Enterprise and Industry

Competitiveness of the European Food Industry

An economic and legal assessment

European Commission

2007

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Foreword

The European Food Industry is an important sector which spans a wide range of economical activities. Two striking observations can be made about it. On the one hand, it produces an impressive diversity of products that ranges from the staples of our survival to luxurious sensual indulgences. On the other hand, this vast array of products emanates from a fairly limited number of famous world leading companies together with a myriad of irreplaceable and relatively unknown small and medium-sized enterprises – both of which exist side by side within the European Community.

By contrast to other prominent industrial sectors such as the car industry or pharmaceuticals, the European Food Industry is *per se* characterised by a complex value chain. This chain links the procurement of agricultural raw materials, through their processing up to their presentation for final human consumption and includes their economic distribution. As a result, this industry involves multiple players such as farmers, input suppliers, manufacturers, packagers, transporters, exporters, wholesalers, retailers and final customers with different and changing interests, cultural attitudes and dimensions.

This huge and composite industrial and economical entity has done well at Community level and, still constitutes a flourishing domain of which we can be proud. Nevertheless, in spite of its leading status at Community level in terms of manufacturing, of value added and of job creation, the competitiveness of this sector is now a matter of concern: this is the clear message I received from this study. Moreover, consumers preferences are evolving very quickly and becoming more demanding and sophisticated. Industry needs to adjust and adapt to these circumstances.

This document sheds light on a truth which will appear to some people as a disturbing one. It highlights recent warning signals such as the diminishing capability of this sector to generate innovation and enough profit to allow for adequate re-investment to maintain or even conquer market share in domestic and/or foreign markets.

If the challenges as revealed by this document are to be met stakeholders must grasp the opportunity to act now and trigger every single action which could improve the current situation. Truly, there are so many reasons for hope. The European Food Industry exhibits a large array of assets that have to be put to profitable use: this industry has the right cards and some very capable players. It needs only to take up the challenge of adaptation of the agro-food industry to new and demanding conditions so as to ensure continuity of its traditional excellence in manufacturing food products of ever higher quality with more and more value added for the fulfilment of its consumer's expectations. I agree this is a difficult task! But really, the reward is worth the effort!

Acting! This is what I propose to do. First of all, I would like to invite all of the interested parties to seize this document, to study it carefully and objectively, as I did myself with my collaborators, to debate it and then to gain the best profit from it. Notwithstanding its freshness of approach and originality as to the competitiveness comparability, this document is not entirely unique but it is timely. It, together with other studies which have come to similar and convergent conclusions, must be understood, appreciated, addressed and harnessed to create new momentum for change to meet the identified challenges in this domain.

Secondly, and more concretely. The Commission, in the course of its mid-term review of industrial policy, has decided to launch a targeted initiative aimed at addressing the challenge of competitiveness and placing the emphasis on innovation. Having regard in particular to the large proportion of small and medium-sized enterprises in the Food sector, it is anticipated that this initiative will be of considerable assistance in assuring the future of our vital Food Industry.

Günter Verheugen
Vice-President of the European Commission

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Executive Summary

Main conclusion: European food industry weak

The competitiveness of the European food industry is weak compared to the US and Canada and at approximately the same level as the Australian and Brazilian industry. Scenarios show that unless the productivity growth in the EU is higher than in the rest of the world, EU competitiveness remains weak. Despite the weak competitive performance, a fair number of world leading food enterprises are located in the EU. Moreover the importance of the food industry in total manufacturing is growing, and the sub-sectors value added is higher than that of most other sub-sectors in manufacturing. The impact of food legislation does not seem to affect EU competitiveness negatively compared to the US. In general, EU companies' view on the food legislation is positive. EU authorities can increase their support for the European industry by engaging in export negotiations. This study is one of the few or maybe even the first one, which included all sub-sectors of the food industry and benchmarked these with important non-EU countries.

Research outline

Aim

The EU took several institutional initiatives which affect also the food industry. Important initiatives are: CAP reform, including implementing WTO-agreements and *the Lisbon Agenda* (2000), which aims to make the EU the most dynamic, innovative and competitive economy in the world by 2010. These initiatives are incentives for The European Commission, DG Enterprise to commission a study to assess:

- the actual competitiveness of the EU food industry compared to other leading countries;
- the impact of the European food legislation on the competitiveness;
- the impact of economic and institutional constraints, as well as (agricultural trade) policies on the competitiveness based on model simulations.

Competitiveness indicators

Assessing the competitiveness is based on the theory of international economics. This concept, widely used by governments, is more focussed on the overall position of countries and regions and less on strategies of enterprises. The competitiveness is presented by 5 indicators:

1. Growth real value added of a specific industry in the total food industry. This reflects the competition for production factors between different industries within a country;
2. Growth of Balassa index. This index reflects the export specialisation level in one category of goods from one country;
3. Growth of the export share (absolute deviation) on the world market. This performance indicator reflects the outcome of the competitive process. The extra-trade determines this growth for the EU;
4. Growth of the real labour productivity. This affects the unit labour costs and in this way the relative prices;
5. Growth of real value added reflects the industrial dynamism.

These indicators have an external and an internal dimension. A profitable gain of market shares is aiming at the external market and highest rent on production factors is aiming at the internal economy. Next to these indicators the description of the sub-sector are enriched with other information: self-sufficiency, information on products produced by the sub-sector as well as on enterprises.

Impact of food legislation on the competitiveness
Due to the implementation of the Commission White paper on Food Safety EU Food legislation developed to respond to growing concerns as regard food safety, consumer information and the functioning of the internal market. The study focuses on the impact of Food legislation on the industry in terms of current competitiveness and its potential to innovate (cost assessment and benchmarking).

Impact of structural change: a model approach
The impact of economic and institutional constraints, as well as (agricultural trade) policies on the competitiveness is based on the GTAP-model. The advantage of this model is its availability and proven value in research for governments. It recognises that changes in the competitiveness determinants of one industry can influence other industries, trade flows between countries and the position of the food industry in the economy.

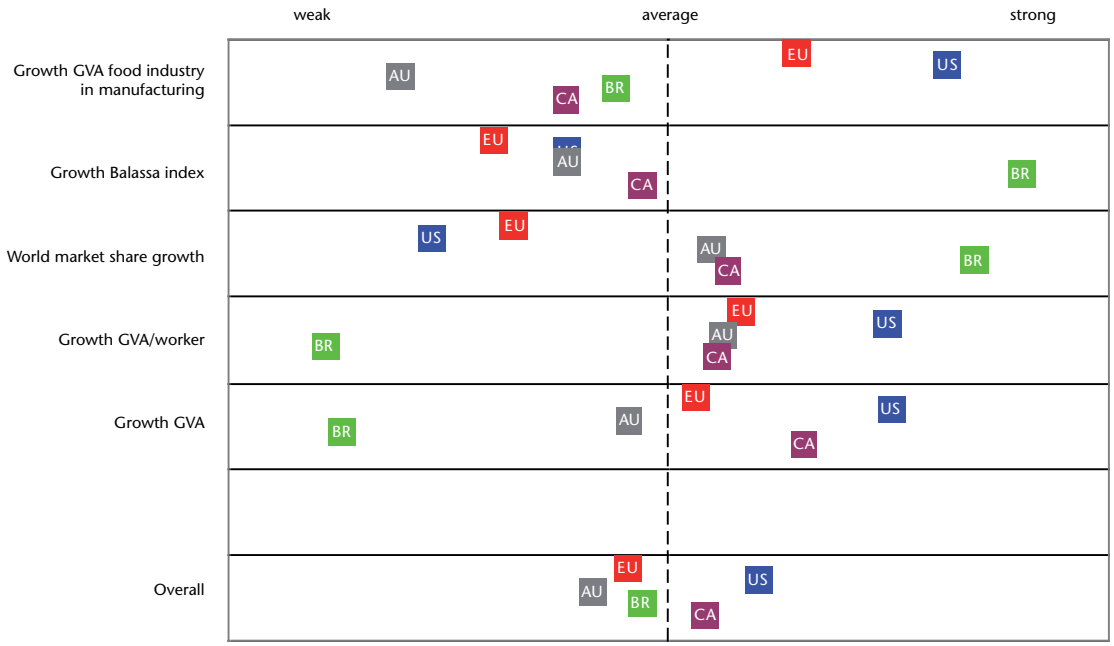
Data and selection of benchmark countries
Main data sources used are from official statistics: Eurostat (Structural business statistics), the UN (Comtrade), FAO (supply and utilisation accounts) and from abroad e.g. the US Census Bureau. The selection of global competitors is based on an analysis of the export market shares. The chosen benchmark countries are US, Australia, Brazil and Canada. China, as an important emerging food exporter, is not taken into account due to lacking enterprise statistics.

As the EU-25 started in 2005 and data are available until 2004, the EU-15 is used as the EU region. This choice is supported by the dominating position of the EU-15. Over 90% of the export value as well as of the production value of the EU-25 originates from the EU-15.

Competitiveness of the EU food industry

The competitiveness of the EU food industry is weak, as is shown in figure 1. The EU is the largest exporter and importer of food products, even if intra-communitarian trade is excluded. The imports as well as the exports of the selected countries grew in the period 1996 till 2004. The

Figure 1 Competitiveness of the EU food industry



growth of the share of the value added of the food industry in total manufacturing is the highest in the US and second in the EU. The growth of the Balassa index (export specialisation index) indicates that the food exports have grown more in importance in Australia and Brazil than in the EU, US or Canada. The importance of the EU decreases whereas it increased in all other countries. The production value of the EU food industry is much higher than in the benchmark countries: 150% the US value and 10 till 20 times the values of other countries. The competitiveness is illustrated in Figure 1, which shows a weak competitive position for the EU and a stronger position for the US and Canada. The reason behind this might be the smaller scale of the enterprises, the restricted availability of raw materials due to quota system (e.g. milk and sugar) and a lower growth of the population which determines the quantity demanded.

Food industry in economy

The European food industry has a share of 1.9% in the value added of the total economy and 2.2% of the employment, often in rural areas. The food industry is, with 11% of the value added in 2003 of the manufacturing industries, important. The value added of the food industry grew faster than that of total manufacturing. The EU is also the largest exporter and importer of food products.

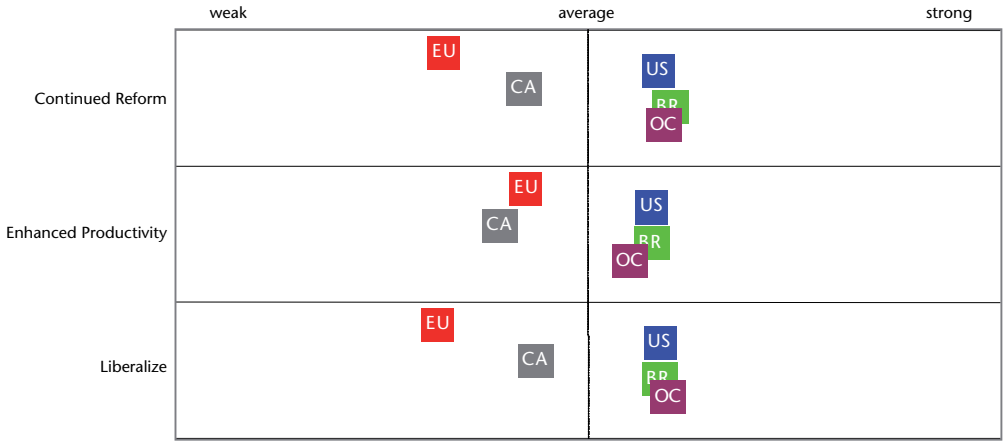
SWOT: Strengths - Weaknesses - Opportunities - Threats

The European food industry is weak in economies of scale and in labour productivity. However it showed it strengths in attracting sufficient capital and labour, has an openness to the world market (export and import grew simultaneously) and is in an open competition (many enterprises). The cultural difference between regions and specialised SMEs enable to exploit 'Economies of scope'. Full exploiting the economies of scale is also an opportunity. New technologies (micro-machine processing) and consumer preferences for differentiated and healthy products enhance exploiting the economies of scope. The low population growth is a major threat: a lower increase in the quantity demanded. The increasing scale of the retail chain will also be a threat, if the food industry scale isn't at the same level. Policy threats are: restriction on raw material production and competitiveness hampering enterprise policies.

Scenarios

The effects of different developments of the productivity growth and trade policy on the competitiveness are illustrated by scenarios. In all scenarios the value added share of the food industry in the total economy decreases for all countries, except for the scenario Liberalise. In the latter case in Brazil and Australia and New Zealand the value added of food industry grows faster than of the whole economy. The competitiveness of the EU food industry will deteriorate further in scenarios with developments that are reasonable certain to happen: the Continued reform and in the Liberalise scenario. Other regions will improve their relative position compared to the EU. In scenarios with an Enhanced productivity growth in the EU food industry compared to the rest of the world, the competitiveness of the EU food industry improves and the value

Figure 2 Competitiveness under different scenarios (OC= Australia and New Zealand)



added increases. Higher productivity at farm level improves the position of the food industry, even without an enhanced growth of the productivity in the food industry. The improvement of the competitiveness of food industry will be slightly higher if only the EU food industry has higher productivity level. Despite the weak competitiveness the value added and export volumes grow, but slower than of the competitors.

The employment in the EU food industry will decrease with 2 till 3% and 4.5% in the case of full trade liberalisation. Enhanced productivity increases the competitiveness of the food industry, but does affect the employment negatively. Not surprising, because the assumption is a higher labour productivity. In all non-EU regions the employment will increase. In the North American region with 3 till 7%, in Brazil, 4 till 6% and in Australia and New-Zealand region even between 8 and 13%.

External environment of the food industry

External drivers of the food industry

Developments which shape the food industry are:

- a lower growth of the population in the EU (0.2% annually) than in the benchmark countries (between 0.9 and 1.2% annually) This results in a lower growth of demand for processed food in the EU;
- consumers prefer more convenient and healthy food and ethical issues (such as animal welfare) are becoming more important - both in relation to higher levels of income and wealth;
- technology development increases the efficiency and efficacy of raw material use, biotechnology enables production of functional food but is controversial in the EU;
- innovation (including micro-machine processing) stimulates product differentiation. Market responsive food chain stimulates this process.

Trade and enterprise policies

EU agriculture policies and the agricultural sector are influenced by international policy developments: WTO in particular. The philosophy of the CAP changed fundamentally due to international pressure and internal policy and budgetary reasons: a shift from market price support to income support decoupled from production but coupled to public goods. As a result, product price gaps between EU and world market levels have declined substantially, yet not for all agricultural products. EU performs less than the US on several issues related to the (general) enterprise policies among others: access to finance, improvement of the Regulatory administrative environment, human capital and R&D expenditures.

Retailers, wholesalers and foodservice

Wholesalers, retailers and foodservice firms are an important link between the food industry and the consumers as final customers. In 2003 consumers spend €1,028 billion at the retailers and foodservices: the market share of retailers is 66%. The concentration is high and still increasing: the top-5 supermarkets have a market share of around 70% in most EU countries. The top-25 global supermarkets, of which 60% with a European headquarter, are active in several countries and even at several continents.

Small scale firms with less than 5 employees are the prevalent wholesaling firms: around 70 to 80% in the EU. However over 50% of the turnover is achieved by a small number of wholesalers with 20 and more employees.

Food services are of growing importance: in the US consumers spend almost 50% of their food purchases in foodservices outlets and in the EU one third. The major channels are restaurants and fast food outlets. Catering has a market share below 20% in the US and even lower in the EU. Retailers spend 80% of the turnover on purchases of goods, food services only 30%. Consumers buy therefore five times as much quantity in the supermarkets than in food services outlets.

Innovation and R&D
The level of R&D expenditures in the food industry is rather low compared to total manufacturing. The levels are comparable low in the textiles sector, the wood and pulp as well as the basic metal industry. High levels are achieved in the sectors of machinery and equipment. Denmark and the Netherlands score above the US in the R&D expenditures in the food industry.

It should be recognised that R&D is important in the food industry, but has a different character than in e.g. telecommunications. New products in a market are mainly variation of older ones. Innovation is more process, marketing and management oriented and less a technology-push based on basic science. Agriculture and the food industry (at least in some countries) are well known for the high speed with which it implements basic innovations from other industries (like ICT, logistics, marketing). Technology transfer to the mass of SMEs is a challenge due to limited management capacity and demanding management tasks in several fields. Small and medium sized enterprises (SMEs) that make up more than 50% of the food industry enterprises are even more challenged than the large international companies. The headlines although will be dominated by the large companies, which have more funds and more possibilities to exploit innovations.

EU food legislation positively perceived

The findings of this research are surprisingly positive for the system of EU food legislation in general. It is not considered as a major factor hampering competitiveness, nor is the EU system seen as inferior to the US-system. Criticism focuses on details. Quite a few improvements are possible. Improvements would be welcomed in stability, clarity and accessibility of both legislation and authorities. The biggest burdens for SMEs are experienced from food hygiene and labelling legislation.

Pre-market approval procedures are for the happy few. Due to the costs and time involved, it is very hard for a regular food business to bring a new additive, novel food, GMO or health claim to the market. For those who are in a position to follow such a procedure, it is not always clear precisely which procedure applies, what requirements must be met, how long the procedure will take and if a favourable outcome may be expected.

A pro-active role of EU and national authorities in assisting companies to negotiate EU procedures and to comply with legal requirements would be most welcome. On the global market, EU authorities can increase their support for the European industry by engaging in export negotiations and by recognising scientific assessments performed under the jurisdiction of well-equipped foreign authorities.

Very recently the European Commission undertook to reduce administrative costs by 25%. To achieve this ambition, audacious and radical steps are called for. Improvements are possible on the EU system of legislation as such and on EU food legislation in particular. An example is fatal deadlines: legally missing the deadline has the same effect as the decision to grant pre-market approval. Another example is clear responsibilities: the current situation with regard to GMOs where responsibility to decide shifts between the Commission and the Council depending on the content of the decision to be taken, the advice of EFSA and the meeting of deadlines is deplorably unclear.

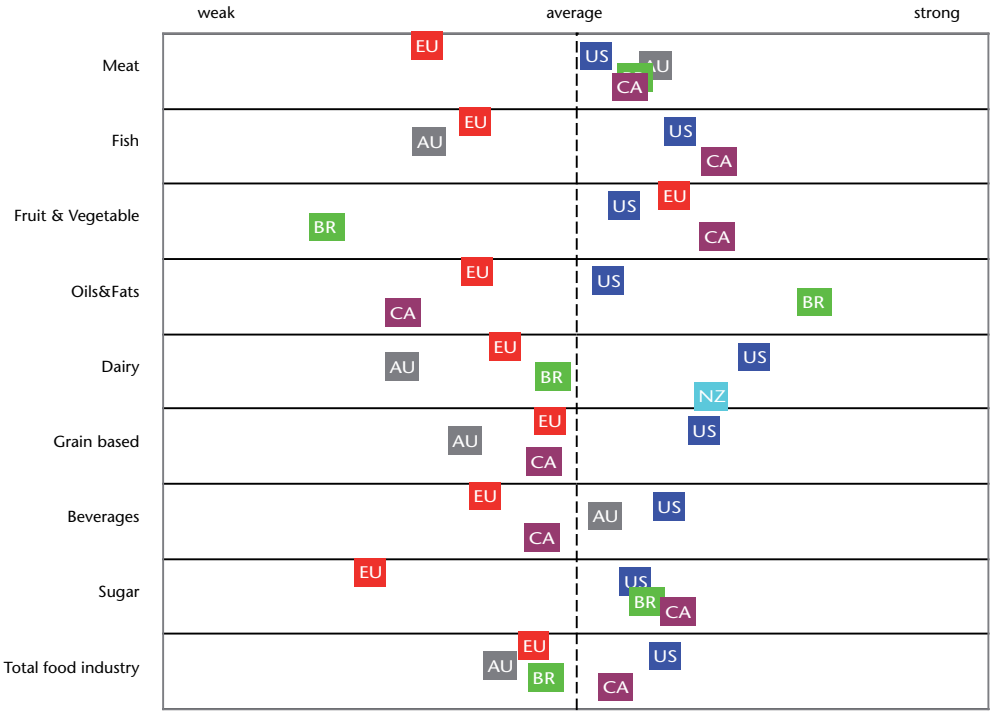
Competitiveness of sub-sectors food industry

The largest sub-sectors are meat, dairy, cereal-based industries and beverages. Table 1 presents the export values and the production values. A description of the industries can be found in section 4.1.

Table 1 Exports and production value of the EU food industry

	Exports (average 2002-2004)			Production value 2003	
	EU-25 (incl. intra trade)	EU-15 (incl. intra trade)	EU-15 to third countries	EU-25	EU-15
Branch	€billion	€billion	€billion	€billion	€billion
Meat	25.5	24.0	4.1	146.8	137.3
Fish	12.4	11.8	2.3	17.6	16.8
Fruit and vegetables	14.9	13.6	2.9	45.5	42.4
Oils and Fats	11.7	11.1	3.2	28.1	26.5
Dairy	22.6	21.5	4.7	107.9	101.9
Cereal based	15.3	14.8	4.2	108.4	102.2
Beverages	25.3	24.8	12.3	115.3	106.1
Sugar	3.6	3.3	1.3	11.7	10.4
Food industry	131.7	124.7	34.9	785.2	729.6

Figure 3 Competitiveness of the sub-sectors



The EU competitiveness of all sub-sectors is weaker than that of the US, except for processed fruit and vegetables (figure 3). Brazil is relatively strong compared to the EU in meat, oils and fats and sugar. The different sub-sectors are discussed briefly below.

Meat products: competition from low cost countries

The EU is a leading exporter of meat: net exporter for pork and poultry and net importer for beef. Major flows are trade between EU countries. The trade balance in meat for the EU developed negatively: the surplus decreased. The EU has a negative trade balance for beef. International trade is mainly based on frozen, cooked or further processed meat products. The EU industry should focus on the production of fresh products for the demanding European customer. In this market segment the local industry has an advantage over third countries.

The competitiveness of the EU meat industry is weak. Third countries like Brazil and Argentina have competitive advantages. Large and reliable livestock supplies, low costs of labour and feed (abundance of land) combined with economies of scale are key factors contributing to the competitiveness of the Brazilian meat industry. Due to higher labour costs, the US has these advantages to a limited extent. The need for consolidation will be a key issue in the meat industry mergers to achieve economies of scale. Only bigger companies with an adequate scale can exploit the opportunity to cater for the various preferences for particular meat cuts between countries. The competitors are not consistently strong in all competitiveness indicators. The Brazilian meat industry is of growing importance within their food industry and on the export market. The Brazilian growth of real value added and labour productivity, however, is weak. The opposite applies to the US. On average all competitors are stronger than the EU-15.

Fish and Seafood industry: consolidation and outsourcing of processing

The seafood sector remains very fragmented, in particular markets for fresh seafood, but is in a process of consolidation and globalisation. With 4 of the top 10 seafood companies, the EU still has a modest position in global perspective. Cross border consolidations that give access to global sources, low costs of processing and access to markets is expected. The companies that take the initiative are likely to become industry leaders and the ones that define and shape the industry for the future. Seafood is one of the fast growing segments of the food industry. Buying power is increasing, in particular in emerging seafood markets like China and Russia. The European seafood industry faces competition with other main developed economies like Japan and US in terms of access to the sources and (labour) costs of processing. The EU-15 is the largest exporter with 23% of the total world exports. The trade to non-EU member states is a mere 4%, below China (9%), Thailand (7%), Norway (6%), US (6%) and Canada (6%). All indicators show weak competitiveness of the EU seafood industry compared to US and Canada. Spain and Belgium are the most competitive of the EU countries with the largest exports; Denmark and Germany are weaker.

Processed fruit and vegetables: faster growth export to third countries

Less than 5% of global production (1.7 billion tons) of fruit and vegetables (F&V) is traded between countries: over 95% is consumed locally. F&V are generally consumed fresh, although in high income countries over 50% of consumption is related to processed fruit and vegetables (including juices). China is the largest producer of F&V with a market share of one third. Processed F&V has a share of 43% in the exports of all F&V. Leading countries in the trade of processed F&V are EU (Netherlands and Belgium), China, US, Canada and Brazil. The largest importers are EU (Germany and the UK), US, Japan and Canada. The leading export product group of processed F&V is canned vegetables, accounting for 36%, followed by fruit juice concentrate (29%), frozen vegetables (14%), a considerable part of which is processed potatoes, canned fruit (9%) and frozen fruit (6%). The EU-15 competitiveness is stronger than that of the US and Brazil, but weaker than Canada. The export to third countries is growing faster than intra communitarian trade and the importance of F&V in the food industry is increasing. Germany, Spain and Belgium are relatively strong, France as large producer is weak in competitiveness.

Oils and fats industry: Brazil is running up, EU strong in value added

The US exports of edible oils and fats are larger than the exports of the EU to third countries. The EU processing industry has a larger turnover. The competitiveness of the US and Brazil is stronger, while that of Canada is weaker. Spain appears to be strong as one of the European countries with a substantial production. The EU competitiveness is weak compared to the US with regard to the production of crude oils and fats. However, Europe produces more refined oil and fat products compared to the US, which are products that can be marketed against higher values. The US and Brazil are the main producers of crude oils and fats, mainly soybeans. However, the European countries produce more refined oil and fat products. The EU-25 is the world's largest margarine producer and accounts for 54% of the world's margarine production. Europe is therefore the major world player in the production of refined and consumer end products. The EU-15 growth of real value added is lower than that of the US and Brazil. Labour productivity growth in the US is much higher than in Europe. Three of the nine biggest oil and fat companies in the world come from the EU.

Dairy products: EU Cap enables growth for competitors

The dairy industry plays a more important role in the food industry in the EU than in the US. This is expressed by the share of turnover, value added and personnel costs in the whole of the food industry. The average turnover of US firms is four times the EU average. The US has a production value which is only 60% of the EU-25. Despite this difference, the value added is larger in the US than in the EU-25. Australia and New Zealand are relatively small producers. Even with half of the world's top 20 dairy companies being European, EU competitiveness is weak compared to the US due to the slower growth of labour productivity, real value added and also the growth of the value added compared to the total food industry. The EU milk quota system restricts growth in the EU, whereas the production in New Zealand, for example, is not restricted. Austria and Italy are fairly strong in competitiveness, while Ireland is weak. The weak or strong performance of a country does not say much about individual enterprises. France is valued overall as almost EU average whereas French company Danone is known to be very competitive.

Grain-based and starch products dominated by a few key players

Almost 90% of the global cereal production is locally consumed either by humans or animals. The global trade of grain mill products totalled 2.98 billion Euros in 2004, divided over 68% flours and 32% starches. The global trade of bread and bakery products and pasta is far more important and amounted to 29.8 billion Euros in 2004, divided over bread and bakery 86% and pasta 14%. The EU has a share of 47% in the world export share in grain-based products. The EU exports 13% of the total world exports to third countries. Important non-EU exporters are: the United States of America (15%), Canada (9%) and Australia (7%). The EU grain-based industry had a production value of 108 billion Euros in 2003, almost 40% above the US production value. Canada and Australia are relatively small producers. However, the scale of the grain-based enterprises in the EU is much smaller than in the US and Canada as indicated by the lower production value and number of employees per enterprise. Consolidation, internationalisation and specialisation will continue, also resulting in a more concentrated grain-based industry in Europe. The EU competitiveness is weak as compared to the US, but equally strong as Canada and stronger than Australia. Austria, Belgium and Germany are relatively strong within the EU. The extra communitarian trade grew less than the intra communitarian. The weak EU performer in competitiveness - France - has several companies in the global top companies. World leading companies like Danone and Kraft foods are also leading in other food segments.

Beverage industry: small scale in wine, large in beer and spirits

The beverage industry produces a wide range of products: wine, beer, spirits and soft drinks. The industry structure depends on the product: many small producers in wine, some large breweries next to many small ones especially in Germany and large scale spirit producers. The overall competitiveness of the EU is slightly lower than the competitors. EU competitiveness is low due to the slower growth of labour productivity and real value added. The development of the share in the total food industry and export specialisation is positive. Five European brewers are in the top 10; in the spirits production they are at number 1 and 10 and in wine the highest ranked of the four in the top 10 is number 6. Within Europe Austria, Belgium and Denmark are strong in competitiveness, whereas UK, France and Portugal are weak.

Sugar: EU competitiveness lagging far behind

The worldwide production of sugar amounted to 148.4 million tons in 2003, whereas the worldwide trade only accounted for 35.7 million tons. This means that around 75% of the global production is consumed locally. EU-15 countries play an important role on the world sugar market with an export share of 34%. However, two thirds of these exports are destined for other EU countries. Over the last decade, Brazil has become the world's leading sugar exporter by far with an export share of 22%. Another important non-EU exporter is Thailand with a share of 9%. The sugar export of the US is of minor importance with a share of only 4%. The EU sugar industry had a production value of almost 12 billion Euros in 2003. This is 70% above the US and 125% above Brazil's production in 2002 or 2003. However, the production value in the EU decreased in five years' time, whereas the production value in the US and Brazil increased. Nevertheless, the sugar industry in Brazil is more important than in the EU and the US, expressed as share of turnover, value added and employment in the total food industry. EU competitiveness is weak compared to the US and Brazil. The largest producers, France and Germany, reflect the weak competitiveness of the EU-15. Spain and Belgium are strong.

Competitiveness of EU member states

Assessing the competitiveness of the EU as a whole region compared to the US and some other countries is the main aim of the research.

Figure 4 Competitiveness of EU member states (Value out of boundaries is put at border value)

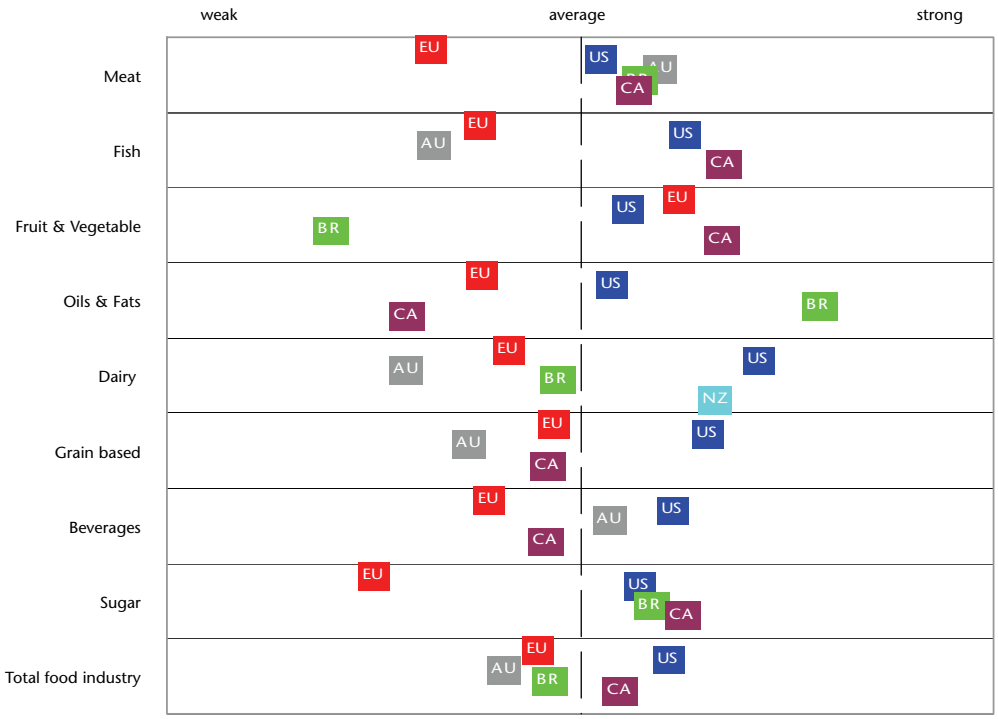


Figure 4 presents the position of the individual countries. The exports of individual countries are all exports: intra and extra communitarian trade. At EU level, only the extra communitarian trade is considered. Figure 4 therefore also reveals the competitiveness on the internal market.

Ireland and new member states e.g. the Czech Republic, Hungary and Poland have a stronger competitiveness. Poland is strong in all indicators, except the Balassa index; the export of the overall economy performs even better. Large exporting countries like Spain, the Netherlands, Belgium and Italy also perform rather well. Weak in competitiveness are large EU countries: France, Germany, UK and Denmark.

Recommendations

The recommendations are directed to enterprises, government and researchers. Enterprises are recommended to exploit economies of scale, economies of scope (differentiation) based on cultural differences in Europe and try to be an innovator in the use of new technologies (micro-machine processing). Research initiated by policy makers can contribute to understanding the driving forces of competitiveness, to innovation, to institution building with regard to property rights and supporting the availability of up-to-date databases.

Action plan for EU: 'Transition agenda to the new food economy'
Several of the policy recommendations addressed to national and regional governments follow from this study. At EU level, the following recommendations are made:

- the *agricultural policy and trade policy* should support the food industry by creating (cheap) access to more abundant raw materials. Trade promotion in rich target markets overseas could be beneficial. In word processing to mitigate the effects of CAP reform to a more liberalised trade policy, might be an option to explore;
- *Enterprise policy* should support cross border mergers and acquisitions (foreign direct investment) more easily. There should be a true common market for services. The use of ICT should be promoted, also adopting e-government at EU level. E-business chain supply systems are particularly important to the food industry;
- *Better and simplified (food) legislation* is needed and the European Commission should pursue the action it has already announced: impact assessments with independent quality control, reduction of administrative costs, technical simplification and co-regulation: using existing independent standards instead of new EU standards. A public-private initiative on reducing and standardising the large number of self-control systems and recognising them in public control systems might be beneficial;
- for the *R&D policy* there is a large list of topics for innovation. These include health issues, micro-machine processing, food chain management ('fork-to-farm approach') and issues on food and the consumers. More important than the topics are access by SME and bringing SMEs into contact with other players in tomorrow's food economy like pharmacy, services and ICT. Food Valley approaches might enhance knowledge tranfers from Universities to SMEs;
- concerning *statistics* and monitoring there is a need to concentrate on better data, at least at EU level, on innovation and more micro economic data. This study should not be the last study on this topic in this sector. It's only the beginning;
- the government policies could be directed to *harmonisation of legislation* within the EU as well as worldwide, to supporting advance industry standards of the future and to enterprises and trade policies which will not weaken the competitiveness.

1. Introduction

1.1 Relevance

The food sector is experiencing a period of structural adjustment. Consumer preferences are having an increasing impact on the industry as a result of income developments, shifts in the population structure and new lifestyles. Globalisation, liberalisation of world trade and agricultural markets and opening new markets (from central and eastern Europe to India and China) are a second category of impacts. And last but not least, major changes in technology, including information technology and biotechnology have led to new products and new methods of organising the supply chain.

In the European Union, the food industry is an important sector and is characterised by a considerable diversity of firms and products. Small and medium-sized enterprise (SMEs) play an important role in addition to a relatively small number of very large, often globally operating, companies. On the one hand, the food industry sector is relatively traditional, while on the other hand it implements advanced technologies. The competitive strength of the food industry is affected by intensifying trends of globalisation, a broad spectrum of EU regulations and policies (CAP - Common Agricultural Policy) and international trade negotiations (DDA - Doha Development Agenda). Consumer concerns regarding food safety and health have imposed requirements on the industry, whereas Lisbon and Götenborg Agendas call for a highly dynamic, competitive and environmentally sustainable European economy.

This situation raises questions about the competitiveness of the European food industry: how competitive is the industry, how will this develop under future globalisation trends (as reflected in policy changes in CAP and DDA) and what role can innovation and changes in legislation contribute to the competitiveness of the industry? These are the questions we will try to answer in this study.

1.2 Terms of reference and aim

Over recent years, the European Commission's DG Enterprise has developed a set of indicators to assess competitiveness and commissioned a number of studies on the competitiveness of certain industry sectors (EU, 2005; O'Mahoney M. and B. van Ark, 2003). In line with these previous activities, DG Enterprise launched this study on the competitive strength of the EU food processing industry, which should serve as guidance in formulation of future policies regarding this sector.

The study is conducted along three important lines:

- an assessment of the competitiveness situation. Firstly, this study describes the competitiveness of the sectors constituting the food industry at EU-15 level and benchmarked against the main competitors. Sector studies are meat, fish, fruit and vegetables, oils and fats, dairy products, cereal-related and starch products, beverages and sugar. In addition the food supply, including wholesale and retail distribution of processed food and the catering sector are studied, presented in section 2.4;
- the second aim of the project is to develop a competitiveness model of the food industry sector to serve as a guide for the elaboration of a sectoral industrial policy. The GTAP model (Global Trade Analysis Project) a number of future scenarios will be evaluated. This model has proven its value for scenario analysis and covers the food industry worldwide (Hertel, 1997: Hertel and Keening, 2003)

– the study will be completed with an impact assessment of the existing European legislative framework on the competitiveness of the food industry. Over the last 15 years, EU food legislation has developed tremendously in response to growing concerns with regard to food safety, the need for consumer information and the functioning of the internal market. The study will focus on an analysis of the impact of existing and future food legislation on the industry in terms of current competitiveness, including its potential to innovate. It will also benchmark the EU with the USA.

This study is important for the European Commission as well as the food industry. Towards other sectors it underlines the important position, the strengths and challenges of the European food industry.

1.3 Methodology and databases

The food industry in this study is defined according to the NACE typology. Primary agriculture (farming) and fishery are not part of the food industry; they supply raw material to the processing food industry. The food industry is divided into sub-sectors as follows:
– food and drink processing and manufacturing:
  a. meat;
  b. fish;
  c. fruit and vegetables;
  d. oils and fats;
  e. dairy;
  f. cereal related and starch products;
  g. beverages;
  h. sugar;
– food supply, including wholesale and retail distribution of processed food, and the catering sector.

The study focuses on processing and manufacturing, which implies that sub-sectors in which processing is of minor importance will not be studied, or at least not in detail. Animal feed is not a consumer product and is not included in the study. In Europe, tobacco is not seen as part of the food industry (compare American practices). With regard to the category 'other food industry', the study focuses on sugar and cereal-related products. A full description of the included industries is provided in the introduction to chapter 4.

In contrast with the food processing industry, wholesalers in processed food are not generally specialised. Retail and catering also handle many products. Together with non-specialised wholesalers, they will therefore be treated as a separate sector (section 2.4).

Competitiveness of the EU Food Industry is defined as the sustained ability to profitably gain and maintain market share in domestic and export (non-EU) markets in which the industry is active. It is recognised that several definitions of competitiveness are used in literature, due to different trade theories and industrial or business economics concepts. However the one given above is preferred as it is very operational and has been used by DG Enterprise as well as the research team before (e.g. Wijnands and Silvis, 2001).

A useful distinction (Buckley et al, 1988) in different aspects of competitiveness is:
– competitive performance: indicates how well the EU Food Industry is operating relative to its rivals from other countries;
– competitive potential: indicates the availability of inputs that produce superior performance;
– competitive process: describes the management process that converts the competitive potential into competitive performance.

These aspects of competitiveness have been developed in a number of indicators, driven by data availability. Five main indicators are consistently used to assess the competitiveness of a sub-sector of the food industry: the growth in real gross value added of the sub-sector in the food industry, the growth of the revealed comparative advantage (Balassa index reflecting the specialisation level in a category of goods from a country), the growth in world market share, the labour productivity measured in real gross value added per worker and the growth in real gross value added. These indicators are used to rank and picture the EU and its main competitors (always including the US) on a scale from weak to strong. The selection of these countries is based on the importance of their exports. Within the EU, important countries are presented. Annex B provides more information on the choice and definition of the indicators.

Data

To create the tables and figures for the analysis a consistent database with historical data has been compiled. Although condensed data (e.g. three year averages, selected countries) are shown in this report, the database focused on the period 1999-2003, to make trend analysis and modelling possible. Main data sources used come from official statistics: Eurostat (Structural business statistics, Comext trade data, input-output tables from national accounts), the OECD (structural analysis database STAN), the UN (Comtrade), FAO (supply and utilisation accounts) and from abroad e.g. the US Census Bureau, The European company information base Amadeus, supplied by Bureau van Dijk. The use of Amadeus marks the fact that due to globalisation and the growing importance of multinational companies (that do their research in one country, produce in others and manage sales in yet more) the territorial approach in assessing the competitiveness of an industry is becoming more problematic. Annex A describes the databases used.

The research database was constructed to ensure that all available base data and the corresponding metadata (the information that describes the data and the treatments they have received to make them consistent) can be easily extracted through a graphic user interface. The main problems in the study concerning the available data dealt with the lack of data and clearly unreliable data, as well as with access to data from the main competing countries outside the EU and US. The first problem could sometimes be tackled by using alternative years, other sources or by using proxies (estimations based on comparable situations).

Experts

Not only are data sometimes not available or unreliable, there are also aspects of the competitive potential and process that are by definition hard to measure. In particular for the description of the competitive position of the sector, we also carried out a qualitative analysis that was partly based on literature (academic as well as trade journals, etc) and partly on interviews with experts. Experts were helpful for exploring new developments concerning issues like consumer trends and scientific developments, but also past performance and driving forces. Experts came from different backgrounds, such as business analysts in banks, management consultancies, food industry organisations (like CIAA, FNLI, Münster group on Food Legislation), academics and international companies. A number of them were grouped in expert panels that reviewed the draft of the Chapters 3 and 4 of this report, and were asked to help define and discuss the scenarios reported in Chapter 5. Experts groups were balanced as far as possible over the major European Food Industry member states. An additional advantage of using experts to contribute to and review the analysis is that DG Enterprise plans to use this report for further interaction with stakeholders. That interaction should be directed at policy making and should not be burdened by discussions on the content or the conclusions of this study. Annex C presents the expert groups.

Econometric model

The second aim of the project is to develop a competitiveness model of the food industry sector to serve as a guide for the elaboration of a sectoral industrial policy. Based on the indicators and data sources discussed above, the model provides a simulation of the impact of impending structural changes on the competitiveness of the food industry. As a basis for our econometric model, we used the GTAP model (Hertel, 1997: Hertel and Keening, 2003). Besides the work already

carried out with it, the advantage of this model is that it recognises that changes in the competitiveness determinants of one industry can influence other industries. If the development in productivity differs between industries and countries, the full impact can only be derived by full integration in one model of all economies. The GTAP model provides a strong and tested instrument to asses that integrated analysis. The model includes the EU countries and most of the food industry sectors. Relationships between policy reforms (value of intermediate inputs and value of production) and value added are available in GTAP. The quantitative relations, the qualitative information on e.g. food legislation and agricultural trade policy and expert opinions have been used as inputs for 'What if' scenarios (simulation of the effects of structural changes and policy measures). Annex D provides more information on the model.

Impact assessment legislative framework

The third line of the study is an impact assessment of the existing European legislative framework on the competitiveness of the food industry. The study focuses on an analysis of the impact of existing and future food legislation on the industry in terms of current competitiveness and its potential to innovate, including as far as possible:

- cost assessment;
- comparison (benchmarking) with other legislation e.g. in the US or legislative approaches e.g. self-regulatory;
- specific recommendations aimed at improving or reorienting Community legislation dealing with Food safety with the view towards striking a better balance between industrial competitiveness and consumer protection.

The research applied three methods:

- desk research of relevant documents;
- semi-structured interviews with stakeholders on the basis of a questionnaire;
- open interviews with stakeholders and discussion with experts.

The administrative burden and legal uncertainty associated with the legal framework in the EU might influence the competitiveness of the industry in theory in four ways:

- they lead to higher costs (in the form of more labour input or a higher value of intermediate inputs);
- they are a barrier to export from the EU to third countries as some production processes (e.g. GMO) are banned in the EU;
- they are a barrier to entry to the EU market by competitors from third countries as these have to follow EU rules (e.g. labelling procedures);
- they support EU producers to export quality products to third countries (e.g. organic products, regional labels).

The first two consequences of the legal framework are negative, and more often discussed than the last two. However all four effects were discussed in the interviews and attention was paid to developments over time, SME versus multinationals and EU versus US.

1.4 Structure of report

The findings in this study are reported in the following five chapters, which closely reflect the three important lines of the study. Chapter 2 contains an overview of the external environment of the food industry: it describes the European food industry, also as a part of the total economy. Special attention is paid to the general trends that characterise the current period of structural adjustment. One of these trends is the increased market power of the retail sector. Although the retail sector is not part of the food industry in statistical definitions, DG Enterprise is also explicitly interested in its competitiveness. Section 2.4 reports on this topic. The development in CAP, WTO trade agreements and the impact of enterprise policy is also discussed. Chapter 3 contains the analysis of the regulatory conditions affecting competitiveness. In fact these issues are the external environment of the food industry and offer the Opportunities and Threats indicators or the SWOT analysis (Strengths, Weaknesses, Opportunities and Threats).

Chapter 4 reports on the competitive position of the EU food industry sectors in the global and EU market. We do this for the food industry as a whole, but also for the sub-sectors, following the NACE definitions. The analyses show the strengths and weakness of the sub-sectors of the food industry. These three chapters contain all the material for the assessment of the competitiveness situation, which is summarised in a SWOT analysis in section 5.2. That is the basis for development of some future scenarios. Section 5.3 reports the results for 3 scenarios in the medium term for the European food industry. The report is concluded in chapter 6 with discussion, conclusions and recommendations. These recommendations are initially aimed at policy makers, but also at strategy development by the industry and for future monitoring and research.

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2. The external environment of the food industry

Jo Wijnands, Martin Banse, Siemen van Berkum and Krijn Poppe

2.1 Key findings

The share in value added and employment of the food industry is growing in all manufacturing industries. Nevertheless the share of manufacturing industries as well as the food industry in the whole economy is declining.

Developments which are shaping the food industry are:
- a lower growth of the population in the EU (0.2% annually) than in the benchmark countries (between 0.9 and 1.2% annually). This results in a lower growth of demand for processed food in the EU;
- consumers prefer more convenient and healthy food and ethical issues (such as animal welfare) are becoming more important;
- technology development increases the efficiency and efficacy of raw material use; biotechnology enables production of functional food but is controversial in the EU;
- innovation (including micro-machine processing) stimulates product differentiation. Responsiveness of food chain stimulates this process.

Wholesalers, retailers and food service companies are an important link between the food industry and consumers as end users. Two different developments can be observed: the number of wholesalers and food service companies increased while the number of food industry enterprises and retailers decreased. In 2003 consumers spent €1,028 billion at retailers and food services: the market share of retailers is 66%. Small companies with less than 5 employees prevail among wholesaling companies: around 70 to 80% in the EU. However over 50% of the turnover is achieved by a small number of wholesalers with 20 and more employees. Wholesalers in meat and meat products are well represented in the EU top 25 followed by 'dairy, eggs and edible oils and fats' wholesalers. The importance of buying groups might be more important for the retailers than the wholesalers. The concentration is high: the top 5 supermarkets have a market share of around 70% in most EU countries. The top 25 global supermarkets, 60% of which have a European headquarters, operate in several countries and even on several continents. Food services are of growing importance: in the US consumers spend almost 50% of their expenditure on food in food service outlets and in the EU one third. The major channels are restaurants and fast food outlets. Catering has a market share below 20% in the US and even lower in the EU. Retailers spend 80% of the turnover on purchase of goods, food services only 30%. Consumers buy therefore 5 times as much quantity in the supermarkets than in food services outlets.

EU agriculture policies and the agricultural sector are influenced by international policy developments. The WTO is particularly important with regard to EU policy. Improvements in market access will be an important issue for the coming years. The philosophy of the CAP changed fundamentally due to international pressure and internal policy and budgetary reasons: a shift from market price support to income support decoupled from production but coupled to public goods. As a result, price gaps between EU and world market levels have declined substantially, although not for all agricultural products.

EU performs less well than the US on several issues related to (general) enterprise policies, including: access to finance, improvement of the Regulatory administrative environment, human capital and R&D expenditure. Ireland and the Netherlands reduced the tax rate on labour the most.

2.2 Introduction and economic position of the food industry

Food remains a major public issue. Due to primary agriculture, the food industry and government policy, food supply is abundant, more varied and of a higher quality then ever before in

the western world. This chapter identifies in more detail the economic trends and policy issues in the food industry in general. The aim of this chapter is to assess the opportunities and threats of the food industry: an analysis of the external environment. It concerns issues that shape the food industry but are beyond the direct control of the food industry itself. In chapter 5 the opportunities and threats will be confronted with the strengths and weaknesses, determined in chapter 4, resulting in a SWOT analysis and an assessment of the Key Success Factors.

Four main items will be discussed: the demand for food, the marketing channel, trade and agricultural policy and business policy issues. Demand determines the size of the industry. Demand depends on the size of the population, the income (welfare) and the type of products. These subjects will be dealt with in section 2.3. The marketing channel from the food industry to the consumer will be analysed in section 2.4. Consumers buy food products from retailers or ready to eat products from food service outlets. Developments such as concentration and market shares in these outlets determine the structure and conduct of the food industry. Retailers and food services buy some of their products from wholesalers; this will also be discussed in this section. The third issue deals with the policy environment of the EU's Common Agricultural Policy (CAP) related to trade agreements with the WTO (World Trade Organisation). The policies influence the competitive environment with third countries and the supply of raw materials for the food industry (section 2.5). Trade tariffs might protect the domestic EU industry. Quota systems for sugar and dairy restrict the production of sugar beet and raw milk. The last issue is business policy such as administrative burdens or access to capital (section 2.6). Differences between countries will result in different productivity developments and hence different competitiveness. The impact of the food law, an important issue, will be discussed in chapter 3.

This section addresses the position of the food industry (nace code 15and16) in the economy. Table 2.1 presents the shares of the value added and employment of the (primary) agriculture sector and of the food industry in the whole economy.

In most European countries as well as in the US and Canada, the share of the food industry in the value added of the whole economy is greater than that of the primary agricultural sector. In France, Greece, Italy, Slovak Republic and Spain, the primary agricultural sector has a higher share. The food industry has twice as much value added as the primary agriculture in Belgium, Ireland, Luxembourg, Sweden and the UK. Despite the increasing (nominal) level of the value added in the food industry, the share in the whole economy is decreasing. The US share is decreasing more than that of the EU-15. Exceptions are Australia and Italy where the share remained at the same level. The share of the primary agricultural sector is decreasing even more quickly. In Ireland the share of the primary agricultural sector in 2003 was less than 40% of the level of 1995, of the food industry 'still' two thirds. In the food industry, the share of employment is slightly higher than the share in the value added: the value added per employee is thus slightly lower than that of the whole economy. In most countries, the share of employment decreased less than of the value added: thus also the value added per employee became relatively less favourable compared to the rest of the economy. The largest decrease of the value added per employee, the lowest performers, was noted in the Slovak Republic, followed by Czech Republic, France, Ireland, Poland and the United Kingdom. The relative share of the value added per employee increased in Australia, Denmark, Italy, the Netherlands and Sweden. A second observation is that the share of primary agriculture in total employment is generally higher than that of the food industry. Among the few exceptions are Belgium, Germany, Luxembourg and the UK. The lower share in the value added and the generally higher share in employment result in a relatively lower value added in the primary sector compared to the food industry.

Despite the decreasing share of the food industry in the EU-15 economy as a whole, it succeeded in having a large share in the total manufacturing. The value added of the food, drink and tobacco industry (nace 15-16) grew faster than of other manufacturing industry (nace 17-37). Employment in the food industry grew slightly, whereas employment of the all manufacturing industries decreased.

Table 2.1 Value added per employee and shares (%) of value added and employment (persons engaged) of total economy

	Agriculture				Food, drink and Tobacco			
	Value added (%)		Employment (%)		Value added (%)		Employment (%)	
	1995	2003	1995	2003	1995	2003	1995	2003
Australia	3.5	3.1	4.6	3.7	2.5	2.5	2.2	1.8
Canada a)	2.5	1.7	3.1	2.1	2.3	2.2	1.8	1.6
US	1.1	1.0	1.6	1.4	2.1	1.7	1.5	1.3
EU-15	1.9	1.4	4.6	3.5	2.2	1.9	2.4	2.2
Austria	2.5	1.8	9.7	8.6	2.4	1.8	2.4	2.1
Belgium	1.5	1.1	2.8	2.0	2.6	2.4	2.5	2.3
Czech Republic	4.0	2.4	5.1	3.4	3.5	2.9	3.0	3.1
Denmark	3.1	1.9	4.0	2.9	3.1	2.7	3.4	2.8
Finland	2.1	1.3	6.8	4.2	2.5	1.7	2.2	1.8
France	2.9	2.2	4.4	3.4	2.3	1.9	2.4	2.4
Germany	1.1	1.0	2.7	2.2	2.1	1.9	2.4	2.4
Greece	9.5	6.1	18.6	14.6	2.9	2.6	3.4	3.1
Hungary	6.3	3.1	7.7	5.2	4.2	3.6	4.3	3.9
Ireland	6.6	2.4	10.0	6.3	7.8	5.1	4.2	3.2
Italy	3.0	2.3	5.6	4.2	2.2	2.2	2.2	2.1
Luxembourg	0.9	0.4	1.9	1.2	1.2	0.9	1.9	1.4
Netherlands	3.4	2.4	4.0	3.3	3.4	2.9	2.3	1.8
Poland	5.9	2.6	24.6	16.7	4.2	3.4	3.6	3.7
Portugal	3.8	2.7	10.0	8.1	3.3	3.3	3.4	3.3
Slovak republic	4.7	3.1	7.5	3.4	3.6	2.4	3.0	3.0
Spain	3.8	2.8	6.9	5.1	3.1	2.3	3.0	2.5
Sweden	1.0	0.6	2.5	2.0	1.8	1.7	1.6	1.4
UK	1.7	0.9	1.9	1.3	2.8	2.1	1.9	1.7

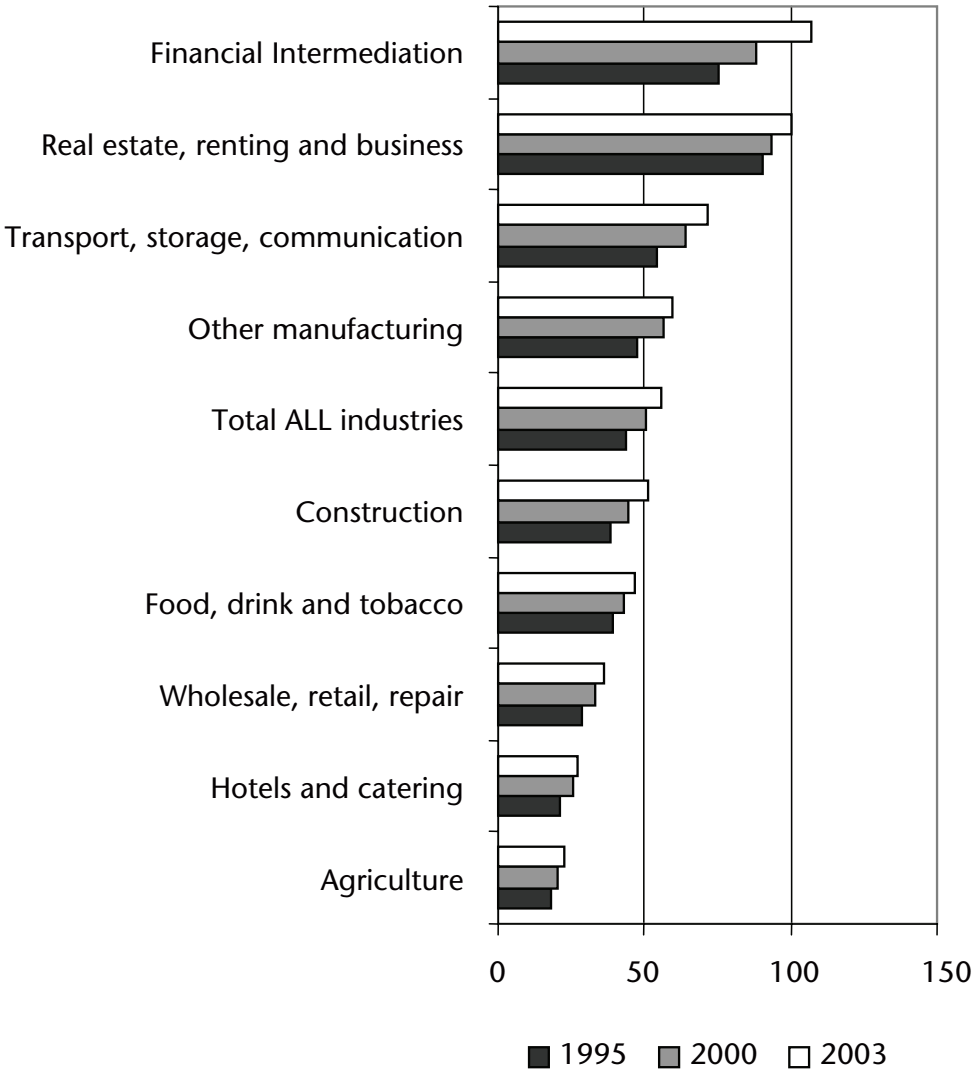
Source: http://www.ggdc.net/dseries/totecon.html
a) Canada: figures of 2003 represent values of 2002.

Figure 2.1 presents the value added per hired employee for different industries in the EU-15. The food industry is below the average of the whole economy (all industries). The lowest value added is generated by primary agriculture; however the food service (hotels and catering) and wholesaling are also below the food industry.

2.3 Economic developments, trends and innovation

The fall of the Berlin Wall in 1989 reshaped Europe. The event also signalled that economic forces cannot be neglected by policy makers in the long term (Friedman, 1999), an insight that Keynes (1919) had already taught Europe after the Great War. Since the fall of communism, the world has been characterised by globalisation, leading to liberalisation in international trade (see section 2.5) Information and communication technology (ICT) has enabled these developments. Every force has its countervailing power. Globalisation leads to more interest in local and regional culture, to preserve identities and save what might become lost by the fading power of globalisation (an example in the domain of food is the slow food movement). This also leads to

Figure 2.1 Value added (€1,000) per hired employee in EU-15 for different industries
Own calculations based on: http://www.ggdc.net/dseries/totecon.html



calls for public intervention, although the territorial limits of governments do not make such action in the globalising world easy.

As a result of this general background, there are four major economic developments which shape the food industry at the start of the 21st century: number of consumer preferences, technology and organisational issues (OECD, 2006). These trends challenge the performance and the innovation agenda of the food industry.

Quantity demanded: number of consumers

One of the major shifts in demand for food depends on the number of consumers. Table 2.2 shows the number of consumers and the growth rate during the period 1999-2003 (same period as in chapter 4). The growth of the population is low in the EU-15 and even negative in the EU-10. The population in the benchmark countries is three to four times higher than in the EU-15. This difference in annual growth will have an impact on the demand for food. If the level and composition of food consumption remains the same, the population growth will induce an equivalent growth of the quantity demanded. This data suggests a more favourable economic environment for the food industry in the benchmark countries.

Table 2.2 Number and growth of the population

	Population 2003 (million)	Share EU-25 = 100	annual growth 1999-2003
Austria	8.1	1.8%	0.31%
Belgium	10.4	2.3%	0.36%
Germany	82.5	18.2%	0.14%
Denmark	5.4	1.2%	0.32%
Spain	41.1	9.0%	0.55%
Finland	5.2	1.1%	0.23%
France	59.8	13.1%	0.48%
United Kingdom	59.3	13.0%	0.25%
Greece	11.0	2.4%	0.34%
Ireland	4.0	0.9%	1.50%
Italy	57.6	12.7%	0.00%
Luxembourg	0.4	0.1%	0.91%
Netherlands	16.2	3.6%	0.65%
Portugal	10.4	2.3%	0.66%
Sweden	9.0	2.0%	0.28%
EU-15	**380.5**	**83.7%**	**0.31%**
Estonia	1.4	0.3%	-0.42%
Lithuania	3.5	0.8%	-0.55%
Latvia	2.3	0.5%	-0.73%
Malta	0.4	0.1%	0.70%
Poland	38.2	8.4%	-0.30%
Slovak Republic	5.4	1.2%	-0.02%
Slovenia	2.0	0.4%	0.12%
Cyprus	0.8	0.2%	0.52%
Czech Republic	10.2	2.2%	-0.20%
Hungary	10.1	2.2%	0.15%
EU-10	**74.2**	**16.3%**	**-0.21%**
EU-25	**454.7**	**100.0%**	**0.22%**
US	290.8	63.9%	1.04%
Australia	19.9	4.4%	1.18%
Brazil	176.6	38.8%	1.25%
Canada	31.6	7.0%	0.91%
New Zealand	4.0	0.9%	1.12%

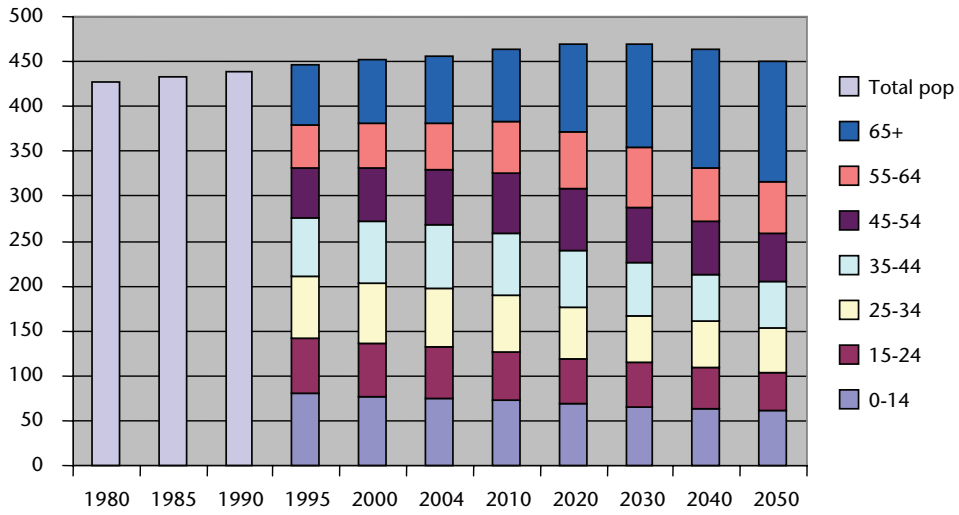
Source: World Development Indicators.

Consumer preferences

Consumer preferences have an increasingly profound impact on the food industry. The number of consumers in the EU-25 is fairly stable (figure 2.2), suggesting a stable demand for food. However the composition of the population is greying and colouring. This affects the demand for different types of food. Older people are believed to be more interested in health aspects (from functional foods and allergen-free to special diets for those in hospital). The multicultural and multiracial society contributes to the already rich European cultural diversity and its food traditions.

The number of households is growing faster than the population, due to individualisation. The share of single person and one-parent households due to death or divorce is increasing. This affects the quantity per individual package purchased and the demand for convenience. The population also seems to be more active then ever. Although this could even apply to retired people, it is certainly the case for younger generations in terms of participation in the workforce. In these households, time is scarce and the average time dedicated to meal preparation is lower than ever and still declining. This creates a demand for convenience and food service, and different food consumption patterns on working days and at the weekend. Related to this trend and to a more hedonistic lifestyle, trend watchers (Gezondheidsraad, 2002) note an increase in 'grazing': a more individual eating pattern and an increase in the number of consumption moments per day (e.g. snacks). Some of this consumer behaviour as well as changes in diets (e.g. moving away from the classical Mediterranean diet, for example) and in types of work (less physical) is regarded as unbalanced and contributing to diseases like obesity.

Figure 2.2 Development population EU-25 by age, 1980 - 2050
Source: Eurostat; 2004-2050 are baseline projections.



In the 1950s, when the Common Agricultural Policy was designed, food security or access to food at low prices was still a major concern. In terms of Maslow's pyramid, food is on the bottom layer with biological needs. European consumers have become much richer and integrate their food demand and choice for distribution channels (retail, food service) in fulfilling their needs for belonging, status and self-fulfilment. Food has a social dimension. Changing lifestyles characterised by individualism and hedonism make issues like convenience, pleasure and health very relevant for the food industry (CGEY, 2002).

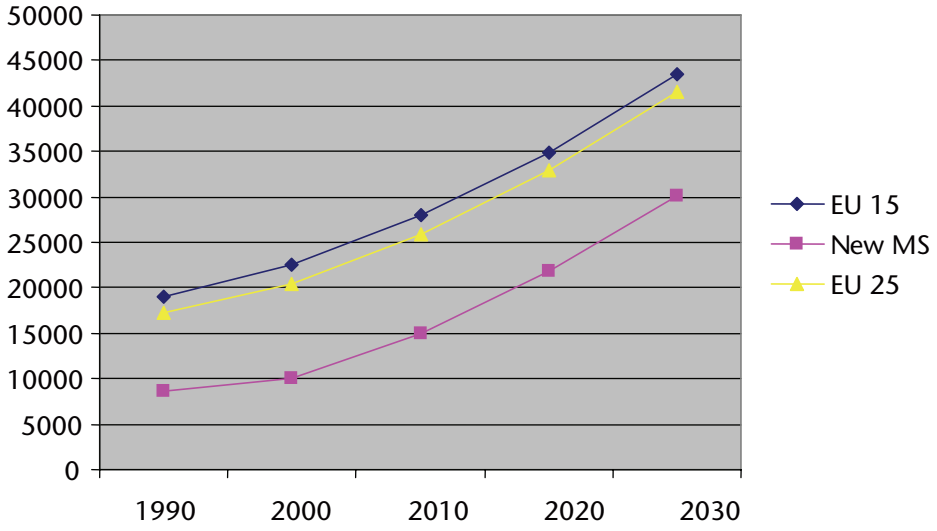
Health issues are a major consumer concern nowadays. This is partly related to the ageing society, but food safety issues as well as obesity and allergen reactions have increased awareness for the relationship between food and health. And the supply of functional foods has created a demand, although time management also plays a role in the decision to take vitamin pills instead of fruit. This trend also positively influences the sales of organic food: essentially an environment-friendly production system, but Dutch consumers now state health reasons as the most important motive for buying (Bijman, 2003).

Higher incomes and attention to 'higher' needs have also resulted in more focus by some consumers on ethical issues like animal welfare, environment-friendly production (e.g. organic) and fair trade. The food industry reacts not only by providing such products but also by corporate social responsibility (e.g. Danone, see Vogelzang et al., 2003). Some of these concerns as well as the increase of consumer awareness of food safety issues lead to a higher demand for information. The food safety issues resulted from a number of food scandals in the 1990s (well known

crises include the BSE and dioxin food scares, but there were several others). Some countries also experienced severe animal health problems (such as food and mouth disease, classical swine fever or avian influenza), and both types of crises opened the eyes of the public to the fact that the food system may now be industrialised but it is not without risks. This led to a demand for improved risk management, leading to big changes in legislation (see chapter 3), instalment of tracing and tracking systems in the farm-to-fork approach, and a demand by consumers for special products (e.g. organic, free-range eggs) and more information, either directly or in the form of store or product brands (Verbeke, 2005).

However the most important lesson learned by the retail and food industry over the last 20 years from these consumer preferences is that 'the' consumer does not exist. Behind many of the preferences and trends are income developments and related individual (and even individualistic) needs for safety, belonging, status and self-actualisation. This has led to segmentation of markets, and in recent years in mature markets marketers found such segmentations far from stable. This contributed to uncertainty for retailers and the food industry. Simple trend extrapolation can be risky, but there are reasons to expect that these trends will characterise the food industry for the near future too. Under different scenarios economic models predict an increase in income (figure 2.3). And several of the trends in preferences discussed above have already shaped the trend leading US and UK industry more than the southern and eastern European markets, for example, where income levels are lagging behind but catching up with north-western Europe.

Figure 2.3 Development of GDP per capita, 1990-2030



Source: EU Energy and transport outlook to 2030, part IV, p.107; derived from Eurostat Economic and Financial Affairs DG, Primes, ACE.
Note: GDP is expressed in purchasing power standards for New MS countries

Technology

There are major changes in technologies, including information and communication technology (ICT) and genetic modification. ICT currently brings the third wave of computer technology. It all started 60 years ago with mainframes: one computer for many. The second wave made them personal, putting a computer and a person around a desktop. The third wave, just starting, has many computers serving everybody all over the world. ICT plays an important role in issues like precision farming, tracing and tracking and logistics.

Wireless sensors, like Radio Frequency Identification technology (RFID) are seen as an important technology for the coming years. RFID can make traceability systems more effective. Compared to the traditional bar code, RFID allows an 'intelligent tag' assigned to each individual product to be read at any position without physical contact with the readers (Wang et al., 2006).

There is currently a great deal of technological development in food processing and packaging. One field is that of separation and fractionation, to use natural resources more efficiently and effectively. The increase in the knowledge of human metabolism in health science leads to a greater need for bioactive ingredients. In general there is a trend towards replacement of thermal-based processes by non-thermal methods like ultra-high pressure processing. This is true for separation processes, preservation and structure formation of food. For example, there is a trend towards higher concentrations (e.g. by water removal), as this obviously reduces the total material flows. Packaging is no longer simply a passive barrier; today it has several functions at once. The use of scavenger technology and sensors give the package a very active role in preserving the quality of products and actively communicating the state of the product to the user. There is also much speculation on the effects of micro-technology, which is now available in the fine-chemicals industry. The technology of micro machine processing was originally developed for mass-producing computer chips. Increasing production in this technology is not by scaling-up (making machines bigger) but scaling-out: running the same production parallel. If such basic systems are small, production could be done at farm level (compare de-scaling the production of energy to smaller units). On the other hand, Boom et al.suggest a postponed production concept, in which central manufacturing plants produce semi-manufactured products based on conventional methods with the finishing in the retail sphere which supports customisation of the product (Boom et al., 2005).

Food as a lifestyle factor and health considerations result in the development of 'functional foods' where the producer develops a product with a special health claim. The concept of functional foods started to gain popularity in western countries in the 1990s, also under the influence of the Japanese/Asian culture where there was a less strict distinction between food and drugs (Schaafsma and Kok, 2005). A well-known example is the use of plant sterols in margarines and dairy products to lower cholesterol levels. Such claims must naturally be substantiated by research. Jongen and Meulenberg (2005) report that levels of bioactive ingredients at the moment of consumption vary up to a factor 100, depending on chain conditions. They suggest that the food industry must learn from concepts used by the pharmaceutical industry. The functional food market is currently dominated by beverages (sports and energy drinks), dairy products and bakery products (Schaafsma and Kok, 2005). Functional foods should not be confused with novel foods that are defined as foods that were hitherto not used for human consumption to a significant degree within the EU (EU Regulation 258/97). Novel foods must be assessed for safety before market introduction. In addition to food, there are dietary supplements that are used to enhance health. These are also called nutriceuticals and nutraceuticals. The 'nutri' type contains mixtures of essential primary nutrients, while the 'nutra' type consists of non-essential secondary nutrients. Bio-activity for essential nutrients is not in doubt, but still has to be proven for the nutraceuticals. The regulatory treatment of dietary supplements is different between member states. Functional food innovation is highly dependent on the success of the development of new biomarkers to substantiate the health benefits, as well as on consumer acceptance (Schaafsma and Kok, 2005).

Nanotechnologies involve the study and use of materials on a tiny scale - at sizes of millionths of a millimetre - and exploit the fact that some materials have different properties at this ultra small scale from those at a larger scale. In the future, the science may be used in food production, probably first in packaging to detect how fresh food is. For the design of food, there are still many uncertainties about the potential effects on human health and the environment

Less far in the future is the use of biotechnology. According to the FAO[1], there is a wide range of 'biotechnologies' with different techniques and applications. The Convention on Biological Diversity (CBD) defines biotechnology as: 'any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific use'. Broadly interpreted: the definition of biotechnology covers many of the tools and techniques that are commonplace in agriculture and food production. Interpreted in a narrow sense, which con-

[1] On whose Statement on Biotechnology (2000) this text is based, see www.fao.org

siders only the new DNA techniques, molecular biology and reproductive technological applications, the definition covers a range of different technologies such as gene manipulation and gene transfer, DNA typing and cloning of plants and animals. To some, the use of genetic engineering is part of a major paradigm shift as society moves into the age of gene sequencing, gene patenting and genetic medicine. While there is little controversy about many aspects of biotechnology and its application, genetically modified organisms (GMOs) have become the target for debate. In the US, more than 70% of foods sold in the supermarket have ingredients derived from genetically engineered plants[2], but in Europe consumer and political acceptance of GMO-food (infamously pictured as Frankenstein food by a tabloid) is more problematic. Examples outside the US include rice that has been genetically engineered to contain pro-vitamin A (beta carotene) and iron which could improve the health of many low-income households.

One of the effects of these technological trends is that intellectual property rights on new products (and brands) have become more important.

Organising the food chain/food chain management

As a result of some of the developments mentioned above (need for quality assurance, enabling role of ICT, property arrangements on varieties), there is a restructuring of the food industry with new coordination mechanisms. Direct linkages between supply chain actors increase and chains develop into networks (net chains). On the other hand specialised activities like logistics are outsourced to third party service providers. The 'invisible hand' of the spot market is replaced by the 'visible hand' of contractual arrangements, with the effect for outsiders like governments and researchers that the chain becomes less visible (transparent). This process is sometimes called 'the new food economy' (Kinsey, 2001; Boehlje, 1999, OECD, 2006).

For many decades the food industry has been reorganising itself (figure 2.4) to cope with changes in demand. By innovating, it has also made such changes in demand possible. Now, at the start of the twenty-first century, developing, signalling and monitoring food quality has become a central issue in the food industry that requires hybrid organisations and institutions. These are shaped by differences in transaction costs, and under current technology increasingly centralised modes of organisation are gaining ground in the coordination of transactions. Intellectual property rights (including brands), contracts, privately managed quality schemes like BRC and Eurogap (see section 2.4) and franchise systems in retail are examples. They substitute private institutions for public policies (Ménard and Valeschini, 2005). They are a challenge to all active in the food industry, but especially to the SME that use less formal management methods like direct supervision and are more oriented towards regional markets.

Figure 2.4 Changes in consumer demand and management reactions in the food industry

Period	Consumer demand	Management concern	Management technique	Performance agri-business	Organisational focus
1960s	price	Efficiency	just in time	efficiency	firm
1970s	quality	Quality	material requirements planning	quality	Firm
1980s	variety	Quality	supply chain management	flexibility	bi-lateral
1990s	delivery time	Flexibility	efficient consumer response	velocity	Chain
2000s	uniqueness	Innovation		innovation power	Chain network

Source: Van der Vorst (2006).

Besides the restructuring of the food industry due to changes in consumer preferences, technology and innovations in food chain management (that are more or less worldwide trends), the European food industry is also still in a process of structural adjustment to reap the benefits of

[2] See the website of Penn State: http://biotech.cas.psu.edu/articles.htm

market integration, enlargement of the Union and the introduction of the Euro. Imports and exports respond quite fast to such changes that bring down transaction costs involved in doing business in other member states. However, to realise the benefits of Foreign Direct Investment (FDI), mergers and acquisitions and relocation of manufacturing require investments that take time to materialise and to bear fruit. It is easier to accomplish for larger companies and therefore reinforces a process of concentration that takes place anyway.

Innovation

The ongoing changes in consumer preferences and technology make innovation an important issue in the food industry. As figure 2.4 suggests, this is nothing new for the food industry, but an ongoing race to stay in business by improving the quality of life of the food consumers. The level of R&D expenditure in the food industry is quite low compared to total manufacturing (table 2.3). The figures are similarly low in the textiles sector, the wood and pulp industry as well as the basic metal industry. High levels are achieved in the sectors of machinery and equipment.

Table 2.3 R&D expenditure as % of value of production for the main sectors of manufacturing in OECD countries

	ISIC Rev.3	1992	1997	2001
total manufacturing	15-37	1.89	1.77	1.89
food products, beverages and tobacco	15-16	0.24	0.22	0.30
textiles, textile products, leather and footwear	17-19	0.16	0.2	0.27
wood, pulp, paper, paper products, printing and publishing	20-22	0.16	0.16	0.14
chemical, rubber, plastics and fuel products	23-25	2.86	2.74	2.72
other non-metallic mineral products	26	0.48	0.49	0.48
basic metals and fabricated metal products	27-28	0.47	0.42	0.42
machinery and equipment	29-33	3.74	3.29	3.47
transport equipment	34-35	..	..	3.72
manufacturing nec; recycling	36-37	..	0.31	0.37

Source: OECD, Stat 2005 (RDIP indicator).

It should be recognised that R&D is important in the food industry, but has a different character than in telecommunications, for example. First of all, our foods and drinks have been in this world for a long time and 'inventing' new ones is very unusual. Consumers are also quite conservative with regard to their food intake. Research on the data of the Community Innovation Surveys (Raymond et al., 2006) confirms that the food industry is a low-tech industry, like textiles or the metal industry. New products in a market are therefore mainly extensions of older ones, or imports from other markets. But such products can contribute considerably to consumer value, as the example of coffee in the American market or wine in northern European markets shows. And the number of new products is not trivial: in the German food market in the year 2000, exactly 32,478 new food products were launched (Weiss and Wittkopp, 2005).

Secondly, the changes in consumer demand ask more for quality and convenience than new products. This leads to changes in packaging, in sales points (out of home, railway and petrol stations etc.), in logistics, in product varieties (ready-to-eat salads, new breakfast products) and recently in integration with hardware (the Sara Lee/DE and Philips Electronics' Senseo for coffee, Heinekens beer tender). There are essentially two 'linear' models of innovation: the technology push model, in which basic science is the driving force for technological development, and the demand pull model, in which market needs are the trigger for innovation (see Clark and Guy, 1997). The food industry is clearly more in the second model.

Thirdly, some of these innovations are much more process and management oriented than based on hard technology. The ready-to-eat salad available in the petrol station or the Senseo

coffee machine is much more a result of innovations in 'orgware' than in software or hardware. Resources devoted to such activities in companies are often reported under current costs in stead of investments.

Fourthly, agriculture and the food industry (at least in some countries) are well known for the rate at which they implement basic innovations from other industries (like ICT, logistics, marketing). This character of R&D makes benchmarking the innovativeness of the food industry with other industries using data on patents or even on investments in R&D a doubtful exercise. It can easily lead to the impression that the food industry is not very innovative, or even worse to the idea that innovation has no important role to play in this sector.

The R&D expenditure of the individual countries differs. A relatively high percentage is achieved in Denmark and the Netherlands, even higher than the US, while the percentage is relatively low in the Czech Republic, Germany and Italy, but also in Canada.

Table 2.4 R&D expenditure as % of value of production and total value in food products, beverages and tobacco

	1987	1992	1997	2002	R&D expenditure mln USD PPP current prices 2002
Belgium	0.16	0.26	0.26	0.38	115
Czech Rep.	..	0.07	0.02	0.02	5
Denmark	0.32	0.32	0.40	0.80	125
Finland	0.40	0.72	0.51	0.51	46
France	0.20	0.26	0.28	0.40	548
Germany	..	0.17	0.14	0.20	302
Ireland	0.21	0.30	0.29	..	51
Italy	..	0.08	0.07	0.11	130
Netherlands	0.42	0.37	0.47	0.61	307
Poland	..	..	0.04	..	9
Spain	0.08	0.11	0.10	0.16	155
Sweden	0.45	0.41	0.45	0.29	39
United K.	0.31	0.43	0.29	0.48	490
Australia	0.28	0.36	0.38	..	175
Canada	0.17	0.15	0.16	0.11	69
Japan	0.57	0.64	0.78	0.78	1742
Korea	..	..	0.24	0.35	218
Norway	0.20	0.26	0.45	0.54	70
US	0.35	0.31	0.37	0.39	2205

Source: RDIP indicator: OECD, STAT 2005; Values from OECD, R&D expenditure in industry 2004.

One of the issues in process innovation in the food industry is to deal with environmental challenges to improve the sustainability of the business. Saving on inputs is one of the objectives, with special attention to water and energy. Energy costs also play a role in innovations to reduce transport costs. Product composition (e.g. concentration of material by removing water, see above) and better logistics are central to such innovations. A chain-integrated approach is important here: sometimes it is more cost effective to reduce storage at shop level and move to just-in-time delivery instead of reducing deliveries. Using service providers that combine product flows can make sense too. Waste reduction (also through better use of ICT and logistics) as well upgrading waste in animal feed, energy production or even by-products is also an important environmental and economic challenge that requires process innovations and links with other industries.

The role of SME

Innovation is often scale-intensive: larger companies benefit more and have larger R&D budgets. But SME are often seen as more entrepreneurial and credited with the start up of new products (examples in food can be found in organic food companies that were sometimes later acquired by large companies). Nevertheless small food manufacturing companies are generally viewed as operating in a mature and low technology area, where R&D activities are limited and patenting is rare. Avermaete et al. (2004) surveyed 177 companies in six rural areas in the EU and identified non-innovators, traditionals, followers and leaders. Drivers of product and process innovation were the skills of the workforce, the company's investment in know-how and the use of external sources of information. Characteristics of the entrepreneur did not seem to play a decisive role. Avermaete et al. (2004) suggest that if policy makers want to increase innovation among small food companies, more weight should be put on improving the in-house capabilities of the workforce rather than focussing on R&D activities as such. Similar results were found by Batterink et al. (2006) in their analysis of the Dutch Community Innovation Survey. In order to be successful in product innovation, companies must have a strong market orientation and they must have organisational conditions (sufficient qualified personnel, knowledge, flexible organisation structure) in place. Garcia Martinez and Briz (2000) noted the same for Spain. Surprisingly Batterink et al. (2006) found the company's network is not perceived as crucial for innovation. Competitors are important in the case of new or improved products, suppliers in process innovation.

An in-depth study of 12 food companies by Trail and Meulenberg (2002) suggested that the traditional theories of demand-pull versus technology push (or a combination) are too simple. Companies have a dominant product, process or market orientation that determines the company culture, the types of innovation accorded most importance and the way in which innovations are organised. They warn government agencies that a 'one size fits all' approach will not work. At least a distinction should be made between 'new to the world' innovation through leading-edge research and promoting technology transfer trough adoption of best practice.

Technology transfer to the mass of SME is a challenge due to the complex structure of management, technology and market organisation in SME. Public-private network programmes that link SME with food research institutes like the Norwegian MATFORSK initiative (Baardseth et al., 1999) or the Dutch AKK program are credited with improved technology transfer.

The retail concentration can influence the incentives of upstream food companies (small and large) to introduce new products, at least in theoretical models. Weiss and Wittkop (2005) show for the German market that the effect is mitigated if manufacturing companies also have some market power as innovations are positively related to the companies' market share. Large companies can also force SME to innovate. Research into the implementation of EDI (Vlachos, 2004) shows that small agribusinesses were well aware of new ICT and EDI. However costs and complexity associated with EDI were perceived as the most significant barriers to implementation. Most companies were more likely to adopt EDI systems due to external pressure (e.g. from retailers) rather than to gain a competitive advantage.

2.4 Distribution channel from food processor to the consumer

2.4.1 Introduction

This section deals with the distribution channel from the food processor to the consumers: the final users. The consumers define the amount and the type of the final product. In the food industry most products can be described as commodities. The products of producers are not significantly differentiated and therefore easily substitutable. Just a small number of food products have a recognised brand value. Coca Cola, the number 1 global brand, is a frequently mentioned and well recognised example. The top 50 global brands include 7 food products, mainly beverages. To acquire a place in the supermarkets also means fulfilling the requirements of the distribution

channel. The distribution channels downstream define the opportunities and threats for the producers. Food processors do not have the power or authority to take decisions in the down stream businesses. Processors can just influence their decision by offering a better price, services or quality: the opportunities. Finding a suitable channel demands a thorough selection. Businesses with brand recognition have a higher power to influence the downstream decisions positively.

Wholesalers, retailers and food service companies are an important link between the food industry and consumers as end users. The developments in these distribution channels define the business environment for the food industry: opportunities and threats. Two different developments can be observed: the number of wholesalers and food service companies increased and the food industry enterprises and retailers decreased (table 2.5).

Table 2.5 Structure of marketing channel in the EU-15

	Number (1,000)		Turnover (€1,000,000)		Turnover per company (€1,000)
	1999	2003	1999	2003	2003
Food industry	261	244	667,000	729,600	3,000
Wholesalers	156	162	574,500	685,900	4,200
Retailers non-specialised	247	217	567,900	677,400	3,100
Retailers specialised	462	425	97,800	105,900	200
Food services	1049	1091	197,900	245,100	200

Source: Eurostat.

Figure 2.5 Food distribution channel

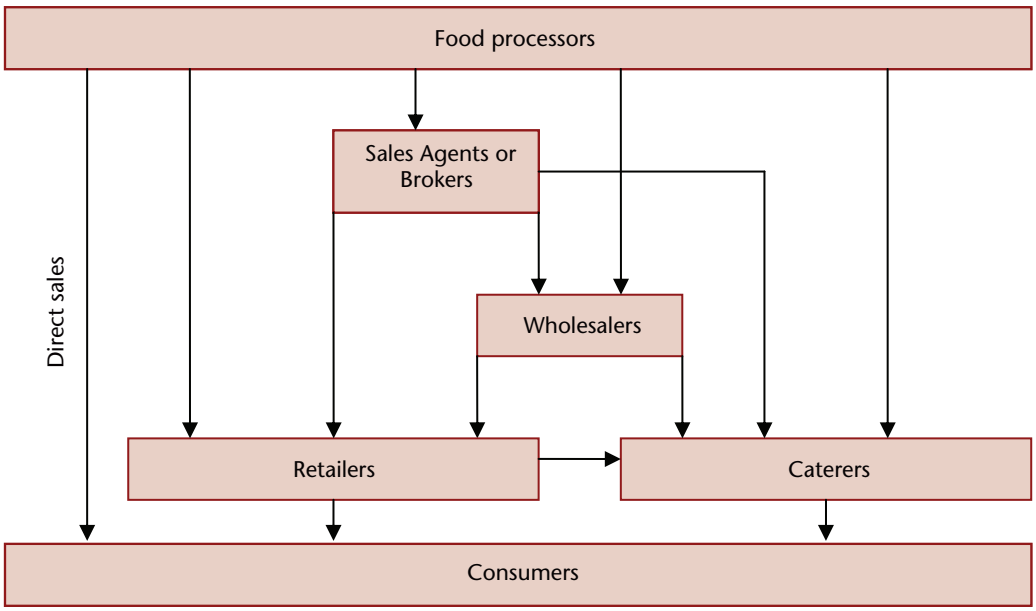


Figure 2.5 presents the channels. Harris et al. (2002) make a distinction between three types of wholesalers:

1. merchant wholesalers. They 'buy and resell food (primarily from a variety of manufacturers), assemble it for redistribution, load it onto trucks, and deliver it to retailers, food service establishments, government or the export market, making profit on the service they provide' (Harris et al., 2002, p12);
2. manufacturers' branches and offices. These are maintained by manufacturers apart from their plants to market their products at wholesale. Branches carry inventory while offices do not;
3. brokers and agents buy or sell goods owned by others on commission.

The consumers are served either by the food processors, the retailer or the caterer. The distribution channel is very dynamic. In the fifties and sixties, the processors sold directly or had their own direct distributor or sales organisation. In the sixties and the seventies indirect channels became more important and since the eighties the down stream channel became even more complex by the incorporation of wholesalers, brokers and dealers (Rolnicki, 1998). Internet sales became possible at the end of the nineties. The importance of direct sales by producers diminished during that period and the importance of caterers increased.

The supply chain creates value and delivers it to customers, but it is configured by a set of discrete activities and processes. 'Mechanisms for linking and coordinating processes can be grouped in three categories: standards, markets and organisational coordination mechanisms' (Regmi and Gehlhar, 2005).

Three types of standards play a role in supply chains of high-value foods:
- primary production practice standards. These standards include several aspects of the triple P for sustainability and corporate social responsibility. Besides public standards on food safety, private standards are in use. These aim at standardising product requirements and harmonising product and delivery attributes. Well known examples are EUREPgap, BRC, Fair Trade or organic labels, etc. Such standards enhance supply chain efficiency by lowering transactions costs;
- packaging and logistics standards. Packaging refers to technology that preserves the integrity of a product as it moves through the supply chain. The size specification of pallets and containers used for transport are standardised, for example. This ensures efficiency, flexibility and in general also quality assurances;
- Electronic Data Interchange (EDI). The systems rely on generic standards and tools, requiring less upfront investments. Besides partly implemented internet data exchange, Radio frequency identification (RFID) is the next logical step to enhance supply chain visibility. RFID enhances inventory and advanced RFID tags quality management. It will therefore reduce handling costs but it will also reduce the level of waste. The announcement of Wal Mart two years ago and the price decline of the tags will contribute to implementation of the technology.

New markets can lower system-wide costs and alter the distribution of returns among chain participants. The benefits of new markets can be developed by internationalisation, which requires management of the enterprises across borders: indicated by transnational management. Transnational management means adapting the production process to or servicing the right (international consumer) markets by your product. It means not only using the differences of the international consumer markets but also the differences in production possibilities. The competitive advantages of transnational management discussed by Bartlett and Ghoshal (1992) are summarised in Table 2.6.

Table 2.6 Strategic goals and means for competitive advantage.

Strategic goals	Source of competitive advantage		
	National differences	**Economies of scale**	**Scope-advantages**
Efficiency	Price of production factors	Production level	Sharing costs by different countries
Risk management	Risks of market and government policy	Production level in balance with strategy and operational flexibility	Portfolio differentiation (risk and opportunities)
Innovation	Learning of organisational and process management.	Cost advantage of experiences.	Learning about different markets, products or activities.

Source: Bartlett and Ghoshal, 1992.

An illustration of the necessity for an international dimension in the external orientation of food producers is that their products are generally commodities that are traded worldwide. The pro-

duction location of these commodities will often differ from the consumption location. The threat of new competitors or substitute products, the position in the chain and the bargaining power are mostly dealt with at arms' lengths market and dominated by the retailers.

Organisation coordination mechanisms deal with collaboration between food producers, wholesalers and supermarkets. This is in fact a modular governance structure. This means: '…some arrangements between buyer and seller, entered into freely, to facilitate a mutually satisfying exchange over time, which leaves the operation and control of the two businesses substantially independent' (Hughes, 1994). If the preferences of the supermarkets are converging to collaboration and value creation, the sales potential of the supplier either the wholesaler of food processor is decreasing, as they stay focussed on the non-collaborative spot market. The demand-driven supply chain forces the suppliers to comply with the preferences of the supermarket. The partnerships must offer mutual benefits to both actors of the partnership. In contrast to integration, modular partnership is characterised by the lack of equity sharing and the absence of drastic obligations like a management take-over.

The success of collaboration will be determined by the following factors (Duffy and Fearne, 2004; Fearne and Hughes, 1999; Zanquetto-Filho et al., 2003):

- strategic orientation. Growth strategies of retailers are based on location, size, competitiveness of product range and price, and increasingly on differentiation, with a private label. Suppliers must respond to the demand of retailers. Wholesalers that are willing to enter such a partnership achieve a growth in their sales potential by investing in customer specific preferences;
- ability to exploit (i.e. add value) market information. Sharing product information between supermarkets, wholesalers and food processors can result in an increase of the value added to a certain market. The value added will result from the ability to achieve strategic objectives; setting competitive prices or reducing waste are easier to achieve if knowledge about costs and market data is shared;
- organisational structure and business culture. The organisational structure and business culture are hard to measure and are closely linked to the strategic visions of the partners. It aims at meeting the preferences of the customer at every level of the business. Industry, wholesalers and supermarkets differ in their approach to partnerships. Supermarkets have more power and they are therefore are inclined to change between wholesalers or food processors on a regular basis. This causes uncertainty for the wholesalers and makes it difficult to achieve long-term relationships with the supermarkets;
- cost control. Cost control can be used to achieve cost reductions by indicating which costs can be cut. Examples of cost reductions from collaboration are a reduction in waste, handling and logistic costs. Also using the final packaging can reduce costs. Suppliers who are implementing good cost control are more suitable for operating in partnerships;
- innovation. Innovation is the strategic plan that stimulates long-term competitive advantage. This results from the fact that the food market is characterised by over-supply. Over-supply increases the need for innovation to stay ahead of competitors by developing new products, varieties or services. Supermarkets are therefore especially interested in suppliers that represent innovative companies; because these companies could bring the partnership long-term advantages such as strengthening the retailers' brand.

In this section the wholesalers will first be discussed, then the retailers and finally the caterers. As the retailers, wholesalers and caterers compete locally, no benchmark will be made. This section aims at discussing the customers of the food industry and indicating the opportunities and threats for them.

2.4.2 Wholesalers

Wholesalers are the link between the food processing industry and retailers. This section provides a quantitative overview of the wholesalers in Europe. The number of wholesalers is still increasing, as is the turnover. The most important wholesalers are in the non-specialised group with the largest turnover, followed by wholesalers of unprocessed fruit, vegetables and potatoes. This

group is not linked to food processors. However this illustrates the move of consumer products along the marketing channel. Fresh fruit and vegetables are ready to eat without processing. Nevertheless value is added by providing grading, packaging and logistic services. Also after processing, several consumer products are classified as fresh products such as milk or unpreserved (fresh) meat. The logistics for fresh produce is very critical due to the perishable nature of these products. The salvage value of last week's or in many cases even yesterday's products is zero or even negative (waste).

Wholesaling by specialisation

The average turnover per enterprise averages €4.2 million and ranges between 2.5 for the wholesaling in coffee, tea, cocoa and spices to €5.8 million for wholesaling in dairy produce, eggs and edible oil and fats (table 2.7). Of interest in this study are the wholesalers in processed food.

Table 2.7 Number of wholesalers and turnover in million Euros in 2003 of EU-15.

Total EU-15	Enterprises			Turnover			turnover/ enterprise	
Wholesale of a)	1999	2003	Share% 2003	1999	2003	Share% 2003	1999	2003
Food, beverages and tobacco	156586	162770	100%	574519	685939	100%	3.7	4.2
Fruits and vegetables	33857	34912	21%	89527	110371	16%	2.6	3.2
Meat and meat products	19309	18007	11%	57577	61829	9%	3.0	3.4
Dairy produce, eggs and edible oils and fats	11968	11166	7%	54755	64473	9%	4.6	5.8
Alcoholic and other beverages	28747	32017	20%	74985	95169	14%	2.6	3.0
Sugar and chocolate and sugar confectionery	6583	7272	4%	21701	24416	4%	3.3	3.4
Coffee, tea, cocoa and spices	2882	3438	2%	10372	8835	1%	3.6	2.6
Other food including fish, crustaceans and molluscs	31182	34273	21%	77475	94039	14%	2.5	2.7
Non-specialised on food, beverages and tobacco	20676	20422	13%	156585	180398	26%	7.6	8.8
EU-15 in % EU-25	**88%**	**89%**		**95%**	**96%**			

a) wholesaling in tobacco is not included. Source: Eurostat, SBS-data.

At almost €685 billion, the total turnover of the wholesalers is more than 10% below the turnover of the food industry. Wholesalers therefore have just a part of the wholesaling market, as the total wholesale turnover includes fresh fruit and vegetables, tobacco products and the wholesaling marketing margin.

Some evidence for the US is provided by Harris et al. (2002). Firstly, self-distributing retailers with their own distribution facilities account for 34%. Food processors deliver directly to these distribution centres. Food processors who deliver directly to individual stores account for 28% of distribution to retail stores. The remaining 38% is for the 'traditional' wholesalers. In the US they deliver specialty food, unique displays and convenience food.

The specialised wholesalers count for 74% of the sales in the EU. Compared to the US where they have a share of 43% (in 1997), this is fairly high. In the US specialised wholesalers in meat and poultry (25%) are the group with the largest sales, followed by fresh fruit and vegetables (18%) and dairy (14%) (Harris et al., 2002). This data is not fully comparable with the EU, due to different classification, but some resemblance can be recognised.

Food processors also largely perform the marketing function 'wholesaling' or distributing products to retailers. Who are the customers of these wholesalers? No evidence has been found for the

Figure 2.6 Food wholesaling in the US by type of customer. Source: Harris et al., 2002.

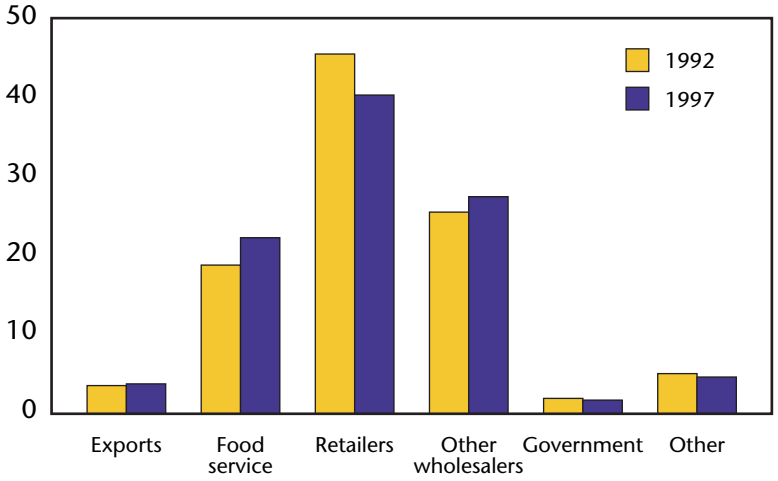
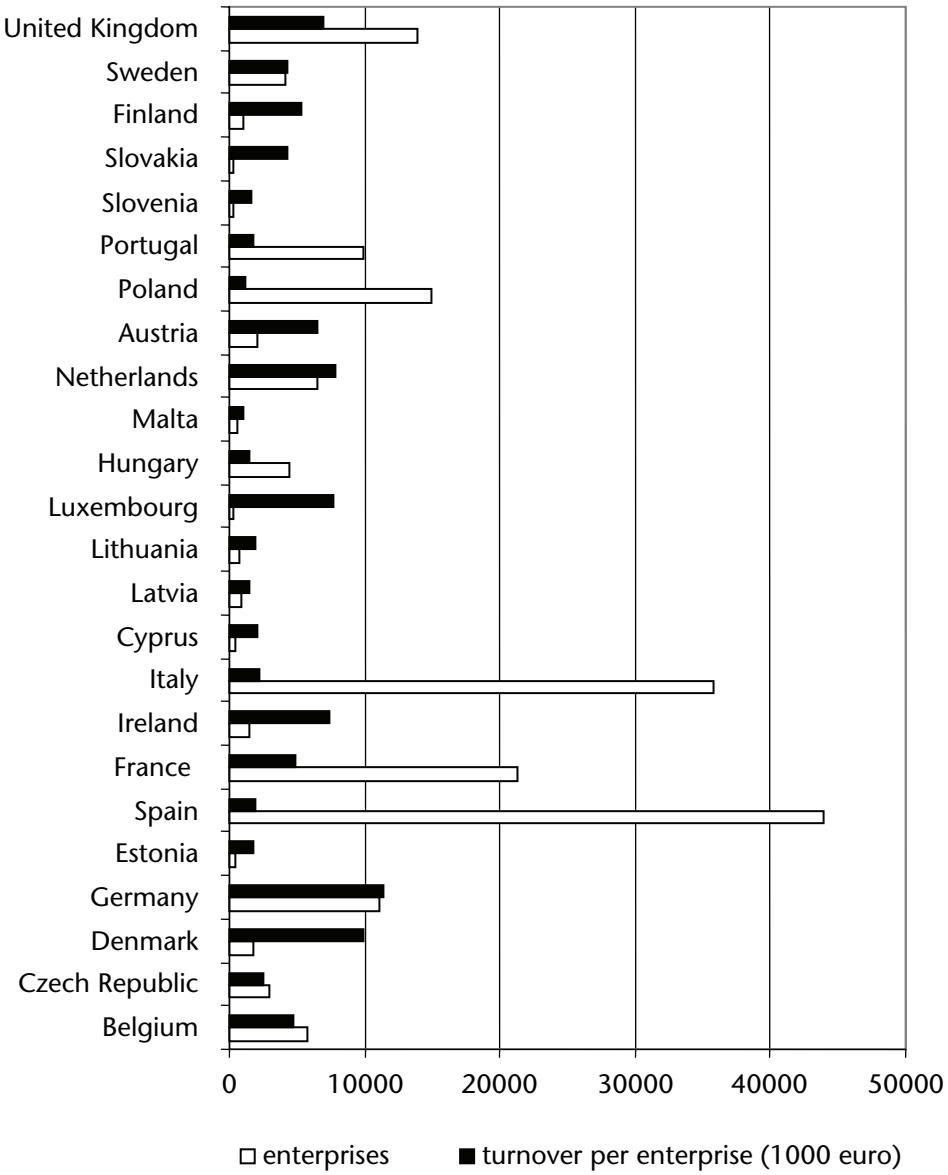


Figure 2.7 Number of wholesalers and average turnover (€1000 Euros) per enterprise in 2003



Source: Eurostat SBS.

EU; figure 2.6 shows some data for the US. The retailers are the main but declining destination. The food services and other wholesalers take most of the remaining part. Europe will differ from this. A higher level of intra communitarian export will be expected, due to less homogeneous and integrated members of the EU. Secondly, the food services are of less importance in the EU.

Differences between EU countries

Germany, France, UK, Spain and Italy are the most important countries for wholesalers measured in turnover. Compared to level of turnover, Germany has a relatively small number of enterprises and as a result a high average turnover (€11.3 million per enterprise). Germany is followed by Denmark (9.9), the Netherlands (7.9) Luxembourg (7.6) and Ireland (€7.3 million per enterprise). Most new member states have a relatively small turnover in Euros (between €1 and 2 million per enterprise) compared to the EU average (figure 2.7). This also applies to the Mediterranean countries like Portugal, Spain and Italy (all around €2 million).

The gross margin for the wholesalers averages around 18% of the turnover for the majority of EU countries and also for the US. This means that 80% of the sales are purchased goods.

Table 2.8 shows the importance of the different wholesale types for the individual EU countries. Wholesaling in unprocessed fruit and vegetables is fairly important for Spain, Italy, Cyprus, the

Table 2.8 The share in total turnover of wholesalers according to nace code.

	Total (million Euros)	Fruits and vegetables	Meat and meat products	Dairy produce, eggs and edible oils and fats	Alcoholic and other beverages	Sugar and chocolate and sugar confectionery	Other food incl. fish	Non-specialised food beverages and tobacco
Nace-code	**g513**	**g5131**	**g5132**	**g5133**	**g5134**	**g5136**	**g5138**	**g5139**
Belgium	27394	12	13	8	11	7	11	21
Czech Republic	2904							
Denmark	18171	7	11	13	7	3	22	36
Germany	125587	14	11	7	16	3	13	23
Estonia	885	7	5	9	14	7	10	39
Spain	84326	26	8	6	12	3	19	20
France	104693	16	8	19	18	4	12	21
Ireland	10154	16	10	2	13	8	9	40
Italy	77759	21	10	11	11	3	21	21
Cyprus	1057	25	7	7	14	5	4	32
Latvia	1349	10	5	8	23	5	17	21
Lithuania	1422	11	5	5	18	4	16	27
Luxembourg	2610	2	2	2	12	4	12	9
Hungary	6964	9	8	4	9	5	10	35
Malta	531	9	9	2	14	13	27	17
Netherlands	51746	21	9	10	11	2	13	25
Austria	13769	9	7	4	14	5	13	29
Poland	16961	8	8	5	23	4	7	34
Portugal	17983	9	5	9	13	1	26	28
Slovenia	538	19	7	7	19	3	18	17
Slovakia	1527	7	2	12	12	7	5	30
Finland	5820	6	2	17	3	4	15	50
Sweden	18037	11	4	3	5	5	11	56
United Kingdom	96658	13	9	7	16	5	6	35
Total	**685939**	**16**	**9**	**9**	**14**	**4**	**14**	**26**

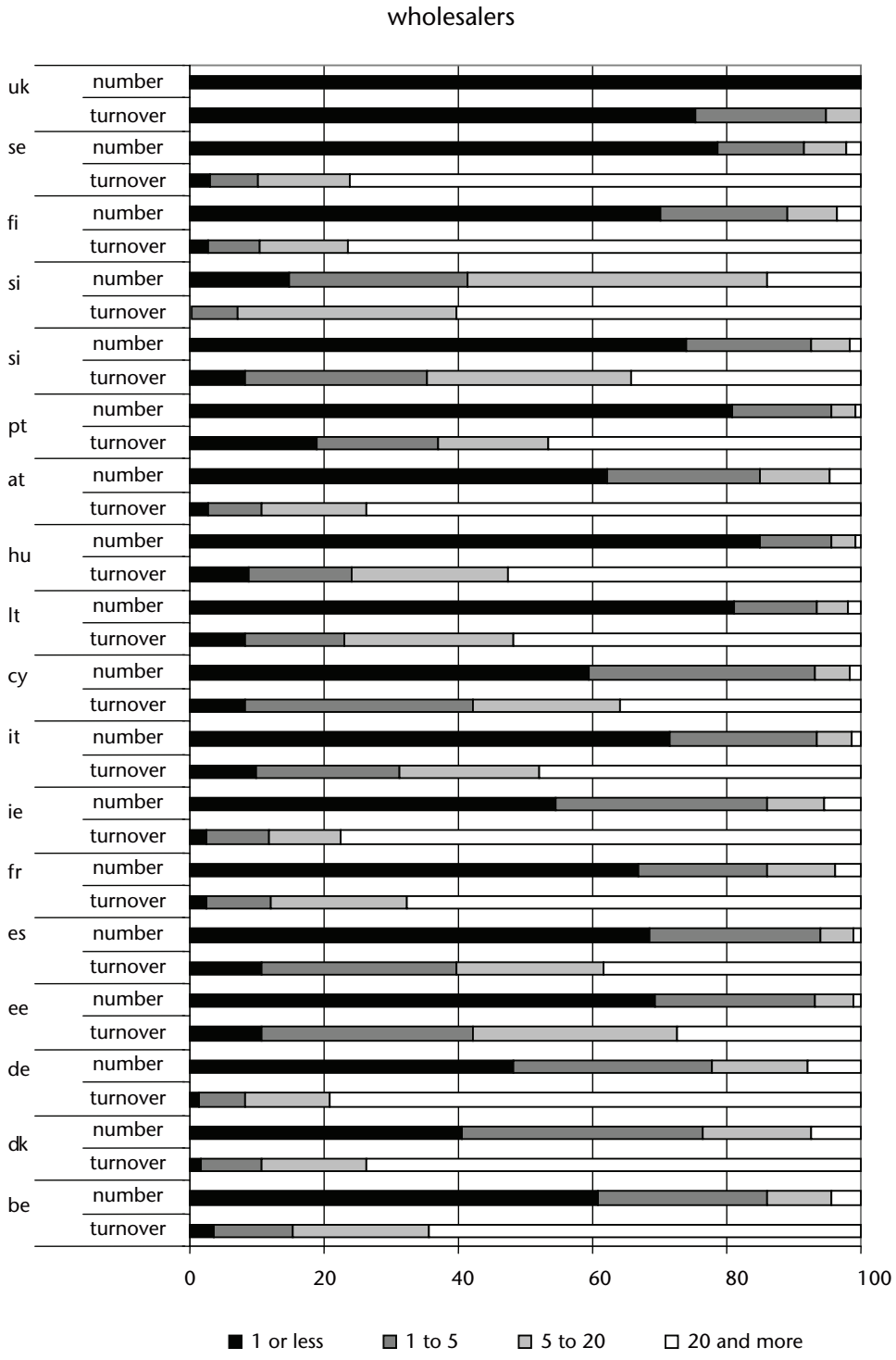
Source: eurostat-SBS.

Netherlands and Slovenia. Dairy products, eggs, edible oils and fats are of relative importance in Denmark, France and Finland, beverages in Latvia, Poland and Slovenia. For other food products the relative importances do not differ much between countries.

Size

Figure 2.8 demonstrates the small-scale of the wholesaling. The majority of companies, even in the north-west of the EU, have fewer than 5 employees.

Figure 2.8 Distribution of wholesalers to number of employees in 2003.



Source: Eurostat SBS.

An exception is Slovakia (SK). These small businesses have a minor share in the total turnover. The opposite is shown for the larger wholesalers: they have a major share. An exception is the UK. Less than 1% of wholesalers have more than one employee; even so their turnover takes one quarter of the total. The differences between the countries with respect to the number of enterprises and the turnover per size class also explain the difference between the countries on the indicator of the average turnover per enterprise. The distribution over size classes is only available for the aggregate of all wholesalers, so not for the subdivision in specialisation of the wholesalers.

Largest wholesalers

Table 2.9 shows the top 25 largest wholesalers. The countries with mature supermarket channels are well presented: large supermarkets chains demands large wholesalers to serve them. Wholesalers in meat and meat products are the largest group in the top 25, with German, British and Italian companies. In Germany wholesalers are involved in about one quarter of the total meat supply to retailers, butchers or catering (ZMP, 2006). Consolidation in the processing industry and at supermarket level will reduce the importance of wholesalers further. Dairy, eggs and edible oils and fats are the second group in the top 25 with mainly French and Danish companies. The names of some companies like 'Spar', 'Coca Cola' or 'Arla', for example, already suggest a close link between the food processor or supermarket and the wholesaler mentioned in the top 25.

Compared to the total turnover of the food industry (NACE code DA15), the total turnover of wholesalers is slightly lower and the number of companies is approximately two thirds of those in the food industry. This suggests on average a higher turnover per firm. As wholesalers are service providers, the majority of their costs are purchase costs of goods.

The largest European wholesaler is relatively small compared with the two largest wholesalers in the US. In 2001 Supervalu Store, inc. had 20.9 billion USD sales and the second Fleming Companies, inc. 15.6 billion USD. The third and fourth are still larger USD than the number 1 in the EU, with 7.1 and 5.8 billion respectively. In the US the sales of number 11 and further is below 1.6 billion USD (Harris et al., 2002). Thus the number of large wholesalers is also limited in the US.

Buying groups centralise the procurement for retailers. Some groups are closely linked to one retailer, while others buy for several retailers. The top 5 are summarised in table 2.10.

Buying groups enhance the market power of the retailers and provide services by outlining and sourcing private labels. The turnover of these buying groups is many times larger than that of the wholesalers. The total turnover can be estimated at €1,000 billion. This is a larger figure than the total turnover for all wholesalers in the EU-25.

Table 2.9 Top 25 largest wholesalers

Rank	Company name	Products	Country	Turnover million EUR 2004	Employees 2004	Profit before tax% turnover
1	Spar handels-AG	Meat products	DE	5,987	29,053	-1.4
2	Booker Limited	Meat products	UK	4,696	8,327	-0.8
3	Gilden holding b	Beverages	NL	2,871	1,349	0.5
4	Gruppo pam.	Meat products	IT	2,554	10,296	1.8
5	Scottish and Newcastle	Beverages	UK	2,382	6,164	-3.1
6	Pomona	Fruit and vegetables	FR	2,159	7,123	2.4
7	Spal boissons	Beverages	FR	2,065	44	0.5
8	A. Moksel	Meat products	DE	1,907	2,304	1.2
9	Societe de Diffusion Internationale Agro-alimentaire	Dairy, Eggs Edible Oils and Fats	FR	1,902	6,911	-0.4
10	Fyffes	Fruit and vegetables	IE	1,833	n.a.	5.2

Rank	Company name	Products	Country	Turnover million EUR 2004	Employees 2004	Profit before tax% turnover
11	Chiquita banana company	Fruit and vegetables	NL	1,773	1,715	0.2
12	NFZ Norddeutsche Fleischzentrale	Meat products	DE	1,721	2,727	-0.1
13	Hoogwegt groep	Dairy, Eggs, Edible oils and fats	NL	1,546	253	1.4
14	Coca-Cola Deutschland Verkauf	Beverages	DE	1,531	100	0.1
15	Agrial	Dairy, Eggs, Edible oils and fats	FR	1,470	6,400	2.1
16	BFS group	Meat products	UK	1,449	4,537	4.1
17	Sucres et Denrees	Sugar and Sweets	FR	1,436	4,318	1.0
18	the Greenery	Fruit and vegetables	NL	1,426	2,794	0.6
19	De Danske Mejeriers Maelkeudvalg	Dairy, Eggs, Edible oils and fats	DK	1,407	18	0.0
20	Bestway (holdings)	Meat products	UK	1,124	1,715	4.7
21	Conway - the convenience company	Sugar and Sweets	BE	1,074	302	0.3
22	AIA. (Agricola Italiana Alimentar)	Meat products	IT	1,050	437	0.2
23	Alliance Agro Alimentaire Union des Coop Agricoles	Dairy, Eggs, Edible oils and fats	FR	875	98	-1.8
24	Granarolo s.p.a. in sigla	Dairy, Eggs, Edible oils and fats	IT	865	2,002	2.4
25	Arla Foods Ingredients	Dairy, Eggs, Edible oils and fats	DK	779	186	5.3

Source: Database Amadeus.

Table 2.10 Top 5 Buying Groups in Europe in 2000.

Group	Members	Turnover €billion	% market share
EMD	Markant. Leclerc, NIsa Today's, Euromadi, Selex, (AxJS), Delhaize, Unil/KK, Esselunga, ZEV-Markant, Musgrave	116.5	13.2
AMS	Opera, Edeka, Ahold, Safeway, Kesko, Dansk Supermarked	114.8	13.0
DMMG	Carefour	68.7	7.8
Eurogroup	Rewe-Billa, Co-OP Schweiz, Laurus	51.4	5.8
NAF	CWS, Co-OP, Italia (Centrale), Inex, FDB, KF Gruppen	44.5	5.0

Source: Rabobank, 2004.

