affected by the vertical transmission of price movements. The size of the mark-up percentage may obviously also give rise to further analysis of the competition in the chain.

Where co-integration exists there will also be price adjustment. After all, if prices exhibit a common stochastic trend, a mechanism is apparently at work that causes the prices not to differ from that trend too far or too long. Such a mechanism leads to the error correction model. Within this model we can test for co-integration via the Johansen (1995) method on the basis of which we can determine in part whether and which deterministic terms form part of the co-integration relationship. In tables 6.1, 6.2 and 6.3 we provide an overview of the long-term price relationships found in the chain. As a positive difference was found in the previous chapter between the purchasing price of the supermarkets and the wholesale price, we have identified three possible situations. In the first situation (table 6.1) we attribute this difference to an extra link between wholesaler and supermarket, which for the sake of convenience we will call 'service provider'. In this situation we will therefore analyse four prices together, namely the consumer price, the purchasing price of the supermarket (or in other words the selling price of the service provider), the wholesaler price and the price for the primary producer. In the second situation (table 6.2) we will assume that the purchasing price of the supermarkets is the price that the wholesaler receives, so that the difference found between the purchasing price of the supermarket and the wholesaler price goes entirely to the wholesaler, which means that the wholesaler drops out of the analysis of the long-term price relationships. In the third situation (table 6.3) we will assume, in contrast, that the found difference belongs to the margin of the supermarkets, so that we can disregard the purchasing price of the supermarkets.

The results in table 6.1 show that most products are characterised by percentage margins in such a way that the relationship between the selling price and the purchasing price contains no deterministic terms. The mark-up percentages of the supermarkets versus the service provider amount to 62% for cucumber, 103% for red paprika and 59% for Elstar apples. In the relationship of service provider versus wholesaler, these percentages are significantly lower, i.e. 32% for cucumber and 35% for red paprika, or somewhat lower, i.e. 51% for Elstar apples. The mark-up percentages in the relationship of wholesaler versus growers are slightly lower again, but still significantly greater than nil: 25% for cucumber, 21% for red paprika and 10% for Elstar apples.

Table 6.1 **Structural price relationships in the chain of supermarket, service provider, wholesaler and producer**

Product	Selling price = $\beta_0 + \beta_1 *$ Trend $+ \beta_2 *$ Purchasing price a)								
	Supermarket versus service provider			Service provider versus wholesaler			Wholesaler versus producer		
	β_0	β_1	β_2	β_0	β_1	β_2	β_0	β_1	β_2
Onions (per kilogramme)	0,34	0,10	1	0,21	0	1	0,03	0	1,57
Cucumber (per item)	0	0	1,62	0	0	1,32	0	0	1,25
Red paprika (per item)	0	0	2,03	0	0	1,35	0	0	1,21
Elstar apples (per kilogramme)	0	0	1,59	0	0	1,51	0	0	1,10
Farm eggs (per item)	0,0,8	0	1	0	0	1	0,02	0	1

a) Trend is equal to nil in week 1 of 2005, equal to 0.01 in week 2 of 2005, and so on, and equal to 2.07 in week 52 of 2008. Bildstar and sliced onions were not included in this table because the wholesale price is missing for these products. For bread we find only stable long-term relationships between the consumer price and the wholesale price and also between the selling price of the service provider and the price for the meal producer; see tables 6.1.2 and 6.1.3.

For farm eggs there is only an absolute margin, because the percentage mark-up is equal to nil, while the constant term (β0) is significantly greater than nil. An exception is the constant term in the relationship of service provider versus wholesaler, which does not differ significantly from nil.

Similarly, the mark-up percentage in this relationship is not significant and we can see in the graph that the two prices are in fact equal to each other, except for short-term variances. Apparently, there is no extra link for farm eggs between wholesaler and supermarket. The estimate of the constant terms that are significant result in an absolute retail margin of 8 euro cents per egg and an absolute wholesaler margin of 2 euro cents per egg. By way of comparison, the average producer price for one egg over the 2005-2008 period came to 30 to 40% of the consumer price and to 40 to 50% for the wholesaler. In other words, there is a doubling of the price in the retail trade.

In the case of onions we see both a positive percentage mark-up of 57% in the wholesaler versus producer relationship and also an absolute margin of 3 euro cents per kilogramme. The mark-up percentages in the other links are equal to nil, although there is an absolute margin for the service provider of 21 euro cents per kilogramme and an absolute margin for the supermarket that has exhibited a rising trend of 34 euro cents per kilogramme at the start of 2005 to about 54 euro cents per kilogramme at year-end 2008. By way of comparison, the average producer price over the 2005-2008 period amounted to 10-20% of the consumer price, the average wholesaler price 20-30% and the average price for service providers 40-50%. This shows that there is a doubling of the price in the links in each chain after the producer.

As stated in the footnote to table 6.1, a number of stable long-term price relationships are missing in the case of bread. The relationships that we did find are stated in tables 6.2 and 6.3. For bread, we can see in table 6.3 that the supermarkets add 59 euro cents to the wholesale price. The gross margin in the supermarket channel is approximately one-and-a- half times the wholesale price. Similarly, the margin of the bread producer versus meal producer includes an absolute part that in this case comes to 49 euro cents; see table 6.2. There is also a percentage mark-up of 71%. The gross margin of the bread industry is 80 to 90% of the ex-industry price. A long-term relationship between the price at the supermarket and the price of the service provider cannot be demonstrated statistically, but the margin comes approximately to a mark-up percentage of 32%. The margin between wholesaler and meal producer is not characterised by a long-term relationship between the two prices either. Finally, a stable long-term relationship is absent between the meal price and the wheat price.

Two other products that we encounter for the first time in table 6.2 are Bildstar and sliced onions. In the case of Bildstar, we see an absolute margin in the wholesale trade of 18 euro cents per kilogramme. Besides an absolute margin of 14 euro cents, the supermarket also shows a mark-up percentage of 54% on top of the wholesale price. The wholesale price amounts to 50 to 60% of the consumer price. In the case of sliced onions, there is a doubling in the supermarket of the wholesale price.

Table 6.2 **Structural price relationships in the chain if the service provider belongs to the wholesale trade**

Product	Selling price = $\beta_0 + \beta_1$ * Trend + β_2 * Purchasing price a)					
	Supermarket versus service provider			Wholesaler versus producer		
	β_0	β_1	β_2	β_0	β_1	β_2
Bread (per item)	-	-	-	0,49	0	1,71
Bildstar (per kilogramme)	0,14	0	1,54	0,18	0	1
Onions (per kilogramme)	0,34	0,10	1	0,23	0	1,63
Sliced onions (per kilogramme)	0	0	1,99	n.a.	n.a.	n.a.
Cucumber (per item)	0	0	1,62	0	0	1,64
Red paprika (per item)	0	0	2,03	0	0	1,63
Elstar apples (per kilogramme)	0	0	1,59	0	0	1,66
Farm eggs (per item)	0,07	0	1	0,02	0	1

a) Trend is equal to nil in week 1 of 2005, equal to 0.01 in week 2 of 2005, and so on, and equal to 2.07 in week 52 of 2008. The abbreviation n.a. stands for not applicable.

The results in tables 6.2 and 6.3 for the products also included in table 6.1 show the same structure for the long-term price relationships as discussed for table 6.1. A comparison of tables 6.2 and 6.3

shows that the margins in the supermarket and those in the wholesale trade are roughly equal to each other if the service provider forms part of the wholesale trade (table 6.2), while the price more than doubles in the supermarket channel if the service provider belongs to the chain store (table 6.3). This leaves the wholesaler with a margin of around half the producer price.

Table 6.3 **Structural price relationships in the chain if the service provider belongs to the supermarket**

Product	Selling price = $\beta_0 + \beta_1$ * Trend + β_2 * Purchasing price a)					
	Supermarket versus service provider			Wholesaler versus producer		
	β_0	β_1	β_2	β_0	β_1	β_2
Bread (per item)	0,59	0	1	-	-	-
Onions (per kilogramme)	0,53	0,12	1	0,04	0	1,52
Cucumber (per item)	0	0	2,13	0	0	1,25
Red paprika (per item)	0	0	2,74	0	0	1,21
Elstar apples (per kilogramme)	0	0	2,41	0	0	1,10
Farm eggs (per item)	0,08	0	1	0,02	0	1

a) Trend is equal to nil in week 1 of 2005, equal to 0.01 in week 2 of 2005, and so on, and equal to 2.07 in week 52 of 2008.
The abbreviation n.a. stands for not applicable.