2.4.3 Retailers

The retailers are a final stage in the supply chain before the final consumers. The minority in numbers are the supermarkets (non-specialised retailers): one third of the retailers belong to this category. This group has 86% of the total turnover. The average turnover per enterprise is 3.1 million Euros, whereas the specialised retailers have an average turnover of 259.000 Euros: less than 10% of the supermarkets. Butchers are the most important group among the specialised retailers. In the US, bakeries had the largest numbers of stores (20,400 in 2000), almost half of all, and the largest total turnover almost (5.4 billion dollars), one third of the total of all specialised food stores. A little below that turnover are the meat and seafood markets, with only 20% of all shops (Harris, et al., 2002).

Table 2.11 Number of retailers and turnover in million euros in 2003 of EU-15.

Retail sale in total EU 15	Enterprises			Turnover			Turnover/enterprise	
	1999	2003	% 2003	1999	2003	% 2003	1999	2003
Non-specialised stores predominating food	247249	217251	35%	567874	677423	86%	2.297	3.118
Total: specialised stores	462260	425028	65%	97778	105867	14%	0.212	0.249
Fruit and vegetables	63573	59514	9%	9626.5	10430	1%	0.151	0.175
Meat (products)	128433	113937	18%	27570	27803	4%	0.215	0.244
Fish and shellfish	34716	32688	5%	5227.1	5657	1%	0.151	0.173
Bakery and sweets	48537	50987	7%	8008.3	9575	1%	0.165	0.188
Alcohol and beverages	31829	29926	4%	16193	16654	2%	0.509	0.557
Tobacco products	66744	61806	9%	19592	20269	3%	0.294	0.328
Other retail stores	88724	76331	13%	11615	15187	2%	0.131	0.199
Total	709509	642279	100%	665652	783290	100%	0.938	1.220
EU-15 in% EU 25	**82%**	**82%**		**95%**	**95%**			

In the Baltic States, Germany, Luxembourg and Slovenia, the share of supermarkets in the total turnover is relatively high. This level is as high as in the US for food stores, which had a share of 95% in 2000 (Harris et al., 2002). The average turnover over all retailers, specialised and non-specialised, is relatively low in the Baltic States, Poland and Portugal as well as in the Mediterranean countries like Spain and Italy. Luxembourg has the highest turnover per retailer.

As for the wholesaler, the purchase of goods which are resold has a high share in the turnover. The gross margins are around 22% of the turnover. So 78% is spent on the purchase of goods. The gross margin is slightly higher than for the wholesalers.

Most specialised and non-specialised retailers are small and have fewer than 10 employees. Over 70% of the turnover is achieved in this size class for the specialised retailers (figure 2.9). The specialised retailers with more than 50 employees count for 0.1% of the number businesses and for 13% of the turnover. These differences are even more extreme for non-specialised retailers: the enterprises with 250 employees or more are 0.2% of the enterprises and count for 71.2% of the turnover of these retailers. In 1999 this group had the same share in the number of companies, but a 66.7% share in the turnover. This indicates the growing importance and market power of the large non-specialised retailers

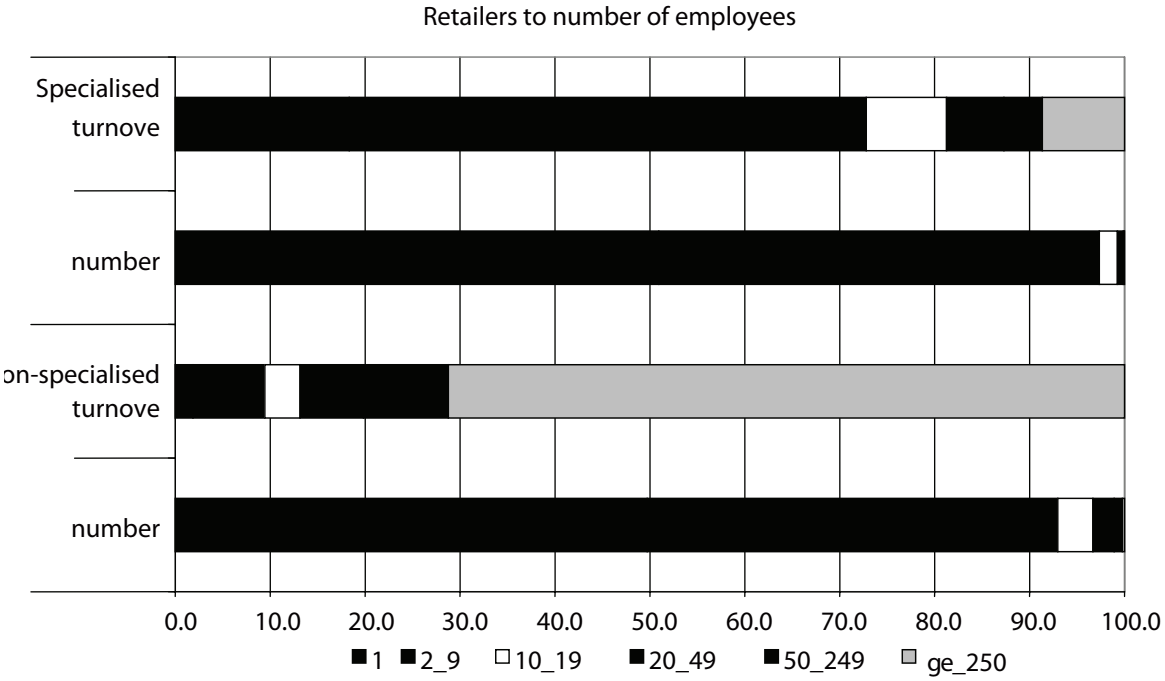
Table 2.12 Turnover and share of non-specialised and specialised retailer (including other retail in non-specialised stores: nace 52.21)

	Turnover total (million euros)	Turnover/ enterprise million euro)	Non-specialised stores with food predominating (% of total)	Specialised stores (% of total)
Nace code			**g5211**	**g522**
Belgium	25841	1.527	86	14
Denmark	13465	2.097	90	10
Germany	133932	2.518	89	11
Estonia	1172	0.851	94	6
Spain	75603	0.475	71	29
France	186214	2.359	93	7
Ireland	10681	1.654	88	12

	Turnover total (million euros)	Turnover/ enterprise million euro)	Non-specialised stores with food predominating (% of total)	Specialised stores (% of total)
Italy	98438	0.556	82	18
Cyprus	1120	0.317	79	21
Latvia	1225	0.478	97	3
Lithuania	1954	0.440	98	2
Luxembourg	2378	4.955	94	6
Malta	473	0.234	57	43
Netherlands	28785	2.212	83	17
Austria	17031	1.872	79	21
Poland	21155	0.189	78	22
Portugal	14259	0.315	80	20
Slovenia	3009	1.652	94	6
Slovakia	1407	2.842	86	14
Sweden	20960	1.659	82	18
United Kingdom	155704	2.452	89	11
Total	**828588**	**1.057**	**86**	**14**

Source: Eurostat SBS.

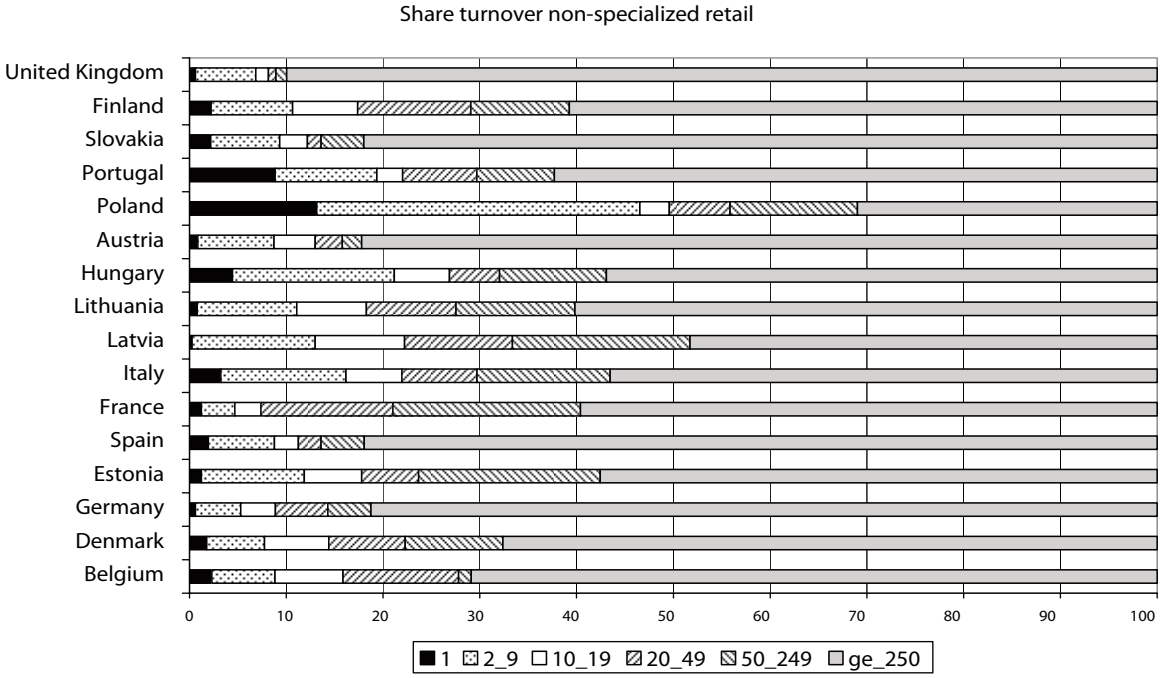
Figure 2.9 Distribution of the retailers in the EU-25 according to the number of employees



In almost all EU countries the largest non-specialised retailers have a small share in the number of companies but more than 50% share in the turnover. The share in the United Kingdom is even 90%. Poland is the lowest with 31%. Germany, Spain, Austria and Slovakia all have around 80%.

The concentration rate in most European countries is high (table 2.13). Italy and Greece as well as t the UK have a relatively low level. Greece and Italy as well as Spain are catching up with the

Figure 2.10 Distribution over number of employees per enterprise in 2003.



European level. Remarkable is the development in the UK: a decline in the concentration rate. Most countries show a further increase of the market share of the top 5 supermarkets in the countries. This development supports the opinion of Rabobank (2001) that 10 to 15 supermarkets chains will dominate the European retail playing field in the near future. The consolidations of the retailers are outpacing those of food processors. During 1996-2001, the sales of the top 10 retailers grew by 59% while those of food companies dropped by 12%. Retailers can use their buying power and puts the food processors under pressure (Rabobank, 2004).

Table 2.13 Market share of top 5 supermarkets

Country	1993	1996	2000	2004
Austria	54	59	68	76
Belgium	60	62	66	77
Denmark	54	59	76	76
Germany	45	45	61	65
France	48	51	61	69
Greece	11	28	38	46
Ireland	62	64	54	79
Italy	11	12	25	41
Netherlands	52	50	68	66
Portugal	36	56	52	68
Spain	22	32	50	79
UK	70	73	80 a)	54
US		26	38	

a) 1999 data
Source: Bush and Bain, 2004; Planet Retail 2004 data.

The internationalisation of the retailers is shown in table 2.14. The top 25 includes 15 EU companies: most are not only active in several European countries but also on several continents. The sales of these companies are many times higher than the average turnover of 3.1 million Euros

as mentioned in table 2.10. The sales of Wal-Mart are far ahead of those of number 2 Carrefour: sales are more than 3 times higher. After number 2, sales decrease slowly: number ten has half the sales of number 2. The average sales per store also differ considerably. Some companies have considerably more stores with the same level of sales: compare the number of stores of number 13 (Edeka, 19,000 stores) with number 12 (Auchan, 2,686 stores) or 14 (Albertson, 2,541 stores) with all sales of approximately 44 billion USD. The table shows that several European companies like Ahold, Aldi, Tengelman and Casino are active in the US. But several US companies also have branches in Europe, including Wal-Mart and Costco.

Table 2.14 The top-25 retailers worldwide in 2005

Rank	Company	Head-quarters	Sales in Billions	No. of Stores	Countries of Operation
1	Wal-Mart Stores	US	$312.40	6,380	Argentina, Brazil, Canada, China, Costa Rica, El Salvador, Germany, Guatemala, Honduras, Japan, South Korea, Mexico, Nicaragua, Puerto Rico, United Kingdom, US
2	Carréfour	France	$92.6	12,179	Argentina, Bahrain, Belgium, Brazil, China, Colombia, Cyprus, Czech Republic, Dominican Republic, Egypt, France, French Polynesia, Greece, Guadeloupe, Indonesia, Italy, Malaysia, Martinique, New Caledonia, Oman, Poland, Portugal, Qatar, Reunion, Romania, Saudi Arabia, Singapore, Slovakia, Spain, South Korea, Switzerland, Taiwan, Thailand, Tunisia, Turkey, United Arab Emirates
3	Tesco	US	$69.6	2,365	China, Czech Republic, France, Hungary, Ireland, Japan, South Korea, Malaysia, Poland, Slovakia, Taiwan, Thailand, Turkey, United Kingdom
4	Metro Group	Germany	$69.3	2,458	Austria, Belgium, Bulgaria, China, Croatia, Czech Republic, Denmark, France, Germany, Greece, Hungary, India, Italy, Japan, Moldova, Morocco, Netherlands, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Slovakia, Spain, Turkey, United Kingdom, Vietnam
5	Kroger	US	$60.6	3,726	United States
6	Ahold	Nether-lands	$55.3	6,422	Czech Republic, Denmark, Estonia, Latvia, Lithuania, Netherlands, Norway, Poland, Slovakia, Sweden, United States
7	Costco	US	$52.9	460	Canada, Japan, South Korea, Mexico, Puerto Rico, Taiwan, United Kingdom, US
8	Rewe	Germany	$51.8	11,242	Austria, Bulgaria, Croatia, Czech Republic, France, Germany, Hungary, Italy, Poland, Romania, Russia, Slovakia, Switzerland, Ukraine
9	Schwarz Group	Germany	$45.8	7,299	Austria, Belgium, Croatia, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Spain, Sweden, United Kingdom
10	Aldi	Germany	$45.0	7,788	Australia, Austria, Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, Slovenia, Spain, Switzerland, United Kingdom, US
11	Walgreens	US	$42.2	4,953	Puerto Rico, US
12	Auchan	France	$41.8	2,686	Angola, China, France, Hungary, Italy, Luxembourg, Morocco, Poland, Portugal, Russia, Spain, Taiwan
13	Edeka	Germany	$41.3e	19,001	Austria, Czech Republic, Denmark, Germany, Russia

Rank	Company	Head-quarters	Sales in Billions	No. of Stores	Countries of Operation
14	Albertsons	US	$40.4	2,541	US
15	AEON	Japan	$40.2	10,132	Canada, China, Hong Kong, Japan, South Korea, Malaysia, Philippines, Taiwan, Thailand, United Kingdom, US
16	Safeway (US)	US	$38.4	1,914	Canada, Mexico, US
17	ITM (Inter-marché)	France	$37.7	3,932	Belgium, Bosnia and Herzegovina, France, Poland, Portugal, Romania, Spain, Serbia and Montenegro
18	Leclerc	France	$35.4	581	France, Italy, Poland, Portugal, Slovenia, Spain
19	7-Eleven stores	Japan	$35.3	21,136	Australia, Canada, China, Denmark, Guam, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Mexico, Norway, Puerto Rico, Singapore, Sweden, Taiwan, Thailand, Turkey, US
20	Tengel-mann	Germany	$29.8	7,730	Austria, Bosnia and Herzegovina, Czech Republic, Germany, Hungary, Italy, Poland, Portugal, Romania, Russia, Slovenia, Spain, Switzerland, US
21	Sainsbury	U.K.	$29.2	808	United Kingdom
22	Casino	France	$28.3	9,388	Argentina, Bahrain, Belgium, Benin, Brazil, Cameroon, Colombia, Comoros, France, Guadeloupe, Latvia, Lithuania, Lebanon, Madagascar, Martinique, Mauritius, Mexico, Morocco, Netherlands, New Caledonia, Poland, Reunion, Saudi Arabia, Switzerland, Taiwan, Thailand, Togo, Tunisia, United Arab Emirates, Uruguay, US, Venezuela, Vietnam
23	Wool-worths (AUS)	Australia	$28.0	2,744	Australia, New Zealand
24	Coles Myer	Australia	$27.9	2,775	Australia, New Zealand
25	Delhaize Group	Belgium	$23.1	2,637	Belgium, Czech Republic, Germany, Greece, Indonesia, Luxembourg, Romania, US

Source: M+M Planet Retail, www.planetretail.net; SN research.
Retrieved on 31-7-2006 from http://www.supermarketnews.com/sntop25.htm

Supermarkets are shown to be important outlets for consumers to buy food. The development indicates a further growth in the importance of supermarkets at the cost of specialised retailers. In section 2.3 the changing lifestyle of Europeans consumers is highlighted. Cap Gemini, Ernst and Young conducted a survey on the impact of the changing lifestyle on the supermarket format (CGEY, 2002). They discovered 5 key attributes of commercial transactions. A survey of 6000 European consumers in 9 Western European countries valued these aspects. These aspects are summarised in table 2.15 and compared to the US. Important are human values. Consumers demand honesty, respect, dignity, consistency and fairness. Consumers will respond to retailers that reflect these values. The importance of most factors is similar in both Europe and the US. In general, US consumers are more outspoken in declaring that a factor is 'extremely important'.

Despite the high unanimity, consumers in different countries value the key attributes differently. Consumers in Germany are highly sensitive to price and access, which explains the high market share of discounters (one third) and hypermarkets (one quarter). The fact that prices are important for the German customer was experienced by Wal-Mart, which entered the German market in 1997. Wal-Mart failed to achieve price leadership in Germany and did not achieve positive profits (Gerhard and Hahn, 2005). Mid 2006 Wal-Mart decided to withdraw from the German market. Lowering the prices requires a larger scale to reach economies of scale.

Table 2.15 Top 3 aspects (% saying extremely important) for retail choice by consumers.

Attribute	Factor	Europe	US
Price	Feeling that the price is honest and not artificially high	58%	64%
	During sales, you save significant money on your sales		57%
	Prices do not fluctuate from day to day	54%	
	You feel you get the lowest price available	38%	54%
Product	The retailer provides consistently good quality	67%	70%
	The retailer carries a wide assortment	50%	58%
	The retailer offers top quality	48%	59%
Service	You can unconditionally return merchandise	60%	69%
	Returning merchandise is hassle free	56%	64%
	Employees can answer your questions about their products	57%	
	Staff effectively bags your items against damage		64%
Access	The store is clean and well maintained	71%	69%
	The price is visible and well marked	64%	68%
	The retailer provides excellent disabled access	57%	
	The store has convenient hours (able to shop when you want)		60%
Experience	Employees are courteous and respectful	69%	73%
	Staff responds to concerns in a positive manner	54%	61%
	You are treated as a valued customer	51%	61%

Source: CGEY, 2002.

Consumers in the UK are sensitive for product and service. Service supermarkets have a market share of over 50% and aspects of food safety, social and environmental responsibility are important production characteristics. French consumers focus on the attribute access; hypermarkets also have the largest market share of over 50%. These supermarket formats characterise in fact the range of possibilities. Colla (2004) describes the expected developments in the supermarket chains. He expects that the French supermarket format will dominate the southern European countries. Price and access have a high sensitivity in both Spain and Italy. The French supermarkets reflect the attribute sensitivity. Several German supermarkets in the top 25 are also based in Italy and Spain, which reflects the price attribute. The northern European countries will have a combination of service supermarkets and discounters according to Colla. Central and Eastern European Countries (CEEC) are in a rapid transition and in the process of consolidation to modern western supermarkets. Inflows from foreign direct investments by retail chains enhanced the large retail format in these countries. The transition at retail level will have a huge impact on the supply chain. The producers need to meet the quality standards at the level of Western European countries, which requires huge efforts. Secondly, farmers markets in CEEC need to be substituted by wholesalers, who have enough capacity to be responsive enough for retailer with a western governance structure (Dries et al., 2004).

Private labels and bargaining power of the supermarkets

Retailers are successfully differentiated, as mentioned before, in different service and price levels. Private labels support this differentiation and enhanced store loyalty. The image of private labels has changed from low quality product to substitutes of global brands. Retailers focussed on upgrading the quality and image of their private labels and lowering the marketing costs. The market share of private labels in the US is only 20% of the sales, but they are growing twice as fast as manufacturer brands.

It is expected that private label food and groceries will account for more than a quarter of the market across Europe within four years. Healthy eating, premium value and lifestyle has helped retailers to strengthen own brands (Foodnavigator, 2006).

Table 2.16 Market size and penetration level of private labels

Market	Private Label Market (billion euro)	Private Label Penetration
United Kingdom	72.1	40%
Germany	63.6	35%
France	59.0	26%
Spain	25.6	26%
Italy	16.1	11%
Switzerland	12.9	44%
Netherlands	9.5	25%
Belgium	9.2	24%
Sweden	4.1	16%
Republic of Ireland	3.7	27%

Source: IGD estimates (Foodnavigator, 2006)

According to Rabobank (2004), the key success factors of private labels are:
- private labels are more profitable than brands. In the US the net margins on private labels are around 23% but only around 16% on branded products;
- the quality of the private label products competes strongly with the branded products or even exceeding the branded quality;
- labelling and packaging resemble branded products, within the legal possibilities;
- private label products are cheaper, usually 10 to 20% and sometimes even higher;
- in cases of little product-differentiation, they can establish high market shares.

The market share of private labels is higher in mature markets, such as in descending order the UK, Germany, Belgium, Spain, France, the Netherlands or the US. The market share of private labels ranges from 16% in US to 32% in the UK. In emerging markets like Brazil, Mexico, Poland or Greece, the market shares are below 5%.

The bargaining power of the retailers increases due to consolidations at international level and the growing importance of private or store labels. Consumer loyalty is shifting from branded products to store formats. The retailers have alternative resources for producing private labels and they can negotiate favourable prices due to large volumes. There is still a great deal of reluctance to cooperate and share information between retailers and food industry. The opportunities of collaboration identified in the introductory section are therefore just partially exploited.

2.4.4 Food services

Food services constitute another food outlet for consumers. Their share increased in recent decades as illustrated by the developments in the US. In the sixties, approximately 30% of food expenditure was out-of-home, in the seventies it was 40% and by the end of the nineties 45%. Consumers spent almost as much money on food out-of-home as at home. Retailers are fiercely competing with food service companies (Harris et al., 2002). In 1999 the share of out-of-home in Europe was almost one third. The share of at home consumption is decreasing, but has not yet reached the level of the US (figure 2.11).

The food service distinguishes two main segments. Within the commercial segment, there are fast-food outlets, restaurants or cafeterias. Non-commercial food services include schools, hospitals or business caterers. In the US, the market share of commercial food services is around 82%. Fast food outlets accounted for 50% of separate eating places and 42% of spending on commercial food services. Second are restaurants and lunchrooms with a share in the sales of 38%. The European out-of-home tradition is not yet as strongly related to fast food outlets which will result in different shares. The non-commercial food services are mainly involved in hospital and

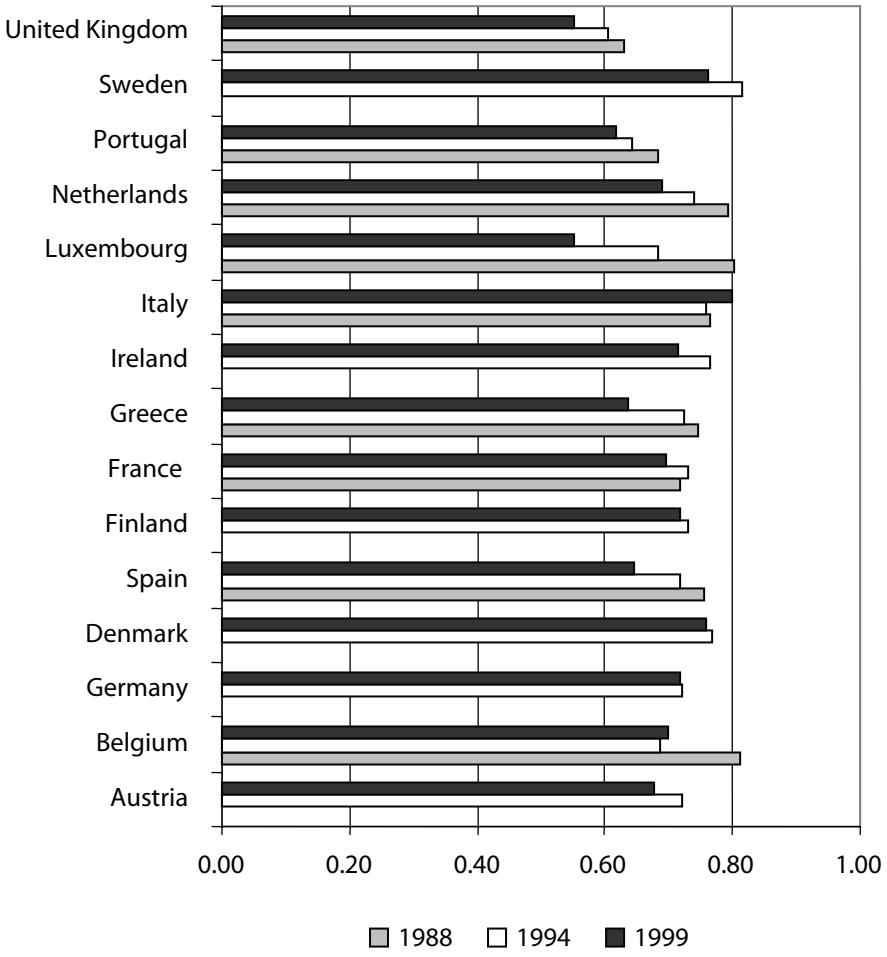
care facilities with a share of 15%; correctional facilities are second (share 11%) and third is business catering with a share of 9% in total for non-commercial expenditure.

European data is hard to find. Eurostat provides data for Italy and Germany, where catering has a share of 3 and 10% respectively. Traditionally companies in Germany serve hot meals at lunchtime. Data from the Netherlands reveals a share of catering and canteens of 14% (www.bedrhoreca.nl). This data shows that catering is less important in Europe than in the US. The Dutch data also shows that fast food outlets have a share of approximately 17% of the commercial food services. Providing drinks is even more important (share of 24%) in 2003. EU catering is dominated by business and in-flight catering which account for 53% of the annual contracted catering turnover. Health and welfare accounts for 24% and education 20% (Ferco, 2005).

The number of restaurants, bars, canteens and caterers are 1.3 million in EU-25 and 1.1 in the EU-15, with on average 5 employees. The southern European countries and France have a fairly large share. In 2003 the turnover was €260 in the EU-25 and €245 in the EU-15. Between 1999 and 2003, the number of enterprises in the EU-15 grew by 1% and the sales by 5.5%. The personnel costs in the EU account for 25% of the turnover.

The catering industry is highly concentrated. The British Compass (29%) and the French Sodexho together have 50% of the European market with a wide geographical coverage. The top 10 covers 75% of the market (Ferco, 2005).

Figure 2.11 Share of food expenditure (%) of total at home



How important is the food service channel for the food industry compared to the retailers? Figures based on Dutch restaurants reveal that the personnel costs are between 25-28% of the

turnover. This is identical to the range provided by Eurostat data. The purchase costs of food and drinks account for 28 to 32% of the turnover. The sales of food services of €260 billion are approximately one third of consumer expenditure on food (see figure 2.11). Retailers therefore sell approximately €520 billion. This is lower then the €783 billion sales of the retailers (table 2.11), due to non-food items in these retail shops. The share of food retailers as a customer of the food industry is less than one third. Food services buy 30% of €245 billion, i.e. €74 billion, on goods. The retailers spend approximately 78% of their sales on purchasing goods: or 78% of €520 billion, i.e. over €400 billion. This means that the retailers are over 5 times as important as the food services for the sales of the food industry. This is quite apart from the fact that consumers spend twice as much at the retailer as at the food service.

2.5 EU Common Agricultural Policy and WTO trade agreements

2.5.1 Introduction

EU agriculture and the 'agro-complex' are greatly influenced by international policy developments. This section looks at the Common Agricultural Policy (CAP), established after World War II that kept EU prices stable and above world market levels, and multilateral trade agreements made within the framework of GATT/WTO since 1994[3]. These agreements have important consequences for the way in which the EU will need to reform its agricultural policy.

2.5.2 EU agricultural policy

To see the CAP of today in perspective, we have to understand its history and the context in which it was created. In legal terms, that history goes back to the Treaty of Rome - the founding document of what has become the European Union, signed in 1957 by France, West Germany, Italy, the Netherlands, Belgium and Luxembourg. Among other objectives, the Treaty sets out that agricultural policy in the signatory countries should aim at:

- increasing agricultural productivity;
- ensuring a secure food supply at reasonable prices; and
- providing the agricultural community a fair income.

These aims were to be achieved through a free internal market with stable high domestic prices. The insulation of EU markets from world markets can only be achieved by restricting imports. In the past, the main instruments for achieving this goal were variable import levies that bridge the gap between fluctuating world prices and fixed domestic prices. In addition, variable export subsidies were used to enable excess supplies to be disposed of on world markets, and intervention purchases are used to remove further excess supplies from the internal market.

However, this system of high internal prices led to overproduction and the associated level of public spending became a problem. The EU had to respond to these problems on several occasions in the last two decades of the 20th century. In the eighties, production quotas for milk were established. The so-called Mac Sharry reform in 1992 was the first reform that demonstrated the shift from market price support to income support of the CAP. Intervention (minimum guaranteed) prices for wheat and beef were reduced by 30% and 15% respectively (see table 2.17). Farmers were partly compensated by area and animal premiums. These area premiums are less trade distorting than market price support and are more effective in achieving income effects (OECD, 2001). Furthermore, setting aside of arable land was introduced to reduce production.

[3] GATT = General Agreement on Tariffs and Trade; WTO = World Trade Organisation, the successor to GATT as of 1995.

Table 2.17 EU decisions and world market prices.

Product	MacSharry price reduction (1993-1996)	Agenda 2000 price reduction (2000-2002)	Mid Term Review price reduction (2004-2007)	EU price 2004 (€ per tonne)	World market price (€ per tonne)
Wheat	30%	15%	0%	100	100 d)
Beef	15%	20%	0%	1,560 b)	1,500- 2,000 e)
Butter Skimmed milk powder	0	0	25% 15%	2,464 as at 1/7/2007 c) 1,747 as at 1/7/2006 c)	1,400 d) 1,700 d)
Sugar	0	0	36% a)	632; 404 in 2009/2010	250 f)

Source: Silvis and de Bont (2006)
a) Decision in February 2006. The market price in the EU was almost €700 in Spring 2006; b) Intervention price; basic price in the EU regulations was €2,224; the European market price in 2004 was approx. €2,800 per tonne of carcass; c) Intervention price set by decisions taken in 2003; d) Expectations of the European CIE and OECD are given in dollars; in € depending on the exchange rate (currently approximately €/$: 1.3/1); e) FAO; Annual Averages, Beef (Australian, cow beef, boneless, cif, US) Year 2003 US$/tonne 2,110; f) The average export price of white EU sugar was €223 per tonne in 2002/03 and €280 in 2001/02.

The Agenda 2000 reforms continued along the same lines as the Mac Sharry reforms with reductions in the intervention prices for wheat and beef (see table 2.17). These reforms were prompted by the following factors: the proposed enlargement of the EU to include Central and Eastern European Countries (CEECs) and the anticipation of a new WTO round.

The recent CAP reform (Mid Term Review) of 2003 in particular reduced the intervention prices of dairy products (see table 2.17). Income supplements were again used in order to compensate the reduction in the guaranteed prices. Up until the Mid Term Review decisions, these were linked with the number of hectares used for cereals, oilseeds and protein crops and the number of beef and sheep livestock kept. Partly due to advance at the WTO, the compensatory payments were further 'decoupled' from production by the introduction of a single farm payment (SFP), replacing most of the existing premiums under different common market organisations. Farmers will be allotted payment entitlements based on historical reference amounts received during the period 2000-02. The wide range of options for implementing the SFP in the Member States illustrates the importance of national decisions for the impact of the reform on agriculture. The different implementations will tie the payments to a varying degree to the factor markets, in particular the land market. This might have long-term effects on the adjustment of agriculture and its competitiveness in the EU.

In February 2006 EU agricultural ministers formally adopted a reform of the EU sugar policy. This reform brings the market regime - which includes production quota at national levels and relatively high support prices from the outset in the sixties - into line with the rest of the reformed CAP. This year, the Commission is working on proposals to reform the common market organisations of fruit and vegetables and wine.

Still after all these reforms the ratio between the current European prices and the world market prices varies greatly per product (see table 2.17). For grain, the EU is already competing at world market price level. Generally speaking, this means that exports without refunds are possible. For beef, the current internal EU prices are higher than the world market price. A direct comparison is difficult in view of the differences in quality. Incidentally, the EU's self-sufficiency for beef has fallen below 100%, due to the decline in the number of dairy cattle (due to milk quotas). The decoupling of the beef premiums could result in a further reduction in production. The internal butter price is currently still too high for exports without refunds to be possible; the difference

between internal and world market prices is smaller for skimmed milk powder. For sugar, the proposed price reduction by no means ensures a bridging of the difference with the world market. Account must be taken of the interests of imports from developing countries (EBA, ACP) and the Balkan region in the context of preferential trade agreements, as well as the isoglucose scheme (a grain-based sugar substitute).

Further reforms to come?
The reform process since 1992 has shown an increasing reduction of price support to production in favour of less and minimal trade distorting forms of income support. European agriculture significantly improved its competitiveness vis-à-vis world markets in a number of products.

While the reform process brought about a significant reduction of export refunds and public intervention compared to the earlier years of the CAP, there are still a number of markets which rely on these forms of support. Import tariffs still play an important role in supporting agricultural prices. A new WTO agreement which foresees phasing out of export refunds, a reduction of import tariffs and increasing market access might well lead to necessary adjustments of a number of market organisations particularly with regard to dairy and sugar. However, internal pressures within the EU may also result in further policy adjustments. Budgetary constraints and a general discussion on how to spend public money to strengthen the EU's competitive position in the world (e.g. Lisbon Strategy) are important aspects in this context.

2.5.3 Trade agreements in the framework of GATT/WTO

With the 1994 Uruguay Round Agreement on Agriculture (URAA), domestic farm policies have become subject to international governance through the GATT (Josling and Tangermann, 1999). The set of rules established under the GATT limits the scope for domestic agricultural and trade policies. Specifically, the agreement has implications in three areas: market access, export competition and domestic support. Ultimately a number of agreements were reached, including a reduction of import tariffs by an average of 36% and a reduction of export subsidies, both in terms of quantity (-21%) and in terms of subsidy budget (-36%). Furthermore, internal support was reduced (through the AMS formula), in particular through less product-linked, trade-distorting support (in the so-called yellow or amber box).[4]

These agreements have been implemented since 1995. Of these, the constraints on the value of export subsidy expenditure and on the volume of subsidised exports have turned out to be the most pressing (Weyerbrock, 1998, Swinbank, 1999, Meijl and Tongeren, 2002). Binding constraints on export subsidies imply that insulation of EU markets from world markets is more difficult because some excess supply cannot be disposed of on world markets at reduced prices. The reduction of intervention prices under the Mac Sharry, Agenda 2000 and Mid Term Review reforms allows the EU to meet the export constraints more easily.

Expectations of the Doha round
In Uruguay it was agreed that negotiations on further liberalisation would take place immediately after the implementation period. The Millennium Round faced a long series of launch delays and a spectacular launch failure in Seattle in 1999. Eventually the talks did take off in 2001 in Doha. The discussions in this so-called Doha Development Round turned out to be very complex, concerning a great diversity of topics, and the number of participating countries has grown to approximately 150. Moreover, more countries are grouping together, such as the 'rising' countries (the G20 including China, Brazil and India) and the smaller developing countries (G90). This means that the US and the EU no longer have the same level of control. The hope that agreements could be reached in 2006 faded when WTO members failed to reach a meaningful compromise and the talks were suspended in July. Despite the current breakdown of the nego-

[4] Decoupled support as well as, for instance, for education, research and quality policy (the green box) is exempt. Income payments (the blue box), such as the European Mac Sharry payments, are exempt for the time being on the condition that production is limited (by means of fallow land and quotas etc.).

tiations, talks on trade liberalisation may be expected to resume following the general consensus that trade liberalisation will lead to increased overall economic welfare in the world.

In the field of agriculture, the focal points are once again export support, internal support and market access. With regard to export support, the aim appears to be complete dismantlement. The EU submitted proposals in this regard back in 2004, albeit under the express condition that the US also gave up its export credit programmes. The Hong Kong ministerial meeting in December 2005 agreed on the phase out of all export subsidies and disciplines are introduced on other export competition practises to ensure parallel elimination of all forms of export subsidies and disciplines on export measures with equivalent effects. This should be completed by the end of 2013.

There also appears to be a need to radically reduce internal support, at least insofar as such support distorts trade. The EU considers that its farm payments introduced in 2003 are in compliance with the green box rules for decoupled income support. However, Swinbank and Tranter (2005) suggested that the EU's new SFP may not fit within the green box of the existing URAA. First, land on which fruit and vegetables are grown cannot be used to claim an SFP payment, suggesting that payment is linked to production. Secondly, payments are directly related to farmland kept in good agricultural and environmental condition.

Market access will be increased through the further dismantlement of import tariffs, for example. The extent of tariff reduction (speed and period) will partly depend on the agreements on non-agricultural products. The impact of the tariff reduction on production and trade depends on the formulas/modalities to be chosen. With regard to the future development of EU agriculture and rural areas, the market access agreement will be crucial. Besides tariffs, the conditions that countries impose on each other are important, for example in the field of food safety and animal/plant diseases. The so-called SPS agreement[5] was entered into this framework. The essence of this agreement is that trade restrictions must be based on objective scientific principles and that the aim should be international harmonisation of the rules in this area. An important role in this is assigned to the so-called standard setting bodies like the Codex Alimentarius (Codex) for the protection of public health, the International Plant Protection Convention (IPPC) for products with plant-based origins and the Organisation for Animal Health (OIE) for animal products (Meester et al., 2005).

2.6 Impact Enterprise Policy on the food industry

Porter (1985) mentioned in his diamond the environment as one of the competitiveness determinants. The government policy as well as the access to production factors (e.g. capital, labour) is important. This chapter is to highlight some important issues in this respect. These elements are aiming at the threats and opportunities for the food industry. Since the launch of the Lisbon strategy in 2000 the EU publish annually the Enterprise scoreboard (EU, 2004). In this report the EU-25 countries are benchmarked against each other and against the United States (important food exporter) and Japan (less important food exporter). In this survey important food producers like Australia, Brazil or Canada are not (always) analyzed. This means that the benchmark of the EU is restricted to the US. The information enables furthermore a benchmark EU countries compared to the US. The countries which perform better are indicated as stronger and the countries which perform worse are indicated as weakest. This section summarizes some important findings of the EU report 'Benchmarking enterprise policy' (EU, 2004).

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[5] Sanitary and Phytosanitary (SPS). This covers the fields of food safety, animal health, plant diseases and infestations. The following are also of importance:
- technical Barriers to Trade (TBT). This comprise matters like technical specifications (labels, packaging etc.) that could obstruct free trade;
- trade-Related Intellectual Property Rights (TRIPs). This agreement was designed to protect intellectual property rights. An example for the plant-based sector is UPOV (*Union International pour la Protection des obtentions Végétales*).

Access to finance

Borrowing is a dominant source of financing SMEs, access to lending markets is therefore very important. It turns out that the EU is weaker in this respect than the United States. The strong countries combine consistently good performance in high availability of credit information, a legal environment that facilitates the expansion of credit and low costs for creating and registering collateral. 'With regard to bank credit, Germany, the UK, Ireland Austria and Slovenia provide a favourable and low cost environment; at the opposite end are Greece, Portugal and Italy' (EU, 2004, p7).

Regulatory and administrative environment

Improving the Regulatory and administrative environment continues to be a policy priority. A quantitative assessment of the impact of the administrative burdens has not yet been possible, which restricts benchmarking with the US. However there is strong evidence that administrative burdens can be significant and that they fall disproportionately upon small enterprises. The e-government maturity takes into account the total number of services for which the national government is responsible that are online (breadth), the level of completeness (depth) and customer (user) relationship. The US (index 68) performs better than all European countries and Canada (80) performs even better than the US. The best performing European countries are approximately 10 points lower on the index the US.

Taxation

The tax system affects the start-up or growth of an enterprise, the propensity to invest and location decisions. In the EU report (2004), no benchmark with non-EU countries is available. In the EU-15, 'top all-in statutory corporate tax rates have converged in the period 1995-2004, with the exception of Ireland which has drastically reduced its rate to the lowest level of all the 25 member states. A second indicator, the implicit tax rate on corporate income, reflects the effective tax burden for corporations in the past and takes all features of the tax system into account. Between 1995-1998 and 1999-2002, the implicit corporate tax rate increased. The increases were highest in the UK and Sweden, where the implicit rates were also highest at around 30%. Italy had the lowest implicit corporate tax rate at about 16%. It only decreased in Denmark, to about 20%. A third indicator is the implicit tax rate on labour. In 2002, it was highest in Sweden, Finland, and Belgium and the EU-15 average was 36%. Changes between 1995 and 2002 did not exceed 4 percentage points; reductions were highest in Ireland and the Netherlands and increases were highest in Greece, Italy and Portugal; the EU average implicit tax rate on labour decreased by about one percentage point during this period. Section 4.10 shows that Ireland and the Netherlands have relatively the highest growth of the labour productivity in the period 1999-2003.

Open and well-functioning markets

The existence of open and well-functioning markets is crucial for the growth of enterprises. Results show that the share of international transactions in each Member State's GDP (trade integration) in 2003 generally remained at the same level as in the previous year. Foreign direct investment declined in most Member States in the post-2000 period. Convergence of price levels in the EU-25 takes place at a slow rate and is mainly driven by increasing prices in many of the low-price countries such as Hungary or Estonia and reducing prices in Sweden. However, in high-price countries like Denmark, Finland and Ireland there has been no sign of a downward realignment. Trans-border public procurement has been increasing since 1996, but remains less than 3% of total public procurement in the EU-15.

Entrepreneurship

The European agenda for entrepreneurship aims at improving the attitude towards self-employment, increasing the number of entrepreneurs and stimulating the growth of existing enterprises. In 2003, the rate of self-employment in the EU-25 remained generally unchanged compared to the previous year at about 13% of the civilian labour force. Sluggish economic growth has taken its toll on people's willingness to consider entrepreneurship as an occupational option. Since 2000, the propensity to self-employment has continuously declined in the EU-15. Nevertheless, the actual gross birth rates of enterprises in the EU and the US differ by only two percent-

age points. Due to a comparatively larger percentage of enterprise deaths in the US, the EU even recorded a higher net change in number of enterprises.

Human capital

The availability of human capital is a crucial factor in the competitiveness of enterprises. Europe has been making progress towards the target that 85% of all 22 year olds to have completed upper secondary education: in 2002, the EU-25 reached 76.7%. Relative to the US, tertiary graduates constitute a considerably smaller proportion of the population and of the labour force in Europe; however data for 2002 shows that the EU average is increasing steadily. Five Member States, i.e. Poland, UK, Ireland, France and Lithuania, have an even higher number of tertiary graduates relative to the relevant age group than the US. In general, the number of science and technology graduates (relative to 20-29 year olds) in the Member States follows a positive trend.

Innovation and knowledge diffusion

Innovation and knowledge diffusion are keys to improving competitiveness. Innovations are almost invariably based on research and development both for radical and for less radical innovations. R&D expenditure as a percentage of GDP in EU-25 did not increase in 2001 or in 2002. The EU-25 continues to lag behind the US, but Sweden and Finland remain the top performers internationally, followed by Japan and the US. Business expenditure on R&D as a percentage of GDP also remained at previous levels and amounts to 1.17% in the EU-25. In the EU as well as in the US the number of patent applications declined in 2002, for the first time after continuous increases since 1996. This also occurred in high tech patents which remained markedly lower in the EU than in the US. A particular concern is technology transfer from science to enterprises. Preliminary data in this area suggests that this function should be strengthened within public research organisations and that there is room for improving the efficiency of technology transfer institutions.

ICT

The impact of ICT on productivity growth in recent years has been decisive. The use of ICT represents a modernisation measure by enterprises, and the EU's underperformance in productivity growth reflects in part weakness in the pace of such modernisation compared to the US. Enterprise Internet access has risen markedly across the Member States; in 13 Member States of the EU-15 the penetration rate is over 80%. Electronic commerce is growing but, with the exception of Ireland which reported a remarkable increase in 2003 to 10% of turnover, it still has only minor importance, with most businesses buying rather than selling on-line.

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3. EU food legislation as perceived by industry

Bernd van der Meulen and Harry Bremmers

3.1 Key findings

The findings of this research are surprisingly positive for the system of EU food legislation in general. It is not considered to be a major factor hampering competitiveness. Nor is the EU system seen as inferior to the US system.

Criticism focuses on details. Quite a few improvements could be made. Improvements would be welcomed in stability, clarity and accessibility of both legislation and authorities. The biggest burdens for SMEs are experienced in food hygiene and labelling legislation.

Pre-market approval procedures are for the happy few. Due to the costs and time involved, it is very hard for a regular food business to bring a new additive, novel food, GMO or health claim to the market. For those who are in a position to follow such a procedure, it is not always clear precisely which procedure applies, what requirements must be met, how long the procedure will take and if a favourable outcome may be expected.

A pro-active role of EU and national authorities in assisting companies to negotiate EU procedures and to comply with legal requirements would be most welcome. On the global market, EU authorities can increase their support for the European industry by engaging in export negotiations and by recognising scientific assessments performed under the jurisdiction of well-equipped foreign authorities.

Very recently the European Commission undertook to reduce administrative costs by 25%. To achieve this ambition, audacious and radical steps are called for. Improvements are possible in the EU system of legislation as such and in EU food legislation in particular.

3.2 Introduction

As the economic parts of this study show, competitiveness of the food industry in the European Union is under pressure compared to other sectors in the EU and the food industry elsewhere in the world, in particular the US. We address the question whether the legal framework (1) provokes additional costs (and benefits) to businesses[6] in the European Union and/or (2) influences the market responsiveness (and especially the innovativeness) of these businesses, and (3) can be improved to enhance competitiveness.

Problem statement
This part of the study focuses on an assessment of the quality, utility and burden of the existing European legislative framework i.e. food legislation in terms of food industry competitiveness. Does the EU regulatory framework on food affect costs and benefits, as well as market responsiveness (innovativeness) of businesses in the EU?

EU Food legislation has developed tremendously over the last 15 years to respond to growing concerns as regard food safety, consumer information and the functioning of the internal market, whereas the effects of the changes are carried by the European businesses (administrative burdens, additional investments etc.). So far there has been little understanding with respect to additional costs and benefits and effects on the market responsiveness of businesses, especially SMEs.

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6 We refer to the players in the field as 'businesses' or 'companies'. Also the abbreviation FBOs is used referring to 'food business operators', the official term used in EU food legislation (see: Article 3(3) GFL).

Research questions

From the problem statement, the following research questions can be formulated.

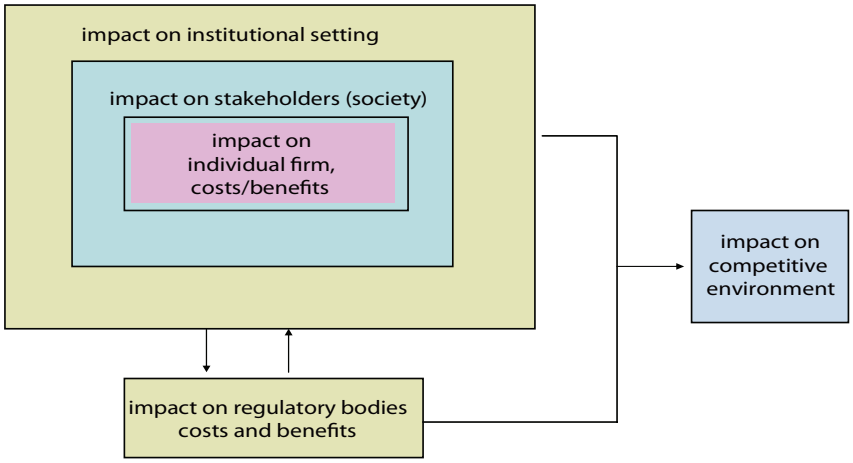
– how is the present legal framework for the food sector in the EU perceived by the food companies, also compared to the US system (section 3.3);
– what costs and benefits are connected to the European legal system and how do these influence the competitiveness? Five topics are addressed in this context:
– what is quality of legislation (section 3.4);
– what is the impact of legislation changes (section 3.5);
– which effects are there on innovation and pre-market approval (section 3.6);
– is there an overdose of control (section 3.7);
– other administrative burdens (section 3.8);
– what recommendations can be made and what discussion points can be discerned to improve and redirect Community legislation dealing with food safety with the aim of achieving a better balance between industrial competitiveness and consumer protection (section 3.9)?

Research framework

The general research framework is given in figure 3.1. It shows that new legislation can influence the internal business processes of a business to which it is addressed. Cost effects can be distinguished in effects on operational costs, costs of investment and additional administrative requirements (such as information collection, auditing, reporting etc.).

Food labelling requirements for example have an impact on the operational costs, while investments in tangible fixed assets would normally be minimal. Also, the extra administrative requirements are relatively low. On the other hand, prohibition of certain food ingredients can change the production process dramatically. It can cause previous investments to become obsolete, necessitate additional investments, ask for audits and for additional information to external stakeholders

Figure 3.1 Research framework



External relations towards stakeholders can change too. They can change towards consumers, if enforced legislation influences consumer's choices and/or alternatives, if distortions on market competition are mended by harmonisation of regulatory requirements, and/or if suppliers are locked out of competition who previously had a 'licence-to-deliver'. Even more broadly, the institutional setting can change if regulations ask for the creation of auditing and controlling governmental bodies, whose costs and infrastructure are borne by the businesses concerned.

It is clear that changes in cost structure and/or turnover for companies obeying new regulatory requirements have an impact on the competitive position of these companies if:

– some companies are following more strictly than others;
– some companies benefit from regulatory requirements more (easily) than other.

There are situations in which this distortion of the present competitive status quo may even be desirable, for example if previous distortions (e.g. because of lack of transparency or discongruent legal obligations in member states) are intended to be repaired.

More specifically, to assess the effect of regulations on business performance, we use the 'costs of quality' model[7] analogously to assess the effects on costs, benefits and market position (in general: business performance). Quality costs are defined as costs of preventing, finding and correcting defective work (Kaner, 1996). The rationale behind the model is that lower failure costs can be compared with increasing appraisal and prevention efforts, if product quality is improved. The scheme can easily be adapted to serve purposes in other fields, like environmental management (see for example: Watson et al., 2004), or the costs of law implementation. We distinguish:

– internal legal effects: adverse effects of non-compliance and (the 'reverse side of the coin') internal benefits of compliance;
– external legal effects: effects on the stakeholder environment of the individual businesses;
– 'appraisal' costs: costs of operating food safety and quality assurance systems;
– prevention effects: effects on the performance of companies of actions undertaken to prevent a-conformity with legal requirements.

Some remarks should be added:

1. by 'internal' we not only mean effects on the operations of businesses, but also effects on the company's strategy, that give ground to the actual functioning of the business;
2. the four distinguished areas partly overlap; for example, appraisal costs are made to prevent a-conformity (prevention effects);
3. the four areas are linked with the general framework proposed; for example, external legal effects will definitively provoke prevention and appraisal efforts at company level.

Research methods

To address the research questions within the given timeframe and limits in resources, we apply:

– desk research, mainly to give a solid foundation to address the research questions.
– survey research. We developed a questionnaire.8 This questionnaire aims at measuring businesses' appreciation of the applicable regulatory framework and identifying aspects of this framework that might influence competitiveness. Some respondents returned a completed questionnaire but in most cases they were completed in an interview either by telephone or in person. As the main representative of the group of neighbouring countries exporting to the EU, Croatia was chosen. As Croatia is a candidate for EU membership, it was considered that businesses in that country are likely to address issues of implementing EU food legislation.

An open invitation to participate was published in the European Food and Feed Law Review.[9] An electronic version of the questionnaire was posted on the websites of IFAL, the European Institute for Food Law and the Law and Governance Group at Wageningen University. Where in this chapter quantitative information is provided on stakeholder opinions, this refers to this part of the project;[10]

– Semi-structured and open interviews with stakeholders in the food industry and experts.

The interviewees and stakeholders were selected to represent a cross section of the relevant stakeholders: SMEs, big companies and multinationals, companies from various product groups, from various areas in the EU and exporting to the EU. A relatively large section of the interview-

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7 We use the cost of quality classification, given below, to categorise effects of new legal requirements on competitiveness. This cost-of-quality framework distinguishes internal failure costs, external failure costs (costs that are incurred after a product has been sold), appraisal costs and prevention costs (costs made to prevent bad quality to occur).

8 See www.food-law.nl.

9 Volume 1 (2006) issue 4, p. 247-248.

10 See annex E on the distribution of interviewees.

ees is from the Netherlands as this is the researchers' home base. However we ensured that there was a sufficiently diverse group from other countries to filter out the risk of national bias.

On 13 July 2006 an expert meeting was held at the Chamber of Commerce in Münster (Germany) organised in cooperation with this Chamber of Commerce and the IFAL® Institut für angewandtes Lebensmittel- und Futtermittelrecht, Produktentwicklung und Lebensmittelqualität. On 14 September 2006 an expert meeting was held at the office of FNLI in Rijswijk (NL) and on 15 September 2006 at the office of the European Commission in Brussels, in cooperation with CIAA. The expert meeting in Münster focussed on the legal part of the research, while the meetings in Rijswijk and Brussels addressed the entire project. A visit to the US took place between 12 and 22 October 2006. During this visit several experts, an official and food companies were interviewed. We are very grateful to all who have contributed to our research, see Annex H.

3.3 The food business' perception of the food regulatory framework in the EU

3.3.1 Perceptions of the EU food regulatory framework in general

The food regulatory framework in the EU is characterised by a restless nature. Between 1 January 1997 and 10 November 2006, the Official Journal published 1,359 measures addressing the food industry in whole or in part.[11] This amounts to an average of two to three publications each week.[12] These figures may represent the tip of the iceberg only. Eur-Lex, the regulatory database on the EU-website gives in its category 60 'Agri-foodstuffs' 56,811 entries.

On top of this innate restless nature, in response to the BSE crisis, the White Paper on Food Safety (2000) announced a fundamental restructuring of the system of food legislation and enforcement. An Action Plan consisting of 84 points was annexed to the White Paper. This overhaul started in earnest in 2002 with the publication of Regulation 178/2002 the so-called General Food Law.[13] For a general background on the history and system of food legislation in the EU[14] see Van der Meulen (2004) and Van der Meulen and Van der Velde (2006); and in particular on enforcement: Van der Meulen and Freriks (2006).

This section addresses the respondents' impressions of the impact of food legislation on:
- the European competitive field and institutional context;
- the stakeholder ('exchange') environment;
- the company level, in accordance with the costs and benefits approach we presented in the research framework.

Level playing field
Several interviewees pointed out that through harmonisation EU law provided a blessing that can hardly be overestimated. On the internal market of the 25 member states, a level playing

11 See the website of the University of Reading (www.foodlaw.rdg.ac.uk).

12 According to an overview published on the website of DG Sanco until 2006 95 legal texts have been published on BSE alone, excluding market regulations, financing decisions and rules with respect to cosmetic and medicinal products and medical devices. See: http://ec.europa.eu/food/food/biosafety/bse/chronological_list_en.pdf.

13 Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, OJ 1.2.2002 L 31/1.

14 Strictly speaking the term 'food law' would be appropriate as it includes case law and soft law like policy documents and administrative practice. The term has been defined in Article 3(1) GFL as follows: "'food law' means the laws, regulations and administrative provisions governing food in general, and food safety in particular, whether at Community or national level; it covers any stage of production, processing and distribution of food, and also of feed produced for, or fed to, foodproducing animals." However we have been informed that in circles of the European Commission 'food law' is understood to refer to Regulation 178/2002 only, we opt for 'Food legislation' as second best to describe the subject of this report.

field has been achieved where the same legal conditions apply to all. It is perceived in particular in relation to the ten new member states that joined the EU on 1 May 2004.

In fact this level playing field goes beyond the borders of the EU-25. To a large extent EU food legislation applies in the European Economic Area (EEA) that includes the EFTA countries, Iceland, Liechtenstein, Norway and Switzerland.[15] Further neighbouring agricultural economies that depend on exports to the EU like Croatia and Serbia adapt their national legislation on food as far as possible to EU regulations and directives. A Serbian government official[16] pointed out that it is practically impossible to export to the EU if national legislation in the exporting country is not adapted to EU legislation.

Substandard competition

In its impact assessment of the hygiene package, the FSA touched upon another aspect of the level playing field. It expected an improvement of competition rather than adverse effects. The hygiene package might even drive out substandard competition from the EU market, since the same standards are applied to all or groups of businesses.

Uncertainty

The institutional context can increase agency costs: costs of gathering information by businesses (agents) to be able to comply and project investment decisions. 71.7% of the respondents totally agree with the question 'Your company is aware which European legislation applies to its activities' (table 3.1).

Table 3.1 Awareness of companies on European legislation a)

Valid	All companies		Companies > 250 employees	
	Frequency	Percentage	Frequency	Percentage
1 totally applicable	38	71.7	24	85.7
2	5	9.4	0	0
3	5	9.4	3	10.7
4	3	5.7	1	3.6
5	2	3.8	0	0
6	0	0	0	0
7 not applicable at all.	0	0	0	0
Total	53	100.0	28	100.0

a) Informedness measured on a 7 point scale; 1 (= totally applicable) to 7 (= not applicable at all).

Of the 28 respondents with more than 250 employees, 85.7% totally agrees with this statement. It appears that big businesses are well aware of EU legislation that applies to their line of business. SMEs sometimes express the feeling that some dark cloud is hanging over them. Compliance assistance can mitigate the cost businesses have to make and assist them in projecting organisational changes in order to come up to institutional demands. An interviewee related that inspectors often hide behind 'Brussels' blaming the EU legislature for unwelcome requirements instead of explaining the reason for certain legislation.[17]

15 European Free Trade Association; see: www.efta.int.

16 In an informal conversation not counted as interview in this research.

17 The interviews show a striking difference in the way food legislation is perceived as a factor influencing competitiveness. Managers in big companies do not seem to worry very much. Legislation is a requirement to be met. SMEs on the other hand either perceive legislation as an almost insurmountable obstacle, or they ignore it altogether. One of the managers of a big company who does not consider legislation as a major problem, did remark however: 'The most time and energy consuming part is to adapt packaging and labelling to the various international requirements.' Packaging law is outside the scope of this research.

In contrast to the respondents from industry, the experts regard access to EU food legislation as highly problematic. See paragraph 3.4.

Companies were asked: 'Do you think that in your company's activities on the EU market, EU legislation gives your company an advantage or a disadvantage over the following competitors'.

Table 3.2 Advantages of EU legislation over competitors a)

		Mean b)	Standard deviation
A.	Advantage towards big companies within EU	4,06	1,4
B.	Advantage towards small companies within EU	3,59	1,3
C.	Advantage towards new members of EU	3,22	1,4
D.	Advantage towards companies in central/west EU	3,85	1,3
E.	Advantage towards companies south EU	3,69	1,5
F.	Advantage towards northern companies	4,08	1,2
G.	Advantage towards companies from US	3,93	1,3
H.	Advantage towards third world companies	3,29	1,5

a) range of N:30-48; b) Score on a seven point scale: 1 = big advantage, 7 = big disadvantage.

Figure 3.2 Advantage of EU legislation over competitors. See Table 3.2 for the labels A-H of the type of competitors.

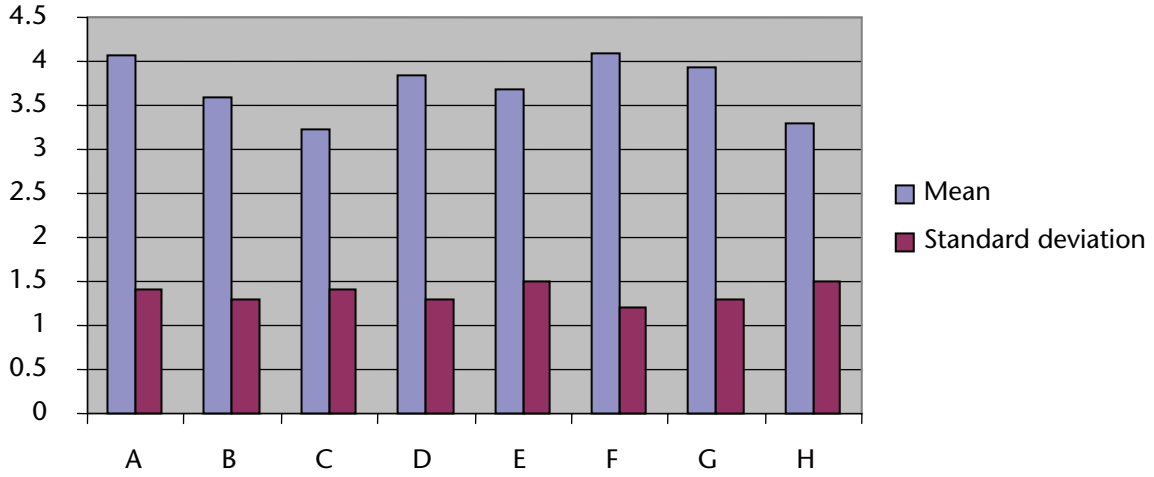

Figure 3.2 shows among others, that the respondents are neutral towards the influence of EU food legislation on the competition with US-based companies.

Relative influence

We now address the stakeholder relations impact of (changing) food legislation:
– a comparison of the impact of food legislation in combination with media attention on effective competition, profitability and quality;
– a comparison of the nuisance caused by food legislation to other branches of legislation.

The results indicate that:
– the respondents tend to the opinion that increased media attention to food topics is an important impulse to food quality;
– the nuisance that is felt from food legislation is comparable to other areas (like spatial, environmental, and fiscal issues).

The effects of extra media attention on quality, effective competition and the pressure on profitability are given below.

Table 3.3 Opinion of companies on the effects of media attention on quality, competition and profitability a)

	Extra quality	Effective competition	Pressure on profitability
1 totally applicable	30.4%	11.1%	7.1%
2	28.3%	35.6%	0%
3	15.2%	28.9%	28.6%
4	19.6%	22.2%	28.6%
5	0%	0%	9.5%
6	2.2%	0%	2.4%
7 not applicable at all	4.3%	2.2%	23.8%
Total	100%	100%	100%

a) Measured on a 7 point scale: 1 = totally applicable; 7 = not applicable at all. N = 42-46.

The impression of the respondents is that media attention enhances quality of food (mean = 2.54, SD = 1.6), leads to effective competition (mean = 2.73, SD = 1.2), and is relatively neutral towards profitability (mean is 4.36, SD = 1.8).

A comparison with other fields of legislation is given in table 3.4. The question was 'EU requirements on food cause more problems than'(legislative domain):

Table 3.4 Comparison of food legislation with other domains

Domain	Mean a)	Standard deviation
Tax	4.20	1.8
Social	4.20	1.7
Employment	4.15	1.7
Environment	4.15	1.7
Waste	3.73	1.5
Spatial	4.50	1.7

a) Score on a seven point scale: 1 = totally agree, 7 = do not agree at all. N = 42-46.

The empirical evidence shows that food legislation is not perceived as better or worse than legislation in other fields.

Stability

We asked to what extent the stability of the institutional context is perceived as preferable to the positive effects of a changing legal environment. The answers indicate that legal certainty is valued over the quality of the regulatory framework, although much weight is attached to this quality as well.

Table 3.5 Opinion of companies on the need to change food legislation

Food law should change the least possible	Frequency	Percentage
1 totally applicable	5	33.3
2	4	26.7
3	1	6.7
4	2	13.3
5	0	0
6	2	13.3
7 not applicable at all	1	6.7
total	15	100.0

The statement 'Food law should change the least possible' received an average score of 2.87 on a 1-7 scale (N=15, SD 2.066), which represents an average tendency towards agreement with the statement, but a big spread round the mean value. On the other hand, the question regarding improvements scored 2.60 (N=15). From these answers to the questionnaire and the interviews, it is clear that the restlessness of the regulatory framework is a burden to industry, although changes in a positive sense are welcome. One interviewee proposed that if the legislature aimed at fixing a specific date every year for the entry into force of new food legislation, the sector could adapt by concentrating their efforts on this date and then enjoy a period of stability and consolidation followed by a new effort at preparing for change.

3.3.2 EU compared to the US

To assess EU food legislation, a comparison was made with the system in the US. It has been suggested to the European Commission that the legal environment in the US might give the American food industry a competitive advantage over the EU food industry. Furthermore, the US is the largest export destination for the EU food industry. For these reasons, this research addresses the American approach as compared to the EU and in particular to the perception of the interviewees and experiences of companies active on both markets.

Legal culture in the US

From the European point of view, the legal situation in the US is characterised by a claim culture, while the regulatory system in the EU is perceived as over-cautious by the Americans.

At the expert meeting in Münster, it was claimed that the US system is more reactive, while the European system regulates in advance 'but by this very nature is innovation-unfriendly.' According to one interviewee insurer, the high rate of claims makes doing business in the US very risky. Only about one in four export insurers is willing to provide coverage for exports to the US or Canada. All else being the same, the premium for exports outside the EU is about double compared to exports within the EU. Coverage for US and Canada costs about six to eight times the premium for exports within the EU. The reason for this price difference is that liability costs are high in the US. Several factors contribute to explaining this situation, such as the system of punitive damages, lay juries, the political character of the juridical system etc. In about one in fifty cases, intentions to export to the world are abandoned due to these costs. In case of exports to the US or Canada, this is in about one in ten cases. It seems fair to conclude that the legal culture in the US forms a de facto barrier for the EU food industry to the American market.

Legal structure in the US

Food legislation in the US is hardly less complex than in the EU. A synopsis of US food legislation is published by the USDA.[18] Further details can be found on the FDA website.[19] Competences are divided between the federal and the state level. At federal level over ten agencies are involved (USDA 2001, Hammonds, 2004).

US food legislation is similar to EU food legislation in its focus on food safety and consumer protection. The regulatory instruments focus on pre-market approval of certain products, the properties of products, their handling and labelling, not unlike EU food legislation.

Some differences between EU and US food legislation

Two of the interviewees preferred the American system to the European system because of its clarity. They consider it to be substantially easier to know one's legal position in the US than in the EU. FBOs in the US are free to market food products that are generally recognised as safe (GRAS). The status of GRAS can be based on a history of safe use or scientific consensus. The FBO may submit its reasons to consider a food GRAS to the US Food and Drug Administration (FDA). For other foods, mainly covered by the concept of food additives, pre-market approval is re-

[18] The Food And Agricultural Import Regulations And Standards Report (FAIRS) United States of America, 2001 (http://www.fas.usda.gov/itp/ofsts/usa2.pdf).

[19] www.fda.gov.

quired. A specific procedure applies to dietary supplements containing new dietary ingredients. A striking feature of this procedure compared to the EU Novel foods regulation is a system of pre-market notification. The company wishing to market the new product must notify the FDA 75 days in advance. At the notification, proof of the safety of the product must be provided. FDA can use these 75 days to decide whether or not the proof provided is sufficient.

Food handling requirements largely rely on good manufacturing practices; however HACCP is being introduced in an ever increasing range of sectors. The US legislature feels less need to create safeguards like traceability. For the EU legislature, science is one factor among others. In its rhetoric the European legislature places emphasis on science partly as a means to compensate for the loss of credibility suffered by business and politics in the BSE crisis. However it never let go of the democratic notion that consumers' wishes are a value in itself.

Labelling requirements are comparable to the EU. The most important difference is that in the US, unlike the EU, nutrition labelling is mandatory.

Interviewees on US food law

Interviewees were asked whether they do business in the US and whether they consider the legal environment in the US preferable to the EU. It turned out that the majority of interviewees who do not do business in the US did not take a position on the comparison between the two systems. Of those respondents that do conduct business with the US (N =19), the vast majority does not prefer the US legal environment. For all respondents, this picture is confirmed (N=42)

Table 3.6 Opinions of companies on the preference of the US legal environment over that of the EU.

Valid	Companies with US experience		All respondents	
	frequency	percentage	frequency	percentage
No	10	52.6	17	40.5
Yes	4	21.1	4	9.5
Do not know	5	26.3	21	50.0
Total	19	100.0	42	100.0

Table 3.7 gives an overview of responses, distinguishing between Croatian companies and EU companies, and companies that do business with the US (yes) and those that do not do business with the US

Table 3.7 Opinions of EU and Croatian companies with or without experience in business with the US on the legal environment in the US compared to EU.

Experience in business US	Legal environment US more preferable				
	Location	no	yes	do not know	Total
no	Croatia	4		6	10
	EU	1		10	11
	total	5		16	21
yes	Croatia	4	3	1	8
	EU	6	1	4	11
	total	10	4	5	19

Croatian companies may not be not well informed about the US juridical climate: they seem unable to make a good comparison. However, for the EU companies the picture is confirmed. For example, looking at only the respondents with head office in Germany, the following data can be obtained.

Table 3.8 Opinion of German companies on the legal environment in the US being preferable to the EU Legal system

	Frequency	Percentage
No	4	44.4
Yes	0	0.0
Do not know	5	55.6
Total	9	100.0

Asked if they consider that EU food legislation gives them an advantage or a disadvantage over competitors from the US, the majority of respondents thought that the effect of EU food legislation in this respect was neutral. We asked 'Do you think that in exporting food products from your country to other countries outside the EU, EU legislation gives your company an advantage or a disadvantage over the following competitors (1 = big advantage; 7 = big disadvantage):

– bigger companies within the EU;

– smaller companies within the EU;

– companies from the US;

– companies from third world countries.

Table 3.9 Opinion of companies on the advantageous effects of EU legislation on the export to non EU countries compared to four types of competitors

	Big companies	Small companies	US companies	Third world companies
Number of respondents	35	36	29	31
Mean a)	3.77	3.61	3.79	3.45
Standard deviation	1.114	1.358	1.048	0.961

a) Score on a 7 point scale: 1 = big advantage, 7 = big disadvantage.

There is a slight tendency towards perceiving an advantage compared to all categories. Given the standard deviation of around 1 in all categories, the effect seems to be best qualified as neutral in all categories. Similar questions focusing on innovation and imports yield similar results.

3.3.3 Food safety and legislation

This part of the research deals with the external legal effects of EU food regulation. As proposed, external legal effects refer to the relationships with the stakeholder environment. The main stakeholder is the consumer: food safety is the main goal that provokes changes in the legal environment.

External legal effects incurred by the implementation of rules refer to the impact of these changes on the economic relationship with external stakeholders (like consumers: less sales, supplier: increased quality and information requirements). For example, GMO products can negatively influence the country's image on European markets (Knight et al, 2005).

General perception of food safety and its legislation
An overview of the response on question relation to food safety and legislation is given in table 3.10.

Table 3.10 Opinion of companies on the impact of food safety regulation and administrative burden.

		Number of respondents	Mean a)	Standard deviation
A	EU law can achieve a higher level of food safety	46	2.35	1.449
B	The administrative burdens are acceptable in the light of the results	44	3.27	1.531
C	Higher administrative burdens are acceptable if higher food safety is achieved	47	2.77	1.507
D	Lower food safety is acceptable if lower administrative burdens are achieved	47	5.66	1.619
E	The present level of food safety is not the result of EU law	45	3.73	1.959
F	Food safety law in the EU is good	45	2.67	1.279

a) Score on a 7 point scale: 1 = totally agree; 7 = do not agree at all.

Interviewees are quite satisfied with the current level of food safety that is achieved through legislation in the EU. They however tend to express that the safety level can be increased by EU legislation (mean = 2.35 on a 1-7 scale, N = 46, SD = 1.44). Although they express different opinions concerning the question whether EU legislation contributed significantly to this state of affairs, the interviewees tend towards the opinion that the administrative burdens incurred are warranted by the results (mean = 3.27, N=44). They further think that some increase in administrative burdens is acceptable if it leads to higher food safety (mean = 2.77, N = 47) while a decline in food safety is not acceptable to lower administrative burdens (mean = 5.66, N = 45). One interviewee elaborated that food safety is not purely a matter of legislation but of controls. According to this interviewee apart from the BSE crisis, there has not been a single food safety crisis in the EU that was attributable to a lack of legislation. It was mainly lack of compliance that escaped the attention of or was accepted by the authorities.

Safety versus sterility

Several interviewees considered the level of food safety to be too high. Surprisingly they do not defend this position from a compliance costs point of view, but from a public health point of view. They argue that the population in the EU is losing its natural resistance due to lack of exposure to pathogens. They also believe that the increase in allergy cases is attributable to an excessively hygienic lifestyle.

Limits to food safety

One interviewee strongly criticised EU food safety policy, the communication on food safety and the emphasis on the responsibility of business operators. According to this interviewee, the EU creates a false sense of security by overstating the current level of food safety. It is the paradox of the perfect systems that when things go wrong, they go badly wrong. The success of the efforts to regain consumer confidence leads to consumer carelessness.

External legal costs and benefits

The interviewees were asked to what extent the changing safety requirements by consumers influenced quality activities, competition and profitability (see table 3.11).

Table 3.11 Opinions of companies on the effects of safety requirements by consumers

	Number of respondents	Mean a)	Standard deviation
Safety wishes stimulate quality	45	2.53	1.120
Safety wishes are an effective base for competition	44	2.77	1.255
Safety wishes are a threat to profitability	44	4.25	1.767

a) Score on a 7 point scale: 1 = totally applicable; 7 = not applicable at all.

It seems that these wishes influence profitability in a neutral/negative way (mean = 4.25, SD = 1.767, N = 44), while effective competition is stimulated (mean = 2.77, SD = 1.3) as well as food quality (mean = 2.53, SD 1.1). Food legislation will affect the relative competitiveness of European countries in comparison with competitors outside the EU.

3.3.4 Concluding remarks

The analysis of the perception of the legal framework by the food companies shows that companies have a balanced view on EU food legislation. They see a number of benefits. First of all the food safety level is seen as satisfactory. That is also in the interest of business, as products perceived as less safe will be hard to sell. Also positive impacts on the competitive environment are recognised: the legal system creates a level playing field through harmonisation for all players, including those from abroad. It also provides companies with a positive reputation outside the EU. The EU system is also preferred over the US system.

However the interviewees report a number of remaining problems in harmonisation. Harmonisation is not fully achieved (e.g. differences in allowed use of pesticides), there are national derogations and interpretation of European law as well as enforcement differing between member states.

In the next sections we report on five issues that influence costs of the legal system for businesses as well as their innovativeness.

3.4 The quality of legislation

Internal and external legal effects (see the presented framework in figure 3.1) will only occur if the legal system is transparent and of high quality. Only then will negative responses (internal: e.g. penalties, shut-down of production facilities; external: e.g. negative publicity and recalls) be transformed into systems and managerial actions to comply (appraisal and prevention measures). The White Paper on Food Safety set out with clear ambitions with regard to legislation. 'There is a need to create a coherent and transparent set of food safety rules.' 'Individual legislation needs to be clear, simple and understandable for all operators to put into effect.'[20] To what extent does EU legislation meet the standard set down in the White Paper? This paragraph deals with this issue.

Structure

In time the legislative approaches to food have changed dramatically. In the first two decades after the Treaty of Rome, vertical directives were the instrument of choice. After the Cassis de Dijon case law, the emphasis shifted to horizontal directives. One interviewee commented that vertical legislation is often perceived by individual producers and producers' organisations as being more practical and more transparent than horizontal legislation. Vertical legislation is easier to defend for certain interest groups like particular sectors of industry. It has been remarked that vertical legislation favours small companies dealing with few products. They find all the applicable requirements in one text.

The transition to horizontal legislation has not been completed. For example companies will not find all labelling requirements in the horizontal Labelling directive. Besides this general codification of food labelling law, countless other provisions exist.[21] The new legislation on claims for example is laid down in a separate regulation. Many other texts that deal with specific subjects of food law, like legislation on beef, the Novel foods regulation and the GMO regulations, include labelling requirements as well. The burden to collect all relevant requirements is on industry. When the introduction of the General Food Law became a news item, several companies -

[20] White Paper on Food Safety, p. 22-23.

[21] The author of a book on food labelling told us that it concerns several dozens of provisions.

misled by this nickname - believed that the EU legislature had taken it upon itself to provide a systematic codification of food law. This was heralded as a major improvement. Disappointment soon followed.

Box 3.1 DG Sanco on codification of labelling law

18. **What is the most appropriate legislative instrument** to implement these laws more homogenously in the European market (Member States have regularly spoken in favour of a regulation instead of a directive) **and how should the labelling provisions be brought together?** It is absolutely true that labelling or labelling-related provisions are included in many pieces of legislation, but this is the consequence of the widely used rule of Lex generalis and Lex specialis. Common labelling requirements applicable to all foodstuffs are laid down in horizontal legislation (Directive 2000/13/EC and related texts), whilst specific provisions, because of specific needs to informing consumers, are included in vertical legislation, as a result of specific composition or quality standards to which they are closely linked. The same structure is used in Member States national legislation as well as in international standards of Codex Alimentarius (DG Sanco 2006, p. 5).

DG Sanco seems to consider it impossible even to codify all requirements on food labelling in one piece of legislation. DG Sanco's reasoning is misleading. The rule of lex generalis and lex specialis is a rule on conflict, not on legislative technique. At the heart of the matter is the choice that is or is not made. The question is who takes the burden to bring together the legislation: the legislature or the user? If the legislature so wishes, it is perfectly possible to bring together general and specific rules. Customs law provides an excellent example where the EU legislature undertook a major effort at codification.[22]

Impact of regulations on national legislation

After the White Paper on Food Safety, the EU legislature changed its legislative strategy again. Instead of directives, the legislature turned more and more to the use of regulations. In general, the advantage of regulations over directives is that they apply directly and uniformly in all the member states of the EU. However several EU regulations on food - primarily the General Food Law - address the national legislatures. This seems to create confusion. By general theory of European law, national legislatures may not transpose EU regulations into national legislation. How do national legislatures have to deal with explicit and implicit requirements in regulations to transpose?

At the expert meeting in Münster, it was further remarked that directing national legislation through regulations results in the national legislation becoming unreadable. It is thought that national legislatures may not quote from regulations and therefore have to refer their readers to the regulation if they use concepts from the regulation.[23] To understand the national text, the user must always have access to the European text as well.

Complexity of EU food legislation.

The White Paper on Food Safety was very explicit about the ambitions on accessibility of food legislation: 'legislation needs to be clear, simple and understandable for all operators to put into effect.' In contrast, many interviewees perceive food legislation as impenetrable. Indeed the new structure is sometimes rather complex. The hygiene package, the heart of food safety legislation, may serve as an example (box 3.2).

Box 3.2 Example the EU hygiene package

The White Paper on Food Safety envisaged one new comprehensive regulation recasting the existing legal requirements to introduce consistency and clarity throughout the food production chain.

Six years later, the Hygiene package consists of four regulations of the Council and of the Parliament and two directives of the Council and of the Parliament (Regulation 852/2004 on general food hygiene; Regulation 853/2004 on food of animal origin; Regulation 854/2004 on official controls of hygiene requirements; Regulation 183/2005 on feed hygiene; Directive 2002/99 on animal health requirements; Directive 2004/41 on transitory measures). These provisions elaborate on Regulation 178/2002 (the General Food Law), and Regulation 882/2004 on official controls.

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22 Council Regulation (EEC) No 2913/92 of 12 October 1992 establishing the Community Customs Code. In pharmaceuticals there exists: Directive 2001/83/EC on the Community code relating to medicinal products for human use.

23 This 'Zitierverbot' is deduced from case law such as ECJ 7.2.1972, case 39/72, Commission vs. Italy, ECR 1973, p. 101.

Implementing measures have been taken by the Commission in four further regulations (Regulation 2073/2005 on microbiological criteria; Regulation 2074/2005 on food chain information, testing methods, etc. Regulation 2075/2005 on Trichinella; Regulation 2076/2005 on transitional arrangements). Five guidance documents on the new hygiene legislation have been published by DG Sanco (Guidance document on the implementation of certain provisions of Regulation (EC) No 852/2004 On the hygiene of foodstuffs; Guidance document on the implementation of certain provisions of Regulation (EC) No 853/2004 on the hygiene of food of animal origin; Guidance document on the implementation of procedures based on the HACCP principles; Guidance document on certain key questions related to import requirements and the new rules on food hygiene and on official food controls; General guidance on EU import and transit rules for live animals and animal products from third countries). The Standing Committee for the Food Chain and Animal Health issued a guidance document on the General Food Law.

The hygiene package is further supplemented by EU, national or industry hygiene codes.

The old system may have been complex, but is seems somewhat bold to label the new system 'simple' and 'transparent'.

Clarity

A major complaint with regard to the quality of EU food legislation is the ambiguity of texts. This problem is highlighted by the need to publish interpretive texts soon after the entry into force of the regulations. One major cause is haste; another is trying to achieve compromises.

Box 3.3 Example high pressure techniques

At the expert meeting at Münster, a food consultant revealed experiences with high pressure techniques. A technique has been developed to apply a pressure of 6000 atm or more to food products as a means of decontamination. In the US this technique is considered state of the art. In the EU uncertainty prevails on the question whether or not application of this technique falls within the ambit of the Novel foods regulation. If so, would food products treated with this technique be considered as 'substantially equivalent'? How is this to be judged? In relation to which products?

If the scope of the novel foods regulation had been clearer, this technique would probably be common now in the EU, either because FBOs are free to apply it, or because the novel foods procedure would have been undertaken.

In the US microbiologic reduction is the only criterion for approval.

Despite these facts, the respondents seem to be well aware of the present legislation that is applicable to them. The following table makes a distinction between Croatian companies and EU companies and gives the response on awareness of present and of future rules scale: 1 = totally applicable, 7 = not applicable at all).

Table 3.12 Opinion of companies in Croatia and EU on awareness of European legislation versus informedness on future new regulations

Our company is completely informed on future new regulations		Our company is aware which European legislation applies to its activities					
	location	1 totally applicable	2	3	4	5	Total
1. totally applicable	Croatia	5					5
	EU	15					15
	Total	20					20
2.	Croatia	1	3		0		4
	EU	2	0		1		3
	Total	3	3		1		7
3.	Croatia	3		0	0	0	3
	EU	2		2	1	1	6
	Total	5		2	1	1	9
4.	Croatia	0					0
	EU	1					1
	Total	1					1

Our company is completely informed on future new regulations	Our company is aware which European legislation applies to its activities					
	location	1 totally applicable	2	3	4	5	Total
5.	Croatia			1	1		2
	EU			0	0		0
	Total			1	1		2
7. not applicable at all	Croatia					1	1
	EU					0	0
	Total					1	1

In general, the companies seem to feel reasonably well informed. The correlation between informedness about the present and coming legislation is high and significant ($p<0.01$) within the sample (table 3.13), indicating that if informedness is high, predictive power of the companies is perceived as high also (and vice versa).

Table 3.13 Correlation (spearman's rho) between being aware of current and future legislation.

Rules known		Our company is aware which European legislation applies	Our company is completely informed on future new regulations
Our company is aware which European legislation applies	Correlation coefficient	1,000	.646 a)
	Sig. (2-tailed)		.00
	Number of respondents	53	48
Our company is completely informed on future new regulations	Correlation coefficient	.646 a)	1,000
	Sig. (2-tailed)	.000	.
	Number of respondents	48	49

a) Correlation is significant at the 0.01 level (2-tailed).

Superfluous legislation

Several interviewees complained about excessive legislation. The EU legislature is thought to overburden industry with unnecessary provisions. The interviewees provided very few examples of legislation they regard as expendable.[24] However, the Dutch enforcement authority responsible for food and product safety, VWA - Voedsel en Waren Autoriteit - issued a report[25] stating that it considers about 20% of the regulations within its competence of such limited value for the protection of consumers or animals that it will no longer enforce them. VWA calls upon the legislatures to reconsider the regulations concerned. See Annex I.

Lack of legislation

Only one interviewee pointed to a lack in legislation. He said that no legislation exists on decontamination. This interviewee suspects that the EU legislature fears that the system of HACCP will be undermined if the legislature acknowledged that contamination in food production is unavoidable and that measures must be taken to solve problems when they present themselves. According to this interviewee, this lack in legislation leads to a lack in legal certainty.

Risk management versus enforcement

One of the principles of EU food legislation is that it is based on risk analysis (art. 6 GFL). Risk analysis comprises risk assessment, risk communication and risk management (Article 3(10) GFL). At the expert meeting in Münster, it was pointed out that in practice risk management is taken

[24] The GMO regulations were explicitly mentioned. Most interviewees just indicated 'too much' legislation.

[25] Voedsel en Waren Autoriteit, Handhaven met verstand en gevoel, The Hague, June 2006, available at www.vwa.nl.

to mean either legislation or enforcement.[26] Specific administrative instruments for risk management are lacking. This emphasis on enforcement fails to appreciate that risk in food cannot always be traced back to unlawful behaviour of FBOs. In situations requiring immediate action like a food safety crisis, but also in situations that call for application of the precautionary principle because scientific doubts have arisen, enforcement instruments may not always be adequate. In the face of enforcement, FBOs enjoy the rights of defence enshrined among others in Article 6 of the European Convention on the Protection of Human Rights and Fundamental Freedoms. Decisive action requires cooperation in targeting the problem, not a struggle targeting people. The legislature should create fine tuned instruments for risk management, taking into account the requirements of dispossession law in so far as the seizure of food products is necessary.

National authorities

According to several interviewees, lack in understanding of EU (food) law by national authorities is a problem. For one of them, problems mainly concern veterinary requirements if (semi-finished) products including raw materials imported from third countries are exported within the EU. Too often national authorities in member states lack knowledge of applicable EU law and make unwarranted demands.

Accessibility of sources

The accessibility of EU food legislation was not a topic in the questionnaire used for this research as such, nevertheless the topic came up in some of the interviews. While in general the efforts made by the EU to make its policy and legislation accessible through its websites were lauded, some critical remarks were made as well. One consultant pointed out that unnecessary hurdles have been put in the way of users. More and more users have to register and acquire a password to get access to documentation and even to illustrations on the EU website. At the same time, urls and the structure of websites change on a regular basis.[27] The EU retains copyrights, in particular with a view to commercial use. This consultant is of the opinion that in a situation, where it has become so difficult for industry to find its own way to EU legislation - at least to those providing the service of making it accessible - all possible entrance should be given.

The biggest problem is that the Institutions have not agreed to a common standard. It is annoying that not all documents are given a date and a reference. Even if there is a reference, it is applied carelessly. Another odd feature is DG Sanco's practice of providing documents to industry associations but withholding them from the general public. Information that is available to some members of the public should be made available to all. This consultant made some specific suggestions for improvements. It would be very useful (as DG Sanco increasingly does) if it was indicated when documents were put on the Internet. FSA is a good example in this respect. It would be great if there was a database of old and new hyperlinks and deleted documents, so that one can retrace documents or at least know that there was no use continuing a search.

US Federal Register System

The problem of accessibility is not unique for the EU. In the US measures to address this problem have been integrated into the legislative process. Back in 1934, Congress recognised the need for a centralised system of communication and introduced the Federal Register Act, which became law on 26 July 1935.[28] The Act established a uniform system for handling agency regulations.

The Administrative Procedure Act, which became law on 11 June 1946,[29] added several important requirements to the Federal Register System. Against the background of the observations that surfaced in this review, two issues stand out: structured publication and continuous codifica-

[26] This opinion can also be found in the White Paper on Food Safety, no. 32.

[27] This very project illustrates the point. It is almost impossible to reach the background information on the EU website. Even landmark documents like the Medina Ortega Report concerning the BSE crisis and the Green Paper on the general principles of food law in the European Union, we could not find at the EU website.

[28] 44 U.S.C. Chapter 15.

[29] 5 U.S.C. 551 et seq.

tion could reduce the costs businesses have to make to come up to new legislation. Likewise, benefits from new legislation could be more easily harvested.[30]

Concluding remarks
European food legislation is complex. On some issues, like hygiene, several regulations, directives and interpretive documents are relevant. Regulations are sometimes used as Directives to address national legislators. Interpretative documents are often required to achieve clarity. Reductions in legislation are possible, as the Dutch food safety authority (VWA) concluded.

The burden of legislation could be reduced for businesses by codification, clarification and simplification. Guidelines for implementation of food regulations by member states could also help. Food safety inspectors should not only check the compliance but also explain legislation to businesses.

3.5 The changes in legislation

EU food legislation has consequences for the financial performance and competitive position of individual companies. In general, positive and negative aspects of food legislation compliance can be discerned. Positive impacts are the mitigation of failure costs (fewer products abandoned, fewer liability claims and the impact on the attractiveness of products for consumers), whereas negative impacts relate to the costs of compliance and extra administrative burdens that are imposed. Economically, improvements in the legislative requirements are only beneficial to businesses (and there will be a positive attitude towards fulfilling new directives and provisions) if benefits exceed costs.

Measuring costs and benefits of changing food legislation
To grasp the complexity of cost and benefit effects of new legislation, costs and benefits should be conceived as multidimensional concepts. There are methodological and practical limitations in assessing the costs and benefits of legislative efforts. This has brought us to measure costs and benefits using perception scales instead of absolute (money measures). Where we used money measures, the data were heavily influenced by the size of companies, while the spread of size appeared to be big (average size in personnel 6566, SD 34403!).

Before proceeding, we will give a general overview of the measurement limitations. Limitations are vested in, among others, the multidimensionality of cost concept(s)

Multidimensionality
The cost concept can be interpreted in different ways. Examples are integral costs, differential costs, opportunity costs, tacit cost effects (like social and environmental costs), variable and fixed, etc. Impact assessments try to categorise these costs in case new EU legislation is to be adopted by national authorities, as in the cases reposted in box 3.4.

Box 3.4 UK impact assessments

The implementation of Commission Directive 2004/14/EEC in England, Scotland, Wales and Northern Ireland, amending rules for regenerated cellulose film (RCF; i.e. food contact materials) provides a 'positive list' of substances that are allowed to use in the production of cellulose film. Negatively formulated, it prohibits the use of certain substances, which can lead to changes in the production process and product design. Whereas the environmental and social costs are expected to be negligible, given the fact that local authorities already have the duty to control for 'Materials and Articles in Contact with Food' (Regulations from 1987), the extra resource implications to the enforcement authorities were unlikely to be significant. However, administrative costs and investments for businesses are unlikely to be nil we guess.

[30] See: www.gpoaccess.gov/fr

The impact assessment of General Food Law Regulation EC/178/2002 mentions for the introduction of enforcement regulations benefits for diverse stakeholder groups, relating to more effective recalls and withdrawals and better traceability systems. Social and environmental costs were not anticipated. For the large food companies and retailers, the additional costs and competitive implications would be limited, since traceability systems have already been widely installed in the UK. A proposed regulatory requirement in accordance with the commitments in the White Paper on Food safety and Directive 2001/18/EC, a safety assessment, authorisation procedure and food labelling requirements were proposed to limit and make transparent the inclusion of GMOs. An impact assessment makes clear that a transparent and coherent regulatory system is created. It was expected that this would have a positive impact on competition, since business with lower standards with respect to food safety, environmental care and human health otherwise have an unfair advantage over those companies that are strict with respect to creating transparency and adjust their business processes.

Further problems in assessing costs and benefits are: setting borders to the cost concept (indicating what cost categories should be measured), (2) homogenising the methodology of measuring costs and benefits is another, (3) a-causality, occurrence of negative costs, opportunity costs and accounting diversity is yet another.

A-causality

As an effect of food legislation often the costs that have to be made are carried by one supply chain member, whereas the benefits are collected by another. For example, in the Finnish Salmonella Control Programme, necessary because of the Zoonoosis Directive 92/117/EEC (1992), the surveillance and control measures focus mainly at the level of primary production, whereas the benefits are harvested at the last stage of the chain, the consumer (Maijala et al., 2005). A Dutch study on campylobacter (Havelaar et al., 2005) showed similar effects. The fact that costs can occur in one stage of the supply chain and benefits can be harvested in another makes it difficult to assess the net effect of new requirements.

Negative costs (benefits)

Some legal requirements not only impose burdens on the companies in a certain country, but also cause benefits, like extra sales due to better labelling and informedness of consumers. Should these extra benefits be treated as a 'negative' cost factor in assigning the impact of implementation of EU directives in national legislation? More and more, consumers are put central in the discussion about the design of food supply chains (see for example: Dagevos, 2005), the costs being borne by the businesses and the benefits being harvested at the end of the supply chain. The companies can only earn back their costs by means of non-market (subsidies) and market (price) incentives. However, according to Gellynck et al. (2006), the effect of information about meat safety on consumer trust through labelling, traceability and QA systems is only limited. The willingness-to-pay should be considered in conjunction with the isolation paradox (Randall, 1999 referred to in: Maijala et al. (2005)). For a single company, taking measures is difficult and expensive if the other companies in the supply chain do not share the goal (Maijala, 2005).

Benefits can be divided into direct effects to sales and lower production costs and indirect effects on the image of companies (and through a better image and effect on the value of businesses and supply chains). The direct effects on sales (turnover) will only occur if the transparency of the system allows consumers to assess the improved quality/hygiene of procurement and if consumers appreciate the improvements by either buying more and/or at higher prices. Labelling can improve the transparency of the system and thus have a positive effect on consumer preferences and demand (see in this respect: Van Rijswijk et al. (2006)).

Benefits can be created by reduced production costs. In general, managerial priorities show that immediate costs and benefits impact managerial behaviour more than long-term effects. Arihara (2006) states that novel functional meat products are not easily marketed, since these products are unconventional and there is a negative image of meat and meat products, which are perceived as bad for health (perceived high fat level and cancer-promoting). The author concludes that there is an urgent need to provide information on the physiological value of meat and functional meat products. With respect to soybean consumption, research by Schyver and Smith (2005) showed that despite the positive health consequences of soybean consumption, many consumers were unaware of them and a negative image was associated with the product (supposed cancer effect).

Opportunity costs
As already stated, some legislation will not only create additional costs, but also cause reduced turnover (for example products that are withdrawn following new legislation). Should reduced benefits be considered as costs? The administrative burden discussion in the Netherlands has excluded these effects from the administrative cost concept. In policy discussion supported by this study, given the fact that this effect can influence the competitive position of individual businesses and sectors on a national and international basis (reduced exports), they should be taken into account.

Accounting diversity
Accounting diversity refers to the fact that accounting principles for the assessment of costs and benefits are different between EU countries. So even if we can categorise costs and benefits of new legislation, the national effects can be measured in different ways, depending on the specific principles used. One example is the measurement of the administrative burden as a consequence of a (change of) legal requirement. Administrative burdens are defined by authors and legal authorities in different ways. Administrative burdens are measured by the Ministry of Financial Affairs of the Netherlands by means of a 'standard cost model' (Meten is Weten, Ministry of Financial Affairs, The Hague). Administrative loads are defined as the costs that are made to comply with the information requirements as a result of rules and laws of government (based on a method developed by the Dutch Institute for SMEs (Instituut Midden- en Kleinbedrijf). A new policy to reduce administrative loads for private enterprise by 25% in 2007 in grants advantages in sectors and in general has been installed in the Netherlands (see in this respect: Suyver and Tom, 2004: 4-5).

The conclusion that can be drawn from this section is that (1) measuring costs in an 'objective' way is not easily performed, and (2) costs are strongly connected with the benefits that are caused at the same time. For example, Bata, et al. (2006) measure the costs of HACCP adoption by distinguishing between costs of development, installation, certification and operational maintenance. Another example is the positive association that was reported between the level of HACCP implementation and exports to US, Japan, Korea etc (43% of sales of companies with a fully implemented system were exports, see Maldonado et al., 2005).

Internal legal costs
Internal legal costs are the internal negative (company level) effects of non-compliance to food safety requirements. Non-compliance can mean that, for example, foodstuffs are not marketed, personnel suffer health problems or that lack of food safety causes social and environmental problems which intrude on the 'licence to produce'. There is a complementary 'other side of the coin': compliance can positively influence company level gains. Drivers for internal costs and benefits mentioned here, are:
– the organisation's innovation capabilities;
– the capability to export;
– the capability to specialise.

Cost estimates
As explained above, it is hard to measure the different type of costs (monitoring costs, information costs opportunity costs) of food legislation for businesses. It is therefore not surprising that not many research studies are available. In this study we focussed on perceptions, but we were unable to identify (net) costs either.

In the Netherlands, the Ministry of Public Health (Bex and Duits, 2006) published a study on the costs of food legislation. This was estimated at € 939 million per year, of which €404 million was the result of the national implementation of European laws. Important cost drivers were Hygiene and Labelling. A study by the UK FSA (see box 3.4) on the impact of the General Food Law concluded that 'relevant control systems are in place' in British companies. Costs for Hygiene and HACCP were estimated at £96.1 million per year. A study on HACCP compliance costs in dairy and meat businesses in Italy, the UK and the Netherlands (Romano, 2005), estimated them at 0.7 to 3% of turnover. The study concluded that 'costs are justified, there are benefits'.

A study in Danish food businesses (Baker, 2006) looked at differences between businesses. This study concluded that winners and losers depend on the quality of the management of businesses, not so much on the type of legislation. This is in line with many studies in primary agriculture that conclude that management levels differ, especially in SMEs, and are important for the long term viability of the company (Poppe and van Meijl, 2006). Companies with a high level of management have lower compliance costs and focus on opportunities and growth. Others have more problems and are more often dependent on government support.

Concluding remarks

Legislation changes from time to time. EU Food legislation is characterised by a continuous flow of updates and new regulations. As disclosure of legislation is not structured, this creates additional problems. The Official Journal is chronological, consolidation and codification are an exception and the EU website is not official. The connection between Regulations and national legislation is problematic.

Interviews suggest that the bigger food companies outsource the burden of staying informed or incorporate the activity of keeping informed fairly easily in normal management practices of specialised staff. This makes it difficult to measure costs. Small and medium-sized enterprises (SMEs) are not able to solve the problem that easily. They have a less formalised management style. The size-effect is however not confirmed by Baker (2006) nor by our own questionnaire.

To cope with the changes in legislation a number of solutions are possible. One solution is the introduction of a regulatory rhythm. The US system of continuous codification and structured disclosure could be copied as a best practice. Compliance assistance (see also previous section) and more self-regulation (see section 3.7) also contribute to alleviating the problems of changing legislation.

3.6 Innovation and pre-market approval

The ability to innovate is an important aspect of the competitiveness of the EU food industry. In innovation studies, a distinction is made between different forms of innovation (Jongen and Meulenberg, 2005; see also CIAA 2005). In the case of the application of known technologies, we talk about product improvement or range extension. The general requirements on safety and the use of ingredients apply. Labelling requirements may present a bottleneck. The second is bringing known products to new markets. In our research this would mean exporting from the EU or importing into the EU. If new technologies are applied, we talk about product development.

It can be seen as an unwritten principle of EU legislation that FBOs are free to bring food products to the market unless specific provisions decree otherwise. FBOs may apply new recipes, new ways of combining, new ways of preparing and new ways of presenting their products. Exceptions to this principle are addressed below.

As far as legislation is concerned, the general requirements apply to safety, including traceability and consumer information in particular through labelling.

The question is, whether EU legislation hampers innovation activities and what special legislative activities/factors have such an influence (see table 3.14). We asked respondents to reply on a 7 point scale (1=totally applicable, 7 = not applicable at all) to the question: 'Our company feels restricted in innovation by (obstruction)'. (N=36-43). The table and annexing figure shows that for the sample, 'Novel Food requirements' are most restrictive for innovation, although the score (4.19) is almost in the middle of the scale from 1-7. The relatively high SD indicates that there are strong differences between the respondents.

Box 3.5 Fraunhofer study

A groundbreaking project on the impact of the regulatory framework on innovation was carried out on behalf of the European Commission (DG Enterprise) by the Fraunhofer Institute for Systems and Innovation Research. The final report was issued in 2004 (Fraunhofer 2004). It was based on several case studies one of which focused on the EU food industry (Menrad 2003). The current study focuses on EU food legislation which by the token of its aim to assure a high level of human life and health and protection of consumers' interest (Art. 5(1) GFL) is mainly - in the wording of Fraunhofer - 'social regulation' with a touch of 'administrative regulation' in particular as far as it is concerned with the free movement of goods within the EU (Art. 5(2) GFL). Fraunhofer is very critical in its assessment of EU food legislation: 'Unclear competences and regulations or very restrictive market approval procedures impede new products or even the establishment of new markets' (Fraunhofer 2004). This conclusion is based on three case studies: Functional Food, GMOs and organic food products. In the interim report on the EU food sector it is concluded among other things that: 'a situation of legal uncertainty or non-harmonised regulatory conditions between the different Member States often impedes innovation activities and may result in loss of market opportunities'.

Table 3.14 Restriction for innovation according to companies

	Mean a)	Standard deviation
General food safety requirements	4.88	2.1
HACCP	5.07	2.1
Traceability	4.72	2.1
System (ISO etc.)	5.19	2.0
Administrative requirements	5.22	1.8
Allergy	4.62	2.3
GMO	4.19	2.3
Hygiene codes	5.02	2.1
Novel Foods requirements	4.19	2.1

a) Score on a 7 point scale (1= totally applicable; 7= not applicable at all).

Food product development

Over the last ten years the number of exceptions to the freedom to market food products has rapidly increased. Products that are not normally consumed as a food or that do not have a history of safe use in the EU are subject to pre-market approval requirements.[31] On top of this, pre-market approval requirements are currently being introduced for claims made on functional foods.

Additives

The use of additives[32] (like anti-oxidants, preservatives, colours etc.) is forbidden unless explicitly authorised. Authorisation takes place in so-called positive lists. These lists are annexes to the applicable directives, stating which additives may be used in which foods. One interviewee pointed out that additives relate to the concept of innovation in different ways. On the one hand they provide opportunities for innovation. The more additives there are available, the more new compositions and recipes are possible. According to this interviewee, additives often contribute to food safety. This is particularly the case with preservatives. On the other hand additives receive a reluctant reception from many consumers who perceive them as artificial. In this context another interviewee described a trend of 'clean labelling'. This is a policy followed by an increasing number of producers to use as little food components as possible to avoid mentioning ingredients on the label that might deter certain consumers. In particular 'unnatural' ingredients and ingredients with chemically sounding names are avoided.

31 And also to novel food contact materials, see Regulation 1935/2004.

32 Framework Directive 89/107 defines the concept of additive in Article 2 as: any substance not normally consumed as a food in itself and not normally used as a characteristic ingredient of food whether or not it has nutritive value, the intentional addition of which to food for a technological purpose in the manufacture, processing, preparation, treatment, packaging, transport or storage of such food results, or may be reasonably expected to result, in it or its by-products becoming directly or indirectly a component of such foods.

Pre-market approval of new additives is altogether a different matter. Only the biggest companies stand a chance of successfully concluding a procedure. Very recently the Commission introduced a proposal for a new regulation on additives. The interviewee who addressed this proposal welcomed the attempt to reform the procedure to become less political and more objective.[33] One interviewee drew attention to the system of E-numbers. This interviewee considered this system to be a total failure. Consumers do not understand the information contained in these numbers. They perceive them as something to avoid. For this particular interviewee, this provided an advantage in competition because he produces alternatives (with enzymes) to which no E-numbers apply.

Interviewees pointed out that in practice it is very difficult to convince the European Commission to rely on existing safety assessment or similar evaluation or even to take it into account. They are said not to be interested in judgments by the FDA or JECFA. JECFA is the joint FAO/WHO committee on food additives. It is not just an outside player. The EU is represented in it. This approach of the Commission is not very helpful on a global market. Countries in Asia and South America are far ahead of the EU as far as recognition of evaluations is concerned. An interviewee strongly recommended that in future the Commission should take external evaluation into account when deciding on market approval for the EU (see also CIAA, 2005, p. 11). At the Rijswijk expert meeting and to some extent also at the Brussels expert meeting, this suggestion was endorsed.

Novel foods

Most interviewees avoided initiatives that might bring them within the ambit of the Novel foods regulation (Regulation 258/97). They agree that this road is closed but for the biggest players (because of the costs of scientific substantiation, time involved (three years on average)[34] in the procedure and the unpredictability of its outcome).

As discussed in the section on the clarity of legislation, the ambit of the novel foods regulation is unclear for interviewees and experts. They have difficulty distinguishing cases to which the procedure applies from those to which it does not apply.

One interviewee advised to take a history of safe use of a food outside the EU into consideration in approving novel foods.

Genetically modified foods

Several interviewees were careful to avoid GMOs because of consumer preferences. It is business policy and in particular its understanding of consumer preferences that impedes innovations through genetic engineering of food products in the EU, rather than the complex nature of the regulatory system. However one interviewee took a radically different stance. This interviewee from retail indicated that they had 72 GM products on their shelves. Sales matched conventional products. However, suppliers feared that their names would be associated with genetic modification and insisted on supplying from alternative sources. For this reason, only three of the original 72 products remain today.

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33 On 28 July 2006 the Commission introduced four proposals: Proposal for a Regulation of the European Parliament and of the Council establishing a common authorisation procedure for food additives, food enzymes and food flavourings, COM(2006) 423 final, 2006/0143 (COD); Proposal for a Regulation of the European Parliament and of the Council on food additives, COM(2006) 428 final, 2006/0145 (COD); Proposal for a Regulation of the European Parliament and of the Council on food enzymes COM(2006) 425 final, 2006/0144 (COD); Proposal for a Regulation of the European Parliament and of the Council on flavourings and certain food ingredients with flavouring properties for use in and on foods, COM(2006) 427 final, 2006/0147 (COD). In conformity with the new policy on legislation, impact assessments of these proposals have been made. See: http://ec.europa.eu/food/food/chemicalsafety/additives/prop_leg_en.htm.

34 DG Sanco published a list on its website of applications that have been received under the novel foods regulation. Four applications have been refused. The decision was reached between six months and 3 years after the application. Twenty-two authorisations were granted. The time involved varied between nine months and eight years. The average was a little under three years. Nine applications were withdrawn after three years in average. Twenty-six applications were pending, the longest for six and a half years.

Functional foods and claims
Foods - as opposed to pharmaceuticals - that are brought to the market under the claim that their consumption has a specific beneficial effect on certain health factors or bodily functions are also known as functional foods. There is no specific regulatory framework for functional foods. They have to comply with general food safety requirements. If they are new, they have to go through the pre-market approval procedure. Otherwise the general rule of free marketability applies. With regard to the claim however, coming legislation requires prior approval. Most interviewees that addressed the issue of claims shared the view that the requirements that have to be met under the proposed Health claims regulation are too high.

Pre-market approval
Most interviewees agreed that the pre-market approval procedures for additives, novel foods, GMOs and (health) claims are beyond reach for the vast majority of food businesses in the EU. Legislation reserves this type of innovation to the happy few. But even for them, life is not easy. Each pre-market approval requirement has its own procedure. Harmonisation is limited. If you choose the wrong procedure, you cannot simply switch, but have to start all over again.

No help from the authorities can be expected in finding the right procedure or negotiating it successfully. Interviewees worry whether the authorities will meet their deadlines. One of them provided an example of a procedure that took fourteen years to complete. One of the problems perceived by interviewees is uncertainty on the range of pre-market approval schemes. Does the application of a certain preparation technique bring the food within the ambit of the Novel foods regulation? Does this application of a genetically modified organism in processing bring the food within the ambit of GM legislation? Is this information concerning the product a claim under the Claims regulation? Etc.

Interviewees advise devising a simple procedure to answer preliminary questions. In particular the decision that a certain procedure does not apply (negative clearance) can be most helpful to open up to innovation. DG competition has developed an informal form, the so-called comfort letter, in which the Commission gives its interpretation on the legal situation. Similar practices would be most welcome in food legislation.

Statistics
Since innovation is a driving force behind competition, the respondents were asked about the extent to which European food legislation favours or hampers innovation in comparison with major competitors. Excluding Croatia (that serves as a mirror/benchmark for the other organisations included in the questionnaire) and excluding those companies for which the questions are not relevant, the results are given in table 3.15 (1 = big advantage; 7 = big disadvantage; range of N = 31-42).

Table 3.15 Opinions of companies on the effects of EU legislation on innovation compared to four types of competitors

	Big companies EU	Small companies EU	US companies	Third world companies
Number of respondents	41	42	33	31
Mean a)	4.20	3.71	4.30	3.52
Standard deviation	1.327	1.019	1.287	1.180

a) Score on a 7 point scale: 1 = big advantage; 7 = big disadvantage.

In general, only the position towards third world companies seems to deviate from the neutral (4) position; no special advantages and disadvantages can be discerned for the other categories. This picture is confirmed if we include Croatian companies (N=7); also in that case the response tends to neutral, with a slight advantage towards third world companies.

Capability to export and import

One of the interviewees, a FBO active in flavourings, pointed out that it is very difficult to import from the US. Imports from the US are severely hampered by EU requirements. In particular products of animal origin remain in the customs warehouses for a long time. EU authorities are suspicious of American products among other things because American legislation is more open to gene technology and less strict in traceability. Everything is checked before a consignment is cleared.

Box 3.6: Respondents on imports

Answers to the question whether interviewees feel advantaged or disadvantaged by EU legislation in importing to the EU are mainly neutral. They indicate slight but not significant advantages for small companies in the EU and companies in developing countries and disadvantages for big companies in the EU and companies from the US.

According to another interviewee, hygiene requirements in the US are similar to the EU, but if a specific factory has not been approved for export to the EU, it is impossible to obtain products from the factory concerned. 'We have to find alternatives or give up a certain line of production'. This remark shows that approval from exporters is not only in the interest of the exporter concerned, but also in the interest of the customer in the EU. Some importers would welcome a structure in which they could acquire clearance for the products they import without depending on the exporter.

The hypothesis is that high standards on the home market give the exporting company an advantage as 'made in EU' becomes a hallmark of safety and quality. One of the interviewees explicitly subscribed to this hypothesis, adding that being used to high standards helps to adapt to foreign standards.

As we have seen above, the high liability risks on the US market prevent some exporters from the EU doing business in the US. This also illustrates that companies which are established on markets with high standards may experience a competitive advantage over companies established on a market with lower standards, at least as far as competition on the same market is concerned.

Competing with third countries on EU market

Interestingly, a large exporter from Croatia considers the overhaul of EU food legislation an advantage in competing on the EU market. Normally, this FBO said, when you enter a new market you have a disadvantage compared to companies that are already on the market because you have to adapt to a new environment, while your competitors are accustomed to the situation. Currently it is easier to penetrate the EU market because established competitors also have to adapt to a new situation and feel too uncertain to respond quickly to the new competitor. This company feels slightly advantaged by EU food legislation compared to companies from the EU. Most important however, is not the legal system but the termination of financial barriers to trade.

At the expert meeting in Münster, it was pointed out that EU companies are disadvantaged if laxer standards are applied to exporting FBOs in third countries than to companies on the home market. An example was given from beef and cattle imports. One of the experts was in contact with integrated animal production businesses in a third country producing for export to EU. In situ they prepare animal material for feed. It is fed to animals that are exported to EU. Thus meat comes to the EU market from animals that are fed in a way that is not acceptable in the EU. By EU standards that should be considered as a BSE hazard and furthermore it distorts competition. According to this expert, the producers say it would be easy not to use this feed for animals exported to the EU, but so far EU inspectors have not required them to do so.

At the expert meetings in Rijswijk and Brussels it was pointed out that third countries discuss with the European Commission the conditions for their industry to export to the EU. Negotiations regarding export from the EU on the other hand are undertaken by individual member states. Consequently the Commission's bargaining power helps competition from third countries enter

the EU market but does not help businesses in the EU access third country markets. As the Commission's bargaining power is greater than that of the member states, this situation disadvantages EU companies compared to competing companies from the US or Japan.

Furthermore, for companies operating in more than one member state, the impractical situation occurs that it can export products from some member states but not from others.

The advice to the European Commission is to take the interests of the European food sector more into account when negotiating import and export conditions.