All things considered, we can conclude that most links use percentage mark-ups as margins. There are absolute margins through the entire chain only in the case of farm eggs. We also find absolute margins in the case of bread, Bildstar and onions. Moreover, the margin for onions increases via an autonomous linear trend. The degree to which deterministic terms are compatible with healthy competition is a matter for further study. With this in mind, we will examine price leadership in the chain in section 6.3. However, given the dominance of percentage margins, we will first examine asymmetric price adjustment in section 6.2.

6.2 Asymmetric margins

A lack of competition can manifest itself in the possibility that a link has to pass on rises in the purchasing price immediately in the selling price and, in contrast, to pass on decreases with a delay. An unexpected rise in the purchasing price means a negative shock in the margin of the link concerned. The link will eliminate this negative shock as quickly as possible. An unexpected fall in the purchase price will produce a positive shock in the margin from which the link concerned will attempt to benefit for as long as possible. Such conduct results in a situation where the profit in the margin after a positive shock will be greater than the loss of margin after a negative shock. So on balance there will be a profit in margin. For the purpose of the analysis, we will examine the error correction models by means of which we estimated the long-term price relationships shown in tables 6.1, 6.2 and 6.3. By allowing the adjustment parameters (and the constant term) to vary in these models between negative and positive values of the error correction terms, we can check whether asymmetric price adjustment exists. Such adjustment conduct results in a situation where the sum of the absolute value of the variances in the long-term relationship – indicated earlier by *variance (t)*, see section 6.1 –may on average be greater, but also smaller, for positive variances than for negative variances. Given the fact that the estimator of the coefficients in the long-term price relationships is super consistent (Engle and Granger, 1987), we can assume that this estimator is also consistent if no allowance is made for thresholds and asymmetry in the error correction model. In this way we will conduct the analysis using the variances of the long-term price relationships estimated in the previous section. In table 6.4 we present the amounts on an annual basis that will result if we multiply the weekly variances over the 2005 through 2008 period by the actual volume turnover in the Dutch supermarkets according to the market research agency and subsequently add the results of this multiplication over time and then divide them by four (years).

Table 6.4	Extra profit/loss per year caused by asymmetrical price adjustment (x €1000)				
Product	**supermarket versus service provider**	**supermarket including service provider versus wholesaler**	**service provider versus wholesaler**	**wholesaler including service provider versus producer**	**wholesaler exclusive of service provider versus producer**
Bread	-	-244	-	-306	-
Bildstar	-19	-	-	-60	-
Onions	-28	-	-	-37	45
Sliced onions	-53	-	-	-	-
Cucumber	-545	2	330	407	27
Red paprika	-35	12	74	134	36
Elstar apples	-316	-164	101	133	33
Farm eggs	-76	-10	-	-23	-38

The amounts found in table 6.4 are not noteworthy. For example, there is no amount that exceeds €1 million. The extra margin as a result of asymmetric price adjustment in the chain is negligible. Supermarkets are more likely to make a loss than a profit from asymmetric price adjustment. The wholesaler gets short-term profits from asymmetrical price adjustment in the case of vegetables, fruit and perhaps farm eggs.

6.3 Price influences in the chain

Another indication of the relationship between the prices in the different links of the chain is the overview of prices that do and do not help to bring about restoration of the long-term price equilibriums as we have presented them in tables 6.1, 6.2 and 6.3. In other words, which prices are affected by variances of the long-term price equilibrium (i.e. exhibit error correction behaviour) and which prices do not do so and thus impose in effect their stochastic trend on the prices that do exhibit error correction behaviour? In tables 6.5, 6.6 and 6.7 we indicate whether the selling price of a link helps to preserve the long-term relationship with the selling price of the previous link.

Table 6.5	Error correction behaviour of prices in the chain of supermarket, service provider, wholesaler and producer				
	Onions	**Cucumber**	**Red paprika**	**Elstar apples**	**Farm eggs**
Supermarket price corrected to service provider price	Yes	Yes	Yes	Yes	Yes
Service provider price corrected to supermarket price	No	No	Yes	Yes	Yes
Service provider price corrected to wholesaler price	Yes	Yes	Yes	Yes	Yes
Wholesaler price corrected to service provider price	No	Yes	Yes	Yes	No
Wholesaler price corrected to producer price	Yes	No	Yes	No	Yes
Producer price corrected to wholesaler price	Yes	Yes	Yes	Yes	No