There appears to be a wide variation in the perception of the impact of food legislation on activities, so no definite conclusions can be drawn on the basis of the data we collected. Data on the relative effects of food legislation on activities of companies in comparison with American companies show a stronger bias towards 'relative advantage'. This can be explained by the fact that strict European Food Legislation negatively influences the relative competitive position of US companies. This interpretation would be in line with the perception of exporters in the US. They feel very much restricted by EU food legislation, to the point where they wonder if the EU is deliberately erecting barriers to trade. Requirements for beef and cattle change so often that exporters wonder if this is done to keep them off the market: first hormones, then traceability and the latest is animal welfare. Soy producers consider it almost impossible to export to the EU due to GMO legislation. For some relatively small producers, however, a niche market is emerging for non GM soy. Demand from the EU and Japan may yield prices that make up for additional costs and loss in quality.[35]

Specialisation: the space for traditional production

99% of the food businesses in the EU are small and medium-sized enterprises. Many of these produce traditional products, applying traditional production methods. Diversity in ways of producing is important for the vitality and versatility of the economy.[36] It provides the backbone for decisive reaction in the face of unexpected developments. Not unlike evolution in nature, (bio)diversity is also a source for innovation. A similar opinion has been voiced by CIAA (2005). One interviewee indicated that small enterprises can respond faster than bigger companies. They can respond spontaneously and have a product the next day. According to this interviewee the biggest hurdle is the labelling requirements.

Small-scale producers of traditional regional products perceive hygiene legislation as by far the biggest threat to their way of doing business. Traditional production sometimes depends on national derogations from hygiene requirements. For example, Italian legislation[37] states that the ban on selling food products which do not comply with EU hygiene legislation does not apply to direct sales by producers or producers' organisations of typical regional products to consumers within the region concerned. It is questionable if at the time of issuing, a sufficient basis in EU law was available for this approach. The new Hygiene regulation 852/2004 remedies this but only with regard to primary products.[38] Some national derogations from the hygiene requirements are possible with the aim of enabling the continued use of traditional methods, at any of the stages of production, processing or distribution of food.[39]

The implied notion that the safety of traditional production methods, like the safety of food products, cannot only be based on science but also on a history of safe use was also expressed by one of the interviewees who stated that the know how of producers should not be underes-

35 Soy is very sensitive to moisture. The right moisture level is usually achieved by blending. This technique cannot be applied in case segregation (identity preservation) is required to comply with EU non-GM standards.

36 In the opinion of the EESC, small and artisanal FBOs are of strategic importance in connection with quality policy as they are the very businesses which can help to promote diversity. Opinion of the European Economic and Social Committee on 'Hygiene rules and artisanal food processors' (2006/C 65/25), OJ 17.3.2006, C 65/141, nr. 3.8.

37 Legge 21 dicembre 1999, n. 526, pubblicata nella Gazetta Ufficiale n. 13 del 18 gennaio 2000 Supplemento Ordinario n. 15 (Art. 10(8)).

38 Article 1(2)(c) Regulation 852/2004.

39 Article 13 (4)(a)(i) Regulation 852/2004.

timated. Often they have a professional sense based on experience even if they cannot scientifically explain why a certain approach is safe. Science should not approach this kind of know how scornfully, but should take inspiration from it for further investigation. As an example, this interviewee indicated that from an HACCP point of view, the use of wood as food contact material is often shunned. Recent research however indicates that it has hitherto unknown pathogen reducing properties.

Protected indications
Companies that lack the financial resources to distinguish themselves through investing in trademarks or patents can profit collectively from the possibility to use protected designations of origin and protected geographical indications that exist for agro-food products that comply with certain requirements (Regulation 510/2006). A new regulation adds to this range a protected designation for traditional products (Regulation 509/2006). Member states can support their home businesses to take advantage of these possibilities.

Concluding remarks
The majority of the respondents and interviewees refrained from innovation that requires premarket approval (new additives, novel food, GM foods, health claims). Four reasons are cited: uncertainty in applicability of the approval process, uncertainty in outcome of the approval process, costs and time (for novel foods almost 3 years in average). These are therefore processes for the happy few.

Innovation could be supported by further harmonisation. This includes parallel procedures for different types of pre-market approval, and recognition of judgements of FDA and JECFA. Preliminary procedures, negative clearance and compliance assistance could also help. Fatal deadlines for authorities (surpassing a deadline means automatic permission) could speed up the approval process.[40]

3.7 Overdose of control

Appraisal: 'operating' the food safety assurance systems
Implementing food safety requirements creates operational costs. The administrative expenses are the most prominent. A question was asked whether the administrative loads are justified by the results of food legislation renewal. The respondents (including Croatia, N=47) scored 2.77 on a 1-7 point scale (SD 1.507, 1 meaning full acceptance, 7 not accepted at all). The perception depends on the administrative burden that is already experienced. Excluding Croatia, the score shows a lower level of acceptance of the increase of administrative burdens. Table 3.17 shows, that if we exclude companies with a domicile in Croatia, the answers are less promising with respect to the administrative burden.

Table 3.16 Opinions of companies on the acceptability of administrative burden

	Number of respondents	Mean a)	Standard deviation
The administrative loads are acceptable in the light of the results	44	3.27	1.531
Higher administrative loads are acceptable if higher food safety is achieved	47	2.77	1.507
Lower food safety is acceptable if lower administrative loads are achieved	47	5.66	1.619

Score on a 7 point scale: 1 = totally agree; 7 = do not agree at al. N=47.

[40] For examples see the last paragraph of this chapter.

Table 3.17 Opinions of European companies on the acceptability of administrative burden

	Number of respondents	Mean a)	Standard deviation
The administrative loads are acceptable in the light of the results	17	3.41	1.326
Higher administrative loads are acceptable if higher food safety is achieved	19	3.37	1.383
Lower food safety is acceptable if lower administrative loads are achieved	19	4.74	1.910

Score on a 7 point scale: 1 = totally agree; 7 = do not agree at al. N=47.

One interviewee indicated that the burden of implementing new legislation would be alleviated if a fixed date could be chosen each year (or better still every second year) as the end date of transitional periods of new legislation. In this way companies could concentrate their efforts to adapt to new legislation and then have the opportunity to consolidate and fine tune before a new round started. The Italian system for traditional products mentioned above provides an example of such a regulatory rhythm in practice.

3.7.2 The role of self-regulation

Prevention costs are costs which are made to prevent a-conformity with legal requirements. During 1999-2003, the US Food and Drug Administration reported a total of 1307 processed food product recalls (Kumar and Budin, 2006). The authors conclude that preventive measures (like HACCP and RFID) can reduce product recalls.

In this context self-regulation comes to bear. The most important legal instruments available for self-regulation are contract law and association law. On the basis of agreements based on the former and membership obligations in articles of association based on the latter, elaborate constructions can be erected. They are made visible through certification. The certificate is the proof to customers and consumers but also to public authorities that the agreed standard has been met. Loss of certification is the ultimate sanction on underperformance.

Food chain integration

Hypothesis has it that the increase in food safety requirements leads to an increase in food chain integration, i.e. vertical cooperation within the food chain. The underlying thought is that where retailers and brand holders are held responsible for the safety they provide consumers, they will want to control their inputs through contractual arrangements structured in quality assurance systems and enforced through third party audits (see for example Loader and Hobbs, 1999). Food chain integration often leads to a concentration of power at the end of the chain. This in turn may call for the creation of countervailing powers earlier in the chain through horizontal cooperation between small-scale producers. Most interviews confirmed this image both with regard to increased cooperation and with regard to power accumulation at the end of the chain.

Motives for self regulation

Motives for self-regulation are manifold. It may be used as a tool to comply with public law requirements or to deal with shortcomings in the regulatory system. In this context it may be used as a way to demonstrate that requirements have been met and that inspections need not have high priority.

Where a public law system is absent, self-regulation may be used to avoid situations that might necessitate the legislature taking action in a direction less favourable to industry. It may also serve as an instrument to deal with differences in legal requirements from various countries that apply to links in international chains. Importers may for example use private law arrangements to ensure that products comply with EU requirements although they are produced under a different public law regime. Companies may even apply it to uphold requirements that in public

law would be considered barriers to trade that have to be removed as a consequence of WTO agreements. In this context one can think of non-trade concerns in the context of sustainability and animal welfare (Freriks forthcoming).

An expert at the expert meeting in Münster was of the opinion that the legislature was outsourcing its work; not by strait forward deregulation or privatisation, but by default. This expert considers the quality of EU legislation to be so poor that industry has no alternative but to re-regulate.

Last but not least, public law requirements set the minimum standard that applies to all on the market. Private law standards may aim at higher levels to distinguish products in the eyes of consumers.

Quality assurance systems

Elaborate self-regulatory schemes have been laid down in quality assurance systems developed by retail chains in the UK (BRC) and continental Europe (EurepGAP). As a result, the data show that investments in BRC, ISO and HACCP are quite common among the respondents (table 3.18). Of the 48 respondents who answered the question whether investments are made in HACCP systems, 40 totally agreed (score 1); 3 scored 2; and 3 scored 3 (mean score 1.44).

Table 3.18 Extent to which companies have invested in HACCP

Valid	Frequency	Percentage
1 totally applicable	40	83.3
2	3	6.3
3	3	6.3
4	0	0
5	0	0
6	0	0
7 not applicable at all	2	4.2
Total	48	100.0

Table 3.19 Opinion of companies on the restrictive effects of HACCP on innovation

Valid	Frequency	Percentage
1 totally applicable	5	11.9
2	1	2.4
3	4	9.5
4	7	16.7
5	2	4.8
6	5	11.9
7 not applicable at all	18	42.9
Total	42	100.0

HACCP requirements do not seem to restrict innovation on average (table 3.19), but there is a wide spread in opinions (mean score 5.07, SD = 2.146, N = 42).

As private law quality assurance systems usually go beyond public law requirements, it was presumed that FBOs applying such systems would experience fewer problems in complying with public law requirements. In general respondents confirmed this presumption stating that the systems they apply are helpful in living up to public law standards.

Global Food Safety Initiative

One interviewee elaborated on the Global Food Safety Initiative. A Group of international retailers, the top 20 in the world, developed a benchmark model to harmonise private food safety

standards. Currently only those that have been recognised remain relevant: SQF, BRC, EFSIS, ISO 22.000, IFS, EurepGAP, and the national HACCPs. This led to the guidance Document Global Food Safety Initiative. All major retailers in Europe apply it; similar schemes are being introduced in China and Japan. US depends on the decision that Wall-mart will take.

So far, the big manufacturers are unwilling to go along with GFSI. They have their own Quality Assurance systems that they impose upon their suppliers. A change is in the air. Cargill was the first; Danone is next choosing ISO 22.000.

Costs of self regulation

The costs of quality assurance systems were perceived very differently by SMEs and big companies. SMEs considered private law systems as expensive. Unlike legislation, the standards are not in the public domain but have to be bought as a commercial commodity. Moreover, the audits are a commercial service that have to be paid for. Indications on prices differed. Some auditing organisations charge a fee of €1,500 per inspection. In other cases tariffs per minute apply.

Bigger companies achieve substantial costs reductions through audits. The old situation was that private label companies all did their own inspections. This has now been replaced by third party audits. One interviewee told that a large producer of vegetable oils 'up until 5 years ago was visited by 100 inspectors from customers per year. Today a BRC audit is performed twice a year and that's it. They are happy, we are happy.' At the expert meeting in Rijswijk, it was pointed out that this experience does not apply to all sectors. Where more sensitive sectors are concerned, such as the meat sector, private label companies do not rely on third party audits but continue their inspection practices.

Controls

The controls system that is connected to many private law systems of food quality assurance is third party audit. In this area, self-regulation meets with privatisation. Particularly in meat production, safety and quality inspection that used to be performed by official veterinarians is now being privatised. Interviewees feel that this is to the advantage of big companies and to the disadvantage of SMEs. SMEs are faced with higher costs while big companies can achieve important savings due to economies of scale.

Several interviewees indicated that through privatisation, the legislature is losing its 'eyes and ears'. There is less feed back on the effect of legislation in practice. Furthermore there is less compliance assistance. Private companies are only interested in production, not in the functioning of the law. Where inspectors' time has to be paid by the minute, FBOs also feel little inclined to exchange views with the inspector. The Dutch Ministry of Agriculture is developing a scheme aimed at reducing burdens. The idea is to focus controls on the applied self-control and third party audit systems. If the results are satisfactory, this will be awarded by a reduction of the number of official controls.[41]

Limits to self regulation

In the Netherlands, the competition authority set a limit to the use of quality assurance systems. The big dairy producers representing over 98% of the procurement market for milk, imposed a standard of quality on their suppliers that went beyond public law requirements. The system is called KKM (Keten Kwaliteit Melk - chain quality milk). An agreement between these companies not to accept milk without the agreed KKM quality standard was considered to be in breach of competition law as it virtually excluded milk that complied with public law standards (but no more) from the market. The companies dropped this particular requirement. However the competition authority announced that it would treat any refusal to buy non-KKM milk as a concerted practice infringing on competition law.[42]

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41 Beleidskader Toezicht op controle (toezicht op toezicht) 22.03.2005: http://www9.minlnv.nl/servlet/page?_pageid=100and_dad=portal30and_schema=PORTAL30andp_item_id=102296

42 NMa 14 maart 2000, zaak 1237, Stichting Keten Kwaliteit Melk (see: www.nmanet.nl).

Statistics

We asked to what extent food quality systems are helpful in meeting food safety requirements. For (non-Croatian) organisations using BRC (8), 62% totally agreed on its usefulness, for ISO (9) (33.3%) and for IFS (7), 56%. For EFSIS, 50% of companies using this system totally agreed with respect to the usefulness of the system in coming up to European requirements.

With respect to investments made to fulfil food regulations and requirements, to this question (N=10) the respondents stated that they strongly invested in requirements like traceability systems and HACCP to comply with GMO regulations or administrative requirements. The score on 'Investments in HACCP' was 86.4% (N=22), and in food allergy labelling 66.7%.

Table 3.20 Extent to which EU companies invest in HACCP or allergy labelling

	HACCP		Allergy labelling	
Valid	**Frequency**	**Percentage**	**Frequency**	**Percentage**
1 totally applicable	19	86.4	12	66.7
2	1	4.5	4	22.2
3	1	4.5	0	0
4	0	0	1	5.6
5	0	0	0	0
6	0	0	0	0
7 not applicable at all	1	4.5	1	5.6
Total	22	100.0	18	100.0

3.7.3 Concluding remarks

Food businesses are confronted with an overdose of controls: self controls under HACCP, audits under private standards, official controls by member states and audits of controls by FVO. In addition businesses miss compliance assistance.

Private standards (like BRC, EuroGap etc.) help to comply with legal requirements. They lower administrative burdens, as they are better integrated in business processes. Therefore the recognition of civil audits in official controls could reduce costs. The public system could develop to a system control of private audits.

3.8 Other administrative burdens

We have already looked at external legal effects in section 3.4. Here we focus on labelling requirements, which are of special interest in the relation to the consumer. Food labels inform and improve the possibilities for consumers to choose. Food labels therefore play a vital role in enhancing fair competition.

We asked to what extent companies invest in allergy labelling and in other labelling requirements. The results show that investments for allergy labelling scores high (1.92 on a 1-7 scale, N = 36) and investments in other labelling requirements even more (1.65, on a 1-7 scale, N = 46).

Table 3.21 Investments in different categories according to companies

	Mean a)	Standard deviation
General foord safety	1.69	1.5
Traceability	1.81	1.4
Recalls	2.21	2.4

	Mean a)	Standard deviation
HACCP	1.44	1.3
Hygiene codes	1.79	1.6
Novel food requirements	3.29	2.1
GGO	2.21	1.6
Allergy labeling	1.92	1.6
Administrative requirements	2.30	1.9
Private systems (ISO etc.)	1.74	1.5

a) Score on a 7 point scale: 1 = important investment; 7 = no important investment. N=46.

According to the Dutch food safety authority VWA the labelling of small quantities of product is a disproportionate burden for artisanal producers. VWA advises exempting small quantities from labelling.

3.9 Discussion, conclusions and recommendations

Although respondents expressed quite a few concerns about the EU system of food legislation, they were nevertheless fairly mild when asked for an overall assessment in terms of 'good' or 'not so good'. These mild judgements are in striking contrast to the opinions voiced by the experts at the meeting in Münster. This indicates that as far as FBOs are concerned, fine-tuning is called for rather than large-scale restructuring. Nevertheless, on the basis of the insights gathered in this research, some suggestions for improvements can be made.

Table 3.22 Opinion of companies on the quality of EU food legislation in general

Valid	Frequency	Percentage
1 very good	7	15.6
2	18	40.0
3	7	15.6
4	11	24.4
5	1	2.2
6	0	0
7 not good at all.	1	2.2
Total	45	100.0

Score on a 7 point scale: 1 = totally applicable; 7 = not applicable at al.

Industry subscribes to the importance of food safety and is willing to take its responsibility. As far as the general principals and structure are concerned, EU food safety legislation is on the right track. Consumer responsibility however is perceived by some as slightly underexposed. This is seen as a matter of communication rather than legislation. EU authorities should consider communicating more openly on accepted levels of remaining risk in order to provide consumers with the opportunity to make their own choices.

Conclusions

The competitive position of companies as a response to changes in food legislation is determined by a multitude of factors. The evidence as represented in tables and figures cannot be interpreted well without the text that guides the reader to conclusions. Based on the hard-fact data, it can be concluded that:

- in general, the companies included in the survey have a positive view on the effects of food legislation;
- the standard (quality)/and effects of food legislation is addressed mildly; in general the level of food law is assessed to be fairly good.

Detailed conclusions:
1. the effect of the legal system on the competitive position against the US is not perceived as being a specific burden. In general, the effect is neutral, meaning that the legal system does not place a special burden on the respondents with respect to competitiveness;
2. positive aspects of EU legislation are the promotion of quality and effective competition, whereas the pressure on profitability is not seen as a special burden by a majority;
3. the food requirements also are not distinct in causing problems compared to other sectors (like taxation, social, spatial and waste);
4. Novel foods requirements restrict innovation on average more than HACCP, traceability and other requirements;
5. food legislation should change as little as possible, but without discarding the advantages of improvements;
6. the companies generally do not prefer the US legal environment;
7. increased consumer awareness of food issues stimulates quality and is an effective basis for competition while the thread to profitability is neutral;
8. surprisingly, the informedness of the rules that have to be applied, and even of the expected rules, is high. Nevertheless, change of the legal system must be confronted with the negative effects of increased uncertainty and adaptation;
9. EU legislation leads to sincere investments in food safety, prevention and administrative devices;
10. lower administrative loads are not acceptable if this leads to lower food safety.

Warnings:
– the representativeness of the sample to the total population has not been checked;
– differences between companies are quite high (standard deviations are relatively high);
– more detailed analysis is necessary, but so far not enough detailed data are available; the total sample is 64 valid observations (questionnaires; excluding open interviews), the results of which are included in the report.

Taking on administrative burdens

The Vice President of the European Commission responsible for Enterprise and Industry all but committed himself to a reduction of administrative burdens by 25% over the next five years.[43] Unlike the economic parts of this research, the legal part does not do very much to enhance the sense of urgency of such measures; it does however provide a basis for some measure that may be taken. It may not be as impossible to achieve such high ambition as it might seem at first sight. Nevertheless, fulfilment requires full commitment from the EU to mustering the audacity to take drastic measures, shouldering the burdens lifted away from industry and investing in the necessary infrastructure.

Drastic measures are measures that go beyond the subtleties of the food regulatory system but that address the long established traditions of legislation in the EC too. To some extent the burdens on industry and the burdens on institutions are communicating vessels. The commitment to reduce burdens on industry is therefore intertwined with the commitment to take on costs and workload.

Currently no measure for the existing level of administrative burden exists; it is therefore impossible to express the achievable reduction in a percentage in this report, but the research does provide some clues for measures that can be taken.

Sales and after sales

The perceived burden of legislation is largely influenced by the extent to which the meaning and necessity of the legislation is understood and does justice to the needs and possibilities of businesses. It is therefore adamant that new legislation is well explained to its addressees and that

[43] Kick-starting the EU economy. Speech/06/577, delivered in Brussels at a business round table on 10.10.2006. See: http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/06/577andformat=HTMLandaged=0andlanguage=ENandguiLanguage=en

the legislature - e.g. the European Commission - receives feedback from the addressees on the practical implications of the legislation.

DG Sanco has organised courses to introduce inspectors to EU food (hygiene) legislation. It is very important that inspectors understand the legislation because they visit the FBOs and are thus best placed to explain the reasons and functioning of the legislation. A similar effort in training should be focussed on FBOs and their consultants.

The inspectors are the first officials to be confronted with the practical consequences of legislation. The Commission would be well advised to invest in communication channels to receive the information collected by the inspectors in order to reduce the problems perceived and improve the legislation.

Deregulation

The most straightforward strategy to reduce administrative burdens is, without doubt, reduction of the quantity of applicable legislation through deregulation. Different strategies present themselves. The first is to delete existing provisions. The Dutch food and product safety authority for example, published a policy document in which it announced that it would no longer enforce 20% of the legislation for which it was responsible because it felt that the legislation concerned could not contribute to food or product safety or to animal health and welfare.[44] Other national and European authorities should be invited to draw up similar lists of legislation which they feel is expendable. The second strategy is codification. Codification not only significantly reduces the number of laws; it also eliminates needless repetitions and improves the accessibility of the system.

Improving EU legislation

Long term

Some of the problems that surfaced during this research can only be remedied by improving the structure of EU legislation. For long-term measures, inspiration can be derived from US legislation, in particular its continuous codification and systematic publication.

EU legislation is published in chronological order in the Official Journal. The final result of an amendment to existing legislation is a text stating what has to be changed. Consolidated texts are published commercially by publishers or as a service with no legal status on the EU website. The burden to have the whole picture of legislation in force is on its users. Experience of commercial publishers shows that creating consolidated texts involves solving countless riddles posed by ambiguities in the legislation. Why should not the legislature take responsibility to decide on the final text of legislation in force? This would require a change in legislative procedure as it is currently applied to the effect that the final result would always be a publication of an official consolidated text. Further the legislature could designate each new piece of legislation a place in a well-structured register. In this way the user can find all legislation in force relating to a certain subject at one official place.

Due to the lack of coherent administrative law in the EU many directives and regulations make specific and often differing provisions on procedures. It would enhance accessibility of EU legislation if a codification would be undertaken of general provisions of administrative law as exists in most member states.

Short term

The use in food legislation of regulations addressing national legislatures, leads to confusion. It would be helpful if such hybrid legislation would be explicit on what the national legislatures are required and entitled to do. Probably if regulations state that certain provisions, in particular those holding definitions, may be copied into national legislation, for the specific case the case law decreeing otherwise can be overruled.

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[44] Voedsel en Waren Autoriteit, Handhaven met verstand en gevoel, The Hague, June 2006, available at www.vwa.nl.

Also in the short term, access to documents using ICT can be improved. Anticipating a formal structure of continuous codification and publication through a register, a rigorous policy of continuous consolidation and disclosure through a register can be applied. Password requirements can be minimised and hyperlinks and in particular hyperlink changes can be better managed. Information that is available to some should be made available to all and no copyrights should be retained on regulatory documents.

Improving EU food legislation

The ambition in the White Paper on Food Safety to create clear, simple and understandable legislation on food safety deserves to be revamped.

According to interviewees DG Sanco already does a great job in making official documents including legislation accessible through the Internet. However the legislation itself can also be made more user-friendly.

Long term

Codification of food law could be taken as the final aim of such an operation. Codification has several advantages. It brings the applicable provisions together; the user no longer has to search for them in separate texts. The burden to apply a coherent system, to answer the question how different elements relate to each other is on the legislature and not on the user. It is advisable to take time for this process. First drafts can be seen as authoritative commentary to current legislation. They can be discussed with stakeholders, etc.

Sub codifications can be attempted in clearly defined areas of food legislation. It should be fairly easy to bring all labelling provisions together in one text, probably a regulation. The same is true for the hygiene package. A general code on pre-market approvals might be a third step.

Short term

In the short term, the suggestion made by an interviewee to introduce a 'regulatory rhythm' in food legislation seems very fruitful. The advantages are self-evident. Discussions and actions in the whole sector run parallel and mutually reinforce each other.

A specific issue to be solved is the improvement of risk management separate from enforcement.

Improvement of the most critical parts of EU food legislation

Pre-market approval schemes

The current system of pre-market approvals is probably the greatest barrier to innovation in EU food legislation. At least six measures can be taken: harmonisation, depolitisation, introduction of fatal deadlines, clear responsibilities, fast track procedures and compliance assistance.

Harmonisation: currently each scheme has its own procedure. Novel foods are dealt with at national level, additives, GMOs and claims at EU level each with a different procedure. These procedures should be simplified and unified.

Depolitisation: a major cause of uncertainty in the outcome of pre-market approval procedures is the political character of decision-making. The decision on additives is taken in a legislative procedure including the European Parliament. Other procedures involve the member states through commitology. Politics should focus on the formulation of the applicable criteria. Applying these criteria should be an administrative measure altogether.

Fatal deadlines: Interviewees are very concerned about the length of pre-market approval procedures. They implore the European Commission and the EFSA to rigorously keep their deadlines. They do not however suggest specific actions within the regulatory framework that may guarantee that deadlines are being met. Experience elsewhere, particularly in the notification proce-

dures that apply in competition law to mergers and acquisitions,[45] shows that fatal deadlines for public authorities all but ensure that they do indeed meet their deadlines. Fatal deadlines are deadlines that have the same consequence as a positive decision when they are not met. In other words, legally missing the deadline has the same effect as the decision to grant pre-market approval. The notification procedures in the US seem to work a little in this direction. Food legislation is specific in that it mostly deals with safety. It may therefore require too much courage to equate the passing of time with a decision that a novel food or a GMO is proven safe. In claims however the situation is different. The procedure is not about the safety but about the functionality of the product. Consequences of wrong decisions are therefore less severe. This makes the pre-market approval procedure for health claims an area where an experiment could be undertaken to see whether or not fatal deadlines have the same beneficial effect in food legislation as in other areas of law.

Clear responsibilities: the current situation with regard to GMOs where responsibility to decide shifts between the Commission and the Council depending on the content of the decision to be taken, the advice of EFSA and the meeting of deadlines is unacceptably unclear.

Fast track procedures: a fast procedure should be introduced to answer preliminary questions on the applicability of pre-market approval requirements. This procedure should result in a negative clearance for products that need no approval and an unambiguous decision on which procedure to follow for products that do. For products with a history of safe use outside the EU or that have been approved by an authority outside the EU (like FDA or JECFA), simplified procedures should also apply.

Compliance assistance: much of the burdens of the procedures may be reduced if the authorities actively help the businesses in taking the necessary steps.

Labelling

Labelling requirements are a burden to all FBOs, but in particular to SMEs. As far as possible, they should be simplified. Other information channels than the label should be explored. Information that does not address the consumer has no place on the label. One simple code should direct inspectors and chain partners to the relevant information on the Internet. DG Sanco should create practical instruments (like an exhaustive checklist) to guide FBOs in designing their labels.

Self-regulation

Self-regulation should be supported and encouraged. Businesses are being confronted with a stacking of layers of controls. Food authorities are invited to pursue a policy of decreasing control intensity in situations where private law audits apply that conform to quality standards acceptable for these authorities.

Improving administrative practices

Three types of action seem to be called for: communication, performance and support. If the necessity of legislation is little understood, it seems worthwhile investing in getting the message across. Some interviewees pointed out that inspectors could be the eyes and ears of the legislature. Currently, in the interviewees' perception, inspectors seem to distance themselves from EU legislation. Much would be gained if they could be convinced to act as ambassadors instead.

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[45] See Article 10 (6) of Council Regulation (EC) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings (the EC Merger Regulation), *OJ L 24, 29.1.2004*. See also Commission Regulation (EC) No 802/2004 of 7 April 2004 implementing Council Regulation (EC) No 139/2004 on the control of concentrations between undertakings (OJ L 133, 30.4.2004). Other examples of fatal deadlines can be found in: Article 95 (6) of the EC Treaty and Article 16 (3) of Regulation (EC) No 1760/2000 of the European Parliament and of the Council of 17 July 2000 establishing a system for the identification and registration of bovine animals and regarding the labelling of beef and beef products, *OJ L 204, 11.8.2000, p. 1–10* and Commission Regulation (EC) No 1825/2000 of 25 August 2000 laying down detailed rules for the application of Regulation (EC) No 1760/2000 of the European Parliament and of the Council as regards the labelling of beef and beef products, *OJ L 216, 26.8.2000, p. 8–12.*

Interviewees are very worried that EU officials will not meet deadlines in pre-market approval procedures. Serious efforts in this regard will be much appreciated.

According to interviewees it is very difficult to acquire assistance in attempting to comply with EU legislation. An active policy of compliance assistance is called for.

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White Paper on Food Safety COM(1999) 719 def.

4. Competitive position of the EU food industry sectors in the global and EU market[46]

4.1 Introduction and methodology

This chapter aims to identify the strengths and weaknesses of the European food industry. The food industry is involved in many different products and each product requires a specific processing activity. As an example, processing bakery products from cereals is quite different from processing meat from live animals. The different branches in the food industry are summarised in table 4.1.1. The NACE codes not mentioned in this table are not discussed separately. Some are: NACE 15.7 (manufacture of prepared animal feeds) and several sub NACE 15.8 codes (among others: 15.84 manufacture of cocoa, chocolate and sugar confectionery; 15.86 processing of tea and coffee; 15.87 manufacture of condiments and seasonings). However, these activities are included in NACE code 15 food industry.

Table 4.1.1 Industry branches by NACE-code and short description

Section	Branch	NACE code	Description
4.2	Meat	DA 15.1	Production, processing and preserving of meat and meat products. Concerns meat of all species of animals
4.3	Fish	DA 15.2	Production, processing and preserving of fish and fish products. Includes fish, crustaceans and molluscs. Excludes activities of vessels engaged in fishing, processing and preserving.
4.4	Fruit and vegetables	DA 15.3	Production, processing and preserving of fruit and vegetables. Includes processing and preserving of potatoes, manufacture of fruit and vegetable juices and processing and preserving of fruit and vegetables not elsewhere classified.
4.5	Oils and Fats	DA 15.4	Manufacture of vegetable and animal oils and fats. Includes production of crude oils, non-edible animals' fats, refined vegetables oils, manufacture of margarine and similar edible fats.
4.6	Dairy	DA 15.5	Manufacture of dairy products.
4.7	Cereal based	DA 15.6 DA 15.81 DA 15.82 DA 15.85	Manufacture of grain mill, starches and starch products. Manufacture of bread, fresh pastry goods and cakes Manufacture of rusks and biscuits, preserved pastry goods and cakes Manufacture of macaroni, noodles, couscous and similar products
4.8	Beverages	DA 15.9	Manufacture of beverages Excludes fruit and vegetable juice.
4.9	Sugar	DA 15.83	Manufacture or refining of sugar Excludes sugar confectionery.
4.10	Food industry	DA 15	Manufacture of food products and beverages.

In the analysis the competitiveness of the industry is evaluated on several industry indicators such as Gross Value Added, labour productivity and international trade indicators. In international trade statistics only products are observed. An industry is able to produce different prod-

[46] Acknowledgement: It would not have been possible to conduct the research of this chapter without the assistance of the data analysts: J. van Dijk, B. Koole, E. ten Pierick, B. Pronk, D. Verhoog and H. Wijsman.

ucts. Dairies produce milk, cheese, desserts, butter, milk powder, etc. The products measured in international trade statistics are matched with the industry by experts. Annex C provides the corresponding table of the NACE industry codes and SITC international trade codes.

Table 4.1.2 provides an overview of the importance of the different industry branches in export value as well as in turnover of the industry. The table shows differences in the world export share between different branches, high for dairy and beverages and low for fish and oils and fats. Furthermore the major flows are intra communitarian trade: around 20 to 30% is exported to third countries. The export of beverages to third countries as an exception, is almost half of the total exports.

Table 4.1.2 Exports and production value of the EU food industry

	Exports (average 2002-2004)				Production value 2003	
	EU-25 (incl. intra trade)	EU-15 (incl. intra trade)	EU-15 (incl. intra trade)	EU-15 to third countries	EU-25	EU-15
Branch	€billion	€billion	% world	€billion	€billion	€billion
Meat	25.5	24.0	49	4.1	146.8	137.3
Fish	12.4	11.8	23	2.3	17.6	16.8
Fruit and vegetables	14.9	13.6	44	2.9	45.5	42.4
Oils and Fats	11.7	11.1	24	3.2	28.1	26.5
Dairy	22.6	21.5	71	4.7	107.9	101.9
Cereal based	15.3	14.8	45	4.2	108.4	102.2
Beverages	25.3	24.8	73	12.3	115.3	106.1
Sugar	3.6	3.3	34	1.3	11.7	10.4
Food industry	131.4	124.7	12	34.9	785.2	729.6

Source: Eurostat.

The aim of the research is to assess the competitiveness of EU against the US and other important competitors on the world market. The EU-25 started in 2005, whereas most industry data are available until 2003. For this reason only the EU-15 is benchmarked. The trade data have reporting countries as starting point: trade to third countries either inside or outside the EU. To get a clear picture of the EU outside the community, the trade to third countries has been derived. That means that the export from the EU to third countries (non-EU-15 countries) is benchmarked with the exports from the US and other countries. As is shown in table 4.1.2, EU-15 takes a share of over 90% in the exports as well as the production values of the EU-25.

The presentation in the next section is generally restricted to the EU countries, which are most important for the branch. The selection is firstly based on export value and secondly on the production value. The export value was chosen because the aim is to benchmark the EU on the world market. Not all EU countries will be presented.

The US is always a benchmark country for all products. Some other important countries were also chosen. The export value is also the selection criterion for benchmark countries. This resulted in the benchmark countries: Australia, Brazil and Canada. These countries will be discussed if relevant for the branch. Sometimes an additional country is chosen.

This chapter will discuss all branches as indicated in table 4.1.1. Section 4.10 discusses the food industry as a whole and provides the conclusions. The key findings of each branch are summarised in each first section.

Methodology

The selection of competitiveness indicators is mainly based on those used by O'Mahoney and van Ark (2003) and used by the EU (2005). The method is more extensively described in annex

A and here a summary is given to enable to understand the results in next sections. The selected indicators to quantify the competitiveness of industry, which will be used in this report, are:

– growth of real value added for a specific industry in the total food industry. This reflects the competition for product factors between different industries within a country;
– growth of Balassa index. This index reflects the export specialisation level in one category of goods from one country;
– growth of the export share (absolute deviation) on the world market. This performance indicator reflects the outcome of the competitive process;
– growth of the real labour productivity. This affects the unit labour costs and thus the relative prices;
– growth of real value added reflects the industrial dynamism.

The selected indicators are based on the approach to the theory of international economics. The value added is deflated by the food price index. Several other disciplines also deal with competitiveness (Hack et al., 1998). Some important disciplines are:

– Industrial Economics. This approach is elaborated in the renowned works of Porter (1980, 1990). Porter emphasises strategies (costs and differentiation) as well as the aspects of the value chain;
– Strategic management. Hamel and Prahalad (1994) and Hunt and Morgan (1995) are important representatives of this approach. Enhancing the core competence of the resources is one of the key elements;
– Marketing. Market orientation, product differentiation and innovation are some important key determinant. Fulfilling specific market niches is the major orientation (Deshpande and Webster, 1989).

These approaches generally focus on the decision making of individual firms. The selected approach in this study, based on international economics, is more suited to compare countries and continues building on other approaches used for EU studies (see e.g. O'Mahoney and van Ark, 2003). In the descriptive parts of each industry, several other variables are discussed, such as the consumption, self-sufficiency, import and export patterns of the main countries, the structure of the industry and the leading companies. These variables are related to the outcome of the aforementioned 5 indicators but also provide some evidence to support conclusions related to other scientific disciplines. The variables are presented at nominal level, in order to increase the recognition by stakeholders from the industry. In conclusion, the final overall qualification of competitiveness is based on international indicators, but the descriptive part also gives information linked to the theories based on the decision making of individual companies.

The European food industries will be benchmarked against the US and if the countries have a relevant production for a specific sub-sector also Australia, Brazil and Canada. The selection of these countries is based on the importance of their exports. The benchmark will be presented for each sub-sector. Unless stated otherwise, the EU-15 is selected because the EU-25 started in 2005. Secondly in the benchmark with third countries, the extra communitarian trade figures are used, the intra-EU trade is excluded. Some important countries like China and Japan are not included due to lack of data with an equal detail as the EU and selected countries. Secondly, the 15 EU countries will be presented, benchmarked against all EU-25 countries. In this case the export of each country is taken, including the intra communitarian trade. It also presents the internal EU competition on the domestic EU market.

The aforementioned indicators have different scales. To compare the different scales, the values will be standardised. All variables will have the same dimension and can than easily presented in one figure. Furthermore the mean of these values can be calculated as an indication of the overall competitiveness. In this case, the implicit assumption was that the weight or importance of each indicator is equal.

However this method also has a disadvantage. The standard scores depend on the number of countries and the levels of indicators in the sample: the standard scores are not fixed. If the

benchmark countries or the levels of indicator change, the position of a specific country will also change.

The terminology to qualify the competitiveness is taken from the SWOT analysis method: Strong and Weak. These are relative qualifications: how does the performance compare to other countries. The selected countries affect the qualification. The qualification might be quite different if other countries are selected as benchmark.

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4.2 Meat products: competition from low cost countries

Peter van Horne and Robert Hoste

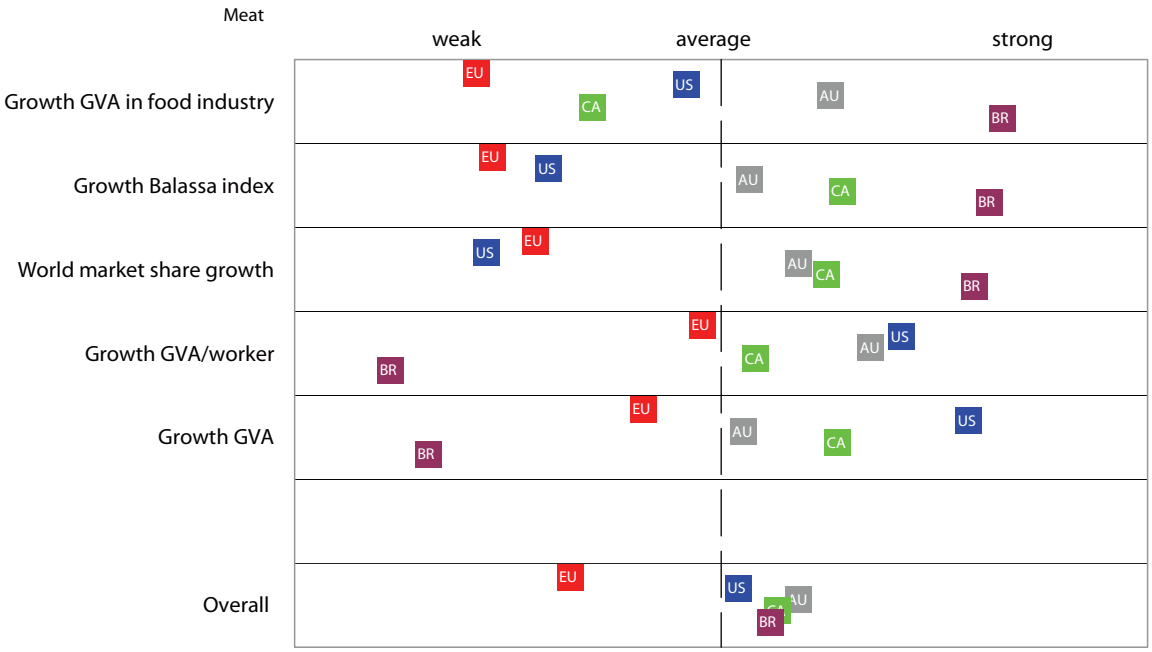
4.2.1 Key findings

The EU is a leading exporter of meat: net exporter for pork and poultry and net importer for beef. Major flows are trade between EU countries. The trade balance in meat of the EU developed negatively: the surplus decreased. The EU has a negative trade balance for beef. International trade is mainly based on frozen, cooked or further processed meat products. The EU industry should focus on the production of fresh products for the demanding European customer. In this market segment the local industry has an advantage over third countries.

The competitiveness of the EU meat industry is weak. Third countries like Brazil and Argentina have competitive advantages in meat production as a result of relatively cheap inputs like feed (abundance land for forage and cereal production) and labour. Large and reliable livestock supplies and low labour costs combined with economies of scale are key factors contributing to the competitiveness of the meat industry. Due to higher labour costs, the US has these advantages to a limited extent. The need for consolidation will be a key issue in the meat industry. Only bigger companies with an adequate scale can exploit the opportunity to supply the different preferences for particular meat cuts between countries.

The EU meat industry is currently protected by trade barriers, such as high import tariffs, quotas and sanitary protection. Due to recurrent outbreaks of animal diseases and the fact that outbreaks are difficult to foresee, global meat trade is and will be restricted and less structured.

Figure 4.2.1 Overall competitiveness of EU and major competitors



The competitors are not consistently strong in all competitiveness indicators. The Brazilian meat industry is growing in importance within their food industry and on the export market. The Brazilian growth of real value added and labour productivity is weak. The opposite applies to the US. On average all competitors are stronger than the EU-15.

4.2.2 Introduction

World market

Meat plays an important role in food consumption. Different types of meat are produced and consumed: pork, poultry, beef, sheep and goat and various other meat types. Beef and ovine meat production typically originate from grass-fed animals. Pigs and poultry are omnivorous animals and fed mainly with compound feed. In general these animals are kept inside and rather footloose to production areas of feed. The 2006 forecast for total meat production in the world amounts to 272.5 million tons (carcass weight equivalent). In the EU-25 it amounts to 41.3 million tons, 15.1% of the world meat production (FAO, 2006). Delgado et al. (1999) predict an increase in meat demand to 303 million tons in 2020. China is a large meat producer with over 50% of the pork production and one third of all meat production. Chinese exports amount to just 3%, below the countries used in the benchmark. China however is expected to become a large net meat importer in the future, given an expected major increase in meat consumption caused by increasing income and wealth of the Chinese, in combination with a limited national feed/food supply which also competes with human food demand.

Table 4.2.1 Production of meat in the world in and some countries (mln. tons)

Country	Year	Pork	Poultry	Beef	Sheep and Goat	Other
EU-15	1995	16.1	8.0	8.0	1.2	1.0
	2002	17.8	9.2	7.5	1.1	0.9
	2006	18.1	7.6	7.2	1.0	0.9
EU-25	1995	18.7	8.8	8.5	1.2	1.0
	2002	21.5	11.0	8.1	1.1	1.0
	2006	21.6	9.7	7.9	1.0	1.0

Country	Year	Pork	Poultry	Beef	Sheep and Goat	Other
US	1995	8.1	13.8	11.6	0.1	0.2
	2002	8.9	17.3	12.3	0.1	0.2
	2006	9.7	18.7	11.9	0.1	0.2
Australia	1995	0.4	0.5	1.8	0.6	0.0
	2002	0.4	0.7	2.0	0.7	0.0
	2006	0.4	0.8	2.2	0.7	0.0
Brazil	1995	2.8	4.2	5.7	0.1	0.0
	2002	2.8	7.2	7.3	0.1	0.0
	2006	3.1	9.7	8.6	0.1	0.0
Canada	1995	1.3	0.9	0.9	0.0	0.0
	2002	1.9	1.1	1.3	0.0	0.0
	2006	1.9	1.2	1.5	0.0	0.0

Source: FAOstat, 2006 forecast (FAO, 2006).

About half of the production and consumption of meat in the EU-25 is pork. The production of pig and poultry meat is growing and the production of beef and ovine meat is declining. The same development is evident in the EU since 1995. The forecast of the FAO indicates a decrease in 2006 for poultry and beef in the EU. Pork production increased in all countries, quite strongly in the US and Canada. Brazil shows a strong increase in poultry and beef production. Sheep and goat meat is of less importance in the total meat production: EU-15 and Australia are the most important producers.

Europe is the largest exporter of meat, but also the largest importer. If the intra trade within the EU member states is excluded, the EU-15 is the second largest exporter after the US. The figures in table 4.2.2 show that Australia, Brazil and Canada increased their share on the world export markets, which is in line with the production growth as mentioned in table 4.2.1. China, the world's largest pork producer, is the next biggest exporter after these countries. This country is not chosen as benchmark due to the lack of data.

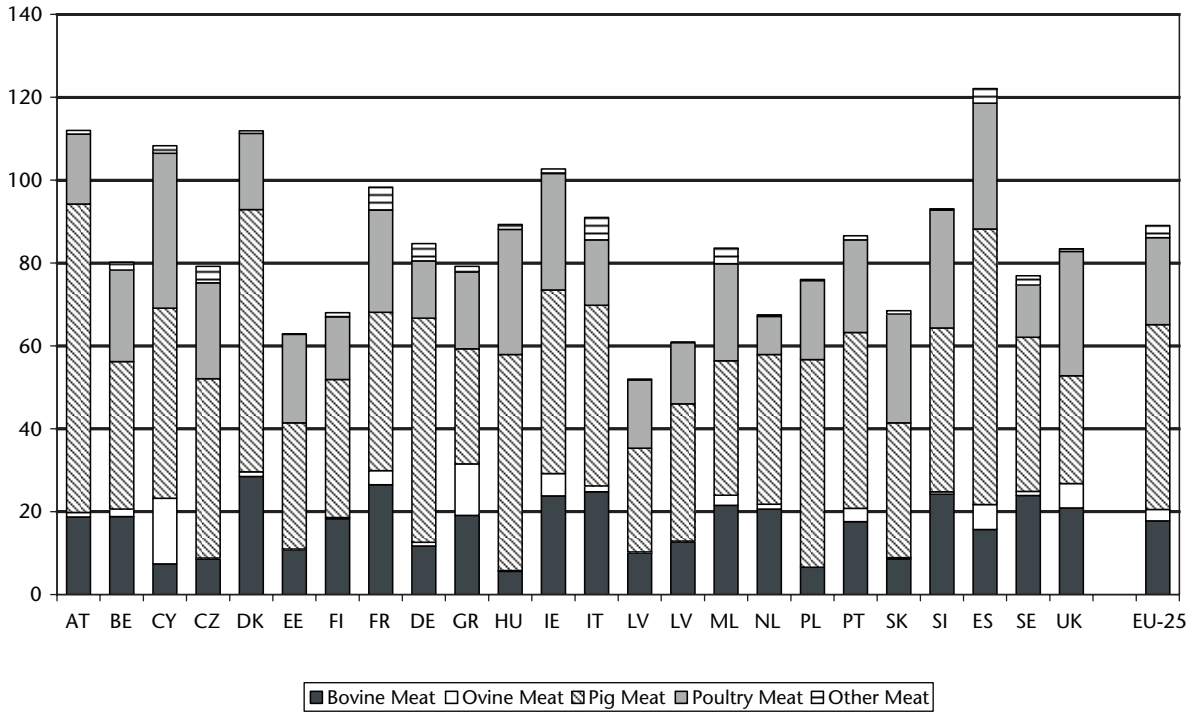
Table 4.2.2 Major exporting and importing countries in meat

Region/Country	Export share			Import share		
	'96 - '98	'02 - '04	difference	'96 - '98	'02 - '04	difference
EU 25	57	52	-5.3	51	48	-3.0
EU 15	54	49	-4.8	50	47	-3.3
EU 15 < > non-EU	11	8	-2.4	9	9	0.3
United States of America	15	12	-3.3	6	9	2.8
Netherlands	11	9	-1.7	3	4	0.9
Brazil	3	8	4.5	1	0	-0.4
Denmark	9	7	-1.2	1	1	0.2
Germany	5	7	2.1	12	8	-3.8
Australia	5	7	1.5	0	0	0.2
France	9	7	-2.8	8	6	-1.6
Canada	4	6	2.0	2	2	0.1
Belgium/Luxembourg	7	6	-1.0	3	3	0.2
New Zealand	4	5	0.6	0	0	0.1
Ireland	4	4	0.1	1	1	0.3
Spain	3	3	0.8	2	2	0.0
China	3	3	-0.2	0	1	0.9

Consumption per head

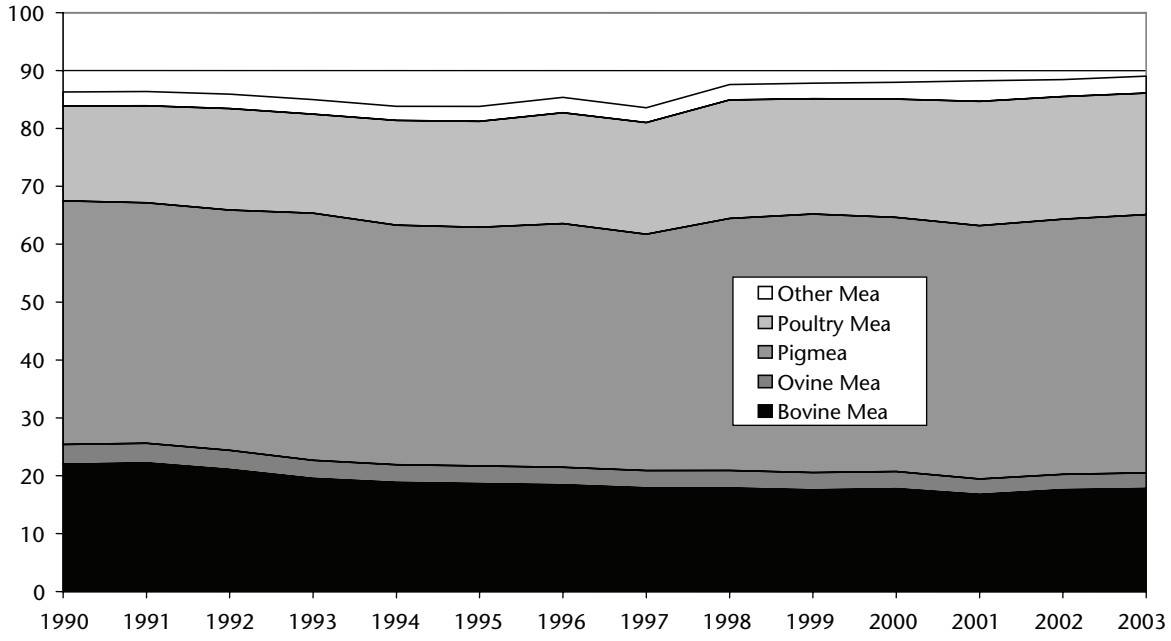
Consumption volume and pattern differ between countries. About 40% of all meat consumed in the world is pork, followed by poultry meat at 30%, and beef at 25%. EU-25 consumers are important meat consumers, with annually 89.0 kg per head, compared to 40.3 kg per head in the world in total. Pork and poultry meat consumption in the world is growing. Figure 4.2.2 shows the meat consumption per EU member state and per type of meat.

Figure 4.2.2 Meat consumption per member state and type of meat in 2003 (kg per head)



Source: calculations based on FAOStat data.

Figure 4.2.3 Meat consumption trend per type of meat of EU-25. Years 1990 - 2003



Competition: Balassa index and share value added.

The variation in meat consumption between countries is huge: from 52 kg per head in Latvia to 122 kg in Spain. Ovine meat consumption is also high in Cyprus and Greece, followed by moderate consumption in Ireland, UK and Spain. The main type of meat is pork with Austria, Denmark and Spain consuming over 60 kg of pork compared with UK, Latvia and Greece with less than 30 kg. Poultry meat is preferred in Cyprus, Hungary, UK and Spain. Beef is less preferred in Hungary and Poland, whereas the Danish and the French consume over 25 kg of beef per head and year.

Figure 4.2.3 shows the development of meat consumption in the EU-25 since 1990. Meat consumption in the EU-25 increased slightly from 86.3 kg in 1990 to 89.0 kg per head in 2003. A shift is found towards less beef and sheep and goat meat (-19% and -21%) and more pork (+6%) and particularly poultry (+28%). Also other meat (game, rabbit, horse) increased by 20% over this period.

Table 4.2.3 shows the highest Balassa index for Denmark, indicating that Denmark is very specialised in meat export, but of declining importance. Meat export is also relatively important for Brazil and Australia. Brazil shows the highest growth of the revealed comparative index. Meat export of the EU-15 (intra-trade excluded), is less than 1, which indicates relatively low importance. The trend is negative; it is becoming even less important.

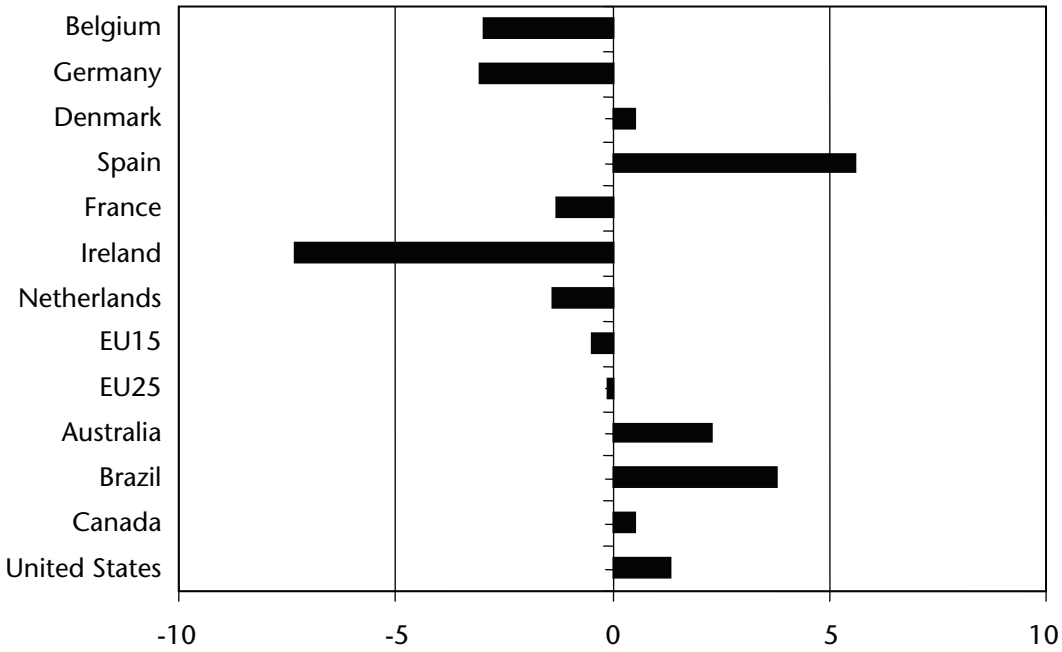
Table 4.2.3 Revealed comparative advantage (Balassa index) and growth rate from '1996-1998' to '2002-2004'

Region/Country	1996 - 1998	2002 - 2004	annual growth %
EU-25	1.3	1.2	-0.4
EU-15	1.3	1.2	-0.0
EU-15 < > non-EU	0.6	0.5	-3.2
United States of America	1.2	1.1	-1.0
Netherlands	3.0	2.8	-0.7
Brazil	3.4	7.7	14.8
Denmark	8.9	8.3	-1.1
Germany	0.5	0.7	6.8
Australia	4.7	6.5	5.5
France	1.6	1.3	-3.0
Canada	0.9	1.5	9.1
Belgium/Luxembourg	1.9	1.5	-3.7
New Zealand	14.7	19.4	4.8
Ireland	3.3	2.9	-2.5
Spain	1.2	1.6	5.1
China	0.8	0.4	-10.4

The performance on the domestic market is compared to the food industry as a whole. Thus if the share of real value added of the meat industry in the total food industry grows, the meat industry performs better than the whole. Figure 4.2.4 shows that the major competitors of the EU have a fairly high annual growth of the share of the meat industry in the food industry, whereas the EU-15 and also EU-25 countries have a slightly negative annual growth. This shows a rather negative competitiveness of the EU compared to the competitors. Within the EU there is a variation in annual growth, with Poland as a very strong grower, followed by Spain and Italy. Ireland and Germany have negative growth figures.

Some developments can be discussed. Spain appears to be quite a strong grower. Currently (2006) however, the growth of meat production and export is expected to stagnate. The Netherlands, on the other hand, has had a cut in pig numbers forced by policy measures; growth of value added in the meat industry in 2006 is likely to grow.

Figure 4.2.4 Annual growth of the real gross value added at factor costs: share meat industry in food industry



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.2.3 Global trade performance

The major trade flows of pork and poultry are shown in figure 4.2.5. Beef is mainly exported from South America to North America, Europe and the Middle East and North Africa and from Australia and New Zealand to the Far East. Sheep meat is exported from Australia and New Zealand to all regions in the world.

Self-sufficiency

The EU degree of self-sufficiency of total meat, and of pork and poultry meat in particular, is just above 100%. The EU is a net importer of beef and sheep/goat meat (figure 4.2.5). Import and export just show a small part of the total meat production and consumption. Exports amount to some 5 - 6% of the production and imports even less. The majority of the production is thus consumed within the EU-25.

It should be stated that export or import can involve specialised meat products. In general, the self- sufficiency rate of pork is 102% while the EU exports pig belly to Japan, South Korea and Taiwan and spare ribs to the US and imports a small amount of pork from Chile, for example. In poultry, the EU exports leg meat to Russia while importing breast meat from Brazil and Thailand.

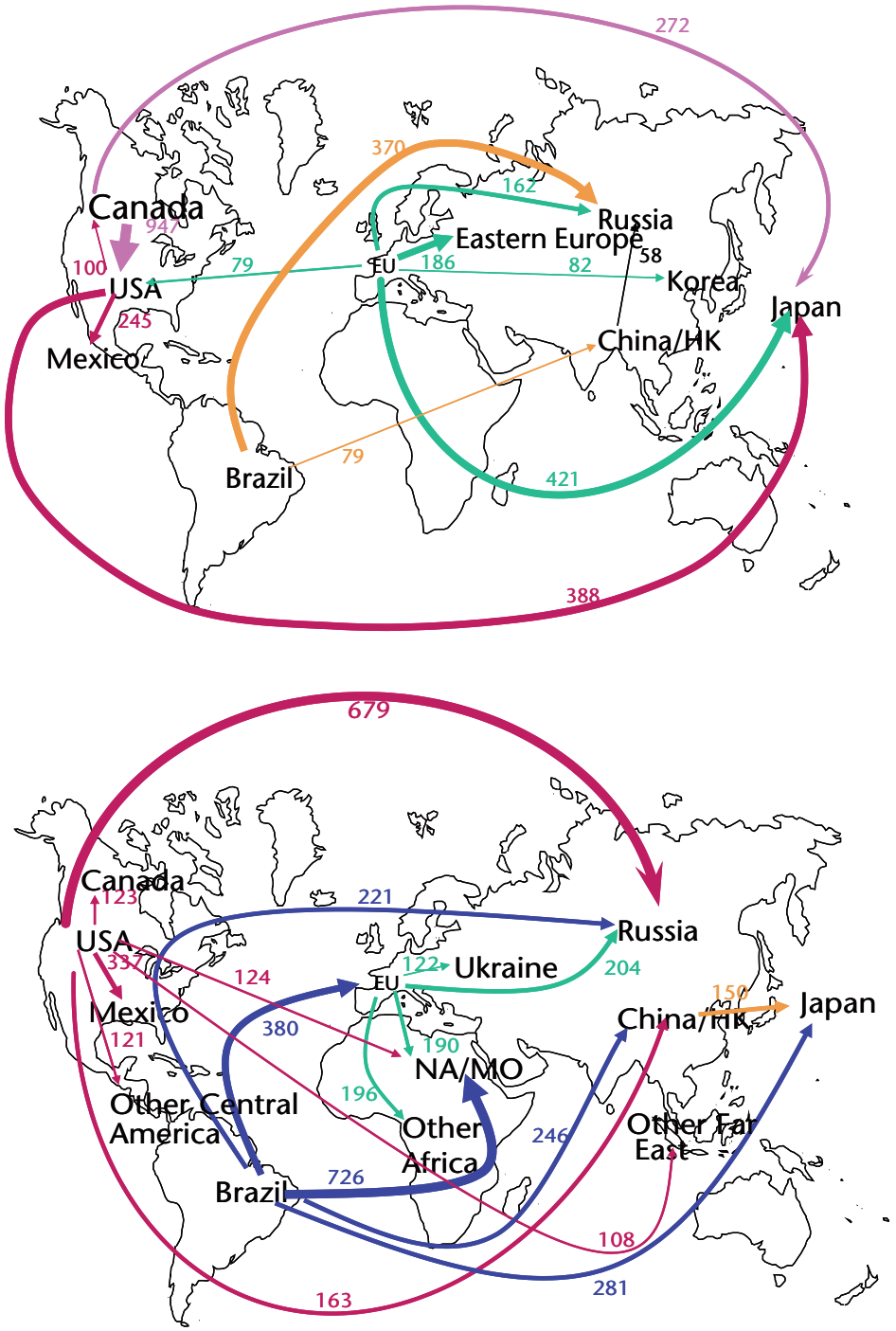
Trade patterns

Historically, meat was produced, processed and consumed locally. Driven by large scale retailers and decreasing profitability of the meat processing industry, the scale of processors increased. The meat trade is also becoming more and more international.

The main meat exporters are the US (poultry and pork), Australia (beef, sheep), Brazil (poultry, beef and pork) and Canada (pork and beef). The largest net importers are Germany, UK (both pork) and Japan (pork meat, poultry and beef). See figure 4.2.7.

The EU-15 and 'EU-15 without intra trade' perform less well than the benchmark countries (figure 4.2.8). The new members show a stronger growth in import than in export value, which results in a negative development of the trade balance for these countries. Brazil shows the

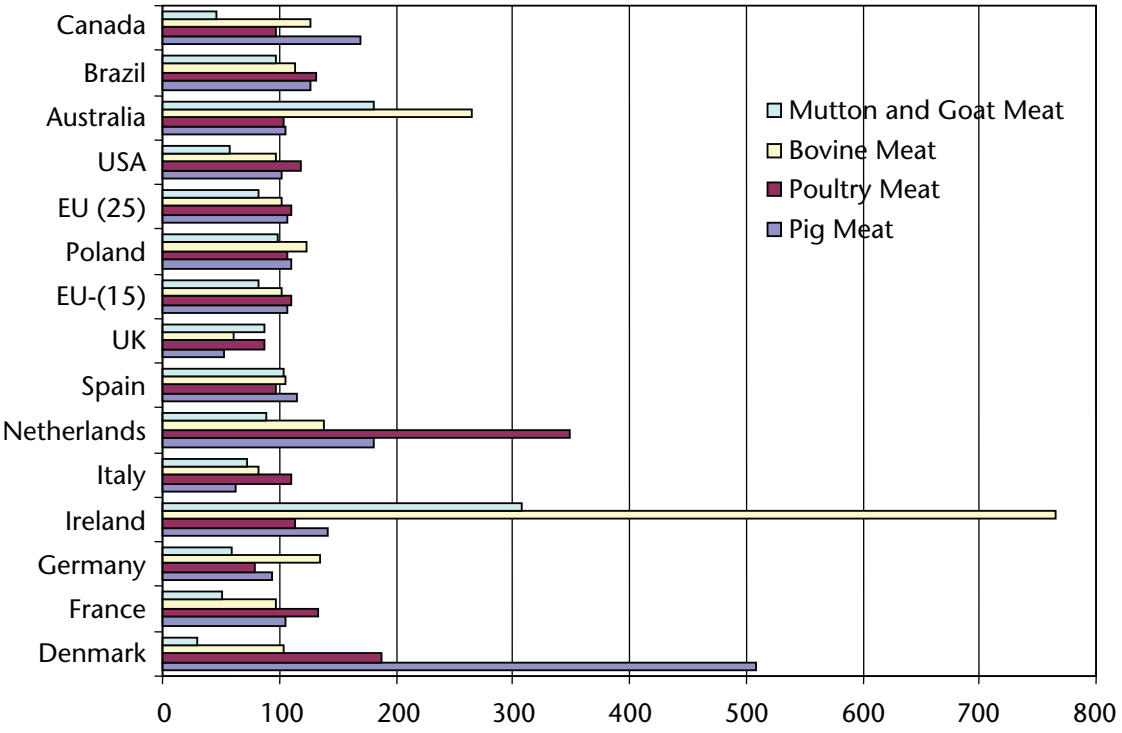
Figure 4.2.5 Major trade flows of pork (A) and poultry meat (B) in the world (figures in '000 tons, year 2004)



Source: PVE, 2006.

strongest export value growth, followed by Canada. Growing importers are Mexico, the Republic of Korea and also the US. The US shows an increase in imports, whereas the exports are hardly growing. The Russian Federation, as a fairly important export destination for countries like Brazil, shows an increase in import value. Within the EU Germany and Spain have the highest growth.

Figure 4.2.6 Self-sufficiency degree for meat (different meat types, year 2002)



Prices

Differences in price levels are determined by the quality of the meat (i.e. fat content) and type of the meat product (degree of processing, plus consumer preference, e.g. tenderloin or shoulder meat). Finally, price differences give an indication of differentiated products of exporting countries and/or the profitability for export markets. Japan as an import market for both of the meat types show high prices, whereas Brazil typically has the advantage of low cost of production and low sales prices. But also the export prices of the US are low compared to the EU-15, Canada and Australia (figure 4.2.9).

Main products in detail

Although meat is mainly a commodity, different markets demand different products. A range of differentiated products can be produced from one animal. For example, broilers provide breast meat, legs or wings and pigs supply legs, shoulder, ribs and bellies. Besides different product types from one animal, the so-called slaughter quality determines the suitability for particular markets, mainly weight and fat content of meat parts.

The meat industry is involved in a number of activities, such as slaughtering, deboning, processing and (pre)packing. After slaughter, the carcasses are cut into primals (like ham, loin, belly, and shoulder) and are further processed, often based on the animal muscle structure. A large number of different meat cuts can be produced: luxury parts, e.g. tenderloin, but also ingredients for processing meat products like bacon, sandwich filling, sausages or minced meat. Fresh pork in the retail store is often made of moderate weight, rather lean pigs. Southern European countries (Italy, Spain) import fat, heavy legs. For pork, a major market is the English bacon market, made from medium or light-weight pigs and mainly supplied by the Danish and Dutch meat industry. Spare ribs are exported to the US and legs and vice versa. The industry for meat products requires common cheap meat parts (e.g. shoulder meat). With regard to poultry meat, an important distinction should be made between breast meat, leg meat and wings. Especially in north western European countries, there is a high demand for breast meat. Beef is produced from high-quality beef animals, but also from culled dairy cows (low quality).

Figure 4.2.7 Import and export of meat products, three years average of values

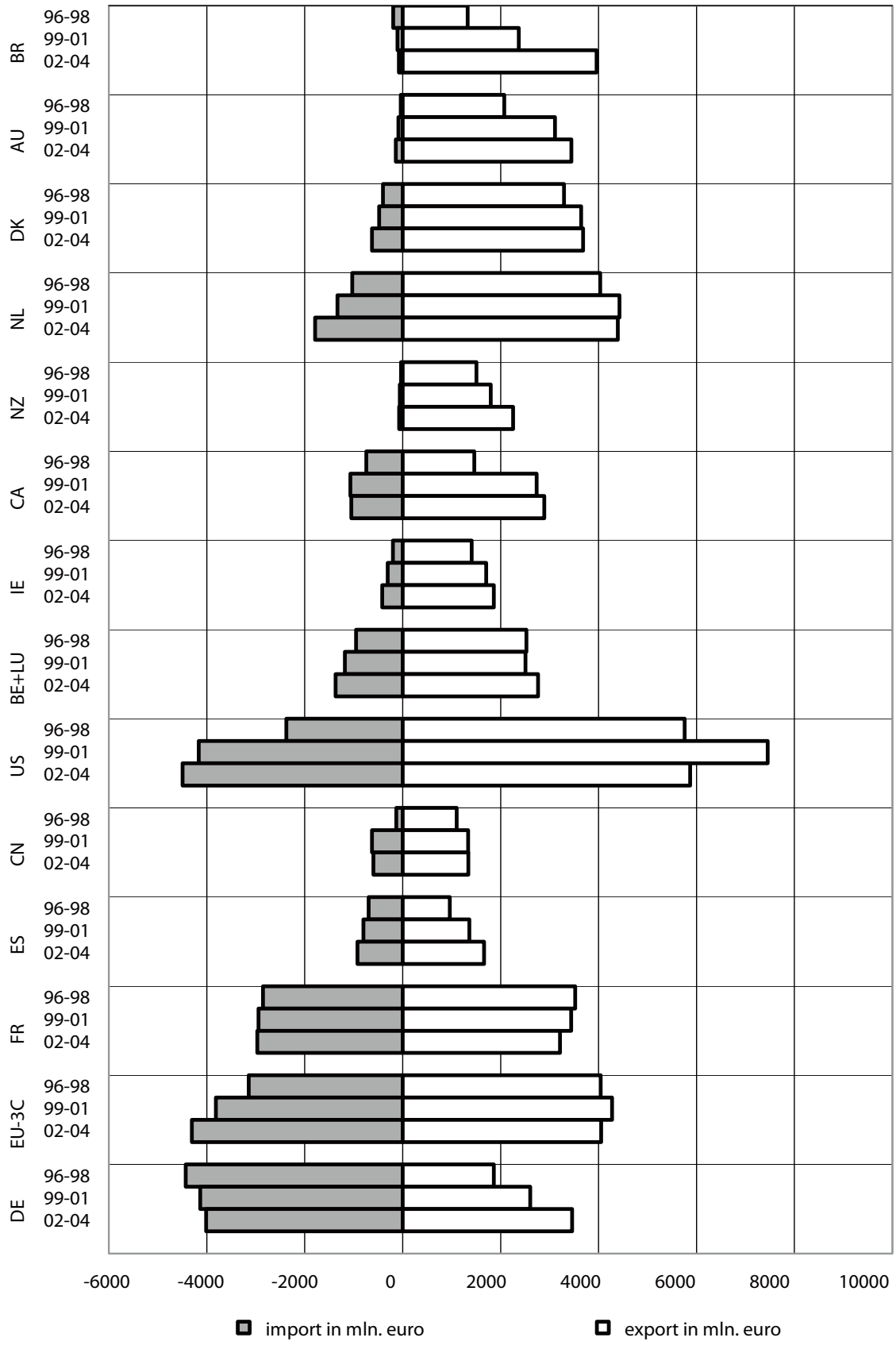


Figure 4.2.8 Annual import and export growth of meat products (% per annum)

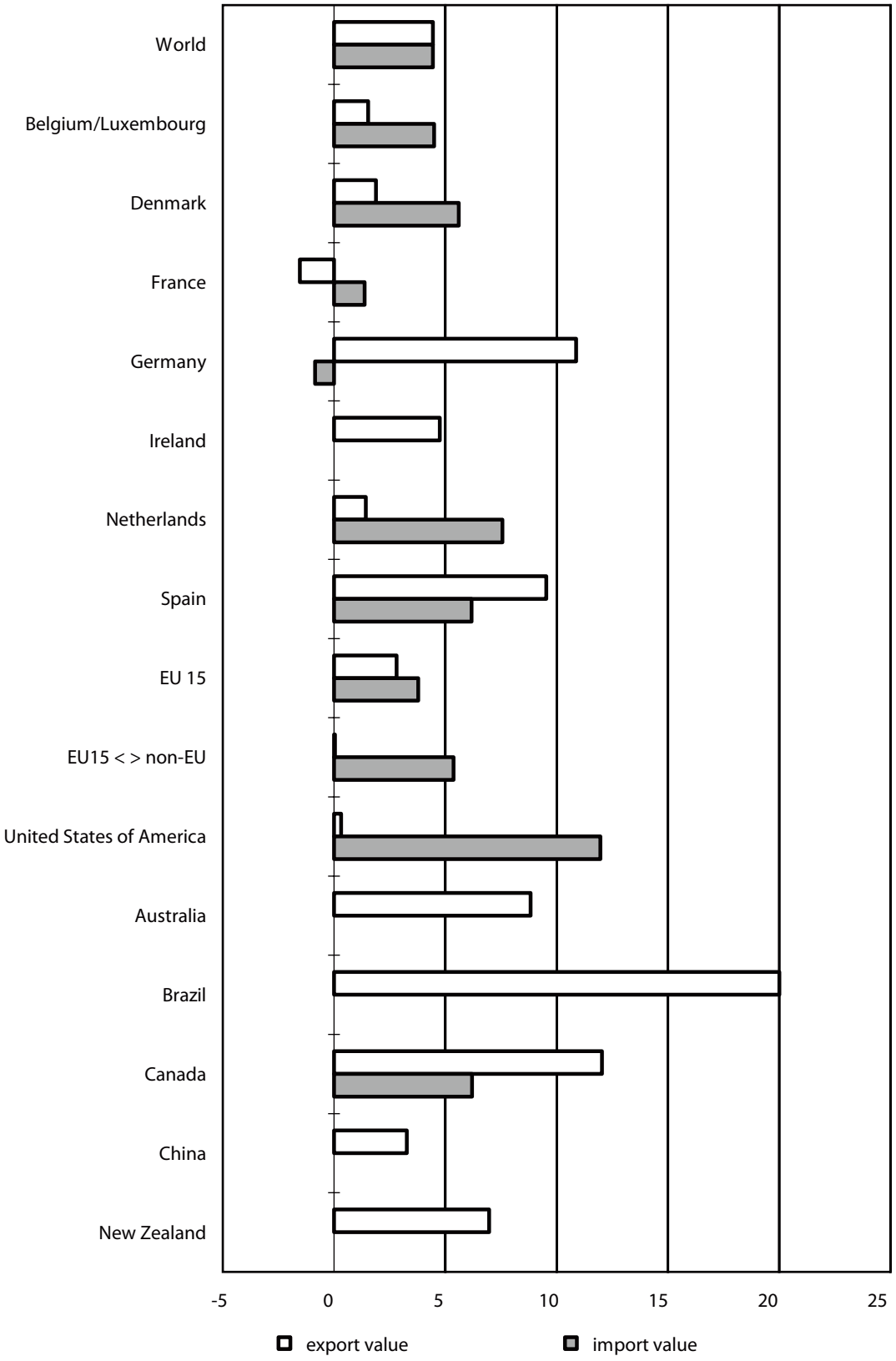
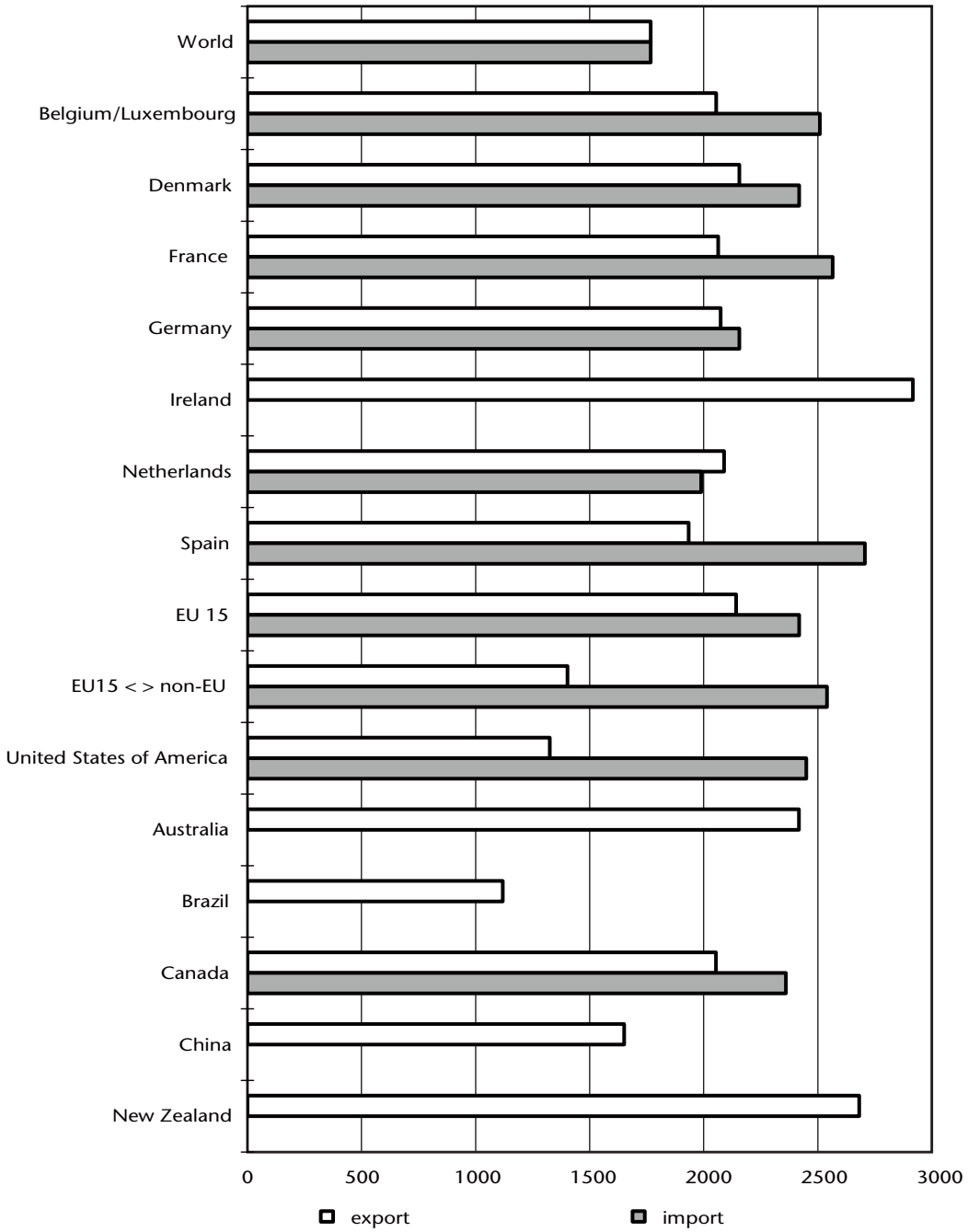


Figure 4.2.9 Import and export prices of meat



The majority of meat could be characterised as a commodity product, where quality differences are fairly small and price is a very important feature in trade. However, other features could play an important role in trade relations, like (perception of) suppliers' trustworthiness, available volumes to supply, physical proximity, ability to adapt to cut-out specifications, flexibility in supply volumes on a weekly or even daily basis, terms of payment, etc., as well as consumer concerns such as animal welfare, sustainable production conditions or the application of tracking and tracing in the supply chain. The meat trade is therefore not simply commodity trade.

Special high value added products, like local meat products, are often based on (a selection of) commodity meat, sometimes however based on meat from special breeds or husbandry conditions (pata negra in Spain, Pietrain breed, organic pig farming). These products are produced for a small market in European terms, but give a high margin for the industry.

4.2.4. Business performance and competitive process

Characteristics of the meat industry

The EU meat industry has a production value of almost 150 billion Euros a year (table 4.2.4). This is about 10% above the US and more than ten times Brazil's and Canada's production.

With regard to production costs, the purchase of goods (mainly slaughter animals) takes a share of over 90% in the turnover in Europe, almost 70% for the US and Brazil and 80% in Canada. Personnel costs take 68% of the value added in Europe, some 30% for the US and Brazil and 45% in Canada.

Table 4.2.4 Key characteristics of the meat industry (values in mln. €)

	EU15		EU25		US		Australia		Brazil		Canada	
	1999	2003	1999	2003	1997	2002	2001	2003	1999	2003	1999	2003
Number of enterprises	43979	39632	52249	46179	3397	3971	N.A.	N.A.	1194	1615	580	790
Production value	119298	137301	127487	146804	99986	129236	8967	9225	10764	12251	9138	12731
Value added at factor costs	26516	28585	27466	30421	26703	42158	1714	1884	3203	3653	2109	2829
Purchases	107235	117714	115783	128897	73366	87311	6100	6044	7168	8206	7541	10306
Personnel costs	18865	19509	19854	20702	8777	13389	1089	1156	1099	980	1022	1280
Number of employees	752265	747120	967052	953317	464991	505976	55800	52500	210320	295186	55074	65091

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

6.5 persons are employed per € million production value in Europe, 4 to 5 in the US and Canada and 24.1 in Brazil. The production value per employee is thus highest in the North American countries, whereas Brazil is far behind both North America and Europe.

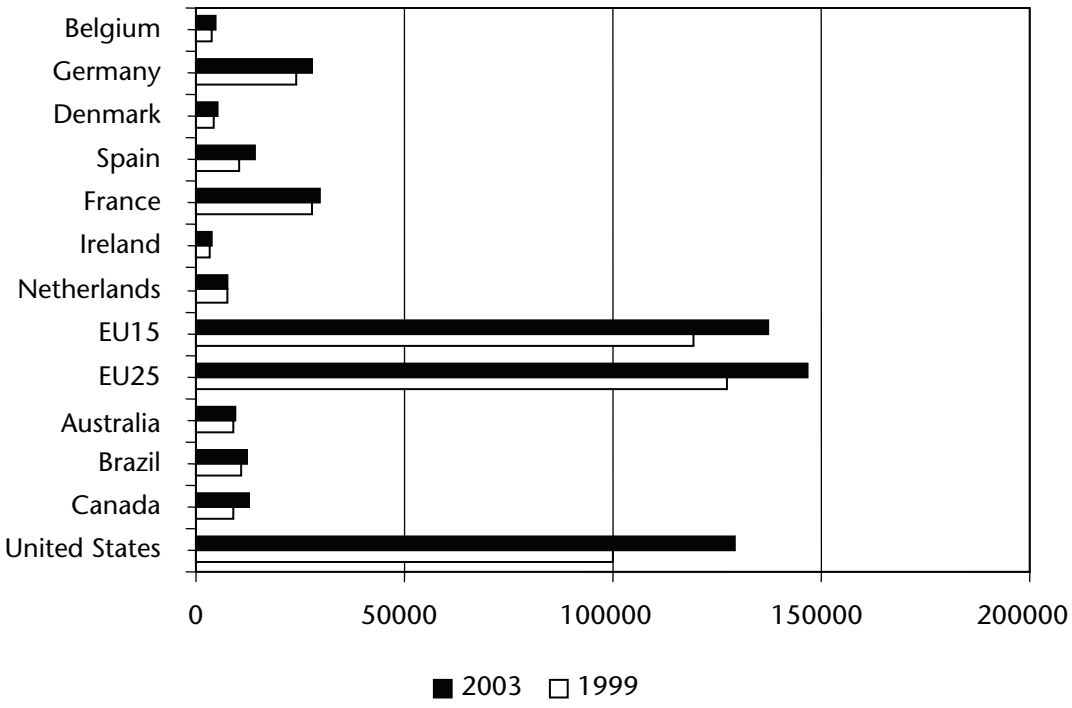
The scale of production is much higher in the US than in Europe, with a number of enterprises only less than 10% of the number in the EU-25, whereas the production value is about 10% lower in the US. The meat supply chains in Europe are diverse in cooperation and integration. Broiler production is fairly integrated in Europe. In pork and even stronger in beef, there is only a loosely coupled system of actors in the supply chain. In the new member states however, some vertical integrations in pig production have been set up (like in Poland). In the US and Brazil, the majority of broiler and pig meat is produced in integrated systems.

The turnover of the meat industry (production value in table 4.2.8) is shown in figure 4.2.10. It is evident that the EU-25 has a somewhat higher turnover than the US. The increase between 1999 and 2003 however is higher for the US than for the EU. Brazil and Canada are major exporters; however the turnover of their meat industries is smaller than each of the larger western European countries (France, Germany, UK, Italy and Spain).

Value added and labour productivity

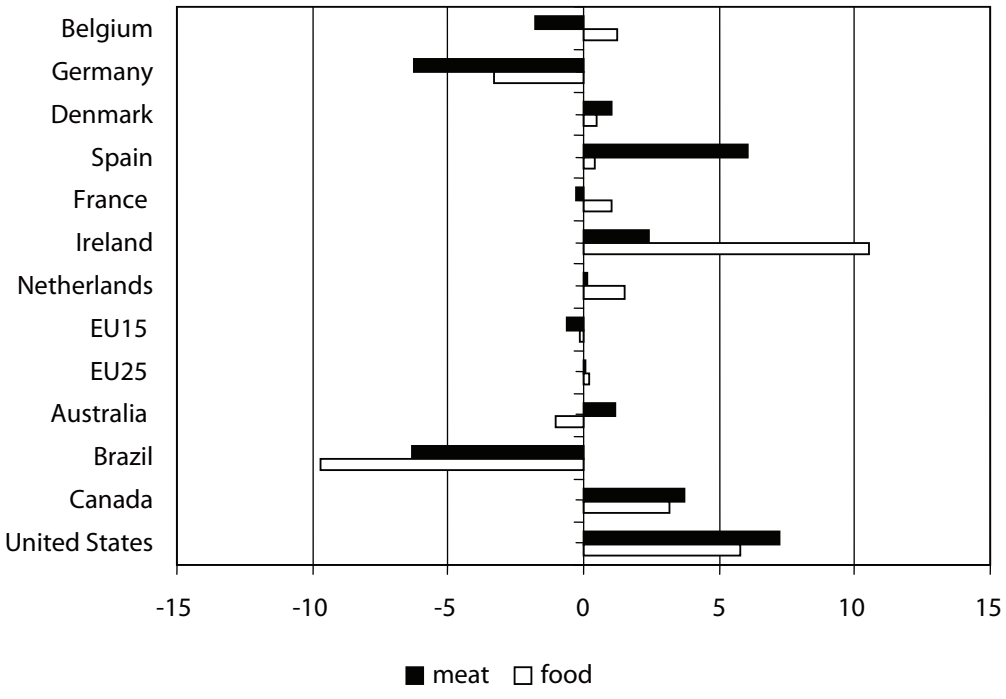
Figure 4.2.11 shows the growth of the real value added per annum. There is almost no growth of the real added value in the EU-15 and EU-25. The US shows an annual growth of some 7%, followed by Canada with almost 4%. Brazil shows a negative growth of the real value added. Within the EU, Poland shows very high growth. Spain is a positive exception within the EU with good growth, in contrast to Germany with a negative growth, even stronger than the rest of the food industry.

Figure 4.2.10 Distribution of turnover of the meat industry in 1999 and 2003 (€million)



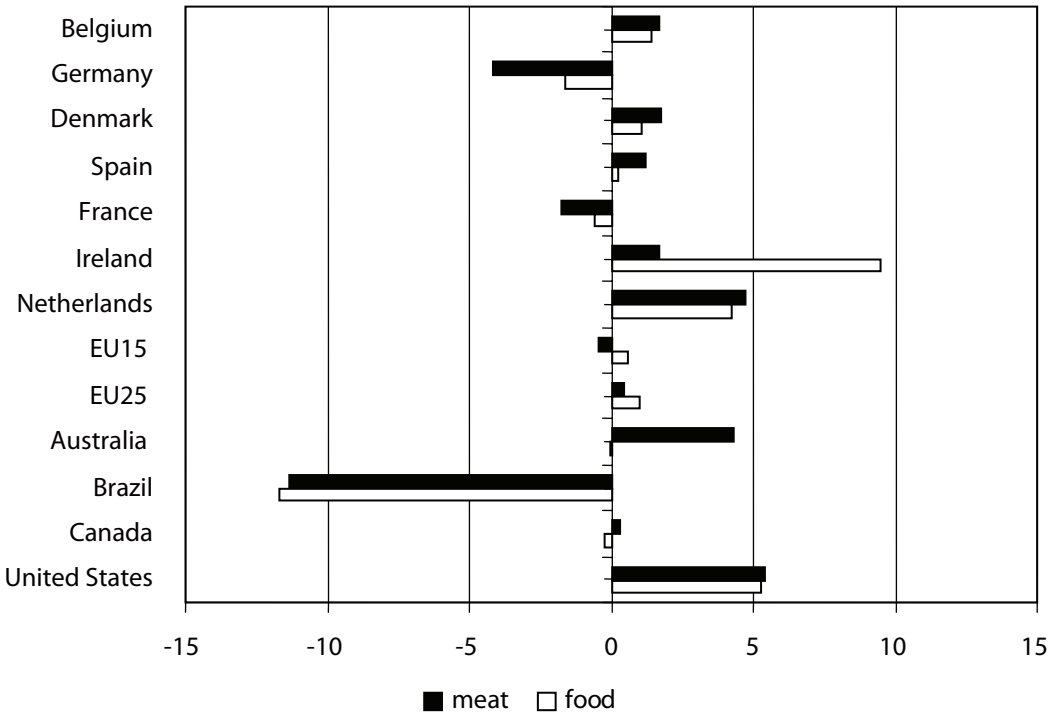
Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.2.11 Growth real value added 1999-2003 (% per annum)



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.2.12 Growth of the labour productivity 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

The growth in labour productivity indicates the competitive performance of the industries in the countries. Figure 4.2.12 shows that the growth in the US is much higher than in the EU-15 and EU-25. In Brazil however, the growth is negative. The differences within the European countries are large. Poland shows a very high increase in labour productivity of over 25% per year. The UK and the Netherlands have a strong positive growth. The growth in Germany is negative.

Market orientation and internationalisation
The list of the top 21 meat companies in table 4.2.5 is dominated by US companies. The American companies Tyson, Cargill, Smithfield and Swift and co., Pilgrim's Pride and Sara Lee Foods hold position number 1, 2, 4, 7, 8 and 9. Nippon Meat Packers of Japan is number 3. The European companies are Danish Crown (5); Vion Group (6); Grampian (13); Glanbia (15); and LDC (21).

Table 4.2.5 Top 21 meat companies in the world

Ranking	Company	Countries
1	Tyson Foods	US, MX, CH
2	Cargill	US, UK, NL, FR, BR
3	Nippon Meat Packers	JP, CH, AU
4	Smithfield	US, PL, RO, FR, ES
5	Danish Crown	DK, UK, US, DE
6	Vionfood Group	NL, DE
7	Swift and Co.	US, AU
8	Pilgrim's Pride	US, MX
9	Sara Lee Foods	US, SP, PO, NL, BE
10	Hormel Foods	US

Ranking	Company	Countries
11	Oscar Meyer	US
12	Grampian CFG	UK, TH
13	Perdue Farms	US
14	Glanbia	UK, IE
15	Sadia	BR
16	Gold Kist	US
17	OSI International	Globally
18	Keystone Foods	Globally
19	Maple Leaf	CA, DE
20	LDC	FR, ES, PO, CH

Source: Rabobank, 2006.

Different processors focus on one or more meat types. Therefore the top players per meat type within Europe are described below.

Pig processors

The main player in pig processing is Danish Crown, with 10% of the pig slaughters in EU-25[47]. This Danish company took part in some prominent mergers lasting recent years such as Flagship (UK), Sokolow (Poland) and Ruakatalo (Finland) in 2004. Another main player is the Netherlands-based VION group (8.4% market share in pig slaughters). The Germans hold third and fourth positions in the top 10 pig slaughterers with Tönnies (2.5%) and Westfleisch (2.3% respectively), followed by the French' whose industry is dominated by the cooperative companies Cooperl and Socopa. The US-based Smithfield with businesses in Poland, France and Romania follows. In the UK, Grampian has a significant interest in the pig industry in Scotland and England. One of the youngest companies among the top players in Europe is the cooperative Swedish Meat.

Poultry processing

The top 10 list of poultry processors is dominated by French companies. The French group Doux is the fourth largest poultry processor in the world and the largest in Europe, with 5% of the poultry slaughters in Europe. Doux owns a large company (Francosul) in Brazil. The company has a turnover of 1.3 billion Euros and employs more than 14,000 people. It has 25 slaughterhouses and processing plants in Europe and five in Brazil. One third of its production goes to the domestic French market. The French company LDC (4% market share) has processing plants in other European countries while the cooperatives Terrena and Unicopa only work within France. In the UK the major poultry processors are the Grampian Country Food (3%) group (owning a company in Thailand) and Two Sisters (1.5%). The Italian companies Gruppo Veronesi (AIA, 3.5%) and Amadori (1.5%) have a strong position on the domestic market.

Beef Slaughterers

With the acquisition of Südfleisch in Germany, Vion Food group has become the leading beef processor, with 4.5% of the beef slaughters in Europe. In beef production, Ireland has a strong position. The UK always has been Ireland's main export destination and many Irish companies have taken over British processing plants. The main company is Irish Food Group (AIBP, ABP, 3.5%) with 23 processing plants and a turnover of around 1 billion Euros. Other Irish companies are Queally Dawn (1.7%), Kepak (1.4%) and Hilton group (Foyle meats, 0.7%). Cremonini (Italca) in Italy is the leading beef company in the country (2.1), and a third player in Europe, slaughtering about 600,000 cattle a year.

Although France is the leading beef producer in the EU, the largest beef slaughterers are outside France. The main companies are the cooperative Socopa (2.1%, number 4 in the top 10 list) and

[47] Source of market shares in pig, poultry and beef slaughters: Meat Processing Global (July/August 2006)

the privately owned Bigard group. In Denmark, Danish Crown is dominant in the pork sector and also the major national beef slaughterer and plays a role in the European beef industry (1%).

Concentration of the meat industry does not differ very much between meat types. The top 10 companies in beef have 19% of the market in Europe. For poultry this is 25% and for pork 31%. The top 10 processors after slaughtering have a total share of 23%. So, overall the top 10 players per type of meat have some 20-30% of the market share in Europe.

Size classes

Table 4.2.6 shows the number of companies. Germany and France in particular have a large number of small meat companies, followed by Italy and Spain. The importance of these small enterprises is small from an economic point of view as is shown in figure 4.2.13.

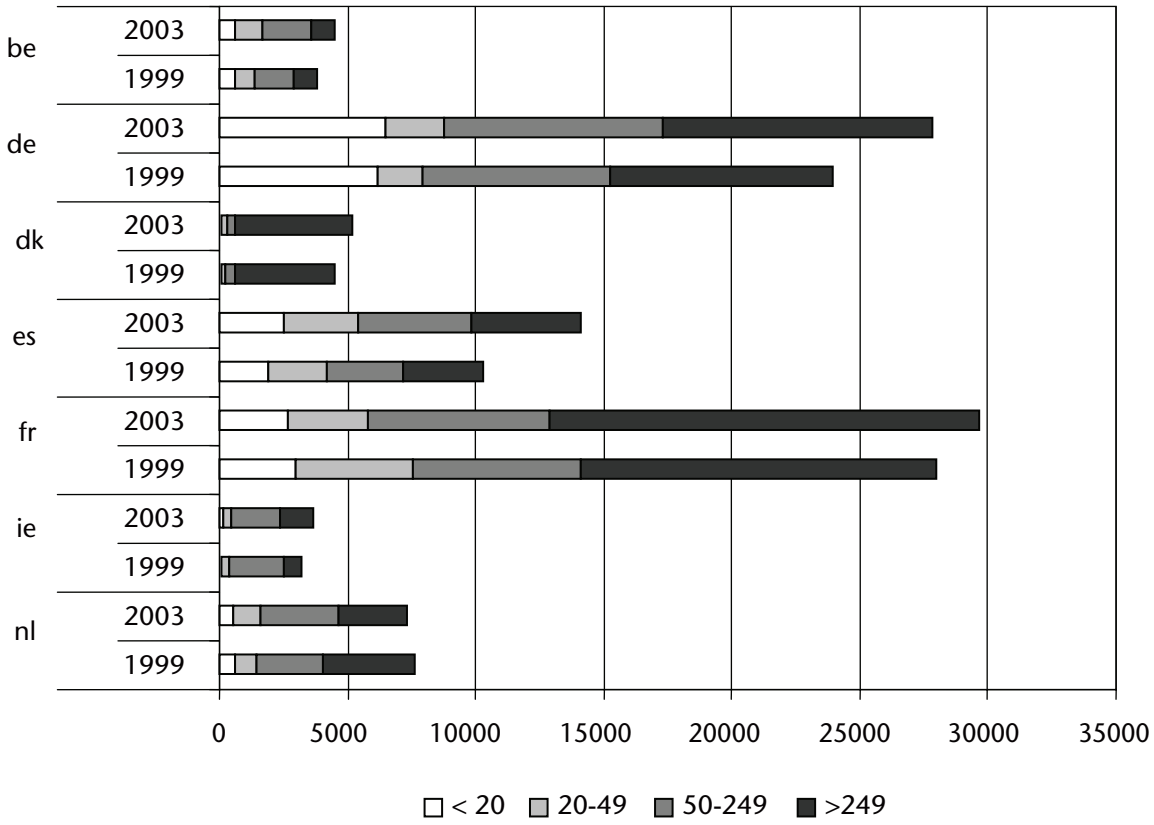
Due to the confidential nature of data in some countries, the turnover of the larger enterprises is not published, which restricts the presentation in the figure. The largest part of the turnover comes from the companies with 250 or more employees.

Table 4.2.6 Number meat enterprises for size classes in number of personnel

		< 20	20-49	50-249	>249
Belgium	1999	655	119	56	8
	2003	597	107	48	12
Denmark	1999	120	20	16	11
	2003	116	20	16	10
Germany	1999	17211	623	457	95
	2003	12916	591	422	87
Greece	1999	30	24	14	5
	2003	30	20	14	5
Spain	1999	2407	445	161	28
	2003	3542	551	218	30
France	1999	12014	669	356	107
	2003	10997	634	348	120
Ireland	1999	57	36	63	10
	2003	49	33	49	16
Italy	1999	3259	311	114	20
	2003	3275	334	135	25
Luxembourg	1999	17	1	6	0
	2003	17	1	6	0
Netherlands	1999	610	100	70	35
	2003	625	95	70	25
Austria	1999	1063	97	50	7
	2003	1076	84	46	8
Portugal	1999	317	85	63	9
	2003	293	92	61	9
Finland	1999	183	11	17	9
	2003	188	12	22	9
Sweden	1999	378	51	32	5
	2003	404	54	32	8
United Kingdom	1999	803	183	157	99
	2003	586	179	160	103

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.2.13 Turnover according to size class



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.2.5 Competitive potential

Innovation and branding

Much effort has been put into system innovation and process innovation, such as integrated chain control, automation in the slaughter line, benchmarking between farmers, workers' education, early warning systems for animal diseases, etc. However, product innovation is more of a challenge. Almost no product innovation is found (Hoste, 2003), compared to the dairy industry for example, but also compared to the US meat industry. Meat is mainly a commodity and the meat industry tends to focus on the fresh market. At retail level, meat is used as traffic generator. Consumers are willing to pay for convenience and differentiated products, even if prices are significantly higher. However, little effort is put into innovation (Hoste et al., 2004). Some new products are developed, mainly in response to health and convenience. Product innovation based on integrated concepts is not very easy because products are often made of just one or more parts of an animal, whereas the other parts should also be valorised or sold as common meat. The extra costs of production should be borne by the value added product assortment, thus leading to often very high sales prices.

Marketing channel

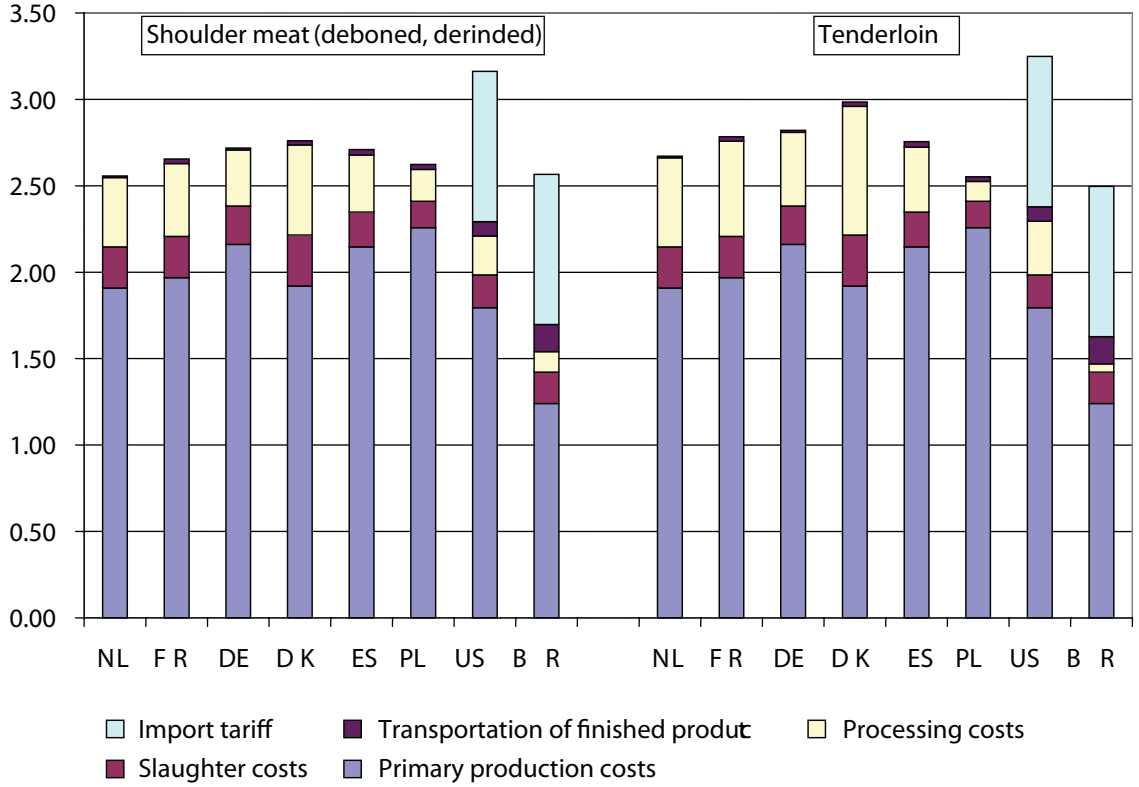
There is a development in the new member states towards an increase in sales through supermarkets. The share in consumer expenditure will also increase for meat, as mentioned in section 2.4. A shift towards pre-packed meat and sales through supermarkets is foreseen. The number of self-employed butchers will decline due to the shopping convenience of the retail stores.

Production cost

Information on the cost of production in the supply chain of meat is scarce. Figure 4.2.14 shows the composition of the production costs for shoulder of pork (deboned and derinded) and pork

tenderloin (defatted), delivered frozen (US and Brazil) or chilled to the German Ruhr region. The cost of (further) processing and packing is not included.

Figure 4.2.14 Cost of production of shoulder meat and tenderloin (€/kg) delivered on the western German market



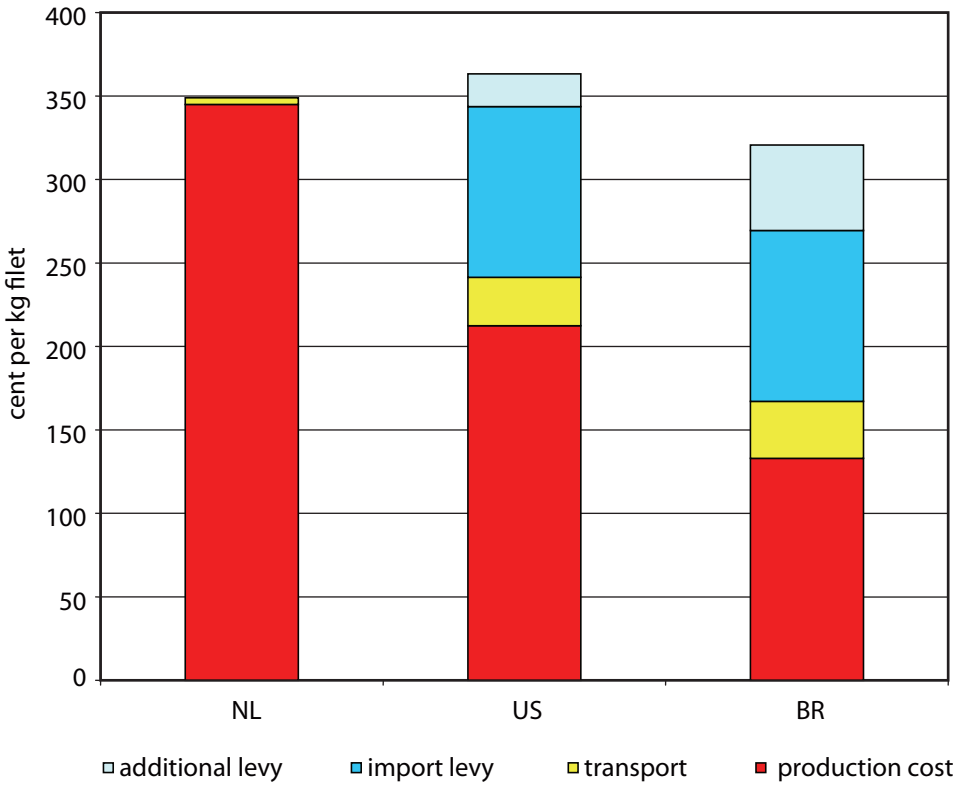
Source: Hoste and Bondt (2006).

Due to the import levy on pork shoulder meat from Brazil and the US, the production costs including delivery to the Ruhr region from Brazil are approximately the same as from the Netherlands; for pork tenderloin, it is actually a little lower. The US is the most expensive potential supplier; although production costs are a little lower, this does not offset the import levies imposed. The high primary production costs in Poland are fully compensated by the low costs of slaughtering and processing. Pork shoulder meat from Poland can be supplied to the German market at a slightly higher price, and pork tenderloin at a slightly cheaper price. Due to differences in the market valuation, the supply price for shoulder meat will actually be lower than suggested here, whereas the opposite is true for pork tenderloin.

Low labour costs, abundant feed supply and an expected increase in meat consumption make the new EU member states attractive for investors from abroad. This has already led to a number of investments by Smithfield from the US in Poland and Rumania. The western European feed industry has also invested in Poland, for example. Farmers emigrating to the new member states (semigration), i.e. running a farm there but living in their home country and travelling regularly between both locations, is a fairly uncommon phenomenon.

Similar figures can be given for poultry meat. Figure 4.2.15 shows that the production costs of breast meat in Brazil are around 40 to 50% lower compared to Europe. Transportation costs and especially high import levies compensate some of this difference. In 2004, the supply price of Brazilian breast meat on the German market was 10 to 15% lower than the price of European producers.

Figure 4.2.15 Supply price of breast meat on the German market by the Netherlands/EU, the US and Brazil (data 2004).



Source: Van Horne and Bondt (2006).

Increase of input cost

Production of meat in the EU is faced with a number of so-called consumer concerns. Farmers have to deal with EU and national laws and regulations to protect the environment and nature (global warming, less use of manure, reduction of ammonia emission), animal welfare (housing, transport) and public health issues (zoonoses, a ban on the use of antibiotic growth promoters). Measurements to meet these requirements will increase the production cost for animals raised in the EU.

In practice however, the pace at which these rules are implemented varies among EU member states. Furthermore, some countries have stricter regulations, exceeding the EU level. The EU is typically at the forefront of fulfilling social and consumer demands. At the moment, producers in most third countries do not have to deal with these requirements.

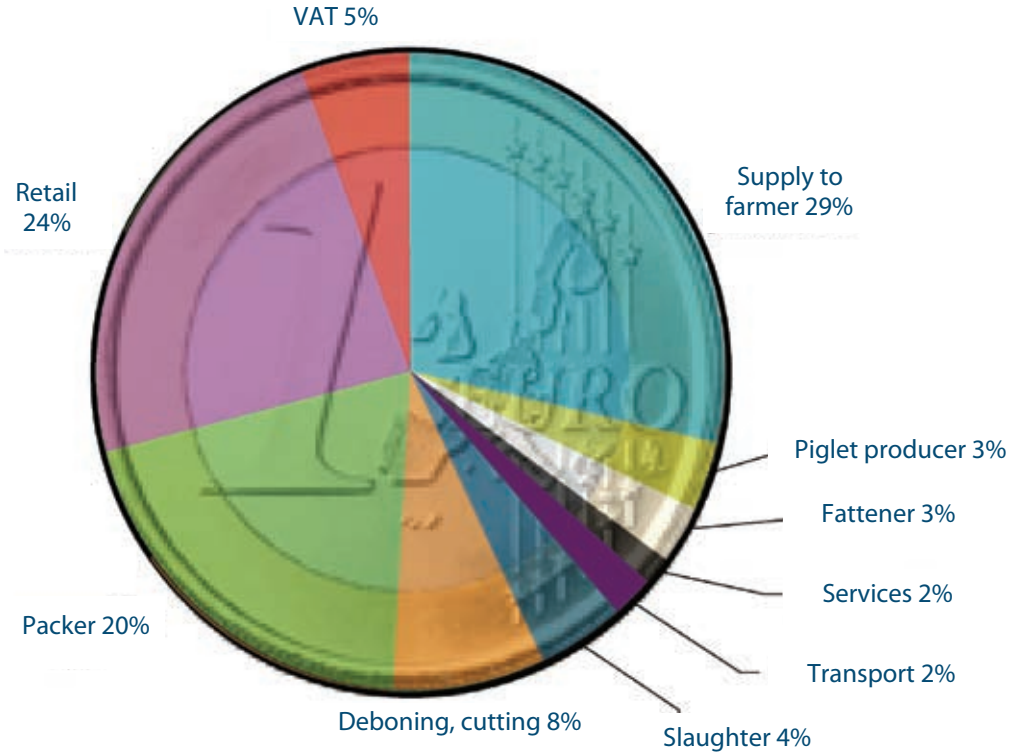
In the US, nutrient oversupply of crops and animal welfare has gained interest and will locally and/or on a voluntary basis lead to cost increasing measures. The future of the European meat industry (including farm production) depends on the valuation of these unique added value product features of European meat such as freshness, animal welfare production, traceability and safe products.

Supply chain

Figure 4.2.16 shows the consumer Euro for fresh pork sold at the retail store: a breakdown of revenue in the pork supply chain based on a pilot study in the Netherlands. About 36% of the revenues are paid at farm level; other major costs concern added value in processing (slaughter, deboning, (further) processing and packing: 32%) and sales (24%).

In contrast to fresh meat, the share of processing costs will be higher for meat products since costs and sales prices are slightly higher. In general, however, not much value is added in the pig meat industry.

Figure 4.2.16 Consumer Euro: Revenue breakdown in the pork supply chain of fresh meat sold at the retail store



Source: Hoste et al., 2004.

Trade barriers by diseases

Trade barriers, both sanitary and access restrictive, have strongly influenced meat trade in recent years. Examples are foot-and-mouth disease (FMD) which affected the trade in beef and pork. BSE virtually ended Britain beef exports and Avian Influenza had a major impact on trade in some EU countries (Italy, 2001 and the Netherlands, 2003) and more recently in 2005 and 2006 in Asia, Europe and Africa. It is expected that animal diseases will have a substantial and persistent effect on the global meat trade. Animal disease control therefore continues to be important.

Global and regional trade agreements have lowered protection barriers. However, significant protection barriers still remain, such as high tariffs and tariff rate quotas, which prevent or inhibit significant potential trade in meat. The time schedule of reducing import tariffs and the speed at which the European meat industry adapts to new economic conditions will determine the future profitability and structure of the supply chain in European countries. The scale of production will increase further and inefficient producers and current trade relationships will experience hard times.

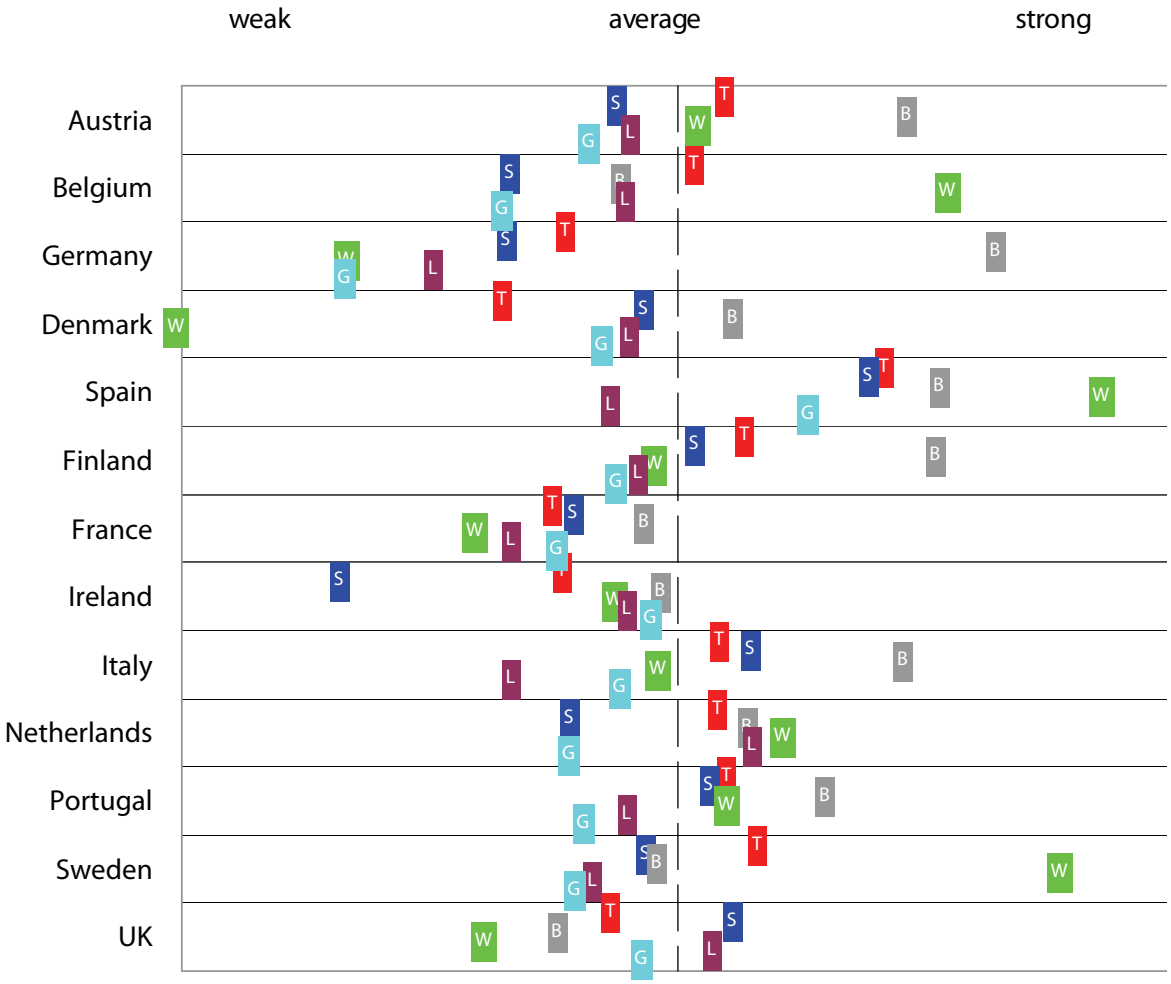
Third countries

Those parts of the world with low priced inputs (feed, labour, equipment) have competitive advantages in meat production. Land for forage and grain production is important for the success of livestock operations. Among the key factors to competitiveness in meat processing are large and reliable livestock supplies, low labour costs either through low wages or scale economies. For Brazil it is expected that export will be the key driver for further growth in poultry, pork and beef production. This is a result of cost competitiveness, product tailoring and marketing efforts. Improvements in sanitary control and product development remain necessary conditions. Foreign investments will accelerate the further development of Brazilian meat industry.

Competitiveness of European countries

Strong countries within the EU are Spain, Italy and the Netherlands. Denmark, Germany and France are rather weak. The weakness of the EU suggests that the other countries as a whole are even weaker than the EU average.

Figure 4.2.17 EU-15 countries benchmarked



T=Total meat; S=growth share food industry in total manufacturing; B=growth Balassa; W=growth world share; L=labour productivity; G=growth valeu added.

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4.3 Fish and Seafood industry: consolidation and outsourcing of processing

Jos Smit

4.3.1 Key findings

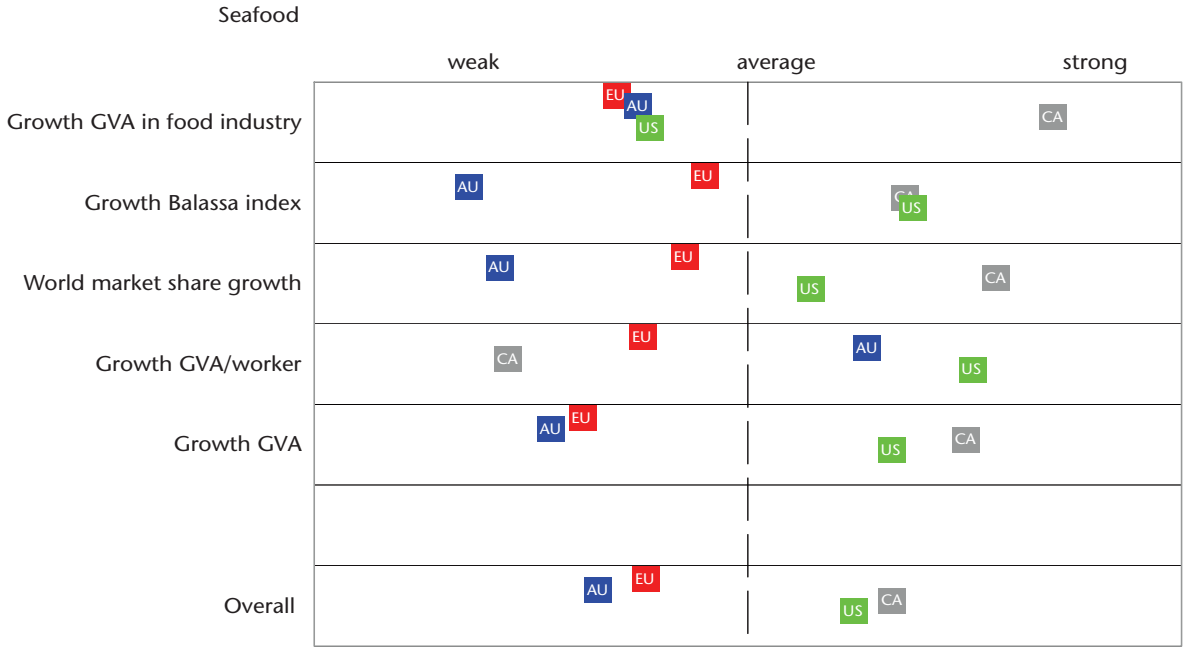
The seafood sector remains very fragmented, in particular the markets for fresh seafood, but it is in a process of consolidation and globalisation. With 4 in the top 10 seafood companies, the EU still has a modest position in global perspective. Cross border consolidations that give access to global sources, low costs of processing and access to markets are expected. The companies that take the initiative are likely to achieve the role of industry leaders and the ones that define and shape the industry for the future.

Seafood is one of the fast growing segments of food industry. Buying power is increasing, in particular in emerging seafood markets like China and Russia. The European seafood industry faces competition with other main developed economies such as Japan and US in terms of access to the sources and (labour) costs of processing.

The following countries have the highest share in world trade in seafood products: China (9%), Thailand (7%), Norway (6%), US (6%) and Canada (6%). The EU-15 is the biggest exporter with 23%. The trade to non-EU member states is a mere 4%.

All indicators in the graph show weak competitiveness of the EU seafood industry compared to US and Canada. Australia with a small export and industry is weaker than the EU. Spain and Belgium are the most competitive of the EU countries with the most exports; Denmark and Germany are weaker.

Figure 4.3.1 Overall competitiveness of EU and competitors



4.3.2. Introduction

The EU benchmark for competitive performance: world exporters

However, being a net importer, the EU competes with other global suppliers for other species and products (e.g. salmon and pelagic fish). EU countries play a major role in exports to the world market. Over 23% of the world exports originate from the EU countries (table 4.3.1). Most of these exports are aimed at other EU countries. Important non-EU exporters are: China, Thailand, Norway, US and Canada. The EU seafood industry will be benchmarked with the US, Canadian and Australian industry. The role of China will also be highlighted, although the lack of data prevents taking China as a benchmark country. Section 4.3.2 presents a more in depth analysis of the trade.

Table 4.3.1 Major exporting countries in seafood products

Region/Country	Export share			Import share		
	'96 - '98	'02 - '04	difference	'96 - '98	'02 - '04	difference
EU-25	24	24	-0.2	37	38	1.2
EU-15	23	23	-0.4	36	37	1.1
EU-15 < > non-EU	4	4	-0.0	21	21	0.3
China	7	9	3.0	1	3	1.8
Thailand	10	7	-2.6	1	2	0.2
Norway	8	6	-1.5	1	1	-0.2
United States of America	6	6	-0.0	15	18	2.7
Canada	5	6	0.5	2	2	0.0
Denmark	5	4	-0.8	2	2	-0.1
Spain	3	4	0.5	6	7	1.1
Netherlands	3	3	0.1	2	2	0.0
United Kingdom	3	2	-0.2	4	4	-0.1
France	2	2	-0.2	6	6	-0.5
Germany	2	2	-0.4	5	4	-0.8
Japan	2	2	-0.2	28	21	-7.1
Australia	2	2	-0.3	1	1	0.0
Belgium/Luxembourg	1	1	0.3	2	2	0.3
Italy	1	1	-0.0	5	5	0.4

Source: ITC/WTO data.

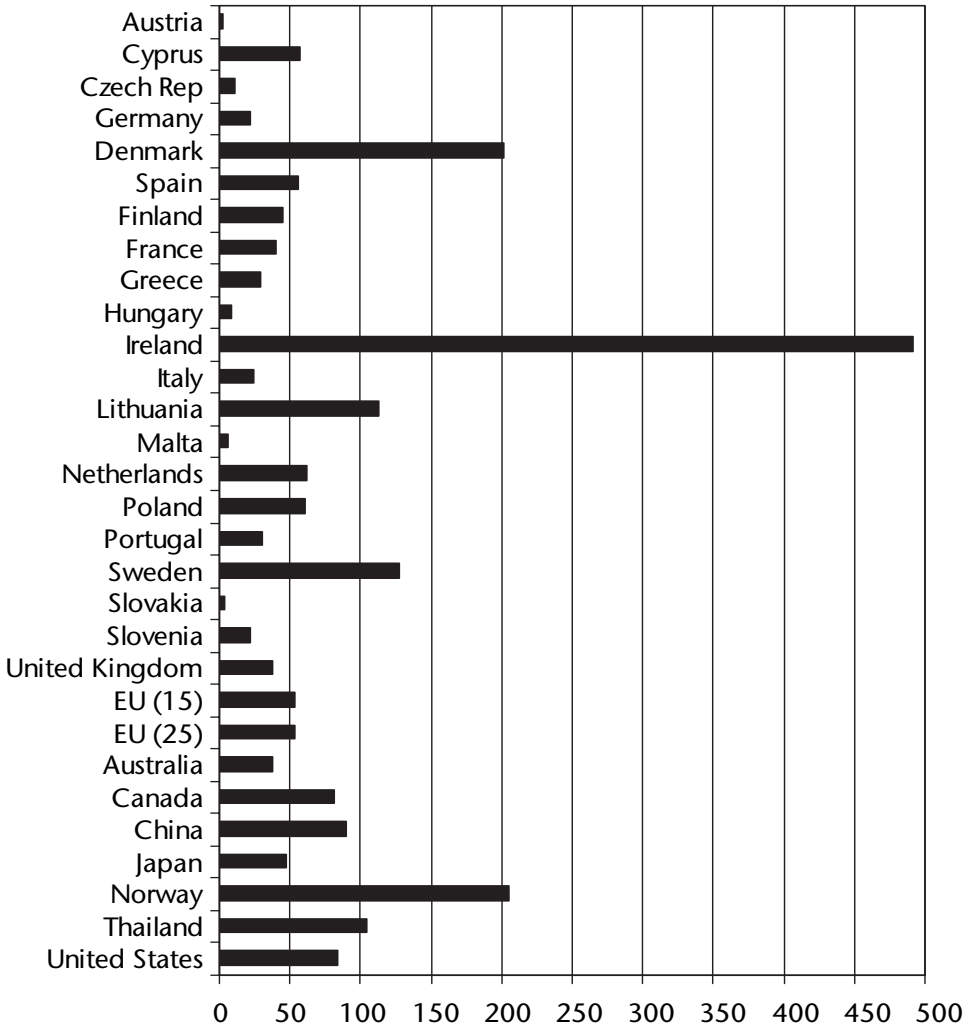
Seafood processing

The core business of the seafood industry is processing fish and shellfish into different consumer and intermediate products. Fish and shellfish are extremely diverse commodities. Differences may be based on species, production area, method of fishing or farming and hygiene. Raw fish and shellfish are inputs for an even wider range of products meeting consumer demands.

Consumption per head

Seafood is considered to be among the fastest growing segments in the food market. Key to seafood growth is the increasing buying power in global perspective. Every year tens of millions of people join the middle and upper classes of societies, demanding more variety and more convenience. This development is evident in many parts of the world, but it is most noticeable in markets like Russia and China.

Figure 4.3.2 Seafood consumption (kg/head) in major EU and benchmark countries



Source: FAO.

On average, in 2003 seafood consumption per capita in the EU-25 was 24 kg. This number is at the same level as the US and China and much lower than Japan (figure 4.3.2). Within the EU-25, consumption ranged from 5 kg per head in Hungary to 59 kg in Portugal in 2003.

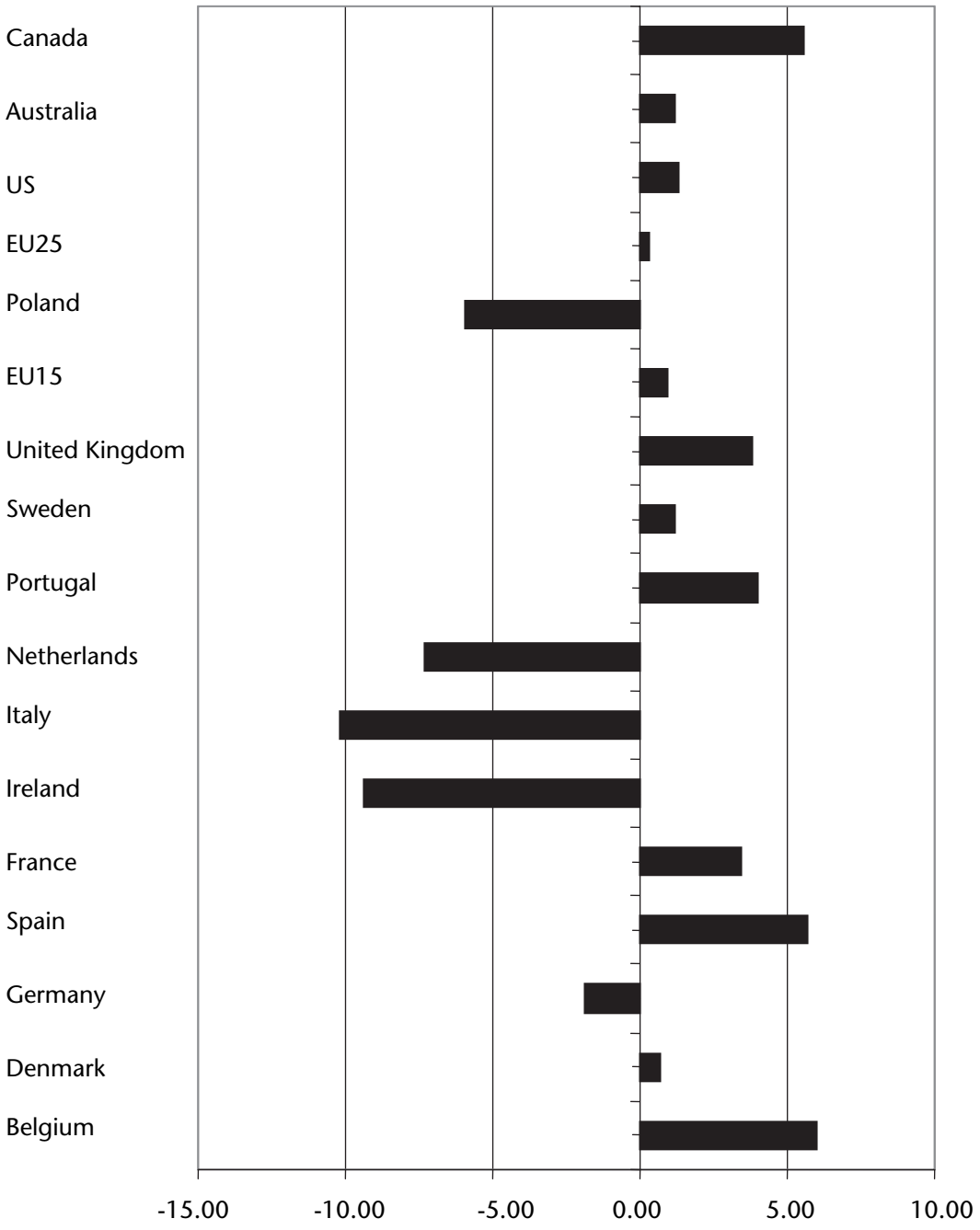
Competition: Balassa index and share value added.
Table 4.3.2 indicates that seafood is less relevant for EU (-15<> non-EU) exports than it is for the US and for China. The position of the EU seafood industry improved between 1996 and 2004, but the US shows larger growth. Chinese seafood exports were obviously slowed down by the overall economic development. Inside the EU, the position of seafood exports from Belgium and Netherlands show relatively large growth which may be due to main-port effects (Rotterdam and Antwerp).

Table 4.3.2 Revealed comparative advantage change is annual growth%

Region/Country	1996 - 1998	2002 - 2004	annual growth%
EU-25	0.5	0.6	1.2
EU-15	0.5	0.6	1.5
EU-15 < > non-EU	0.3	0.3	1.1
China	1.9	1.5	-3.1
Thailand	8.4	6.2	-4.9
Norway	8.4	6.7	-3.7
US	0.5	0.6	3.4
Canada	1.2	1.5	3.3
Denmark	4.9	4.5	-1.6
Spain	1.6	1.9	2.5
Netherlands	0.8	1.0	3.0
United Kingdom	0.5	0.6	2.6
France	0.4	0.4	1.4
Germany	0.2	0.2	-2.7
Japan	0.2	0.2	2.1
Australia	1.6	1.5	-1.9
Belgium/Luxembourg	0.3	0.4	4.1
Italy	0.2	0.2	2.8

The performance on the domestic market is compared to the food industry as a whole. Thus if the share of real value added of the seafood industry in the total food industry grows, the seafood industry performs better than the whole economy. Figure 4.3.4 shows that the EU-15 countries have a modest growth just below the US and Australia. The differences within Europe are considerable: an annual decline in the share of the food industry in the Netherlands, Italy and Ireland. The UK, Portugal, France, Spain and Belgium the share in food industry increased.

Figure 4.3.4 Annual growth rate (%) real value added of fish industry in total food industry.



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.3.3 Global trade performance

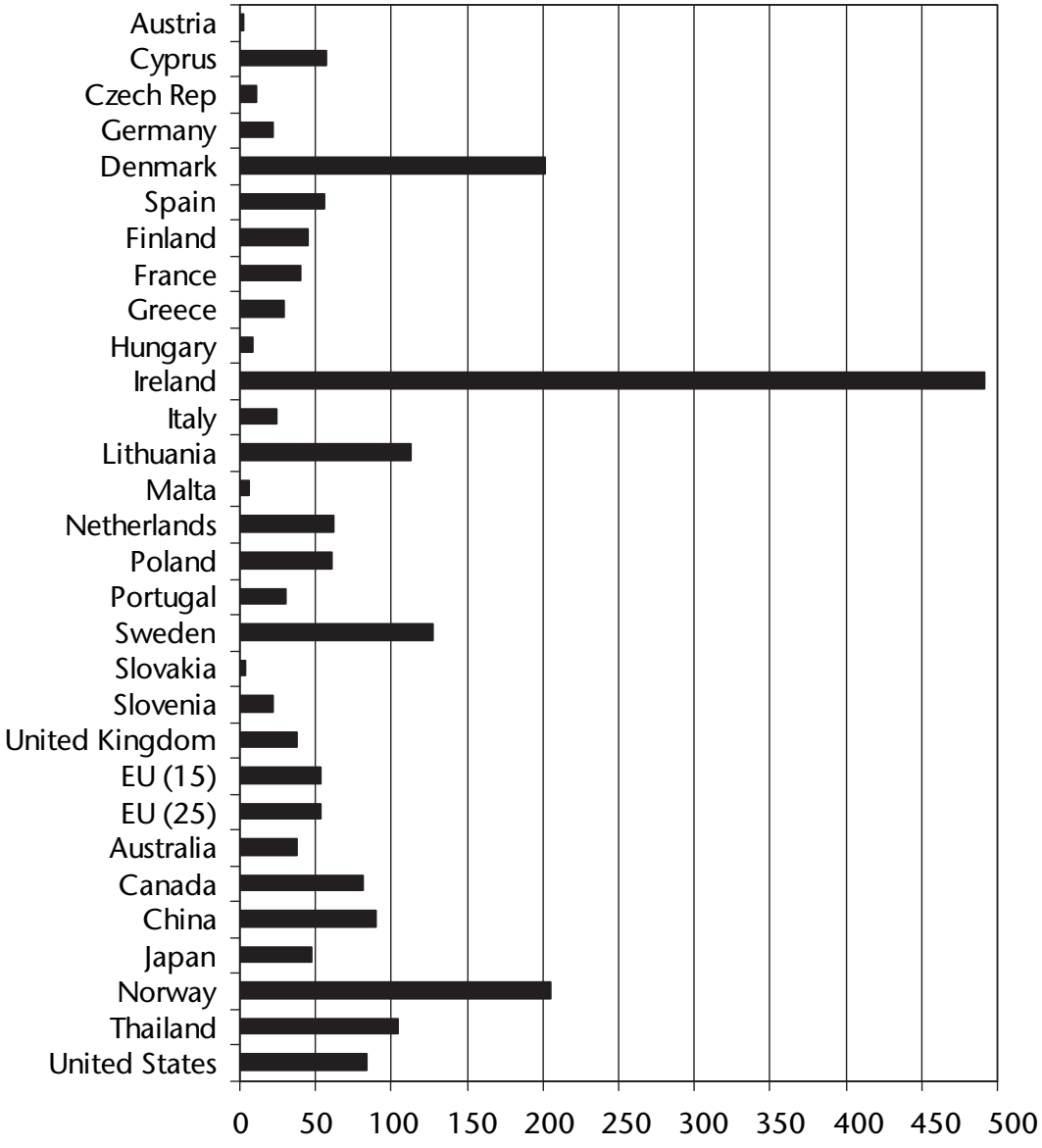
Self-sufficiency

The relevance of international trade compared to domestic production is shown by the level of self-sufficiency (figure 4.3.5).

All developed economies rely on imported raw materials and final products. The EU competes with other main developed and emerging economies such as Japan, US, Korea, China and Russia for access to sources (e.g. whitefish blocks and shrimps). EU self-sufficiency amounts to 55%. EU member states with the largest populations are all well below 100%. Only Denmark, Ireland and Sweden and some of the Baltic States have relatively large export positions.

The self-sufficiency varies between product categories. It is estimated to be approximately 100% for fresh seafood products. It is much lower for frozen seafood and canned products. These products are less perishable and can easily be transported over long distances.

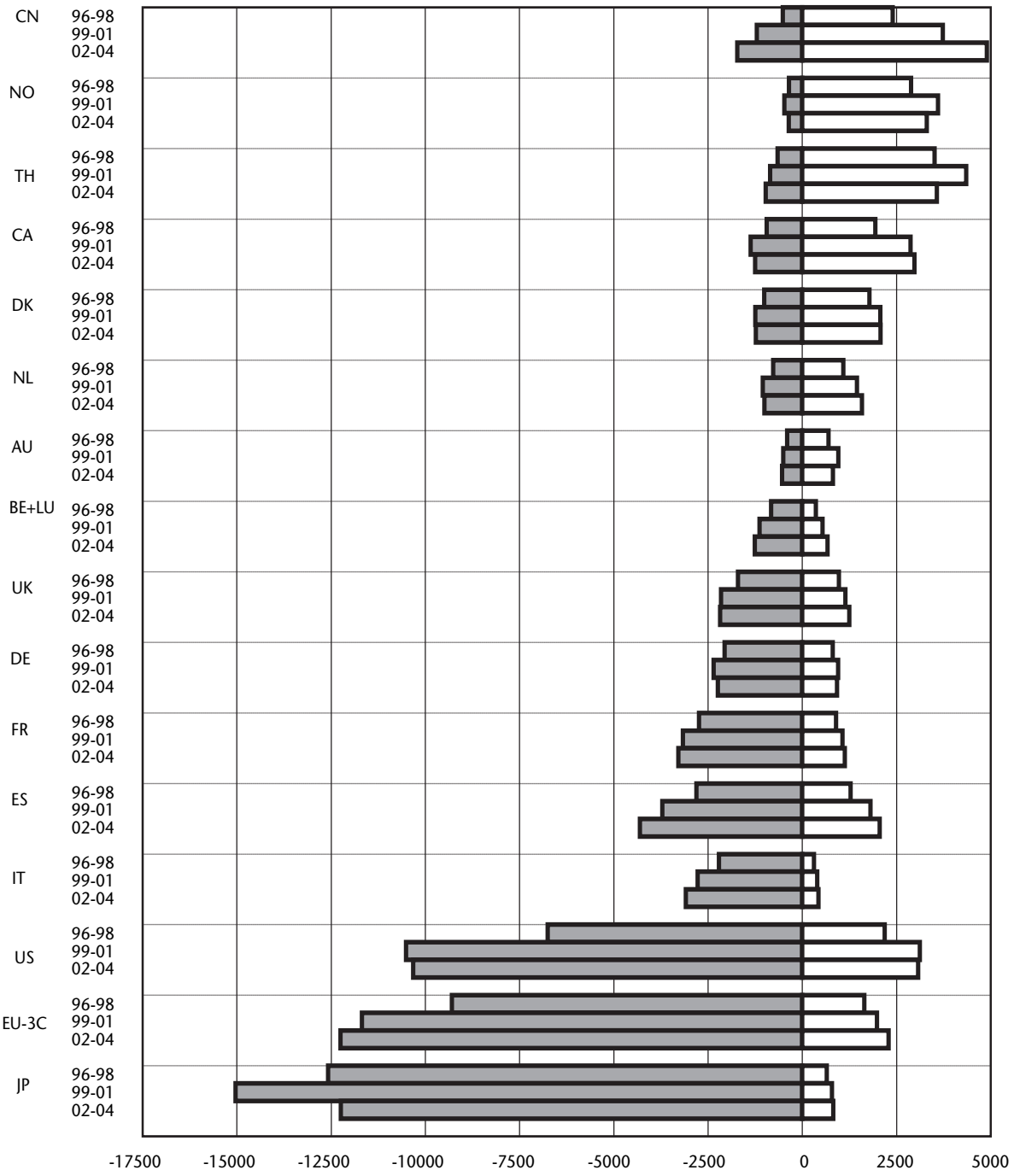
Figure 4.3.5 Self- sufficiency (%) for seafood



Trade patterns

China overtook Thailand in 2002 to become the largest **net** exporter of seafood products, followed by Norway (figure 4.3.6). The largest **net** importers are Japan and the US. The figure shows an intensification of world trade and a dominant position of developed countries. EU-15 is the second importer and fifth exporter. The US is third importer and fourth exporter.

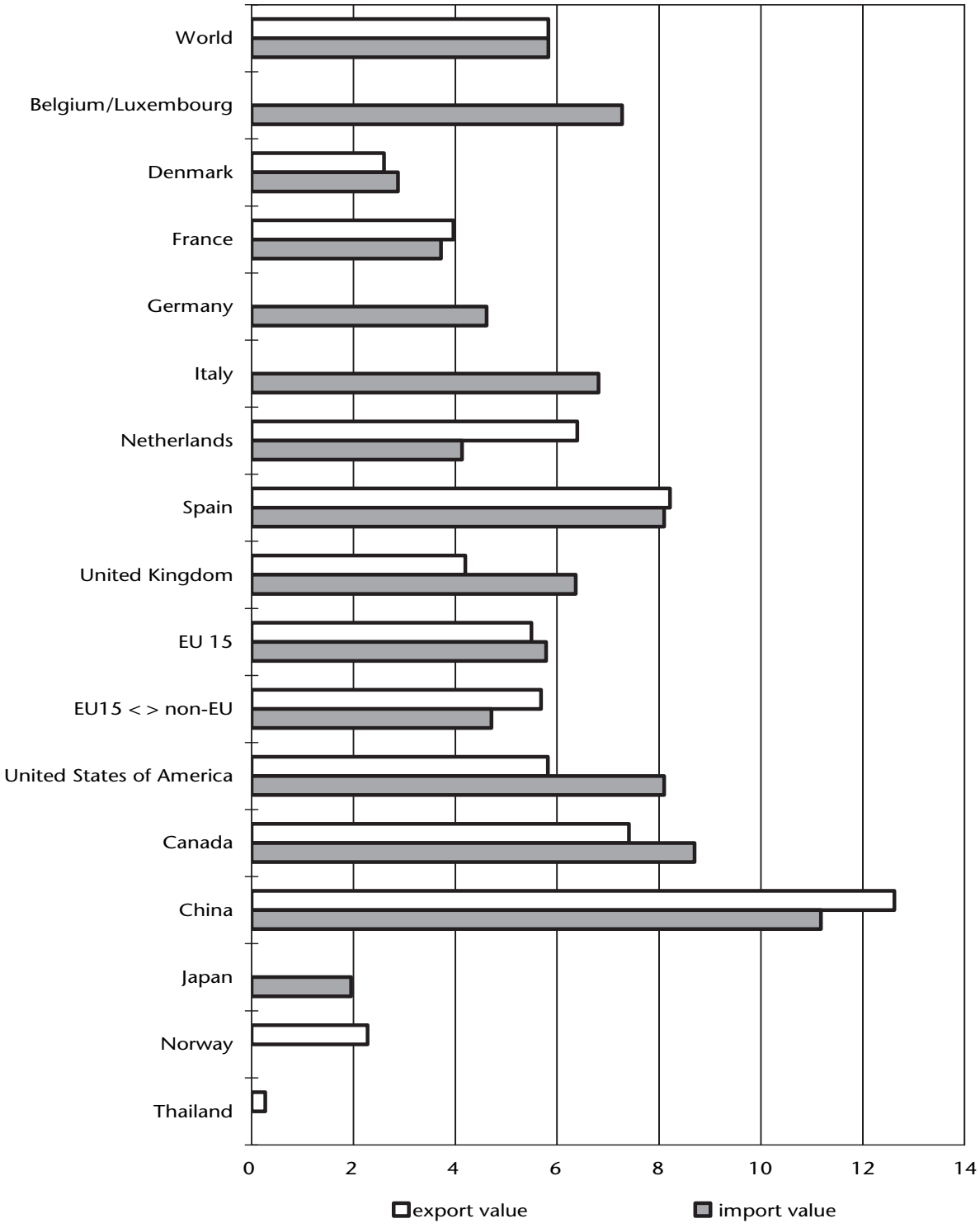
Figure 4.3.6 Import and export of seafood products, three years average of values



Over the period between 1996 and 2004, the exports and imports increased in most countries at the same time. One-way trade still exists: a number of major fish producing countries like China, Norway and Thailand are largely seafood exporters, their imports being very limited. Japan mostly imports seafood, with only a small export trade.

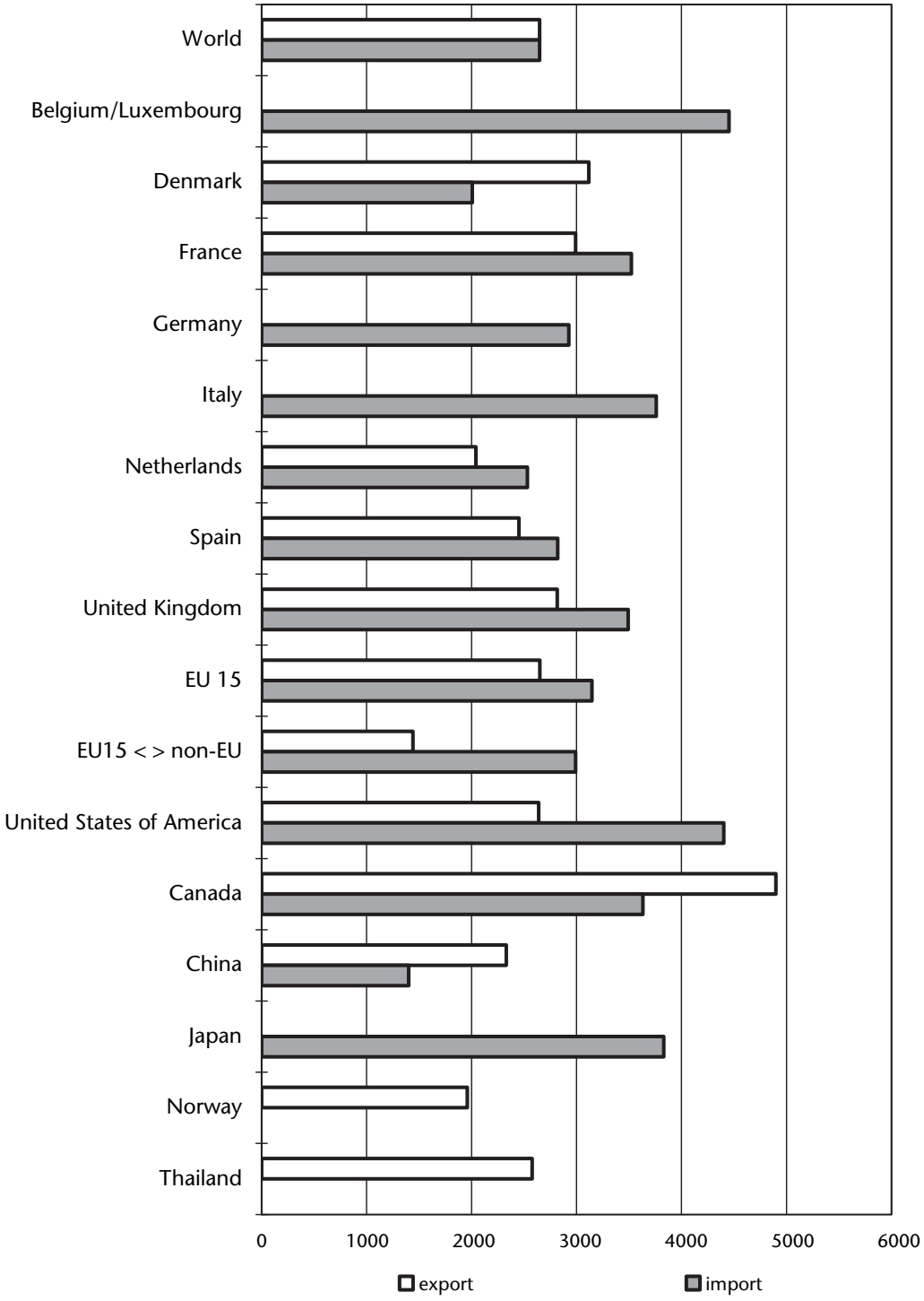
EU-15 exports developed the same as the benchmark country US (figure 4.3.7). China and Canada are the best performers among the larger exporters.

Figure 4.3.7 Annual import and export growth of seafood products



The average price of exported seafood products of the EU is well below those of its competitors (table 4.3.8). This indicates that developed countries import valuable products and that they export lower value fish that does not meet a demand on the domestic markets.

Figure 4.3.8 Average export price of seafood products (2002-2004 average)



Seafood in detail

The seafood industry develops in three markets: fresh products, frozen food and canned fish/shellfish. A vast share of the seafood production is distributed to local markets for fresh specialties. Particularly in this market for fresh products, consumer preference in terms of species and processing goes back to traditional dishes that vary between continents, countries and regions.

The trend in consumption towards value added products, such as ready-to-eat meals, means that the relatively safe position of high entry barriers for fresh products is becoming less self-evident.

The scope for competition and price formation varies between fresh and frozen/canned products. Prices of fresh products or raw materials are set within geographically isolated local markets. Frozen and canned fish are commodities with price formation on a world market. Increasing pressure on prices of frozen fish due to production from low labour cost countries may be the cause of an extremely wide gap between prices of fresh specialties and frozen commodities. For example the consumer price of fresh fillets may be 2.5 times the price of frozen fillets produced from identical species. This strong preference for fresh is a challenge for EU producers to develop the domestic markets for fresh products.

4.3.4. Business performance and competitive process

Characteristics of the seafood industry
The EU seafood industry has a production value of more than 17 billion Euros per year (table 4.6.3). This is nearly twice the US, six times the Canadian and 22 time the Australian figure. Eurostat figures indicate that EU production value has increased by some 70% in the last ten years. Growth has been stronger in Spain and France.

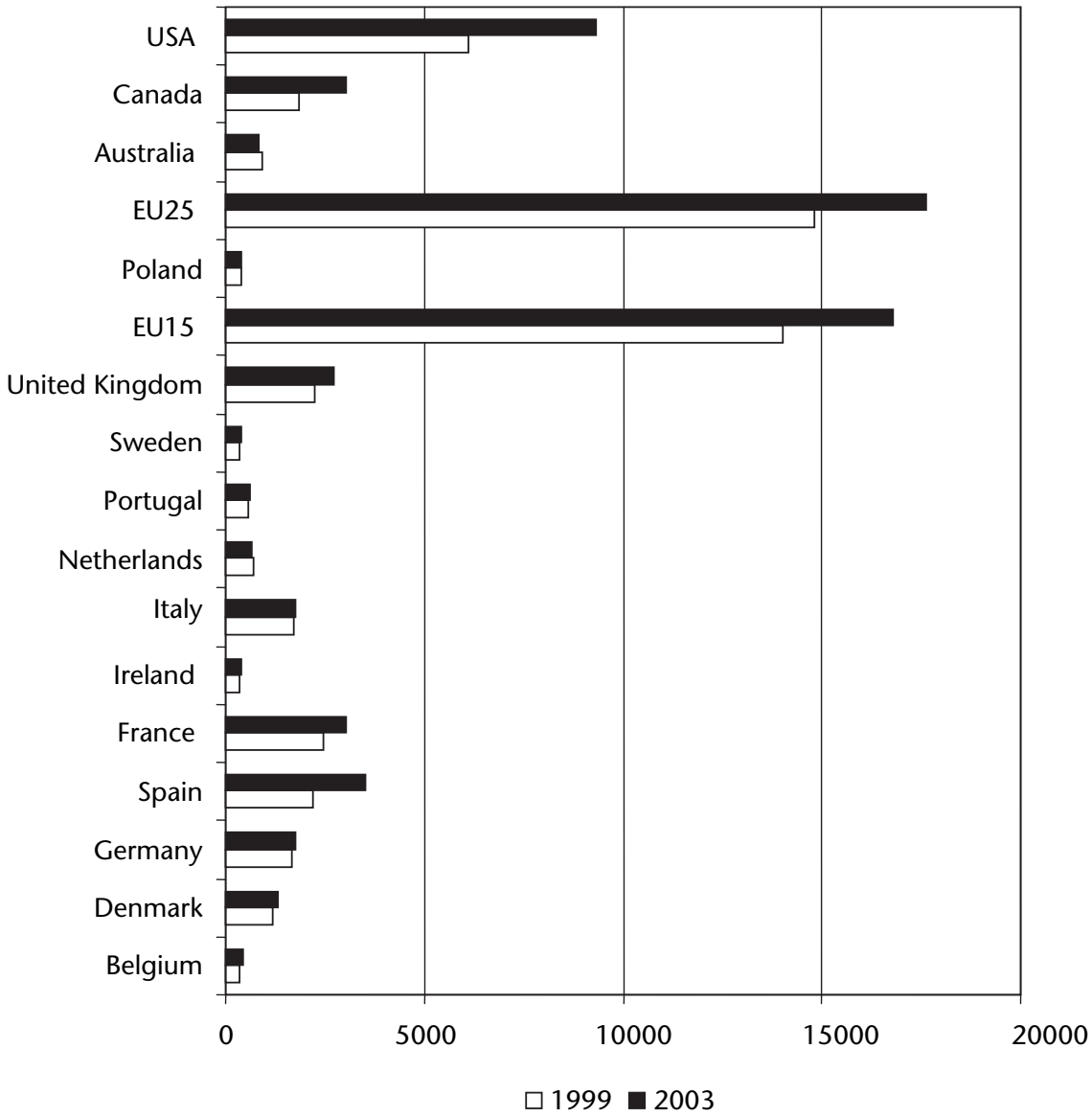
Table 4.3.3 Key characteristics of the industry

	eu15		eu25		US		Australia		Canada	
	1999	2003	1999	2003	1997	2002	2001	2003	1997	2002
Number of enterprises	2,907	3,038	3,821	3,839	839	746	N.A.	N.A.	429	687
Production value (€million)	14,041	16,789	14,823	17,605	6,124	9,310	921	814	1,853	3,031
Value added at factor cost (€million)	3,052	3,502	3,236	3,681	2,223	3,510	126	135	511	876
Purchases (€million)	12,719	15,000	13,413	15,902	3,905	5,820	688	558	1,598	2,223
Personnel costs (€million)	2,,010	2,321	2,127	2,443	784	1,118	70	76	294	409
Number of employees	94,750	96,394	126,221	126,479	40,763	41,148	4,700	4,300	21,634	37,843

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002. Eurostat. USDA.

Six EU countries are responsible for nearly 80% of the production value of seafood products in the EU: Spain, France, UK, Germany, Italy and Denmark. Apart from Denmark, these are also countries with a large population. Denmark has a relatively high production compared to its population. The (nominal) turnover grew in most countries, including the benchmark countries. The Netherlands and Australia are among the few exceptions. The distribution of employment is almost the same as the distribution of turnover.

Figure 4.3.9 Distribution turnover (€ million); US and Canada 1997-2002, Australia 2001-

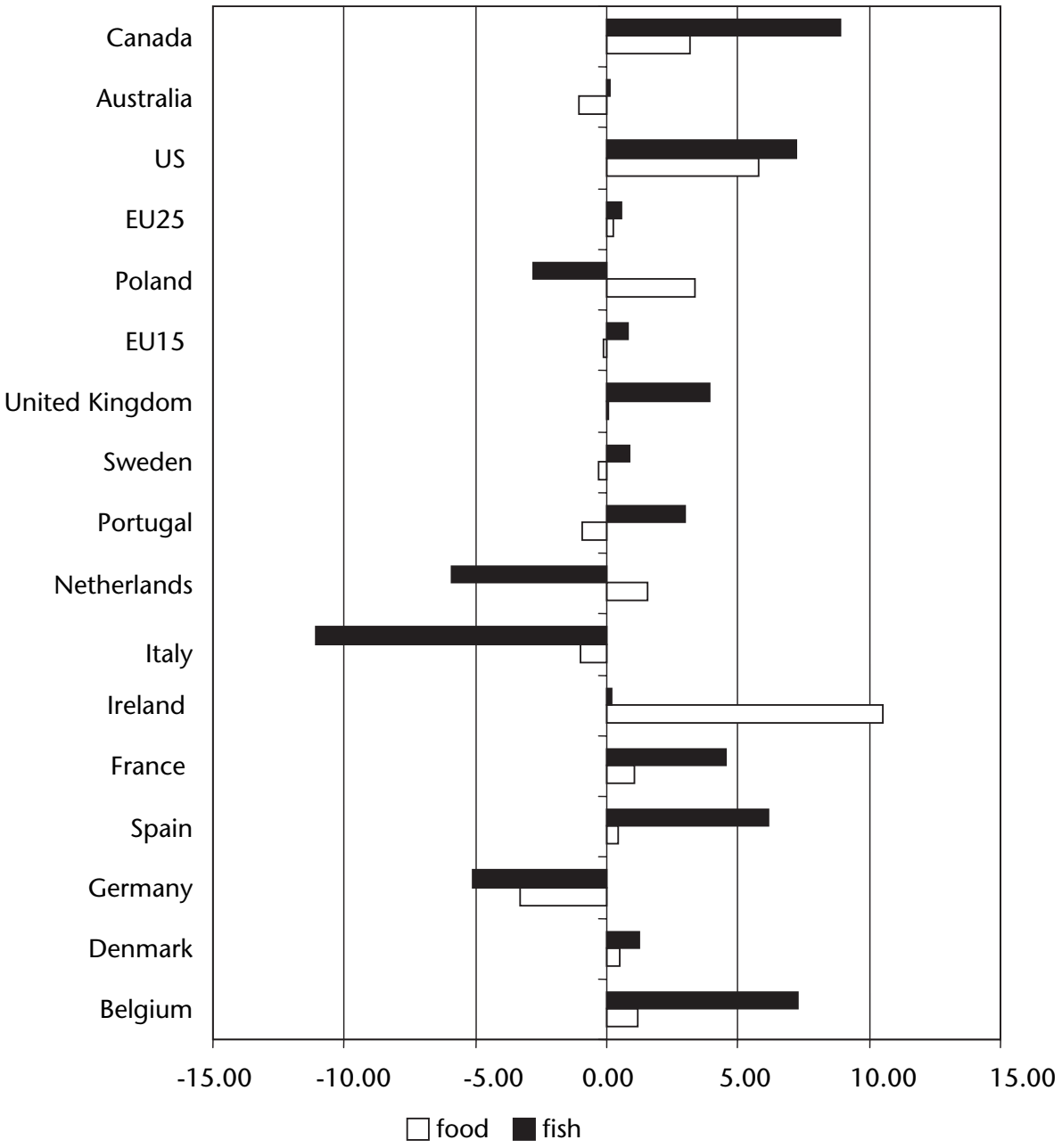


Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Value added and labour productivity

Figure 4.3.10 shows that Europe has a weaker performance than the US and Canada. Within Europe the differences between countries are large: good high performance in Belgium, Spain, France, Portugal and the UK and negative trends in Germany, Italy Netherlands and Poland. In particular, Germany is a large producer.

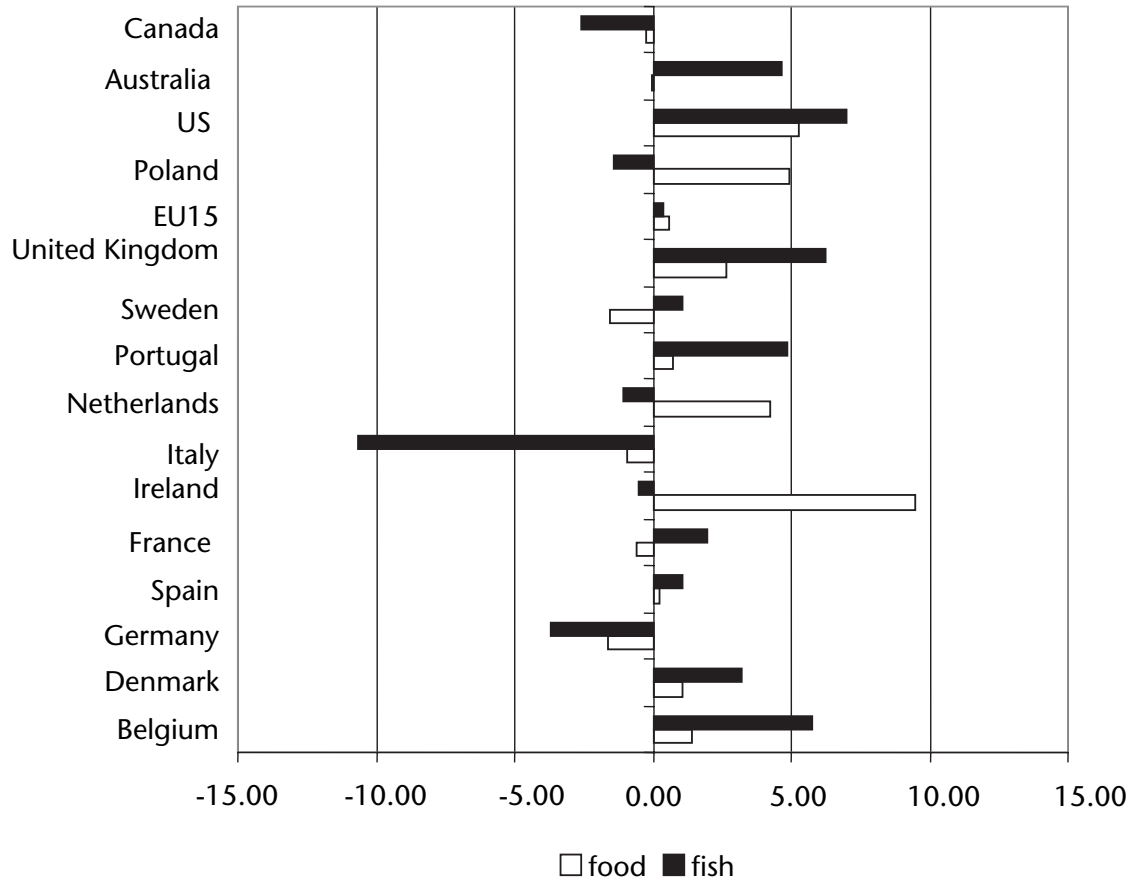
Figure 4.3.10 Growth real value added



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Development of labour productivity is an indicator of competitive performance of the industries by country. Figure 4.3.11 shows growth in the US is much higher than in Europe. The differences between European countries are clear: a rather poor performance of the seafood industry of Italy and Germany. Most other European countries have a positive growth. US and Australia have a higher labour productivity growth than the EU and Canada lower.

Figure 4.3.11 Growth of the labour productivity



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Market orientation and internationalisation

Table 4.3.4 presents a ranking of top 10 players of all seafood sectors in the world. Large companies in the EU are Pescanova (Spain) and Unilever which exploits national brands in a number of EU Member States like Iglo, Birds' Eye, Findus, Davigel, John West, Young's Bluecrest (UK) and Deutsche See (Germany). The Bolton group with Saupiquet (France) is third. The US takes the seventh position.

Table 4.3.4 Top-10 Global Seafood companies by turnover (million) in 2005

	Company	Country	Turnover	Activities
1	Marine Harvest/PanFish/Fjord Seafood	NO	€1,600	Aquaculture salmon
2	Icelandic Group/Pickenpack Husmann and Hahn	IS/DE	€1,200	Frozen seafood, processing
3	Unilever	NL	€1,200	Frozen seafood
4	Young's Bluecrest Seafood	UK/SE	€1,200	Chilled, frozen
5	Thai Union Frozen Products	TH	€1.000	Frozen, canned seafood
6	Pescanova	ES	€999	Integrated wild catch, aquaculture, processing
7	Trident Seafoods (US)	US	€669	Integrated wild catch
9	Cermaq	NO	€669	Aquaculture salmon
9	The Bolton Group	BE/IT	€650	Canned seafood
10	Alfesca	IS	€600	Fish processing

The (European) seafood industry is in a process of consolidation. The existing processing industry in the EU (and US and Japan) tends to go deeper into the market. The EU food industry focuses on marketing and distribution and countries like China may do the primary production. There is also a change to products that are not easy to copy under private label. Unilever, for example, put up for sale most of its under-performing frozen foods businesses, which includes four manufacturing plants and all activity under its brands Iglo, Birds Eye and Findus. The reasoning is that growth would require significant management and financial resources. Unilever believes it has better opportunities elsewhere (Unilever 2006). This opens opportunities for others. A number of important mergers have been established and more are expected. Private equity funds and investment banks are becoming increasingly active in the seafood industry. For example, the EU seafood operations of Heinz bought by Lehman Broths, Young's Bluecrest and Findus by CapVest, Dutch Heiploeg by Gilde, Spanish Bernardo Alfageme by Inversiones Loured,. Marine Harvest by Greenwich. CapVest is looking for further acquisitions in EU and North America. Investment banks see an enormous potential in up-scaling the seafood sector and in positive growth of global seafood consumption. Financial experts believe that up-scaling will offer access to sources, to cheap labour and access to markets. The most logical way is through international consolidation. The companies that take the initiative in true cross border acquisitions are likely to achieve the role of industry leaders and the ones that define and shape the industry for the future.

China is becoming a key role player in (frozen) seafood processing. It has a booming seafood industry around the port of Qingdao in the northern part of the country. Leading seafood companies from Japan, the US, the Republic of Korea and Europe outsourced fish processing to this area.. American Pacific Andes, for example, is building a new processing plant in Qingdao to employ 15,000 people. EIMSKIP (IC), which transports 800,000 tons of seafood annually, opened its office in China. The new industry combines low labour costs with very high quality standards. Experts claim that labour cost in China is at 20% of the level in developed economies.

Size classes

Table 4.3.5 shows the number of companies. Spain, France and Italy in particular have many small seafood companies. The importance of these small enterprises is mainly in processing and distribution of fresh specialties. The main share of the turnover in frozen seafood is in companies with 50 to 250 and over 250 or more employees (figure 4.3.12).

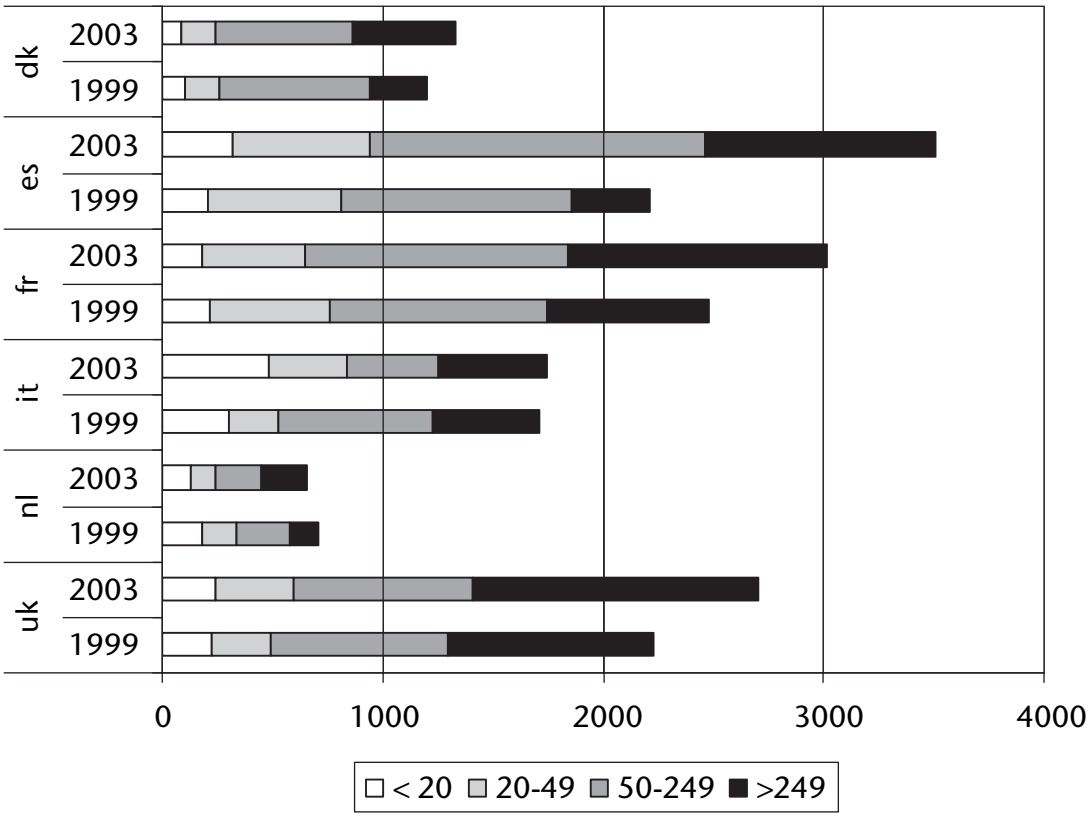
Table 4.3.5 Number seafood enterprises for size classes in number of personnel

Country	Year	< 20	20-49	50-249	> 249
Denmark	1999	79	25	33	4
	2003	62	22	29	6
Germany	1999	103	50	10	6
	2003	98	38	20	6
Spain	1999	262	196	38	8
	2003	451	140	86	12
France	1999	363	82	45	9
	2003	357	84	52	12
Ireland	1999	36	35	14	0
	2003	38	32	16	0
Italy	1999	374	40	25	2
	2003	394	37	18	2
Netherlands	1999	115	25	10	5
	2003	90	15	15	5
Portugal	1999	41	37	34	3
	2003	31	28	31	4
United Kingdom	1999	255	63	58	12
	2003	260	63	65	13
Poland	1999	489	32	44	23
	2003	347	36	47	8

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

In most other food industries, the size class above 250 employees has the largest share in the turnover. In this respect the fish industry differs: the size class from 50 to 250 generally has the largest share. In Italy and Spain, the turnover in the lowest size class even increased since 1999.

Figure 4.3.12 Turnover of the fish industry by employee size class



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.3.5 Competitive potential

Innovation and branding

Seafood industry is less mature than other sectors, allowing many opportunities for new product development and branding. It is one of the backgrounds of recent consolidations. The industry effectively follows general consumer trends such as increased health and convenience. Examples of convenience products, both for the retail outlets and for food service chains can be found in all markets. The majority of product innovations deal with incremental innovations, such as variations in taste and packages designed for different consumption moments. An impression of recent innovations can be found at http://www.euroseafood.com/prix/prix2006_winners.doc.

Only a very small number seafood brands have some degree of global exposure. Most of these companies are active in other (food) industries (e.g. Heinz). Most frozen and canned seafood is distributed under numerous national producer or private labels. The European market has many national or regional brands (e.g. Iglo Germany and neighbouring countries, Pescanova Spain, Young's Bluecrest UK, Davigel France) which reflects the differences in consumer demands in Europe and the ability of European companies to manage those differences. Fresh products are almost exclusively sold without retail packaging or under private labels.

Costs of inputs

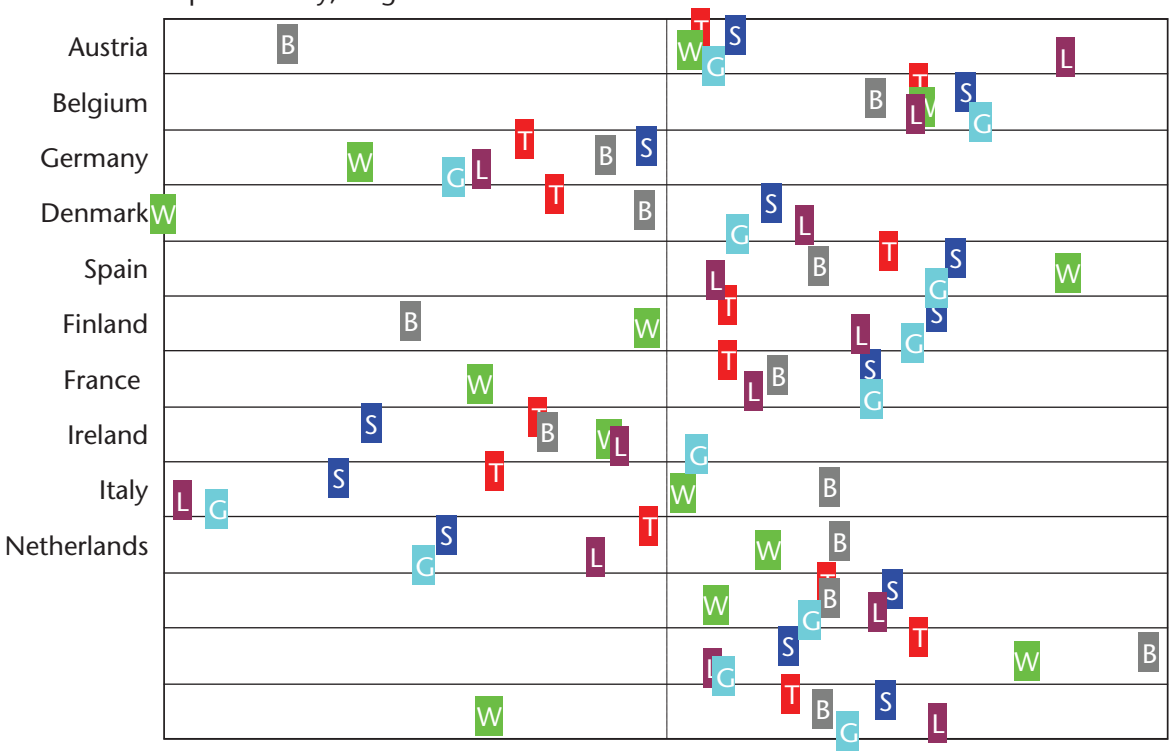
Purchases of raw fish and shellfish and other ingredients amount to 80-90% of the costs for the seafood industry. It is difficult to compare prices of raw materials between countries due to the specific species in each country and continent.

Competitiveness of EU countries

Figure 4.3.13 gives an overview of the competitiveness of 5 the largest producers of the EU. Since 1999, Spain, Belgium and the UK have clearly improved their position. Denmark, Germany, Italy and Ireland perform less well.

Figure 4.3.13 Competitiveness fish processing of the EU countries

T= total fish; S= growth share food industry in total manufacturing;
B= growth Balassa; W= growth world share;
L= labour productivity; G=growth value added.



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4.4 Processed fruit and vegetables: faster growth export to third countries

Myrtille Danse

4.4.1 Key findings

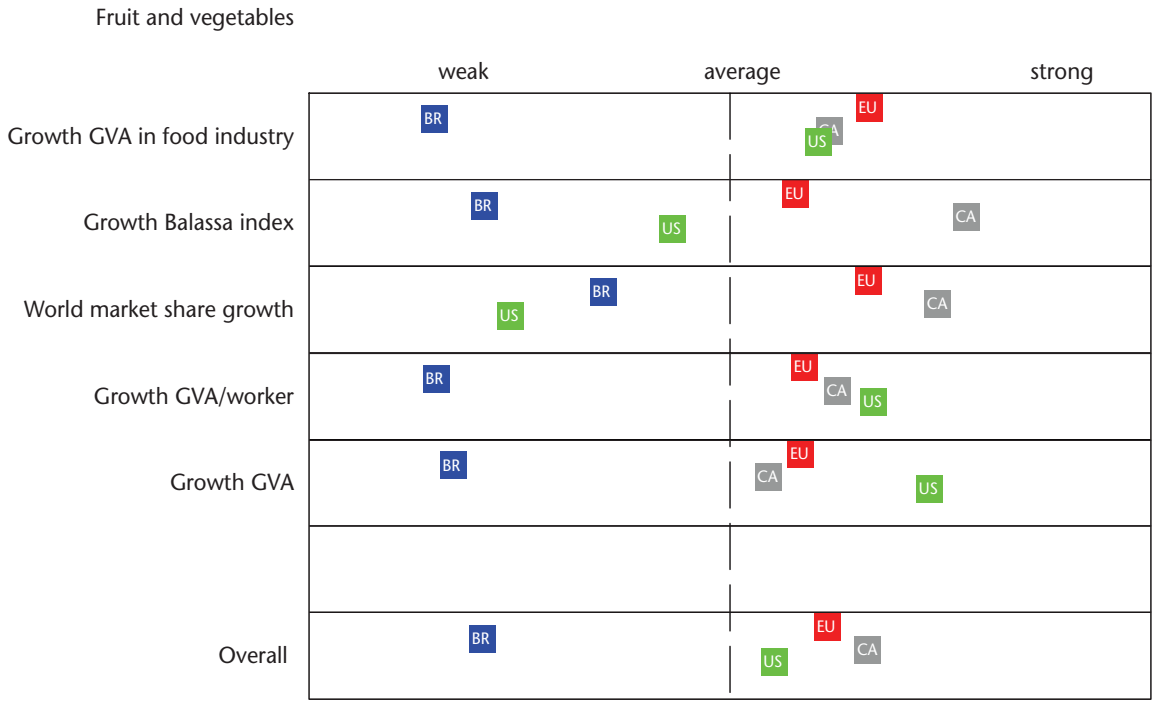
Less than 5% of the world production (1.7 billion tons) of fruit and vegetables (F&V) is traded between countries: over 95% is consumed locally. F&V are mostly consumed fresh. However in high income countries over 50% of the consumption is processed fruit and vegetables (including

juices). China is the largest producer of F&V with a market share of one third. Processed F&V has a share of 43% in the exports of all F&V. Leading countries in trade of processed F&V are EU (Netherlands and Belgium), China, US, Canada and Brazil. Largest importers are EU (Germany and the UK), US, Japan and Canada.

The leading export product group of processed F&V is canned vegetables, accounting for 36%, followed by fruit juice/concentrate (29%) and frozen vegetables (14%), a considerable part of which is processed potatoes, canned fruit (9%) and frozen fruit (6%).

The competitiveness of the EU-15 is stronger than the US and Brazil but weaker than Canada. The export to third countries is growing faster than intra communitarian trade and the importance of F&V in the food industry is increasing. Germany, Spain and Belgium are relatively strong; France as a large producer is weak.

Figure 4.4.1 Competitiveness of the processed fruit and vegetable industry



4.4.2. Introduction

The EU benchmark countries

The worldwide production of fruit and vegetables (F&V) amounted to 1,681 million tons in 2003. Major producing countries are China, India and Brazil (Baas, 2005). EU countries play an important role on the world market of processed F&V, with an export share of 48% (Table 4.4.1.). Intra communitarian EU exports account for almost 80% of total exports. EU, US, China, Canada and Brazil are the main exporters. Importers are almost the same countries: the EU, Japan, US, Canada and Turkey. Major exporters to the EU-25 are Turkey (nuts, cucumbers, peppers in vinegar and olives), Brazil (orange juice), China (tomatoes, asparagus, mushrooms), and Thailand (pineapples). Processed F&V has a share of 43% in the exports of all (fresh and processed) F&V in 2002-2004. In processed product groups, canned vegetables are the leading exported product group (36%), followed by fruit juice/concentrate (26%), frozen vegetables (15%) of which French fries accounts for 2.2.% and canned fruit (9) (Eshuis, 2005).

Table 4.4.1 Major exporting countries in F&V products

Region/Country	Export share			Import share		
	'96 - '98	'02 - '04	difference	'96 - '98	'02 - '04	difference
EU-25	48	49	1.1	54	53	-1.4
EU-15	43	44	0.7	52	50	-1.7
EU-15 < > non-EU	9	9	0.7	21	19	-2.2
China	7	9	2.3	0	1	0.4
US	11	9	-2.1	11	13	1.9
Netherlands	8	8	-0.5	5	5	-0.8
Belgium/Luxembourg	6	8	1.4	4	4	0.2
Italy	6	6	-0.1	4	4	0.1
Spain	5	6	0.9	3	3	0.3
Germany	5	5	0.6	13	12	-1.5
France	5	5	-0.5	8	8	0.2
Canada	3	5	1.3	4	4	0.0
Brazil	5	4	-1.3	2	1	-1.1
Turkey	4	3	-0.8	0	0	-0.1
Thailand	3	3	0.2	0	0	-0.0
Poland	2	3	0.6	1	1	0.0
United Kingdom	2	1	-0.2	8	8	-0.7
Japan	0	0	-0.1	11	9	-1.7

Source: ITC/WTO.

Processing activities

The perishable nature of fresh fruits and vegetables usually requires consumption soon after harvest. A climate controlled post harvest chain increases the shelf life of fresh produce. An even longer shelf life is provided by F&V processing. This allows products to be stored for longer periods and distributed over greater distances without the need for expensive climate-controlled conditions. Another aim of processing is to prepare F&V as a ready-to-use ingredient in the food-processing and beverage industries. Processing methods of F&V are drying, salting, pickling, sweetening, canning in tins and glass jars and deep freezing. Dried and frozen fruit, dried vegetables, fruit juice concentrates and provisionally preserved F&V are mainly used as ingredients for the food processing industry. Processing and preserving of fruit and vegetables include manufacturing potatoes (mainly into French fries), fruit and vegetable in juices and other preserved F&V.

Fruit juices and concentrates are the largest imported product category, accounting for 32% of imports of processed F&V by EU-25. Other important categories are canned vegetables (26%), frozen vegetables (12%) and canned fruits (10%). Of lower importance are frozen fruits (8%), dried fruits (6%) dried vegetables (3%) and provisionally preserved F&V (2%). Germany is the main import market for preserved F&V, accounting for 23% of total EU imports, followed by France (14%), the United Kingdom (14%) and the Netherlands (11%) (Eshuis, 2005).

The EU-25 F&V processing industry represents an average of 6% of total food processing industry. French fries are mainly produced in the Netherlands, the main juice producers in the EU are Italy (orange and apple juice concentrates), Spain (orange juice concentrate) and Germany (apple juice concentrate). EU production of frozen vegetables is estimated at 2 million tons, one quarter of which is supplied by Belgium. Greece (currants) and France (prunes) produce some dried fruits. Dried vegetables are mainly produced outside the EU.

Table 4.4.2 Production of fresh and processed fruits and vegetables (million ton)

	EU-25		US		Brazil		China		Turkey	
Product	1995	2002	1995	2002	1995	2002	1995	2002	1995	2002
Potatoes	74.8	67.5	20.1	20.8	2.7	3.1	46	66.6	4.8	5.2
Vegetables	137.7	145.3	73.7	79.9	19.3	22.2	414.3	777.5	48	54.4
Fruits	112.6	122.5	58.6	60.6	67.8	71.5	88.8	144.	19.2	21.9

Source: FAOStat, World Development Indicators 2005.

Consumption per head

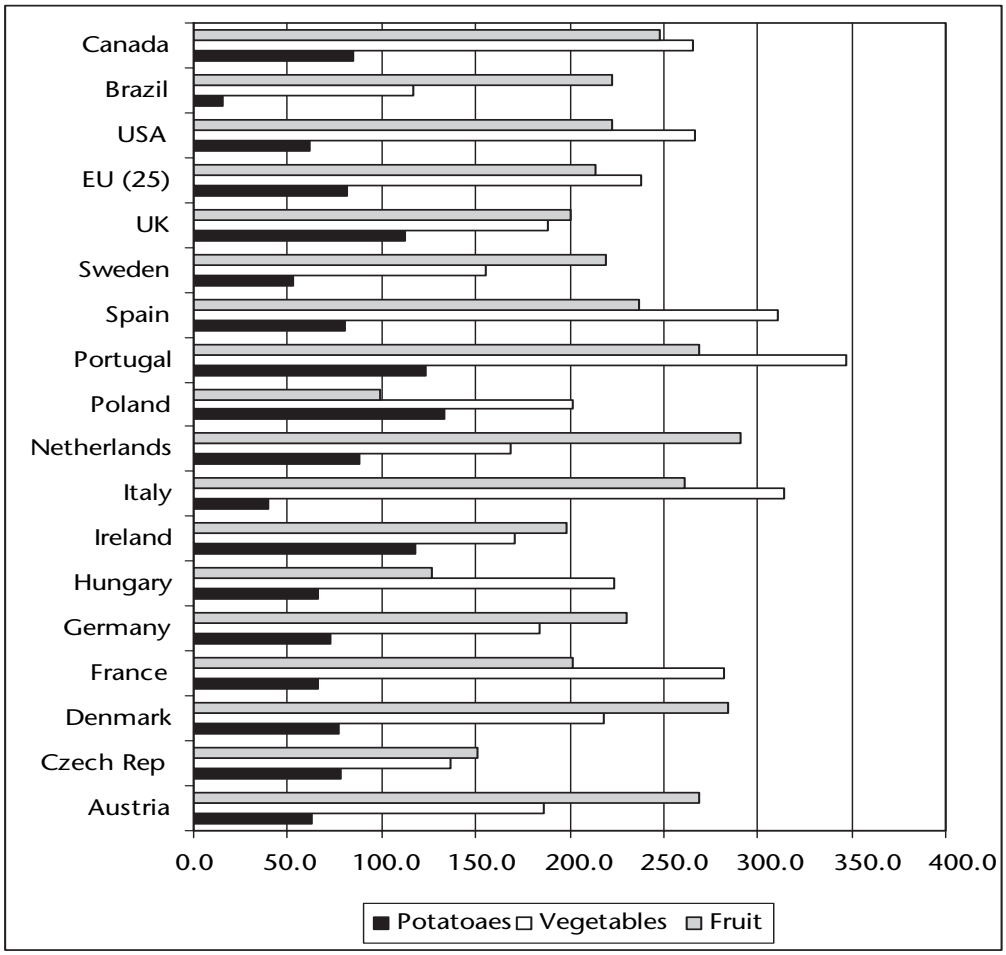
F&V production worldwide is outpacing global population growth; hence on average per head availability is increasing. Overall F&V consumption in developed countries differs from developing countries where consumption is based on locally and seasonally available products and the F&V chain is supply rather than demand driven. Producers of processed F&V with a long shelf life, in particular the canning industry, are encountering stagnating consumption in high income regions. As a result, processors and other chain actors try to exploit the increasing consumer preference for freshly processed F&V such as pre-cut, cleaned, pre-packed or as a ready-to-eat meal. Frozen products appeal to consumers as their nutritional values are almost the same as fresh vegetables and they can be stored for longer periods. Processed vegetables, fresh, canned or frozen, are also widely used in the food services.

Total F&V consumption in Europe as a whole is fairly stable, but differs considerably per country in quantity and variety consumed per head. As no data for processed produce is available in FAO statistics, the consumption of total (fresh and processed) F&V are presented. As an average, the EU-25 F&V consumption is almost 533 kg per head in 2002 (figure 4.4.2.). Within the EU-25, consumption ranges from 333 kg per head in Slovakia to 911 kg in Greece. These differences are partly due to spending power but also due to cultural differences. While the average market growth is stagnating in the EU-15, it is estimated that the food markets in the ten new EU countries will grow due to the increasing spending power. The average EU-25 consumption is slightly lower than the 551 kg per head consumption in the US. US consumption of fresh F&V is on the rise partly at the expense of processed, in particular canned, vegetables. The fresh cut segment was popular in US retail produce departments in the early 1990s. All segments in the US fresh-cut segment are experiencing more than 10% growth, resulting in sales of at least USD 15 billion in 2005 (Baas, 2005). With 651 kg, China's consumption per head is considerably higher than the average for EU-25. This is not the case for Brazil with 355 kg per head.

Competition: Balassa index and share value added.

Table 4.4.3 indicates that the majority of the countries have a low specialisation in F&V exports. Turkey, Brazil, Poland, Spain and the Netherlands have relatively high Balassa indices. The EU-15 third countries trade has a low index, but a relatively high growth rate. Canada has the highest growth rate. The Balassa index of Turkey, China, Brazil and Mexico decreased.

Figure 4.4.2 Fruit and vegetable consumptionin 2002 (kg/head)



Source: FAOStat.

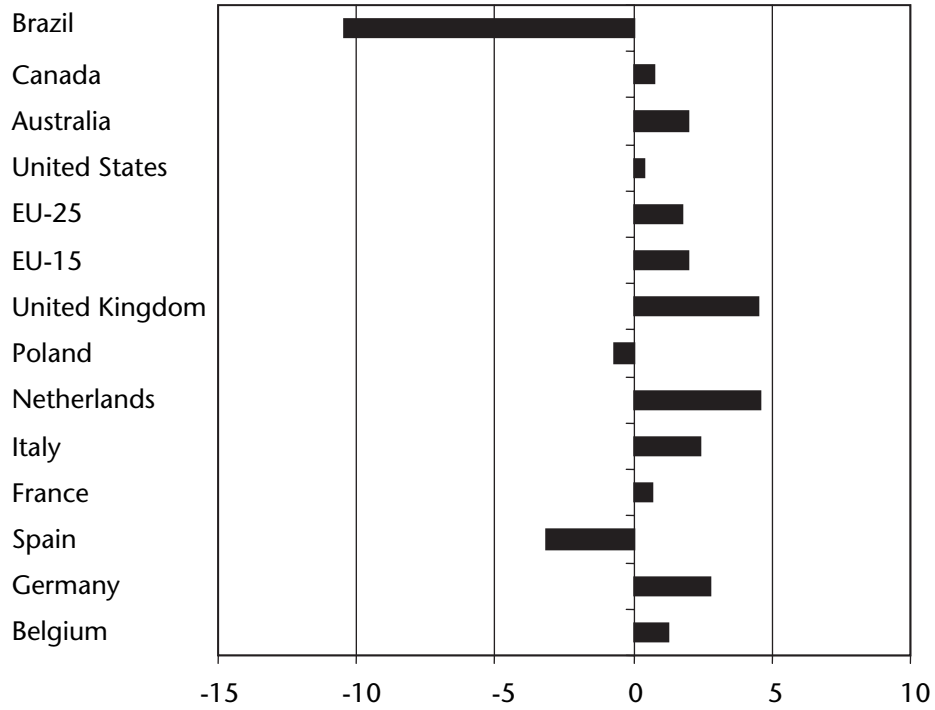
Table 4.4.3 Revealed comparative advantage and growth rate

Region/Country	1996 - 1998	2002 - 2004	annual growth%
EU-25	1.1	1.2	1.7
EU-15	1.0	1.1	2.0
EU-15 < > non-EU	0.5	0.6	2.5
China	2.0	1.5	-4.6
United States of America	0.9	0.9	-0.1
Netherlands	2.2	2.4	1.4
Belgium/Luxembourg	1.7	2.0	2.7
Italy	1.3	1.5	2.8
Spain	2.4	2.8	3.0
Germany	0.4	0.5	2.8
France	0.9	1.0	1.4
Canada	0.8	1.2	7.4
Brazil	4.8	3.4	-5.5
Turkey	8.2	5.2	-7.2
Thailand	2.6	2.7	1.1
Poland	3.9	3.5	-1.6
United Kingdom	0.3	0.3	1.9
Japan	0.0	0.0	-3.8

Source: ITC/WTO data (PCTAS).

The performance on the domestic market is compared to the food industry as a whole. So if the share of real added value of the F&V industry in the total food industry grows, the F&V performs better than the whole. Figure 4.4.3 shows that both the selected EU-15 and EU-25 countries have a positive growth, whereas Brazil shows a negative growth. The competitiveness of the European F&V is better than Brazil and the US, but worse than Canada and Australia. The majority of the EU-15 countries show a positive annual increase; Spain and Poland show a decrease.

Figure 4.4.3 Annual growth rate (%) of processed F&V in the total food industry



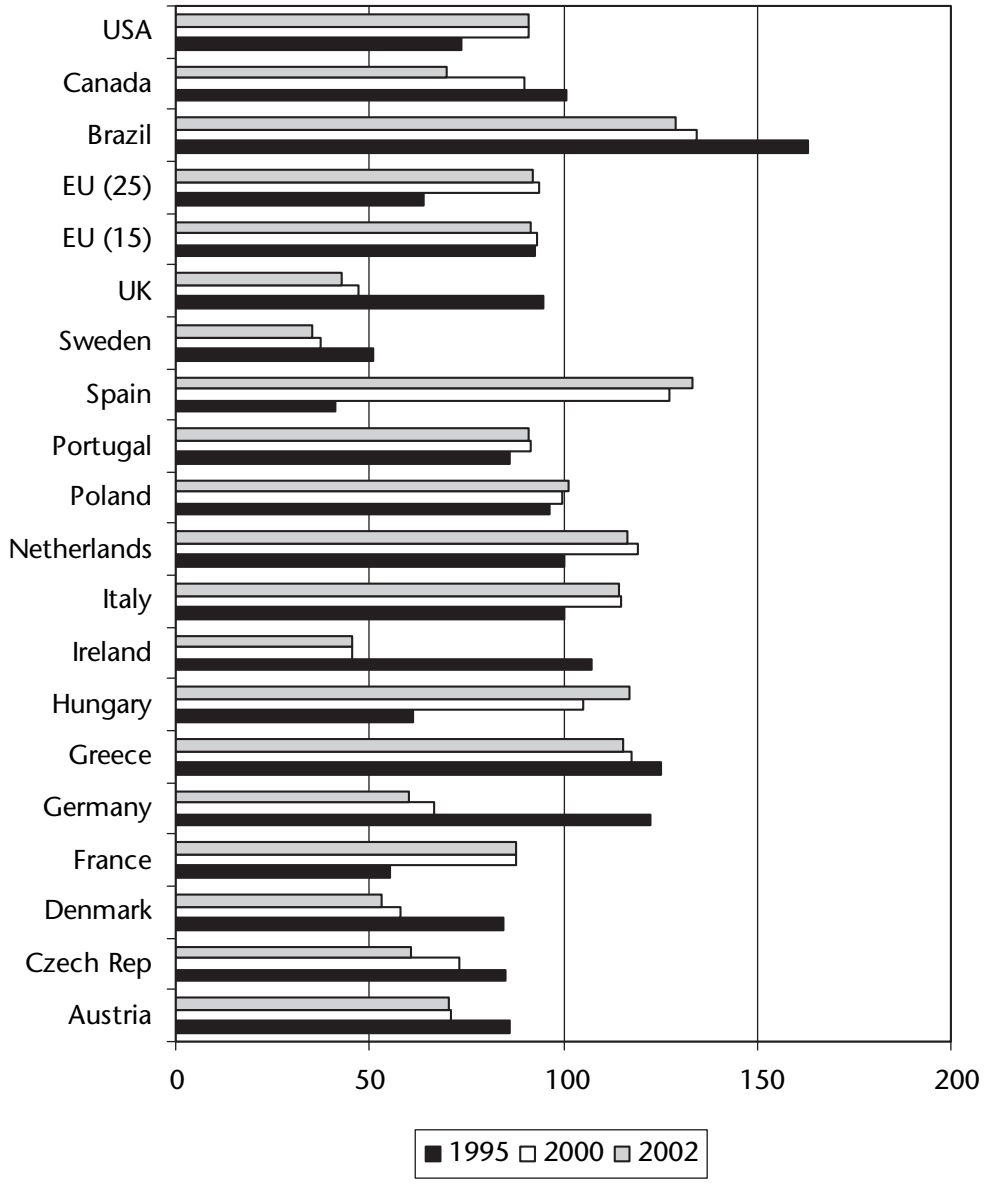
Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.4.3. Global trade performance

Self-sufficiency

The limited exports of F&V indicate a high level of self-sufficiency for most countries. For the EU-25 self-sufficiency was around 100% for potatoes and vegetables and around 80% for fruits. The lower rate for fruit can be explained by the growing demand for tropical and sub tropical products, which are hardly or not at all grown in the EU. As no data of processed F&V are separately available, the self- sufficiency of all F&V are presented in figure 4.4.4

Figure 4.4.4 Self-sufficiency degree for F&V

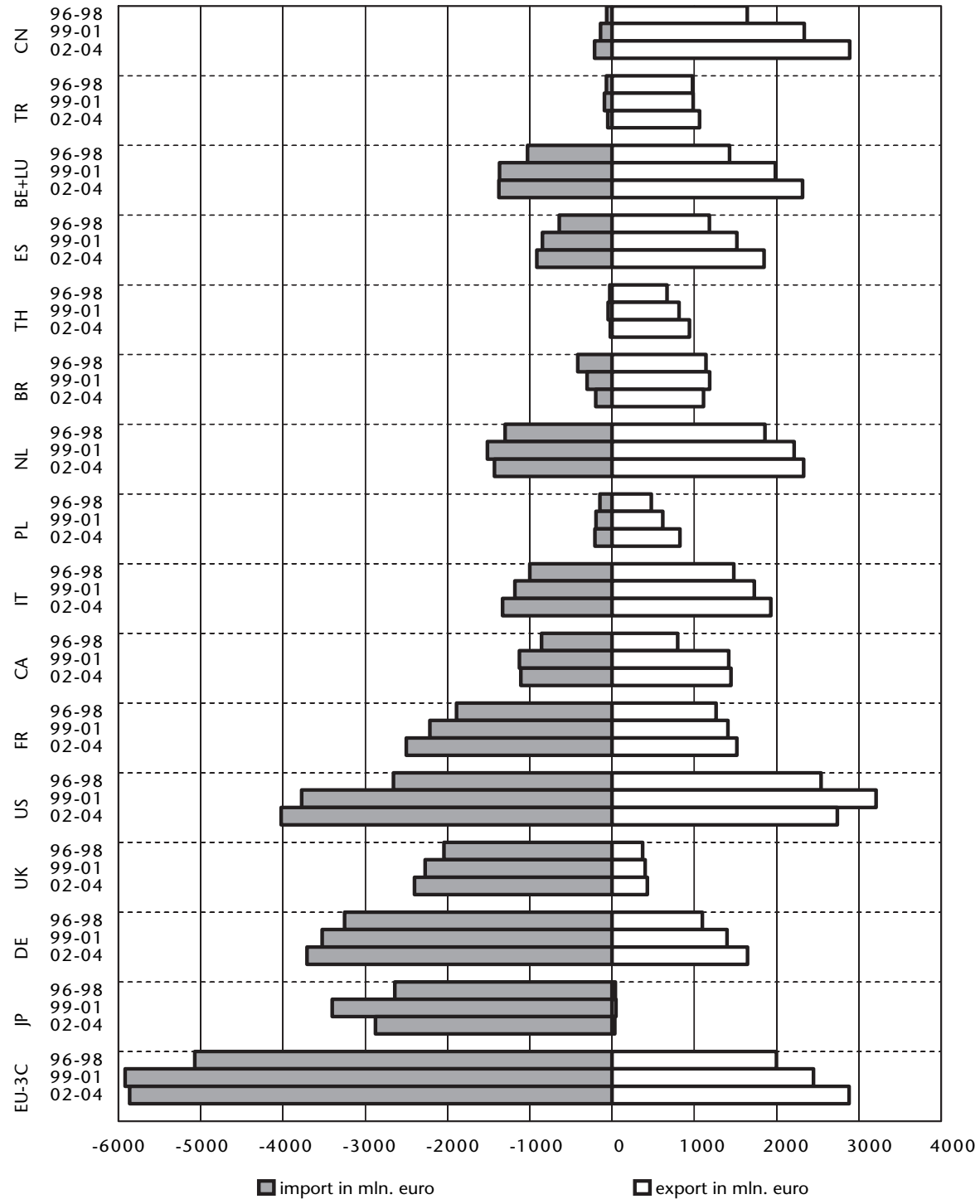


Source: FAO Stat (FAO).

Trade patterns

The largest net exporters of processed F&V are China, Turkey, Belgium and Spain (figure 4.4.5.). The largest net importers are the US, Japan, Germany and the UK. The figure shows an intensification of trade relations between countries. In the period between 1996 and 2004, the exports and imports increased in most countries at the same time.

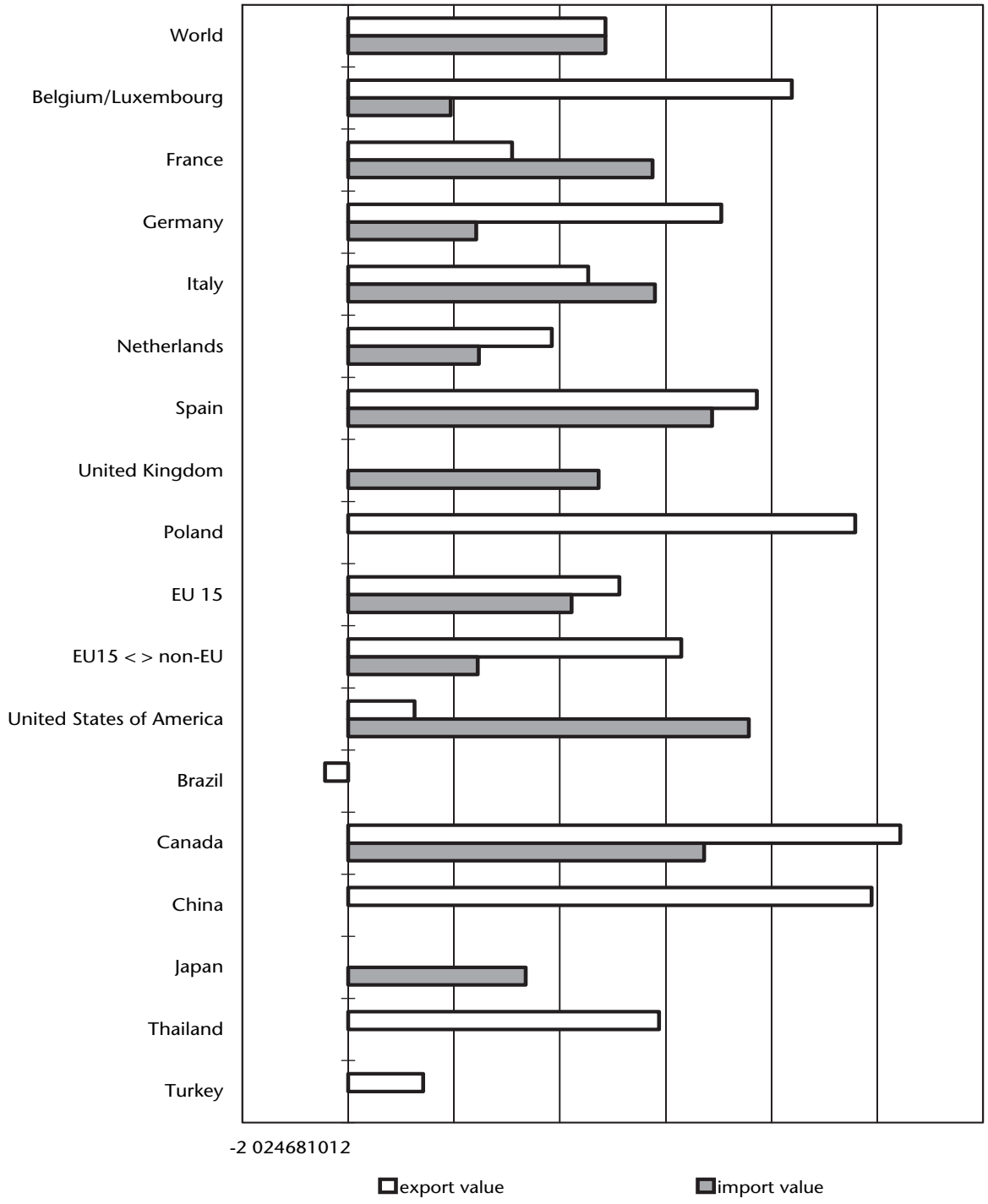
Figure 4.4.5 Import and export of processed F&V products (Million €, three years averages)



(Countries selected on largest net export or net import and ranked to net export level.)

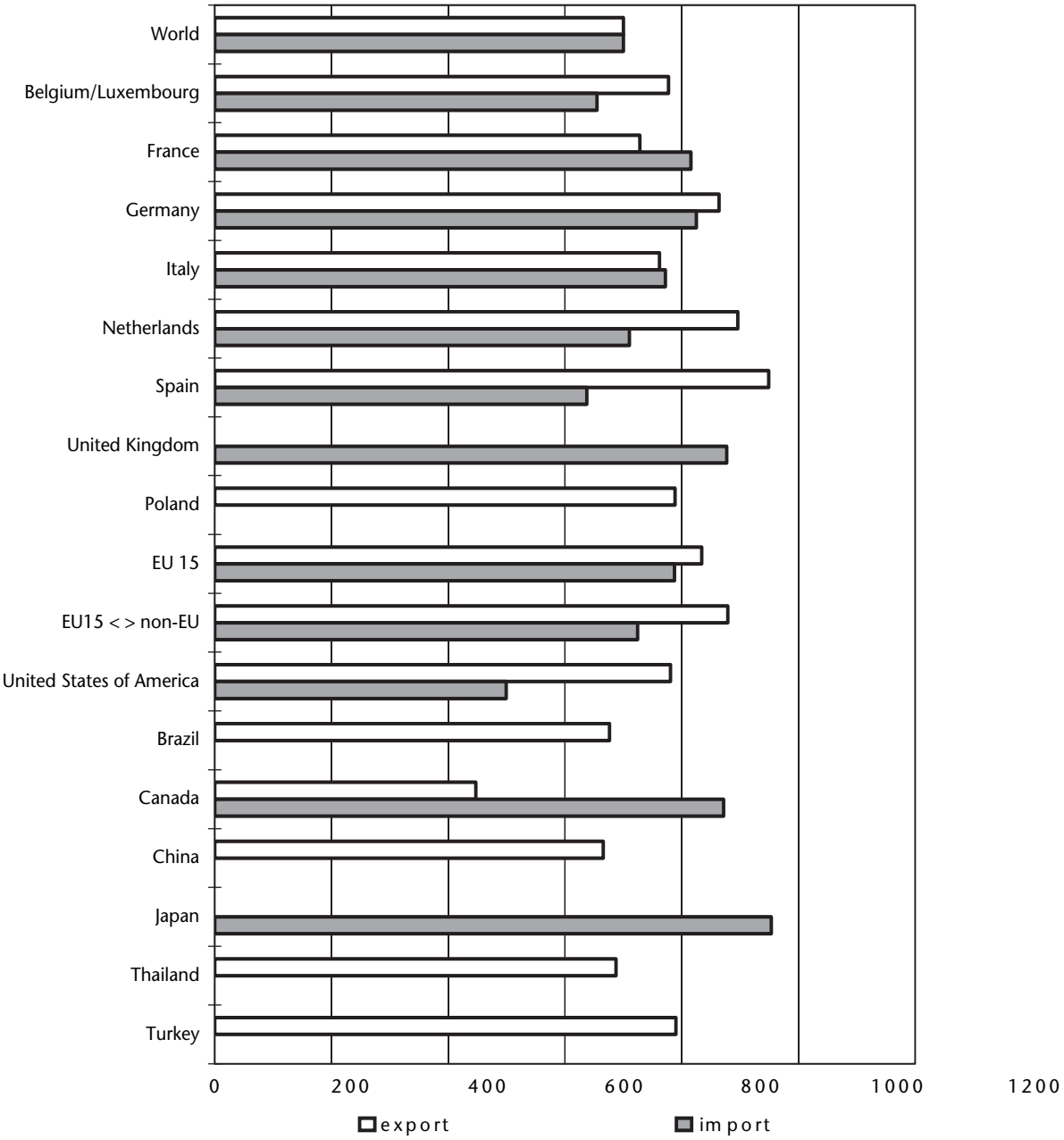
EU-15 export growth to third countries is better than the world average. It is also better than Brazil, US and Turkey, but less than China and Canada with a growth of around 10%. The export growth including the intra communitarian trade is lower than the growth to third countries. Good performers within the EU are Belgium, Germany, Spain and Poland.

Figure 4.4.6 Annual import and export growth of processed F&V products



The value per ton of exported processed F&V products of the EU-15 is above the world average and of the main competitors US, Brazil, Canada, China and Turkey (figure 4.4.7). The export value per ton is higher than the import value in the EU-15 as well as in the US. The price of intra communitarian exports is lower than to third countries. Only Spain and the Netherlands perform better. France has the lowest export price of the selected EU members.

Figure 4.4.7 Import and export prices of F&V product 2002-2004



Products in detail

Processed potato products

The global production of French fries is dominated by North American companies, which account for two thirds of the production. Aviko (global market share 6%) and Farm Frites (5%) are the only European (Dutch) based global manufacturers of French fries. Together with the Dutch manufacturers of French fries, the McCain (28%) joint venture, Lamb Weston/Meijer (20%), and strategic alliance Simplot (11%)/Farm Frites (5%) account for 70 percent of all production. Aviko belongs to the Dutch food processor Cosun. Due to the high cost of transport, locations for new French fry plants are generally established close to potato production areas. The potato production area is in slow decline in the Netherlands, and potato processing facilities are already operating at full capacity. Industry expansion and new processing capacity is gravitating southwards to supply growing demand in the Mediterranean countries. Other investments are being made outside the EU-15 and in countries like Poland to meet the growing demand in Central and

Eastern Europe (Pinckaers, 2004). Table 4.4.4 highlights the quantity of potatoes products. The majority of the products are pre-fried chips, in most countries around 60% of the total. In the Netherlands the share is 90% in Italy only 50%.

Table 4.4.4 Processed potatoes products in 2000.

Country	1,000 tons
Belgium	791
Germany	786
France	556
Italy	73
The Netherlands	1,508
UK	853

Source: VAVI (2002).

Fruit juice and concentrates

Brazil and the US together account for 90% of the global orange juice production. The production in Europe is small. Spain and Italy produce orange juice concentrate, which specific quality makes it more suitable for the soft beverage industry. Germany and Italy are the major EU producers of apple juice concentrate.

In 2003, total EU-25 exports of fruit juice/concentrate amounted to €3.5 billion or 4.4 million tons. The Netherlands is the largest exporter of fruit juice/concentrate with a value share of 20%, followed by Belgium (17%) and Germany (16%). Almost 90% of the export is intra-EU, with Germany, France, and the United Kingdom as the main destinations. US, Japan and Russia are the main destinations outside the EU (Eshuis, 2005).

Canned vegetables and fruits

France is by far the largest EU producer of canned vegetables, accounting for more than 50% of the total EU production, followed by the Netherlands, Italy and Spain. Countries have different specialisations: canned sweet corn is dominated by France, the US, Thailand and Hungary and canned mushrooms by China and the Netherlands. In 2003, total EU exports of canned vegetables amounted to €4.3 billion, or 4.9 million tons. 65% of exports were intra-EU oriented. US, Russia, Switzerland and Australia were the main destinations outside the EU. Southern European countries Greece, Spain, France and Italy are the main producers of canned fruit. In 2003, total exports of canned fruit amounted to €1 billion or 1 million tons. More than 80% of EU exports were intra-EU oriented, with Germany, France, Poland and the United Kingdom as the leading destinations. US, Russia and Japan were the leading export destinations outside the EU (Eshuis, 2005, Brans, 2004).

Frozen vegetables

Frozen vegetables are strong substitutes for canned vegetables. Production technology and quality are constantly improving within the frozen food industry. The improvements and research development and strong marketing efforts contribute to a positive consumer attitude towards frozen food consumption (Eshuis, 2005). Belgium is the world's leader in the frozen vegetables segment, producing 730,000 ton of deep frozen vegetables in 2005. The majority of the Belgian frozen vegetables production is exported and, including re-exports, Belgium accounts for 27% of global exports. Intra-EU exports represent almost 90% of total EU exports. US, Russia and Canada are export destinations outside the EU (Eshuis, 2005, Brans, 2004).

Dried fruits and vegetables

Dried fruit is used in consumer and food service packing, mainly consumed as a snack or as an ingredient for breakfast cereals, healthy ready-to-eat snacks and desserts. Bakeries and breakfast cereal mixers are one of the large end users of dried fruit. There are only a few

countries in the EU supplying significant amounts of dried fruit. Greece is a major producer of currants and raisins. France is the second largest producer of dried prunes in the world after the United States. Spain is the only date producing EU member country. In the EU market, dried vegetables are mainly used as ingredients by the instant soup industry. Only a few EU countries, Germany, France, Belgium and United Kingdom, produce dried vegetables. The amounts are small compared to other processed F&V. China has been producing dried vegetables for 30 years. Its export volume constitutes two thirds of the world's export volume. China exported 130,000 tons of dried vegetables in 1995 and 152,100 tons in 2000 (Yuman et.al., 2004).

Pre-cut fresh F&V

Pre-cut fresh F&V are usually not included in the definition of processed vegetables and fruits, but can also be considered as a type of processing. Peeling, slicing, washing, mixing of different products and packaging belong to this type of processing. The US can be considered leading in the pre-cut produce industry, with estimated sales of EUR 10 billion in 2005 in both retail and foodservice, which is double the amounts in 2000 (Baas, 2006). Brands play an important role in this segment. For example the brands of Dole and Fresh Express accounted for 88% of the US packaged salad market in 2004.

4.4.4. Business performance and competitive process

Characteristics of the F&V processing industry

In the EU-15 6,300 companies are active in the F&V processing industry employing almost 200,000 employees (table 4.4.5). A benchmark with China is not included due to the lack of data. The US has by far the largest industry in turnover and value added of the summarised countries. The number of employees per company in the benchmark countries is twice to three times the EU number.

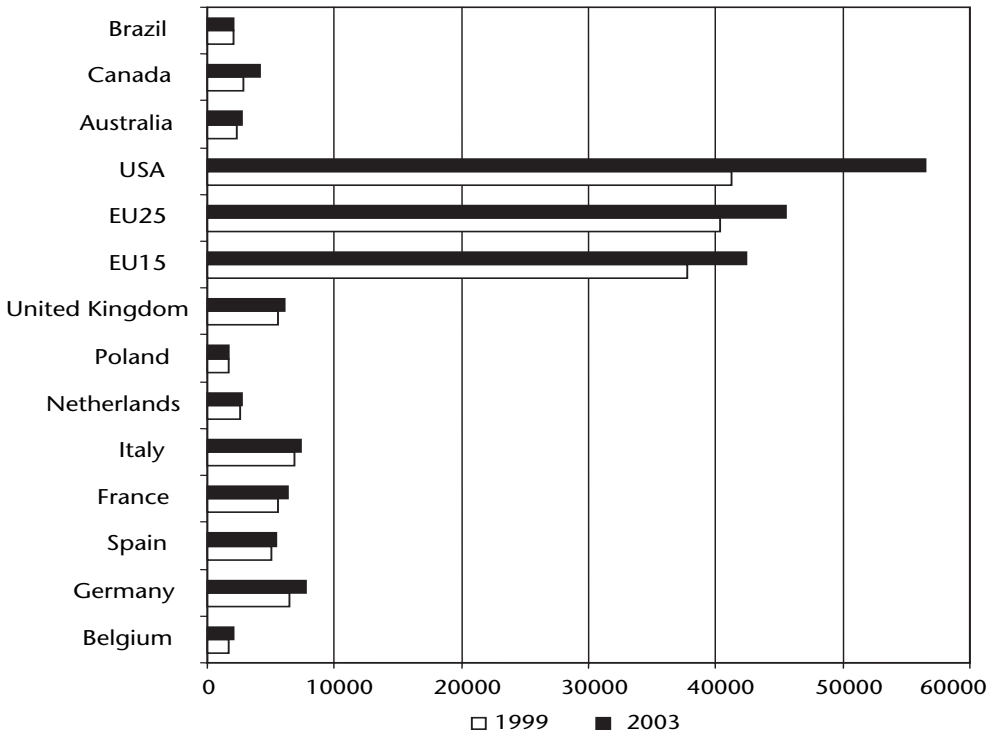
Table 4.4.5 Key characteristics of the F&V industry (in €million)

	EU-15		EU25		US		Canada		Brazil	
	1999	2003	1999	2003	1997	2002	1997	2002	1999	2003
Number of companies	6430	6341	8174	8498	1780	1742	218	377	579	626
Production value	37714	42383	40356	45511	41257	56465	2812	4109	2071	2034
Value added at factor cost	8256	9773	8921	10655	20674	31162	1342	1819	962	608
Purchases	29675	34304	32070	37840	20553	25320	1789	2627	1118	1132
Personnel costs	4571	5633	4960	6070	4323	5687	397	528	230	168
Number of employees	194357	198354	259895	257480	191576	177135	20349	25042	49142	46054

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.4.8 shows that the production value in the EU-25 has declined by almost 10% in the last 4 years. The decline has been the strongest in Italy, United Kingdom, France and Germany, and less in Spain and the Netherlands.

Figure 4.4.8 Distribution turnover in 1999 and 2003 (€million)

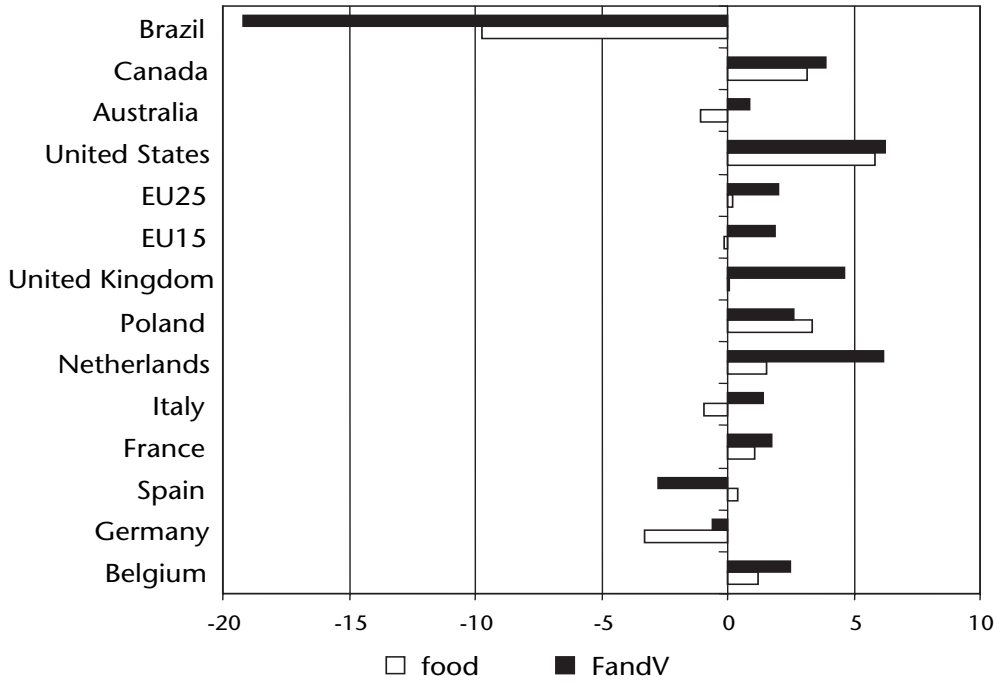


Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Value added and labour productivity

Figure 4.4.9 shows that Europe has a lower growth of the real value added than the US and Canada, but better than Brazil. Within Europe the differences between countries are considerable: high performance in Austria, the Netherlands and Hungary. Germany and Spain, two of the larger EU producing countries, show a negative growth in real added value.

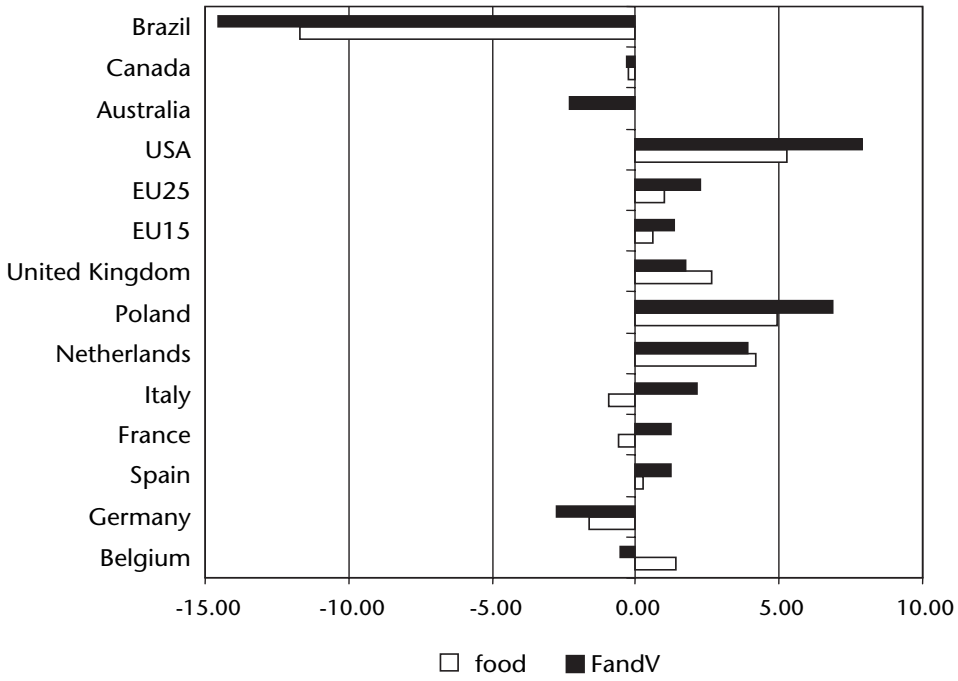
Figure 4.4.9 Growth real value added 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.4.10 shows that the labour productivity growth in the US is higher than EU-15. The EU performs better than Brazil and Canada. Both have a negative growth rate. The differences within the European countries are large: above-average growth in the Netherlands and Poland and negative in Germany.

Figure 4.4.10 Growth of the labour productivity 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Market orientation and internationalisation

Most of the bigger and internationally-oriented F&V companies are involved in more than one link in the chain. The world's largest F&V companies (in terms of total annual sales) such as Dole, Chiquita and Del Monte are based in the US and are involved in primary production, trade, processing, marketing and distribution of F&V (table 4.4.6). Most of these multinationals source their produce on a global scale and increasingly follow a diversification strategy, adding a whole range of F&V products to their product portfolio (Stichele, 2006). However, the majority of these companies are mainly specialised in sourcing and trading of fresh F&V. With regard to processing, some of these companies have developed fresh cut products. In addition, there are a considerable number of food processing companies that source fresh and/or partially processed F&V to process them for final consumption or add them to other food products. Some of these companies have diversified the product portfolio to a number of food products, and in some cases also other consumer products. Other companies have specialised in specific processing techniques, such as Bonduelle (table 4.4.6).

Size classes

Besides these large multinationals, there are tens of thousands of smaller companies all over the world involved in processing and trade of F&V. Despite regular mergers and acquisitions taking place in the sector, the sector is quite fragmented and it is expected to remain like that for the near future (Baas, 2006). One can best describe the sector as a big-small model, where extremely large companies control leading positions in most markets and smaller companies operate in a competitive fringe trying to serve a particular market niche or develop a new idea (Azevedo et.al, 2004). Table 4.4.7 shows the number of F&V companies in Europe. Spain, France, Italy and Poland in particular have many small F&V processing companies. Companies with over 50 employees have a share of over 50% in the total turnover of the whole industry (figure 4.6.11).

Table 4.4.6 Important companies in fresh and processed F&V processing (turnover 2004)

Company name	Country of origin	Turnover in million euro	Activity
Dole	US	5,300	Producer/marketer of fresh and processed F&V (and flowers)
Chiquita (incl. Atlanta Gruppe)	US	3,250	Producer/marketer of mainly fresh/processed bananas as well as other fresh and fresh-cut F&V (24% fresh cut)
Fresh Del Monte Produce	US	2,750	Producer/marketer of mainly fresh and fresh-cut fruits (limited in vegetables)
Nestle	Switzerland	1,800	Beverages, dairy products, prepared dishes, cooking aids, confectionery, biscuits, pet care, pharmaceutical products
Unilever	NL/UK	1,300	Savoury and Dressings, Spreads, Weight Management, Tea and Ice Cream
Pomona	France	2,300	Processor, marketer of processed food (incl. canned fruits and vegetables) and pet food
Bocchi Group/Univeg	Italy/Belgium	1,800	Producer/trader of fruits, vegetables and flowers, fresh cut vegetables, prepared meals
Bokkavőr	Iceland	1,800	Processor/marketer of (fresh) prepared meals and vegetables
Bonduelle	France	456	Processor/marketer of processed/fresh vegetables
McCain foods (g.b.) limited	Canada	467	French fried potatoes, frozen pizzas, and pizza snacks, frozen green vegetables, desserts, oven dinners and entrees, specialty meat products, juices and juice concentrates, juice drinks, appetizers, waffles
Franz Zentis gmbh and co.	Germany	510	Jams and sweet creams, confectionary products, marzipan and chocolate products, prepared fruits for the dairy and baking products industry.
Rauch Fruchtsäfte gmbh and co	Austria	379	Fruit juice concentrates, (partly dehydrated fruit juices) and fruit juice aroma/essence

Exchange rate USD: EUR= 1:1.2.

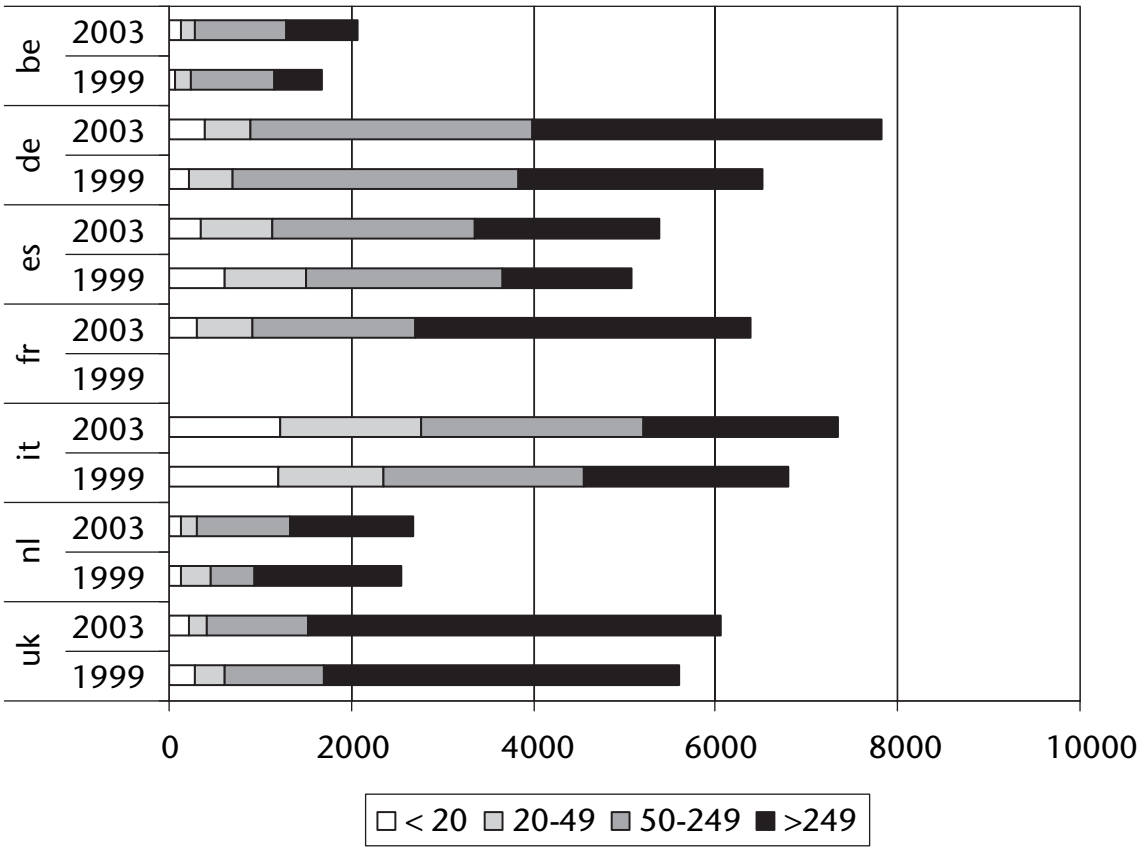
Source: Amadeus, Rabobank (2006).