The first result that stands out in tables 6.5, 6.6 and 6.7 is that the price in the supermarket always helps to preserve the long-term equilibrium with the selling price of the previous link (service provider or wholesaler), except in the case of sliced onions. The supermarket does what it wants in the case of this product and the wholesaler will follow; see table 6.7. If the restoration of equilibrium with the

selling price of the previous link, if applicable, and the selling price of the next link, if applicable, is of no importance to the selling price of a link in the chain, then this link can be regarded as the price leader in the chain, because the selling prices of the other links must exhibit error correction behaviour if all prices in the chain are co-integrated via bivariate price relationships. For example, the supermarket could be the price leader in the chain for sliced onions. The intermediate links in the chain – service provider and wholesaler with or without service provider – do not seem to be able to play this role for any of the products. However, in the case of farm eggs, the yield prices for the primary producers appear to impose their mark on the prices in the rest of the chain. The same would apply to bread, Bildstar and onions if the wholesaler were to have integrated the service provider. The wholesaler then possibly exerts no influence on the growers for them to produce in accordance with market norms. Finally, in the case of Bildstar and onions in the situation where the service provider belongs to the wholesaler (table 6.6), in the case of farm eggs in the situation where the service provider forms part of the supermarket channel (table 6.7) and in the case of bread if we combine both situations (see tables 6.6 and 6.7), we can see the traditional production-focused chain in which the selling price of the producer makes no allowance for the selling price of the wholesaler and the wholesaler in turn makes no allowance for the selling price in the supermarket.

Table 6.6	**Error correction behaviour of prices in the chain if the service provider belongs to the wholesaler**			
Product	**Supermarket price corrected to wholesaler price**	**Wholesaler price corrected to supermarket price**	**Wholesaler price corrected to producer price**	**Producer price corrected to wholesaler price**
Bread	-	-	Yes	No
Bildstar	Yes	No	Yes	No
Onions	Yes	No	Yes	No
Cucumber	Yes	No	Yes	Yes
Red paprika	Yes	Yes	No	Yes
Elstar apples	Yes	Yes	Yes	
Farm eggs	Yes	Yes	Yes	No

Table 6.7	**Error correction behaviour of prices in the chain if the service provider belongs to the supermarket**			
Product	**Supermarket price corrected to wholesaler price**	**Wholesaler price corrected to supermarket price**	**Wholesaler price corrected to producer price**	**Producer price corrected to wholesaler price**
Bread	Yes	No	-	-
Onions	Yes	No	Yes	Yes
Sliced onions	No	Yes	-	-
Cucumber	Yes	Yes	No	Yes
Red paprika	Yes	Yes	No	Yes
Elstar apples	Yes	Yes	Yes	Yes
Farm eggs	Yes	No	Yes	No

Summarising, we may conclude that neither the supermarket (except for sliced onions) nor the service provider or wholesaler impose their prices on the rest of the chain. Except in the case of farm eggs and meal/flour for bread, the producers, too, receive in most cases prices that adjust themselves to the pricing elsewhere in the chain. Consequently, the analysis in this section again provides no indication that one or more links in the chain after the primary producer act independently of the price development elsewhere in the chain.

6.4 Influence of concentration in the retail trade on the development of cost prices

This section addresses the question of whether increasing concentration in the supermarket sector, as measured via the C4 ratio, has an influence on the development of the gross margin in the chain. According to the 'market structure hypothesis' in industrial economy, a positive connection may be expected to exist between the concentration in an industry and the margin achieved in the industry. The gross margin is read from the Lerner index L in industrial economy:

$$L = \frac{P^c - P^w}{P^c} \tag{6.1}$$

where P_c = weighted average consumer price
P^w = weighted average purchasing price of supermarkets

The Lerner index expresses the gross margin as a percentage of the consumer price. The Lerner index can be derived based on a profit maximisation function:

$$\pi_i = \left(P_{i_i}^c - P_{i_i}^w - c_{i_i}\right)Q_{i_i} \tag{6.2}$$

where πi = profit of company i
P_i^c = consumer price of supermarket chain i
P_i^w = purchasing price of supermarket chain i
c_i = purchasing costs per unit in supermarket chain i
Q_i = sales volume at supermarket chain i

Based on profit maximisation, the Lerner index can be related to the criterion for the market structure (Hirschmann Herfindahl Index (HHI) and the market demand (price elasticity of demand) (Scherer and Ross, 1990):

$$L = \frac{P^c - P^w - c}{P^c} = -\frac{HHI}{\varepsilon} \tag{6.3}$$

where c is the weighted average sales cost per unit. As the HHI is > 0 and the price elasticity of demand ε is less than nil, the expression on the right-hand side is positive. The gross margin increases as concentration increases and decreases as demand becomes more price-elastic.