Table 4.4.7 Number F&V enterprises for size classes in number of personnel

Country	year	< 20	20-49	50-249	>249
Belgium	1999	80	15	24	6
	2003	80	11	27	8
Denmark	1999	34	3	6	4
	2003	23	4	8	4
Germany	1999	332	98	109	19
	2003	394	97	106	22
Greece	1999	53	37	38	4
	2003	54	34	40	5
Spain	1999	763	207	168	11
	2003	583	132	139	25
France	1999	884	70	63	25
	2003	1123	68	66	27
Ireland	1999	22	9	8	0
	2003	21	3	6	0
Italy	1999	1658	178	102	16
	2003	1708	183	108	11
Netherlands	1999	70	25	20	10
	2003	80	20	25	10
Austria	1999	119	7	10	3
	2003	98	4	10	4
Portugal	1999	121	13	16	3
	2003	117	16	17	3
Finland	1999	191	9	3	3
	2003	170	8	7	2
Sweden	1999	116	8	10	3
	2003	122	9	10	3
United Kingdom	1999	485	47	54	29
	2003	343	42	65	34
Czech Republic	1999	69	11	25	3
	2003	96	22	20	4
Hungary	1999	69	25	47	19
	2003	478	30	51	17
Poland	1999	1033	80	124	26
	2003	929	87	142	27

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.4.11 Turnover (€million) to employee size class or value added



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.4.5 Competitive potential

Food ingredients versus end consumer products
Dried and frozen fruits, dried vegetables, fruit juice concentrates and provisionally preserved F&V are mainly used as ingredients for the food processing industry, which is the largest market segment. Producers of processed vegetables with a long shelf life, in particular the canning industry, are encountering stagnating consumption in high income regions. As a result, processors are trying to leverage on the increasing consumer preferences for F&V that are freshly processed including pre-cut, cleaned and pre-packed or in the form of meal components ready to heat and eat.

The competitiveness of EU countries
The EU competitiveness of the processed F&V is average to strong compared to the US and Brazil. As for potatoes, the EU-15 competitive position is weaker than that of Canada. Compared to the US, the growth in Balassa index, real value added and productivity of EU-15 are lower but still higher than average. However, market share growth is considerable higher than the US and Brazil. If data were available for China, EU-15 would result lower at this point.

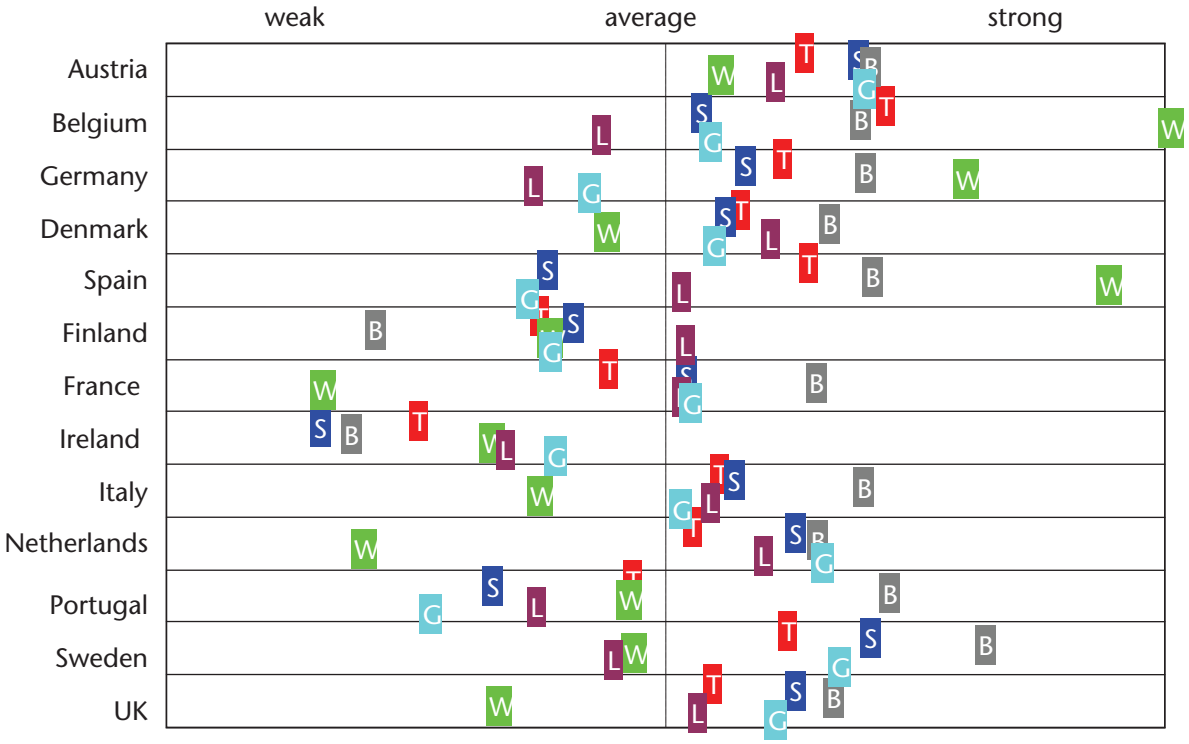
Figure 4.4.12 presents an overview of the competitiveness of the EU countries with F&V processors. The largest producers Belgium, Germany and Spain reflect good competitiveness. France, as a larger producer, is relatively weak.

Figure 4.4.12 Competitiveness of processed F&V of EU countries

T= total FandV; S=growth share food industry in total manufacturing;

B= growth Balassa; W= growth world share;

L= labour productivity; G=growth value added.



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4.5 Oils and fats industry: Brazil is running up, EU strong in value added

Victor Immink

4.5.1 Key findings

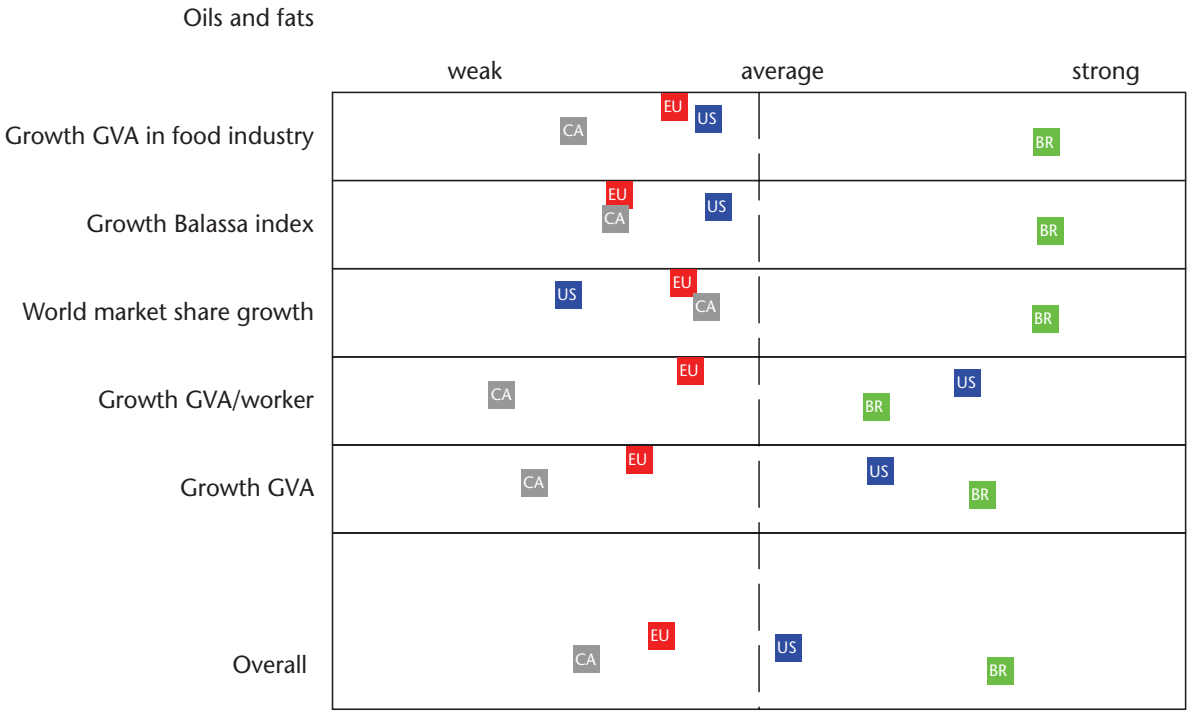
US exports of edible oils and fats are larger than the exports of the EU to third countries. The EU processing industry has a larger turnover. The competitiveness of the US and Brazil is stronger, while that of Canada is weaker. Spain appears to be strong as one of the European countries with a substantial production.

The EU competitiveness is weak compared to the US with regard to the production of crude oils and fats. However, compared to the US, Europe produces more refined oil and fat products, which are products that can be market against higher values. Oils and fats are important for the processing of margarines, mayonnaises, salad dressing and spice oils, as well as for feed and other non-food products. The US and Brazil are the main producers of crude oils and fats, mainly soybeans. However, the European countries produce more refined oil and fat products. The EU-25 is the world's largest margarine producer and accounts for 54% of the worlds' margarine production. Europe is therefore the major world player in the production of refined and consumer end products.

The EU-15 growth of real value added is lower than that of the US and Brazil. The growth in labour productivity indicates the competitive performance of the industries in the countries. Labour productivity growth in the US is much higher than in Europe.

Three of the nine biggest oil and fat companies in the world come from the EU. Together these three companies, Unilever (the Netherlands/Great Britain), Montedison SPA (Italy) and Raisio Group (Finland), represent 21.8% of the whole oils and fats market.

Figure 4.5.1 Competitiveness of the fats and oils processing industry

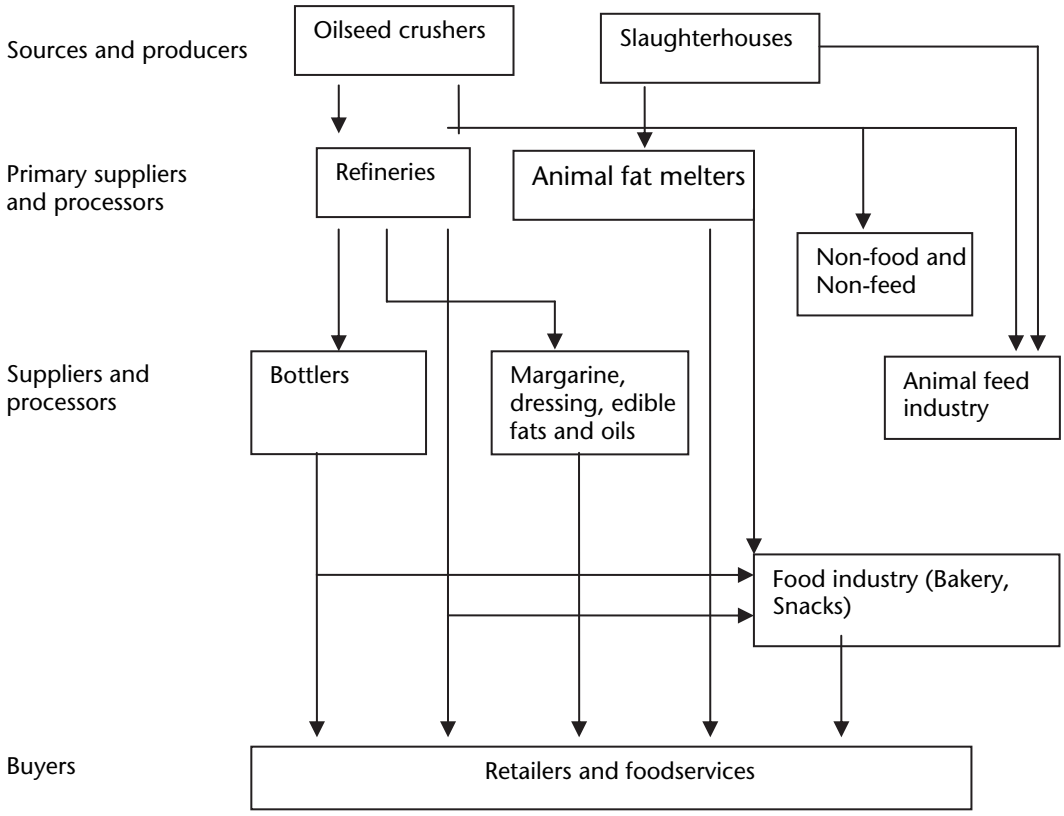


4.5.2 Introduction

Oil and fat processing

The core business of the oil and fat industry is processing vegetable oil seeds and animal fats into different consumer and intermediate products. The oils and fats industry consists of oilseed crushers and animal fat producers who are the primary sources and producers of oils and fats. Before the processing industry can use the oils and fats, refiners and hardeners and animal fat rendering plants process the crude oils and fats. The physical and chemical properties of the different raw materials (e.g. soybean oil and rapeseed oil) make them easily substitutable for food consumption as well as for industrial use (Othman, 1998).

Figure 4.5.2 Supply chain for edible oils and fats



Oils and fats are important for the processing of margarines, mayonnaises, seasonings and spice oils, but also for animal feed and other non-food products. About 50% of the oils and fats are used in the food industry, 30% in the animal feed industry and 20% as raw material for cosmetics, detergents, pharmaceutical products, soap and paint. The remaining products are used in bio fuels for production of electricity (MVO, 2005). In the industry code NACE15.4 the non-food use of oils is excluded as well as the use edible use of animals' fats. The last group is part of the meat industry.

The US is the largest producer of oil and fat products, as is shown in table 4.5.1. The US and Brazil are the main producers of crude oils and fats: mainly soybeans. The European countries produce more refined oil and fat products. The EU-25 is the world largest margarine producer and accounts for 54% of the worlds' margarine production, the US just 5%. Europe is the major producer of refined and consumer end products.

Table 4.5.1 Production of oil and fat products (x 1000 Mt)

	EU (25)		Brazil		Malaysia		US	
	1995	2002	1995	2002	1995	2002	1995	2002
Animal fats	13220	14736	2138	2384	48	36	12589	13307
Refined oils	20773	24766	8634	11236	18130	27334	19579	21962
Crude oils	17025	17477	27530	46990	3531	4130	68809	83834
Total	51019	56981	38304	60611	21710	31501	100978	119105

The EU benchmark for competitive performance: world exporters

Trade in oils and fats is increasing with the growth of the world population and rising consumption levels. The EU is a major exporter, but the main destinations are other EU countries. Malaysia, Brazil and the US have larger exports than the EU-15 exports to non-EU countries. Australia, Brazil, Canada and the US are used to benchmark the EU oil and fat industry. Section 4.5.3 will provide a more in-depth analysis of the trade.

Table 4.5.2 Market shares (percentage) of major exporting and importing countries

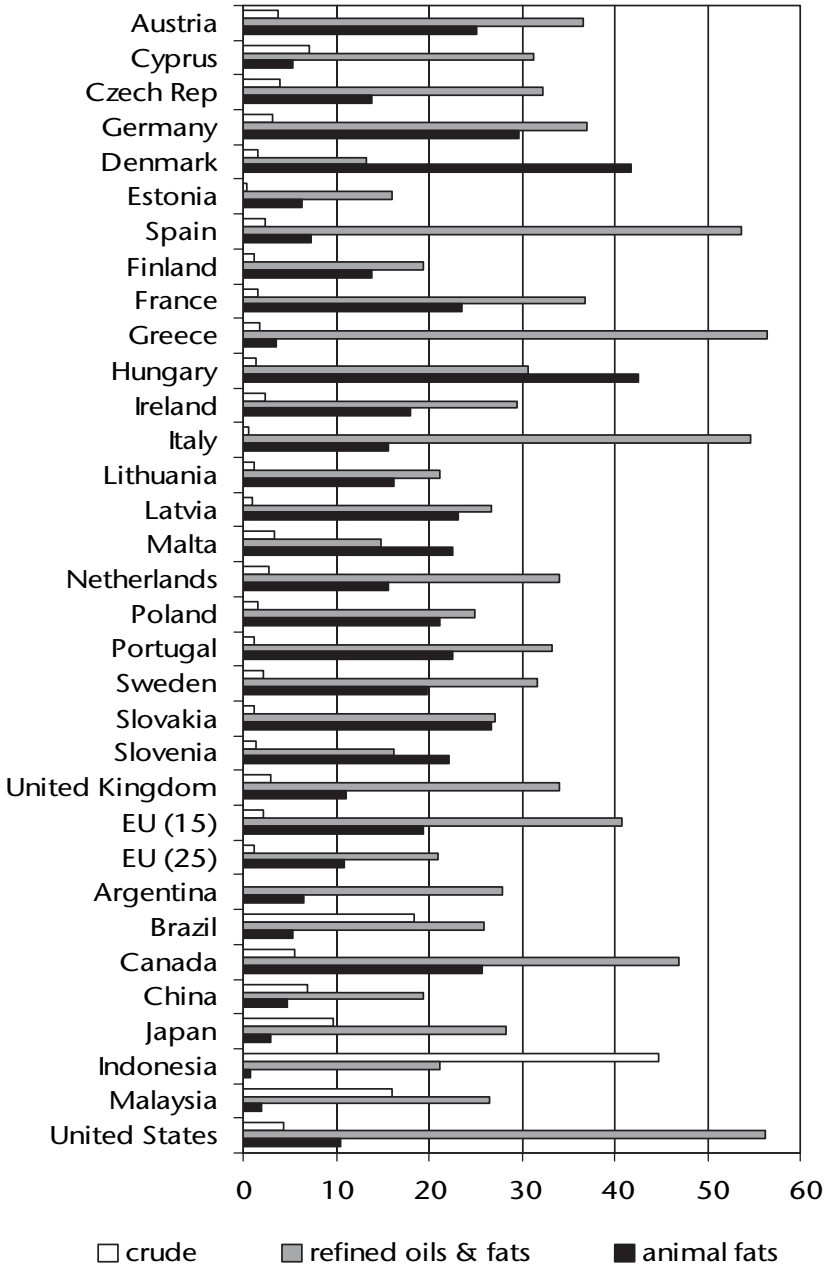
Region/Country	Export share			Import share		
	'96 - '98	'02 - '04	difference	'96 - '98	'02 - '04	difference
EU-25	28	25	-2.4	42	36	-5.4
EU-15	26	24	-2.5	40	34	-5.1
EU-15 < > non-EU	9	7	-1.6	22	19	-3.4
US	22	18	-3.6	5	4	-0.8
Malaysia	12	12	0.1	1	1	0.4
Brazil	7	11	4.1	2	1	-0.9
Argentina	7	9	1.3	0	0	-0.2
Indonesia	4	7	2.4	1	1	-0.0
Netherlands	5	5	-0.4	7	6	-0.6
Spain	4	4	0.4	4	3	-0.7
Canada	5	4	-1.2	1	1	0.2
Germany	4	4	-0.7	8	6	-1.1
Italy	2	3	0.2	5	5	-0.1
France	4	3	-1.1	4	3	-0.7
Belgium/Luxembourg	3	3	-0.1	4	3	-0.4
China	2	1	-0.6	6	15	8.9
UK	1	1	-0.1	4	3	-1.1
Japan	0	0	0.0	8	6	-2.1

Source: ITC/WTO data.

Consumption per head

Asia is becoming more important in the world's demand for protein (e.g. soybean meal for meat production) due to favourable economic developments. In China, the domestic demand for protein meal is exploited by domestically crushed soybeans. India is the largest consumer of vegetable oils. Palm oil tends to be favoured by the market (as soybeans yield little oil). The importance of oil imports has given rise to refining capacity being located near the country's port. Local demand is expanding with the increase in income (Rabobank, 2005).

Figure 4.5.3 Consumption of oil and fat products in countries worldwide in kg/head



Within the EU-25, large differences in the consumption of oil and fat products exist (figure 4.5.3). Greece has the highest consumption of refined oil and fat products: approximately 57 kg/head, followed closely by Italy with 54 kg/head. Greece has the same consumption level of refined oil and fat products as the US. Denmark uses the lowest level at 13.3 kg per head. Hungary (42.5 kg/head) and Germany (29.6 kg/per head) use the highest amount of animal fats. Malaysia (2.0 kg/per head) and Greece (3.6 kg/head) are the lowest users of animal fats. Europe's consumption of animal fats is almost twice that of the US and of refined oil almost two third. In the total the fat and oil consumption per head is comparable.

Competition: Balassa index and share value added.

Greece has the highest level of the Balassa index in the EU, followed by Spain and the Netherlands. Greece shows a sharp decline. The export specialisation is higher in Argentina, Malaysia and Brazil. The EU has a rather low index which means that other products are of much more importance in the export portfolio.

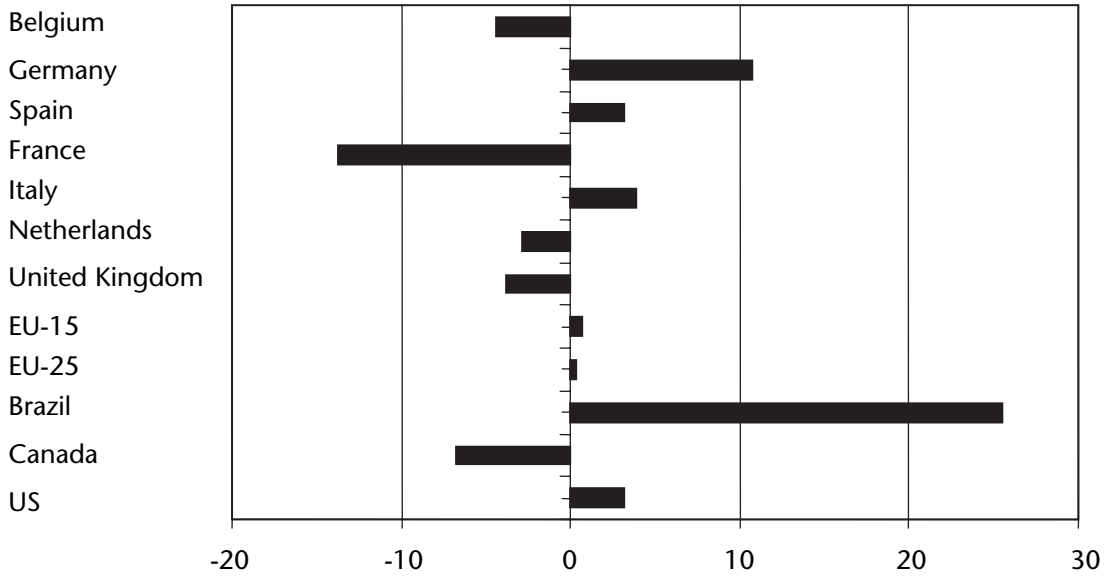
Table 4.5.3 Revealed comparative advantage and growth 1996-2004

Region/Country	1996 - 1998	2002 - 2004	annual growth%
EU-25	0.6	0.6	-0.4
EU-15	0.6	0.6	-0.1
EU-15 < > non-EU	0.5	0.4	-2.4
US	1.7	1.8	0.2
Malaysia	7.6	8.0	0.8
Brazil	6.3	10.2	8.3
Argentina	13.9	20.7	6.8
Indonesia	4.2	8.1	11.5
Netherlands	1.4	1.5	1.0
Spain	1.6	1.8	1.9
Canada	1.2	1.0	-2.5
Germany	0.4	0.3	-2.4
Italy	0.5	0.6	4.0
France	0.6	0.5	-3.1
Belgium/Luxembourg	0.7	0.7	-1.4
China	0.5	0.2	-14.7
UK	0.2	0.2	2.2

The performance on the domestic market is compared to the food industry as a whole. So if the share of real value added of the oils and fats industry in the total food industry grows, the oils and fats industry performs better than the food industry as a whole.

Figure 4.5.4 shows that the EU-15 and the Netherlands (no data available from Greece) have much less growth compared to that of the US. Spain has a comparative advantage equal to the US. So in general, the competitiveness of European oils and fats industry is weaker than that of the US and Brazil.

Figure 4.5.4 Annual growth of the real gross value added at factor cost: share oils and fats industry in food industry



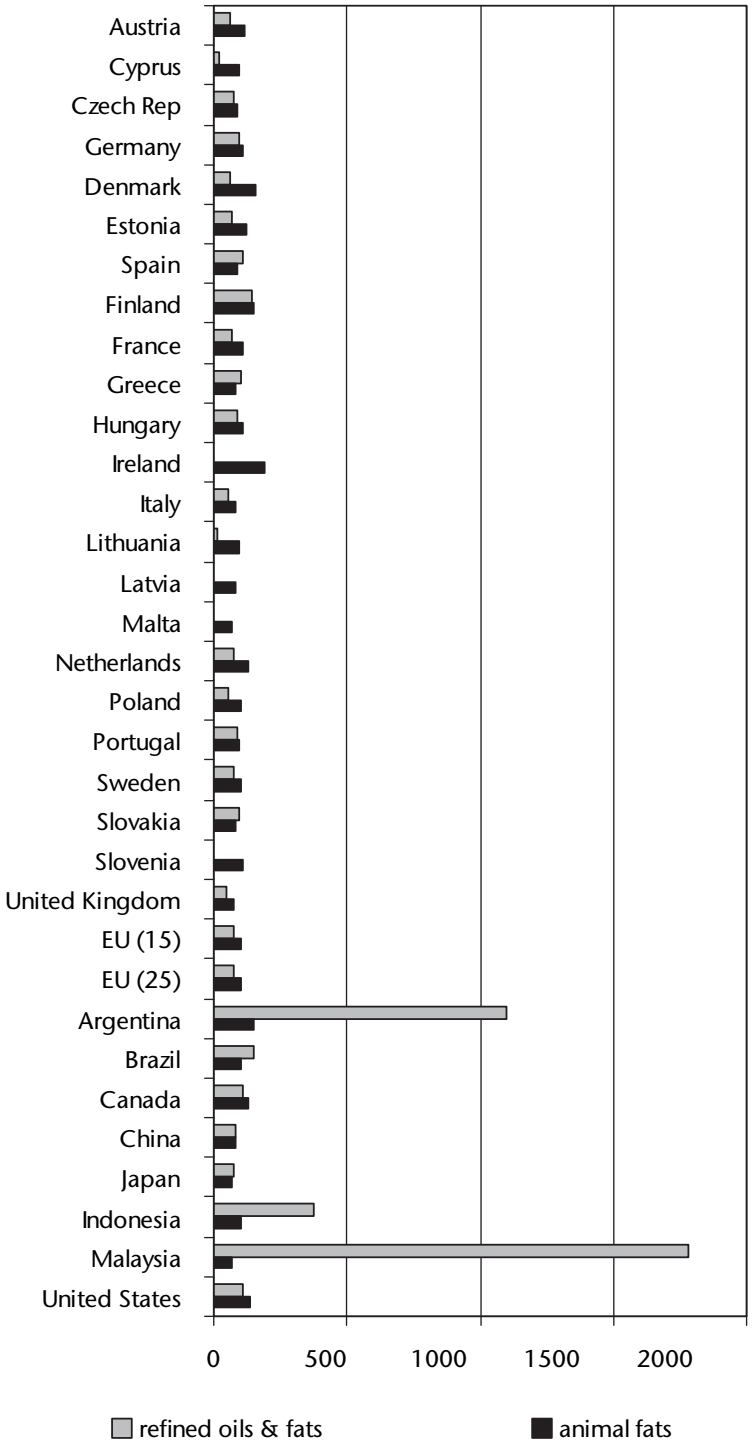
Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.5.3 Global trade performance

Self-sufficiency

The level of self-sufficiency shown in figure 4.5.5 reveals the importance of Malaysia in the world of oils and fats. Malaysia's self-sufficiency of refined oils and fats is 1782%. The EU-25's self-sufficiency of refined oils and fats on average is 74.8% ranging from Finland 140% to Ireland 8% and Malta 0.3%. The US is just about self-sufficient (106%) for refined oils and fats.

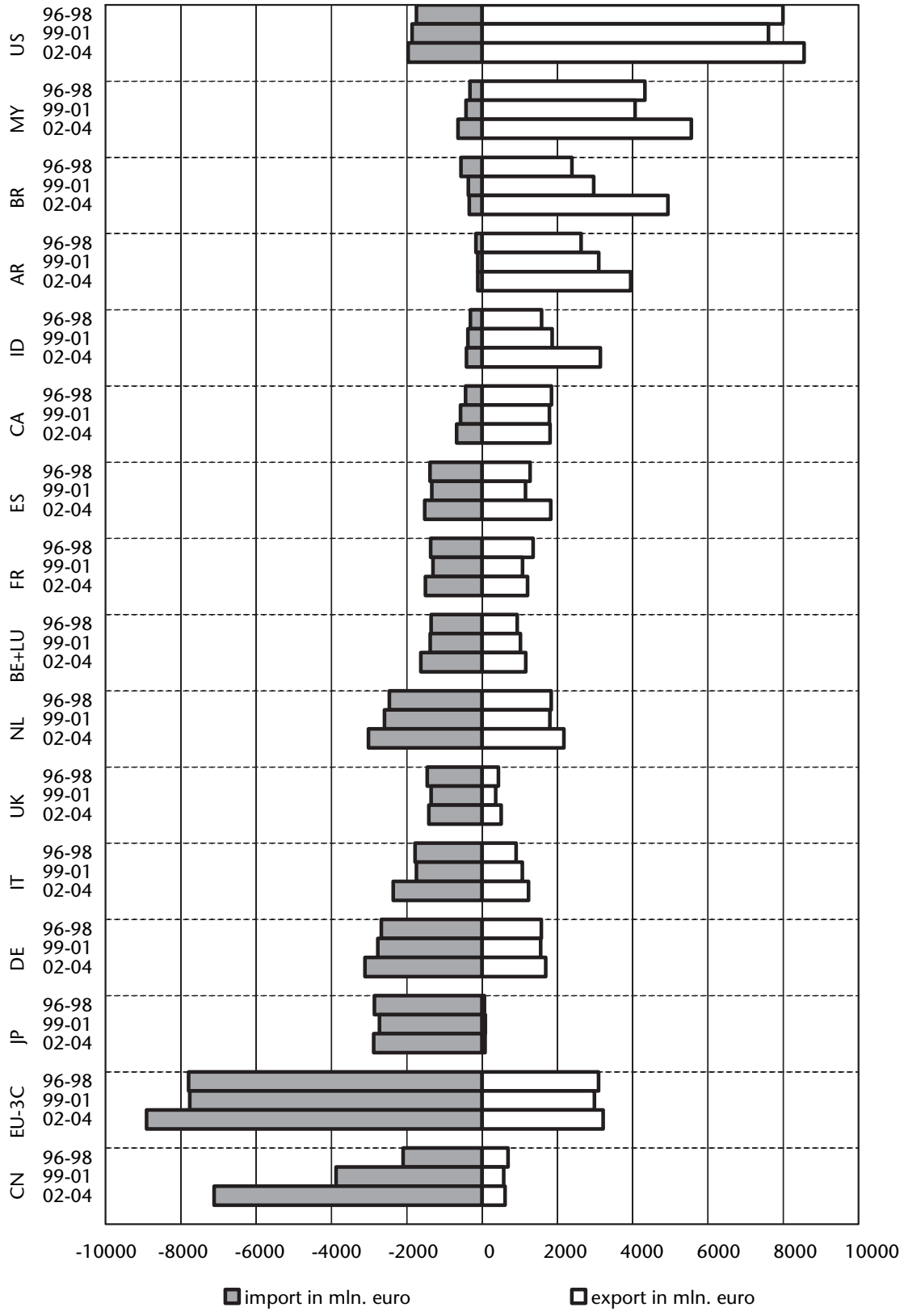
Figure 4.5.5 Self-sufficiency degree for refined vegetable oils and fats



Trade patterns

The US is the largest **net** exporter of oils and fats, followed by Malaysia and Brazil (figure 4.5.6). The largest **net** importers are China, EU15 (extra communitarian trade) and Japan.

Figure 4.5.6 Import and export of oil and fat products, three years average of values



Chinese imports increased rapidly. Several EU countries are large importers as well as important exporters. The figure shows an intensification of trade relations between countries. In the period between 1996 and 2004, exports and imports increased in most countries at the same time.

Figure 4.5.7 Annual import and export growth of oil and fat products

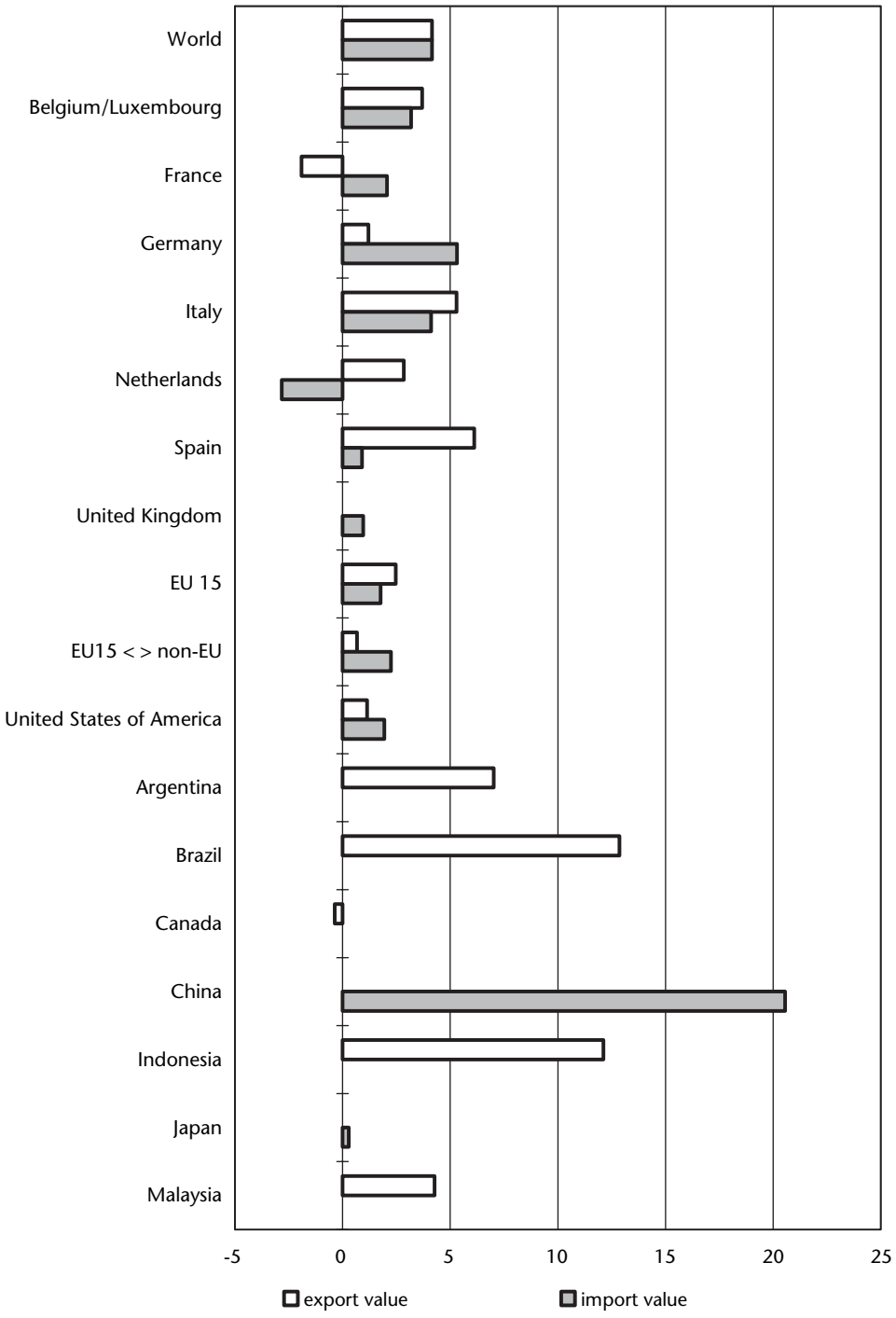
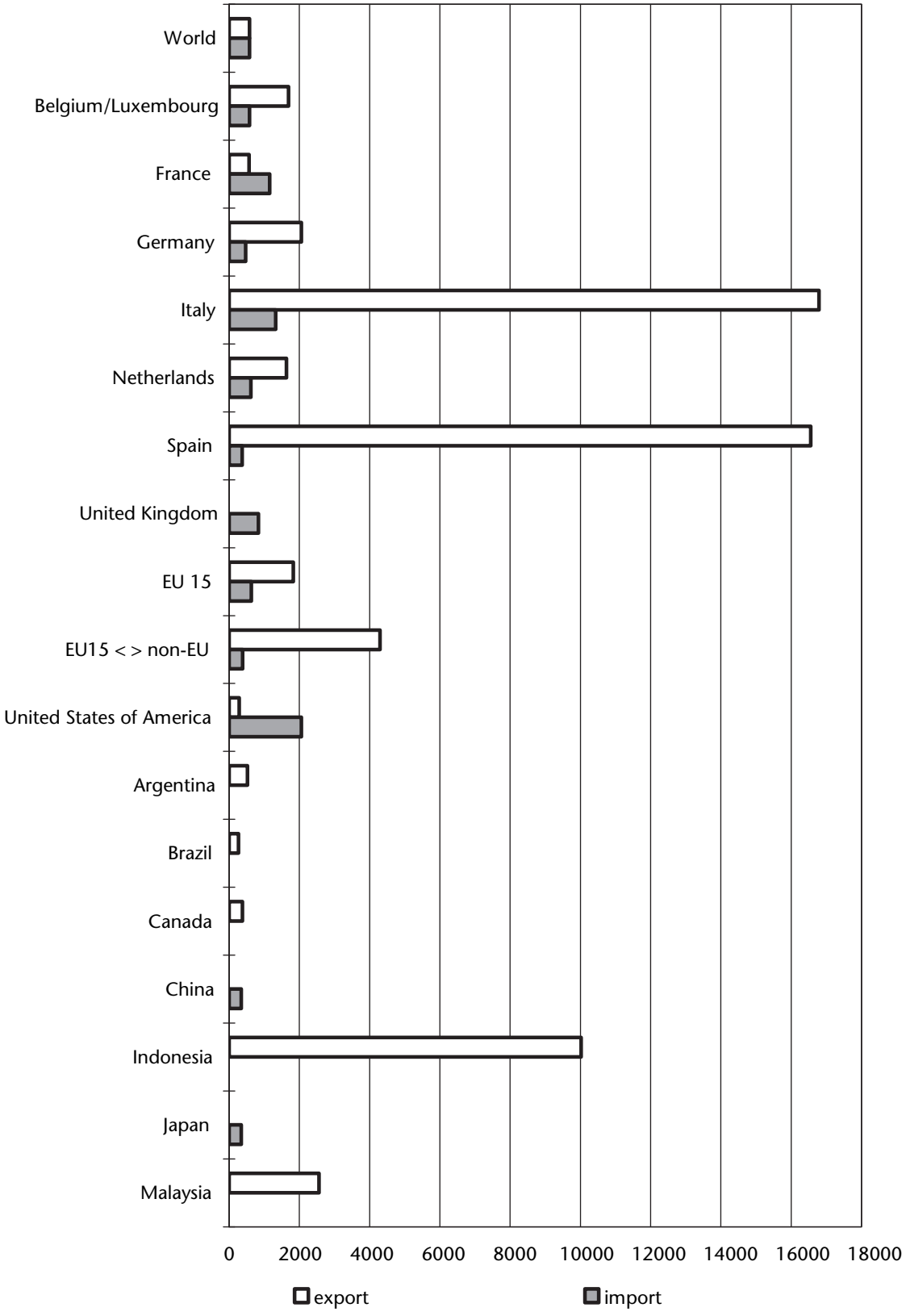


Figure 4.5.8 Import and export prices of oil and fat products 2002-2004



The export growth of the EU is below world average, also compared to the benchmark countries US and Brazil. Argentina, the benchmark country Brazil and Indonesia showed a high growth of their export. Malaysia, second exporter after the US, showed an average growth. Within Europe, Italy and Spain have an above average growth rate (see figure 4.5.7). These two countries and Indonesia also have very high export prices, several times the average export price. On average, EU has high export prices compared to US, Brazil and Canada (figure 4.5.8). The higher share of refined oil or even end products based on fats and oils contribute to this higher level.

Main products in detail

Soybean oil has been the largest vegetable oil traded over the globe. However, this is particularly the case for the US. In the last 25 years, palm oil has become a major second (Morgan, 1993). Palm oil has seen a tremendous increase in the vegetable oil market over the last 25 years (Othman, 1998). In the US palm oils share is just 3% of the total vegetable oil consumption (Rabobank, 2005). Palm oil is traded only as the result of refining requirements and as production is concentrated in Indonesia and Malaysia, the industry is highly focused on the export market. This is quite an important distinction from oilseeds. 92% of the world export of palm oil comes from these two countries. Malaysian exports are weighted towards processed palm oil (RDB: Refined, Bleached, Deodorised) while Indonesia primarily exports crude palm oil. However, the export prices in figure 4.5.8 do not reflect this difference in processing. Malaysia has been engaged in investments further downstream the major export markets, including the EU and India, in order to secure market access (Rabobank, 2005). Palm oil followed by olive oil are the leading vegetable oils consumed by the EU food industry. The Netherlands, the UK and Germany are the leading EU markets for palm oil and together account for more than half of the total EU consumption. Presumably Germany and the Netherlands re-export some of this oil, directly or as part of other food products. Olive oil is mostly consumed in Mediterranean countries, particularly in Italy, Spain and Greece, which together consumed about 85% of the total EU supply in 2003 (UNCTAD/BTFP, 2005).

Rapeseed oil (canola oil) has also seen a major growth in international trade. The health advantages of rapeseed oil over other oils (lower in saturated fat) have contributed to its growth. Developed countries in particular value the health prospects. The EU is the largest rapeseed producer in the world, followed by Canada, China and India. The crushing and refining of rapeseed is concentrated in the production locations: only around 14% of total rapeseed production is exported. Japan and China are major importers. EU exports of rapeseed decreased as domestic demand growth outpaced the domestic supply of vegetable oil. Rapeseed oil is also used for bio diesel. Bio diesel accounts for 32% of EU rapeseed oil consumption. Major sunflower producing countries are the EU, Russia, Argentina, Ukraine, China and India. Ukraine and Argentina are the major exporting countries. The Netherlands and Germany are also important markets for coconut oil, while sesame oil is an important ingredient in Germany and Greece.

4.5.4 Business performance and competitive process

Characteristics of the oil and fat products industry

The EU-25 oil and fat products industry had a production value of more than 28 billion Euros in 2003 (Table 4.5.4). This is 26% above the US. The EU production value has increased slightly since 1997. The purchases of goods exceed the production value. The personnel costs take over 49% of the value added in Europe; for the US personnel costs take over just 13%.

Table 4.5.4 Key characteristics of the oil and fat products industry

	EU-25		US		Australia		Canada		Brazil	
	1999	2003	1997	2002	2001	2003	1997	2002	1999	2003
Number of enterprises	7,393	6,939	279	280	N.A.	N.A.	33	50	130	182
Production value	26,501	28,136	20,691	22,314	891	970	2,237	1,953	6,059	10,063
Value added at factor cost	3,164	3,636	3,143	5,427	188	234	511	472	1,188	2,901
Purchases	27,357	29,378	17,549	17,018	591	534	1,789	1,482	4,047	6,005
Personnel costs	1,575	1,773	531	703	84	97	74	83	283	268
Number of employees	56,860	54,512	17,753	17,058	2,800	3,000	2,448	2,556	30,580	36,093

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.5.9 Oil and fat production EU countries and US 1990-2002

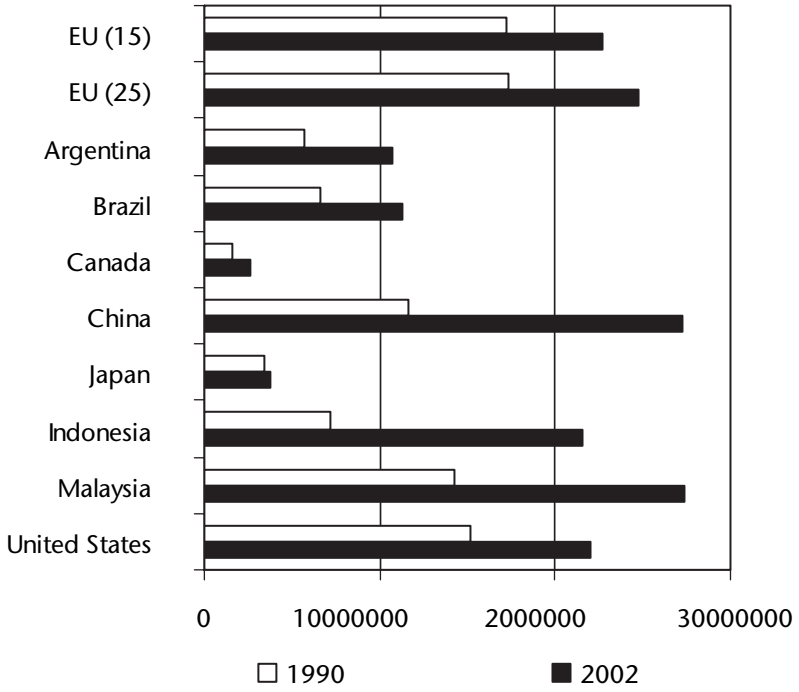
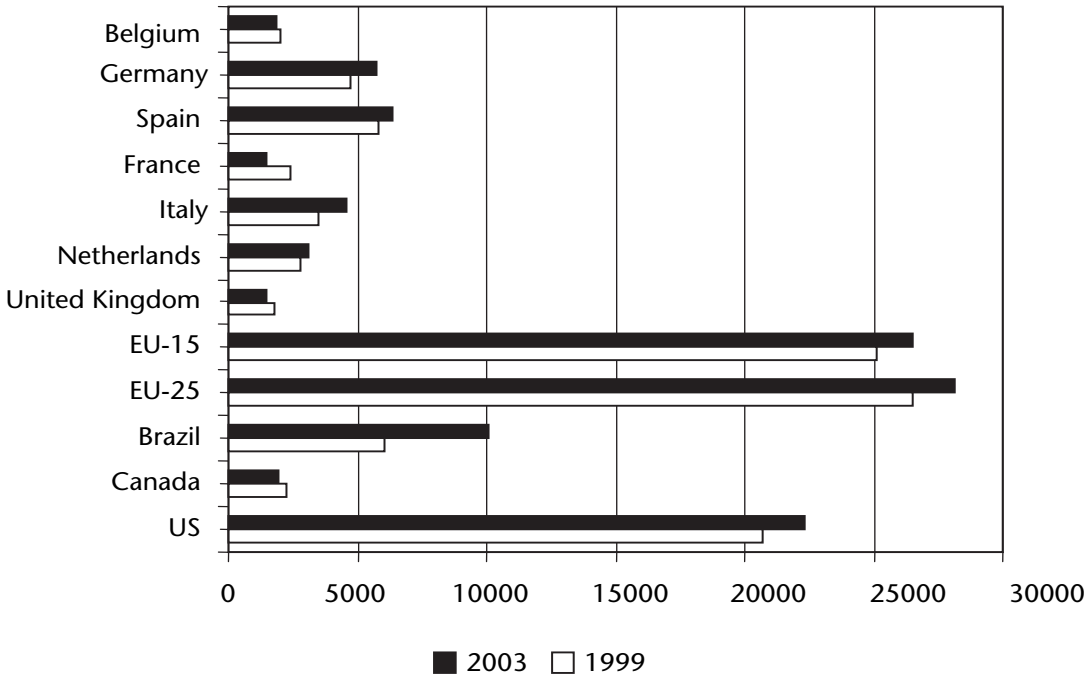


Figure 4.5.9 shows the production of the major individual EU countries and the US in the period 1990-2002. Compared to the US, the EU has not continued its growth in oil and fat products production as did the US. Six EU countries are responsible for 75% of the production of oil and fat products in Europe: Germany, Spain, France, Italy, the Netherlands, and the UK. These are the countries with a large population. The Netherlands has a relatively large production compared to its population.With regard to the distribution turnover, a similar pattern appears with respect to the major EU countries; the US is still lagging behind Europe, as shown in figure 4.5.10.

Figure 4.5.10 Distribution turnover in 1999 and 2003 (€million)

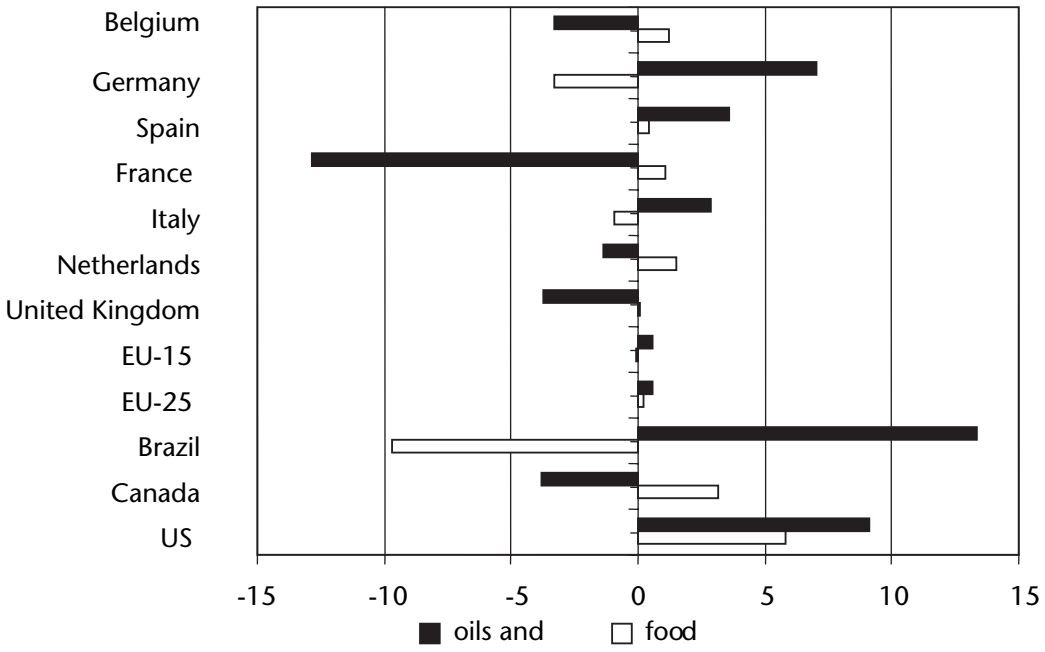


Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Value added and labour productivity

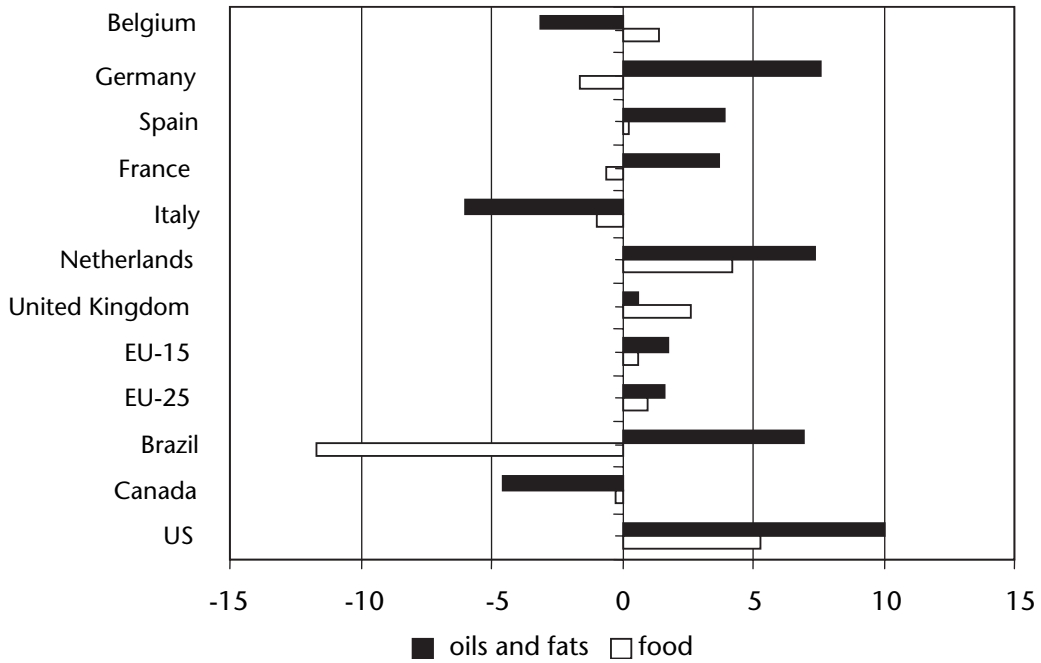
Figure 4.5.11 shows the weaker growth of value added in the EU-15 than in the US. Within Europe there are big differences between countries: high growth rate in Germany, Spain and Italy and low in France, UK and Belgium. Figure 4.5.12 shows a higher growth in the labour productivity in the US than in Europe. The differences within the European countries are large. Fairly low performance in Italy and Sweden and higher in Germany and the Netherlands. The labour productivity growth of both last countries is slightly lower than in the US but higher than Brazil.

Figure 4.5.11 Growth real valued added 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.6.12 Growth of the labour productivity 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Market orientation and internationalisation

Three of the nine biggest oil and fat processing companies in the world are based in the EU (see Table 4.5.5.) Together these three companies, Unilever (the Netherlands/Great Britain), Montedison SPA (Italy) and Raisio Group (Finland) represent 22% of the world oils and fats market. They are multinational companies with production facilities all over the world; they also produce other foods. Unilever Group (the Netherlands/Great Britain) is the largest oil and fat firm worldwide. Unilever Group also produces ice cream, ready meals, soups, pasta, canned and dried food. Its sales in oils and fats accounted for almost 17% of the world market in the year 2000. Unilever has a market share of 10.7% in the US, followed by Procter and Gamble (5.9%), Kraft (5%) and RJR Nabisco (3.9%).

Table 4.5.5 Global companies, their country of origin and market share in 2000

Company	Country of origin	Market share
Unilever	Netherlands/Great Britain	16.8
Montedison SPA	Italy	3.1
Nisshin Oil Mills Ltd	Japan	2.3
Bunge International Ltd	US	2.1
Raisio Group	Finland	1.9
ConAgra Inc	US	1.8
Ajinomoto Co Inc	Japan	1.4
Cargill Inc	US	1.3
Private labels		7.5
Others		61.8

Source: UNCTAD/BTFP, Euromonitor.

Table 4.5.6 Number of companies in the oil and fat products industry (EU-15)

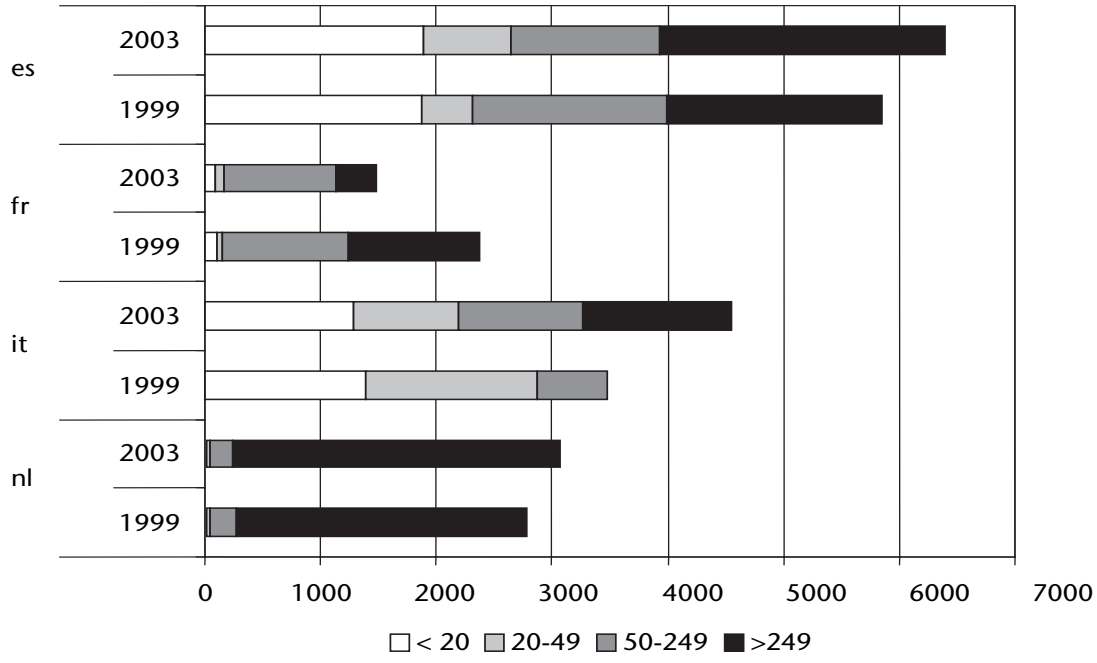
		< 20	20-49	50-249	>249
Belgium	1999	10	2	2	1
	2003	10	1	1	3
Germany	1999	23	16	9	Na
	2003	30	19	15	Na
Greece	1999	22	9	6	1
	2003	21	7	5	1
Spain	1999	1143	78	29	10
	2003	1445	65	21	5
France	1999	165	10	12	3
	2003	174	9	11	1
Italy	1999	4823	44	18	0
	2003	4074	37	14	4
Netherlands	1999	5	5	Na	Na
	2003	10	5	5	5
Austria	1999	24	0	3	1
	2003	34	1	3	Na
Portugal	1999	551	10	10	Na
	2003	452	8	6	Na
United Kingdom	1999	47	7	4	3
	2003	40	4	4	2

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

The food industry is the main user of oil and fat products. Multinational food processors like Unilever, Nestle, Danone and United Biscuits and many other processors use vegetable oils as ingredients for a wide range of food (e.g. ready-to-eat meals and soups) and non-food products (e.g. cosmetic industry).

Besides these large multinationals, several European countries are characterised by the small and medium size enterprises, especially Italy, Spain and Portugal (table 4.5.6). Spain shows that small enterprises can play a major role in the value added (figure 4.5.13). Due to the confidential nature of data in several countries, the turnover of the larger enterprises is not published, which restricts the presentation in this figure.

Figure 4.5.13 Turnover to size class or value added



The number of plants producing oils and fats saw a decline from 1067 in 1963 to 450 for the US in 1992 (Connor and Schiek, 1997, p. 87) and is expected to decline further. In 2000 Unilever acquired Bestfood (US) and ConAgra acquired International Home Foods (US). In England, Dairy Crest bought Unigate, in Italy Montedison SpA bought Compart SpA. Vertical integration is a major development: combining marketing functions such as trading directly to retailers, processing crude oil and refining it and producing seed oils.

4.5.5 Competitive potential

Conner and Schiek (1997) determined the value added for each stage in the supply chain of sunflower oil. In this calculation the intermediate prices of seed (sunflower) and crude oil are based on USDA market prices. (Connor and Schiek, 1997, p483).

Table 4.5.7 Share of value added (%) of sunflower oil at different stages in the chain

Product	Value €	%
Farmer	450	41.7
Processor crude oil	36	3.3
Processor refined oil	144	13.3
Wholesaler and retailer	450	41.7
Total	1080	100

A debate on the phasing-out of industrially produced trans fatty acids in oil and fat products has been initiated over the last few years in the EU (Debomy, 2003). With regard to the use of oils and fats in food, manufacturers are now aware of the content of trans fatty acid in food. Recent insights into the consequences of high levels of trans fatty acid consumption and effective campaigns of (non) governmental organisations has increased consumer awareness of the nutritional value of their food. In the process of converting vegetable oils into solid fats like margarine (partial hydrogenation), some unsaturated bonds are converted to an unnatural trans position. In humans, trans fatty acids increase low-density lipoprotein cholesterol (bad cholesterol) and reduce high-density lipoprotein cholesterol (good cholesterol). In addition, positive links between the intake of trans fatty acids and coronary heart disease have been observed in epidemiological studies (Willett and Ascherio, 1995). Consumption patterns of 'fats, oils and savoury sauces' and margarine lost some ground to the lighter 'halvarine'-type substitutes (Health Council of the Netherlands, 2002). The reduction in the average quantity of fat in the diet and the improvement of the trans fatty acid composition can be regarded as a (potentially) positive development. However, the quantity of saturated fatty acids is still markedly higher than recommended. The reduction in the consumption of 'visible' fats (spreads and cooking oils, etc.) has not been fully offset by the use of added ('hidden') fats in bread, potato products and pre-prepared meals. Similarly, the reduction in the intake of saturated fatty acids in spreads, cooking oils, cheese, dairy products, meat and bakery products has not been fully offset by the increased intake from sources such as potato products and prepared meals. The number of people with a diet which complies with the published dietary guidelines with regard to total fat intake, saturated fatty acids, carbohydrates and dietary fibre remains extremely small. In its product development and choice of ingredients, the food industry and services should be encouraged to observe certain basic principles which will lead to a further reduction in the quantity of trans fatty acids in the diet to the level found in nature itself. With regard to legislation, the commission finds that the Netherlands should take the initiative in ensuring that the necessary amendments are made to Directive 90/496/EEG of the Council of European Municipalities (dated 24 September 1990 and relating to the labelling of foodstuffs; Pb EG L276), whereby the trans fatty acid content should be clearly stated and whereby all food labels (where applicable) should indicate the fatty acid composition (total, saturated, trans, simple unsaturated and polyunsaturated) (Health Council of the Netherlands, 2002). Manufacturers acknowledge possible vitality problems and aim to reduce or eliminate the use of partially hydrogenated vegetable fats in order to remain competitive. For example, Unilever has launched the Nutrition Enhancement Programme,

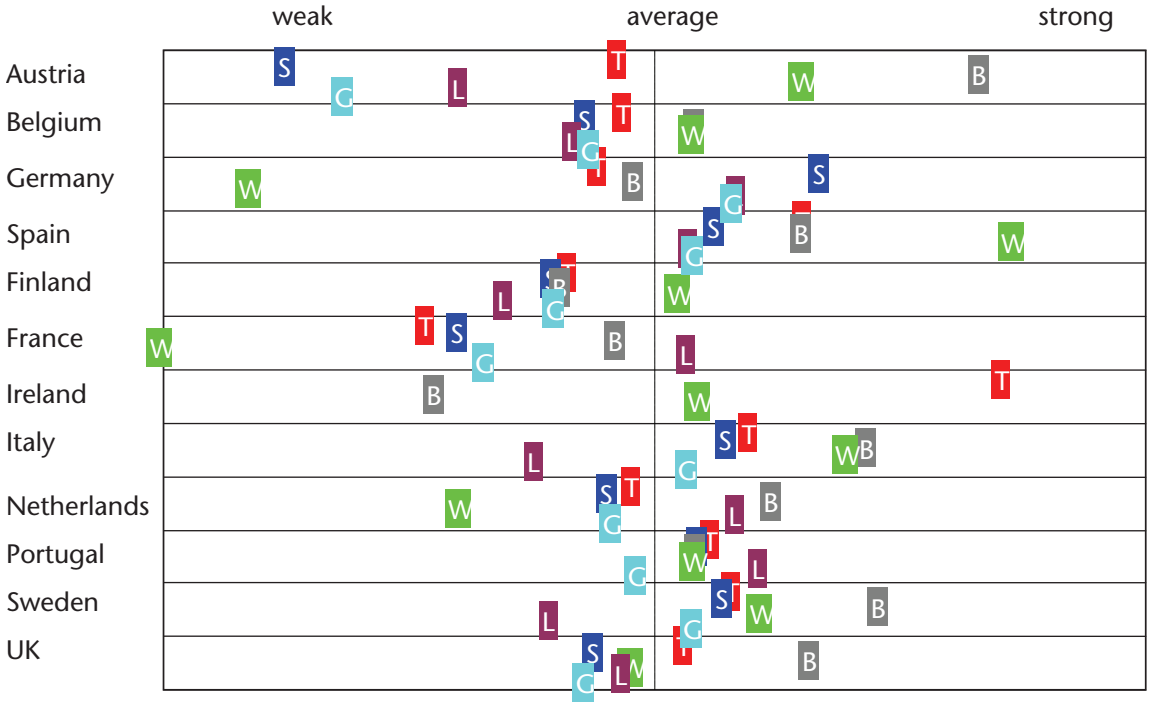
which aims to improve products. Unilever´s goal is that these products are sustainable, contribute to health, and provide children with a good start. Over 8,000 products, which is about half of the products, have been under research in the programme. The result was a decrease of 15,000 tons of trans fatty acids in their products.

Furthermore, consumers are encouraged to eat a more Mediterranean diet that contains more healthy oils such as olive oils. There is evidence from a study performed in Greece that olive oil consumption may reduce the risk of breast cancer, whereas margarine intake appears to be associated with an elevated risk for the disease (Trichopoulou et al., 1995). Europe is not only the largest producer of olive oil in the world, it also has a large cultivation and consumption of olive oil in particular in the Mediterranean countries (EC, 1998). More insight into the positive properties of olive oil on a healthy diet and effective promotion towards consumers can contribute to the competitive advantage of Europe's (olive) oil and fat industry.

Figure 4.5.14 shows the competitiveness of the important EU countries. France is the weakest and also the EU is below average. Spain, an olive oil producing country and Ireland are strong.

Figure 4.5.14 Competitiveness of EU-countries

T= total oils an fats; S = growth share food industry in total manufacturing;
B= growth Balassa; W = growth world share;
L= labour productivity; G = growth value added.



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4.6 Dairy products: EU Cap enables growth for competitors

Gemma Tacken and Paul Ingenbleek

4.6.1 Key findings

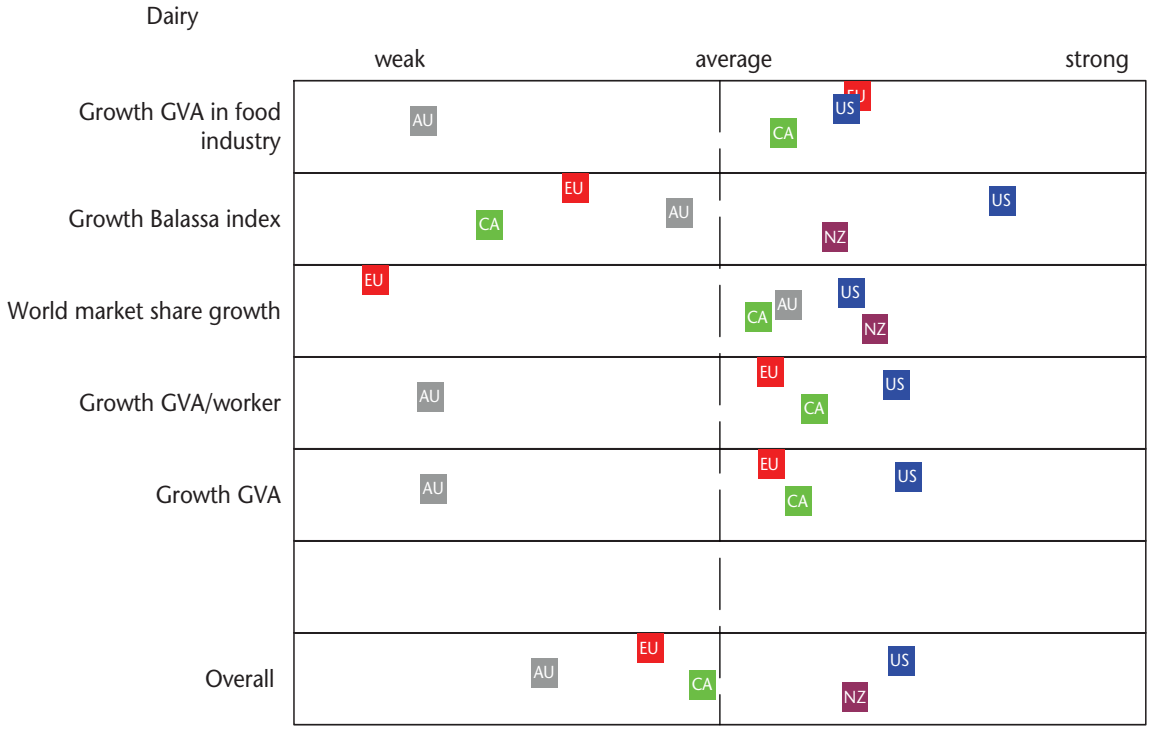
The dairy industry plays a more important role in the food industry in the EU than in the US. This is expressed by the share of turnover, value added and personnel costs in the whole of the food industry. The average turnover of US companies is four times the EU average.

The US has a production value which is only 60% of that of the EU-25. Despite this difference the value added is larger in the US than the EU-25. Australia and New Zealand are relatively small producers with a turnover of approximately 6 to 7% but again a relatively high value added: 12 to 13% of EU-25 level. Even with half of the world top 20 dairy companies being European, the dairy industry seems weak in competition.

The EU competitiveness is weak compared to the US due to a slower growth of the labour productivity, real value added and also the growth of the value added compared to the total food industry. The EU milk quota system restricts growth in the EU, whereas the production in New Zealand, for example, is not restricted. Figure 4.6.16 gives an overview of the competitiveness of the EU countries. Austria and Italy are fairly strong, Ireland weak. A weak or strong performance of a country does not say much about individual companies. Overall, France is valued as

almost EU average whereas French company Danone is known as very competitive. This divergence between companies and regions within Europe makes the European average hard to interpret and reflects the ongoing restructuring in the European area, leading to more specialisation and better competitiveness.

Figure 4.6.1 Overall competitiveness of EU and major competitors



4.6.2 Introduction

The EU benchmark for competitive performance: world exporters

Although a vast share of the dairy production is consumed locally, the EU dairy industry competes on the global market with milk powder, butter and several branded products like ice cream. EU countries play a major role on the world market as over 70% of the world exports originate from the EU countries (table 4.6.1). A major part of these exports are destined for other EU countries. Important non-EU exporters are: New Zealand, Australia and the US. These three countries together with Canada will be used to benchmark the EU dairy industry. Most countries are exporters as well as importers. A more in depth analysis of the trade will be given in section 4.6.3.

Milk processing

Most of the production involves liquid milk, mainly for local consumption. New Zealand is the exception; milk powder is the main product category. Whereas milk powder production declined in the EU, it increased in other countries (table 4.6.2).

Table 4.6.1 Major exporting countries in dairy products (countries with at least 2% share in world markets)

Region/Country	Export share			Import share		
	'96 - '98	'02 - '04	difference	'96 - '98	'02 - '04	difference
EU-25	78	75	-3.2	66	65	-0.5
EU-15	75	71	-3.7	65	64	-0.8
EU-15 < > non-EU	18	16	-2.3	3	4	0.8
Germany	17	15	-2.0	13	12	-0.7
France	15	14	-1.0	8	7	-0.7
Netherlands	13	12	-1.2	8	7	-1.0
New Zealand	8	8	0.5	0	0	0.0
Belgium/Luxembourg	7	7	-0.0	8	8	-0.1
Denmark	5	5	-0.5	1	1	0.4
Australia	5	5	-0.0	1	1	0.1
Italy	4	4	0.8	11	9	-1.5
United Kingdom	4	3	-0.6	7	7	0.4
US	2	2	0.3	3	4	0.9
Austria	1	2	1.1	1	2	0.5
Spain	1	2	0.7	4	5	0.9
Canada	1	1	-0.2	1	1	0.2

Source: ITC/WTO data

Table 4.6.2 Production of dairy products (in million kg)

Product	EU-25		US		Australia		Canada		New Zealand	
	1995	2004	1995	2004	1995	2004	1995	2004	1995	2004
Liquid milk	30670	32858	24757	26950	1951	2025	n.a.	2750		390
Cheese (cow milk-based)	5974	7592	3122	4008	254	370	313	340	197	290
Milk powder	2411	1861	632	727	315	377	77	90	460	905
Butter	1715	1984	572	557	136	85	93	88	241	300
Condensed milk	1280	1218	216	238	99	90	Na	59	30	1

Source: Productschap Zuivel 2004.

The core business of the dairy industry is processing raw milk into different consumer and intermediate products. Raw milk is a commodity with fairly small quality differences between producers. Differences based on cow species, feed quality and composition and farm hygiene may occur and could be exploited more in the future for niche markets including health. Processors can be seen as 'bio-refineries': apart from the 87% of water, cow milk contains approximately 4.9% lactose, 3.7% fat, 3.5% proteins and 0.7% others minerals. (http://www.food-info.net/nl/national/ww-melk.htm). Milk is the basis for a wide range of different products meeting the demands of both consumer and industrial markets. Examples include drinking milk (full cream, semi-skimmed, skimmed), cheese, yoghurt, butter and flavoured milk drinks. Lactose, butter, skimmed milk powder and whey are sold on industrial markets in the food industry (including chocolate, sweets and meat). Lactose and newly developed specialty products also target the pharmaceutical industry.

Consumption per head

The EU dairy industry can build on a relatively stable market. On average the EU-25 milk consumption per capita was 73 kg in 2004. This number is below that of the US. Within the EU-25, in 2004 the consumption ranged from 21 kg per capita in Latvia to 140 kg in Slovenia (figure 4.2). The consumption of cheese is relatively large within the EU. Cheese consumption based on cow milks is increasing slightly in the EU-25, from 16.5 kg per capita in 2000 to 17.3 kg in 2004. It now ranges from 3.8 kg per head in Latvia to 28 kg in Greece.

Figure 4.6.2 A: Cheese (based on cow milk) consumption (kg/head) in major EU and benchmark countries.

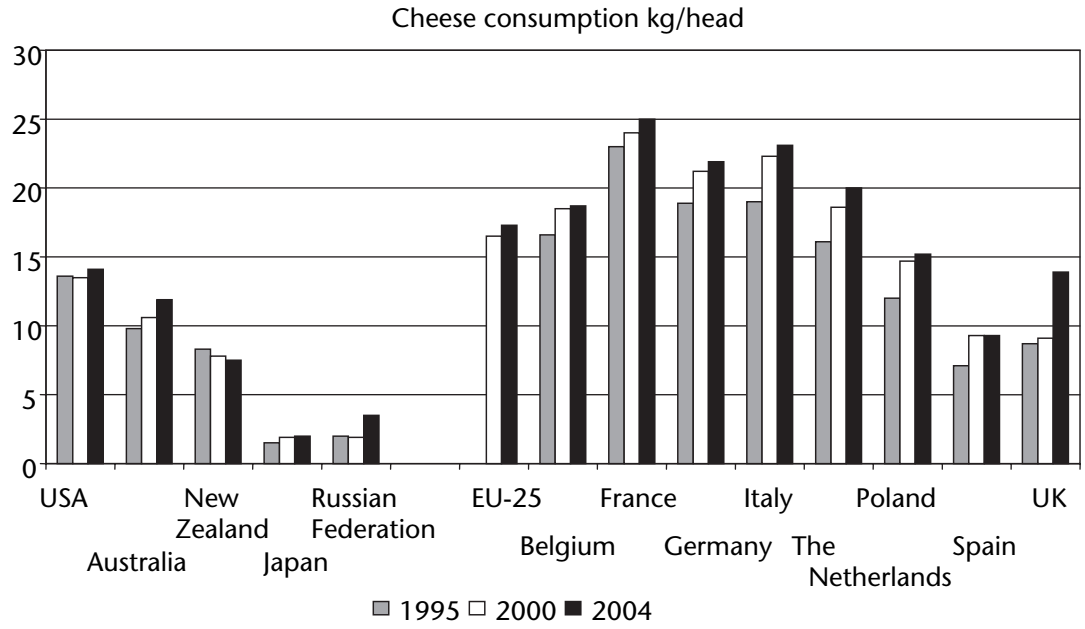
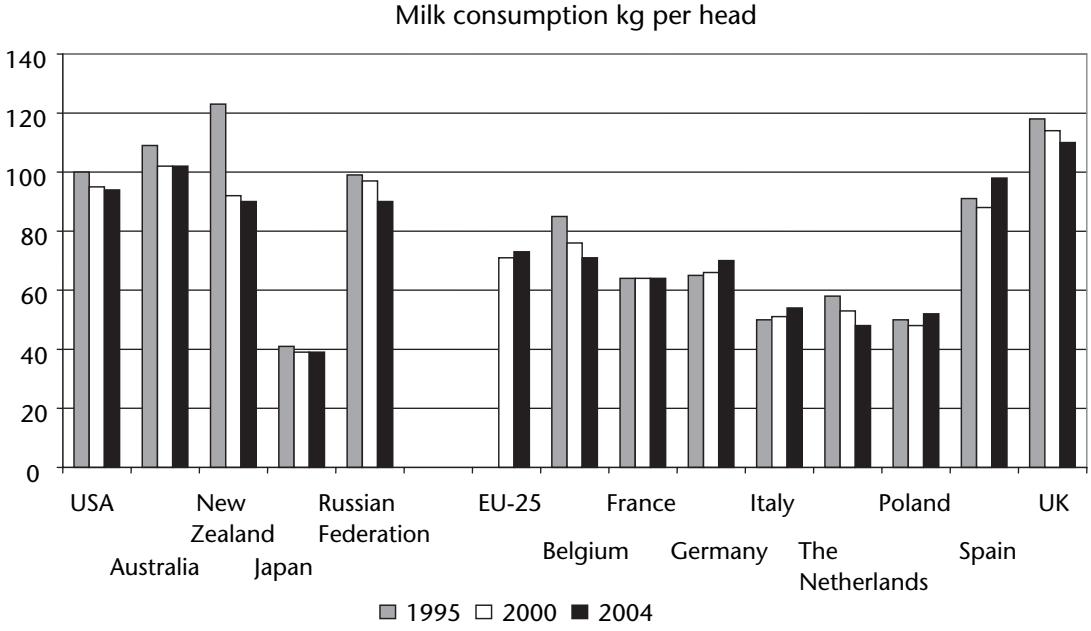


Figure 4.6.2 B: Milk consumption (kg/head) in major EU and benchmark countries.



Source: Productschap Zuivel, 2004.

Competition: Balassa index and share value added.
An industry competes on the domestic market for means of production. The performance can be measured firstly by the Balassa index (Revealed Comparative Advantage) and secondly by the growth of the gross value added compared to the rest of the industry.

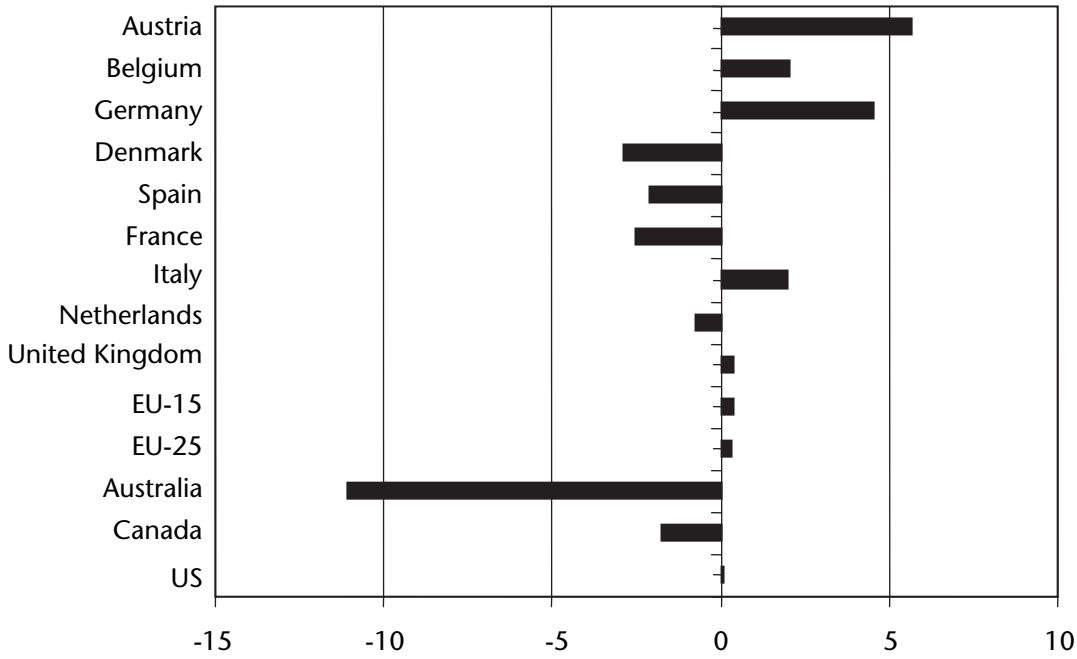
Table 4.6.3 Revealed comparative advantage (Balassa index) and growth rate from '1996-1998' to '2002-2004'

Region/Country	1996 - 1998	2002 - 2004	annual growth %
EU 25	1.7	1.8	0.5
EU 15	1.7	1.8	0.7
EU15 < > non-EU	1.1	1.0	-1.3
Germany	1.6	1.5	-1.4
France	2.5	2.8	1.6
Netherlands	3.7	3.9	0.6
New Zealand	29.5	35.7	3.2
Belgium/Luxembourg	2.1	2.0	-1.0
Denmark	5.4	5.3	-0.4
Australia	4.1	4.3	0.8
Italy	0.7	1.1	6.7
United Kingdom	0.7	0.8	1.2
US	0.2	0.2	6.5
Austria	0.9	1.8	11.6
Spain	0.7	1.0	6.9
Canada	0.2	0.2	-3.0

The Balassa index indicates the specialisation degree of the export portfolio: external orientation. A growth of the index means a better than average performance. The Balassa index indicates that New Zealand is very specialised in dairy exports: the Balassa index is far higher than all other countries. Dairy export of the US is of minor importance: it has the lowest Balassa index, although the index is growing the fastest of all countries. The Balassa index growth is negative for the EU-15 to third countries; the intra trade within the EU became more important (table 4.6.3)

The performance on the domestic market is compared to the food industry as a whole. So if the share of real value added of the dairy industry in the total food industry grows, the dairy industry performs better than the whole. Figure 4.6.3 shows that the selected EU-15 countries (representing 85% of the value added) have a negative growth whereas the US has a small positive growth. So the competitiveness of European dairy industry is weaker than that of the US. The differences within Europe are huge: over 2% annual decrease in Germany and almost 5% growth in Ireland.

Figure 4.6.3 **Annual growth of the real gross value added at factor cost: share dairy industry in food industry.**



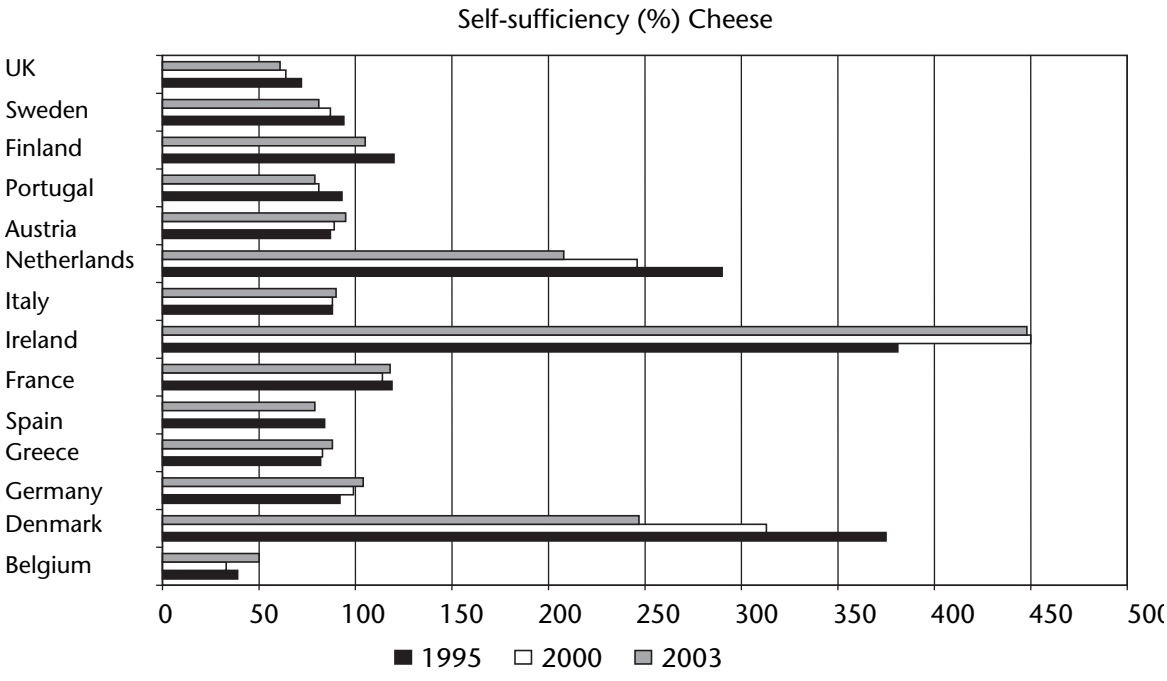
Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

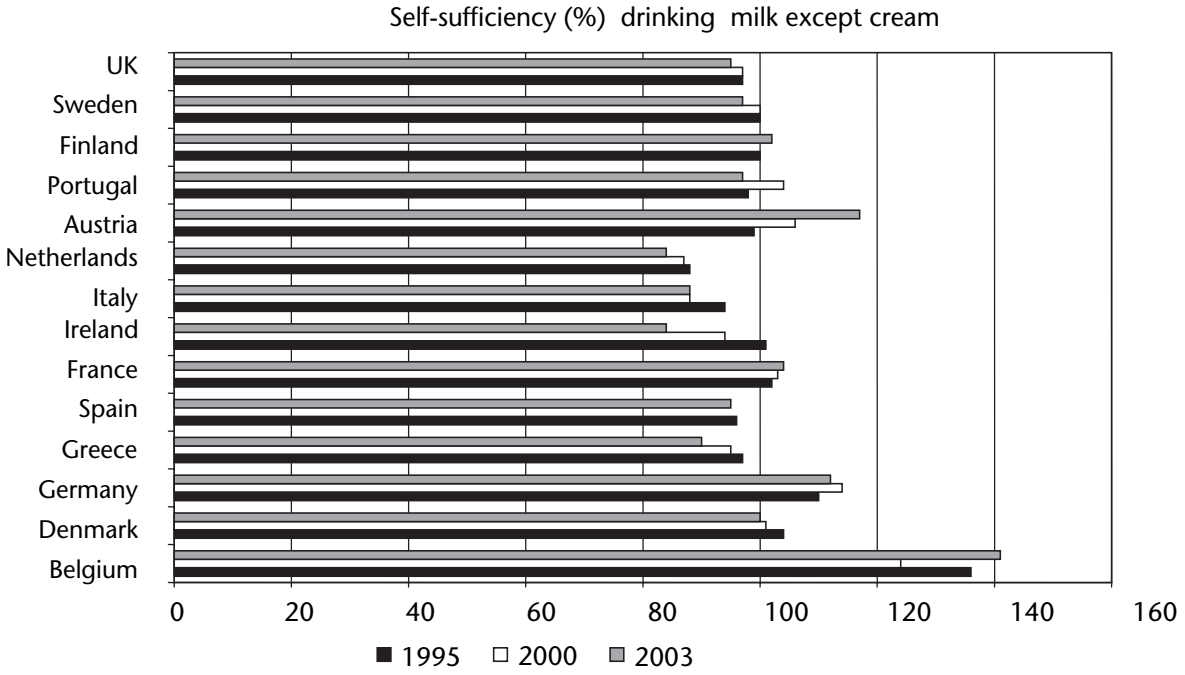
4.6.3 Global trade performance

Self-sufficiency

The share of international trade is fairly small compared to domestic production, as is shown by the level of self-sufficiency (figure 4.6.4) for drinking milk (except cream) and cheese. For drinking milk, a fresh perishable product, the self-sufficiency degree is approximately 100.

Figure 4.6.4 **Self-sufficiency degree for drinking milk (except cream)**





The Netherlands and Italy are below 100% and import from their neighbours Belgium, Germany and Austria. Self-sufficiency for cheese is quite different; this ranges from 50% for Belgium to 450% for Ireland. This product is less perishable and can easily be transported on long distances. Ireland, Denmark and the Netherlands have relatively large export positions. Product categories that are growing in importance are ice cream and cheese, for example. The growth in the consumption of ice-cream is based on a trend towards more luxury products; the market for cheese is growing predominantly because it is increasingly used in ready-to-eat meals.

Trade patterns

New Zealand is the largest net exporter of dairy products, followed by France (figure 4.6.5). The largest net importer is Italy, followed by the UK. However the largest exporter and at the same time importer is Germany. The figure shows an intensification of trade relation between countries. In the period between 1996 and 2004, the exports and imports increased in most countries at the same time. One-way trade is still visible: New Zealand only imports.

The EU-15 and EU-25 perform below the average of the benchmark countries (figure 4.6.6). The exports of the new member states, however, strongly exceed the world average but they still have a small market share. All benchmark countries (US, New Zealand and Australia) perform better than the world average. In addition the EU import growth exceeds the export growth, which results in a negative trade balance. However differences between export and import growth are even larger in the US. Within the EU, Austria, Spain and Italy are the best performers. An average growth above the world growth means an increase of market share.

The value per ton of the exported dairy products of the EU is also below that of its competitors. At first glance, no relationship seems to exist between the export growth and export value. For Italy, the Netherlands and the EU external trade, the value per ton of exports is higher than the import value. US exports low price products and imports high price products.

Figure 4.6.5 Import and export of dairy products, three years average of values

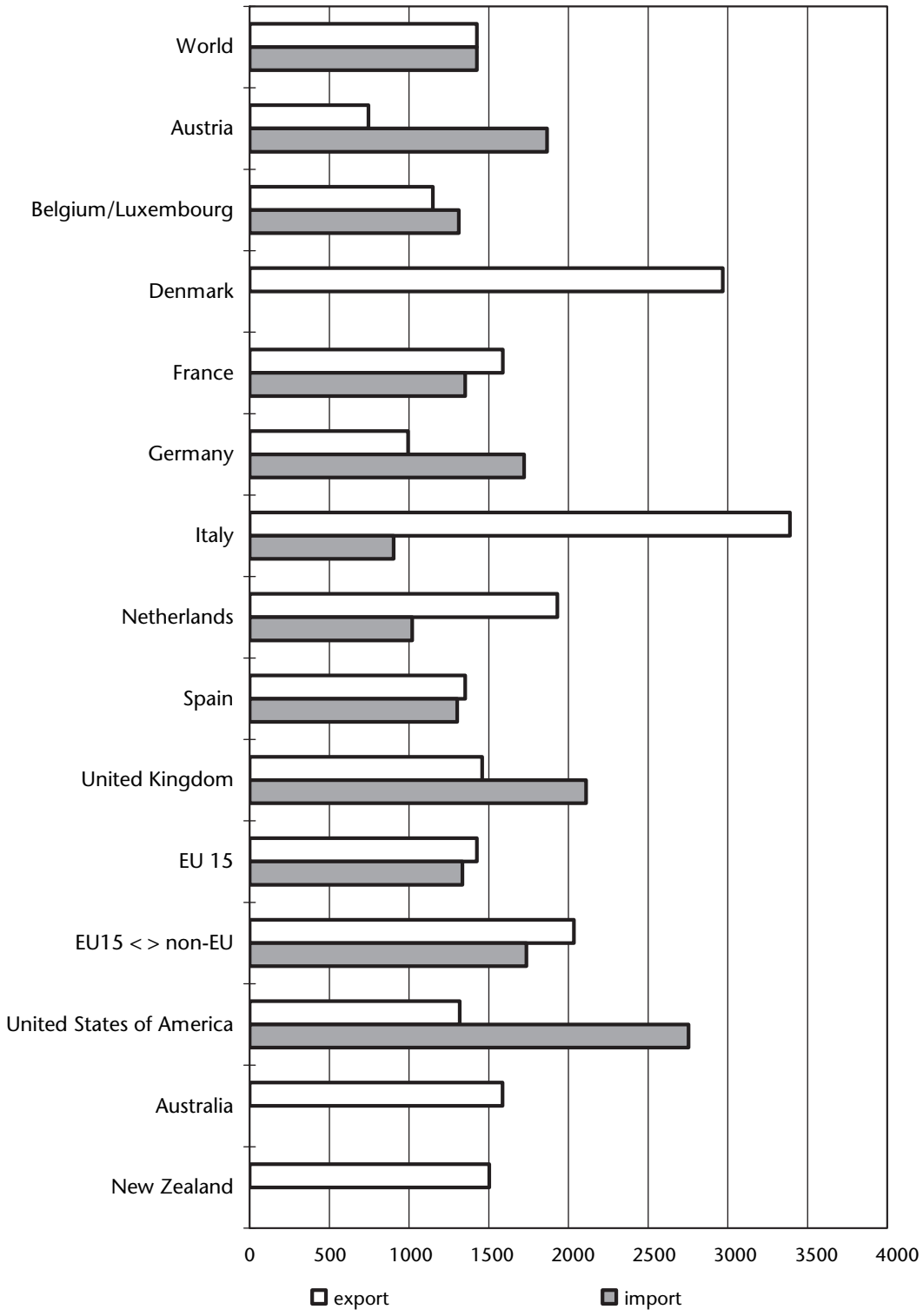


Figure 4.6.6 Annual import and export growth of dairy products

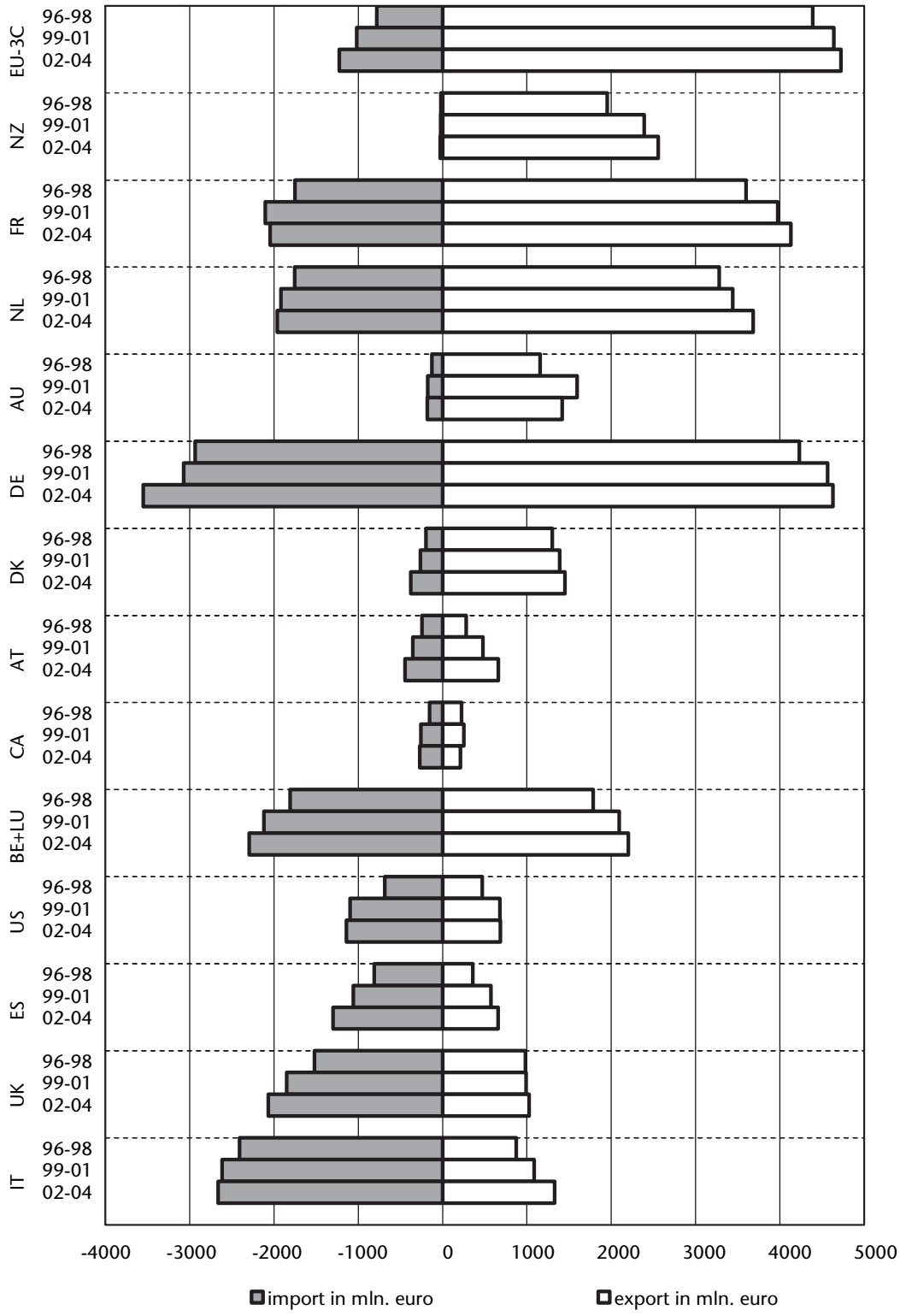
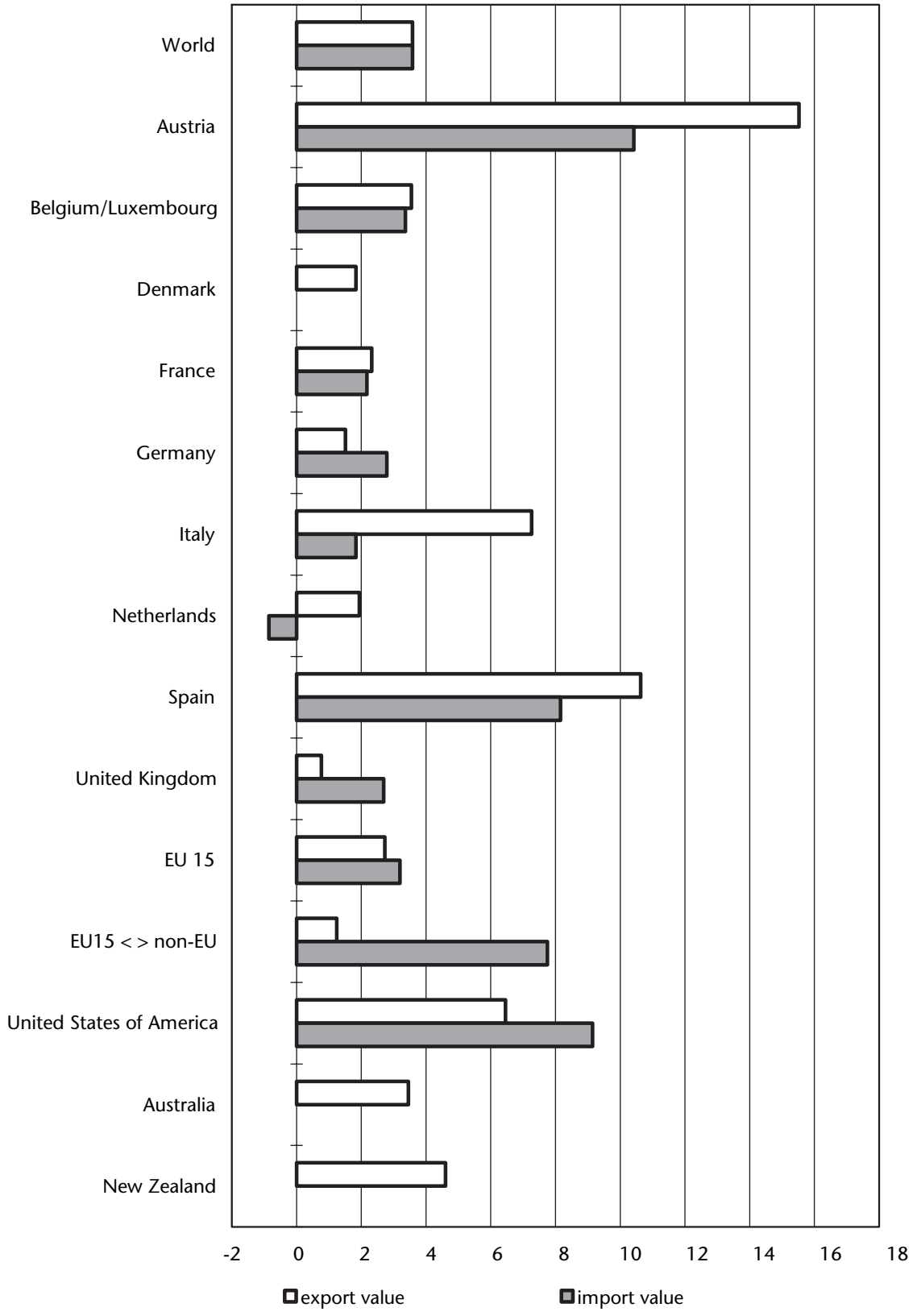


Figure 4.6.7 Import and export prices of dairy product 2002-2004



Main products in detail

Cheese is a commodity. The main importers of cheese are Germany, Italy, France, Spain and the Netherlands. The main exporters are Germany, France, the Netherlands, Denmark, Belgium and Ireland. Cheese from the EU mainly goes to the US, Russia and Japan; these three count for 50% of the export destination. Saudi-Arabia and Switzerland are also significant trading partners for cheese. The main yoghurt and dessert importers are Germany, the Netherlands, France, Spain and Italy. The main exporters are Germany, Belgium, France, Austria and Spain. Less than 1% of yoghurt in the EU comes from third countries or goes to third countries.

Another commodity is milk powder. New Zealand is the market leader on the world market for milk powder with more than 1.5% fat and the EU is a close second. Argentina and Australia are third and fourth at a distance. In the export of low fat milk powder, New Zealand is also the world market leader followed by the EU, with Australia and US as close followers. In particular the US improved its position in 2004. Algeria is the most important destination for milk powder, followed by China, Mexico, Philippines, Saudi-Arabia, Malaysia and Indonesia. Together these countries take nearly 55% of all imports on the world market.

Fresh milk is mainly produced for local markets. Within the EU, only 6% of the total production is exported or imported. In export volume, cheese is the main product: 6% of the cheese production is exported to countries outside the EU (whereas only 1% is imported from countries outside the EU, predominantly Australia and New Zealand). 35% of total production is traded within the EU. Yoghurt and desserts are also mainly produced for the local market; nearly 20% of the total production is traded within the EU and less than 1% with third countries (ZMP, 2005)

China is becoming an important market for exports and foreign direct investment for dairy processors. China has a small dairy production in the northern part of the country, but not in the south where major consumption is. European companies are active here. Nordmilch exports products to China. Friesland imports milk powder (also from New Zealand) and produces the products at local Chinese plants. Other companies like Danone and Nestlé are also active in China.

The market for industrial and intermediate products like milk powder (in combination with proteins and fats or low-fat substitutes) is growing worldwide (also based on the growing consumption of ice cream and chocolate). Nordmilch exports much of its cheese and fresh dairy to Russia. They are almost the market leader in unbranded retail products.

The price of milk powder is currently higher than the intervention price. Butter is increasingly difficult to sell because people consume less fat. The world market price for butter (or fat) is therefore lower than the EU intervention price (ZMP, 2005). In 2015 the EU system will abandon the quota system and intervention prices. Sales of fat will then become problematic for all dairy companies. Companies with a strong relationship with processors might be able to sell the fat in combination with proteins and milk powder to chocolate factories, for example.

4.6.4 Business performance and competitive process

Characteristics of the dairy industry

The EU dairy industry has a production value of more than 100 billion Euros a year (table 4.6.4). This is 70% above the US and almost ten times the production in New Zealand and Australia. The production in New Zealand is dominated by one company: Fonterra with a market share of 96% (Fonterra, 2005). The production value in Europe has not changed much in the last twenty years. This is largely related to the CAP milk quota system that was installed in the mid-eighties.

With regard to production costs, the purchases of goods (mainly raw milk) take a share of over 90% in the turnover in Europe, over 80% in New Zealand and Australia and between 60 and 70% for the US. The personnel costs take over 60% of the value added in Europe and a mere 20 to 25% in the US.

Table 4.6.4 Key characteristics of the industry

	EU15		EU25		US		Australia		Canada		New Zealand
	1999	2003	1999	2003	1997	2002	2001	2003	1997	2002	2004
Number of enterprises	9234	9748	10837	11377	1830	1681	Na	Na	267	436	
Production value	93030	101902	98390	107939	51923	69337	5256	5181	5240	6534	6582
Value added at factor cost	14912	16744	15839	17307	15595	23138	1074	891	1406	1684	1154
Purchases	87030	95318	92326	102148	36339	46323	3275	3049	4665	5658	5428
Personnel costs	9412	10026	9984	10384	3664	5113	490	519	535	521	
Number of employees	294528	287228	403843	388261	131868	129173	19100	19200	20944	19534	

Source: Eurostat, USDA, Fonterra (2005), Australia (2005).

In the introductory section of this chapter, the production of the EU was benchmarked with the main non-EU producers. Figure 4.6.8 shows the production of individual EU countries. It is clear that production in the benchmark countries increased in that period. Five EU countries are responsible for nearly 75% of the production value of dairy products in Europe: Germany, France, Italy, UK and the Netherlands. These are the countries with a large population. In this respect Spain and Poland lag behind. Belgium, Ireland, the Netherlands and Sweden have a relatively high production compared to the population. Eurostat figures indicate that the production value increased slightly in the last ten years. This increase has been stronger in the southern and eastern countries than in the northern European countries. Despite the milk quota system, the turnover of the industry is growing.

Figure 4.6.8 Dairy production (butter, cheese, milk) in million tons

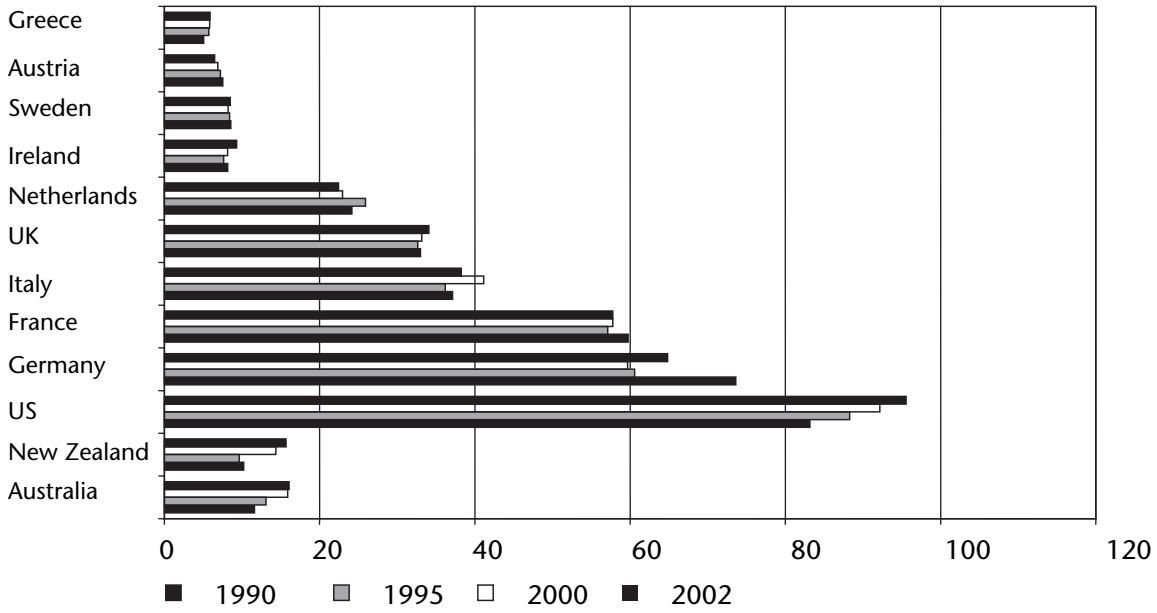
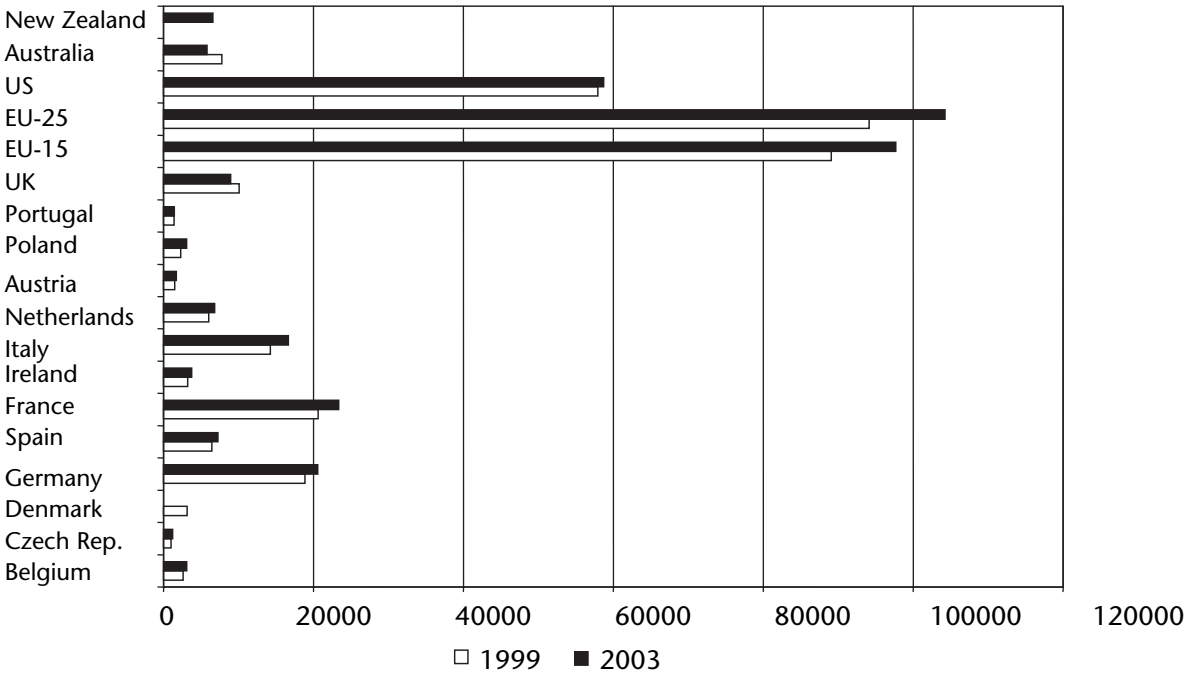


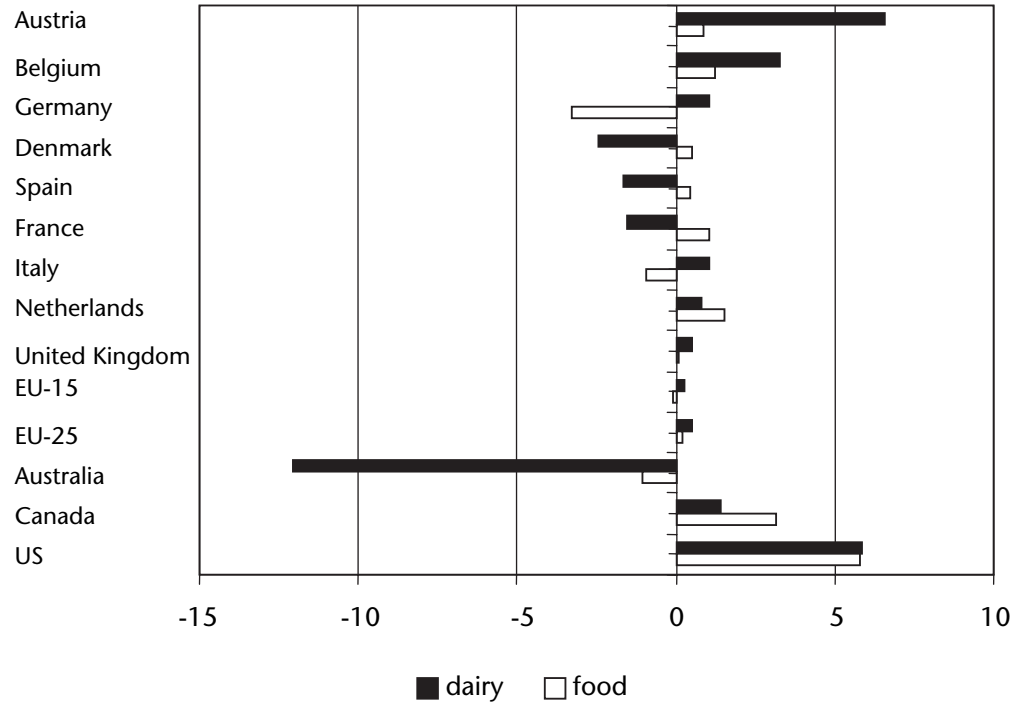
Figure 4.6.9 Distribution turnover in 1999 and 2003 (€ million; US and Australia 2004, New Zealand 2005).



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

The distribution of employment is almost the same as the distribution of turnover. In countries with relatively low wages such as the Czech Republic, the Baltic States or Hungary, the number of employees is relatively higher.