Equation 6.3 forms the theoretical basis for the estimates made in this section. As the compilation of the HHI requires a lot of information, i.e. information about the turnover of each supermarket format, we have used the C4 index as an alternative. In view of the limited lead time we will disregard the effect of consumer demand on the gross margin and will derive the following function that must be estimated:

$$\Delta L = \Delta \frac{P^c - P^w}{P^c} = \alpha_0 + \alpha_1 \Delta C_4 + \eta$$

where Δ before the variable indicates that it concerns changes to that variable and η is a residual term. In conformity with the theoretical expectations embodied in the market structure hypothesis, α1 is > 0 (Hypothesis 1A). Concentration leads to a larger gross margin. However, in conformity with an alternative hypothesis propagated by the Chicago School, large companies are more efficient and the gross margin may actually decrease in the event of an increasing concentration (hypothesis 1B):

Hypothesis 1a $\alpha 1 > 0$
Hypothesis 1b $\alpha 1 < 0$

C_4 was determined on a weekly basis for the panel of the research agency. For this purpose the agency provided for all supermarket chains in its panel the total turnover per week plus the turnover of the four largest supermarket chains. NMa requested turnover from one supermarket chain that is not in the panel. However, this company did not provide data on a weekly basis. Therefore, we do not have a series of turnover figures on a weekly basis (200 observations) for the years of 2005-2008 for this company. So for the analysis in this section we used the research agency panel. Table 6.8 shows the ranking of the five largest supermarket chains in the Netherlands. It should be noted, however, that the turnover figures of the companies in the panel concern only packed products and the turnover of those products was estimated too low[6]. This contrasts with the supermarket chain that supplied the data itself. The result is an overestimation of the market share of the supermarket chain concerned, particularly for apples, cucumbers and paprikas.

Table 6.8 Ranking of market shares in the Dutch supermarkets (2008)

Products	C_4 (%)	Turnover (€)	Chain 1	Chain 2	Chain 3	Chain 4	Chain 5
Sliced onions	75,7	8,0	4	3	2	1	5
Unsliced onions	69,3	31,7	5	4	3	1	2
Red paprika	60,9	23,6	3	4	2	1	5
Cucumber	72,4	65,7	4	5	3	1	2
Apples	75,1	80,5	3	5	2	1	4
Whole loaf	63,8	576,4	5	4	2	1	3
Farm eggs	65,9	136,8	4	5	2	1	3
Potatoes	68,4	182,1	3	4	2	1	5

The joint market share of the four chains in the research agency panel increased on average by 4-6% in the 2005-2008 period, except for cucumbers and bread (1-2%) and apples (8%)[7]. Table 6.9 presents an overview of the values for the Lerner index and also examines whether a change in C_4 leads to a significant change in the Lerner index and how this affects the consumer price and/or the purchasing price of the supermarket. The average of the Lerner index lies between nil and 1, which is in line with the theory. The maximums and minimums also satisfy this criterion, except the minimum for cucumber, which is less than nil. This latter result is the consequence of a seasonal effect and disappears when a correction is made. To compare the Lerner indices of the products we would first need to estimate the price elasticity ε of consumer demand. Compared with the absolute value it is more interesting to check how the Lerner index changes if C_4 increases by one percentage point.

[6] In the case of apples, 39.5% of turnover is sold packed and 60-65% as single piece items, which were not included. In the case of paprikas, 66.8% is sold packed and the figure for cucumbers is 81.8%. In the case of the other products, 94-100% is sold packed and is included in the panel. If a correction is made for this, the ranking of the company not in the panel goes down for onions, cucumbers and apples.

[7] The market share of the company that does not participate in the panel decreased or remained the same in the case of bred, eggs, onions and cucumbers. The increase in the C4 was slightly overestimated.