Figure 4.6.10 Growth real value added 1999-2003



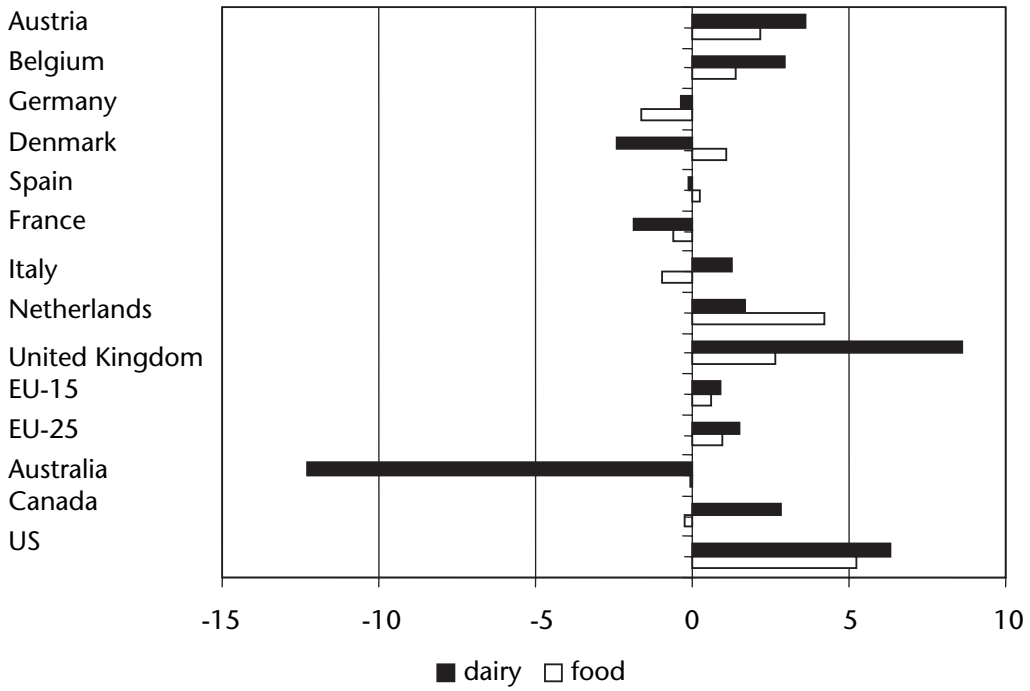
Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Value added and labour productivity

Due to differences in purchasing power parities, these nominal levels are not comparable. The growth of the real value added is interesting, however. Figure 4.6.10 shows that Europe has a weaker performance than the US. Within Europe there are great differences between countries: good high performance in Ireland and negative performance in France, Spain, Germany and Italy. These last three countries are large producers.

The growth in labour productivity indicates the competitive performance of the industries in the countries. Figure 4.6.11 shows that growth in the US is much higher than in Europe. There are great differences within the European countries. Relatively poor performance in Germany and France - the two largest producers in turnover. The UK and Portugal perform better than the US.

Figure 4.6.11 Growth of the labour productivity 1999-2003.



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Market orientation and internationalisation

Table 4.6.5 shows the twenty largest dairy companies in the world, by order of sales. Some of these companies are active in other (food) industries (e.g. Nestlé, Danone, Unilever). Some use milk to produce chocolates and sweets, to the extent that labelling them as dairy products company is arbitrary. Danone as well as Nestlé use little milk as input compared to many other companies and to their turnover: they are not the biggest dairy producers. Product innovations, branding and internationalisation are major themes. The Swiss company Nestlé is the largest dairy company in the world, however not in volume of processed milk (table 4.6.5). The largest company in the EU is Danone, a French company, in fifth place. Among the top 20 of the world, ten companies are from the EU, five from the US and three from Japan. This indicates that the European dairy industry has an important position in the world market for dairy products.

Seven of the European top 10 dairy companies also have production facilities outside the EU. Many of these companies started as cooperatives or are still cooperatives. This governance issue is much discussed in the industry (Donceva et al., 2004), as managing and financing a multinational from a cooperative perspective is sometimes difficult as responsiveness to changes in the market is necessary to stay competitive.

In recent decades, the domestic-oriented cooperative industry switched to a more international focus. Several cooperatives are active all over the world. The Danish/Swedish Arla bought 50% shares in the largest UK Dairy company. Campina has Dutch and German farmers as members. Second brand orientation became more prevalent. Campina has consumer brands in their main markets (Everwand, 2006).

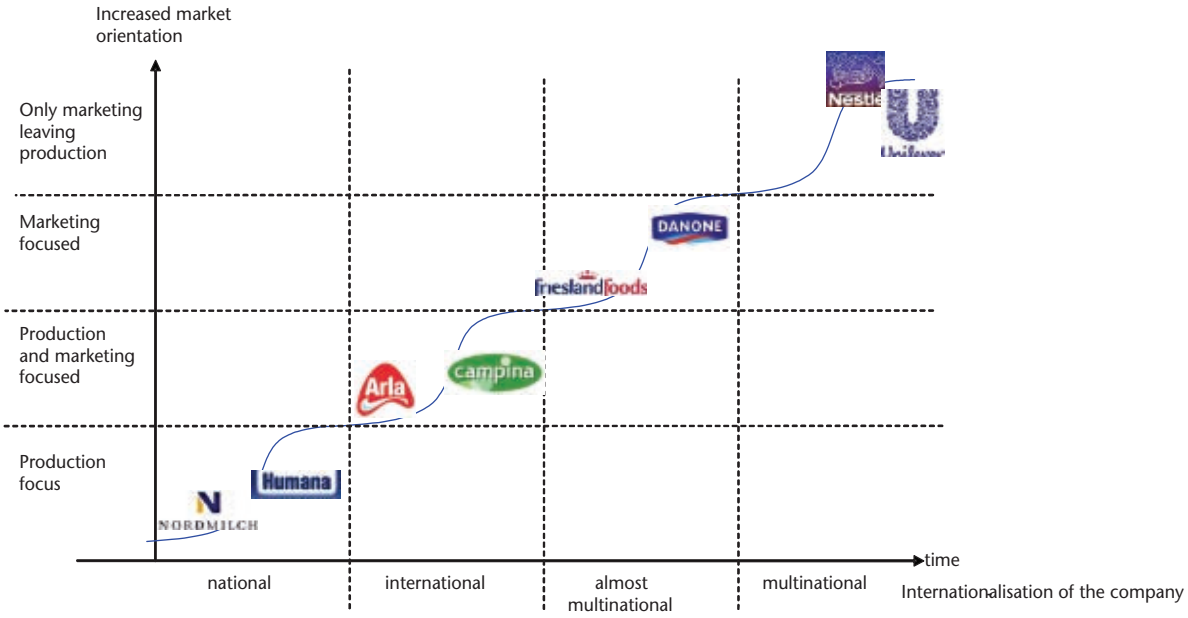
Table 4.6.5 Top-20 Global Dairy companies, by turnover in 2004

Rank 2004	Rank 1992	Company	Cooperative/ Investor Owned Firm	Country of origin	Dairy sales in billion € (2004) a)	Processed milk (mln. ltr.) b)
1	1	Nestlé	IOF	Switzerland	14,7	2,8
2	-	Dean Foods	IOF	US	7,0	
3	16	Dairy Farmers of America	cooperative	US	6,8	14,5 c)
4	4	Danone	IOF	France	6,5	2,43
5	12	Arla Foods	cooperative	Denmark/ Sweden	6,4	8,5
6	-	Fonterra	cooperative	New Zealand	6,3	11,5 c)
7	13	Lactalis	IOF	France	5,7	7,0
8	2	Kraft Foods	IOF	US	5,0	0,65
9	11	Unilever	IOF	Netherlands/ Great Britain	4,8	
10	10+15	Friesland	cooperative	Netherlands	4,3	5,6
11	19	Bongrain	IOF	France	4,1	4,1
12	8	Meiji	IOF	Japan	3,7	
13	6	Campina	cooperative	Netherlands	3,6	5,75
14	9	Morinaga Milk Industry	IOF	Japan	3,3	
15	-	Parmalat	IOF	Italy	3,3	1,83
16	-	Land O'Lakes	cooperative	US	3,2	
17	-	Humana Milchunion	cooperative	Germany	2,7	3,3
18	-	Saputo	IOF	Canada	2,3	
19	-	Schreiber	IOF	US	2,3	
20	-	Nordmilch	cooperative	Germany	2,1	4,2

a) Source: Donceva et al., 2004, ranked by dairy turnover in EUR billions, 2004 + mergers and acquisitions in 2005; b) LTO International Milk Price Comparison, 2002; c) Canadian Annual Dairy Trade Bulletin, http://www.dairyinfo.agr.ca/main.htm.

Fonterra (the New Zealand dairy) collaborates with European companies in several markets, but it does not export a large amount of dairy products to the EU. For Fonterra, South America is far more interesting because there they can produce milk powder cheaply. Producing basic milk products such as milk powder is Fonterra's core competence. They often have joint ventures with branding companies like Danone, Arla and Friesland. For European brand producers, they are therefore more an opportunity than a threat: they offer cheap raw material. For European milk producers (farmers), this might be more a problem than for the industry.

Figure 4.6.12 Evolution of the European dairy industry (Source: Everwand, 2006)



Size classes

Table 4.6.6 shows the number of companies. Italy, France and Spain in particular have a large number of small dairy companies.

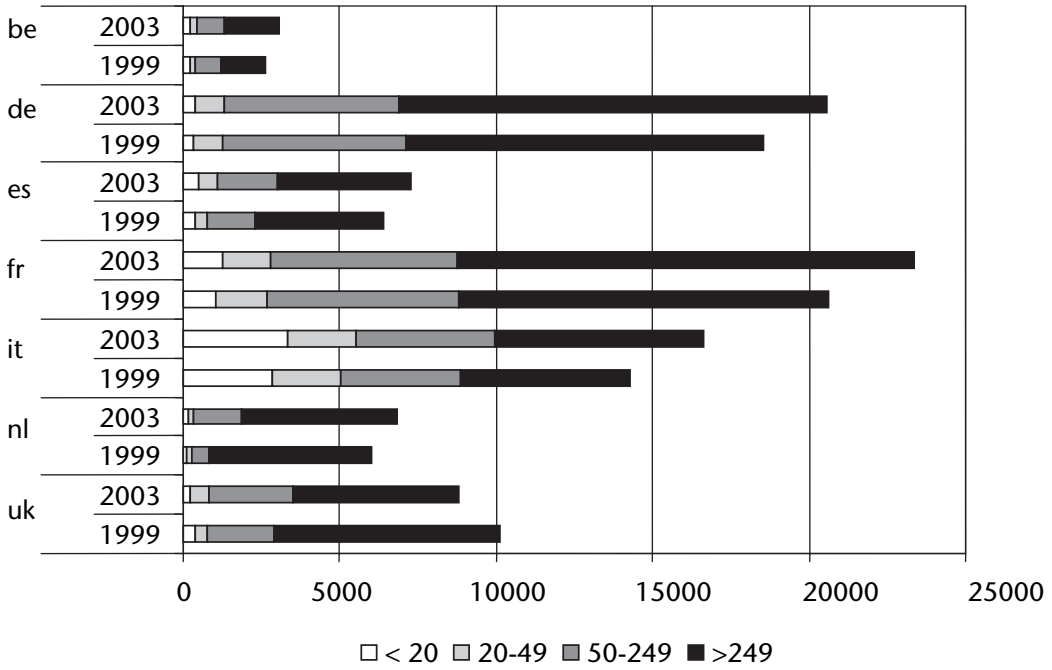
Table 4.6.6 Number dairy enterprises for size classes in number of personnel

		< 20	20-49	50-249	> 249
Belgium	1999	406	10	16	8
	2003	346	13	14	9
Denmark	1999	47	11	6	5
	2003	44	7	8	2
Germany	1999	164	51	102	38
	2003	196	37	84	43
Spain	1999	842	82	42	22
	2003	1348	82	48	18
France	1999	1236	155	131	47
	2003	1198	131	133	57
Ireland	1999	21	8	25	8
	2003	18	7	20	9
Italy	1999	3948	223	103	12
	2003	4031	217	111	19
Netherlands	1999	180	10	7	5
	2003	205	10	19	5
Austria	1999	88	9	18	2
	2003	121	7	19	4
United Kingdom	1999	482	59	62	34
	2003	437	54	59	24

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

The importance of these small enterprises is negligible from an economic point of view, as is shown in figure 4.6.13. Due to the confidential nature of data in several countries, the turnover of the larger enterprises is not published, which restricts the presentation in the figure. The remaining countries, including Italy, Spain and France, show that the most of the turnover comes from companies with 250 or more employees.

Figure 4.6.13 Turnover to size class.



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.6.5 Competitive potential

Innovation and branding

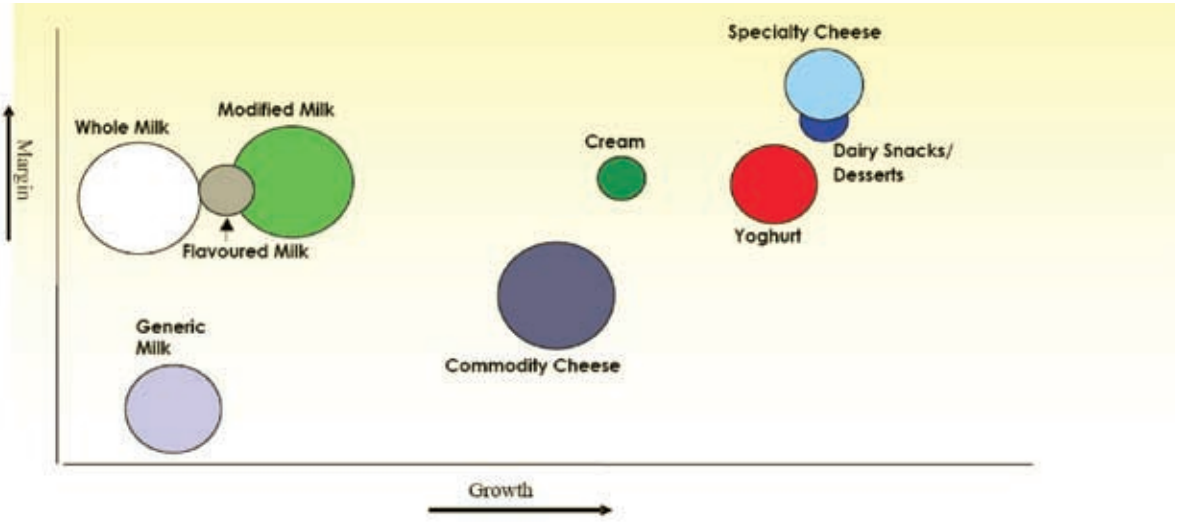
The dairy industry has a relatively strong tradition in new product development. The majority of product innovations deal with incremental innovations, such as variations in taste and packages designed for different consumption moments. Globally, the product group yoghurts and yoghurt drinks count most innovations. In yoghurt and yoghurt drinks, incremental innovations like new flavours are introduced. The market of prebiotics and probiotics is being developed by Yakult, but other companies in dairy are introducing new products in this market as well. In addition, several innovations in low fat products are being introduced in the market in all product types. Research into innovations shows that especially in the US, dairy companies are investing in low carb products, while in other parts of the world this product group is hardly developed at all. Another innovation area is the snack market. In ice cream, cheese and desserts, snacks have been introduced in the last few years which have been quite successful.

The dairy industry effectively follows consumer trends such as increased health and convenience. For example, low fat alternatives are being developed in relatively 'fat' product groups like cheese and whipped cream. Examples of ready-to-eat products include yoghurt snacks with fruit for breakfast and flavoured milk products in a one-person packaging. In addition, the dairy industry benefits from increased sales of ready-to-eat meals such as pasta and pizza. New products have been developed specifically targeting kids. Figure 4.6.14 shows the product portfolio of dairy products, although public statistics are missing for most high margin and innovative products.

Striking innovations (based on new technologies that are applied to new markets) are rare, but they do exist. Campina, for example, entered the market for meat substitutes with a product based on dairy. The dairy products industry is also innovative in the ingredient market: interme-

diate products delivered to the food and the pharmaceutical industry. This ingredient market is quite profitable for companies that invest in this market and sometimes even more profitable than the production of standard consumer products. However, this is a market in which innovation and R&D are very important to be able to keep up. On all continents, large dairy companies are active in this market and in some countries specialised companies are active in this market.

Figure4.6.14 Dairy product categories on growth/margin matrix (Hooke, 2003)

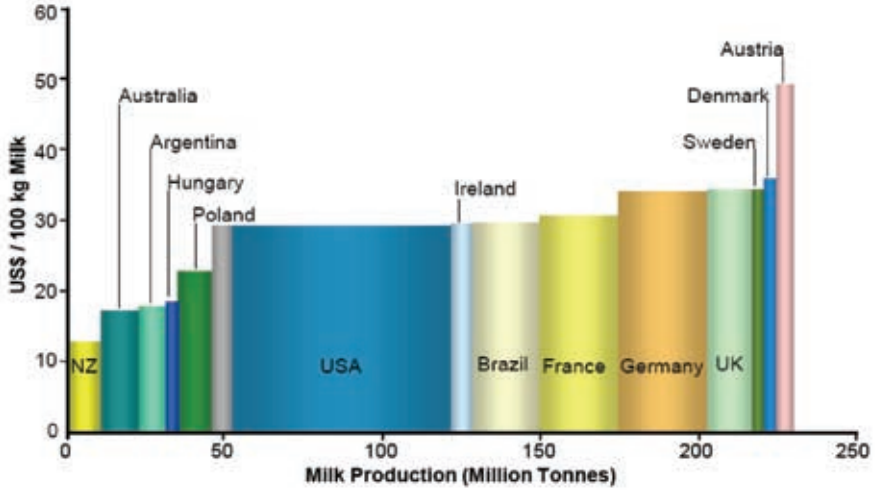


Only Nestlé (Swiss) and Danone (France) rank in the 66th and 67th place among the top 100 best global brands (www.interbrands.com). The European market still has many regional brands (also within one company like Nordmilch or Campina), that are partly a legacy problem. However they also reflect the differences in consumer demands throughout Europe and the ability of European companies to manage those differences. Some small dairy companies also show these skills, e.g. in producing local (cheese) specialties in France or catering for niche markets like halal and kosher food (Rouveen, the Netherlands).

Costs of inputs

Purchases of raw milk are major costs for the dairy products industry. Figure 4.6.14 shows the difference in cost prices of raw milk in several countries. The price seems rather high in Europe. However the low cost price in Australia and New Zealand correspond with a low population density. Logistic costs to the consumption areas are disadvantages for these countries.

Figure 4.6.15 Cost price of raw milk. For several countries



Source: Goldberg and Porraz, 2003.

The trend in consumption to value added products like cheese, ice cream and desserts that can be transported over longer distances means that the relatively safe position of high entry barriers for fresh products is becoming less important. Even though the milk price in Europe is (still) higher (27 cents) than in New Zealand (20 cents), industry experts see large-scale European farmers able to produce at even lower cost prices than 20 cents per kilogram milk. Once the EU quota system ends, these differences will probably become even larger. Countries like Portugal, Spain and Greece will probably end up with a smaller number of dairy cows, while countries in North-West Europe (Ireland, Denmark, the Netherlands) are likely to increase production (and thus reduce costs) even further (Lips and Reader, 2006).

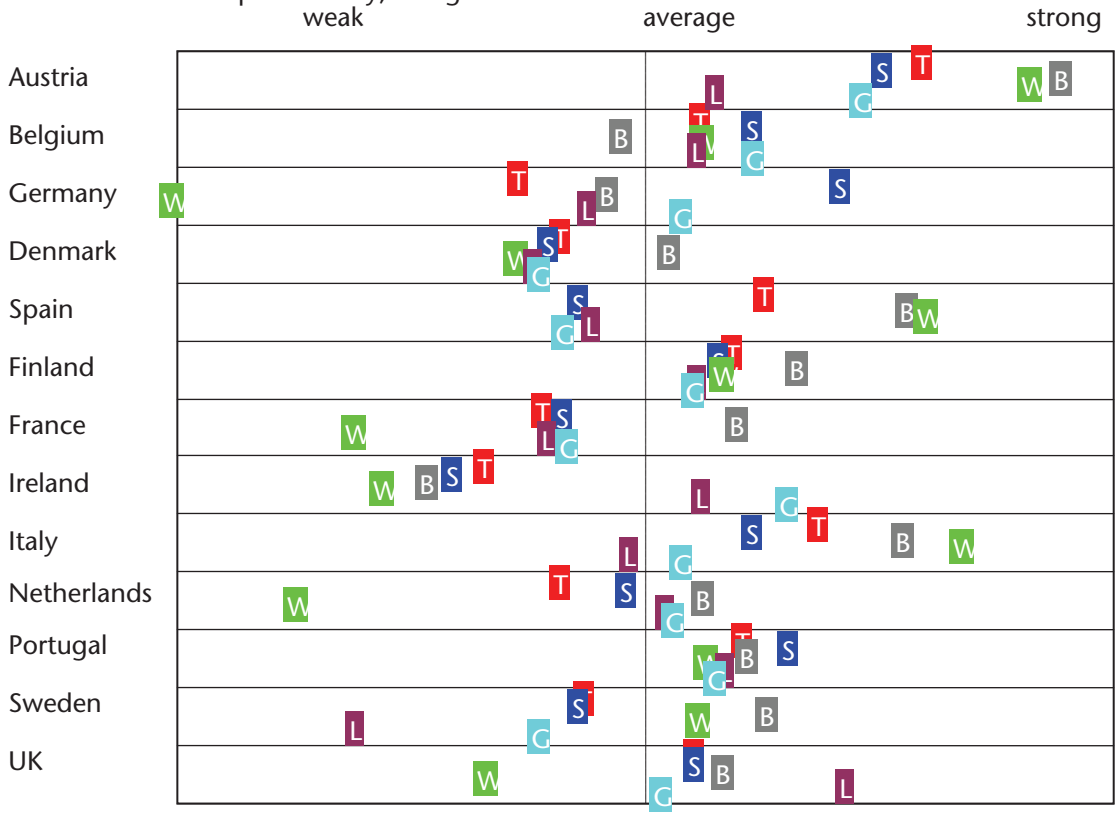
The competitiveness of EU countries

EU competitiveness is weak compared to the US due to the slower growth of labour productivity, real value added and also the growth of the value compared to the total food industry. Figure 4.6.16 gives an overview of the competitiveness of EU countries. Austria and Italy are among the important producers in a stronger position. Ireland is weak. The relatively strong position of the UK is remarkable, considerable better than some years ago. Since 2000 the UK dairy industry was undergoing a period of tremendous change. It had to evolve rapidly to meet the changing requirements and constraints of an increasingly global marketplace. The strong position of the Italian dairy industries is also reflected in their high prices (figure 4.6.7).

A weak or strong performance of a country does not say much about individual enterprises. In France, for example, has a very competitive company in Danone, but the overall performance of the whole country is valued below EU average. This divergence between companies and regions within Europe makes the European average hard to interpret and reflects the ongoing restructuring in the European area, leading to more specialisation and better competitiveness.

Figure 4.6.16 Competitiveness of the dairy industry in EU countries

T= total Dairy; S = growth share food industry in total manufacturing;
B= growth Balassa; W = growth world share
L= labour productivity; G = growth value added.



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4.7 Grain based and starch products dominated by a few key-players

Robert Stokkers and Myrtille Danse

4.7.1 Key findings

The worldwide production of cereals amounted to 2,233 million tons in 2004, and the worldwide trade 234 million tons. Thus almost 90% of the global cereal production is locally consumed either by humans or animals. The world trade of grain mill products totalled 2.98 billion Euros in 2004, divided over 68% flours and 32% starches. The global trade of bread and bakery products and pasta is far more important and amounted to 29.8 billion Euros in 2004, divided over bread and bakery 86% and pasta 14%.

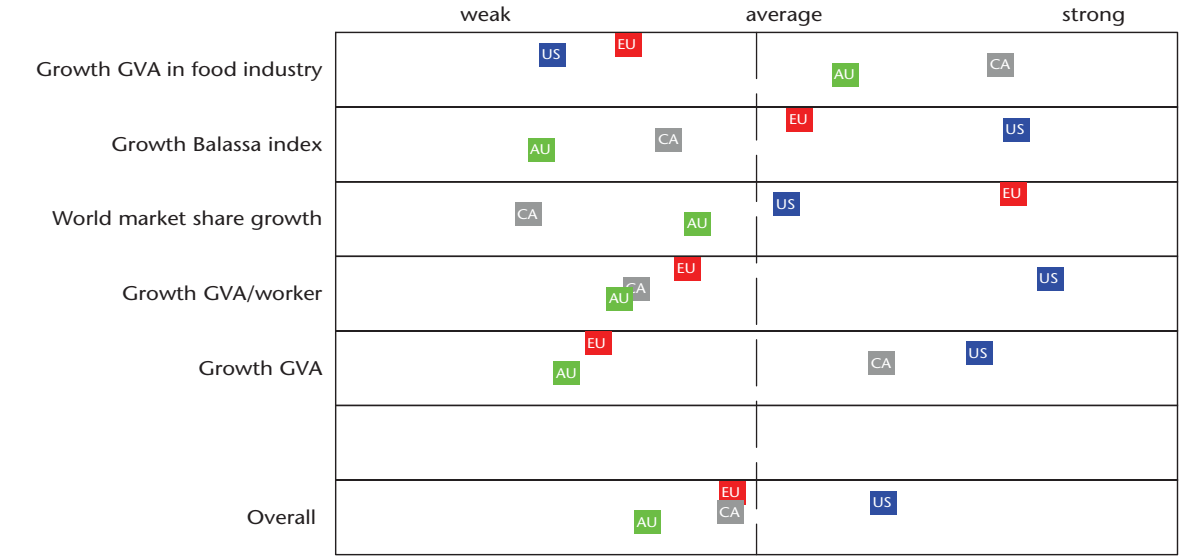
The EU has a share of 47% in world exports of grain-based products. The EU exports 13% of the total world exports to third countries. Important non-EU exporters are: the US (15%), Canada (9%) and Australia (7%).

The EU grain-based industry had a production value of 108 billion Euros in 2003, almost 40% above the US production value. Canada and Australia are relatively small producers. However, the scale of the grain-based industry in the EU is much smaller than in the US and Canada as indicated by the lower production value and number of employees per enterprise. Personnel costs make up around 65% of the value added in the EU, just 25% in the US and between 40 and 45% in Canada and Australia. Consolidation, internationalisation and specialisation will continue, also resulting in a more concentrated grain-based industry in Europe.

EU competitiveness is weak compared to the US, but equally strong as Canada and stronger than Australia. Austria, Belgium and Germany are relatively strong within the EU. The extra communitarian trade grew less than the intra communitarian. The weak EU performer, France, has several companies in the global top companies. Leading companies in the world market like Danone and Kraft foods are also leading in other food segments.

Figure 4.7.1 Competitiveness of the EU-15

Grain based and starch products



4.7.2 Introduction

The EU benchmark for competitive performance: world exporters

The worldwide production of grains amounted to 2,233 million tons in 2004, whereas the worldwide trade only accounted for 234 million tons. This means that almost 90% of the global grain production is used locally as animal food or processed in local grain mills (Rabobank, 2005). Half the amount of grains traded internationally is wheat; the other half coarse grains and in particular maize. Trade in rice is less important since most of the harvested rice is consumed in Asian regions where it is produced (Braks et al., 2003).

The world trade of grain mill products totalled 2.98 billion Euros in 2004, divided over 68% flours (mainly wheat) and 32% starches (mainly wheat, maize and potato). The global trade of bread and bakery products and pasta is far more important and amounted to 29.8 billion Euros in 2004, divided over bread and bakery 86% and pasta 14% (source: ITC/WTO data).

EU countries play an important role on the world market of grain-based products with an export share in 2002-2004 of 47% (table 4.7.1). Around 70% of this export is destined for other EU countries. Important non-EU exporters are: the US (15%), Canada (9%) and Australia (7%). These three countries will be used to benchmark the EU grain processing industry. A more in depth analysis of the trade will be given in section 4.7.3.

Table 4.7.1 Major exporting countries of grain-based products

Region/Country	Export share			Import share		
	'96 - '98	'02 - '04	difference	'96 - '98	'02 - '04	difference
EU-25	45	47	2.0	37	39	2.9
EU-15	43	45	1.3	35	38	3.0
EU-15 < > non-EU	14	13	-1.6	4	6	2.5
US	17	15	-2.0	6	8	2.0
France	12	11	-1.4	5	5	0.1
Canada	12	9	-2.4	2	2	0.4
Germany	7	8	1.0	5	5	0.2
Italy	7	7	0.7	5	5	-0.7
Australia	9	7	-2.1	0	1	0.2
Belgium/Luxembourg	4	5	1.3	4	4	0.4
United Kingdom	4	3	-0.9	4	5	0.9
Netherlands	3	3	-0.1	3	3	0.4
Spain	2	2	0.4	3	4	0.8
Japan	1	1	-0.0	6	5	-0.6

Source: ITC/WTO data

Grain processing

The broadly defined group of grains covers many types, including maize (known as corn in the US), wheat, barley, sorghum and rice. About half the grain is used directly as feed grain in the livestock sector; the other half is further processed in the grain-based industry. The grain processing chain is very long. The first processing step consists of dry milling, resulting in flakes, flour and white rice, or wet milling, resulting in malt, starch and glucose. These semi-finished products can be used in a wide variety of food and non-food processing industries. Examples of food products are bread and bakery products, beer, pasta and noodles. Examples of non-food products are textile, paper, animal feed and bio fuels (Braks et al., 2003). In this chapter only the semi-processed products flour and starch and the food products bread and bakery and pasta will be discussed.

Consumption of grain products

Nearly 75% of the global wheat production is used for human food processing, equalling 400 million ton. As such it is a typical food grain for human consumption. By contrast, these numbers are only 13% (80 million tons) for maize and 5% (7 million tons) for barley. In most developed countries the food use of wheat is declining, whereas in developing countries competitive prices have encouraged wheat consumption. The global demand for maize for human consumption is fairly steady and the demand for barley is expected to increase in both developed and developing countries. The demand for grain-based foods is strongly correlated to population developments. As a result, over the past decade bakery sales have stagnated in developed countries. In many developing countries, population numbers are still rising and bakery products are becoming more popular. Nevertheless, in Asia bread and bakery products will never replace the rice-based diet that is traditional on this continent (Braks et al., 2003).

Competition: Balassa index and share value added

Table 4.7.2 indicates that Australia is the most specialised in the export of grain-based products, the Balassa index being far higher than in all other countries, but showing a negative growth. In the past decade Canada has lost his second position, mainly because of a negative growth of the Balassa index. The US export of grain-based products is of relatively less importance, but showing an increasing Balassa index. The export from the EU-15 to third countries is of minor importance and diminishing further; the intra trade within the EU gained importance.

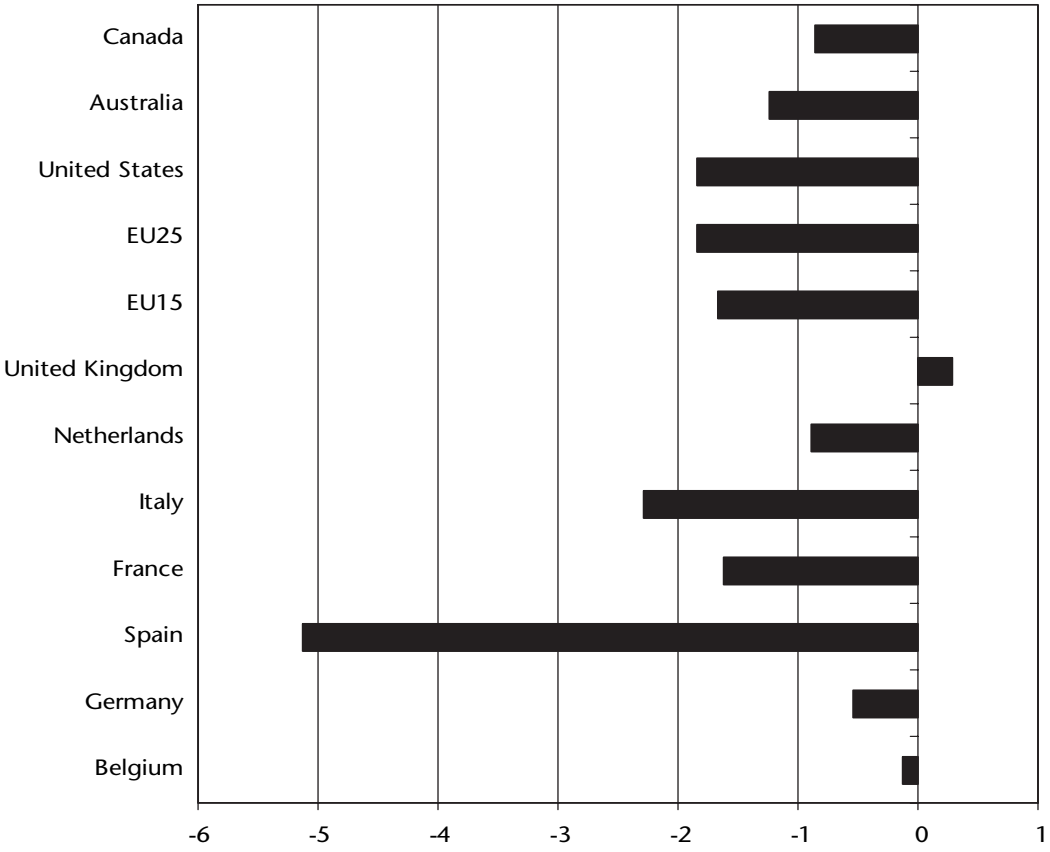
Table 4.7.2 Revealed comparative advantage (Balassa index) and growth rate from '1996-1998' to '2002-2004'

Region/Country	1996 - 1998	2002 - 2004	annual growth%
EU--25	1.0	1.1	2.0
EU-15	1.0	1.1	2.1
EU-15 < > non-EU	0.9	0.8	-0.9
US	1.4	1.5	1.3
France	2.0	2.1	0.9
Canada	2.7	2.4	-1.9
Germany	0.7	0.8	2.8
Italy	1.3	1.8	4.7
Australia	7.9	6.5	-3.2
Belgium/Luxembourg	1.1	1.4	4.2
United Kingdom	0.8	0.8	-0.1
Netherlands	0.8	0.9	1.8
Spain	0.7	0.9	3.7
Japan	0.1	0.1	3.3

Source: ITC/WTO data

The performance on the domestic market is compared to the food industry as a whole. Thus if the share of real value added of the grain-based industry in the total food industry grows, the grain-based industry performs better than the whole. Figure 4.7.2 shows that all benchmark

Figure 4.7.2 Annual growth of the real gross value added at factor cost: share grain-based products in food industry



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

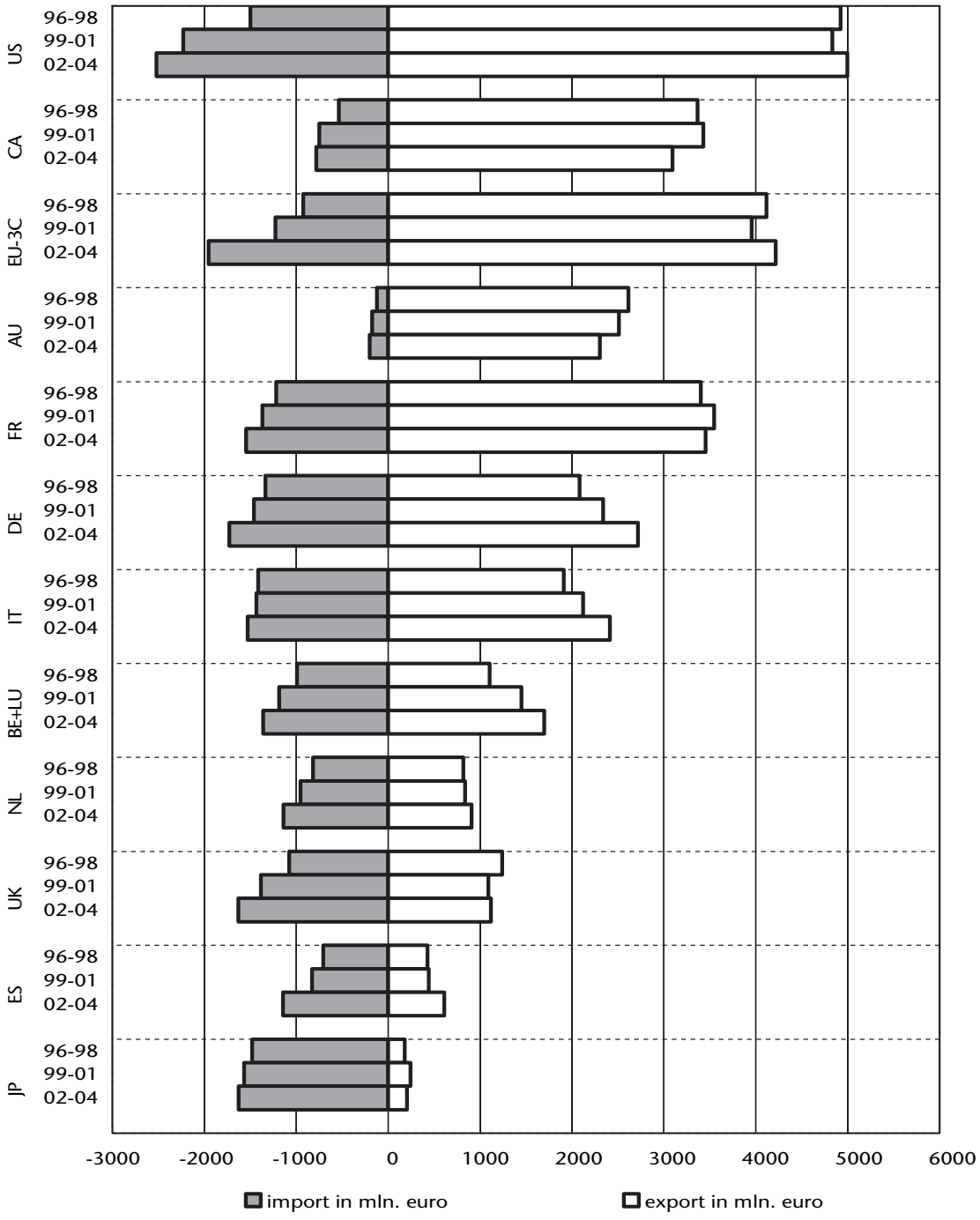
countries have a negative growth, varying from -0.86% for Canada to -1.84 for the EU-25. Thus, the competitiveness of the European grain-based industry in general is only slightly less than that of the benchmark countries. The negative growth shows that the share of grain based products is declining in the food industry in almost all countries.

4.7.3 Global trade performance

Trade patterns

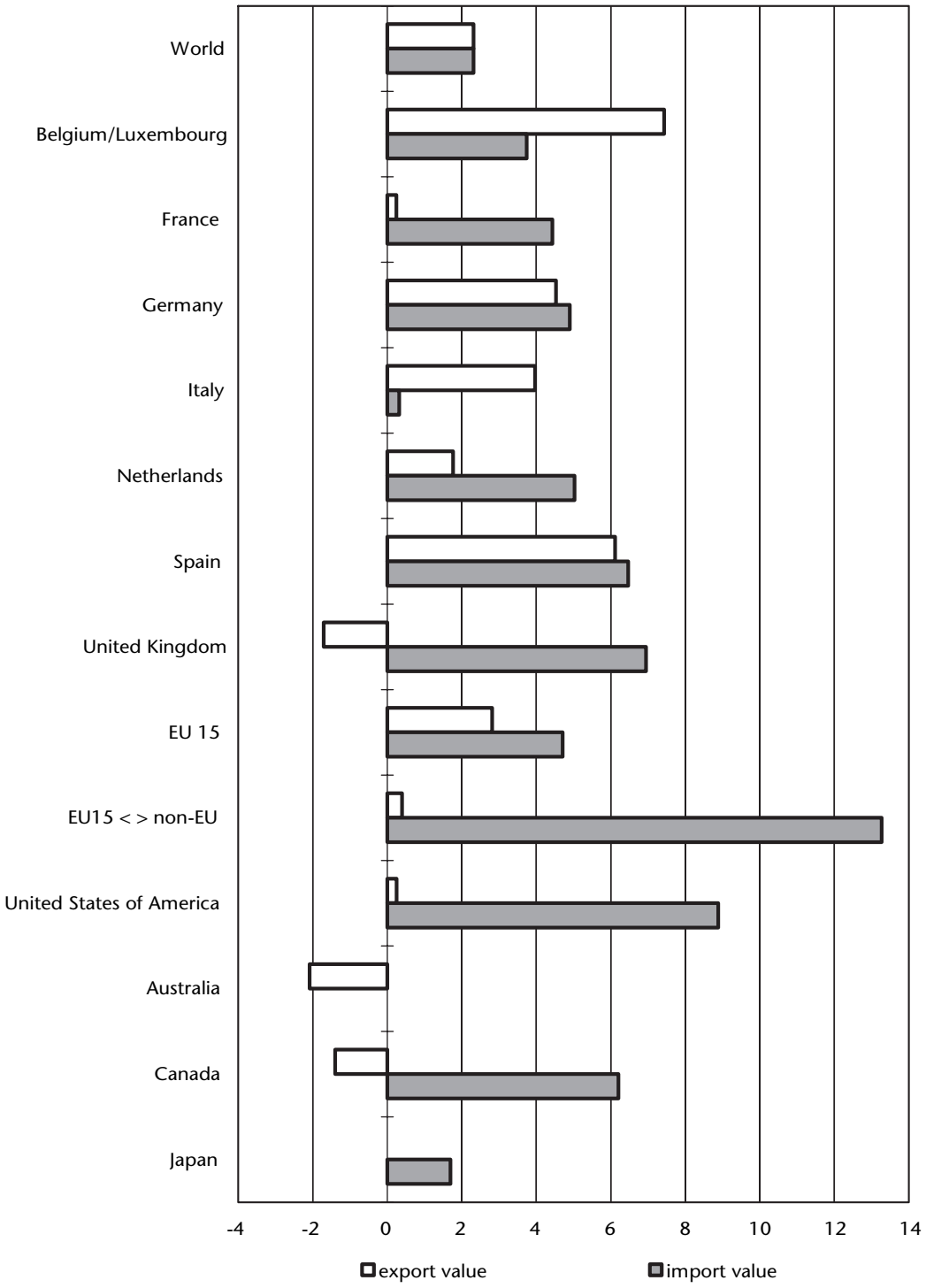
The share of international trade is fairly small compared to domestic production, as is shown by the high level of self-sufficiency for grains of about 90% (see section 4.7.2). The US is the largest net exporter of grain-based products, closely followed by Canada, Australia and France (figure 4.7.3). The largest net importers in the EU-25 are Spain and the United Kingdom, and outside

Figure 4.7.3 Import and export of grain products, three years average of values



the EU-25 Japan. The figure shows a slight intensification of trade relations between countries. In the period between 1996 and 2004, exports and imports in most countries stabilised or increased at the same time. One-way trade is still visible in Japan.

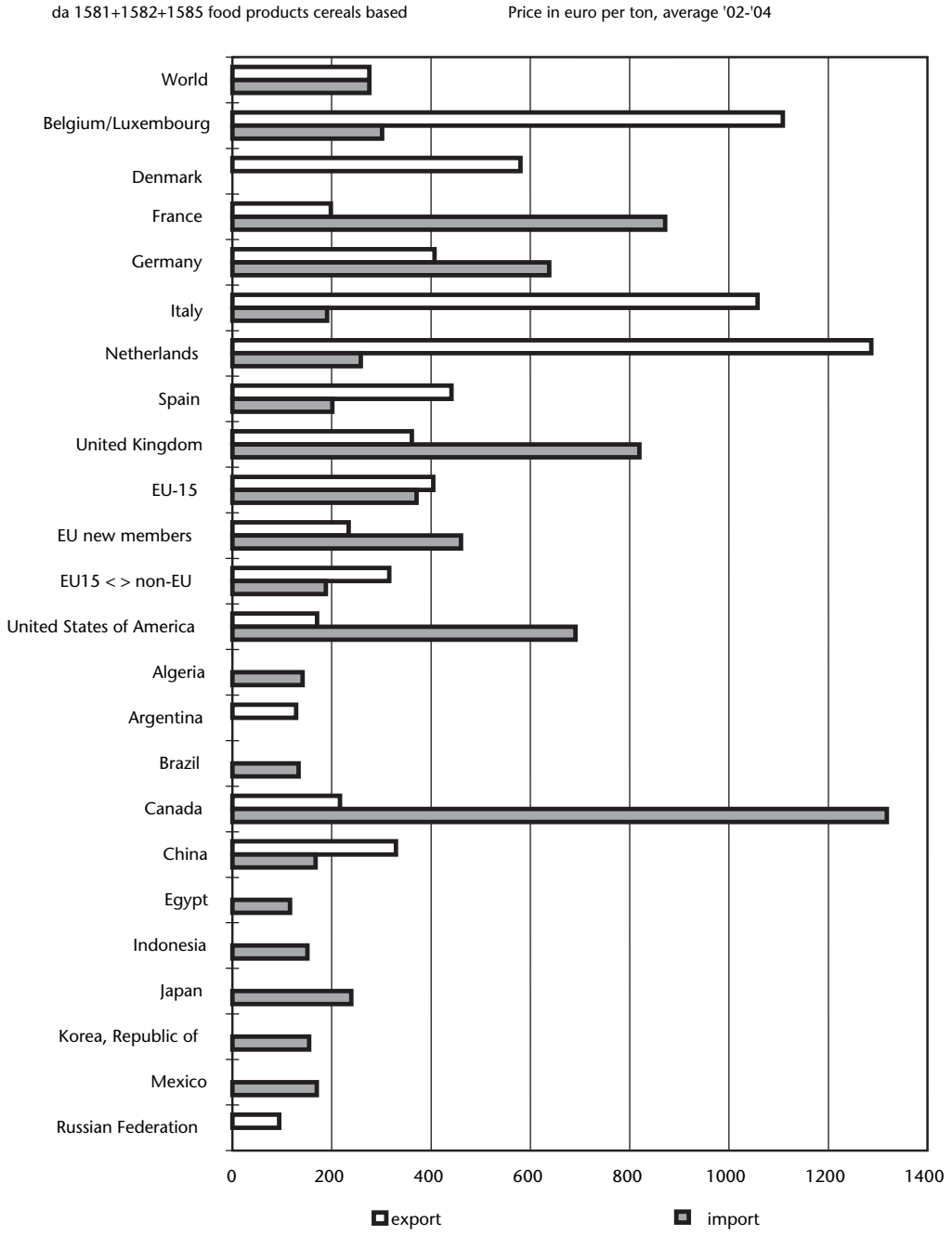
Figure 4.7.4 Annual import and export growth of grain products



With regards to export growth, the EU-15 performance corresponds to the world average, but is much better than in all benchmark countries, i.e. US, Canada and Australia (figure 4.7.4). The new member states of the EU-25 perform even better than the old member states, although they still have a small market share. In the EU-15, import growth exceeds export growth, but differ-

ences are much larger in the US and Canada. Within the EU-15, France and Germany still have the best trade balance, but Belgium/Luxembourg and Italy are the best performers in terms of growth. An average growth above the world growth means an increase of market share.

Figure 4.7.5 Import and export prices of grain products 2002-2004 (Australia omitted, due to missing volume data).



The values per ton of exported and imported grain-based products of the EU-15 are slightly above the world averages (figure 4.7.5). Relatively high export prices are achieved by Belgium, Italy and the Netherlands. Over the past decade, the EU has undertaken steps to reduce export subsidies by lowering the intervention prices of crops like wheat. As a result, grain prices in the EU have come in line with world market prices. On the other hand, the US and Canada have maintained substantial support levels for farmers. Also because of this policy, import prices for these benchmark countries are much higher than the export prices

of grain-based products. However, the US and Canada's grain processing industry benefit from ample raw material availability (Braks et al., 2003).

Main products in detail

The commodities considered in this chapter are the grain mill products flours and starches (9% of the world trade) and the grain-based products bread and bakery and pasta (91% of the world trade). With regard to the raw material, the main exporters of wheat are the US, Canada, the EU-15 and Australia. On the import side, about half the volume goes to North Africa, the Middle East and the Far East. Import requirements for these regions are growing rapidly as local production cannot cope with the increased demand of a rapidly growing population. For maize, the US accounts for more than half the international trade, whereas other major exporters are China and Argentina. Maize is imported mainly into Asia: Japan is the largest importer, followed by South Korea, Taiwan and Mexico. Growing disposable income in this region is helping to increase meat consumption and thus maize consumption (Braks et al., 2003).

The EU is the world market leader for grain flour and starches, with Germany, France and the Netherlands accounting for 60%. Major export destinations are the EU itself (46%), Libya (12%) and several Asian countries (together 4%). The US ranks second with Canada (19%), the EU (9%) and Japan (7%) as major destinations. Major export destinations for Canada are the US (88%) and Japan and Hong Kong (together 4%). Major destinations for Australia are the US (23%), Indonesia (22%) and Hong Kong (17%). The world trade in wheat flour dropped to around 8 million tons in 2000-2002. This fall is the result of increasing investments in milling capacity in countries in North Africa and the Middle East (Braks et al., 2003).

The EU is also market leader for grain-based bread, bakery and pasta: France, Germany and Italy accounting for 56%. Major export destinations are the EU itself (75%), the US, Algeria and Egypt (each below 3%). The US ranks second with Canada (12%), Japan (11%) and Mexico (10%) as major destinations. Major export destinations for Canada are the US (37%) and the EU (11%). Major destination for Australia is Japan (12%).

4.7.4 Business performance and competitive process

Characteristics of the grain-based processing industry

The EU grain-based industry had a production value of 108 billion Euros in 2003 (table 4.7.3). This is almost 40% above the US and even 25 to 50 times above the production value of Canada and Australia. However, production value per enterprise in the EU is only about one tenth of the US and one fourth of Canada. Also the number of employees per enterprise in the EU is much lower and just one quarter of that in the US and Canada. These are indications that the scale of the grain-based processing industry in the EU is much smaller than that in the US and Canada.

With regard to production costs, the purchases of goods take a share of just over 70% in the EU, around 40% in the US and between 55 and 60% in Canada and Australia. The purchases largely consist of raw grains and grain mill products. The personnel costs make up around 65% of the value added in the EU, just 25% in the US and between 40 and 45% in Canada and Australia. The personnel costs per employee are about the same for all benchmark countries.

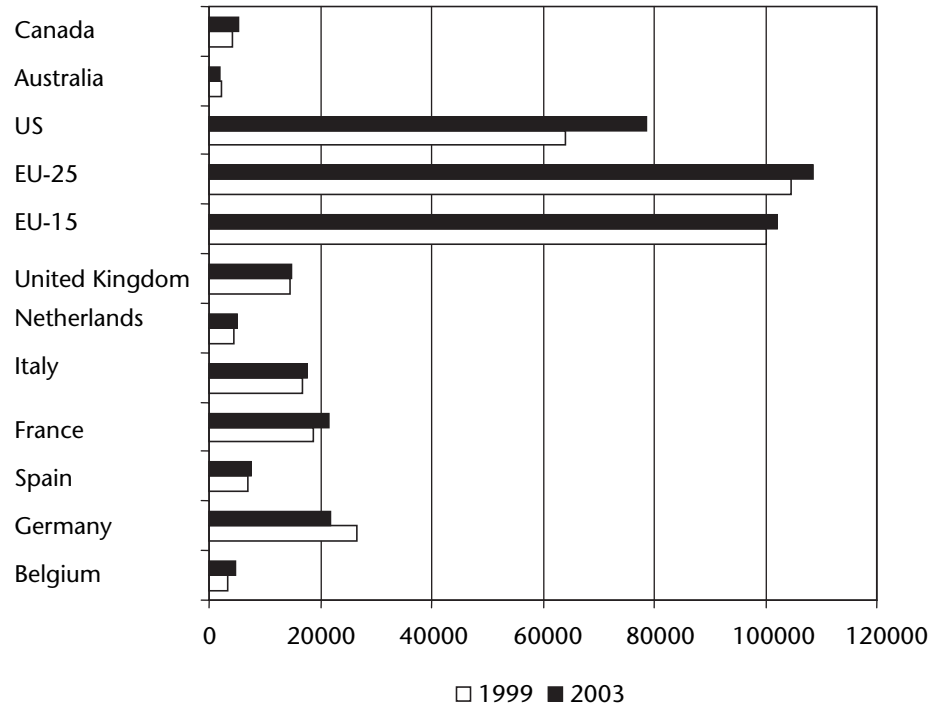
The business performance within the grain processing chain shows large differences, depending on the country and the position in the chain. Grain traders, wheat millers and maize refiners generally involve huge operations with relatively low margins. Today the flour-milling industry in Australia is highly consolidated and rationalised (no over-capacity), but is much more fragmented and less efficient in the US (capacity utilisation 85%) and the EU (capacity utilisation 40-90%). The starch industry is highly concentrated and dominated by a few large players in the world. Both in the EU and US potential take-over candidates are becoming scarce. Increasingly, starch companies are becoming part of companies with a sugar background that are looking for diversification (see section 4.9).

Table 4.7.3 Key characteristics of the grain-based processing industry (million €)

	EU-15		EU-25		US		Canada		Australia	
	1999	2003	1999	2003	1997	2002	1997	2002	2001	2003
Number of enterprises	157.805	147.102	172.972	161.554	11.858	11.991	1.648	1.813	N.A.	N.A.
Production value	100.190	102.226	104.510	108.408	64.090	78.723	4.154	4.486	2.128	2.065
Value added at factor cost	36.323	37.306	37.657	39.002	34.937	47.070	2.045	2.185	506	518
Purchases	71.992	72.981	75.696	78.177	29.160	32.065	2.482	2.607	1.172	1.142
Personnel costs	24.713	24.346	25.530	25.352	8.462	11.697	806	846	210	231
Number of employees	1.143.808	1.078.437	1.332.897	1.268.527	339.790	346.434	40.122	47.027	8.400	8.200
Prod. value/ enterprise	0.63	0.69	0.60	0.67	5.40	6.57	2.52	2.47	N.A.	N.A.
Employees/ enterprise	7.25	7.33	7.71	7.85	28.65	28.89	24.35	25.94	N.A.	N.A.

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.7.6 Distribution turnover in 1999 and 2003 in €million



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

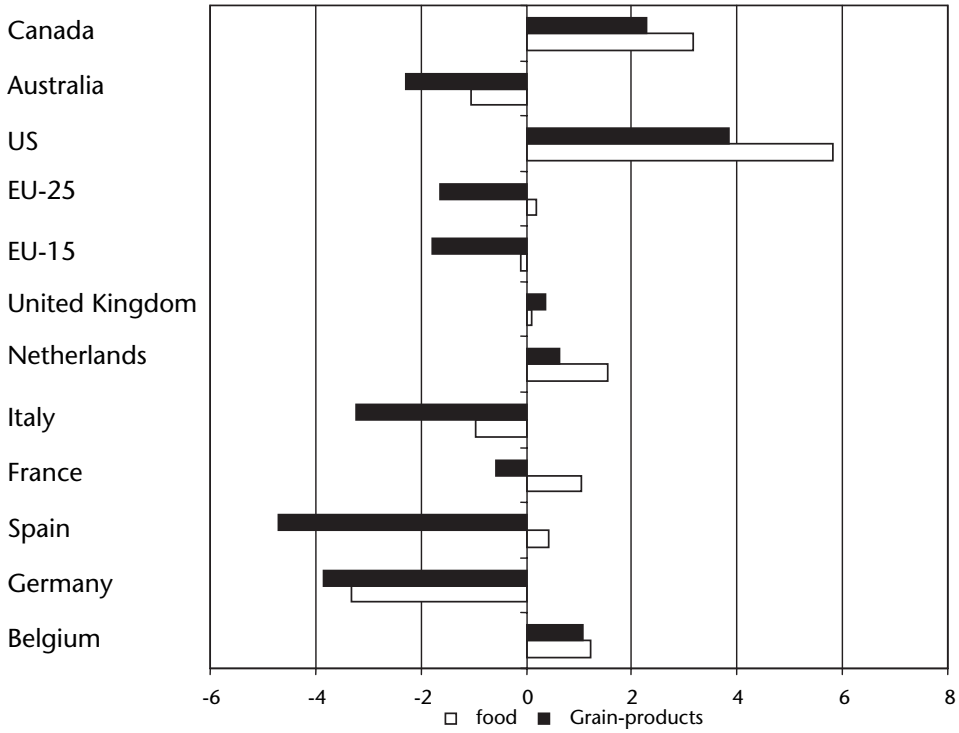
Manufacturers of grain-based consumer products acquire a high share of the value added in the grain processing chain with relatively high margins. In the bakery sector, the shift from craft to industrial production continues, driven by concentration in the food retail and food service. At the end of last century, the bakery industry started to consolidate and rationalise production and distribution in an attempt to increase profits. In order to achieve real growth, bakeries now focus increasingly on value-added products (Braks et al., 2003).

Eurostat figures indicate that turnover in the EU-25 has increased by 3.7% in the last five years (figure 4.7.6). Of the major producing countries in the EU, France and the Netherlands showed the strongest increase of around 14%, whereas Germany suffered a decrease of 18%.

Value added and labour productivity

Due to differences in purchasing power parities, these nominal levels are not comparable. However the growth of the real value added is interesting. Figure 4.7.7 shows that the performance of the EU is below that of the US, but about the same as Canada and Australia. Within the EU, there are great differences between countries: excellent performance in new member states like Hungary and the Czech Republic and poor performance in Ireland, Spain, Germany and Italy. These last three countries are major producers of grain-based products.

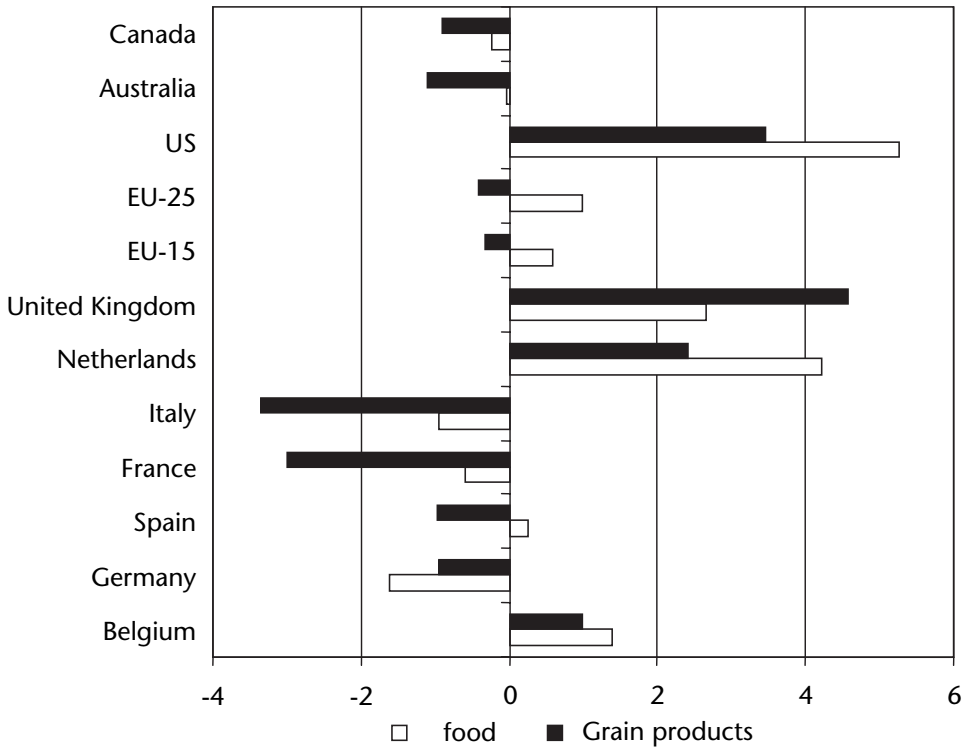
Figure 4.7.7 Growth real value added 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.7.8 shows that the growth of labour productivity in the EU-25 and Australia is slightly negative. The US has a positive growth of 3.5% and Canada a negative growth of 4.0%. Again differences between EU countries are large: excellent performance in the new member states like Hungary and the Czech Republic and poor performance in Ireland, Italy and France. The latter two countries are major producers of grain-based products within the EU.

Figure 4.7.8 Growth of the labour productivity 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Market orientation and internationalisation

The main players in the international grain processing and trade are companies like ADM, Cargill, ConAgra, and General Mills. They all perform a broad range of activities in trading and processing various commodities. ADM is currently the world leader in processing and making products from soybeans, corn, cocoa, wheat, peanuts, rice, canola, barley, sunflower seeds and cottonseed. The company has over 270 processing plants. Among the products they resell are lecithin, corn sweeteners, gasohol (mix of petrol and alcohol), paint solvents and animal feed, all based on the rendering of agricultural products like soybeans and corn. The company has a worldwide presence with recent acquisitions in China, Brazil, Turkey, and Bolivia. Cargill Food Products division is number 2 in the area of corn wet milling. In its Corn Wet Milling businesses, it produces sweeteners, food and industrial starches, various starch derivatives and wheat proteins. It has plants in the US, Western Europe, Turkey, Poland, and Russia. ConAgra is a US-based company and is estimated to be the number 3 seller of retail food products in the world (after Altria/Kraft and Nestle). The company is one of the top three buyers and processors of grain products (corn, wheat, etc.) and handles a significant portion of US grain exports. Furthermore it is actively involved in the cattle and hog feed sector, food services, poultry processing, trade in agricultural products and fertilizers. General Mills is currently one of the world's largest food companies. Its 2001 acquisition of Pillsbury, another leader in baking supplies, made it the number 5 food company in the world and number 3 in the United States. It is the US leader in yogurt, number 2 (after Kellogg's) in breakfast cereal and the third-largest food service supplier in the world. It is the leader in ready-to-bake products.

Due to the bulk market characteristics of the flour market, cost price efficiency and economies of scale are important. In addition millers are engaged in forward integration towards the consumer in order to try to add more value to the product. While the breakfast cereal market is mature in the US, General Mills has looked elsewhere to guarantee its future. It does very well in snack foods, particularly with Bugles chips. The company has strengthened its position with joint ventures. It works closely with Nestle, with Cereal Partners Worldwide, which resells General Mills cereals, and others outside North America. General Mills also works with Pepsico in a joint

venture called Snack Ventures Europe (SVE) selling Bugles and other snacks alongside Pepsico's Frito-Lay snacks.

Table 4.7.4 shows the 6 largest grain trading companies in the world. These companies account for nearly 80% of the global grain trade, a large part of which is destined for their own use.

Table 4.7.4 Five major grain trading companies in the world

Company	Country of origin	Million of tons
Cargill	US	42
ADM	US	23
CWB	Canada	18
Glencore	Switzerland	16
Nidera	Netherlands	12
Soufflet	France	11

Source: Braks, et al., 2003.

The US flour milling industry is less fragmented than in the EU. The six main companies in the US have a cumulative market share of 95%. The top 15 only includes 6 European companies (table 4.7.5).

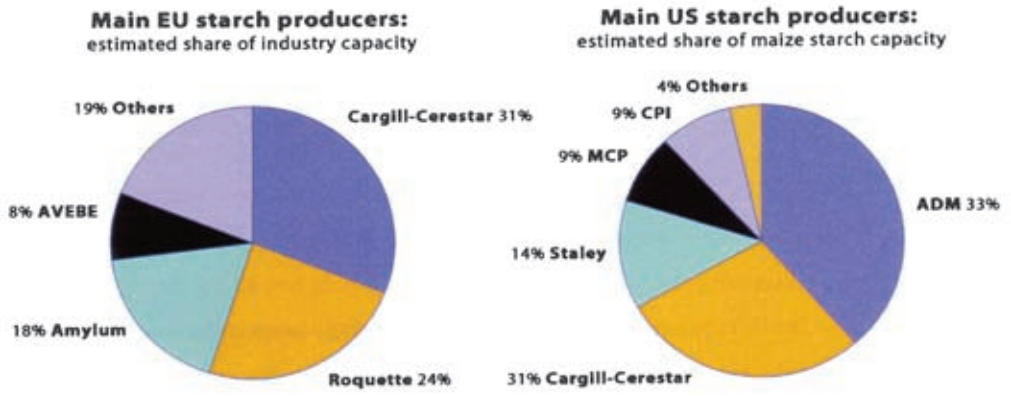
Table 4.7.5 Top 15 global flour milling industry (source: Braks et al. 2003)

Rank	Company	Country	Annual production (million ton)
1	ADM	US	> 5
2	Cargill	US	>5
3	ConAgra	US	4-5
4	Bogarasi	Indonesia	3-4
5	Soufflet	France	2-3
6	Nisshin	Japan	2-3
7	VK Mühlen Hamburg	Germany	1-2
8	Meneba (Maxeres)	The Netherlands	1-2
9	Intermill Paris	France	1-2
10	Cereal Food Processors	US	1-2
11	General Mills	US	1-2
12	Bay State	US	1-2
13	Bunge	US/Brazil	1-2
14	Rank Hovis	UK	1-2
15	Grandi Molini	Italy	1-2

The starch industry in the EU and US is highly consolidated: in the EU the top 4 has a market share of 81% and in the US 87% (figure 4.7.9).

The starch business is actually a business-to-business environment. Its products are used and further processed by other industries, like food, paper and textiles. The starch industry is characterised by a high degree of concentration; a limited number of players account for a majority market share. Concentration has increased even further with the recent acquisitions of Cerestar by Cargill and of Minnesota Corn Processors (MCP) by ADM. The barriers to entry are high given the capital-intensive nature of this business and the scale required to perform efficiently. Cerestar was the European market leader until Cargill made a successful bid to acquire it. Following the

Figure 4.7.9 Main starch producers in the EU and US (Braks et al., 2003).



Source: LMC International, Rabobank International estimates.

takeover, Cargill became number one and is now well equipped to cater for demand for value-added starches. Before the takeover, Cerestar had been investing substantially in its production plant in the Netherlands, the biggest starch production facility in Europe. The other main players are Roquette Ferres (France), Amylum (Belgium) part of Tate and Lyle (UK), and AVEBE (The Netherlands). Amylum was one of the first to move into the wheat-based starch, a decision which was based on cost and efficiency and its search towards value added produce.

While private and public companies dominate grain starch, potato starch is still largely produced by cooperatives. Within Europe, the cooperative AVEBE is market leader in potato starch with a share of approximately 50%. Due to the uncertainties caused by possible changes in the EU starch regime, the company is looking for activities in other raw materials.

Table 4.7.6 World's largest bakeries in 2002

Rank	Company	Country	Grain based food sales (million ton)
1	Kellogg Co.	US	7,464
2	Yamazaki Baking	Japan	5,694
3	General Mills	US	4,653
4	Interstate Bakeries	US	3,729
5	Grupo Bimbo	Mexico	3,652
6	Kraft Foods	US	3,596
7	Sara Lee	US	3,464
8	Barilla	Italy	3,264
9	Danone	France	3,232
10	George Weston	Canada	2,960

Source: Braks et al. 2003.

Most of the main players in the bakery industry have a North American background, clearly indicating the more concentrated nature of the industry on this continent (table 4.7.6). The top five bakeries in the US account for a market share of almost 50% (excluding private label). The European bakery industry is still highly fragmented; each country still has a large number of medium-sized and small players.

When observing the companies that are active in different phases of the grain chain, it becomes clear that most companies are either present in grain trading and milling (flour, starches) or fo-

cus on the manufacturing of grain-based consumer products like bread and bakery. The concept of full integration, i.e. being involved in all operations, is not widespread in the grain chain. As a result of the expanding retail and food industry and forced by narrow margins, a strong *consolidation* is taking place in virtually all sectors of the grain chain. In order to survive, sufficient volumes need to be acquired. This explains the domination of a few players in the grain chain. The grain mill industry has shown *worldwide expansion* in search of locations with either good sourcing of raw grains or good market prospects of their semi-processed products. The grain starch business has also expanded, primarily into Eastern Europe, Asia and Latin America. Another trend is *specialisation*, whereby grain-based companies are narrowing their range of products. Priorities are set regarding the processing activities and the choice of products to ensure a viable competitive position in the grain chain. In conclusion, consolidation, internationalisation and specialisation will continue, also resulting in a more concentrated grain-based industry in Europe (Braks et al., 2003).

The lists of important companies illustrate the diversification of several companies such as Danone and Kraft foods.

4.7.5 Competitive potential

Innovation and branding

Consumer habits have changed rapidly over the past decades and today food issues like convenience, indulgence, health, ethics, variety, value-for-money and safety are very important. This has resulted in a shift in the assortment of bread and bakery products. For example, sales of standard loaves of bread are in decline, while the sales of small items like sandwiches and wraps are on the increase. Sales of traditional biscuits are under pressure, while low-fat biscuits sweetened with dry fruit are gaining market share. Bakeries focus increasingly on value-added products such as pre-baked, frozen dough, wholesome, ethnic or specialties. Pre-baked and frozen dough are new products that require little handling before being ready-to-serve and can be used by in-store bakeries, food service chains and consumers. Many consumers today are worried about obesity. Bakeries that address this growing concern by presenting healthier products to the consumer enhance their profitability. However, this will not be the end for indulgent bakery items. Grain processors have to meet the requirements of the food industry; or go out of business. They have to adhere to quality standards and/or launch new special products. There is increasing scope for non-food applications. A fairly new development is the production of bio-ethanol and biodegradable plastic from grain starch (Braks et al., 2003).

Box 4.7.1 Instant Noodles

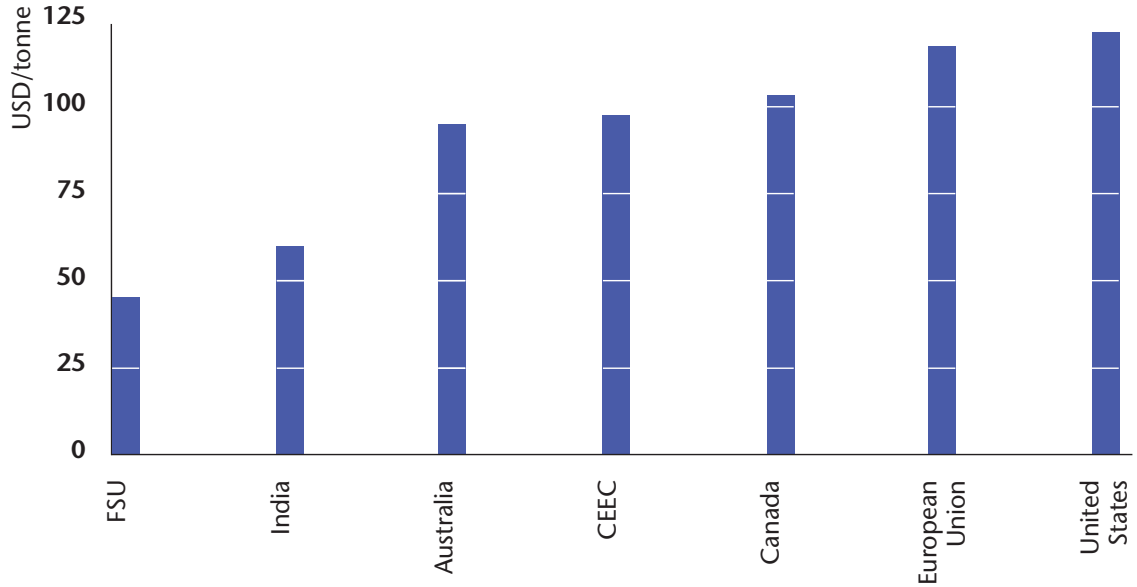
Invented by Nissin Foods in Japan in 1958, instant noodles have gained tremendous popularity worldwide for their convenience, long shelf life and improved taste over the years. It is estimated that about 55 billion packs of instant noodles were consumed in 2002.

A global bakery brand still does not exist, not even in biscuits. Nevertheless, branding remains a key issue for bakeries all over the world. A strong brand undeniably generates added value and strengthens the market position. The importance of brands has even increased with the consolidation in the food retail. Retailers try to counteract with private label products in order to strengthen their market position (Braks et al., 2003).

Costs of inputs

Recently, the EU-15, US, Canada and Australia have faced increased competition from new exporting countries such as the former Soviet republics (FSU), India and Central and Eastern European countries (CEEC). Based on lower production costs for wheat, these countries are increasing their production levels and shares in global exports. The FSU republics can produce wheat at less than half the cost of the EU, US, Canada and Australia (figure 4.7.10), because of lower input and labour costs (Braks et al., 2003).

Figure 4.7.10 Production costs for wheat in major exporting regions



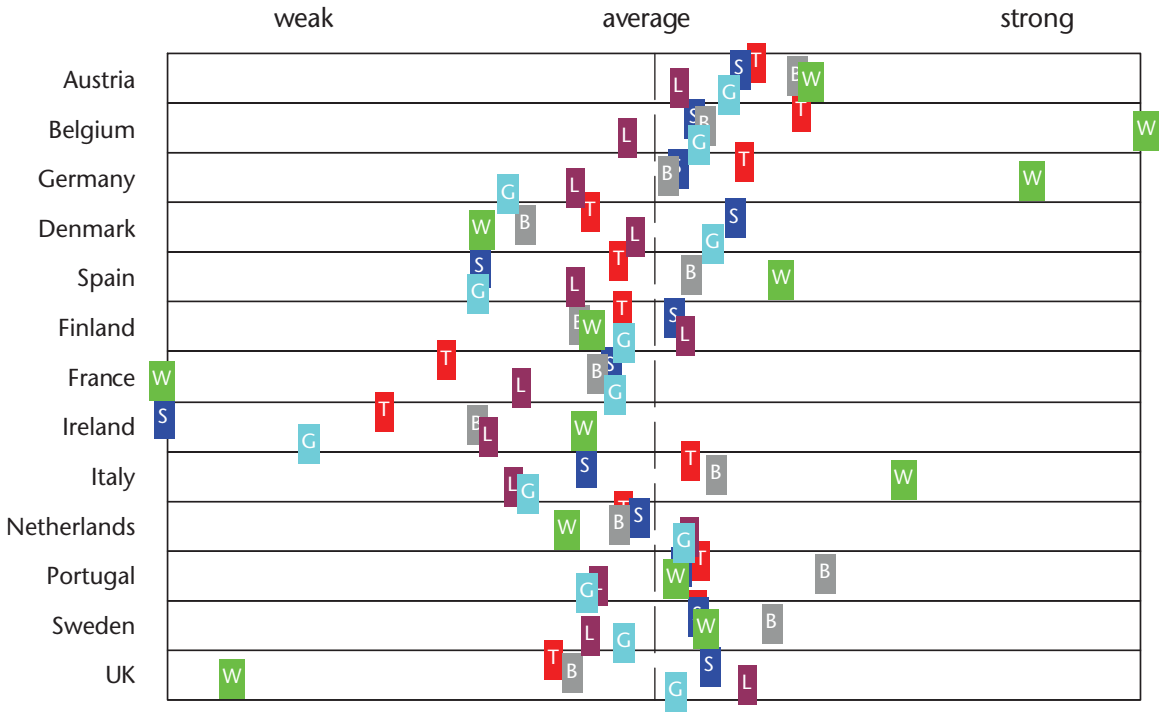
The competitiveness of EU countries

EU competitiveness is weak as compared to the US, but strong compared to Canada and Australia. In comparison with the US, the growth in Balassa index, real value added and labour productivity are much lower and in comparison with Canada and Australia the growth in turnover is higher compared to the total food industry. On the other hand, the EU performs very well on world market share growth and compared to Canada and Australia also on growth of the Balassa index and labour productivity.

Figure 4.7.11 gives an overview of the competitiveness of EU countries. Austria, Belgium and Germany are strong. France and Ireland are weak performers. The extra communitarian trade grew less than the intra communitarian. The Balassa index declined and the share on the world market (based on extra communitarian trade) also grew less than of the individual countries. A weak or strong performance of a country does not say much about individual companies. The weak EU performer, France, has several companies in the aforementioned global top companies. The divergence between companies and regions within the EU makes further interpretation very difficult.

Figure 4.7.11 Competitiveness of EU countries

T= total Grain-based; S= growth share food industry in total manufacturing;
B= growth Balassa;W= growth world share;
L= labour productivity; G=growth value added.



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Rabobank, 2005. Rabobank view on food and agribusiness 2005 - the dynamics of the global food and agri-industries. Rabobank International, Utrecht.

4.8 Beverage industry: small scale in wine, large in beer and spirits

Victor Immink

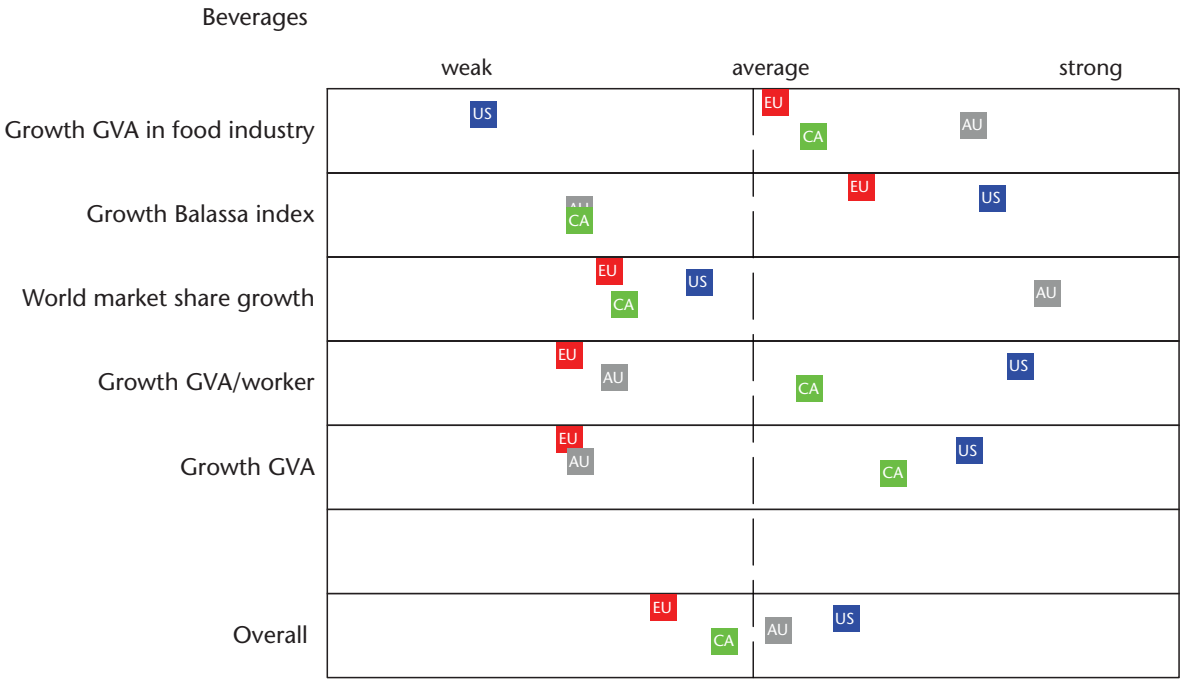
4.8.1 Key findings

The beverage industry produces a large range of products: wine, beer, spirits and soft drinks. The industry structure depends on the product, many small wine producers, some large breweries besides many small ones especially in Germany and large scale spirit producers. The overall competitiveness of the EU is slightly lower than the competitors.

The EU competitiveness is low due to the slower growth of labour productivity, real value added but higher growth of the value and development of the market share. The development of the share in the total food industry. Five European Brewers are in the top 10, in the spirits production numbers 1 and 10 and in wine the highest ranked of the four in the top 10 is number 6.

Within Europe, Austria, Belgium and Denmark are strong in competitiveness, whereas UK, France and Portugal are weak.

Figure 4.8.1 Competitiveness of EU



4.8.2 Introduction

The EU benchmark for competitive performance: world exporters

This section examines beverage industry from the viewpoint of alcoholic beverages (beer, wine and spirits) production, trade and consumption. This study excludes fruit juice, which will be reviewed in the fruit and vegetable section, but also excludes partly soft drinks and mineral water. Business information on soft drinks and mineral water is generally private and disclosed information and therefore not publicly available. This study reviews in particularly spirits or beverages (manufacture of distilled potable alcoholic beverages, e.g. whisky, breezers, rum and gin etc.), wine (e.g. wine from fresh grapes, sparkling wine) and beer (beer etc. made from malt). International trade statistics are blurred by the exports of tap water by pipelines between countries, for example. Only trade in alcoholic beverages are considered in this study. Bottled mineral waters and soft drinks are included in this business economic analysis but not discussed (section 4.8.4).

EU countries play a major role on the world beverage market as over 73% of the world exports originate from the EU countries (table 4.8.1). In the beverage industry, Europe is a global market leader. Relatively important non-EU exporters are: US, Australia and Canada. These three countries will be used to benchmark the EU beverage industry. Mexico is also an important exporter. Due to the lack of economic data, this country is not used as benchmark country. Most countries are exporters as well as importers. A more in depth analysis of the trade will be given in section 4.8.2.

Beverage production

Production of beverages is very heterogeneous in the range of products. Europe's beverage industry is the largest in the world for all segments spirits, beer and wine (table 4.8.2). Production of wine includes so-called New World wines from areas such as California in the US, Chile and Argentina in South America, South Africa, Australia and New Zealand. No country exceeds the EU in production. Beer is generally produced in the country in which it is consumed because of its large volume.

Table 4.8.1 Export/import shares (%) of beverages (soft drinks and mineral water excluded)

Region/Country	Export share			Import share		
	'96 - '98	'02 - '04	difference	'96 - '98	'02 - '04	difference
EU-25	79	75	-4.9	50	48	-2.5
EU-15	78	73	-4.9	49	46	-2.8
EU-15 < > non-EU	37	36	-0.4	8	11	3.0
France	27	24	-3.5	5	4	-0.7
United Kingdom	17	14	-2.6	13	13	-0.4
Italy	10	10	0.5	3	3	-0.0
Spain	5	5	-0.1	4	4	0.1
Germany	5	5	-0.3	10	8	-2.1
Netherlands	4	5	0.7	3	3	0.1
Mexico	3	5	2.3	0	1	0.2
Australia	2	4	2.4	1	1	0.1
US	4	4	-0.0	21	27	5.6
Ireland	2	2	0.0	1	1	0.5
Belgium/Luxembourg	2	2	0.1	4	4	-0.2
Portugal	2	2	-0.2	1	1	-0.0
Canada	2	2	-0.5	3	4	1.0
Japan	0	0	-0.2	7	4	-2.4

Source: ITC/WTO data.

Besides this recorded production, home production (which may be legal or illegal) is usually unrecorded production. This has to be mentioned because the unrecorded production represents a huge volume in virtually every country around the world. It includes both traditional home brews and the illegal production and trade of alcohol. According to the WHO (2004), on a regional basis, unrecorded alcohol production is estimated to be at least two-thirds of all alcohol consumption in the Indian subcontinent, about half of consumption in Africa and about one-third in Eastern Europe and Latin America.

Table 4.8.2 Production of beverage products (1.000 x Mt)

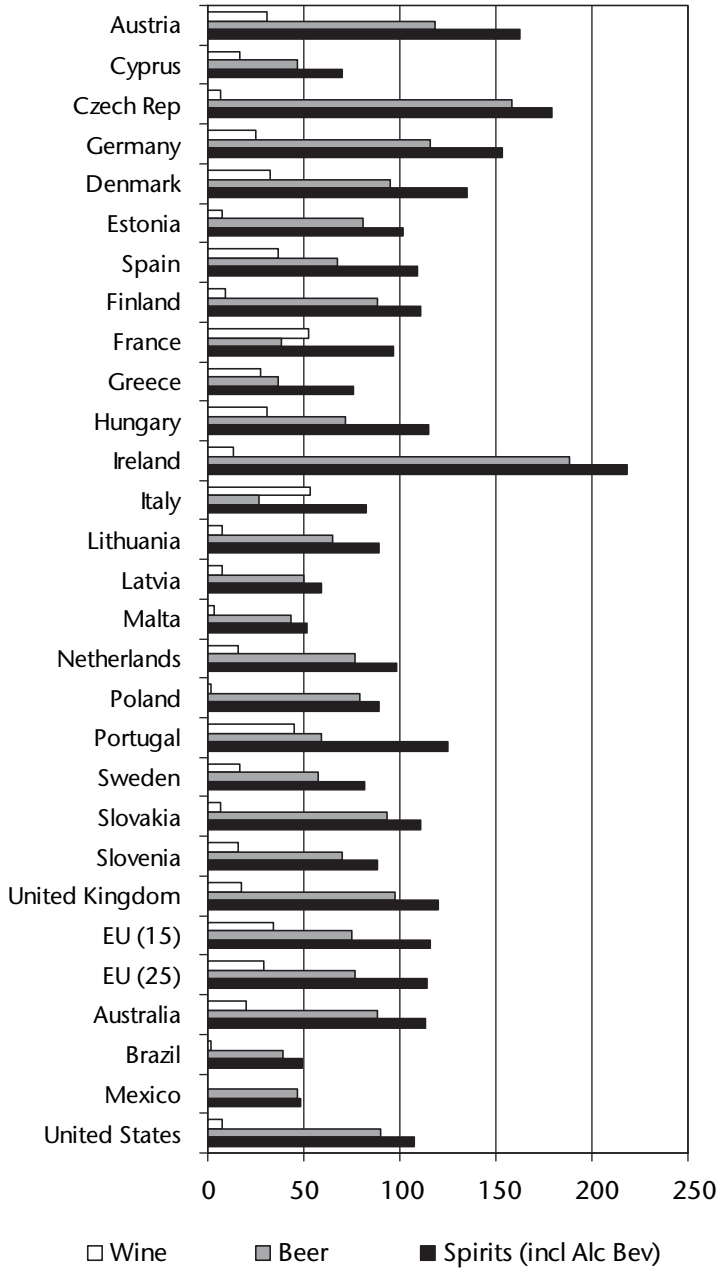
	EU (25)		US		Australia		Mexico	
	1995	2002	1995	2002	1995	2002	1995	2002
Wine	16026	16188	1866	2540	502	1220	146	101
Beer	35469	36860	23380	23511	1750	1754	4420	5925
Beverages, Alcoholic	56383	57560	28675	33097	2267	2989	4898	6314
Spirits	3532	3131	889	978	14	15	202	160
Total	111410	113741	54811	60127	4535	5979	9668	12500

Consumption per head

It is estimated that there are some 6 million legally licensed points of sales for beverage worldwide (ICAP 2006). On average the EU-25 beverage consumption is 219 litres per head in 2002 (figure 4.8.2). Consumption of beer in the US and Australia is higher compared with the EU-25, although the market for wine is much smaller in these benchmark countries. In Mexico, beverage consumption mainly consists of spirits and beer.

Competition: Balassa index and share value added.

Figure 4.8.2 Consumption of beverages per head (litre 2002 per head)



Source: FAOSTAT/FAO; World Development Indicators/World Bank (2002).

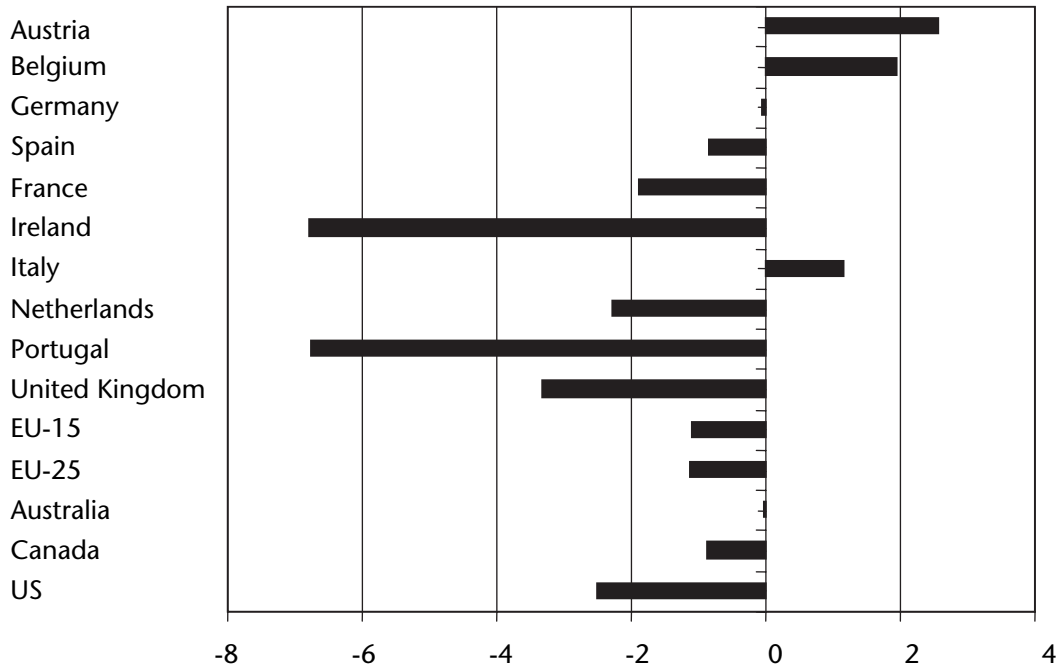
The Balassa index for alcohol beverages is relatively high for the extra communitarian EU trade compared to the US and Canada. The export growth (and growth of the index) of Australia (wine) resulted in an even higher Balassa index in the last period. Within Europe, the wine producing countries have high Balassa indices. Beer and spirits contribute to a high index in the UK.

The performance on the domestic market is compared to the food industry as a whole. So if the share of the real value added of the beverage industry in the total food industry grows, the beverage industry performs better than the whole. Figure 4.8.2 shows that the EU-15 countries have a negative growth: however, the growth decline in the US is even higher. So the competitiveness of the European beverage industry is stronger than in the US. There is also growth in Italy as well as Belgium and Austria.

Table 4.8.3 Revealed comparative advantage

Region/Country	1996 - 1998	2002 - 2004	annual growth%
EU-25	1.8	1.8	0.1
EU-15	1.8	1.9	0.5
EU-15 < > non-EU	2.2	2.3	0.8
France	4.6	4.7	0.6
United Kingdom	3.1	3.3	1.0
Italy	1.9	2.4	3.9
Spain	2.5	2.5	-0.1
Germany	0.5	0.5	-0.4
Netherlands	1.2	1.6	4.7
Mexico	1.2	2.0	9.8
Australia	1.7	4.1	15.6
US	0.3	0.4	3.4
Ireland	2.2	1.9	-2.6
Belgium/Luxembourg	0.5	0.5	-0.3
Portugal	4.3	4.3	-0.0
Canada	0.5	0.4	-3.0
Japan	0.0	0.0	-10.5

Figure 4.8.3 Annual growth of the share real gross value added of beverage industry in food industry



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.8.2 Global trade performance

Self-sufficiency

The share of international trade is quite small compared to the domestic production, as is shown by the level of self-sufficiency (figure 4.8.4). For beer, the self-sufficiency degree is approximately 100 for the EU-25 as well as the EU-15. The Netherlands is an exception with a self-sufficiency level of 200% and Italy below 80% (figure 4.8.4b). The entire EU has about a 109% self-sufficiency for spirits, Australia has112%, whereas the other benchmark countries the US and Mexico are at respectively 91% and 117%. The self-sufficiency of the EU-25 for wine is around the 100%. The self-sufficiency level of Spain, Portugal and Italy is above 100%, France is just above 100% and most other EU countries are zero. The degree of self-sufficiency of Australia has a (sharply increased) self-sufficiency level of 192%, and the US and Mexico are below the 100% level (figure 4.8.3b).

Figure 4.8.4a Self-sufficiency degree for wine

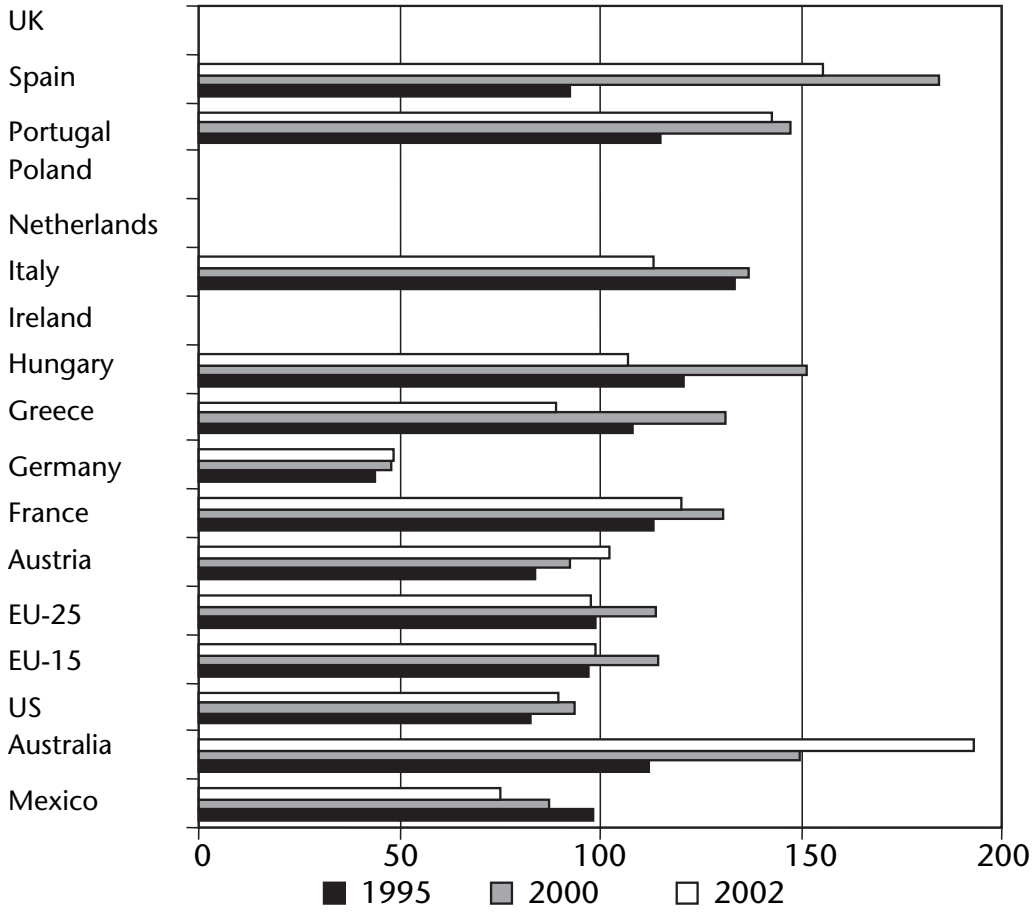
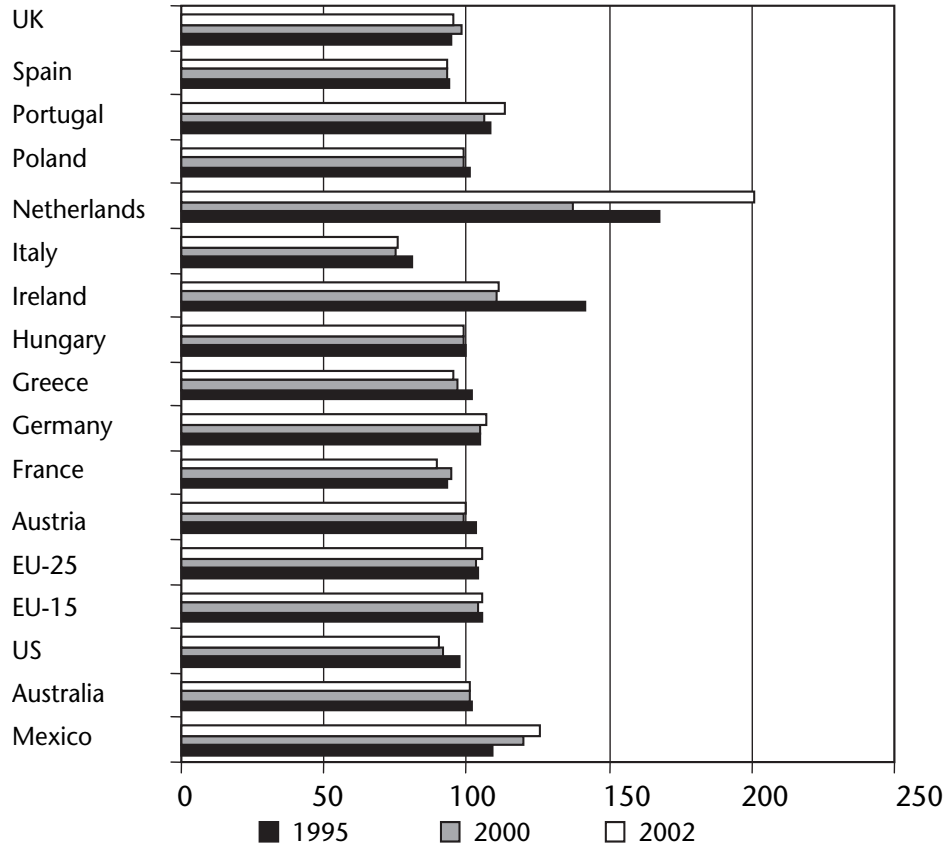


Figure 4.8.4b Self-sufficiency degree for beer



Trade patterns

The EU-15, particularly France, is the largest **net** exporter of beverage, followed by Italy (figure 4.8.5). The largest **net** importer is the US. The largest exporters are the wine-producing countries. The extra communitarian or the EU is the largest on the world.

The export growth rate of the EU-15 (intra trade excluded) is comparable with the US, higher than Canada and lower than the Australia (figure 4.8.6). Within the EU, Austria, the Netherlands, Belgium Italy have the highest growth rates. The two largest producers the UK and France have a lower growth than the EU-15.

The EU extra communitarian export prices are higher than the intra communitarian prices. Both prices are higher than those in the benchmark countries. Within Europe there are great differences between the countries: high export prices for Belgium, Ireland, Portugal and Spain, low for German, Italy and the Netherlands.

Figure 4.8.5 Import and export of beverage (soft drink and mineral water excluded)

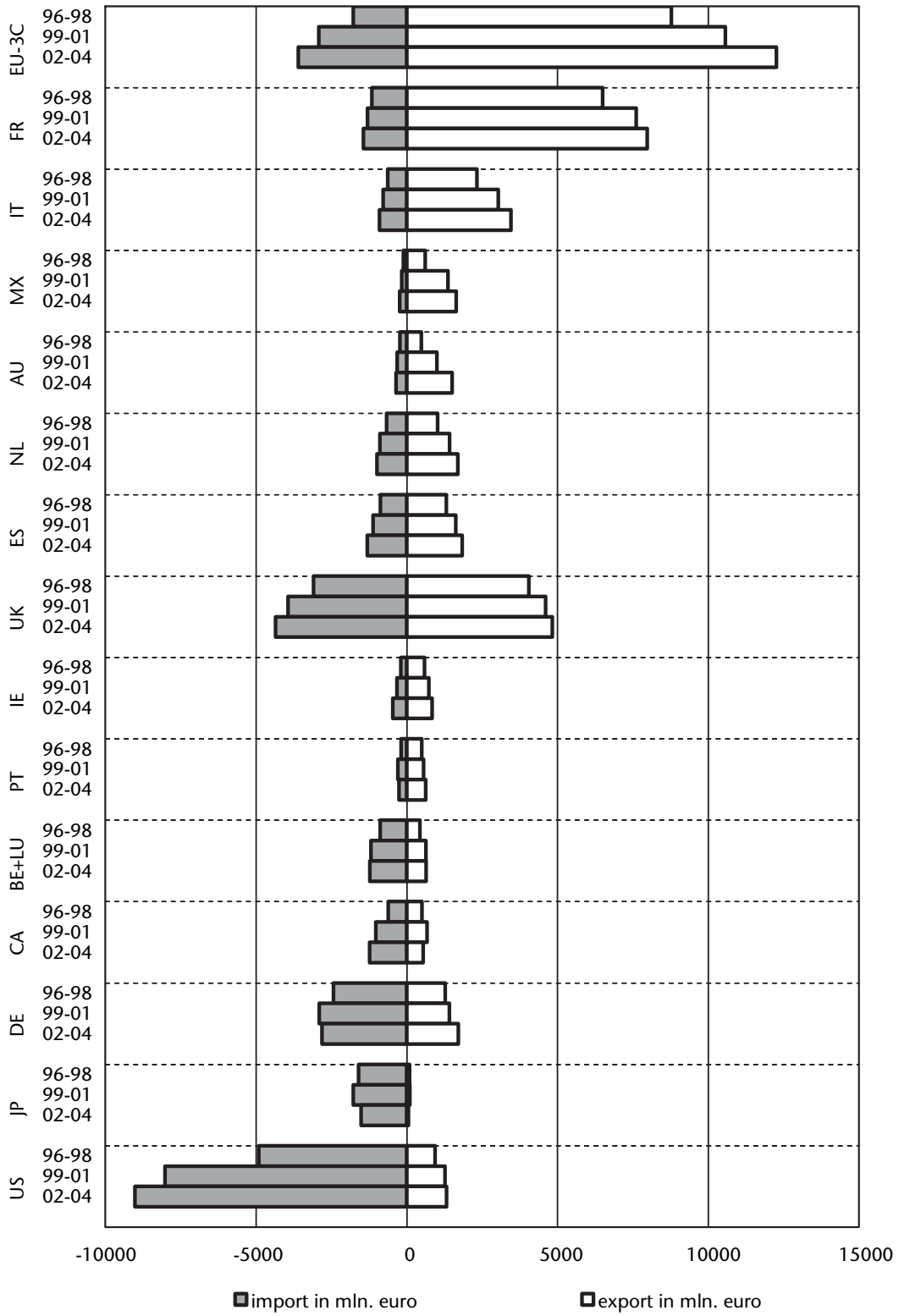


Figure 4.8.6 Growth of import and export of beverages beverage (soft drink and mineral water excluded)

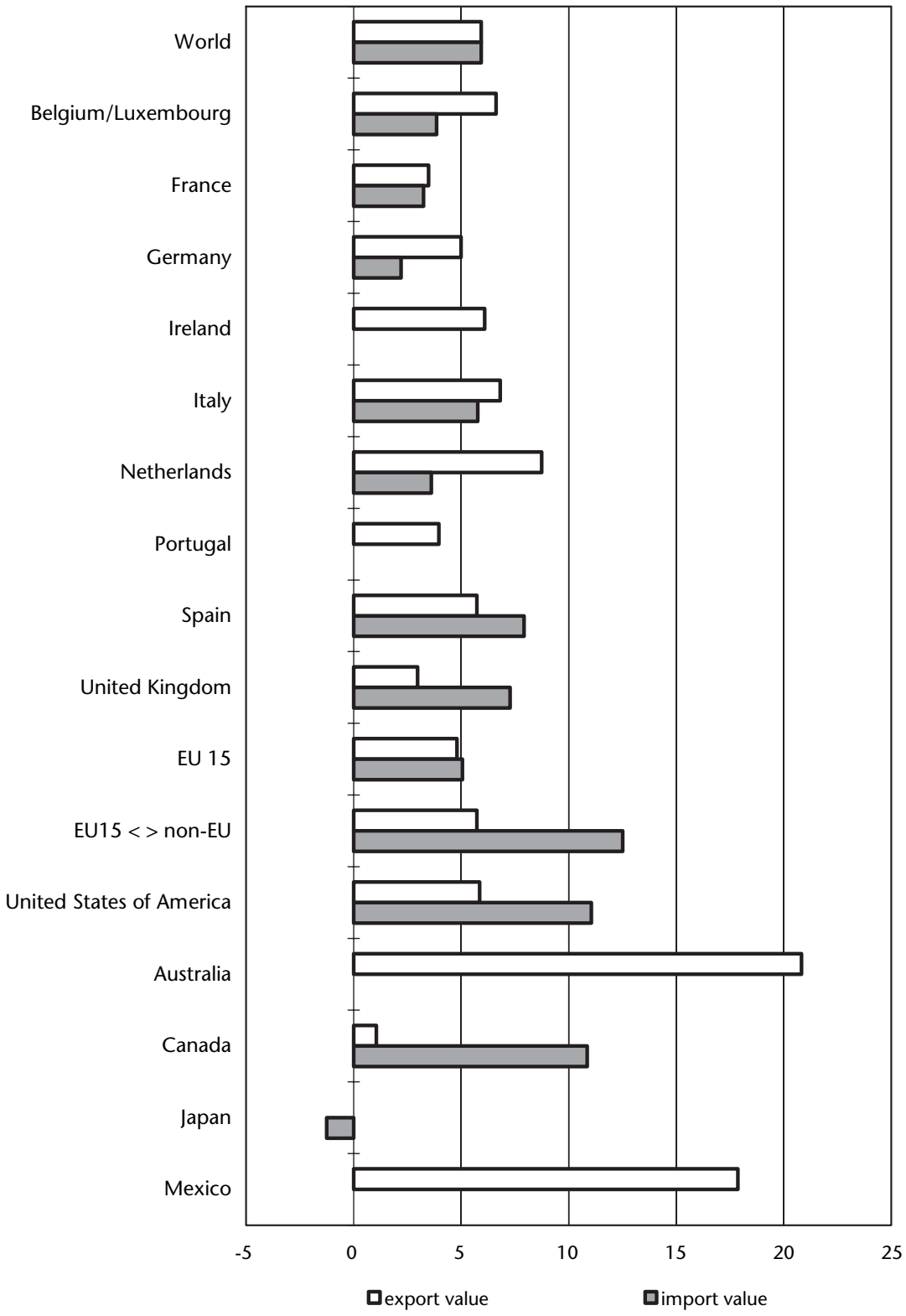
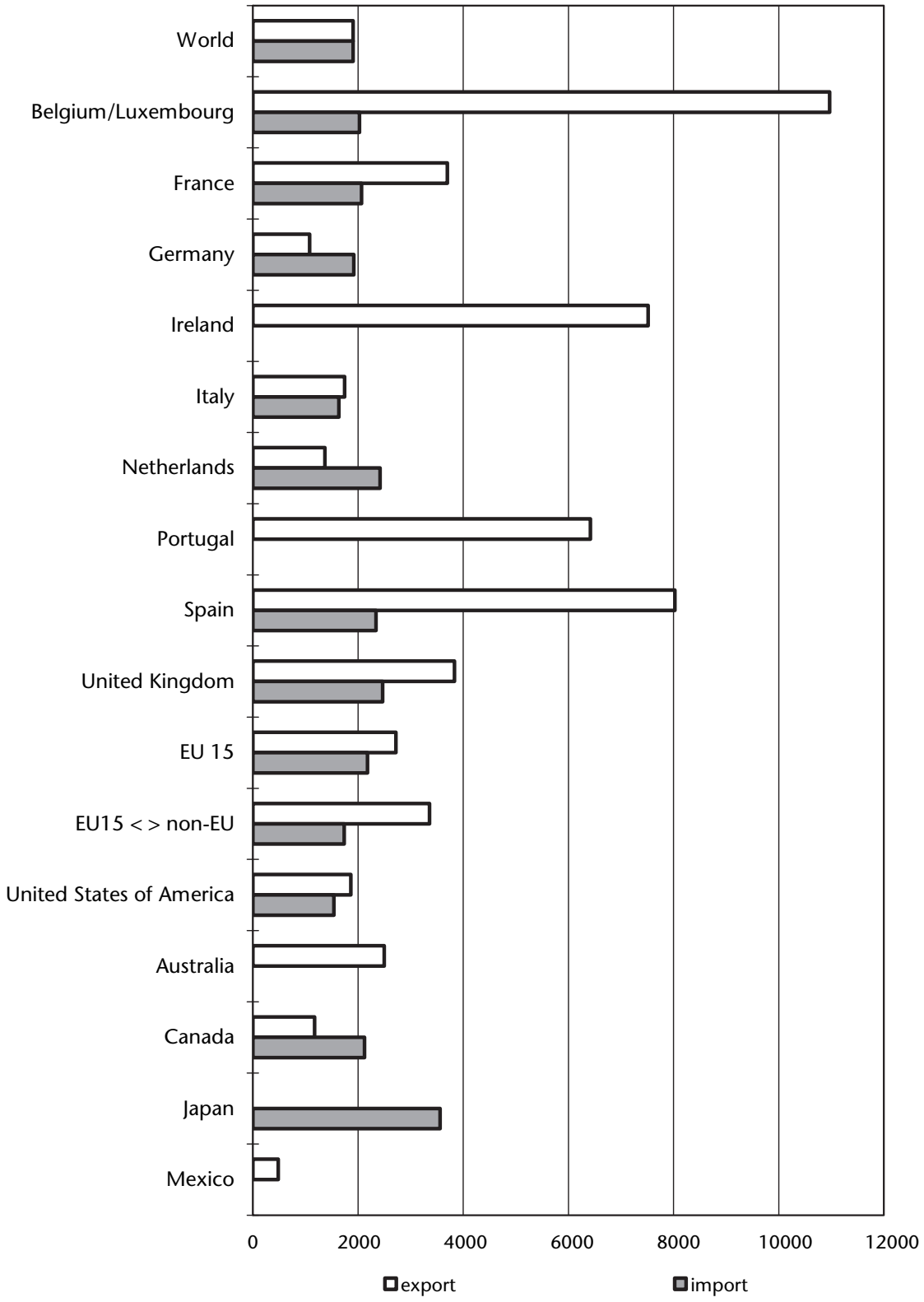


Figure 4.8.7 Import and export prices €per ton of beverage (soft drink and mineral water excluded)



4.8.3. Business performance and competitive process

Characteristics of the beverage industry

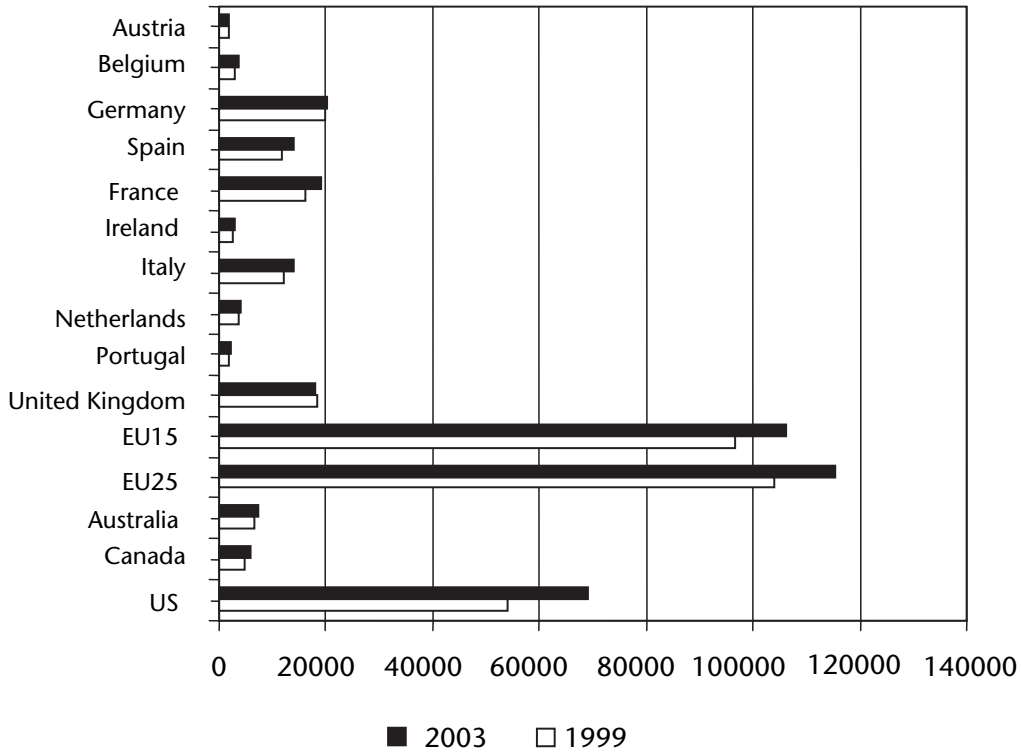
The EU beverage industry had a production value of more than 115 billion Euros in 2003 (Table 4.8.4). The production value of the US is two thirds of that of the EU15 and Australia and Canada 7 at 5%. Mexico is omitted in this benchmark, due to the lack of data. The EU production value has seen a slight increase since 1999. The purchases of goods take a share of 70% in the turnover in the EU-25, whereas for the US this is 50%. The personnel costs take over 44% of the value added in Europe; for the US personnel costs take over just 17%.

Table 4.8.4 Key characteristics of the beverage industry in million €and numbers

	EU-15		EU-25		US		Australia		Canada	
	1999	2003	1999	2003	1997	2002	2001	2003	1997	2002
Number of enterprises	13205	15330	16056	20086	2622	2903	N.A.	N.A.	230	520
Production value	96474	106074	104169	115290	53893	68919	6683	7188	4665	5860
Value added at factor cost	27539	29079	30981	33194	26323	34284	2291	2406	2748	3435
Purchases	67985	75278	72833	81250	28165	34849	3226	3654	2364	2560
Personnel costs	12650	13723	13482	14660	4548	5793	762	783	703	741
Number of employees	337255	329949	445329	424818	142117	136074	27000	26500	24757	25474

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.8.8 Distribution turnover in 1999 and 2003 (€million)



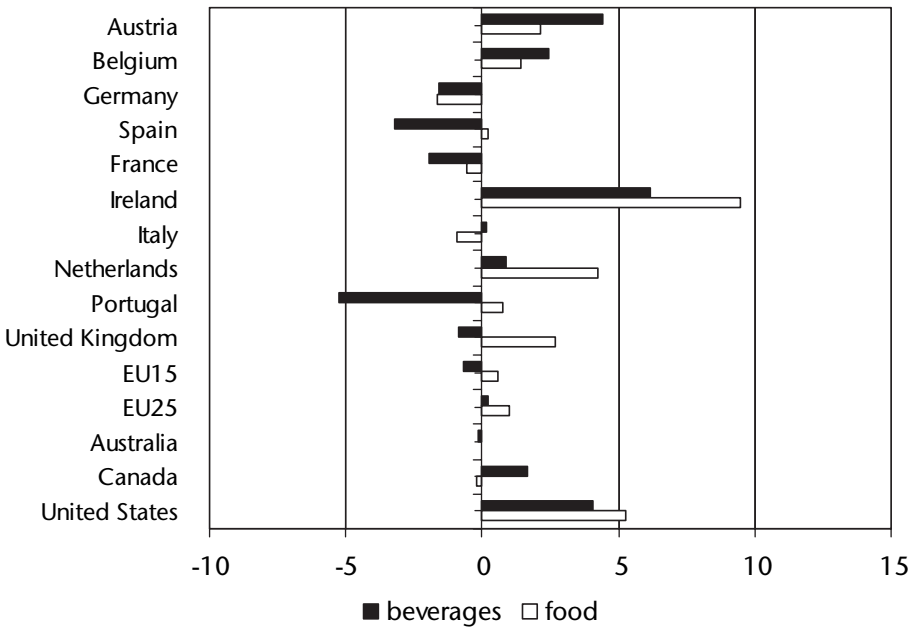
Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.8.8 shows the turnover of the major individual EU and benchmark countries in the period 1990-2003. Germany, France, Italy, Spain and the UK are the major producers. These are the countries with a large population. The level of turnover in Australia and Canada is below the level of these countries, but above the medium-sized EU countries.