Table 6.9	Lerner index and effect of C4 on Lerner index and purchasing and selling prices of supermarket a)				
	Lerner index (L)				Effect Δ (C4) on Δ (L) expressed as extra profit for supermarket sector per year if Δ (C_4) increases by 0.01 (= 1 percentage point) (in €)
	average	max	min	st. dev.	
Bread	0,25	0,48	0,15	0,06	9.607.937
Bildstar	0,47	0,60	0,09	0,08	0
Onions	0,51	0,68	0,24	0,07	0
Sliced onions	0,50	0,78	0,36	0,06	-137.269
Cucumber	0,37	0,81	-0,1	0,15	889.490
Red paprika	0,66	0,32	0,07		0
Elstar apples	0,38	0,71	0,05	0,12	-73.587
Farm eggs		0,51	0,64	0,34	0,05
a) All estimated effects unequal to nil are significant.					

By means of an impulse response analysis based on a bivariate vector autoregressive model of the changes (after seasonal correction) in the Lerner index and in the C4, we can determine the effect on the Lerner index if C4 ultimately increases by one percentage point. If we then multiply this effect by the total turnover value of the relevant product in the Dutch supermarkets, we can express the one percentage point increase in C4 in the increase/decrease of the total gross profit (i.e. selling price minus purchasing price) on the relevant product for the Dutch supermarkets. The results are stated in the right-hand part of table 6.9. This shows that, except for sliced onions, the products with relatively lower Lerner indices are the ones where an effect of C4 is observable. Only in the case of bread does this effect produce some degree of extra profit of significance, with an increase of the profit for the supermarket sector of €9.5 million for each percentage point by which C4 increases. In the case of cucumbers, this amount is €900,000. This is negligible, particularly if allowance is made for the circumstance that an increase of the C4 also means a growth of the market share of the value-for-money supermarkets. The four largest companies in the panel of research agency are, after all, supermarket chains with relatively high quality, service, costs and gross margins[8]. For sliced onions and Elstar apples on the other hand, we can find some empirical evidence for hypothesis 1b, although the amounts here are exceptionally small.

6.5 Conclusions

The supermarket sector and wholesalers apply percentage margins. For vegetables and fruit like cucumbers, red paprikas and Elstar apples the supermarkets charge a mark-up percentage that often makes the supermarket price more than double the wholesale price. In the wholesale trade the mark-up percentages are usually smaller by more than half. Only in the case of farm eggs are there absolute margins throughout the entire chain. Nevertheless, even then there is a doubling of the price in the retail channel, while the wholesaler charges a mark-up that comes to slightly less than half the producer price. Similarly, we find absolute margins in the case of bread, Bildstar and onions. In the case of onions, this margin also increases via an autonomous linear trend. On the whole, we can say that the margins in the supermarket sector are usually significantly higher than the price that the producer receives for his product.

Despite supermarkets and wholesalers charging mainly percentage margins, the amounts that are gained or lost via asymmetric price adjustment are hardly significant. Decreases in the purchasing price are passed on just as quickly as price increases and not, as is the case with asymmetric price

[8] The market share of the company that does not participate in the research agency panel remained roughly the same for bred in the 2005-2008 period and decreased for cucumbers. In the case of bread, the non-inclusion of the company in the C4 probably has no consequences. The level should have been higher, but on balance the change is more or less the same. The change in the C4 for cucumbers was overestimated.

adjustment, with a delay. Moreover, we can see that neither the supermarket (with the exception of sliced onions) nor the service provider or wholesaler impose their prices on the rest of the chain. Except in the case of farm eggs and meal/flour for bread, the situation that exists in most cases is that the producers receive prices that adjust to the pricing elsewhere in the chain. Consequently, the analysis of price-influencing in the chain provides no indication that the pricing in the links after primary production does not take into account the price developments elsewhere in the chain.

Finally, the study into the effect of the concentration ratio on margins in the supermarket sector shows that the supermarkets benefit if concentration increases only in the case of bread and cucumbers.

7 Conclusion

This report examines food pricing. The report endeavours to determine whether the prices for food products at the levels of ex-farm, ex-wholesaler, ex-industry and ex-supermarket are related to each other. Do the prices follow each other? And are the differences between the prices too large? The report checks whether any deficiencies – i.e. no relationship between prices, large differences – can be explained by the concentration of supermarkets.

The analysis was conducted for eight products, i.e. bread, potatoes, sliced and unsliced onions, cucumbers, paprikas, apples and eggs. Except for bread, these are all products that are not processed and as such can be tracked throughout the entire chain.
Pricing was examined in six ways:

- A comparison was made of the development of prices in the Netherlands and some neighbouring countries.
- The structure of the chains was defined.
- Research was conducted into the contractual conditions between suppliers and supermarkets and the way the conditions are established.
- The price dynamics and the relationships between the prices in the different links were examined graphically and econometrically.
- The price structure was identified.
- A relationship was established between the difference between selling prices and purchasing prices in the supermarket and the concentration in the supermarket channel.