Value added and labour productivity

Figure 4.8.9 shows that Europe has a weaker growth of the value added than the US and Canada. Within Europe the differences between countries are large: high in Austria, Belgium and Ireland, negative in Portugal, France and Germany.

Figure 4.8.9 Growth real valued added 1999-2003



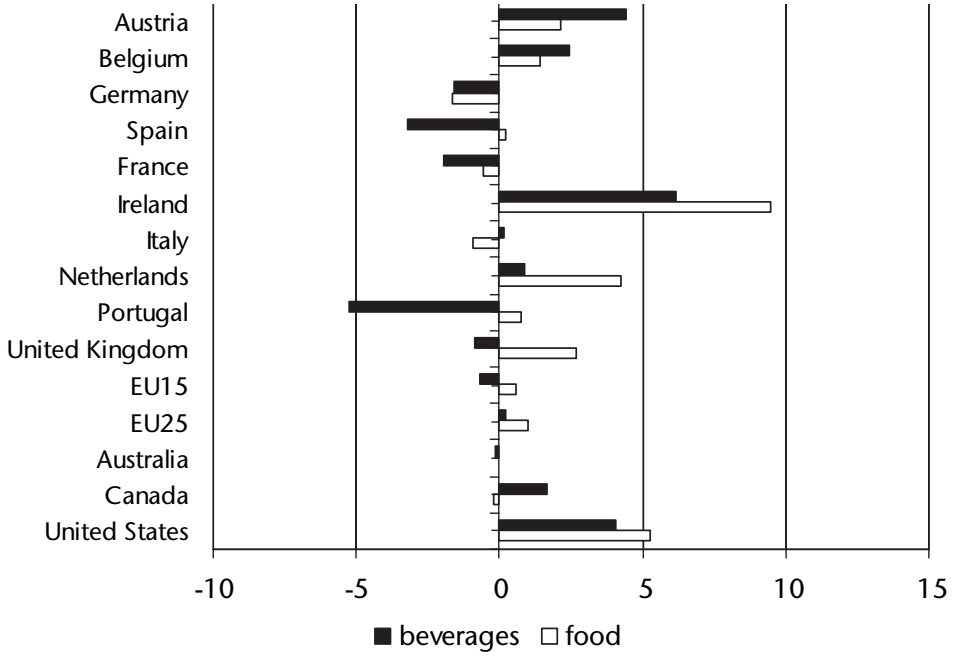
Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Growth of labour productivity is much higher in the US and Canada compared to the EU-15 (figure 4.8.10). The growth of labour productivity in Australia is just negative. The differences within the European countries are large and show much resemblance with the growth of the value added.

Market orientation and internationalisation

Starting in the 1960s, there has been a strong trend towards consolidation of the alcohol beverage industry. The most recent merger wave, which started in 1998, has been part of a trend in which companies restricted their businesses to a limited number of global brands, applying similar marketing strategies. This wave involves not only spirits companies but also brewers and wine producers, which had remained essentially domestic. Several major mergers and acquisitions have taken place: the merger of the UK companies Guinness and Grand Metropolitan in 1997; the acquisition of Seagram spirits and wine business by Diageo and Pernod Ricard in 2001; the merger of South African Breweries and the US firm Miller in 2002; and the merger of Ambev from Brazil and Interbrew from Belgium in 2003. More recent developments include consolidations in each of the three major sectors: in the wine sector, Foster's Group takeover of fellow Australian Southcorp; in the spirits sector, the acquisition of Allied Domecq by Pernod Ricard; in the beer sector, SABMiller's acquisition of Latin America's number two brewer Bavaria (ICAP 2006).

Figure 4.8.10 Growth of the labour productivity 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Beer

European companies from Belgium, the United Kingdom, the Netherlands and Denmark dominate the world beer market, as is shown in Table 4.8.5. Although the largest global brewers have significant international production, their brands have a local orientation. The international brand companies license local producers to use their 'recipe' and market under their brand name. Exports are important only for a few countries with prominent brands (e.g., Heineken, Carlsberg, Stella Artois or Guinness), which are produced by some of the world's largest brewing companies (ICAP 2006). The country of origin lists the country of their headquarters, although most companies have production facilities at several locations worldwide, e.g. SABMiller operates on five continents.

Table 4.8.5 Top ten brewers: global share in percentages of branded beer market, 2005.

Company	Country of origin	Market share
InBev	Belgium	12.6
SABMiller	UK	11.9
Anheuser-Busch	US	9.1
Heineken	the Netherlands	7.7
Carlsberg	Denmark	4.5
ScottishandNewcastle	UK	3.5
Molson Coors	Canada	3.2
Modelo	Mexico	3.1
Tsingtao Group	China	2.7
Kirin	Japan	2.3

Source: Euromonitor (2006).

InBev based in Belgium produces in the US, Europe and Asia, and is ranked no. 1 or no. 2 in over 20 key beer markets around the world (www.inbev.be). InBev's strategy strengthens its positions

in the world's major beer markets through organic growth, efficiency measures, acquisitions, and branding. InBev has a portfolio of more than 200 brands, including Stella Artois, Brahma, Beck's and Leffe. It employs some 77,000 people and runs operations in 32 countries across the Americas, Europe and Asia Pacific. In 2004, InBev realised a revenue of more than €8.57 billion. SABMiller has brewing interests or major distribution agreements in over 60 countries spread across five continents. Brands are: Peroni Nastro and Azzurro (Italy), Miller Genuine Draft and Castle Lager. Heineken's principal international brands are Heineken and Amstel, but the group brews and sells more than 170 international premium, regional, local and specialty beers, including Cruzcampo (Spain), Tiger (US), Zywiec (Polen), Birra Moretti (Italy), Ochota (Russia), Murphy's (Ireland). Their strategy to establish further growth is through organic profit growth, but also by focusing on building the long-term future of their brands.

Spirits

Of the ten spirits brands in the world with regard to volume, only two major spirits brands feature in the world: Bacardi and Smirnoff vodka. The other brands mainly have a local orientation (ICAP 2006). Thus, despite the mergers of the past decades, the spirit's market is highly fragmented and generally a local business. The top global companies and their market shares are depicted in Table 4.8.6. 60% of the volume of premium Western-style spirits[48] produced is accounted for by the global spirits producers. However, this is only approximately 20% of the total global spirits market. For example, as highlighted in Table 4.8.6, by volume Diageo produces 14.7% of the global Western-style spirits, but only 4.4% of total spirits volume (ICAP 2006).

Table 4.8.6 Top ten companies: global share in percentages of spirit market, 2005

Company	Country of origin	Market share	
		Western style spirits	Total branded spirits
Diageo	UK	14.5	4.5
Pernod Ricard	France	12.8	3.9
The UB Group	India	8.5	2.5
Beam Global Spirits and Wine	US	5.9	1.9
Bacardi	US	5.8	1.8
Suntory	Japan	2.6	1.0
Constellation Brands	US	2.5	1.0
VandS Vin and Spirit	Sweden	2.4	1.0
Brown Forman	US	2.4	1.0
Gruppo Campari	Italy	2.2	1.0

Source: Euromonitor 2006, IWSR (2004).

Companies from the United Kingdom and to a lesser extent France dominate the world spirits market, as is shown in Table 4.8.6. Although the headquarters are located in these countries, these global companies usually have production facilities in countries all over the world. Diageo is the world's leading 'premium drinks' company with a collection of alcohol beverage brands across spirits but also in wine and beer categories. Their marketing strategies branding is an important vehicle. Among their brands are: Smirnoff, Johnnie Walker, Guinness, Baileys, JandB, Captain Morgan, Cuervo, Tanqueray, Crown Royal and Beaulieu Vineyard and Sterling Vineyards wines. They employ over 20,000 people worldwide and have offices in around 80 countries and manufacturing facilities across the globe including the UK, Ireland, United States, Canada, Spain, Italy, Africa, Latin America, Australia, India and the Caribbean. Pernod-Ricard was founded in 1975 by the merger of the two French com-

[48] The term 'western-style spirits' refers to products made in accordance with internationally accepted industrial standards (e.g., EU, WTO etc), which specify raw materials, aging, level of alcohol by volume (abv), etc. Much of the whisky produced in India, for example, does not qualify as 'whisky' under the EU industry standards (ICAP 2006).

panies. There, net sales accounted for 3,674 million in 2005. Pernod Ricard has developed through organic growth and acquisitions (the purchase of Allied Domecq, in July 2005). Its international development is driven by a portfolio of brands: Jameson, Ricard, Malibu. Pernod-Ricard employs a workforce of 12,304 in 75 subsidiaries.

Wine

The global wine market remains highly fragmented with numerous small and medium-sized producers in every wine-producing market. In 2005, IWSR listed 1,360 companies, which account for 27% of the world wine market. The remainder is produced by smaller 'undefined' companies. As with beer and spirits, the top 10 wine makers produce only 11% of the global volume (ICAP 2006). The fragmented market ensures that no single company really dominates the market as can be seen from table 4.8.7.

Table 4.8.7 Top ten companies: global share in percentages of wine market, 2005

Company	Country of origin	Market share
Constellation Brands	US	2.4
E and J Gallo	US	2.0
Fosters Group	Australia	1.3
The Wine Group	US	1.2
Pernod Ricard	France	1.0
Castel Freres	France	0.9
Bacardi-Martini	US	0.7
Concha y Toro	Chili	0.6
UCCOAR	France	0.5
Henkell and Soehnlein	Germany	0.4

Source: Euromonitor 2006, IWSR (2004).

Constellation Brands, Inc. is a producer and marketer of approx. 200 beverage brands. Constellation embarked on its multi-category strategy and produces not only wine, but also spirits and beers. Constellation Brands has two operating divisions - Constellation Wines and Constellation Beers and Spirits. EandJ Gallo has four wineries located in various parts of California and access to grapes from other vineyards. The Foster's Group is a premium global multi-beverage company producing a portfolio of beer, wine, spirits, cider and non-alcohol beverages.

Size classes

Table 4.8.8 shows the number of companies. In particular, Spain, France, Italy and Germany have a large number of small enterprises. In Germany local breweries are important and in the other 3 countries the vineyards. The importance of the small enterprises is only limited from an economic point of view in the 4 mentioned countries (figure 4.8.10). Due to the confidential nature of data in several countries, the turnover of the larger enterprises is not published, which restricts the presentation in the figure.

Table 4.8.8 Number of enterprises in the beverage industry (EU-15)

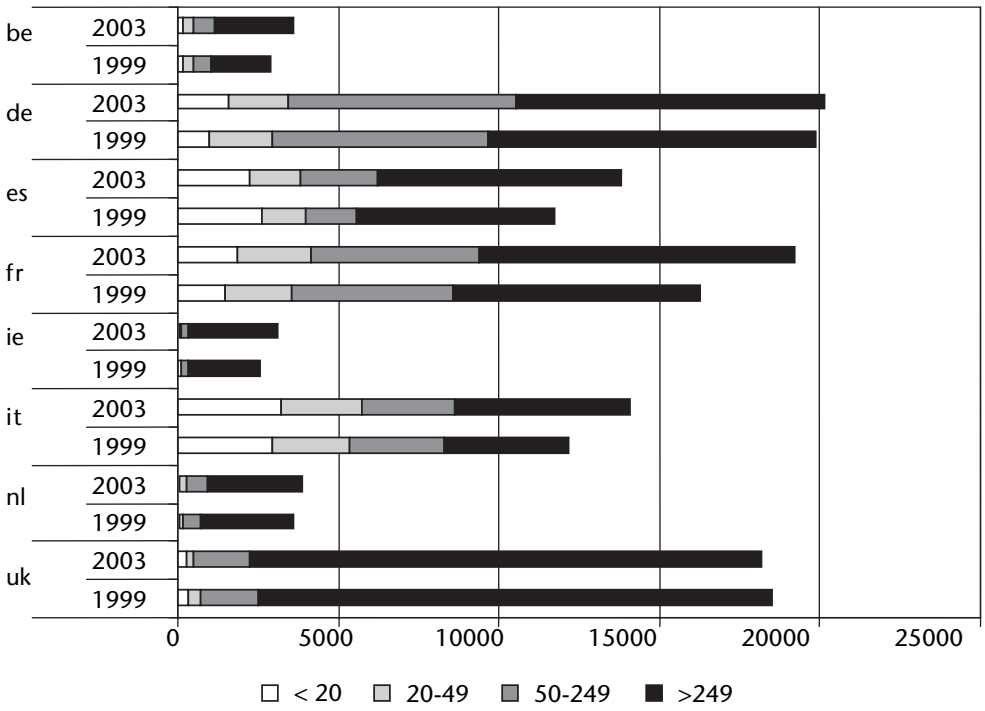
		< 20	20-49	50-249	>249
Belgium	1999	167	27	17	7
	2003	153	21	17	6
Denmark	1999	16	9	3	6
	2003	20	11	3	4
Germany	1999	1250	302	259	60
	2003	1534	265	247	57
Greece	1999	44	22	29	4
	2003	44	21	27	4
Spain	1999	2061	222	84	30
	2003	4208	264	105	29
France	1999	3247	196	104	26
	2003	3209	218	109	26

Table 4.8.8 Number of enterprises in the beverage industry (EU-15) (continued)

		< 20	20-49	50-249	>249
Ireland	1999	17	3	6	9
	2003	13	6	6	8
Italy	1999	2889	214	74	15
	2003	2542	205	76	18
Luxembourg	1999	13	5	5	0
	2003	13	5	5	0
Netherlands	1999	70	10	10	10
	2003	80	10	20	5
Austria	1999	182	36	26	4
	2003	235	37	27	3
Portugal	1999	288	89	43	8
	2003	347	85	47	10
Finland	1999	79	4	1	4
	2003	83	5	1	4
Sweden	1999	69	5	5	6
	2003	77	4	4	5
United Kingdom	1999	656	49	61	48
	2003	576	61	64	41

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.8.11 Turnover to size class or value added



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.8.4 Competitive potential

Commodity versus branding

With consumption fairly static, companies attempt to increase their business through enhancing their brand, enabling them to gain market share at the expense of the competition by trying to give their brands greater appeal than other branded competitors. In emerging markets, where the situation is less static, companies still mainly compete with each other for market share (ICAP 2006). A distinction can be made between branded and 'commodity' alcoholic beverages. Branded alcohol accounts for 37.5% of volume sales; 'commodity' alcohol accounts for 62.5% volume sales. The reason is that the vast majority of beverages consumed worldwide are not advertised. This is especially true in low and middle-income countries, where many beverages are home-brewed, produced illegally or are 'commodity' products (ICAP 2006).

Key success factors

Key success factors are identified to cope with the changing market circumstances and the strong competition in the branch (Rabobank, 2004). These factors are:

– leading brands

  As could be noticed in the paragraphs above, the major companies market their products through strong brands. These brands result in value added above average. A clear brand strategy should clarify the emotional and instrumental values, the architecture as well as the communication to support the brand;

– depth of the product range

  Most companies supply a range of products - different beverages - to be more attractive to customers. Companies with a narrow range are more vulnerable to changes in demand as well as distribution. Brands can create distribution power.

– new products;

In particular, young consumers jump from hype to hype. Trendy products are important to attract the attention of young consumers;

– distribution power

Distribution is crucial to all beverage companies. Strong brands can pull the products into the distribution channel;

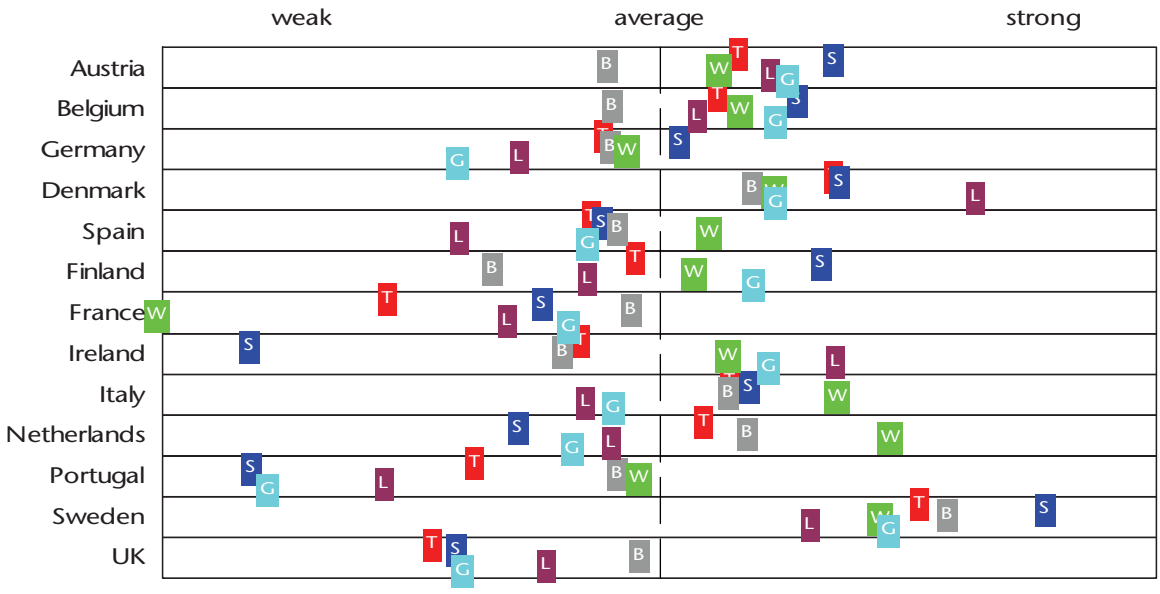
– financial power

Adopting the strategy of strong brands demands huge investment and on-going support for the brand.

Within Europe, Austria, Belgium and Denmark are strong in competitiveness, whereas France, Portugal and UK are weak.

Figure 4.8.12 Competitiveness of EU countries

T= total beverages; S= growth share food industry in total manufacturing;
B= growth Balassa;W= growth world share;
L= labour productivity; G=growth value added.



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4.9 Sugar: weak competitiveness due to CAP

Robert Stokkers

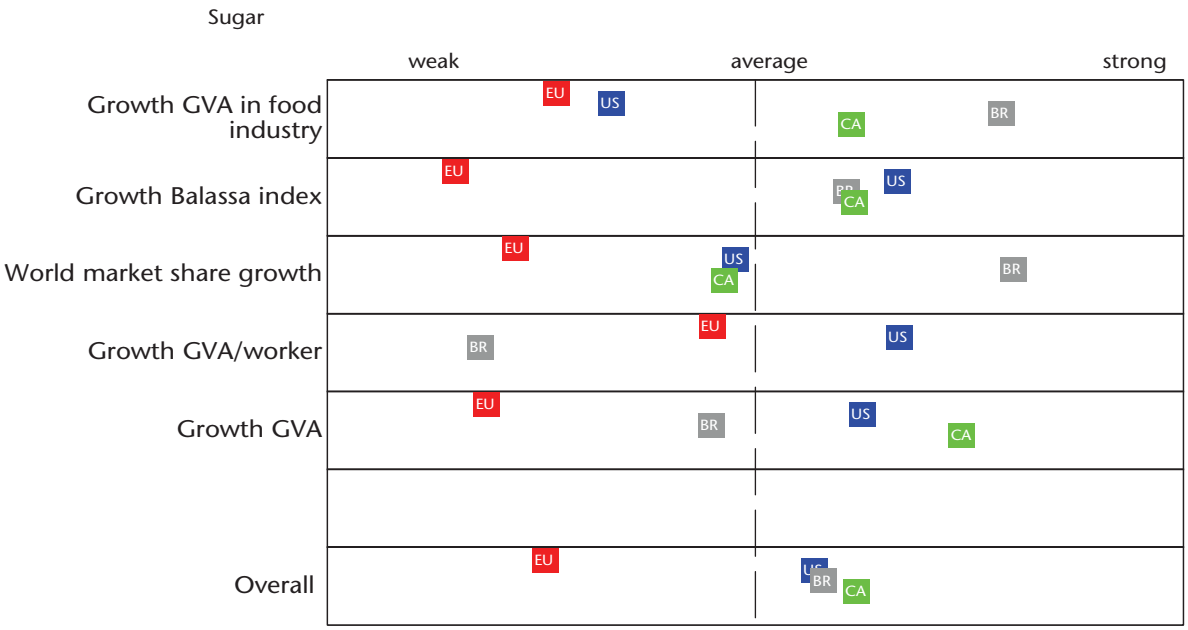
4.9.1 Key findings

The worldwide production of sugar amounted to 148.4 million tons in 2003, whereas the worldwide trade only accounted for 35.7 million tons. This means that around 75% of the global production is consumed locally. The EU-15 countries play an important role on the world sugar market with an export share of 34%. However, two thirds of these exports are destined for other EU countries. Over the last decade Brazil has become the world's leading sugar exporter by far with an export share of 22%. Another important non-EU exporter is Thailand with a share of 9%. The sugar export of the US is of minor importance with a share of only 4%.

The EU sugar industry had a production value of almost 12 billion Euros in 2003. This is 70% above the US and 125% above Brazil's production in 2002 or 2003. However, the production value in the EU declined over a period of five years, whereas the production value in the US and Brazil increased. Nevertheless, the sugar industry in Brazil is more important than in the EU and the US, expressed as share of turnover, value added and employment in the total food industry.

The EU competitiveness is weak compared to the US and Brazil (figure 4.9.1). Compared with the US, the growth in Balassa index and real value added are much lower and in comparison with Brazil the growth in turnover compared to the total food industry, Balassa index, world market share and real value added are much lower. On the other hand, the EU performs reasonably well on labour productivity. The largest producers, France and Germany, reflect the weak competitiveness of the EU-15. Spain and Belgium are strong.

Figure 4.9.1 Competitiveness of the EU



4.9.2 Introduction

The EU benchmark for competitive performance: world exporters

The worldwide production of sugar amounted to 148.4 million tons in 2003. Major producing countries are Brazil (17.5%), India (14.6%), China (7.7%) and Thailand (5.2%). Around 75% of the global production is consumed locally (Rabobank, 2005).

EU countries play an important role on the world sugar market with an export share of 38% (table 4.9.1). Two thirds of these exports are destined for other EU countries. However, over the last decade Brazil has become the world's leading sugar exporter by far with an export share of 21%. Most of this sugar is destined for the Russian Federation. Other important non-EU exporters are Thailand (9%) and the United States (3%). These three countries will be used to benchmark the EU sugar industry. A more in depth analysis of the trade will be given in section 4.9.3.

Table 4.9.1 Major exporting countries of sugar

Region/Country	Export share			Import share		
	'96 - '98	'02 - '04	difference	'96 - '98	'02 - '04	difference
EU-25	37	36	-1.0	31	40	8.3
EU-15	36	34	-1.9	30	38	7.8
EU-15 < > non-EU	17	13	-4.0	10	12	2.3
Brazil	15	21	5.6	0	0	0.0
France	14	12	-2.1	3	4	0.8
Thailand	8	9	0.3	0	0	0.1
Germany	6	6	-0.7	3	5	1.8
Belgium/Luxembourg	4	4	0.1	5	5	0.6
Netherlands	3	4	0.9	1	2	0.4
US	3	3	0.5	9	7	-2.3
United Kingdom	3	3	-0.2	8	8	-0.3
Italy	1	2	0.2	3	5	2.3
Poland	1	1	0.1	0	0	0.1
Austria	1	1	-0.1	1	1	0.6
Spain	1	0	-0.7	3	3	0.6
Russian Federation	0	0	-0.0	10	7	-2.5
Japan	0	0	0.0	5	3	-1.4

Source: ITC/WTO data.

Sugar processing

Sugar is an unusual commodity in that it can be produced from two entirely different crops: sugar cane and sugar beet. Sugar cane is grown in the tropics and sub-tropics and sugar beet mainly in temperate zones. The share of sugar cane in global sugar production rose to 73% in 2004/2005 (Rabobank, 2005).

Sugar cane and sugar beet must be processed immediately after harvesting. Therefore the production of sugar cane and sugar beet is identical to the domestic supply. There are two processing stages in cane sugar production. Cane is milled to produce raw sugar that needs further processing before it is fit for human consumption. This takes place in a refinery, where raw sugar is purified into refined sugar, a high quality white sugar suitable for direct consumption. Refining can either take place at the mill itself or raw sugar may be shipped in bulk elsewhere for refining in a stand-alone refinery. By contrast, beet processing factories produce refined sugar directly from beet, with no raw sugar stage (Rabobank, 2005).

Table 4.9.2 shows that the US produces a high volume of sugar and sweeteners compared to the production of refined sugar. The production of sugar and sweeteners in Brazil and Thailand is modestly above the level of refined sugar production; whereas the EU has an intermediate position.

Sugar is identical to sucrose and can be split into equal parts of glucose and fructose. Glucose and fructose can also be produced from corn and wheat starch and inuline syrup from chicory. Glucose is not as sweet as fructose and in several ratios they form a basic material for many important sugar substitutes. Another natural sweetener of only limited importance is lactose, a sugar derived from milk and consisting of glucose and galactose. Besides natural sweeteners, there is a large group of artificial sweeteners like sorbitol, xylitol, aspartaam and saccharine, which will not be considered in this chapter (Berkhout and Van Berkum, 2005).

Table 4.9.2 Production of sugar (in million kg)

	EU-25		US		Brazil		Thailand	
Product	1995	2002	1995	2002	1995	2002	1995	2002
Sugar raw equivalent	18.992	22.107	6.686	7.602	13.594	23.810	5.202	5.947
Sugar refined equivalent	17.472	20.338	6.151	6.994	12.506	21.905	4.786	5.471
Sugar and sweeteners	25.967	31.087	28.018	31.823	13.888	24.120	5.225	6.003

Source: FAOSTAT (FAO), World Development Indicators (World Bank).

Consumption per head

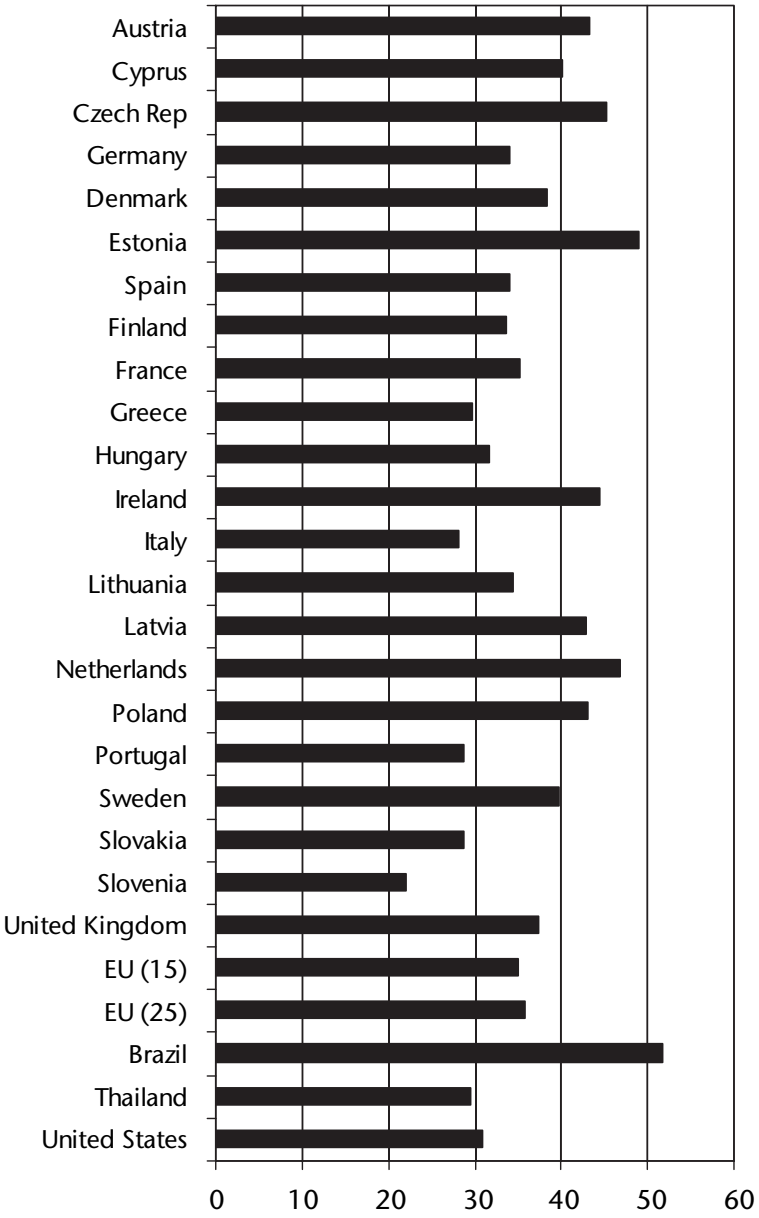
The EU sugar industry can build on a very stable market, protected by the European sugar policy. On average the EU-25 sugar consumption per capita is 62 kg in 2002, nearly all beet sugar (figure 4.9.2). Within the EU-25, consumption ranges from 31 kg per head in Slovakia to 202 kg per head in the Netherlands. The EU-25 sugar consumption is much lower than the 116 kg per capita in the US, where consumption of beet sugar and cane sugar is almost in balance, but much lower than the 58 and 33 kg per capita in Brazil or Thailand, all of this consumed as cane sugar.

Only part of the sugar is sold for direct human consumption in various forms, sweetness, colours and packages. Most of the sugar, however, is sold to the food industry and serves as an ingredient for the production of e.g. bakery products, beverages, chocolate, confectionary, ice cream and industrial alcohol.

Competition: Balassa index and share value added.

Table 4.9.3 indicates that Brazil is very specialised in sugar exports, the Balassa index being far higher than in all other countries and growing steadily. Thailand ranks second, also with a considerable sugar export and small growth of the Balassa index. The US sugar export on the other hand is of minor importance, resulting in a low Balassa index. However, the index is growing the fastest of all countries. The Balassa index growth from the EU-15 to third countries is negative; the intra trade within the EU gained importance.

Figure 4.9.2 Refined sugar consumption in major EU and benchmark countries in 2002 (in kg/



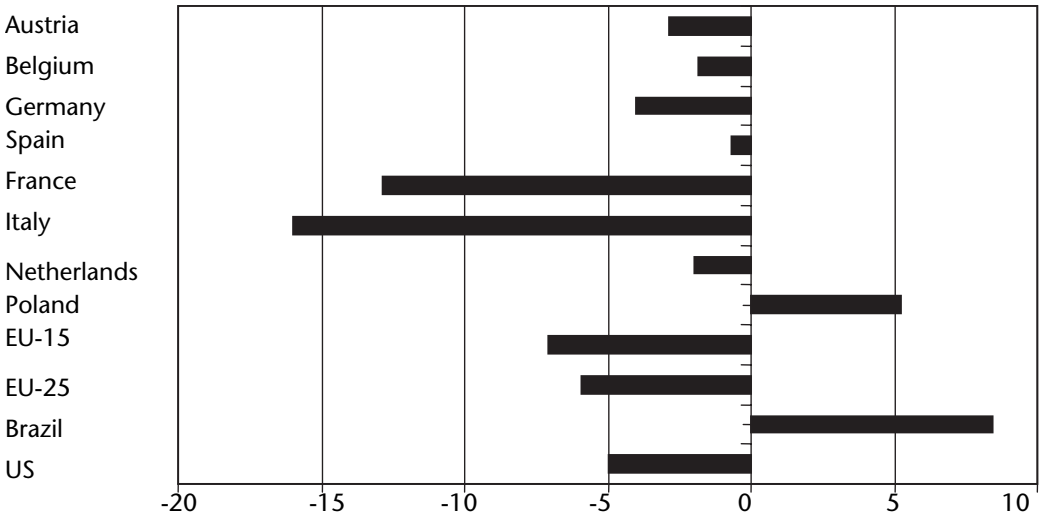
Source: FAOSTAT (FAO), World Development Indicators (World Bank).

Table 4.9.3 Revealed comparative advantage (Balassa index) and growth rate from 1996-1998 to 2002-2004

Region/Country	1996 - 1998	2002 - 2004	annual growth%
EU-25	0.8	0.9	1.0
EU-15	0.8	0.9	0.8
EU-15 < > non-EU	1.0	0.8	-3.3
Brazil	14.8	20.1	5.3
France	2.3	2.4	0.2
Thailand	7.4	7.8	0.9
Germany	0.6	0.6	-1.1
Belgium/Luxembourg	1.2	1.2	-0.4
Netherlands	0.8	1.2	7.4
US	0.2	0.3	6.5
United Kingdom	0.5	0.6	3.1
Italy	0.3	0.4	5.5
Poland	1.7	1.4	-2.9
Austria	0.6	0.5	-4.0
Spain	0.5	0.2	-14.9
Russian Federation	0.2	0.2	-4.5
Japan	0.0	0.0	7.6

The performance on the domestic market is compared to the food industry as a whole. So if the share of real value added of the sugar industry in the total food industry grows, the sugar industry performs better than the whole. Figure 4.9.3 shows that Brazil has a positive growth, whereas the EU-25 and the US has a negative growth. The competitiveness of the European sugar industry is only slightly less than that of the US, but far less than that of the Brazilian sugar industry. The differences within Europe are huge: most countries show an annual decrease, whereas the new EU member states, especially Poland, show an annual growth.

Figure 4.9.3 Annual growth of the real gross value added at factor cost: share sugar industry in food industry



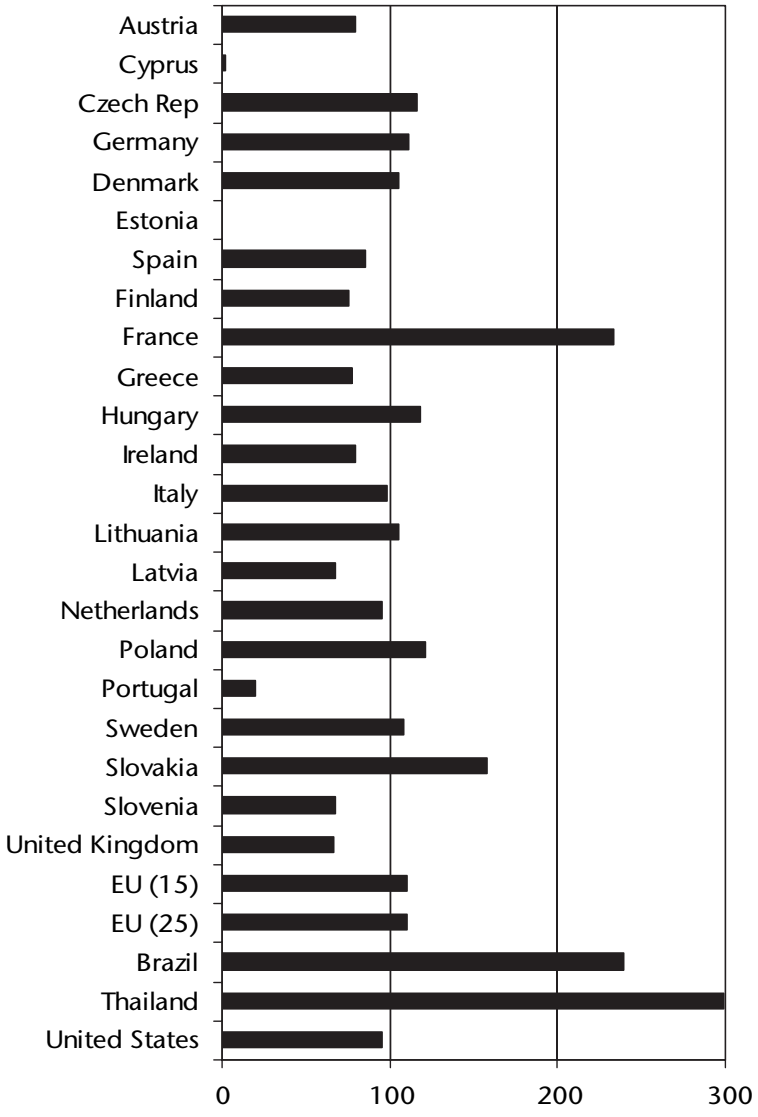
Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

4.9.3 Global trade performance

Self-sufficiency

The share of international trade is fairly small compared to the domestic production, as is shown by the level of self-sufficiency for sugar of around 100% in most countries (figure 4.9.4), even though sugar is not perishable and can easily be transported on long distances. For the EU-25, self-sufficiency was about 110% in all years, whereas the US is slightly behind with 95%. Brazil and Thailand have large export positions with self-sufficiency degrees of 240% and 299% respectively in 2002, followed closely by France with 234%. As a result of the sugar policy reform in the EU, self-sufficiency in the EU might drop below 100% in 2006/2007 and export of sugar might decrease by 75% (Agrarisch Dagblad, dated 22-06-2006).

Figure 4.9.4 Self-sufficiency degree for refined sugar

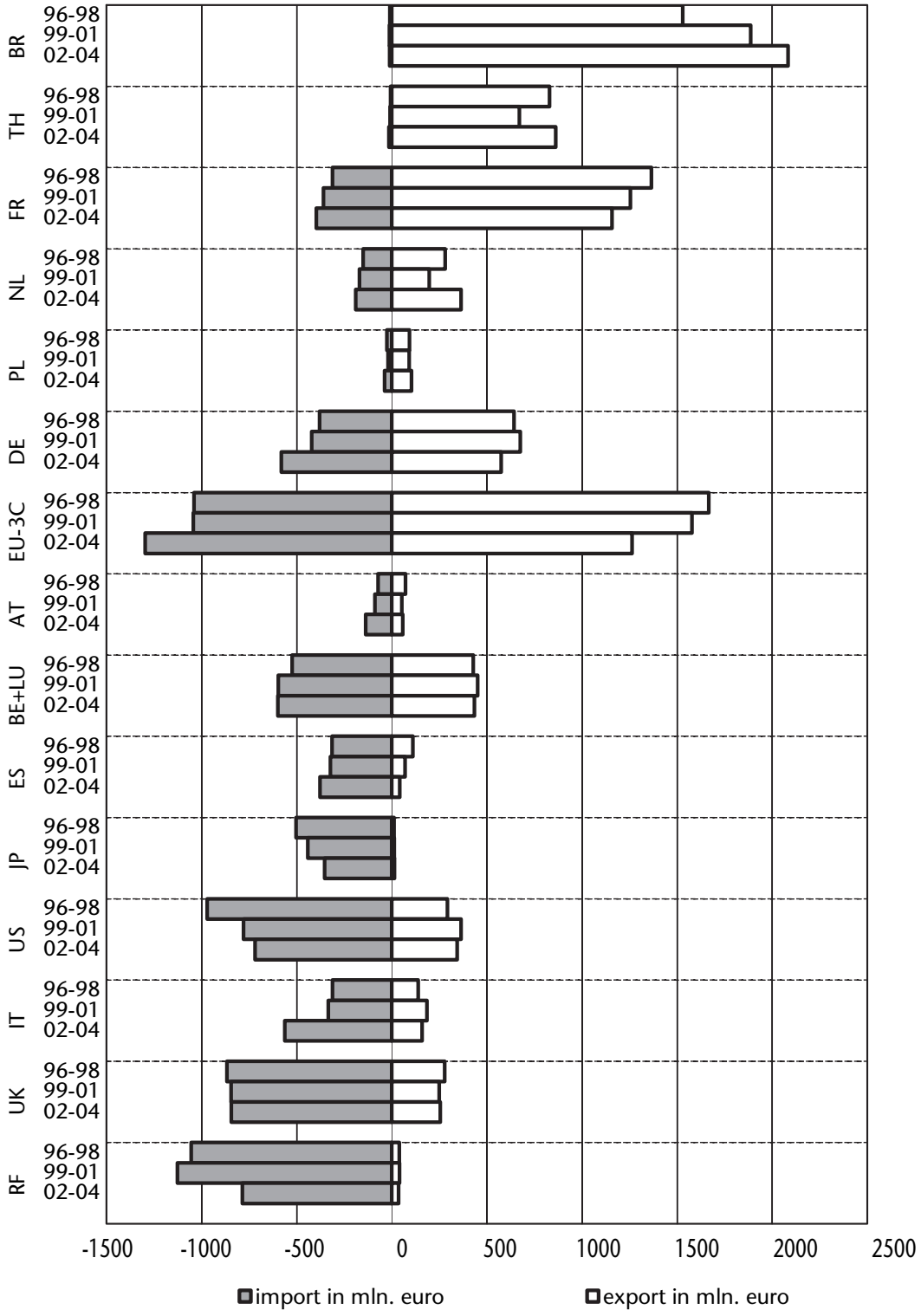


Source: FAOSTAT (FAO), World Development Indicators (World Bank).

Trade patterns

Brazil is by far the largest **net** exporter of sugar, followed by Thailand and France (figure 4.9.5).

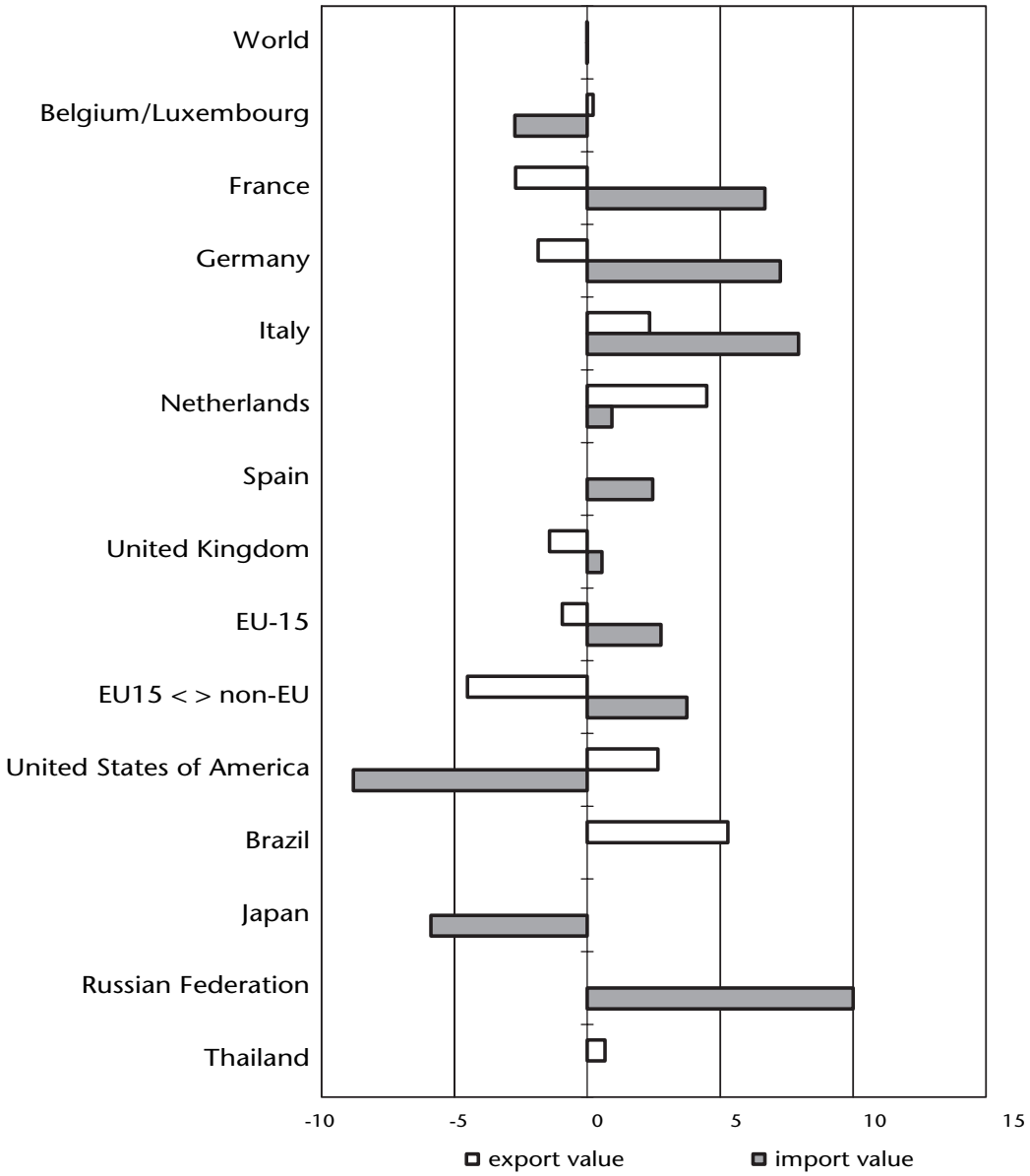
Figure 4.9.5 Import and export of sugar, three years average of values



The largest **net** importers in the EU-25 are the United Kingdom, Italy and Spain and outside the EU-25 the Russian Federation, US and Japan. The figure shows a stabilisation of trade relations between countries. Only the export of sugar from Brazil is increasing at the cost of exports from other countries. One-way trade is still visible: Brazil and Thailand only export, whereas the Russian Federation and Japan only import.

With regard to export growth, the EU-15 performs less well than the benchmark countries US, Brazil and Thailand (figure 4.9.6). In addition the EU-15 import growth exceeds export growth, resulting in a negative trade balance in 2002-2004. However, in the new member states of the EU-25, export growth exceeds import growth and the trade balance is slightly positive. In the US import growth is even negative, resulting in an improvement of the still negative trade balance.

Figure 4.9.6 Annual import and export growth of sugar

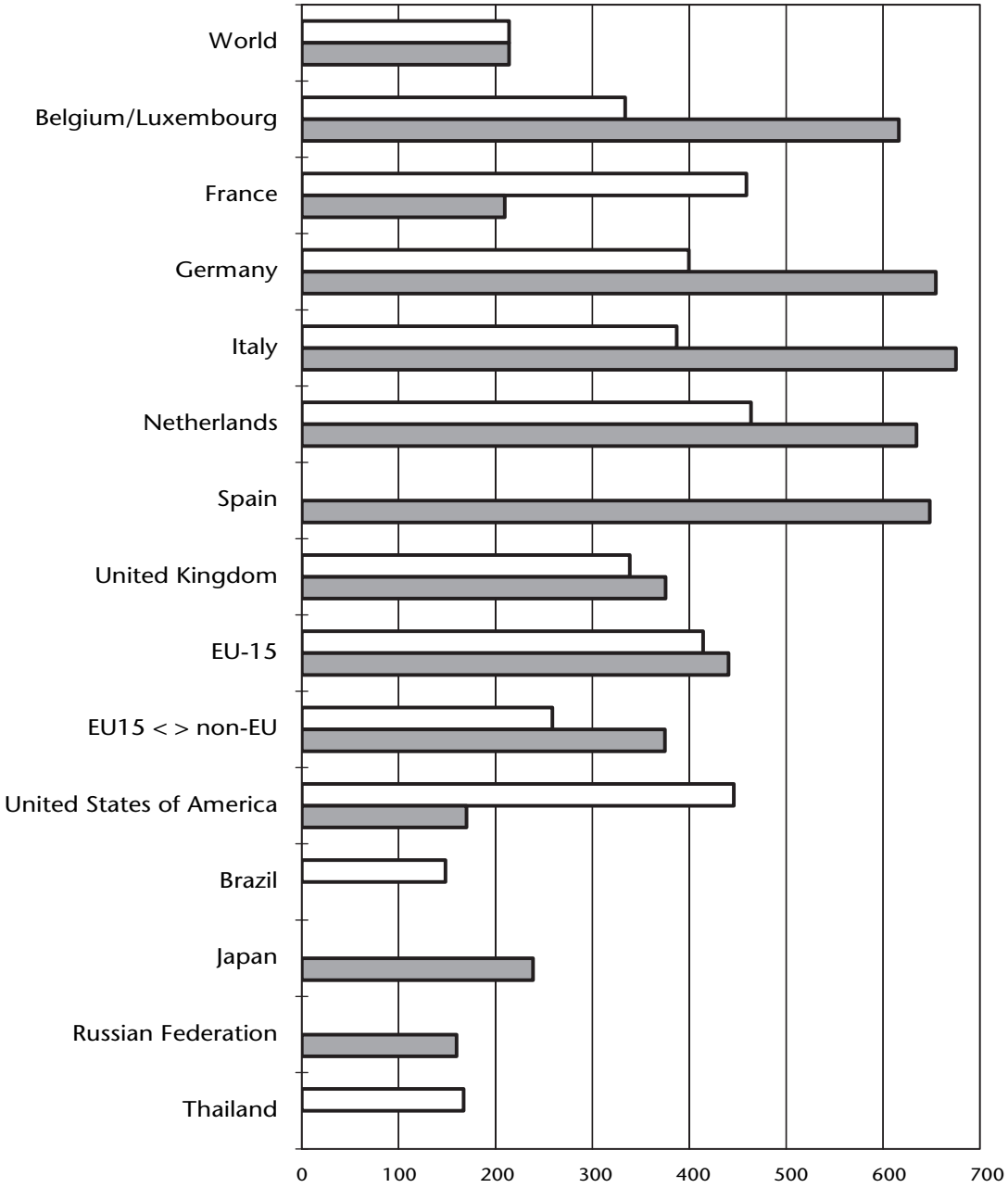


Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Within the EU-15 France still has the best trade balance, but the Netherlands is the best performer in terms of growth. An average growth above the world growth means an increase of market share.

The value per ton of exported sugar of the EU-15 is equal to that of the US but above the world average and that of its competitors Brazil and Thailand (figure 4.9.7). For France and the US, the values per ton of export are higher than the import values, whereas for the other EU-25 countries it is the other way round.

Figure 4.9.7 Import and export prices of sugar 2002-2004



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

The world market price of 216 Euros per ton and the EU-15 intervention price of 632 Euros per ton in 2002/2003 are reflected in the import and export prices. It also indicates the huge difference in production costs between cane and beet sugar.

Main products in detail

The main commodities are refined cane and beet sugar (51% of the trade), raw cane and beet sugar (34% of the trade) and other sugar (15% of the trade).

Brazil is market leader on the world sugar market, a position that it is likely to maintain in the foreseeable future. The major export destinations are the Russian Federation, Canada and Algeria (total share 33%). Brazil has taken over Cuba's position as major supplier on the Russian market. Thailand ranks second with Indonesia and Japan as major destinations (total share 45%). The major export destinations for US sugar are Canada and Japan (total share 44%), whereas the major import sources are Canada, Brazil and Guatemala (total share 45%).

The main exporters of sugar in the EU-25 are France, Germany, Belgium/Luxembourg and the Netherlands (total share 70%). The main importers are the United Kingdom, Italy, Belgium/Luxembourg, Germany, Spain and France (total share 81%). Sugar from the EU-25 mainly goes to Algeria with a total share of only 2%. Expansion of sugar exports is not commercially rewarding, so export volumes have been stable for many years. Sugar imported into the EU-25 mainly comes from Mauritius with a total share of 9%. This is one of the original suppliers to the European markets. The trade flows of sugar are illustrated in figure 4.9.8.

Figure 4.9.8 Trade flows of sugar.

Global sugar consumption has risen at an average annual rate of around 2.0% over the last decade. However, at regional level trends in sugar consumption have been different. Asia currently accounts for 40% of the global sugar demand and has shown an annual growth rate of 2.7% over the same period. This growth is driven by factors like rising populations, increasing incomes and urbanisation.

Many of the sugar beet growing regions and especially the EU and US have favourable policy measures that make domestic sales very attractive. However, markets in the EU and US are almost saturated and sugar consumption in Western Europe has grown annually at just 0.5% over the past ten years. Because of health concerns in the EU and US, there is a trend towards products that are low in sugar or sweetened by non-calorific sweeteners (Rabobank, 2005).

Sugar processing companies have grown mainly on the basis of regional expansion. Leading Brazilian companies have concentrated on consolidation and expansion into new cane producing areas in the country itself. The stagnation of the sugar beet production for domestic and export sales has forced EU sugar processing companies to look outside the EU to achieve further growth. Many of the companies invested in Eastern Europe in anticipation of the accession of new member states to the EU in 2004. In addition some processing companies have acquired cane sugar operations outside Europe. A remarkable trend is the expansion of the sugar refining industry in the Middle East and North Africa, for example Algeria. This region has historically been a major importer of sugar and over the last decade a number of large new refineries have been constructed here (Rabobank, 2005).

Sugar is a difficult commodity to deal with in the context of regional and international trade negotiations and is often referred to as the most political of agricultural commodities. More than 130 countries have a sugar industry of their own and a vast majority of the companies are in some way protected from the world market. The reduction of trade protection has proved to be a sensitive issue. From 1 July 2006 onwards the sugar policy in the EU will be reformed, leading to lower production quota and a reduction of net sugar prices by 36% in four years' time. This will result in a further rationalisation of the sugar production and a scale increase in the sugar processing industry in the EU (Berkhout and Van Berkum, 2005; Rabobank, 2005; Duff and Pals, 2006).

4.9.4 Business performance and competitive process

Characteristics of the sugar industry

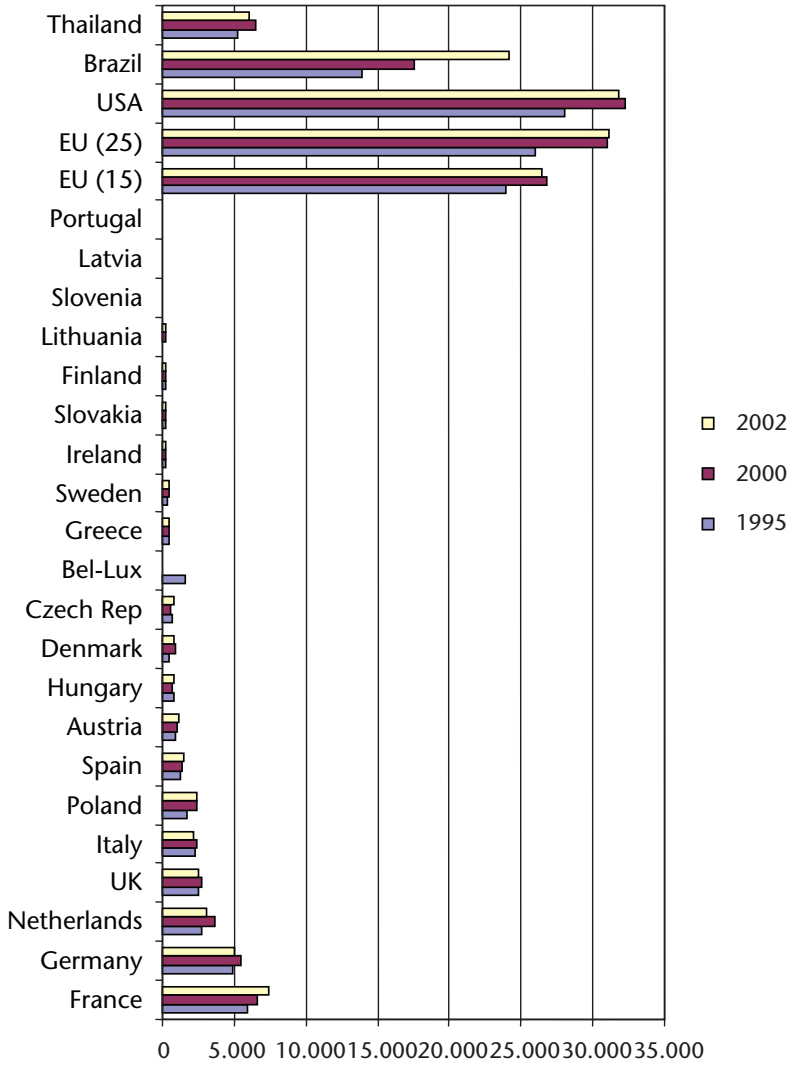
The EU sugar industry had a production value of almost 12 billion Euros in 2003 (Table 4.9.4). This is 70% above the US and 125% above Brazil's production in 2002 and 2003. However, the production value in the EU decreased over a period of five years, whereas the production value in the US and Brazil increased. Characteristics for Thailand are not available. With regard to production costs, the purchases of goods take a share of 80 to 85% in the EU, between 65 and 75% in the US, and increased from almost 60% to more than 100% in Brazil. The purchases mainly consist of raw and refined cane and beet sugar, but in Brazil might also include investments in production capacity. The personnel costs make up 45 to 50% of the value added in the EU and just 25 to 30% in the US and Brazil. The sugar policy reform in the EU might result in the closing of 60 factories and a loss of 8,000 employees in the EU sugar industry (Agrarisch Dagblad of 22-6-2006).

Table 4.9.4 Key characteristics of the sugar industry

	EU-15		EU-25		US		Brazil	
	1999	2003	1999	2003	1997	2002	1999	2003
Number of enterprises	192	209	315	303	92	87	182	155
Production value	12609	10395	14003	11704	6548	6901	4453	5208
Value added at factor cost	3099	2569	3356	2961	1908	2184	1777	2416
Purchases	10050	8664	11401	9974	4706	4623	2536	5438
Personnel costs	1368	1236	1542	1419	541	595	556	644
Number of employees	30050	25699	58665	45143	16547	14603	108658	202542

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.9.9 Sugar production in million kg in 1995, 2000 and 2002

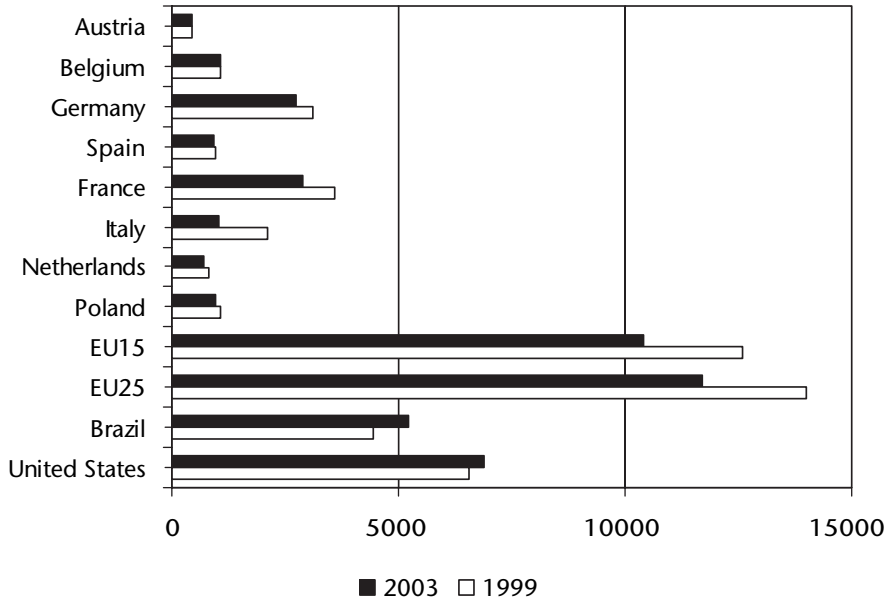


In table 4.9.2 in the introductory section of this chapter, the production of the EU was benchmarked with the main non-EU producers. Figure 4.9.9 also shows the production of individual EU countries.

It is clear that production in the benchmark countries increased in that period, by far the most in Brazil. Three EU countries are responsible for 50% of the production of sugar in Europe: France, Germany and the Netherlands. These are countries with large populations. In this respect the UK, Italy, Poland and Spain are lagging behind. The Netherlands, Denmark, Austria and France have a relatively high production compared to the population.

Eurostat figures indicate that the production value in the EU-25 has decreased by over 15% in the last five years (figure 4.9.10). The decrease has been strongest in Western European countries like Italy, France, Germany and the Netherlands.

Figure 4.9.10 Distribution turnover in 1999 and 2003 (in €million)

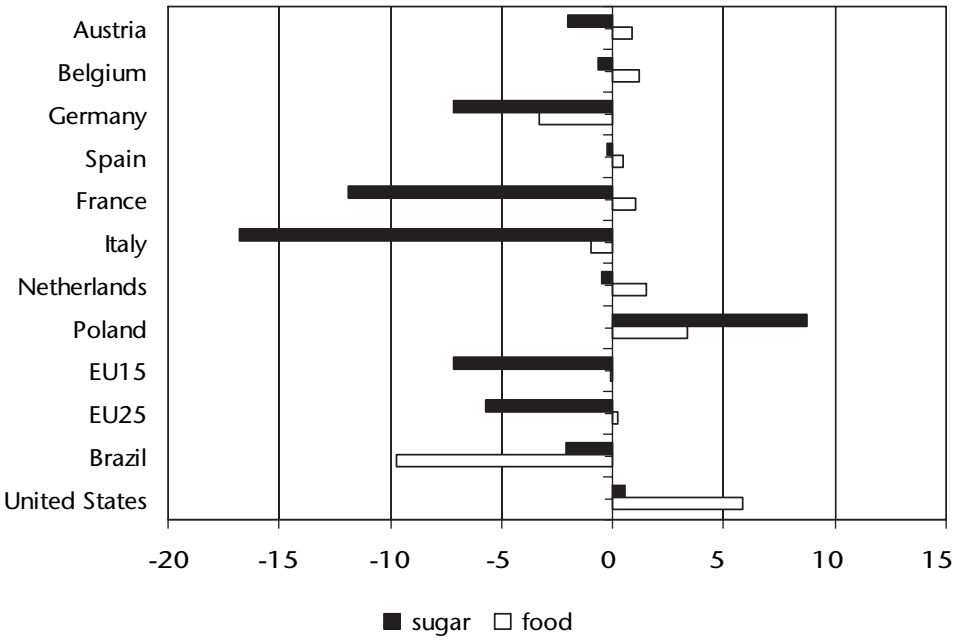


Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Value added and labour productivity

Due to difference in purchasing power parities, these nominal levels are not comparable. However the growth of the real value added is interesting. Figure 4.9.11 shows that the performance of the EU is below that of the US and Brazil. Within the EU there are great differences between countries: excellent performance in new member states like Lithuania and Poland and very negative performance in Italy, France and Germany. These last three countries are large producers of sugar.

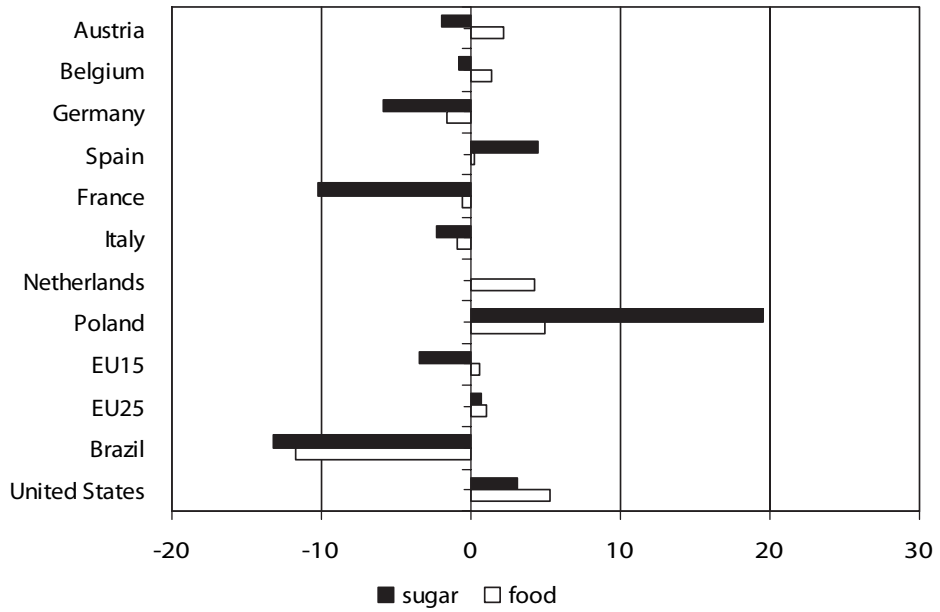
Figure 4.9.11 Growth real value added 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Figure 4.9.12 shows that growth of the labour productivity in the EU-15 is below that in the US, but much higher than the very negative growth in Brazil. Again there are great differences between EU countries: excellent performance in Poland and poor performance in France and Germany. The latter two countries are the largest producers of sugar within the EU.

Figure 4.9.12 Growth of the labour productivity 1999-2003



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

Market orientation and internationalisation

Table 4.9.5 shows the ten largest sugar producing companies in the EU by order of total turnover. Major companies like Südzucker, Danisco and Royal Cosun also achieve a large share of their turnover in other branches of the (food) industry like grain starches, food and bakery ingredients, instant fruit and vegetable products and bio-ethanol. Other companies like Tereos, Nordzucker and British Sugar are more specialised in sugar.

Table 4.9.5 Top-10 EU sugar companies, by total turnover in 2004 (in million €)

Rank	Company	Turnover (€million)	Production (1,000 ton)	Countries (first country is headquarters)
1	Südzucker	5,099	4,149	GE, BE, AU, FR, PL, SK, HU, CZ
2	Danisco	2,203	1,189	DK, SE, FI, GE, LT
3	Tereos	2,123	1,613	FR, CZ, Mozambique, Réunion
4	Royal Cosun	1,375	592	NL, BE
5	Nordzucker	1,265	1,523	GE, PL, SK, HU
6	British Sugar	1,121	1,320	UK, PL
7	Azucerera Ebro	734	780	ES
8	Pfeifer and Langen	656	876	DE, PL
9	Polski Cukier	424	659	PL
10	CO.PRO.B	397	603	IT

Source: Amadeus, Nordzucker, Tereos.

Another important strategic development besides diversification towards other activities in the food industry is the scale increase by regional and international expansion. Tate and Lyle

could be called the most global sugar processing company and has production facilities in Europe, North and South America and Southeast Asia. However, the German company Südzucker is market leader in Europe with a share of 22% of the sugar production. In the past decade this company has taken over Saint Louis Sucre (France) and Raffinerie Tirlemontoise (Belgium) and acquired participations in Agrana (Austria) and Eastern Europe (Poland, Slovakia, Czech Republic, Hungary, Moldavia, Rumania). The French company Tereos ranks second and has production facilities in France, Czech Republic, Rumania, Brazil, Mozambique and Reunion. The German company Nordzucker ranks third and has production facilities in Germany, Poland, Czech Republic, Slovakia and Hungary.

In the United States sugar manufacturing industries are highly concentrated and specialised in sugar. The four largest sugar cane mills control almost 60% of the market and the four largest sugar cane refiners have a combined market share as high as 99%. Sugar cane milling and refining tend to be vertically integrated operations owned by companies such as Imperial Sugar Company and Tate and Lyle. In beet sugar manufacturing, the four largest companies control 85% of the market. Examples of sugar beet processors are American Crystal Sugar, Minn-Dak Farmers Cooperative and Southern Minnesota Beet Sugar Cooperative.

The Brazilian sugar industry on the other hand is very fragmented. The four leading companies control only 23% of the total processing capacity. Market leader is União with a share of 17%, owned by a cooperative of sugar companies. The other three companies Da Barra, Açúcar Guarini and Caraveles have market shares around 2%. In general, Brazilian companies have also diversified into ethanol production, which is used in Brazil as automobile fuel (Azevedo, Chaddad and Farina, 2004).

4.9.5 Competitive potential

Innovation and branding

The sugar industry does not have a long tradition in new product development and branding is not very common. The majority of the product innovations are only incremental: variations in form, sweetness, colour and packages. However, over the past decade research and development on natural and artificial sweeteners have intensified. In order to comply with the important consumer trend related to health, research has focused on developing a new generation of low calorie sweeteners. A good example is the recent market introduction of Splenda®Sucralose by Tate and Lyle. This is a low calorie sweetener made from sugar, but 600 times sweeter, that can not be absorbed by the human body. Research on internet reveals that European sugar companies in particular invest large budgets in research and development of up to 5% of their turnover. Nordzucker and Cosun have established their own research centres InnoSweet and Cosun Food Technology Centre. Tate and Lyle and Danisco have both started their own venture funds to engage in companies that develop high value added food and industrial ingredients for the next generation. Another important development is the production of bio-ethanol from sugar. Brazil leads in this development, but a few European companies like Südzucker, Tereos and British Sugar have also taken up this production activity.

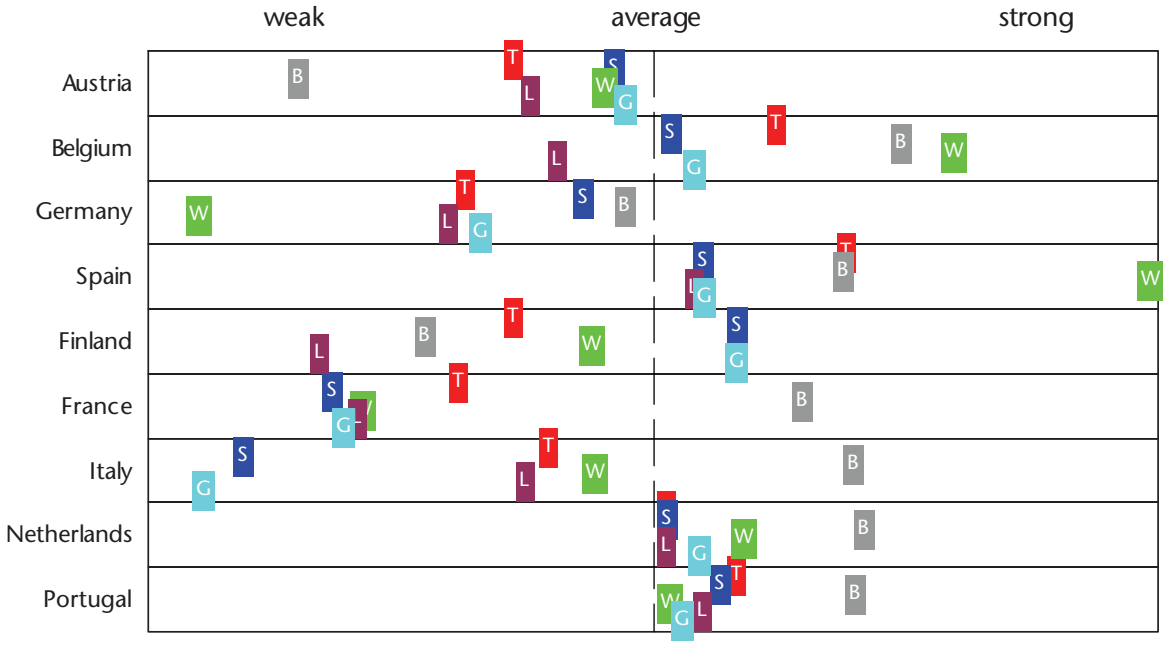
The competitiveness of EU countries

EU competitiveness is weak compared to the US and Brazil. In comparison with the US, the growth in Balassa index and real value added are much lower and in comparison with Brazil the growth in turnover compared to the total food industry, Balassa index, world market share and real value added are much lower. On the other hand, the EU performs reasonably well on labour productivity.

Figure 4.9.13 gives an overview of the competitiveness of the EU countries. The largest producers, France and Germany, reflect the weak competitiveness of the EU-15, while Spain and Belgium are performing strongly.

Figure 4.9.13 Competitiveness of EU countries

T= total sugar; S= growth share food industry in total manufacturing;
B= growth Balassa;W= growth world share;
L= labour productivity; G=growth value added.



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4.10 The European food industry as a whole and in individual countries

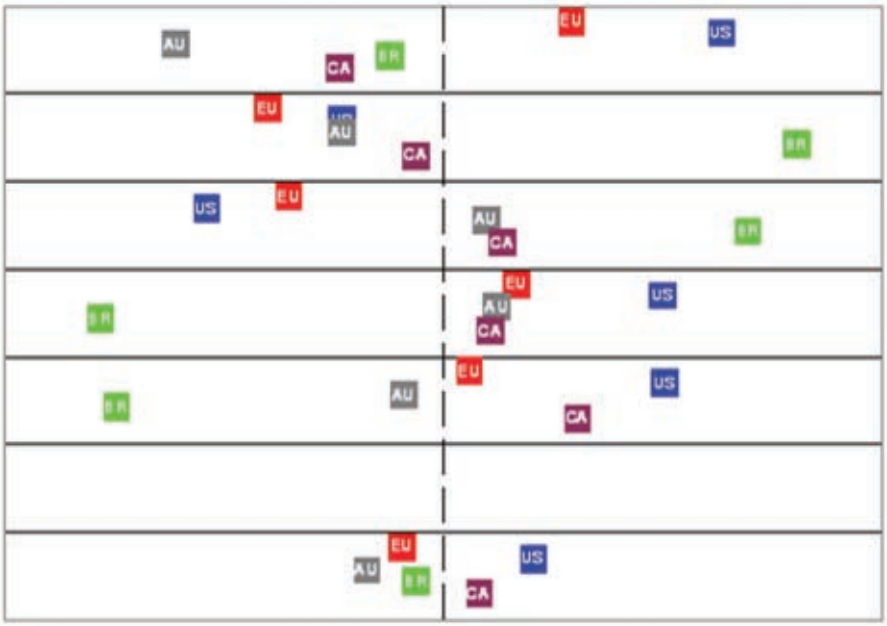
Jo Wijnands

4.10.1 Key findings: weak competitiveness.

The EU is the largest exporter and importer of food products, even if intra-communitarian trade is excluded. The imports as well as the export of imports of the selected countries grew in the period 1996 to 2004. The growth of share of the value added of the food industry related to total manufacturing is the highest in the US and second in the EU. The Balassa index indicates that the food exports are more important in Australia and Brazil than in the EU, US or Canada. The importance of the EU is decreasing whereas it is increasing in all other countries. The production value of the EU food industry is much higher than in the benchmark countries: 150% of the US value and 10 to 20 times the values of other countries. The competitiveness is illustrated in figure 4.10.1, which shows a weak competitive position for the EU and a stronger position for the US and Canada. The reason behind this might be the smaller scale of the enterprises, the restricted availability of raw materials due to quota systems (e.g. milk and sugar) and a lower growth of the population which determines the quantity demanded.

Ireland and new member states, e.g. the Czech Republic and Hungary, have a stronger competitiveness than the best performing benchmark countries (Australia and Brazil). Also large exporting countries, like Spain, the Netherlands, Belgium and Italy perform better than the US and Canada. But the UK also has an above average position. Weaker than the EU-15 average is the largest EU exporter France. Germany (as second largest) is just slightly above this EU average but still below the US level.

Figure 4.10.1 Competitiveness of the EU food industry



4.10.2 The food industry as a whole

This section aims to provide an overview of the total food industry compared to the benchmark countries. The previous section discussed products, consumption, self-sufficiency as well as most important enterprises within each industry branch. This section will focus on the main indicators and their development. Firstly the trade of food products as aggregate of groups of the previous sections (see annex C) is discussed. EU is in all aspects the largest

trader, either as EU-25, EU-15 or as exporter to third countries. The US follows as second. The deficit on the trade balance is higher for the US than for the EU. Australia, Brazil and Canada have a surplus on the trade balance. These 4 countries and the EU have a share of 69% in the total world exports. A major importer is Japan, with almost no exports (table 4.10.1).

Table 4.10.1 Shares of major importing and exporting countries

Region/Country	Export share (%)			Import share (%)		
	'96 - '98	'02 - '04	difference	'96 - '98	'02 - '04	Difference
EU-25	48	46	-2.1	46	45	-0.9
EU-15	46	44	-2.3	44	43	-1.0
EU-15 < > non-EU	13	12	-1.2	13	13	0.1
US	11	10	-1.7	10	12	2.0
Canada	5	5	-0.1	2	2	0.2
Brazil	3	4	1.4	1	1	-0.7
Australia	4	4	-0.2	1	1	0.1
Japan	0	0	-0.0	13	10	-2.7

Figure 4.10.2 presents the most important net traders, including the main individual EU countries. The countries are ranked according to their net trade balance. It turns out that Brazil and Australia are the largest net exporters: Canada ranks fourth after France. Japan, UK and US are the largest net importers. The position of Japan is remarkable: the export level is very low compared to the import level. As is shown, France and the Netherlands are the largest EU net exporters while the UK, Germany, Italy and Spain are the largest EU net importers. These 4 countries are also large producing countries in agricultural products. For most countries the imports as well as the export increased in period from 1996 to 2004.

The extra communitarian export of the EU-15, the export of the US, Australia and Canada grew faster than the imports. The developments of Brazil are extraordinary: the export growth is the highest and the imports even decreased as the only one of the selected countries. The exports grew faster than the imports in Poland, Netherlands, Italy, Germany, Belgium and Spain. The imports grew faster than the exports in France, Denmark and UK.

Figure 4.10.3 shows the import and export prices. The export prices of the US, Brazil and Canada are below the world average. The EU and the selected European countries have export prices above the world average. This indicates exports of products with a relatively high value. The prices of Germany are just above average and even lower than the prices of Poland.

The growth of the Balassa index is the lowest in the EU compared to the benchmark countries (table 4.10.2). The importance of food exports of the EU is decreasing compared to the benchmark countries. Food exports are important for Brazil (indicated by the Balassa index) and are becoming even more important as is shown by the high growth rate. Within the EU, food exports are becoming more important in Italy and Spain and its importance is decreasing in Poland.

Figure 4.10.2 Import and export of food products

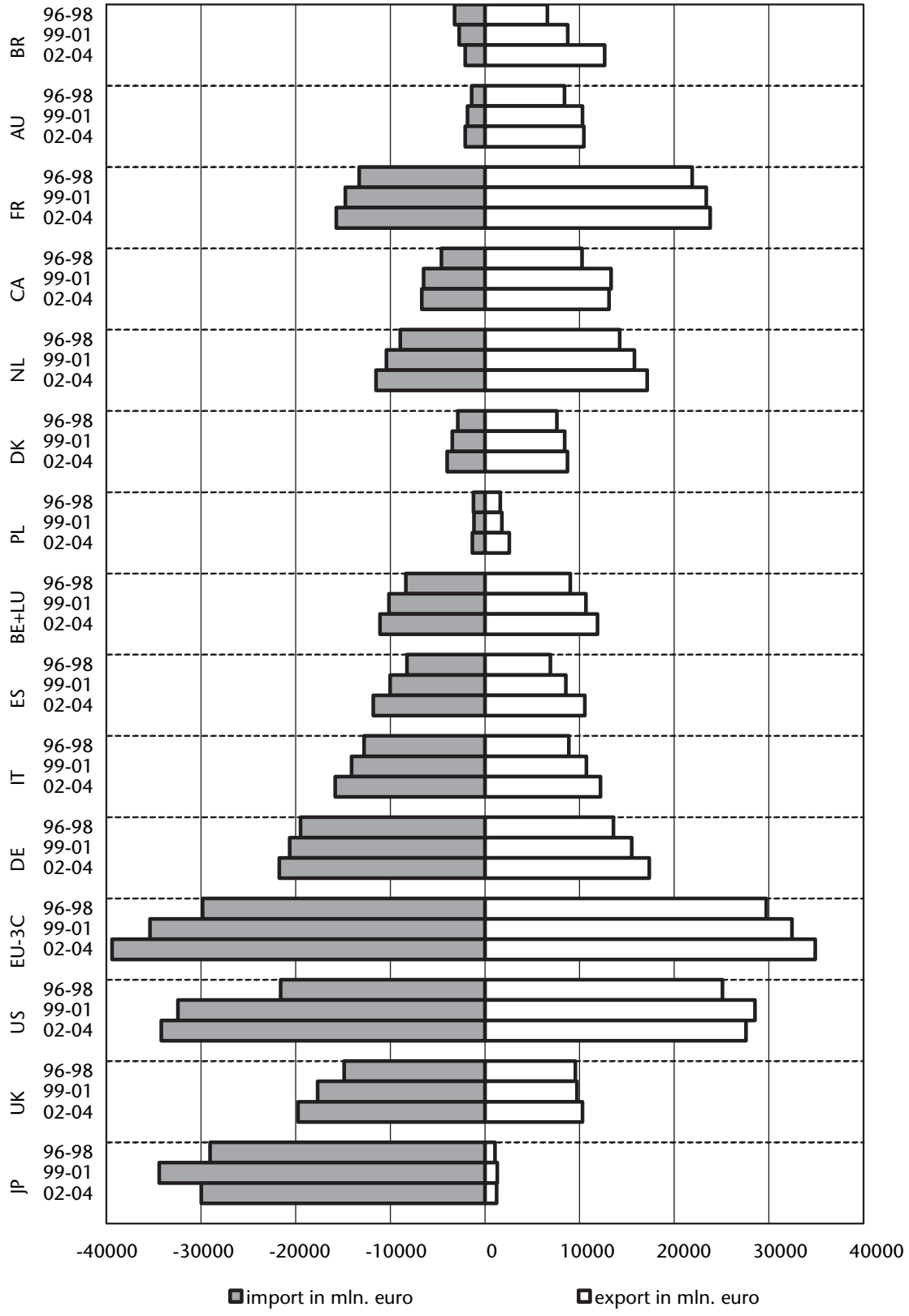


Figure 4.10.3 Import and export prices (€ per ton): average 2002-2004

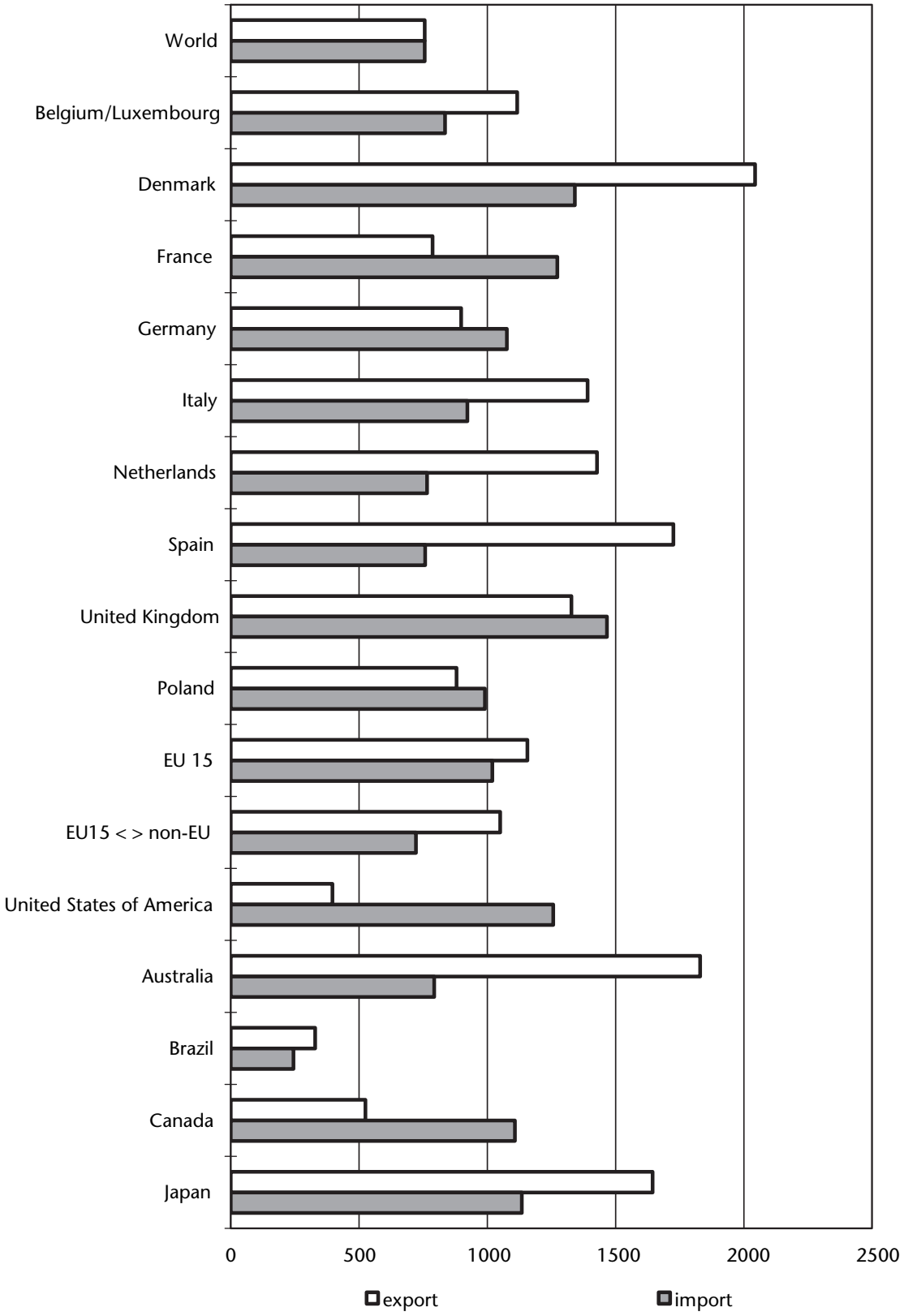


Table 4.10.2 Revealed comparative advantage and growth rate

Region/Country	1996 - 1998	2002 - 2004	annual growth %
EU-25	1.1	1.1	0.6
EU-15	1.1	1.1	0.9
EU-15 < > non-EU	0.8	0.8	-0.5
US	0.9	0.9	0.6
Australia	3.3	3.4	0.6
Brazil	2.9	4.3	6.8
Canada	1.1	1.2	1.7
France	1.7	1.7	0.1
Germany	0.6	0.6	0.5
Netherlands	1.8	1.9	1.2
Italy	0.8	1.0	4.2
Belgium/Luxembourg	1.2	1.1	-0.4
Spain	1.4	1.7	3.0
United Kingdom	0.8	0.8	1.0
Denmark	3.5	3.4	-0.5
Poland	1.4	1.2	-2.4
Japan	0.1	0.1	1.9

The conclusion with respect to international trade flows indicates that the US performs less well than the EU. Australia and Canada perform better, but their market share on the world market is still decreasing. The market share of Brazil increases, due to a high export growth rate and even decreasing imports. But the EU has the lowest growth of the Balassa index.

Table 4.10.3 depicts the importance of the food industry of the 4 benchmark countries. It should be noted that the total food industry also comprises the sub-sectors which are not included, see table 4.1.1 for the definitions. EU has a relatively large number of enterprises compared to the US.

Table 4.10.3 Key characteristics of the food industry

		Number of enterprises	Production value (€ million)	Value added at factor cost (€ million)	Purchases (€ million)	Personnel costs (€ million)	Number of employees
EU-15	1999	261,071	667,023	157,975	534,418	93,014	3,356,849
	2003	244,431	729,589	173,504	579,421	98,122	3,267,197
EU-25	1999	295,156	709,446	169,580	571,206	97,989	4,282,837
	2003	282,087	785,244	189,113	625,909	104,152	4,146,160
US	1997	26,302	373,237	144,853	228,806	33,954	1,466,956
	2002	27,897	482,977	214,205	269,729	48,125	1,505,776
Australia	2001	n.a.	38,138	9,660	21,775	4,591	197,200
	2003	n.a.	39,457	10,148	22,065	4,899	193,200
Canada	1997	3,289	38,789	14,378	28,948	4,027	229,172
	2002	5,992	50,923	18,793	34,757	4,851	270,966
Brazil	1999	19,594	51,477	18,458	29,110	5,908	929,706
	2003	19,625	53,145	18,156	31,943	4,661	1,148,563

Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

The production value per enterprise is in the US 5 to 6 times higher than in the EU. The EU-15 and EU-25 averages are comparable with the Brazilian average and thus below the Australian and Canadian averages. Also the production value per employee is 1.5 times higher in the US. This indicator is higher in the EU-15 than in Brazil and Canada and comparable with Australia.

The growth of the real value added is around zero in the EU: higher than the very negative value of Brazil and the moderately negative value of Australia but below the US and Canada (table 4.10.4). The development of labour productivity is only higher in the US than in the EU.

Table 4.10.4 Annual growth (%) of real value added and labour productivity from 1999 to 2003

	Value added	Labour productivity
EU-15	-0.11	0.57
EU-25	0.20	1.01
US	5.81	5.26
Australia	-1.06	-0.04
Canada	3.17	-0.23
Brazil	-9.72	-11.67

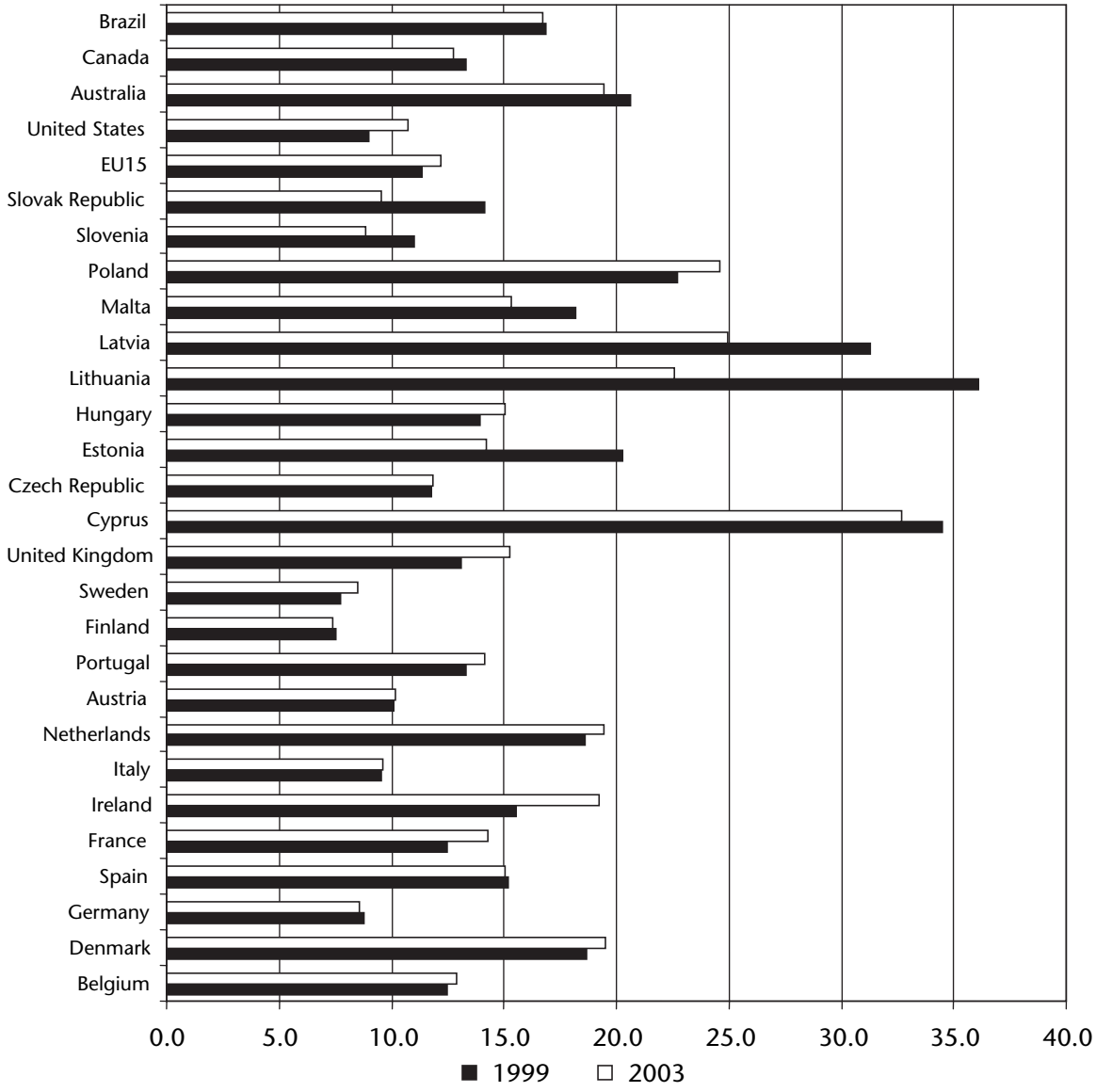
Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

The indicator growth of the share of the value added for a sub-sector of the food industry is substituted as the growth of the share of the food industry in the total manufacturing sector. It is assumed that the food industry competes with the manufacturing industry for the production factor labour and capital. Figure 4.10.4 shows the food industry in the EU-15 is more important than in the US. However share of the food industry in total manufacturing is growing faster in the US than in the EU. The importance in other benchmark countries is higher but decreasing. The share of the food industry in total manufacturing is fairly important in several new member states such as: Poland, Latvia, Lithuania and Cyprus. The share is only growing in Poland; in the other three countries it is decreasing. Within the EU-15 the food industry is relatively important in Denmark, Ireland and the Netherlands and the share is growing. Also in the large production countries of France as well as in UK and Spain, the share is (slightly) growing. The share in the other large production countries of Germany and Spain is slightly decreasing.

The overall conclusion is that the US and Canada ranks better in competitiveness than the EU. Australia and Brazil are more or less at the same level as the EU as illustrated in figure 4.10.1 of the key findings.

What might be the reasons behind this? One can speculate on several issues. Firstly, it has been shown that the average size of EU enterprises is smaller than in the US, Australia and Canada. Economies of scale are important in the food processing industry. Ollinger et al. (2000) show that the costs decrease by 5 to 7% each time the capacity of a poultry slaughtering plant doubles. The largest volumes of food products are not in the range of luxury products, but necessities of life with low demand elasticities. Low prices are very important. This might be the reason for the low competitiveness of the meat industry and also for the beverages industry (wine production). A second issue might be the prices and availability of raw materials. The weak competitiveness of the European dairy industry is partly the result of the milk quota system. New Zealand could improve its position on the world market due to unrestricted production quota. Dairy is one of the larger sub-sectors. The European sugar industry is also weak, with production restricted by a quota system and high internal prices. The EU fruit and vegetable sector with only seasonal import tariffs and no production quota is quite strong. A third issue can be related to. food safety issues. The meat industry might be weak due to a number of diseases (food and mouth diseases, BSE, Avian Influenza) which restricted exports and thus the growth of the industry. And finally the demand conditions are weaker in Europe than in the benchmark countries. The population growth, one of the main determinants of the quantity demanded, is lower in the EU than in the benchmark countries (section 2.3). In the EU countries the population grew an-

Figure 4.10.4 Share of the real value added of the food industry in total manufacturing.



Source: see Annex C. EU countries and Brazil 1999-2003; Australia 2001-2003; US and Canada 1997-2002.

nually by 0.2%, whereas the growth in the benchmark countries ranged from 0.9% in Canada to 1.3% in Brazil in the period 1999-2003.

4.10.3 Individual countries of the EU-25

In the previous sections, only the most important countries of the EU were discussed. This section aims at highlighting the position of the individual EU countries. Table 4.10.5 provides an overview of the exports for the different sectors. In descending order, France, Germany, the Netherlands, Spain and Belgium are the main exporters of food products. These countries are generally also the most important exporters for the different products. However some countries also have a major share in specific food products: Denmark is a large exporter of meat and fish, Spain is a major exporter of fish and oils and fats and UK is important for the export of fish and beverages.

Furthermore countries can be relatively specialised in certain products, even if their total exports are small. Meat export has a 42 % share in Danish exports. The Finnish dairy export is 43 % of the total food export, the French beverages (wine) 34%, Greek fruit and vegetables 35%, The

Irish meat export amounts to 42 % of the total food export, Portuguese beverages 38%, British beverages 47%. The export of food from Malta is 80% fish, 1% of the total EU-25 fish exports. In general all products are part of the export portfolio of each country. This also applies to the benchmark countries with the exception of the Brazil. Its export portfolio is dominated by three products: meat (31%), oils and fats (39%) and sugar (16%).

The turnover of the food industry is presented in figure 4.10.5. In broad lines, the turnover of the food industry follows the size of the population of a country: in descending order Germany, France, UK, Italy and Spain. The new member state Poland also has a significant share, although quite low compared to the Netherlands or Belgium. These two countries have a much lower population than Poland, but a larger food industry.

Table 10.4.5 Exports for EU countries (€ million, average 2002-2004)

	Total food	Meat	Fish	Fruit and Vegetables	Oils and Fats	Dairy	Cereals	Beverages	Sugar
EU-25	131396	25504	12447	14934	11701	22637	15305	25265	3604
EU-15	124737	24044	11778	13537	11105	21511	14586	24831	3347
EU-15 < > non-EU	34912	4054	2292	2881	3220	4726	4217	12260	1263
US	27582	5871	3070	2738	8555	686	4998	1321	343
Australia	10450	3448	814	348	579	1419	2304	1502	36
Brazil	12649	3959	359	1111	4937	55	117	27	2084
Canada	13122	2893	2978	1445	1806	211	3094	541	155
Austria	2266	572	4	329	133	661	392	117	57
Belgium/ Luxembourg	11890	2766	668	2313	1165	2204	1699	641	434
Denmark	8733	3682	2077	222	359	1451	447	403	91
Finland	636	95	12	24	68	276	53	65	42
France	23792	3211	1132	1516	1210	4131	3454	7979	1158
Germany	17356	3459	925	1648	1694	4628	2718	1708	575
Greece	1598	23	297	566	291	149	155	112	6
Ireland	4476	1861	380	84	58	980	207	843	62
Italy	12222	1274	431	1927	1232	1328	2412	3458	159
Netherlands	17131	4391	1584	2327	2176	3682	910	1695	365
Portugal	1649	44	336	194	144	151	101	628	51
Spain	10546	1663	2056	1846	1826	659	612	1841	42
Sweden	2146	125	627	110	240	183	305	508	48
United Kingdom	10298	878	1248	430	508	1027	1119	4832	255
Cyprus	81	6	11	10	5	22	3	24	1
Czech Republic	761	73	39	56	114	198	110	121	49
Estonia	301	29	118	12	22	76	4	35	4
Hungary	1731	657	6	410	261	97	191	72	38
Latvia	198	4	76	14	9	29	24	38	5
Lithuania	458	26	91	35	41	181	64	4	16
Malta	43	0	35	0	0	0	2	5	0
Poland	2564	571	284	822	62	392	266	63	104
Slovakia	307	24	3	25	72	85	45	15	37
Slovenia	215	71	7	12	10	48	10	55	2

Figure 4.10.5 Turnover of the total food industry (nace code da-15) of the European countries (€ million)

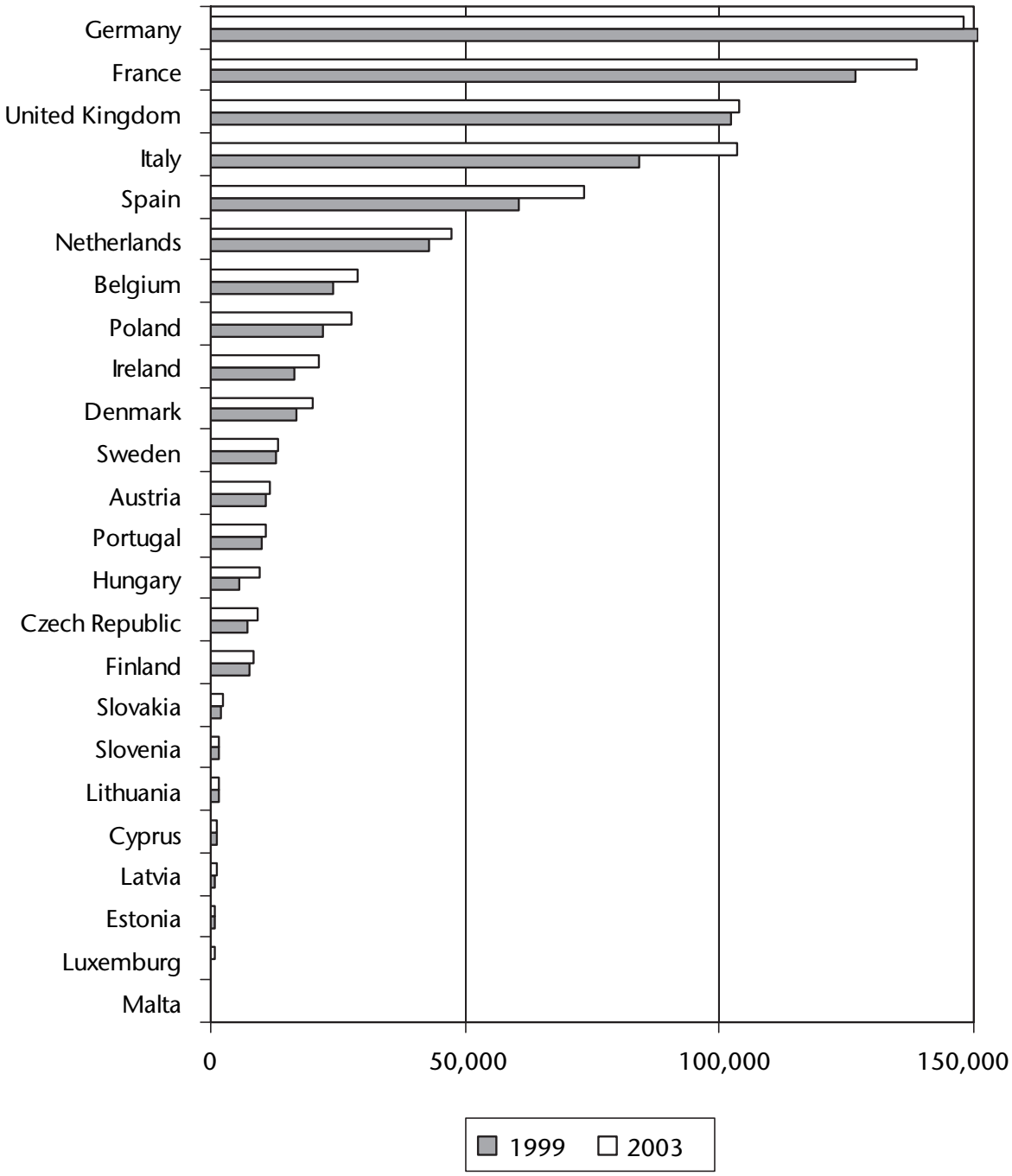


Table 4.10.6 provides data relating to the turnover of the different sub sectors. The distribution of the different sectors among countries also generally follows the distribution of total food. This distribution of countries according to their turnover in food industry differs from the distribution of export value: Italy and the UK are not included among the largest food exporters. For some countries and some products, the export value is higher than the production value. The cause might be the imports which are then re-exported.

Table 4.10.6 Turnover (gross premium written) of the food processing industry per sector a) (€ million)

	Total	Meat	Fish	F&V	Oils and fat	Dairy	Cereals	Beverages	Sugar
Belgium	29072	4502	442	2063	1883	3091	4683	3585	1070
Denmark	20114	5195	1328	558	N.A.	3158	1620	2045	N.A.
Germany	147824	27862	1769	7822	5715	20573	21897	20144	2747
Greece	N.A.	516	74	814	311	1173	0	1329	N.A.
Spain	73243	14109	3509	5391	6390	7266	7498	13804	940
France	138871	29637	3018	6378	1478	23365	21528	19192	2880
Ireland	21107	3696	399	190	14	3764	498	3084	N.A.
Italy	103600	17230	1743	7352	4544	16650	17605	14091	1019
Luxembourg	724	78	0	N.A.	N.A.	N.A.	136	119	0
Netherlands	47404	7328	658	2683	3068	6821	5171	3898	719
Austria	11768	2456	25	1144	153	1719	2097	1934	429
Portugal	10735	1424	628	503	579	1460	1634	2040	280
Finland	8224	2030	105	380	230	1768	1165	979	311
Sweden	13226	3082	384	1053	733	2280	1835	1680	N.A.
UK	103678	18158	2708	6053	1450	8815	14858	18153	N.A.
EU-15	729589	137301	16789	42383	26549	101902	102226	106074	10395
Cyprus	1143	220	N.A.	49	37	145	184	231	0
Czech Republic	9202	1831	40	199	437	1220	270	1882	N.A.
Estonia	790	134	96	21	N.A.	195	89	145	0
Hungary	9645	2085	5	843	463	946	1147	1509	175
Lithuania	1705	223	127	28	9	376	162	285	75
Latvia	1065	181	113	33	N.A.	178	166	203	N.A.
Malta	394	42	N.A.	64	N.A.	31	54	80	N.A.
Poland	27614	3972	389	1664	505	2304	3455	4169	966
Slovenia	1762	410	15	189	32	248	304	270	N.A.
Slovakia	2335	406	31	37	106	394	352	442	93
EU-25	785244	146804	17605	45511	28136	107939	108408	115290	11704
Australia	39457	9225	814	2654	970	5181	2065	7188	N.A.
Brazil	53145	12251	N.A.	2034	10063	N.A.	N.A.	N.A.	5208
Canada	50923	12731	3031	4109	1953	6534	5254	5860	541
US	482977	129236	9310	56465	22314	69337	78723	68919	6901

a) see Table 4. 1.1 for the definitions of the food industry and sub-sectors.

Figure 4.10.6 shows the position of individual EU countries as opposed to the EU-15 to third countries values. In this figure, the EU-15 is the average level: the deviation from the average level is standardised. France, UK and Denmark as large producing countries are weak due to loss of market share and Germany due to a low growth of value added and labour productivity. Austria, Ireland and Sweden are among the stronger countries in the EU-15. Poland as the largest new member state also appears to be quite strong compared to the EU-15. The Netherlands compensated the loss of the market share by relatively high scores on the other indicators. The new member states, except Hungary, improved their market share.

Figure 4.10.6 Competitiveness of EU countries (Values outside the boundary are presented as the border value).

T= total; S= growth share food industry in total manufacturing;
B= growth Balassa;W= growth world share;
L= labour productivity; G=growth value added.

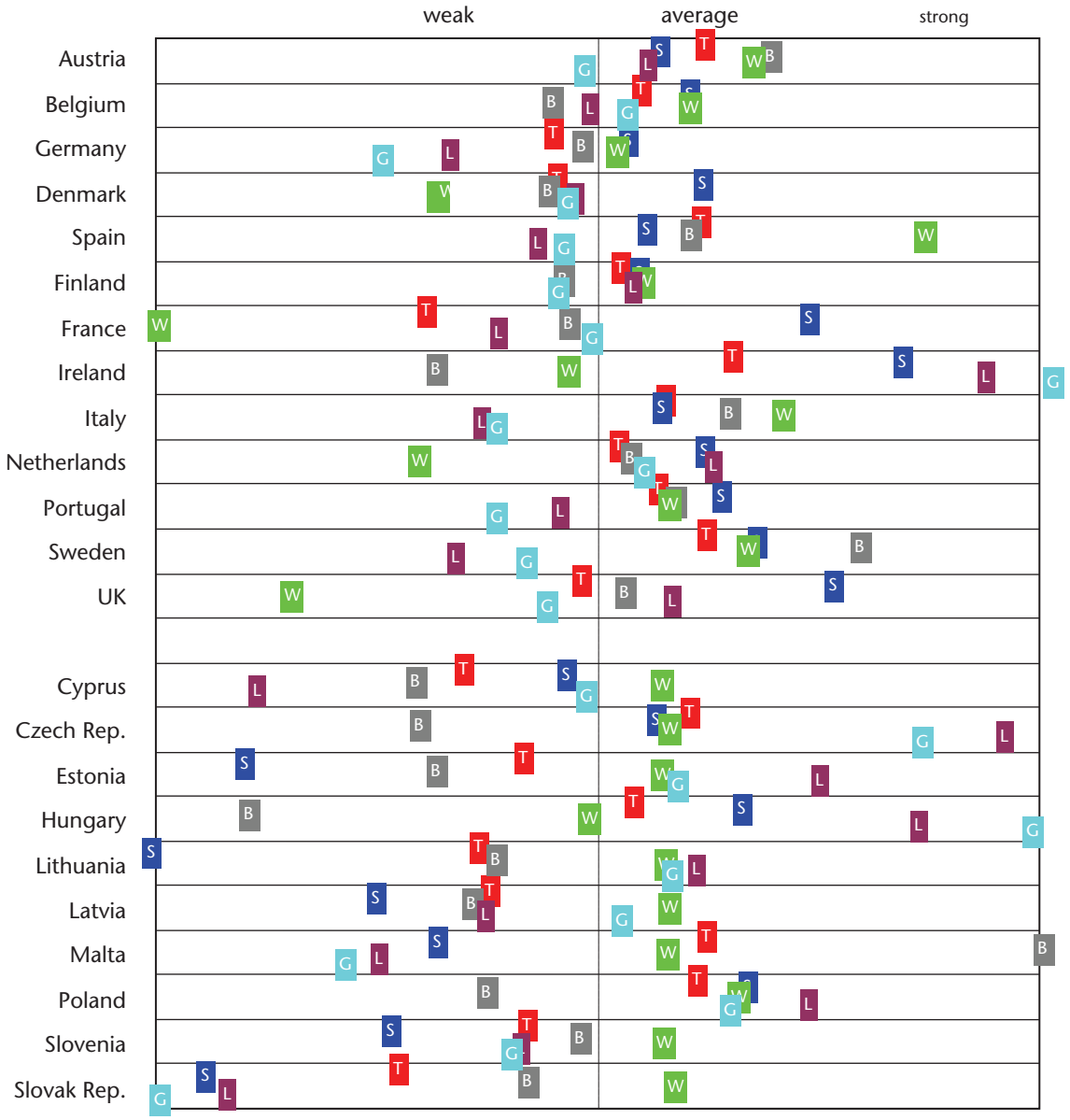


Figure 4.10.6 shows the position of the individual EU countries

References

Ollinger, M., J. MacDonald and M. Madison, 2000. Poultry plants lowering the costs and increases variety. Food review 23(2) pp. 2-7.

5. Key Success Factors and Policy Scenarios

Martin Banse and Jo Wijnands

5.1 Key findings

The European food industry is weak in economies of scale and in labour productivity. However it showed its strengths in attracting sufficient capital and labour, has an openness to the world market (export and import grew simultaneously) and is in an open competition (large number of enterprises). The cultural differences between EU regions and specialised SMEs enable it to exploit 'Economies of scope'. Full exploitation of the economies of scale is also an opportunity. New technologies (micro-machine processing and e-Business standards) and consumer preferences for differentiated and healthy products enhance the opportunity to exploit the economies of scope. The low population growth is a major threat; the demand curve is shifting upwards more slowly than in other countries. The increasing scale of the retail chain will also be a threat, if the food industry scale is not at the same level. Policy threats are: restriction on raw material production, approval procedures for new products and competitiveness hampering enterprise policy such as Finance, R&D and human capital policies. Key Success Factors are low cost leadership to gain export share to compensate lower demand growth on the domestic market, providing differentiated products and being an innovator in exploiting new technology. The (EU) government can enhance competitiveness by harmonising the legislation internally and globally by supporting ICT supply management systems and by supporting the implementation of quality standards for the future and successful negotiation for worldwide acceptance.

The effects of different developments of the productivity growth and trade policy on competitiveness are illustrated by scenarios. First of all, a baseline is constructed in which the current setting of the EU's Common Agricultural Policy in 2006, after the 2004 enlargement and the implementation of the 2003 reform are realised. All other scenarios are benchmarked against this scenario. The policy scenarios cover developments from 2006 to 2010. The first scenario is the *Continued Reform* scenario, in which current policies are considered to continue into the future, with modifications over time that are reasonably certain to occur according to the current political situation. The labour productivity (growth GVA per worker) does not change for all regions by assumption. The competitiveness of the EU remains overall weak (figure 5.1).

As outlined in previous sections, the degree of competitiveness of industries is particularly determined by the development of sectoral productivity. The second scenario is therefore enhanced *growth*, in which there is the same policy setting as under the continued reform scenario but with a higher productivity growth only in the EU. In this scenario, the consequences of enhanced productivity growth in European primary agriculture and in the European food processing industries are assumed.

The assumption of higher growth of labour productivity in the EU is clearly visible in figure 5.2. The overall competitiveness improves compared with the Continued Reform scenario.

The third scenario 'Liberalise' illustrates the consequences of full trade liberalisation in all sectors, including a withdrawal of all domestic support in agriculture. For this scenario the growth rates of sectoral productivity are the same as under the scenario Continued Reform. Again the EU continues to stay in a weak position.