A comparison of Dutch producer and consumer prices with prices in other western European countries showed among other things that:

- Consumer prices for food in the Netherlands have risen slower than in other western European countries. This applies in particular to bread and grain products.
- Consumer prices for vegetables in the Netherlands have increased faster than in other western European countries in the euro zone. This contrasts with producer prices for fresh vegetables.

Based on ten in-depth interviews on negotiation of the conditions of delivery between suppliers and supermarket chains, it is possible to draw the following conclusions:

- The interdependence between suppliers and supermarket chains is large and is increasing still further as a result of the chain-wide consolidation.
- Supermarkets are increasingly imposing wishes and requirements in terms of product properties, logistics and planning in the chain. In that sense the influence of the chain stores in the chain is increasing. On the other hand, arrangements agreed for these wishes and requirements also bind the supermarkets. The arrangements form the switching costs of chain stores.
- Long-term delivery and price agreements are concluded for bread and eggs. Weekly arrangements continue to dominate in the world of potatoes, vegetables and fruit.
- There are no large differences between suppliers and customers as regards the contractual conditions, apart from objective differences in quality, order size and order frequency.
- Supermarket chains and suppliers both say that the negotiating position of suppliers is relatively weak. This is mainly due to oversupply on the supplier side.
- Apart from price, there are all kinds of volume and graduated discounts and payment agreements that are important in the relationship between suppliers and supermarkets. Contributions towards promotional activities also occur regularly. Payments for a place on the shelves or inclusion in the range and the introduction of new products occur seldom if at all in the fresh market. Discounters negotiate only about price.
- The risks in terms of perishing and unsold products shift on delivery of the product from the supplier to the supermarket chains. Product recall is seldom if ever an issue for Dutch products. Unsold bread is taken back by the bakeries. This is regulated contractually.

- Commercial differences of opinion occur in the chains about such matters as the quality of the delivered product. These differences are settled amicably. No evidence was found that breaches of contract occur (regularly) in the chains concerned. Suppliers and supermarket chains can threaten each other about the discontinuation of deliveries or the taking up of a product. Such threats often concern one product or a small number of products, but seldom the entire range and the relationship between supplier and customer.

Analysis of the weekly price development at all levels in the chain revealed that:
- The price developments at the different levels are related to each other, albeit occasionally with some delay, as in the case of bread.
- The difference between selling prices and purchasing prices in the supermarket has increased in the case of potatoes, sliced onions and unsliced onions, and has decreased in the case of bread. The difference has remained almost constant in the case of apples, cucumbers, paprikas and eggs. Millers and bakers continue to benefit from the high grain prices of the winter of 2007-2008.
- There are large differences between the products as regards the volatility of prices. The prices of bread, eggs and to a lesser extent sliced onions exhibit little short-term dynamics. The prices of fresh potatoes, vegetables and fruit exhibit seasonal patterns. In the case of cucumbers and apples, there are large differences in the consumer prices from week to week as a result of promotional campaigns. There are considerable dynamics at the wholesaler and grower levels in the case of cucumbers and paprikas on account of the weekly fluctuations in supply and demand.

Analysis of the price structure over the examined period showed that:
- Supermarkets make a profit confined to large net profit on all the examined products. Net margins (sometimes large) are also obtained by wholesalers, arable farmers and fruit growers. Greenhouse market gardeners and laying hen farmers have experienced four bad years on average.
- In the case of vegetables and fruit, there is a large difference between the selling prices of the wholesaler and the purchasing prices of supermarkets. We have no watertight explanation for this situation. The most obvious explanation is that service providers account for part of this difference.

The econometric time series analysis of the prices in the chain showed that:
- There are percentage margins between most links. Absolute margins are applied throughout the entire chain only in the case of eggs.
- Although percentage margins enlarge price fluctuations, the profits/losses as a result of asymmetric price adjustments are negligible.
- After the primary production there are no links in the chain that impose their prices on the other links in the chain, except in the case of sliced onions, where the wholesaler follows the prices in the supermarket.
- Only in the case of bread and cucumbers do the supermarkets achieve a slightly higher gross margin if the concentration in the supermarket sector increases.

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