Figure 5.1 **Competitiveness of the EU food industry under the Continued Reform scenario.**

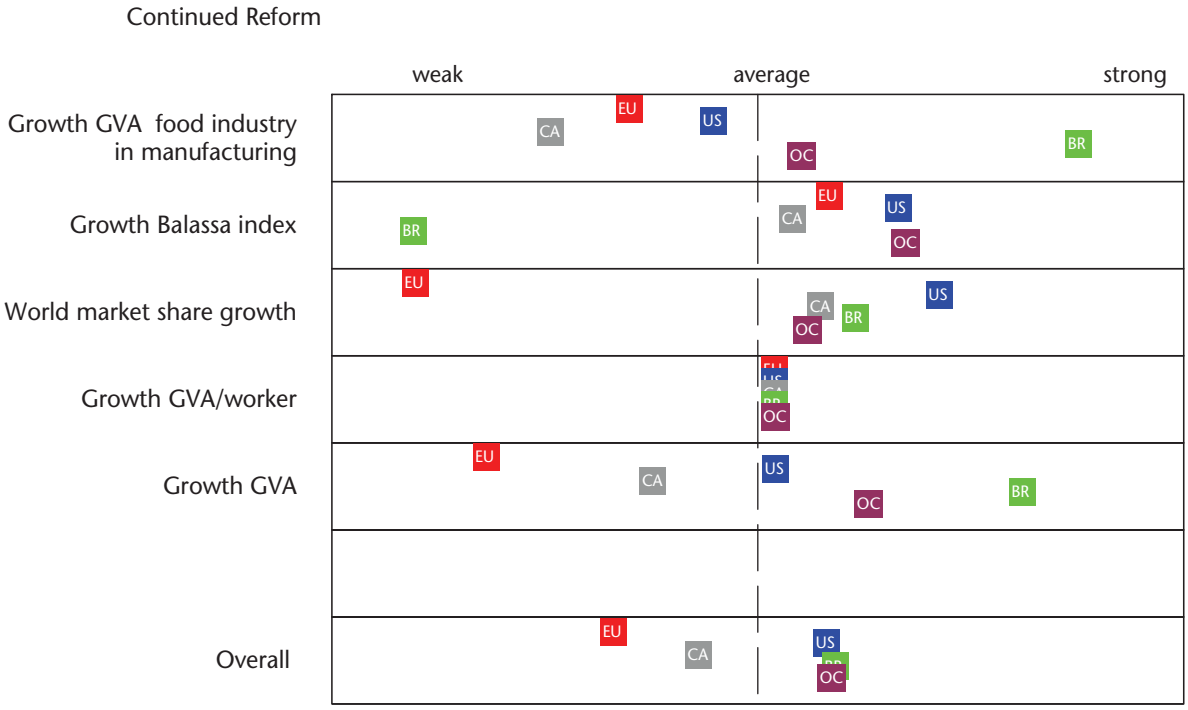


Figure 5.2 **Competitiveness of the EU food industry under the Enhanced Growth scenario.**

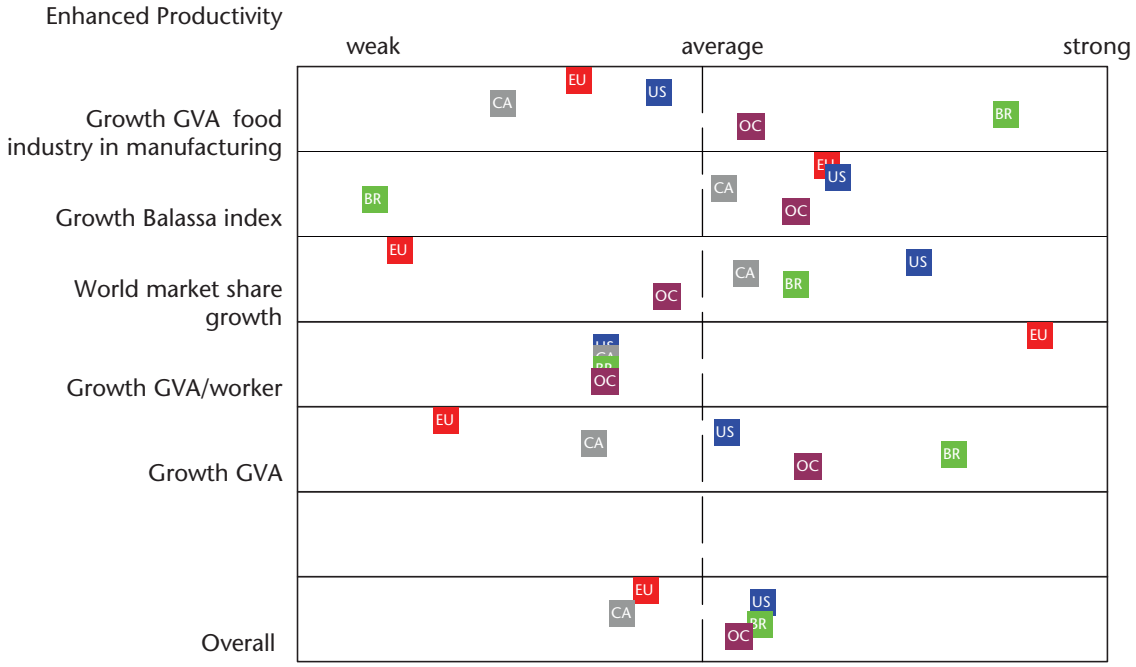


Figure 5.3 Competitiveness of the EU food industry under the 'Liberalise' scenario.

In all scenarios the value added share of the food industry in the total economy declines, except for the scenario 'Liberalise'. In the latter case, only in Brazil and Australia and New Zealand (OC=Oceania) does the value added of food industry grow faster than that of the whole economy. The competitiveness of the EU food industry will deteriorate further if past developments continue (Continued Reform) and in the Liberalise scenario. Others regions will improve their relative position compared to the EU. In scenarios with enhanced productivity growth in the EU compared to the rest of the world, the competitiveness of the food industry improves.

Maquiladoras are well known and successful examples of Mexican inward processing. The share of inward processing in the food industry is limited to 1 or 2% in these cases. Labour costs did not differ much between inward and the domestic processing. Cost advantages are most important to explain inward processing. The model structure does not allow developing an inward processing scenario.

5.2 Key Success Factors: a SWOT analysis

The aim of this chapter is to derive the Key Success Factors to enhance the competitiveness of the food industry. The framework of Strengths, Weaknesses, Opportunities and Threats (a SWOT-analysis) will be used. We first provide the external analysis of the European food industry: the Opportunities and Threats. These issues are not controlled by the food industry. The Strengths and Weaknesses are discussed next: the food industry can control these aspects. By confronting the Strengths and Weaknesses with the Threats and Opportunities, the Key Success Factors can be derived.

Strengths and Weaknesses

The European food industry competes on the destination (export) market for customers with similar enterprises. The first topic of the SWOT is assessing the strengths and weaknesses. On the domestic market, the food industry competes with other industries for attracting capital, labour and other means of production. Porter's five forces model is used to describe the strengths and

weaknesses of industries competing for customers (Porter, 1980). It deals with competition for buyers.

1. threat of entry

   – Economies of Scale are an important factor in the case of entry barriers. Most sectors of the food industry are characterised by an increasing scale and decreasing numbers of firms. The average company size in Europe is smaller than in the US, resulting in higher costs per unit product. History and the large cultural differences in Europe were (and still are) disincentives for scaling up. The European market is more heterogeneous than the US market. Food habits in Europe differ considerably between the Mediterranean countries and the North-Western Countries, for example. Compared to the competitors, Europe is weak in economies of scale. The European food industries perform low on growth of labour productivity. This indicates a cost disadvantage in the long run;

   – Product differentiation creates a barrier to entry. The cultural differences could be considered a barrier to entry. The existence of many small enterprises with specialised products in Italy for most of the sub-sectors, for meat in Germany and France, oils and fats (olive oil) in Spain and Italy and for beverages in France, Spain (wine) and Germany (beer) might support the assumption of the existence of differentiated products. However some evidence of consumer preferences for locally produced products weakens this assumption. Many locally produced products of wine, cheese, sausages, olive oil or pastry have almost full substitutes. Nevertheless consumers prefer local products. Small-scale production does not have the advantage of economies of scale in production, marketing and distribution. The higher prices will therefore be a weak aspect, especially for most commodities, which are consumed daily. Only for a limited range of niche products bought on special occasions or by extremely wealthy people can bear high costs. Examples of such niches are Parmesan cheese, Champagne or Pata Negra. The ongoing rise of internationally operating supermarkets chains does not stimulate low volume speciality products. Small scale can enhance product differentiation and thus lead to higher value added. However the responsiveness of the supply chain must be right to acquire a strong position. Europe might have an advantage in this respect. The lack of data on innovation to compare the benchmark regions prevents concluding remarks in this field;

   – Capital requirements are not an entry barrier: most industries are characterised by very small scale (family) businesses as well as multinational companies. However to be competitive for the large scale supermarkets, the industry needs to reach an equivalent scale. In the seafood industry, scaling up comes from outside the industry. Private equity funds and investment banks are becoming increasingly active aimed at industry leadership by creating large scale enterprises. EU is weaker in access to finance than the US (EU, 2004);

   – Switching costs are the one time costs a buyer faces when switching from one supplier's product to another. The buyers from the food industry are again mainly the supermarkets. Food products are highly standardised or codified, which makes them near substitutes. Costs for employee training or investments in selling units after switching will therefore be negligible. European retailers can easily sell European or foreign food products; the food industry is fairly weak in the supply side of e-business processes. The conclusion of the EU (2006, p46) is: 'Retail chains continue to drive integration along the supply chain, levering their bargaining power towards manufacturing. However, diverse ICT systems, integration costs and the lack of information standards continue to hamper external integration'. In the coming years e-business compliance might be a 'conditio sine qua non' for participation in supply chains;

   – Access to distribution channels will deter new entrants from launching new products. Existing producers and wholesalers are based on long relationships and the competition for shelf space is tough. In this respect European industries might have an advantage in

Europe. However several non European suppliers are active. It will be clear that this regional advantage is a disadvantage in other regions, such as the US. The possibilities of e-commerce and codification increase the transparency, which enables switching to lower costs suppliers. The larger scale US food industry is stronger because of the higher resources to entry new markets.

The overall conclusion of entry barriers is that the European food industry is relatively weaker due to the lower economies of scale. The future developments might be more positive if the small scale enterprises can exploit product differentiation;

2. threat of substitutes

   Each food processor separately provides the retailer with a small range of products. The differentiation in the range of products between food processors is very low. This means that the retailer can easily find another food processor or wholesaler with an almost identical range of products within comparable quality standards. So the position of the food industry is weak against the retailers. But is the European food processor weaker than in other regions? As is shown in several charts of leading (large) companies for each sub-sector, in Chapter 4 the European industries are well presented. This suggests that the European food industry, despite the overall small scale level is on a competitive level with foreign companies. What matters is the right strategy;

3. bargaining power of buyers

   Supermarkets have a certain level of bargaining power which they use to claim prices and conditions that are not always suitable to their suppliers. The increasing share of private labels underlines the bargaining power of retailers. The forecast of an even smaller number of supermarket chains operating at European level does not enhance the bargaining power of processors. However this structure of the supply chain does not differ from the benchmark countries.

   The industry has an open mind towards development on the world markets. The exports as well the imports rose over the last decade. This indicates knowledge of world markets. European prices of export products are higher than the prices of imports: higher valued products are exported, lower valued products are imported. The US has the opposite position. This underlines the proficient level of market orientation of the European food industries;

4. bargaining power of suppliers

   With respect to the food processors, the primary producers must be seen as the suppliers. Producers have relatively little bargaining power. Compared to food processors, producers operate on a small scale. The bargaining power of producers for several products is even threatened by the logistic option of international sourcing. Substitutes are abundantly available from several parts of the world, as is illustrated for the meat sector. The European food processors are nevertheless in a weaker position than in other regions. The Common Agricultural Policy fixed the supply of some raw materials (such as milk and sugar) and is therefore a threat for the industry. The Common Fisheries policy (which is based on a stronger economic foundation than the CAP) and some environmental policies have similar effects;

5. degree of rivalry between existing competitors

   The degree of rivalry in the food processing market is high, which is reflected in the top-level companies in the charts and the production locations. The large food processors are becoming multinational enterprises. The retailers show a similar development. No strong evidence is found that the food industry as a whole is weak in competitiveness compared to other regions. The market can be characterised as very competitive.

Competition on the final market was illustrated above. Now we discuss the *competition on the (input) factor markets*. Besides raw material specific for the industry, the food industries also need general factors of production which are used by other industries: labour and capital. In the methodology of Chapter 4, the share in the food industry was used as indicator for this competitiveness. Compared to other industries, the food industry has a slightly increasing share in the manufacturing industry. It indicates that the food industry is competitive enough to attract sufficient production means. Compared to the US, the share of food industry in total manufacturing is growing in the US even faster: a stronger position for the US food industries.

Opportunities and threats
The opportunities and threats are the second topic to be raised in the SWOT analysis. These are externalities for the sector and cannot be influenced by the food industry. Some factors are the domain of government policies.

Opportunities
- despite the large common market of over 450 million people, the companies in EU still operate in a fragmented EU market. The European market is 50% larger than the US market. Economies of scale are not fully exploited. The activities of equity funds indicate that it will be profitable to exploit the advantage of economies of scale in the common market;

- compared to the US, cultural differences in Europe are much greater. Tastes, food habits and preferences can be distinguished in different regions and member states. The food industry can draw on many sources for innovation and differentiation. It is easier to find out about different markets, products or activities. This not only applies to products but also to organisational and process management. To exploit these 'Economies of Scope', a focussed and implemented strategy will be necessary. The differences between countries, including the different languages, seem to be a threshold;

- Increasing income and wealth. Partly as a result of more international trade and specialisation, incomes in Europe as well as export markets are expected to rise in the coming decades. Although for many food products, income elasticities are low, this provides opportunities for convenience and luxury products;

- Cultural differences can benefit the increased preferences for healthy and convenience food. European consumers buy most food at the retailers. In the food service sector, the Europeans are not (yet) strongly related to fast food outlets, which count for half of the eating places in the US. Fast food restaurants are not known for healthy food. The different snack cultures in different European countries can be exploited by introducing (healthy) consumption habits to other member states;

- New technologies, like micro-machine processing, might result in exploiting economies of scale at a low scale level. This development will benefit small enterprises in the EU. The preferences based on cultural differences enhance this development. Whether these opportunities for regional differentiation are beneficial will depend on the implementation of a focussed strategy;

- ICT supply management systems can enhance the European food industry in Europe. Improving and standardising according to the European culture makes internationally sourcing by European retailers more difficult. Moreover such systems will enhance exploiting micro-machine technology and the opportunities of the RFID.

Threats
- the growth of the value added of the food industry is lower in the EU than in the US. A major driver for the food industry is the quantity demanded. The lower population growth in the EU will restrict the growth of the food industry. More production requires exploiting markets outside the EU;

– the bargaining power of the retailers is getting stronger, due to the larger scale of retailers. Consolidation of the food industry (economies of scale) will be essential to bring bargaining power in balance;

– the Common Agricultural Policy restricts the availability of raw materials. Either the volume is limited or/and due to the limited supply the price is unfavourable. The results of the dairy and sugar sector provide some evidence of weakened competitiveness due this restriction;

– Industrial policies, which apply to all industries, are less favourable on several aspects in the EU than in the US. Examples relate to access to finance, administrative burdens, human capital and R&D. The last two items are important for the innovative capacity. Within the EU, labour taxation is favourable in Ireland and the Netherlands. Both countries showed the highest labour productivity of all the EU-15 countries;

– innovation and product differentiation is further hampered by the approval procedures of EU Food law, which is more complex and time-consuming than in the US. The opposition to products based on GMO (Genetically Modified Organism) among a large part of the EU population does not help either.

SWOT confrontation matrix

The third topic of the SWOT analysis is deriving the Key Success Factors. Figure 5.4 provides the confrontation matrix and summarises previous issues. The strategic Issues are indicated by ++ for the most relevant and by + for relevant issues. Elements dealing with economies of scale or labour productivity and economies of scope are valued by ++ as more important due to the strong relationship with the main generic strategies cost and differentiation leadership as indicated by Porter. Obviously the quadrant 'Weaknesses and Threats' is less favourable: a common strategy is to withdraw from that market. However some issues in this quadrant, which will be discussed later, must be tackled. The following strategic issues are derived.

1. economies of scale and growth of labour productivity should be enhanced

   To stay in business in a highly competitive market, costs should be minimised. The difference in economies of scale with the US indicates possibilities for improvement. Having a low cost position yields the company above average returns. Why is cost leadership so important to Europe? Most food products are in the range of necessities with low demand elasticities. The market is mature and shows signs of saturation. Price competition is the dominant competition strategy. The EU population is growing more slowly than other countries, so other market shares must be gained on foreign markets. Success requires being highly competitive.

   This weakness and the globalisation of the supermarket, which is the major outlet for the food industry, require internationally operating suppliers with sufficient scale. The competition between retailers in many countries is based on price competition. In Germany the discounters are dominating. But the service oriented UK supermarkets will also only have a small range for higher prices. Wal-Mart, a price-oriented retailer, entered the UK market, which has also impact on the price setting behaviour of the UK retailers.

   Cost leadership enhances the strengths, attracting capital and labour, staying competitive and a sufficient performance on the export market;

2. exploit economies of scope

   The cultural difference within Europe can be exploited in other markets than the local market. This can be indicated as innovative products on other markets, fulfilling the demand for differentiated products. In the dairy industries, the innovation of the French Danone in small size packed flavoured yoghurts has been followed by industries in other countries. This means additional value added for the dairy industry. Some products contribute to health. Olive oil as an important ingredient of the Mediterranean kitchen has been successfully introduced in

northern European countries. Exploiting the cultural heritage (like Belgian beer or French cheese) in export markets is another example. However the marketing problems with French wine show the pitfall of such a strategy

Figure 5.4 SWOT-confrontation matrix.

	SMEand Cultural differences	Attracting capital and labour	Competitive industry	Export –import orientation		Small scale of industry	Low labour productivity
	Strengths					Weaknesses	
Opportunities							
Exploit economies of scale		++	++	++		++	++
Exploit Economies of scope	++			++			
Health and differentiation	+						
New technologies	+		+	+			
Threats							
Population growth				+			
Scale retailers						++	
Agricultural policy			+	+			
Enterprise policy			+	+			
Approval procedures			+	+			

3. reshaping the global food industry by early adoption of New Technologies

New technologies like micro-machine processing can exploit the cultural differences in Europe by the large number of small processors in the EU. This will result in many differentiated products, responding to the fresh trend and locally produced food products. These products will be destined for the domestic market. Designing ingredients for these types of products can enhance the export position of high value added products. An example can be found in the bakery industry. Several supermarkets supply freshly baked products based on pre-baked products or freshly prepared dough based on a pre-mix of ingredients. The consumers experience a flavour of products prepared according to traditional methods. The products might appeal to several trends, such as health, fresh and luxury in short high value differentiated products. The European industry has a strong position in bakery ingredients. CSM is a European example is this area. CSM operates in USA, Europe, Canada, Brazil and Asia, and has number 1 positions in the UK, Germany, France and Italy with a total turnover of €8.5 billion.

Establishing e-business standards for the food supply chain will enhance the European food industry. These standards should fulfil the professional requirements of large scale enterprises and be simple to use for the SMEs. The e-business should support the efficiency of the supply chain, reduce administrative burdens and enhance food safety. RFID could be a promising technology to support the e-business in the food industry;

4. enterprise and trade policies

Agricultural policy restricts the supply of raw materials. This restricts the development of the food industry. The food legislation should enhance the approval procedures for new products; innovation should be encouraged not hampered. And in general, the institutional framework should be better than that of the competitors. The transparency of the food law is an advantage for the industry, not only for the EU enterprises but also for the competitors. If competing countries are less transparent, this could be a competitive disadvantage. One expert stated that a third country negotiates with 'Brussels' for access of their products to all EU member states. But this influence is not used to negotiate access for all EU countries to that specific country. Each country has to negotiate individually. Harmonisation of trade and enterprises policies enhances the competitiveness of the food industry. Standard setting (as in organic products) by business and governments can be beneficial.

5.3 Scenario analysis

5.3.1 Scenario setting in the EU Food Industry competitiveness study

The previous section showed among others that the EU has a lower labour productivity than the US and that the CAP restricts the supply of raw materials. In this section the effects on the competitiveness will be illustrated by scenarios that illustrate what might happen if the EU succeeds in improving the productivity more than the rest of the world.

For the principle setting of the scenario calculated in this study, it is important to distinguish between those drivers or developments that are assumed to be exogenous. These drivers are not directly influenced by policies in the short or medium term. They are population growth, macroeconomic growth, consumer preferences, agri-technology, environmental conditions and world markets. The second element of drivers describes *policy-related* drivers, and these will certainly have a discernable effect within the short and medium term. They are EU agricultural and fishery policies, enlargement decisions and implementation, WTO and other international agreements and environmental policy.

Scenarios

We start with the current setting of Common Agricultural Policy of the EU, after the 2004 enlargement and the implementation of the 2003 reform (decoupling of direct payments and the partial reform of the sugar market organisation). As the database which is used for this study is based on 2001 (GTAP Version 6.5), the model has been updated to reflect the actual CAP of 2006. This is the *Base* scenario. Several choices have been made for the development and analysis of scenarios. The second is that the policy-related drivers are then coupled to the baseline scenario in two iterations. The *Continued Reform (CR)* is the second scenario, in which current policies are considered to continue into the future, with modifications over time that are reasonably certain to happen according to the current political situation. These scenarios will project a medium-term development until 2010. These policy changes will stem from internal forces at European level. Here one can expect further reforms of those market organisations which apply quantitative restrictions on farmers, milk, sugar and obligatory set-aside. At international level, an agreement in the current Doha-Round under the WTO will bring a further decline in support to farmers together with a complete abolition of export subsidies. As proposed by the EU, improved market access will be implemented in four tiers for bound tariffs between 0 and 30 percent, 30 and 60 percent, 60 and 90 percent and a fourth tier for bound tariff rates above 90 percent. For these four tiers, the proposed reduction rates are the following: 35 percent for the first, 45 percent for the second, 50 percent for the third and 60 percent for the fourth tier. According to the EU offer, there is also a maximum tariff of 100 percent (tariff cap) implemented in this scenario (see table 5.1). Growing economies in other regions of the world will also provide export opportunities for European agricultural and food processing sectors. Therefore, variants of the productivity scenario will analyse the impact of a further CAP reform including an abolition of export subsidies, a decline in import tariffs and a phasing out of milk and sugar quotas in

the EU. The results of this scenario will be compared with the current situation on the markets on agricultural and food markets. To identify the impact of the abolition of production quotas, the phasing out of quotas in the milk and the sugar sectors are analysed in two separate scenarios. Scenario 2a (*CR-NQ milk*) analyses the consequences of abolishing the milk quota, while Scenario 2b (*CR NQ sugar*) analyses the consequences of abolishing the sugar quota. The abolishing of the quotas is modelled by an extreme increase in production quotas above a level where quotas margins become zero and quotas are not binding anymore. For further details of the technical implementation of production quotas see the technical annex B with the model description.

As outlined in previous sections, the degree of competitiveness of industries is determined especially by the development of sectoral productivity. Therefore, a third scenario is an *enhanced productivity scenario*, in which there is the same policy setting as under the productivity scenario. This scenario will analyse the consequences of higher productivity growth in European food processing industries as well as in European agriculture compared to other countries and sections. The sub-scenario (3a) analyses the consequences of enhanced productivity growth in European primary agriculture only, while under sub-scenario (3b) enhanced productivity growth is assumed only in European food processing industries. An additional sub-scenario (3c) analyses the impact of enhanced productivity growth in both sectors: agriculture and food processing. To identify the consequences for European food processing industries in the context of trade liberalisation, a final scenario illustrates the consequences of full trade liberalisation in all sectors including a withdrawal of all domestic support in agriculture. For this fourth scenario 'Liberalise' (4), the growth rates of sectoral productivity are the same as under scenario 2. All scenarios except the Base scenario will project a medium-term development until 2010.

Table 5.1 Outline of Policy Scenarios in the EUFI Project

	Acronym	Scenarios	Description
1	Base	Baseline: 2001 – 2006	Development of CAP until the 2006 EU accession of EU10 Implementation of 2003 CAP Reform: – Decoupling – Sugar reform
2	Continued Reform (CR)	Continued reform: 2007-2010	– Implementation of EU WTO-offer Tariff Reduction: Four Tiers Cuts 0 -30 35% 30 – 60 45 % 60 – 90 50% 90+ 60% – average productivity growth 1.2 % p.a.
2a	CR-NQ- milk	Abolition of milk quota	– as 2) but abolition of milk quota only
2b	CR-NQ-sugar	Abolition of sugar quota	– as 2) but abolition of sugar quota only
3	Enhanced productivity	Productivity: 2007-2010	– Implementation of EU WTO-offer – Abolition of milk and sugar quotas
3a	Prod. Agr.	Primary agriculture	– + enhanced growth rates in technical progress in European primary agriculture only (50% higher compared to scenario 2)
3b	Prod. Food	Food industry	– + enhanced growth rates in technical progress in European food processing industries only (1.8% p.a.)
3c	Prod. Both	Primary agriculture and food industry	– + enhanced growth rates in technical progress in European agriculture and food processing industries
4	Liberalise	Liberalise 2007-2010	– Full multi-lateral trade liberalisation – Full withdrawal of domestic support in agriculture

The presented scenarios focus on the trade policy proposed by the EU. Within the framework of this study, proposals from others (such as from the US, G10, G20) are not analysed. To evaluate these different proposals, a separate study needs to be conducted with more capacity than available in this study.

Data

Version 6.5 of the GTAP data for simulation experiments was used. The GTAP database contains detailed bilateral trade, transport and protection data characterising economic linkages among regions, linked together with individual country input-output databases which account for intersectoral linkages. All monetary values of the data are in USD millions and the base year for version 6 is 2001. This version of the database divides the world into 88 regions. An additional interesting feature of version 6 is the distinguishing between the 25 individual EU member states. The database distinguishes 57 sectors in each of the regions. That means that for each of the 65 regions there are input-output tables with 57 sectors depicting the backward and forward links amongst activities. The database provides quite a lot of detail on agriculture, with 14 primary agricultural sectors and seven agricultural processing sectors (such as dairy, meat products and further processing sectors).

The social accounting data were aggregated to 30 regions and 16 sectors (see Tables 5.2 and 5.3). The sectoral aggregation distinguishes between agricultural sectors that use land and sectors engaged in the Common Agricultural Policy (CAP). The regional aggregation includes all EU-15 countries (with Belgium and Luxembourg as one region) and all EU-10 countries (with Baltic regions aggregated to one region and with Malta and Cyprus included in one region) and the most important countries and regions outside EU.

Table 5.2 Regional Aggregation in the EUFI Study

No.	Code	Description	No.	Code	Description
1	belu	Belgium and Lux.	16	cze	Czech Republic
2	dnk	Denmark	17	euba	Baltic countries
3	deu	Germany	18	hun	Hungary
4	grc	Greece	19	pol	Poland
5	esp	Spain	20	svn	Slovenia
6	fra	France	21	svk	Slovakia
7	irl	Ireland	22	reur	Rest of Europe
8	ita	Italy	23	fsu	Former Soviet Union
9	nld	Netherlands	24	usa	USA
10	aut	Austria	25	can	Canada
11	prt	Portugal	26	ram	Rest of America
12	fin	Finland	27	bra	Brazil
13	swe	Sweden	28	oce	Australia, New Zealand
14	gbr	United Kingdom	29	asia	Asia
15	euis	Cyprus, Malta	30	afri	Africa

Source: GTAP data base, Version 6.5.

Table 5.3 Structure of Sectoral Aggregation in the EUFI Stud

No.	Code	Description	No.	Code	Description
		Primary agriculture			**(Food) industry**
1	grain	Cereal grains nec	9	meat	Meat and meat products
2	oils	Oil seeds	10	oil_f	Vegetable oil
3	sug	Sugar cane and beet	11	dairy	Dairy products
4	hort	Vegetables, fruit, nuts	12	sugar	Sugar
5	crops	Other crops	13	bev	Beverages and tobacco
6	cattle	Cattle, sheep, goats, horses	14	agro	Other agr-food products a)
7	oap	Animal products nec	15	ind	Industry
8	milk	Raw milk	16	ser	Services

a) includes processed rice, other food products and fisheries.

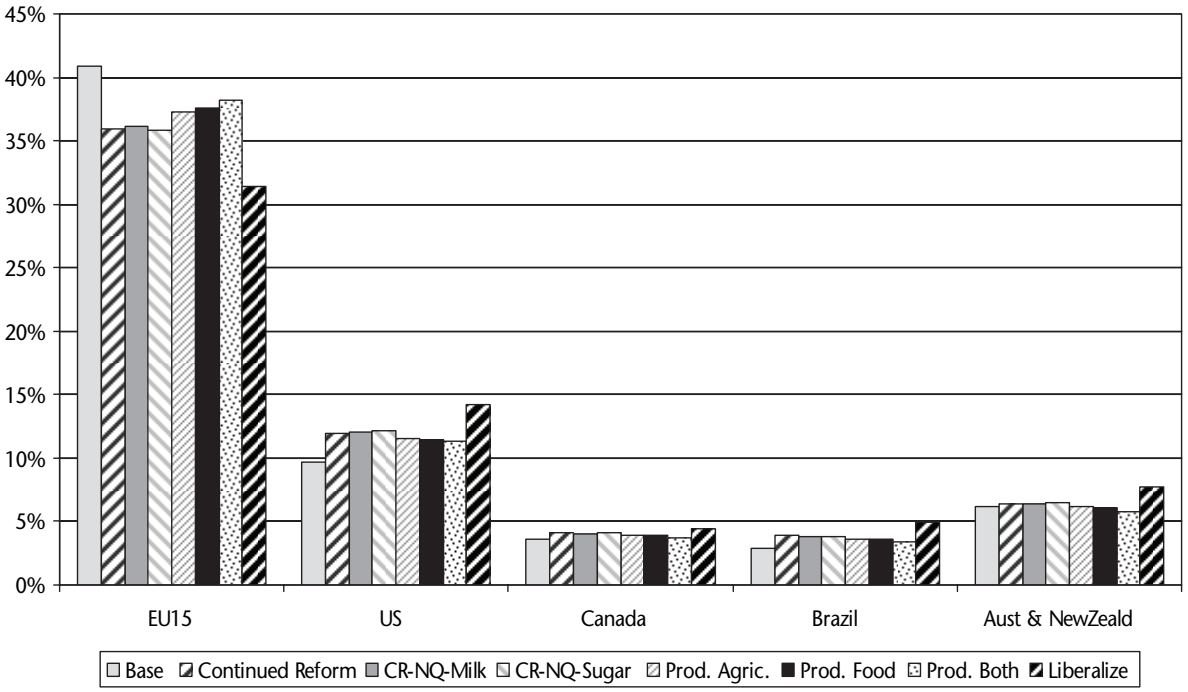
Source: GTAP data base, Version 6.5.

5.3.2 Results of the model

Food Export and International Competitiveness

The following graphs present results of the scenarios calculated for this study. In general the first scenario which analyses the consequences of the implementation of the proposed policy reforms (Continued Reform) and the scenario analyzing the full withdrawal of any support (Liberalise) show a decline in competitiveness of European food processing industries both at international and national levels.

Figure 5.5 Food exports shares (% of world food export) of selected regions under different scenarios 2010 (base: 2006).



This is presented in figure 5.5 which describes the development of food exports shares of total world food exports. Under the initial 2006 situation (Base), the EU has a food export share of over 40 percent. It should be mentioned that under all scenarios calculated for this study, the EU-15 remains the largest exporter of processed foods. However, the declining export shares

between 2006 and 2010 indicate a loss in international competitiveness. This decline is due to the consequences of the decline in agricultural support as the consequence of the implementation of EU WTO offer. The CAP instruments also affect the prices of processed food prices. As a consequence production in agri-food sectors decline in the EU-15 and excess supply disappears. In this scenario other regions in the world gain export shares: highest relative increases are in US and Brazil.

An Enhanced Productivity growth in European primary agriculture (scenario Prod. Agr.) and European food processing industries (scenario Prod Food) will compensate for the above mentioned decline in European share of food products in world total food exports. It is assumed that productivity growth rates in the other regions are as high as under the Scenario Continued Reform. The higher productivity growth will reduce cost in production in Europe relative to other competitors at world markets. In the scenario Prod Both enhanced productivity growth is assumed to take place in both sectors primary agriculture and food processing. Under this scenario European export shares in world market will increase significantly.

Full liberalisation, which also includes the liberalisation in trade in non agri-food products, will lead to a dramatic drop in the export share of EU-15 agri-food products in total food exports. Under this scenario 'Liberalise', all domestic support to farmers is also withdrawn, e.g. phasing out of coupled and decoupled direct payment. This cut in agricultural support together with full trade liberalisation will lead to reduced agricultural output and increased domestic consumption in agri-food products as a consequence of declining food prices. This effect also contributes to the decline in food exports.

In relative terms Brazil and Australia/New Zealand benefit most under the liberalisation scenario with an increase in the food export share of 29 percent and 20 percent, respectively (figure 5.5). The changes in agricultural policies are also reflected in the specialisation level in different commodities amongst the trading partners. Here the Balassa Index shows the share of a product in total national exports relative to the share all exports of this product in the sum of world exports. A level larger than 1 indicates a relative specialisation for that commodity. The changes in the Balassa Index under different scenarios are presented in table 5.4.

Under the scenario Continued Reform the EU-15 shows a decline in specialisation in meat, oils and fats and sugar, whereas the index increases for dairy and beverages. The increase in dairy products reflects the increase in milk production in the EU-15 as a consequence of the abolition of the milk quota regime which is modelled under this scenario.

The decline in the index for sugar can be explained by the cuts in the sugar prices and the decline in European sugar production as a consequence of the sugar reform. Brazil and the US show a strong increase in specialisation in the meat sector under the scenario Productivity. Also the specialisation in dairy production in Australia/New Zealand continues under this scenario.

Enhanced Productivity Higher growth rates in primary and in the food processing industries in the EU-15 do not reverse the development under the Continued Reform scenario. However, the decline in specialisation in sugar and oils and fats is smaller compared to the Continued Reform scenario. A *combined increase in productivity* in primary agriculture and food processing industries show higher levels in the Balassa Index compared to the scenario 2a and 2b. Thus, Enhanced Productivity growth in European agri-food sectors will improve the competitiveness of European food products on world markets. Under full *liberalisation*, the European food industries show a decline in specialisation for most products. Only the specialisation in beverages and tobacco increases slightly. These results mirror the decline of Europe's food export share in total world food exports as described in figure 5.5

Economy-wide Economic Growth

The dynamics of income growth in different regional are significantly affected by growth in productivity. Figure 5.6 indicates the growth in national GDP under the different scenarios. Brazil and Australia/New Zealand benefit most under the scenario Productivity while the EU-15 shows only a relatively small increase in GDP.

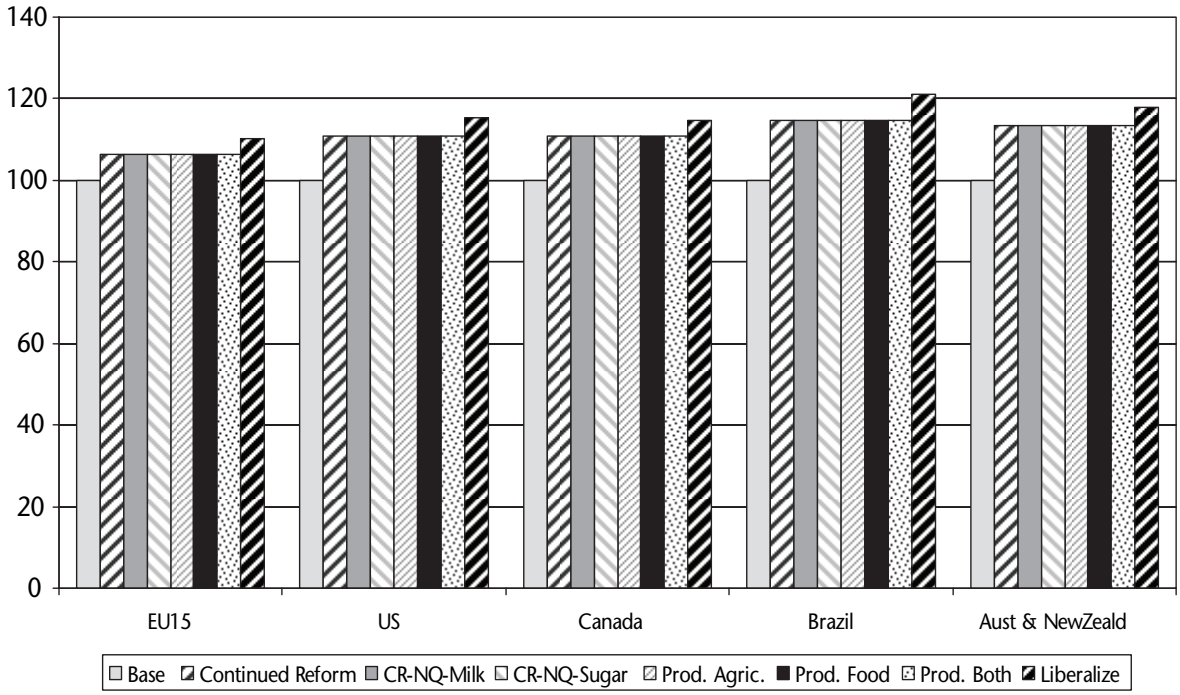
Table 5.4 Development of the Balassa Index under different Scenarios in Food Processing Industries

	EU15	US	Canada	Brazil	Australia and NZ
Baseline					
Meat	1.12	1.27	1.68	5.14	7.42
Oils and fats	0.87	0.45	0.52	3.91	0.78
Dairy	1.76	0.23	0.30	0.14	11.21
Sugar	0.37	0.33	0.51	18.02	7.53
Beverages and Tob.	1.70	0.67	0.53	0.15	2.21
Other Food	0.95	0.80	1.02	2.64	2.95
Continued Reform					
Meat	0.73	1.94	2.28	10.80	5.56
Oils and fats	0.69	0.36	0.39	3.55	0.47
Dairy	1.73	0.27	0.62	0.22	14.61
Sugar	0.22	0.30	0.41	17.82	8.67
Beverages and Tob.	1.72	0.73	0.54	0.14	2.18
Other Food	0.98	0.88	1.02	2.36	3.04
Enhanced Productivity: Agriculture and Food Processing					
Meat	0.79	1.93	2.26	10.19	5.63
Oils and fats	0.77	0.35	0.40	3.54	0.46
Dairy	1.81	0.27	0.60	0.20	13.96
Sugar	0.23	0.30	0.40	17.76	9.15
Beverages and Tob.	1.79	0.71	0.52	0.13	2.12
Other Food	1.02	0.88	1.00	2.35	2.99
Liberalise					
Meat	0.46	2.44	2.60	11.94	4.29
Oils and fats	0.50	0.24	0.27	1.31	0.26
Dairy	1.59	0.39	1.29	0.11	12.79
sugar	0.12	0.24	0.23	12.27	13.47
Beverages and Tob.	1.76	0.81	0.53	0.10	2.17
Other Food	0.99	0.98	0.99	1.78	2.88

Different assumptions on sectoral productivity growth rates as analysed under the scenarios Enhanced Productivity of both Agriculture and Productivity Food Processing only have a marginal impact on total GDP. However, the final scenario Liberalise reveals the consequences of full trade liberalisation which also contributes significantly to the growth of national GDP. Again, Brazil is the region with the highest increase in national income due to the relatively high protection in the non-agri-food sectors. Internal competition for resources, intermediate inputs and production factors amongst different industries at national level can be described by the growth in real value added of a specific industry in the total industry. To illustrate the contribution of the food industry to total income, the following figure 5.7 illustrates the development of the share of food processing industries value added in total national value added.

The quantitative results of this study indicate that in the near future in the EU-15, like other industrialised countries presented in this analysis, the share of food processing will continue to fall and share of activities, e.g. services will continue to increase. To assess these results, it should be stated that these results reflect the long-term effect of the analysed policy reforms analysed here. Regions with high shares of agriculture and industries may be vulnerable to this process with regard to employment and income growth, as the structural change process is often characterised by adjustment processes and related costs. It takes time for people to adjust their skills and

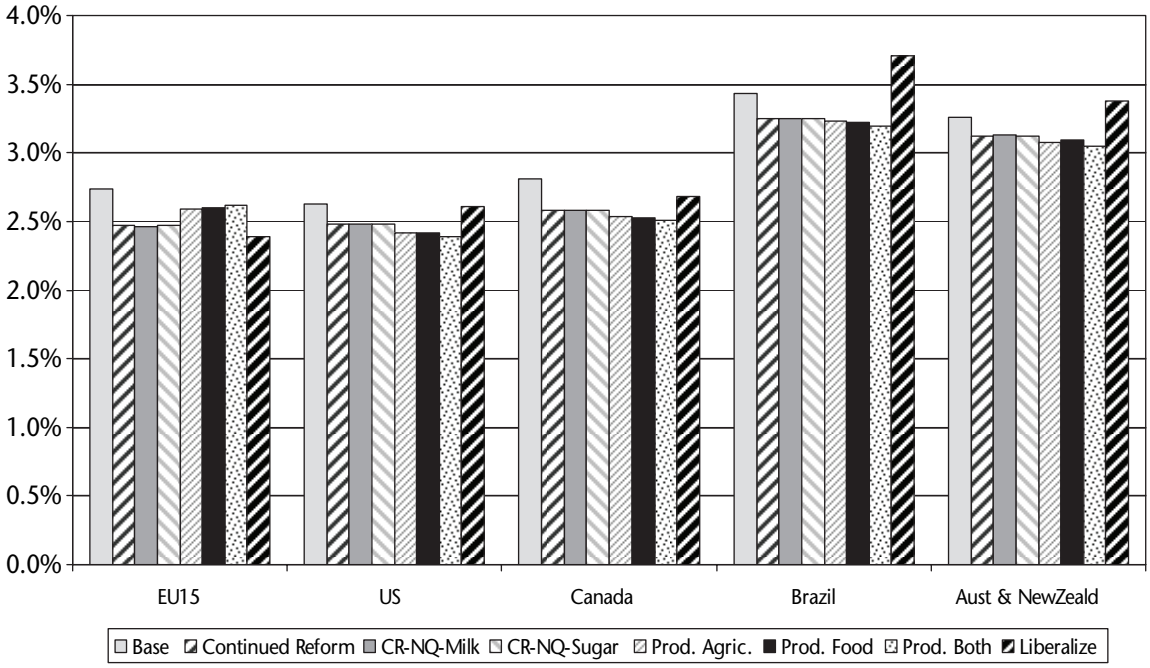
Figure 5.6 Development of GDP in selected regions under different scenarios2010 (base: 2006).



industries to grow, etc. Even in Brazil, sectoral share in value added will tend to decline. Food industries in these countries can only partially participate in high income growth. This development is due to the fact that income elasticity's for services and manufactures are higher than for agricultural and food products.

The other policy scenarios indicate that this development is independent from the assumptions of productivity growth rates. In all scenarios apart from the Liberalisation scenario, the contribution of food processing is less than under the base situation. However, an enhanced growth rate in productivity in primary agriculture and/or food processing can partially compensate for the decline

Figure 5.7 Development of food industries' value added shares (% of regional value added) in selected regions under different scenarios 2010 (base: 2006).



value added share of the food processing. Enhanced productivity in agriculture and food processing industries (Prod. both) will lead to a higher level of value added for the food sector compared to the two scenarios where either primary agriculture or food processing industries exhibit higher productivity growth rates. An increase in productivity in European agri-food sectors has a slight negative impact on the economic performance of the food processing industries in other regions.

As presented in Figure 5.8, full liberalisation will have a significant negative impact on European food processing. The share in food industries' value added continues to decline under this scenario. In the other countries, however, this share increases. In Brazil and Australia/New Zealand the contribution to total national income is even higher compared to the initial situation.

Employment in Food processing industries
The impact of different policy scenarios on employment is described in table 5.5. The decline in the contribution of the European food processing industries to total GDP under scenario Continued Reform is also mirrored by the development of employment in the European food processing industries.

The Continued Reform scenario (developments until 2010) will lead to a decline in sectoral employment by around 2.8 percent in EU food processing. Employment in the other regions or countries increases under the scenario Continued reform is between 2.8 percent in Canada and around 9 percent in Australia/New Zealand. In these countries employment in food processing increases while the sectoral shares in total GDP decline, see figure 5.7. This different development can be explained by the following: most other regions are much more dynamic compared to the EU. Total GDP increases between 12 and 18 percent in these regions. Here factor substitution leads to an increase in labour employment and a 'decline' in capital use, i.e. capital is substituted by capital. However, in the EU the opposite development is the case. Here labour in food processing industries is substituted by capital.

Figure 5.8 Development of the composition of value added food industry in the EU-15 under different scenarios, in Million USD, 2010

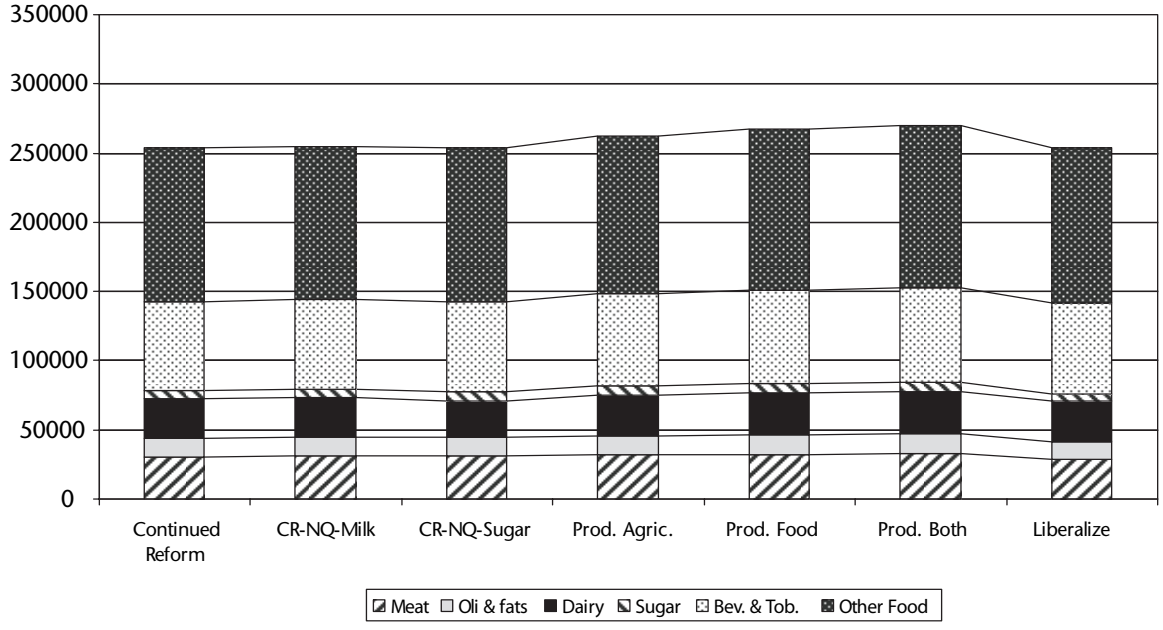


Table 5.5 Development of Sectoral Employment under different Scenarios in Food Processing Industries, Base = 100

		EU-15	US	Canada	Brazil	Australia and New Zealand
1	Base	100.00	100.00	100.00	100.00	100.00
2	Continued Reform	97.24	105.11	102.83	104.52	108.87
2a	CR NQ Milk	97.66	105.01	102.72	104.42	108.76
2b	CR NQ Sugar	97.29	105.05	102.84	104.36	108.65
3a	Enhanced Prod. Growth Agriculture	97.68	105.01	102.79	104.37	108.78
3b	Enhanced Prod. Growth Food	97.57	104.95	102.71	104.25	108.62
3c	Enhanced Prod. Growth Both	97.51	104.95	102.73	104.26	108.64
4	Liberalise	95.55	106.85	103.74	106.00	112.36

This development becomes even more obvious under the last scenario Liberalise. Here employment in European food processing industries declines by 4.5 percent compared to the initial situation, while employment in food processing industries in Australia and New Zealand increases under full liberalisation by more than 12 percent, see table 5.5.

Enhanced growth in sectoral productivity in primary agriculture and food processing as modelled under scenario Prod. Both will lead to a slight decline in employment. However, the impact of productivity on employment is relatively small compared to the consequences of trade liberalisation modelled under the scenarios Productivity and Liberalise. The main reason for the fairly insignificant impact of different assumptions of productivity growth in European agriculture and food processing industries can be explained by the limited economy-wide relevance of these sectors. Changes in sectoral productivity growth will have an impact on the output level but almost no impact on the economy-wide factor markets. Therefore, different growth rates of productivity in food processing and primary agriculture have only little impact on the level of factor prices.

Sectoral Income in Food processing industries

Figures 5.9 to 5.12 illustrate the composition and development of the value added in food processing industries in the EU-15, US, Canada, Brazil and Australia/New Zealand. All values are in Million USD presented for the year 2010. Under the scenarios with Enhanced Productivity growth rates in the EU value added in the European food processing sector gain in total terms. In all other regions the expansion of European food processing industries has a slightly negative impact. However, under full liberalisation, total value added in food processing industries remains constant in the EU-15 while it expands in the other regions.

A comparison of figure 5.5 presenting the changes in European food exports with figure 5.8 shows that the loss of export shares at world level does not coincide with a general decline in value added of European food industries. Total value added in European food industries remains relatively stable between different scenarios. There are some changes in the composition of total value added, e.g. the abolishment of milk quota will increase the share of the dairy sub-sector. However, a constant value added in food processing does not imply a constant or stable level of employment, due to the fact that increasing productivity requires less labour to produce the same amount of output. The positive changes in total value added under the scenarios with Enhanced Productivity growth are not mirrored by significant increase in sectoral employment.

Figure 5 9 **Development of the composition of value added food industry in the United States under different scenarios, in Million USD, 2010**

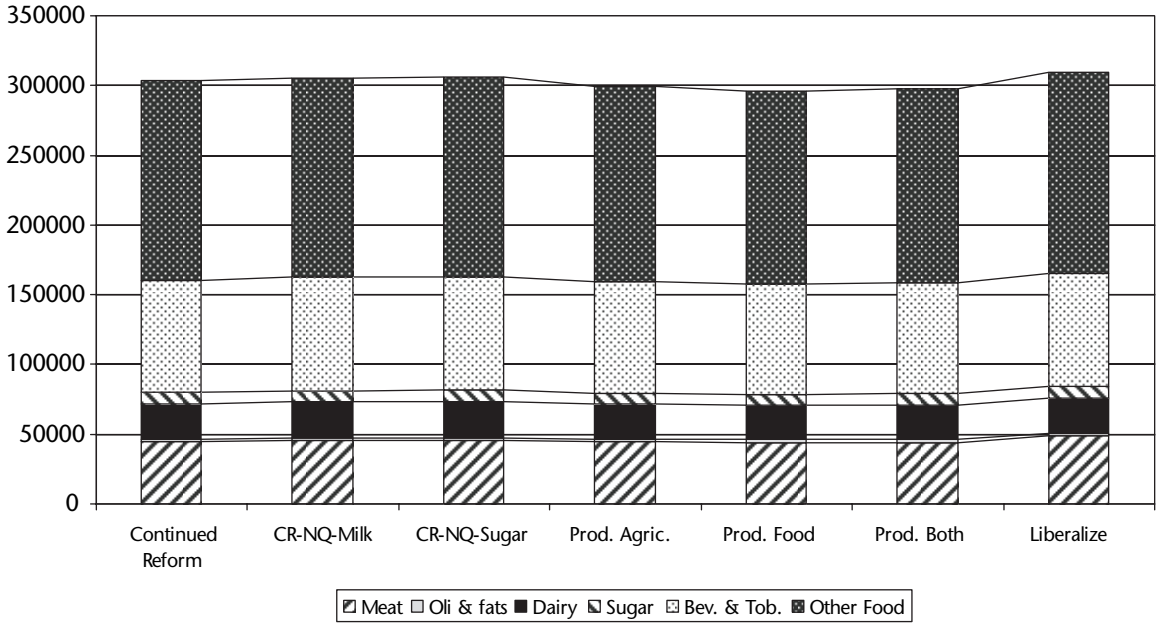


Figure 5 10 **Development of the composition of value added food industry in Canada under different scenarios, in Million USD, 2010**

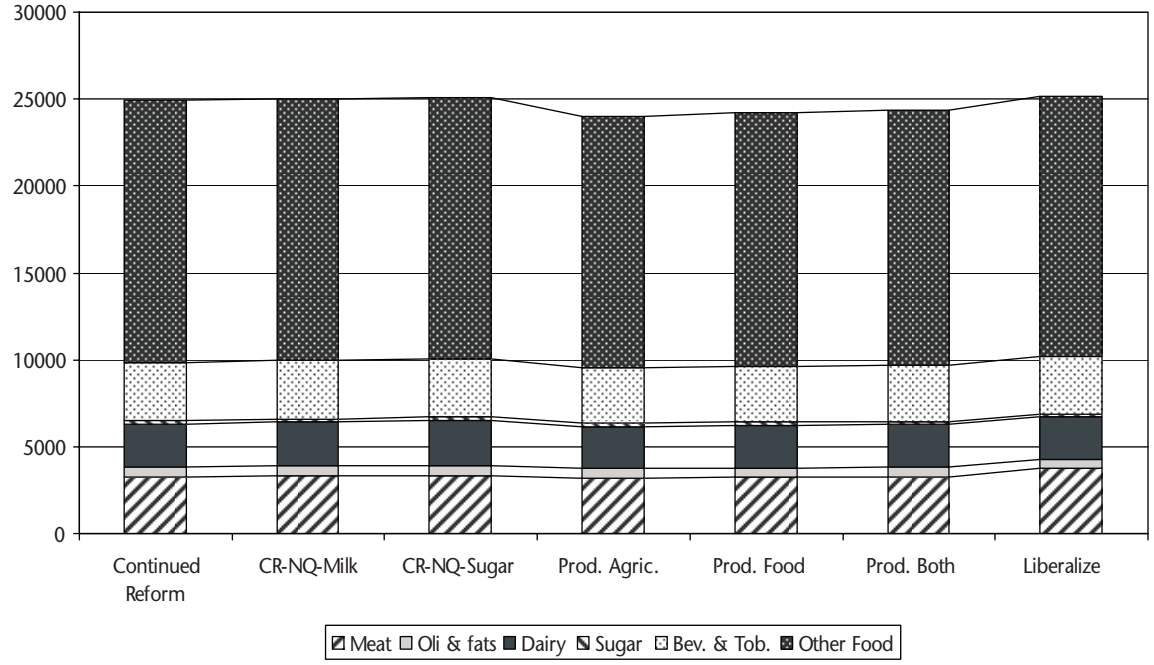


Figure 5 11 **Development of the composition of value added food industry in Brazil under different scenarios, in Million USD, 2010**

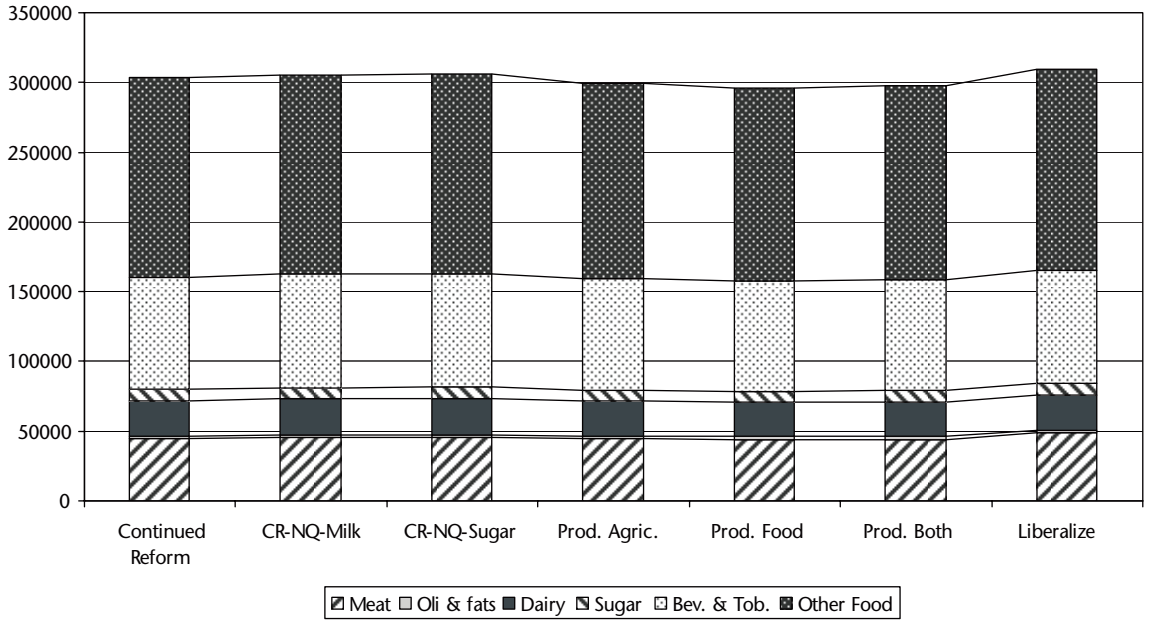
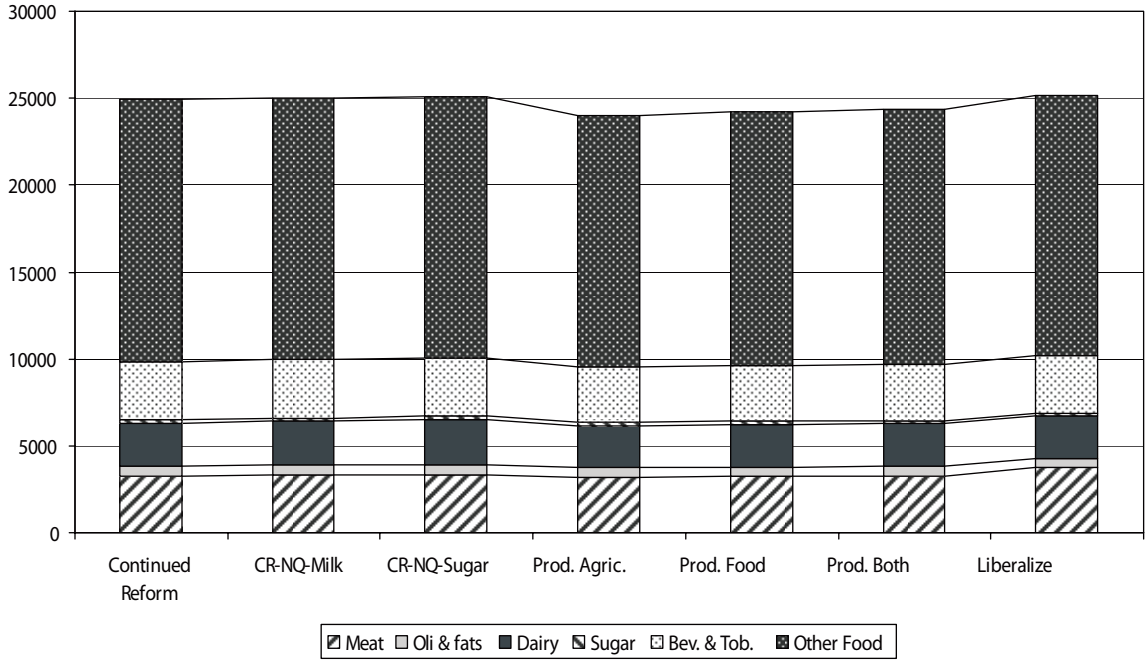


Figure 5 12 **Development of the composition of value added food industry in Australia/New Zealand under different scenarios, in Million USD, 2010**



5.4 Discussion: Inward processing

'Inward processing' is a system based on an import flow of intermediate goods from a foreign economy for further processing after which the goods are re-exported under tariff exemption (Egger and Egger, 2005, p152). Well-known inward processing factories are the Mexican Maquiladoras that started in the mid sixties. The Maquiladora programme was designed to alleviate the unemployment and poverty after the US terminated the Bracero programme. The Bracero programme aimed at fulfilling the US agricultural labour demand by Mexican workers. The Maquiladora programme allowed plants to temporarily import goods in Mexico as long as the output was exported back to the US (Cañas and Coronado, 2002). The advantages of such plants (low wages and tax incentives) are now offered by many developing countries. The first Maquiladoras were labour intensive with limited technology, such as assembling textiles, footwear, toys or electronics and later also auto parts. The second generation moved from assembly towards manufacturing processes. These firms used (semi-) automatic and robotics. Examples are manufacturing of televisions sets and electrical appliances. The third generation relied on highly skilled labour and the decision-making became more autonomous and less dependent on the US parent company (Cañas and Coronado, 2002). The importance of the food industry in the Maquiladoras is low compared to all the industries: in 1992 the domestic food industry employed 5 times as many labourers than the Maquiladoras whereas for all industries the range was 3 times. The Mexican Maquiladoras food industry had a share of 1.3% in total operators in 1995 (MacLachlan and Aguilar, 1998). The agriculture is relatively important for the Mexican economy. Egger and Egger (2005, p.155) provide some figures on the importance of the inward processing imports and exports as a share of the total trade. In the period between 1989 and 1999, the shares range between 0.4 and 0.8%.

To our knowledge, no other relevant inward processing systems have been analysed and can be used in an ex-ante analysis of a similar facility in the EU. The structure of the GTAP model we used in the scenario analysis in this chapter makes it impossible to model such an inward processing system. Substitution from the current import-re-export processing (like in cacao) towards such a system is hard to estimate. Furthermore, it means a distinction between the regular import and export flows and the 'inward processing flows'. The model should be redesigned to evaluate such scenarios. Given the data for Mexico, the share of the EU food industry might be even lower. One of the research findings is '.. a country's relative price position and cost situation (measured by other cost variables) are most important to explain processing trade…' (Egger and Egger, 2005, page 163) and 'For EU countries' inward processing trade, the cost factors seem even more important' (page 165). Also in the Mexican Maquiladora cases, MacLachlan and Aguilar (1998) concluded that the wages between domestic industries and Maquiladoras do not differ. In conclusion therefore, inward processing might be interesting if effective levels of taxes or trade tariffs are beneficial. But lower taxes overall might be even more beneficial: the majority of food is produced and consumed in the same region. Efficiency is important to compete, even for inward processing. The impact of inward processing on the food industry is expected to be low.

There is -to our knowledge- no experience with inward processing as a transition facility from a protectionist to a more liberal environment. In case a fast phasing out of export subsidies would create overcapacity in export oriented factories near sea ports, without liberalising the internal market at the same speed, inward processing might be considered a transition facility for a fixed period. In short term it is beneficial from an economic viewpoint as long as the returns are higher than the variable costs.

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6. Discussion, conclusions, recommendations

Jo Wijnands, Krijn Poppe, Bernd van der Meulen

6.1 Key findings

This study provides an overview of the competitiveness of the EU compared to third countries, of almost all sub-sectors of the EU food industry and of individual member states. Furthermore it includes an economic and legal assessment. No other studies have been found with such a focus.

The theory of international economics to derive competitiveness can be discussed. The competitiveness of sub-sectors of the food industry in countries is highlighted. Countries weak in competition might have competitive enterprises or a country strong in competition might have weak enterprises. In a follow-up study, sub-sectors might be analysed based on theories which are more focussed on enterprises. Publicly available data are used, which are suitable for international economic analysis. A longer time period is desirable as well as more accurate date for innovation and R&D expenditure. Data availability of enterprises should be secured to conduct follow-up studies based on enterprises oriented approaches. The overall conclusion is a weak competitiveness of the EU food industry. A low population growth in the EU might be the background for the lower growth of the value added, not exploiting economies of scale for the lower labour productivity. Less densely populated countries like Australia, Brazil and Canada were successful in capturing a larger market share.

The recommendations are aimed at enterprises, government and researchers. Enterprises are recommended to exploit economies of scale, economies of scope (differentiation) based on cultural difference in Europe and try to be an innovator in the use of new technologies (micro-machine processing). Government policies could be directed towards harmonisation of legislation within the EU as well as worldwide, towards supporting advance industry standards of the future and towards enterprises and trade policies which will not weaken competitiveness. Research can contribute to understanding the driving forces of competitiveness, to innovation, to institution building concerning property rights and supporting the availability of up-to-date databases.

6.2 Discussion

The objective of this study is to identify the competitiveness of the European food processing industry. The measurement of competitiveness was based on the international economic theory. Governments and politicians are interested in the economic performance of countries. In that context, trade flows and growth of productivity and value added are evaluated. Furthermore other EU competitiveness studies use similar indicators. In reality, businesses not countries compete in the markets of goods and services and the average situation of a sector in a country does not reflect the performance of an individual company or a special product. Globalisation complicates the analysis even more: multinational enterprises have plants in different countries. Thus even the sum of individual enterprises in a country does not give a clear picture of a country. For this reason the findings based on the indicators of the international economic theory have been enriched with additional information from business statistics and attention has been paid to the position of the top global players in each sector. SMEs were also studied, but large companies export most and are engaged in a global battle for markets.

Despite this discussion on the method used, this type of study is rare. As far as we know, such a study has never been conducted before and provides thus new information for the EU food industry. Even the renowned study of Trail and Pitts (1998) or other studies by ISMEA (1999) or Rama (2005) on this subject are based on case studies, without a systematic analysis of all food

processing sectors and all EU countries. The study of Coyler et al. (2000) is an exception in this respect in that it deals with all sectors of the US food economy. However the legal impact is missing. This study provides comparisons between the EU and third countries possible, between sub-sectors and even between EU countries. The method applied is commonly used in competitiveness comparisons of economies.

Indicators to measure competitiveness might have been taken from other theories that emphasise enterprises. Discussions with industry experts mainly highlighted the potential differences between the international economics approach and the ability to compete by individual companies. We chose to use traditional, well-proven indicators. They measure growth rates to prevent problems with inflation and differences in purchasing power parities. The disadvantage is that growth from a low base is more favourable than maintaining a high productivity or large value added. The only exception is the market share in the world export. This was the only case in which we took the absolute deviation of the market share, which is in line with the definition of competitiveness: a profitable gain in market share. For data we relied on official and publicly available sources. As the EU-25 started in 2005 and data were only available up to 2003 and 2004, the EU-15 was used as the region. The share of the food processing industry of the 10 new member states is fairly small in the production value as well in exports. We therefore do not feel that the issue of data availability and our focus on major EU countries (although also paying attention to others) has hampered our conclusions very much. The choice of benchmark countries was also driven by data availability; the major trading partners were included in most sub-sectors. The lack of data from the food industry in China as well Thailand and Vietnam made it difficult to perform a thorough analysis of competitiveness for some sectors.

For an outlook to the future, the GTAP model was used to calculate a number of scenarios. Although general equilibrium models have their shortcomings (e.g. non-trade barriers are hard to capture), this is a widely accepted and much used model. It has the advantage that it calculates and reports on a global scale for all sectors in the economy. From a policy point of view, it should be understood that in all scenarios the food processing sector will decline at least in relative size, as the benefits of productivity increases and more international trade will end up with the consumers who capture the welfare gain.

This study particularly focused on the impact assessment of the European legislation framework that is specific to the food industry. This part of the research was qualitative and based on interviews and a survey, besides literature research. With a limited timetable and budget, it is impossible to carry out a survey that is representative for all sectors and countries. In-depth interviews were therefore conducted and results discussed with experts. With regard to impact analysis, it is especially difficult to retrieve hard figures on the different types of costs (including effects on the ability to innovate and more generally, the ability to compete) that are affected by legislation. In the cases of large enterprises, for example, that have to adopt legislation that has been announced well in advance, this could mean that costs are reasonable, but this is certainly not the case for many SMEs - as our interviewees made clear.

6.3 Conclusions

This section will provide overall conclusions. The key findings at the beginning of each chapter provide more detailed results. The European food industry had a share of 1.9% in the total value added of the economy and 2.2% of the employment in 2003, often in rural areas. The food industry is an important sector for the manufacturing industries. Its importance even increased last decade. The value added in the food industry grew annually 5.1%, whereas in other manufacturing industries the annual growth was 4.6% in the period 1995-2003. The EU is also the largest exporter and importer of food products (even excluding intra-trade). As in the US, the growth in turnover in the industry looks healthy. However the overall competitiveness is rather weak, particularly compared to the US and Canada. Labour productivity and growth in value added are higher in North America. In many sub-sectors, Brazil also outperforms the EU by gaining market

share. Australia lags behind. One of the drivers for the enhanced growth of the value added in the benchmark countries is the higher growth of the population. More people to feed means a larger production.

This general picture describes the situation well for many sub-sectors. In some sub-sectors it is partly the direct result of trade and the common agricultural policy. Over the past decade export subsidies decreased, and in some sectors volume restrictions were applied. Especially in dairy but also in sugar, quota systems imply sourcing problems for food processors. In fisheries, the declining stocks and the common fishery policy had the same effect. In meat, environmental policies in north-western Europe also played a role in the output of the industry and its exports.

In meat, the EU faces strong competition from all the benchmark countries (figure 6.1). Large and reliable livestock supplies, low labour costs and size (economies of scale) are the key factors contributing to the competitiveness of a meat industry. The seafood sector is currently very fragmented. This is a fast growing segment of the industry, where the EU is rather weak against North America. Asian countries like China and Thailand are important traders; however due to the lack of industrial data they are not included in the quantitative analysis. Processed fruit and vegetables (including juices) is the only sector where the EU performs better than the US and Brazil. Oils and fats are a complex industry where the competitive position of the EU is weak compared to the US and especially Brazil that became a large player in the soybean market. A comparable weak position characterises the dairy industry, where New Zealand plays the role of Brazil. Nevertheless half of the world top 20 dairy companies are European. The US is more competitive than the EU and Canada in cereal-based products, although the EU's market share is growing. The EU competitiveness in beverages (beer, wine, spirits, soft drinks) is weak due to a slower growth of labour productivity, value added, export specialisation and labour productivity. The US and Australia (wine) outperform. In sugar the EU is outperformed on all indicators by North America and Brazil.

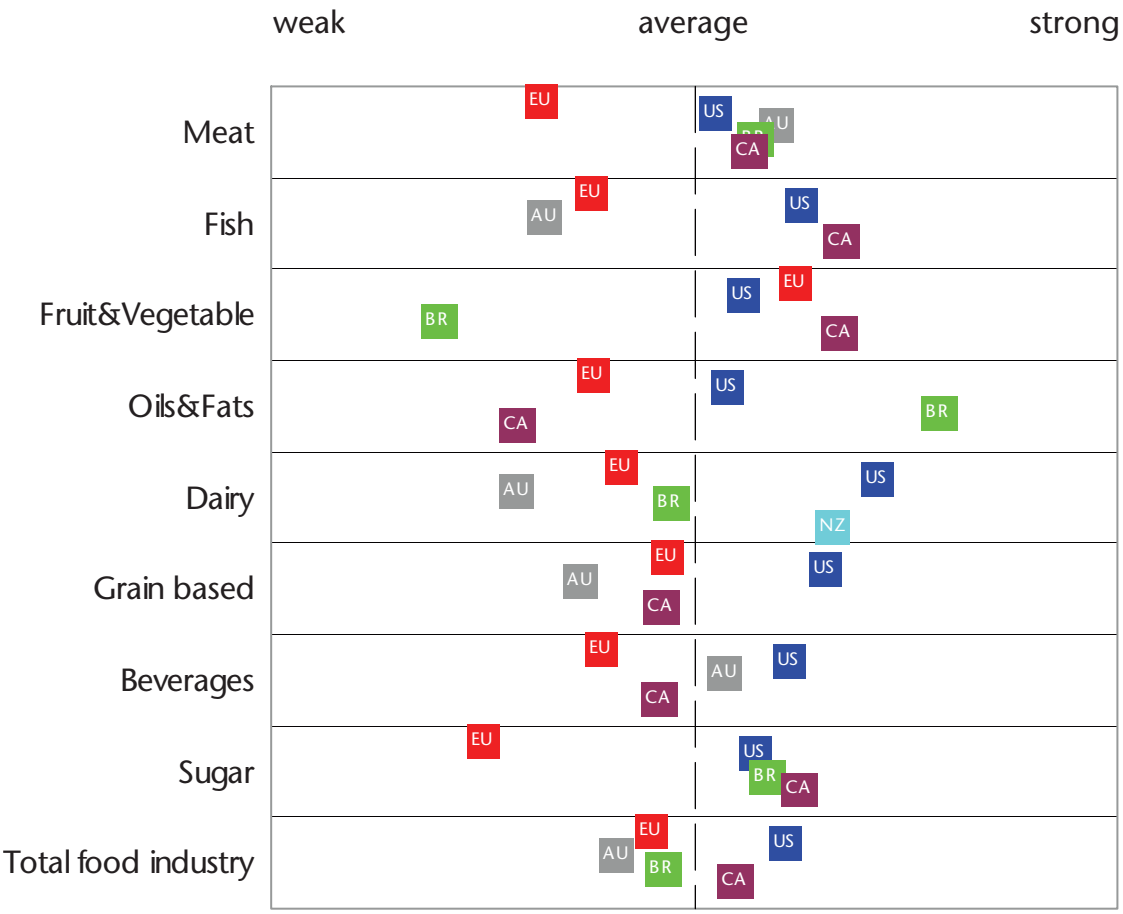
The competitive position of the food industry in the individual member states of the EU is related to the composition of the industry. The position of the food industry in the large agricultural member states France and Germany is rather weak. Besides general economic problems, this is due to the fact that the processing of (CAP regulated and reformed) raw materials like milk, sugar and cereals plays a large role in these countries. Some small (new) member states also have a weak competitive position, but most of the others (mainly medium-sized member states) have a better competitive position than France and Germany, and sometimes match the non-EU benchmark countries. Italy is a good example, due to specialisation in high value products and probably supported by the improvement of the economy in recent years (with less exchange rate risk due to the euro introduction). Ireland is another example, where also the general economy and the recovery from the BSE crises might have helped.

The food industry in Europe is experiencing a period of structural adjustment and the current competitive position is partly a reflection of that. European companies are still busy reaping the gains of market integration, the introduction of the Euro and enlargement. Imports and exports respond quite fast to such changes, but foreign direct investment, mergers and acquisitions and relocation of manufacturing take some time to bear fruit. By comparing the competitiveness results (section 4.10) the Euro zone countries do not perform better than non Euro zone countries. However it shows that higher reduction on implicit labour tax rates in Ireland and the Netherlands goes together with a higher growth of labour productivity. Apart from that, the global food industry is challenged by three issues. Consumer preferences are having an increasing impact as a result of income developments, shifts in the population structure and new lifestyles. Globalisation with the opening of new markets and liberalisation of trade are a second category of impacts. And last but not least, major changes in technologies lead to new products, manufacturing processes and methods to organise the supply chain. Over the last decade, the market power of the large retail chains has increased. In most EU countries the top 5 supermarkets have a market share of around 70%. The top 25 global supermarkets, 60% of which has their headquarters in the EU, also operate on foreign markets and often on more than one con-

tinent. Further concentration is expected, as in most food industries. Food service has also become very important, although more in value than in product flows.

These ongoing changes make innovation an important issue in the food industry. The level of R&D expenditure is relatively low in the food industry although Denmark and the Netherlands score above the US. It should be recognised that R&D is important in the food industry but has a different character than in telecommunications, for example. Products that are new to the world are rare, product extensions (convenience, quality) and new imports are not trivial. Innovation is more process, marketing and management oriented and less a technology-push based on basic science.

Figure 6.1 Overview competitiveness of the all sub-sectors.



In this scene of internationalisation, economies of scale and innovation, small and medium-sized enterprises (SMEs) that make up more than 50% of the food industry are even more challenged than the large international companies. Although the headlines will be dominated by the large companies, the structural adjustment will particularly affect the performance and continuity of many SMEs in the coming years.

Legal uncertainty is a major issue in the EU food industry, due to the overhaul of legislation also as a reaction to various food scandals. Our research shows that in principle the current, modernised legislation is seen as effective, providing the benefits of harmonisation and being relatively easy available on the internet. These positive attitudes come with a long list of caveats and complaints that make the implementation of the law very difficult for companies.

Considering this competitive position and the trends that shape the food industry, some scenarios have been calculated. The competitiveness of the EU food industry will not improve if the past developments are extrapolated to the future. In the case of full free trade, the competitive-

ness deteriorates even more. Competitiveness improves either by a reduction of the price of raw materials in the EU compared to the rest of the world or by higher productivity growth in the food industry. The total value added will increase in the EU and decrease in other regions. This illustrates that efforts are necessary to improve the competitiveness of the food industry. Higher productivity might be the result of higher value added induced by innovation, production differentiation or economies of scale.

6.4 Recommendations

Section 5.2 presents the Key Success Factors (KSF) derived from a SWOT analysis based on the analysis of the external developments (Chapters 2 and 3) and the internal analysis (Chapter 4). KSFs are the issues that affect industry's ability to prosper in the market. In this section some recommendation are made to improve competitive abilities. Three groups of actors will therefore be distinguished: the enterprises as decision makers, the government as upholder and creator of the institutional framework and research as provider of competitive knowledge.

Business oriented

Competition is between businesses, not between countries. This study and relevant literature suggests that there are three potential roads for companies in the EU food industry:

1. *Economies of scale* will contribute to low costs and countervailing power. In Europe the economies of scale are not yet fully exploited. The US enterprises have an historical advantage on this issue. Low cost prices are very important for competitiveness worldwide. Lower population growth in Europe should be compensated by price leadership on the world markets. Countervailing power will be necessary due to the ongoing concentration of supermarket chains. It is predicted that in Europe around 10 supermarket chains will shape the retail sector. The size of the food processors should at least match the size of these retail chains. Exploiting economies of scale will result in an increase in multinational enterprises that are producing in all regions;
2. *More value added* based on European cultural/regional diversity in foods (niche markets). In strategic management literature this differentiation strategy is the second key strategy. The competitive low cost disadvantage of differentiated small scale enterprises can be exploited in the future to enhance marketing of high value added products. This means exploiting the increasing income of consumers which can be directed to buying healthy products, convenient products or luxury products which enhance consumers' social profile. In this respect the European cultural differences should be exploited. Important is to support the small scale firms to organise the supply. Many European companies have earned their skills with specialty products, being market-oriented without relying on the mass marketing methods of the global companies;
3. *Exploit the possibilities of micro-machine processing.* The actual level of technologies indicates a too small scale of the enterprises. The disadvantage of the industry structure fits well with the technological development of micro-machine processing. This strengthens the differentiation strategy. Although small companies exist all over the world, Europe should be an early adopter to gain the first mover advantage.
4. *Explore knowledge exchange and SMEs in food valleys*. The European cultural difference might be exploited in Food Valley approaches as proposed in Café (Café, 2003). A close cooperation between research groups (such as Universities) supports the knowledge transfer to SMEs. A food valley approach fosters the innovation and new businesses and acts as an incubator and science parks. It supports the aforementioned 'value added' and 'micro-machine' strategies.

Policy oriented

Policies shape the institutional environment of the industries. The strategies outlined above for the food industry can be supported by governments. The model results in chapter 5 showed that a future with a productivity growth in agriculture and the food industry above those of the competitors is necessary to the more competitive than non-EU countries. Therefore we first pay at-

tention to policies that increase productivity in general. We then turn to the specific strategies of economies of scale (low cost) and value added (differentiation strategy). In these sections we focus on the 'what to do' question; the rationale is already discussed in the SWOT analysis in chapter 5. We end by summarising the actions for the European Union itself in the form of an action plan.

1. Improve productivity
   Increases in productivity require good functioning labour markets. Output per worker grows more slowly in rule-bound markets (OECD, 2006). Rules on hiring and firing are especially problematic in a restructuring and relatively stable industry. Productivity will rise more if businesses have more possibilities to hire (temporarily if necessary) well trained new staff and fire others. Promoting the use of ICT is another productivity enhancing measure. The same OECD study (2006) suggests that differences in productivity between countries are influenced by the adoption of ICT that is in turn influenced by differences in competition (that forces adoption) and burdensome regulations (that also work as an entry barrier for Foreign Direct Investment). According to economic theory, Foreign Direct Investment (whether from other EU countries or from outside the EU) should not be seen as harmful, but as a way to increase productivity. It should therefore be welcomed.
   Human capital and especially entrepreneurship are also important, as has been recognised in the Lisbon Agenda. So is access to research. This is particularly the case for SMEs that play such a big role in the food industry. Studies cited in Chapter 2 suggest that human capital in businesses, market orientation and access to research institutes is more important than basic, technological research as such. Those 'downstream innovations' are less internationally mobile (and therefore a more sustainable advantage) than the 'upstream' innovations in basic research. The last category is better protected in legal terms, but it is also easier to copy (legally).
   There is a large list of topics for innovation by research in the public-private domain (ETP, 2005). These include health issues, micro-machine processing that benefits smaller firms and special products, food chain management ('fork-to-farm approach') and issues on food and the consumers;

2. Economies of scale/lower costs
   The low cost strategy of economies of scale can be supported by further harmonisation of the enterprise policies in the European Union, an issue not specific to the food industry (see section 2.6). As food production is increasingly integrated with services, the liberalisation of the market for services, in the EU and worldwide, is also important.
   Better and simplified (food) legislation can contribute to lower costs of enterprises. The European Commission in general already announced a number of actions: impact assessments with independent quality control, reducing administrative costs, technical simplification and co-regulation: using existing independent standards in stead of new EU standards.
   A public-private initiative on reducing and standardising the large number of self-control systems and recognising them in public control systems (moving from inspection to a system of reviewing internal control systems) might be beneficial. Standards for RFID or e-business supply management systems, for example, might have a similar positive effect as those for GSM technology (that gave Europe a lead in the use and production of mobile phones) or for organic farming in the food domain. The time-span for approval procedures for novel products can be shortened considerably.
   The food industry, and especially those businesses that go for economies of scale, would benefit from more abundant and cheap access to raw materials - as our model calculations in Chapter 5 show. WTO or bilateral negotiations could deliver this. An expert in our discussions suggested that all trade issues (also the export-oriented negotiations between the Netherlands and China, for example) should be centralised at EU level to have maximum bargaining power.
   A special trade issue is the facility for inward processing, that would provide plants in the EU with the possibility to import and export at world market levels by manufacturing in a kind of bonded warehouse ('en entrepot'). This would at least save the company the burden of administration on imports and export restitution and could become attractive in cases where

export restitutions are impossible, but import levies or high internal prices still exist. Cost advantages are of major importance for successful inward processing
The low cost strategy of economies of scale can be supported by making cross border mergers and acquisition easier - in the EU as well as outside the EU (which asks for trade deals on capital movements). Harmonisation in law and taxes helps. Blending the emotion in products from southern Europe with the efficiency of production in the North would be attractive, but is hard to do within one company culture and even harder to support by policies. The large number of SMEs, especially in southern Europe, suggests that in some cases capital markets are not working well and restrict growth. Easier access to venture capital and equity markets might help;

3. Value added
The strategy of differentiation to tap 'the massafication of luxury' can be supported by several policy measures, some of which overlap with those mentioned in previous sections. An extreme is supporting 'downstream innovations' to promote innovation with consumers. According to Porter's theory an industry benefits from innovative and demanding customers in its home market. Food education in schools (currently in vogue in the UK and the Netherlands) to recognise flavours and improve the sense or taste are an example.
Supporting SMEs in reaching rich customers outside Europe might also help: *Die Grüne Woche* and *Le Salon d' Agriculture* should have their consumer equivalent in places like Shanghai, Singapore and Sao Paulo. Market access to third countries should also pay attention to non-tariff barriers. This is for high value products (that are e.g. prone to counterfeiting) perhaps even more important than for commodities. Besides brand protection, standards for geographical indications, fair trade, organic farming etc. are relevant. In some cases the production methods include traditional plant varieties, and current issues in intellectual property rights apply (Eaton et.al., 2005).
Concerning R&D, more research to find and substantiate health claims could be beneficial. Joint projects between food and pharmacy companies (or others in the health industry), cooperation with the luxury/fashion industry, services (design, art) and ICT companies might be supported. Examples like the Italian coffee company *Illycafe* suggest that technology inventions and high end marketing based on cooperation with arts can co-exist within one company;

4 Monitor and research.
This study is the first competitiveness study for all sub-sectors in the food sector, including all EU member states and benchmarked against leading food exporting countries. The focus is to support EU policy makers. This needs a follow-up and monitoring, as the world continues to change and (trade) policies replace export subsidies by market access. The experts involved in this study also stressed that the next step, analysing the competitiveness of enterprises, would be welcomed.
More focus on enterprises and sub sub-sectors would mean that statistical data must be improved. Data should at least be published at EU level if data at country level has problems with privacy - which incidentally is a strange concept if data are publicly available in published annual reports. The periods for which data are available are rather short and on issues as R&D and innovation data are incomplete for cross country analysis. We experimented with micro-economic data like those from the Amadeus database, but more research on that is needed to evaluate its representative ness. As companies become more multinational, gathering and analysing statistics by country makes less sense than in the past.

Action plan for EU: 'Transition agenda to the new food economy'
Several of the policy recommendations presented above are addressed to national and regional governments as well as the EU. Here we summarise the recommendations for the EU, emphasising keeping open all future options that support low cost as well as value added strategies of business: 'no regret' options.

The agricultural policy and trade policy should support the food industry by creating access to more abundant and cheap access to raw materials. All trade issues should be centralised at EU

level to have maximum bargaining power. If negotiations on liberalising trade are successful, an inward processing facility is not needed, otherwise this might be an option to consider. Trade promotion in rich target markets overseas could be beneficial.

Enterprise policy should support cross border mergers and acquisitions (foreign direct investment). There should be a true common market for services. The use of ICT should be promoted, also adopting e-government at EU level.

Better and simplified (food) legislation is needed and the European Commission should pursue its already announced actions: impact assessments with independent quality control, reducing administrative costs, technical simplification and co-regulation: using existing independent standards in stead of new EU standards. A public-private initiative on reducing and standardising the large number of self-control systems and recognising them in public control systems might be beneficial.

For the R&D policy, there is a large list of topics for innovation. These include health issues, micro-machine processing, food chain economics (why are beneficial 'fork-to-farm approaches' not implemented) and issues on food and the consumers. More important than these topics are access by SMEs and bringing SMEs into contact with other players in tomorrow's food economy like pharmacy, services and IT.

With regard to statistics and monitoring. there is a need to concentrate on better data, at least at EU level, on innovation and more micro economic data. This study should not be the last study on this topic in this sector. This is just the beginning.

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Annexes

A. **Methodology**
B. **LEITAP Global Economy-wide projections**
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Annex A. Methodology

Jo Wijnands

Introduction

Measuring competitiveness originates in the trade theories of Adam Smith, which are based on absolute cost differences between countries. New trade theories incorporate different aspects in the analysis of competitiveness, such as product differentiation, innovation or economies of scale. O'Mahoney and van Ark (2003) focus on productivity. In their study, productivity contributes to a large extent to the performance measurement of competitiveness. Industry characteristics and market institutions matter in competitiveness analyses. In their study they use the growth in labour productivity or value added as performance indicators. This choice can be argued by a statement by Krugman and Obstfield (1994) '…..absolute productivity advantage over other countries in producing a good is neither a necessary nor a sufficient condition for having a comparative advantage in that good'. Current literature stresses several aspects of competitiveness. A main line of sustainable competitive advantage is the fundamental basis of above average performance in the long run, according Porters' theory (1980, 1990). In this study competitiveness of the EU food Industry is defined as the sustained ability to profitable gain and markets shares in domestic and export markets in which the industry is active.

Comparative advantage has two dimensions:
- cost of uniqueness advantages, which means a comparison of domestic and foreign sectors or products. Most indicators aim at this aspect;
- the highest efficiency gap. Even if a sector performs well, other sectors can perform even better. In the long run, the sector that is thought to be successful performs less well than partial competitiveness studies predict. The better performing sectors can pay an additional rent for the production factors (van Berkum and van Meijl, 2000).

The selection of competitiveness indicators is mainly based on those used by O'Mahoney and van Ark (2003) and used by the EU (2005). The selected indicators to quantify the competitiveness of industry, which will be used in this report, are:
- growth value added of a specific industry in the total food industry. This reflects the competition for product factors between different industries within a country;
- balassa index. This index reflects the specialisation level in one category of goods from one country;
- growth of the export share on the world market. This performance indicator reflects the outcome of the competitive process;
- growth of the labour productivity. This affects the unit labour costs and in this way the relative prices;
- growth of value added reflects the industrial dynamism.

The selected indicators originate from the theory of international economics. Several other disciplines also deal with competitiveness (Hack et al. 1998). Some important disciplines are:
- Industrial Economics. This approach is elaborated in the renowned works of Porter (1980, 1990). Porter emphasises strategies (costs and differentiation) as well as the aspects of the value chain;
- strategic management. Hamel and Prahalad (1994) and Hunt and Morgan (1995) are important representatives of this approach. Enhancing the core competence of the resources is one of the key elements;
- Marketing. Market orientation, product differentiation and innovation are some important key determinants. Fulfilling specific market niches is the major orientation (Deshpande and Webster, 1989).

These approaches focus in general on the decision making of individual companies. The selected approach based on international economics is more suited for comparison countries and continues to build on other approaches used for EU studies (see. O'Mahoney and van Ark, 2003).

In the descriptive parts of each industry several other variables are discussed, such as the consumption, self-sufficiency, import and export patterns of the main countries, the structure of the industry and the leading companies. These variables are related to the outcome of the above-mentioned 5 indicators. These variables are presented at nominal level, in order to increase the recognition by stakeholders from the industry.

A closer look at the indicators

Real value added

To derive the real value added at factor costs, the nominal value added is deflated by the food price index. This index comes closer to the industry than a general inflation index. The data are taken from the Word Development Indicators. All productivity growth data are based on real value added. The calculation of the real value added is the nominal value added divided by the food price index. This index is fixed to 100 in a specific year.

$$RVA_{it} = \frac{VA_{it}}{FP_{it}}$$

RVA_{it} is real value added for industry i in period t

VA_{it} is nominal value added for industry i in period t

FP_{it} is food price indicator in period t

Exchange rates

Except for the Balassa index, all indicators are growth percentages. Growth percentages are not influenced by exchange rates, so they can be calculated in the original currency. The Balassa index is also a relative value, so the currency rate has no impact on it.

The nominal values in the descriptive parts are all converted to Euros with the exchange rate as mentioned by Eurostat and DNB.

Growth rate of real value added of a specific industry in the total food industry

The importance of a specific industry is derived from its share in the food industry. A growth in the share reflects a competitive advantage. The industry is then able to attract resources for their production. This index is aimed at competition on the production factors on the domestic market. The food industry is used if a sub-sector of the food industry, e.g. dairy processing, is evaluated. Where the food industry as whole is evaluated, the manufacturing industry has been used. The metrics is the growth of the share of the specific industry in the food industry. Growth shows a better than average performance than the food industry as a whole. This index is internally oriented: the position of an industry on the domestic market. The growth is calculated as an annual percentage. If the food industry as whole is considered, the share of the food industry in manufacturing will be used.

The growth of the Balassa index

The relative importance of an industry in the total trade will be measured by the Revealed Comparative Advantage (RCA) or Balassa index or specialisation index. The Balassa index is as follows:

$$B_{ijt} = \frac{V_{ijt} \Big/ \sum_{j} V_{ijt}}{\sum_{i} V_{ijt} \Big/ \sum_{i}\sum_{j} V_{ijt}}$$

Export value of specific industry i from country j in period t.

The development means measuring the shares for two periods. The annual growth will be calculated. A Balassa index of 1 indicates that a country is equally specialised as the total world exports. A level below 1 means relatively unspecialised and above 1 relatively specialised.

The Balassa Index will be presented with the identical time periods as the trade flows. This shows the development of the indices and hence the competitive performance. The index is only relevant for exporting industries; selected countries with only imports will be omitted. The index will be used as metrics as an indicator for competitiveness. In fact is indicates the export focus of an industry and is therefore externally oriented. Again the annual growth between the first and last time period will be used.

Several other indicators related to international trade are available. The Net Trade Ratio (NTR) expresses the ratio between imports and exports of a country and measures almost the same as the Grubel Loyd index. The intra-industry trade index (Grubel Loyd) is represented by analysis of the trade data: the import as well as the exports will be discussed in the industry sections. The high levels of self-sufficiency shows furthermore that trade takes just a small part of consumption. This indicator is not taken explicitly into account by O'Mahoney and van Ark (2003) and the EU (2005).

The growth of the export share on the world market

Firstly the export share on the world market is derived. The growth is the absolute deviation, and not an annual growth rate. This index takes the market size into account. Very small exporters can have large growth rate, but remaining small exporters. Even with small growth rates, large exporters will have a larger impact on the market. By taking the absolute deviation, the real impact on the world market is taken into account. Table B1 gives an example of the discussion above.

Table B1 Example of impact of indicators and market shares development.

	Market share (%)			
	1996-1998	2002-2004	Deviation	Growth
Country A	1	2	1	100 %
Country B	50	51	1	2 %
Country C	20	20	0	0 %
Country D	29	27	-2	-7 %

This performance indicator reflects the outcome of the competitive process.

$GES_j = MS_{jt} - MS_{j1}$

GES_j is growth export share on the world market for country j

MS_{jt} is export share on the world market for country j in period t

The growth of the labour productivity

Labour productivity affects prices in the market. Growth of labour productivity improves industrial competitiveness in international markets. Labour productivity is often seen as a crucial determinant of competitiveness. The labour productivity is the real value added divided by the number of employees. This indicator can not be compared between different countries due to different levels of purchasing power parities. As we take the growth of the labour productivity, the indices of different countries can be compared. This indicator can be seen as measurement of the potential competitiveness.

The growth of total value added.

Creating added value is an important economic indicator. It is related to the industrial dynamism. Total value added is not only based on the production factor labour but also on the production factor capital and land. Again the growth is taken, so that countries can be compared easily.

Innovation and R&D

There is no indicator which reflects the innovation and R&D efforts. These data are not available for each sub-sector and sufficient years in the Eurostat database on Industry, Trade and Services. Therefore an indicator could not be included. Secondly the impact of innovation and R&D efforts will be captured in the performance indicator labour productivity and value added. Nevertheless they are very important variables to explain growth in value added and labour productivity. Some indicators mentioned by O'Mahoney and van Ark (2003) and the EU (2005) are not included: mainly due to lacking data, such as the education levels or labour skills. Others are not taken as a main competitiveness indicator. Value added is seen as a more important variable than profitability.

Comparison and overall competition

The European food industries will be benchmarked against the US and one or two other important competing countries. The selection of these countries is based on the importance of their exports. Within the EU important countries will be presented. The benchmark will be presented for each sub-sector.

The above-mentioned indicators have different scales. To compare the different scales the values will be standardised. Calculations are:

X_i is observation i=1,n (ic number of countries)

$$\overline{X} = \sum X_i / n$$

$$s = \sqrt{\frac{\sum (X_i - \overline{X})^2}{n}}$$

$$z_i = \frac{X_i - \overline{X}}{s}$$

All variables will have the same dimension and can than easily presented in one figure. Furthermore the mean of these values can be calculated as an indication of the overall competitiveness. In this case the implicit assumption was that the weight or importance of each indicator is equal. It is possible to impose different weights for each indicator. However no empirical evidence is currently available for different weights.

In any case the different indicators will be presented separately. Each user can give his weights to the variables.

However this method also has a disadvantage. The standard scores depend on the number of the countries and the levels of indicators in the sample: the standard scores are not fixed. It is a fact a benchmark, and if the benchmark countries or the level of indicator changes, the position of specific country will also change.

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Annex B. LEITAP Global Economy-wide projections

Hans van Meijl and Martin Banse

The analysis was carried out with an adapted version of the general equilibrium model of the Global Trade Analysis Project (GTAP, Hertel, 1997). The first part of this section provides a brief overview of the standard GTAP model; the second part focuses on extensions. The standard model was improved with a new land allocation method that takes into account the degree of substitutability between different types of land use. A new land supply curve allowing for conversion and abandonment of land is described in the following section. The linkage of the adapted economic model to the IMAGE framework in order to model yields and feed efficiency rates is described. Additionally, we used information from the OECD's Policy Evaluation Model (PEM) to improve the production structure and introduced an endogenous quota mechanism. This chapter finishes with a description of the projection methodology and a discussion of the database and the regional as well as sectoral aggregation of the model for the EUFI study.

Global Trade Analyses Project: The standard Model

GTAP was initiated with the goal of supporting high level quantitative analysis of international trade, resource and environmental issues in an economy-wide context. The GTAP project is supported by the leading international agencies (e.g. WTO, World Bank, OECD, and UNCTAD) in trade and development policy, as well as a number of national agencies with active research programmes on these issues. The GTAP project develops and maintains a database, a multi-region, multi-sector general equilibrium model. It also provides training courses and organises an annual conference on global economic analysis. This project has grown rapidly since its inception in 1993. There is no doubt that the GTAP database and its associated modelling efforts represent a major achievement for advancing quantitative analysis of international trade, resource and environmental issues. The success of this approach is reflected in a high degree of academic recognition as well as its increasing use for policy analysis by international and national agencies.

Standard model characteristics

There are basically two strands of quantitative modelling in policy analysis. One approach is to build issue-specific models, depending on the question at hand. These models will usually be capable of capturing many relevant aspects of one specific policy question, but are of less use in a different policy context. The other approach sets out to construct more general and flexible models, which do not necessarily attempt to capture all details but are flexible enough to allow elaborations in face of specific policy questions. The Global Trade Analysis Project (GTAP) provides such a modelling framework.

The standard GTAP model[49] is a comparative static multi-regional general equilibrium model. In its standard version, constant returns to scale and perfect competition are assumed in all markets for outputs and inputs. A detailed discussion of the basic algebraic model structure of the GTAP model can be found in Hertel (1997)[50]. In the GTAP model each country or region is depicted within the same structural model.

The general conceptual structure of a regional economy in the model is represented in figure B.1. Within each region, firms produce output, employing land, labour, capital, and natural resources, and combine these with intermediate inputs. Firm output is purchased by consumers, government, the investment sector, and by other firms. Firm output can also be sold for export.

[49] We deliberately refer to the 'standard GTAP model' as the model version that is supported by the GTAP consortium. GTAP users have developed numerous variations on the standard model. In this study we also make some modifications to the standard model. These are discussed more extensively in subsequent chapters.

[50] Or on the internet http://www.agecon.purdue.edu/gtap/model/chap2.pdf

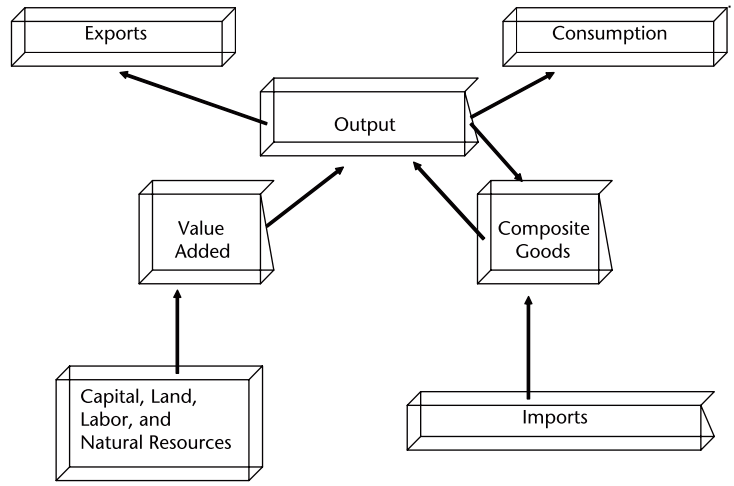
Land is only employed in the agricultural sector, while capital and labour (both skilled and unskilled) are mobile between all production sectors.

The model is characterised by an input-output structure (based on regional and national input-output tables) that explicitly links industries in a value-added chain from primary goods, through continuously higher stages of intermediate processing, to the final assembling of goods and services for consumption. Inter-sectoral linkages are direct, like the input of steel in the production of transport equipment, and indirect, via intermediate use in other sectors. The model captures these linkages by modelling firms' use of factors and intermediate inputs. The most important aspects of the model can be summarised as follows:

(i) it covers all world trade and production;

(ii) it includes intermediate linkages between sectors.

Figure B.1. The flow of production.



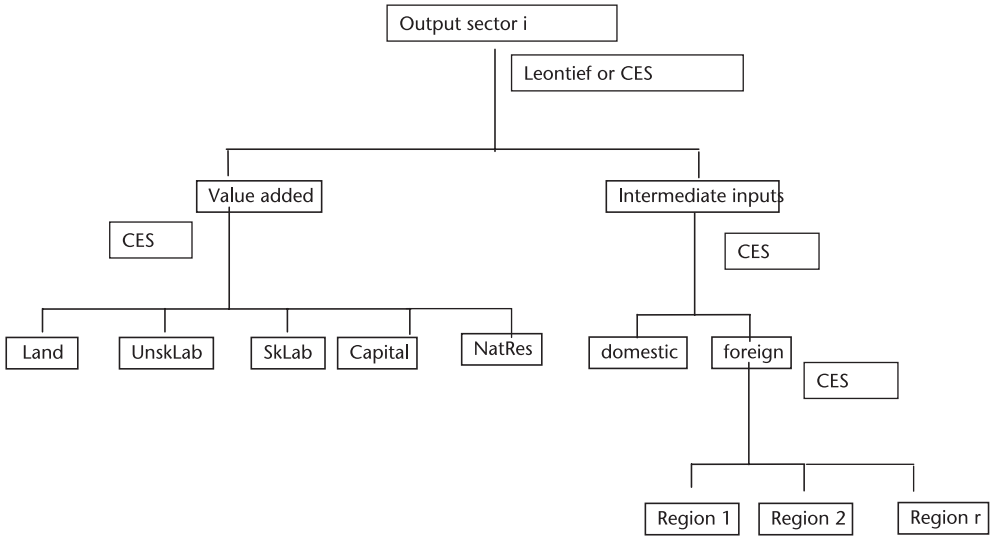
The consumer side is represented by the regional household to which the income of factors, tariff revenues and taxes are assigned. The regional household allocates its income to three expenditure categories: private household expenditure, government expenditure and savings. For the consumption of the private household, the non-homothetic Constant Difference of elasticities (CDE) function is applied.

In the model, a representative producer for each sector of a country or region makes production decisions to maximise a profit function by choosing inputs of labour, capital and intermediates to produce a single sectoral output. In the case of crop production, farmers also make decisions on land allocation. Intermediate inputs are produced domestically or imported, while primary factors cannot move across countries. Markets are typically assumed to be competitive. When making production decisions, farmers and firms treat prices for output and input as given. The primary production factors land and capital are fully employed within each economy, and hence returns to land and capital are endogenously determined at the equilibrium, i.e. the aggregate supply of each factor equals its demand.

The production structure is depicted by a production tree with four nests (figure B.2). The Leontief and the Constant Elasticity of Substitution (CES) functional forms are used to model the substitution relations between the inputs of the production process. In the output nest, the mix of factors and intermediate inputs are assembled together, forming the sectoral output. The functional form can be Leontief (fixed proportions) or CES. The substitution relations within the value added nest are depicted by the CES function. While labour and capital are considered mobile across sectors, the Constant Elasticity of Transformation (CET) function is used to represent the sluggish adjustment of the factor land, i.e. land can only move imperfectly between

alternative crop uses. The CES function is applied in the composite intermediate nest depicting the substitution between domestic and imported products. The last nest illustrates the relation between imports of the same good from different regions. The Armington approach treats products from different regions as imperfect substitutes.

Figure B.2 Production tree



Source: Hertel (1997).

Prices on goods and factors adjust until all markets are simultaneously in (general) equilibrium. This means that we solve for equilibrium in which all markets clear. While we model changes in gross trade flows, we do not model changes in net international capital flows. Rather our capital market closure involves fixed net capital inflows and outflows. (This does not preclude changes in gross capital flows). To summarise, factor markets are competitive, while labour and capital are mobile between sectors but not between regions.

The GTAP model includes two global institutions. All transport between regions is carried out by the international transport sector. The trading costs reflect the transaction costs involved in international trade, as well as the physical activity of transportation itself. In using transport inputs from all regions, the international transport sector minimises its costs under the Cobb-Douglas technology. The second global institution is the global bank, which takes the savings from all regions and purchases investment goods in all regions depending on the expected rates of return. The global bank guarantees that global savings are equal to global investments. With the standard closure, the model determines the trade balance in each region endogenously, and hence foreign capital inflows may supplement domestic savings. The model does not have an exchange rate variable. However, by choosing an index of global factor prices as a numerary, each region's change of factor prices relative to the numerary directly reflects a change in the purchasing power of the region's factor incomes on the world market. This can be directly interpreted as a change in the real exchange rate.

The welfare changes are measured by the equivalent variation, which can be computed from each region's household expenditure function.

Taxes and other policy measures are included in the theory of the model at several levels. All policy instruments are represented as *ad valorem* tax equivalents. These create wedges between the undistorted prices and the policy-inclusive prices. Production taxes are placed on intermediate or primary inputs, or on output. Trade policy instruments include most-favoured national tariffs applied, antidumping duties, countervailing duties, price undertakings, export quotas and other trade restrictions. Additional internal taxes can be placed on domestic or imported intermediate inputs, and may be applied at differential rates that discriminate against imports. Where

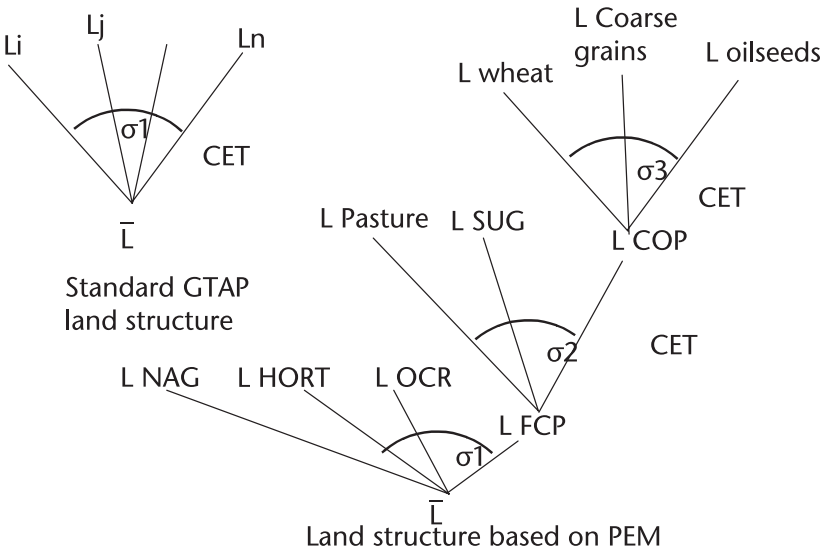
relevant, taxes are also placed on exports, and on primary factor income. Finally, where relevant (as indicated by social accounting data) taxes are placed on final consumption, and can be applied differentially to consumption of domestic and imported goods.

The GTAP model is implemented in GEMPACK - a software package designed for solving large applied general equilibrium models. A description of Gempack can be found in Harrison and Pearson (2002)[51].

Various GTAP users have developed adaptations of the standard model. Such elaborations include increasing returns to scale and imperfect competition, dynamic equilibrium formulations and incorporation of non-continuous policy instruments such as Tariff rate quota that resulted from GATT Uruguay round, or production quota as applied in the European milk and sugar sectors. For a model version that uses both increasing returns and production quota, see Francois et al. (2002) and Francois et al. (2003).

Extensions to the standard GTAP model
For the purpose of the EUFI study, we have constructed a special purpose version of the GTAP database and model, designed to make it more appropriate for the analyses of the agricultural sector. We use information from the OECD's Policy Evaluation Model (PEM) to improve the production structure.

Figure B.3 Land allocation tree



Land allocation under the heterogeneity of land assumption:
The base version of GTAP represents land allocation in a CET structure (see left part of figure B.3). It is assumed that the various types of land use are imperfectly substitutable, but the substitutability is equal among all land use types. We extended the land use allocation structure by taking into account that the degree of substitutability of types of land differs between types (Huang et al., 2004). We use the OECD's Policy Evaluation Model (OECD, 2003) structure, as it has more detail. It distinguishes different types of land in a nested 3-level CET structure. The model covers several types of land use more or less suited to various crops (i.e. cereal grains, oilseeds, sugar cane/sugar beet and other agricultural uses). The lower nest assumes a constant elasticity of transformation between 'vegetable fruit and nuts' (HORT), 'other crops' (e.g. rice, plant based fibres; OCR), the group of 'Field Crops and Pastures' (FCP), and non-agricultural land (NAG)[52]. The transformation is governed by the elasticity of transformation σ1. The FCP group is itself a

[51] More information can be obtained at www.monash.edu.au.policy/gempack.htm
[52] The non-agricultural commodities do not use land in the current GTAP model version. However, since land allocation in GTAP is defined over all commodities, we add the non-agricultural land to the land allocation tree.

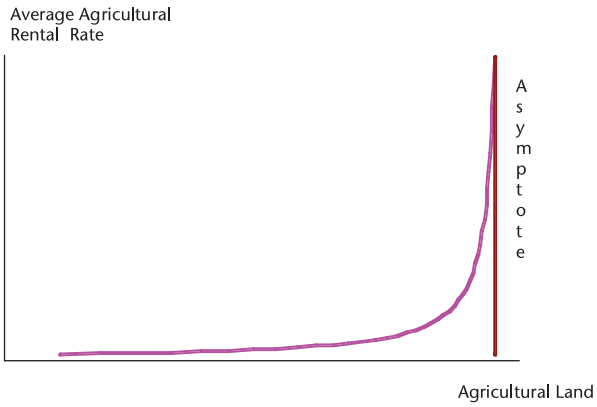
CET aggregate of Cattle and Raw Milk (both Pasture), 'Sugarcane and Beet' (SUG), and the group of 'Cereal, Oilseed and Protein crops' (COP). Here the elasticity of transformation is σ2. Finally, the transformation of land within the upper nest, the COP-group, is modelled with an elasticity σ3.

In this way the degree of substitutability of types of land can be varied between the nests. It captures to some extent agronomic features. In general it is assumed that σ3> σ2 >σ1. This means that it is easier to change the allocation of land within the COP group, while it is more difficult to move land out of COP production into e.g. vegetables. The values of the elasticities are taken from PEM (OECD, 2003).

Variability of total area
In the standard GTAP model, the total land supply is exogenous. In the version of the model the total agricultural land supply is modelled using a land supply curve, which specifies the relation between land supply and a rental rate (Meijl et al., 2006). Land supply to agriculture as whole can be adjusted as a result of idling of agricultural land, conversion of non-agricultural land to agriculture, conversion of agricultural land to urban use and agricultural land abandonment.

The general idea is that when there is enough agricultural land available, increases in demand for agricultural purposes will lead to land conversion to agricultural land and a modest increase in rental rates (see left part of figure B.4). However, if almost all agricultural land is in use, then increases in demand will lead to increases in rental rates (land becomes scarce, see right part of figure B.4). When land conversion and abandonment possibilities are low, the elasticity of land supply in respect to land rental rates are low and land supply curve is steep.

Figure B.4 Land supply curve: land conversion and abandonment



We have assumed the following land supply function:

$$\text{Land supply} = a - b/\text{real land price} \qquad (1)$$

where: a (>) is an asymptote, b is a positive parameter and the land supply elasticity E in respect of the land price is equal to

$$E = b/(a \cdot \text{real land price} - b) \qquad (2)$$

We have calibrated the parameters a and b of the land supply function in such a way that it reproduces the GTAP land data for 2001. We have assumed the available agricultural land expressed by asymptote a is a sum of the agricultural land used currently is the production process and abounded agricultural land. We have used the agricultural land changes per region for 2030 predicted by FAO as indicators of agricultural land availability. In general, we have assumed that higher predicted increase of the agricultural land means higher availability of abounded agricultural land in the region. If the decrease in agricultural land was predicted, we have assumed the scarcity of the agricultural land. Based on these consideration, we set the asymptote a.

Having asymptote a, we have used GTAP land use data for 2001 as the land supply and observation for 2001 the initial GTAP real land prices equal to one to calculate the parameter b of the land supply function from the formula:

$$b = a - \text{Land supply} \qquad (3)$$

and the land supply elasticity E in respect of the land price from formula (2).

Yield and feed conversion: linkage with IMAGE[53]

Yields are only dealt with implicitly and the feed livestock linkage in the GTAP is calculated using input-output coefficients. To improve the treatment of these issues the adjusted GTAP model was linked with the IMAGE model (Alcamo et al., 1998; IMAGE Team, 2001[54]). The objective of IMAGE 2.2 is to explore the long-term dynamics of global environmental change. Ecosystem, crop and land-use models are used to compute land use on the basis of regional production of food, animal products and timber, and local climatic and terrain properties. The production of food and animal products come from the adjusted GTAP model. The coinciding land-use change and greenhouse gas emissions are determined. The atmospheric and ocean models calculate changes in atmospheric composition by employing the emissions and by taking oceanic CO_2 uptake and atmospheric chemistry into consideration. Subsequently, changes in climatic properties are computed by resolving oceanic heat transport and the changes in radiative forcing by greenhouse gases and aerosols. The impact models involve specific models for sea-level rise and land degradation risk and use specific features of the ecosystem and crop models to depict impacts on vegetation and crop growth (Leemans and Eickhout, 2004). Since the IMAGE model performs its calculations on a grid scale (of 0.5 by 0.5 degrees), the heterogeneity of the land is taken into consideration (Leemans et al., 2002).

Yields

In the adjusted GTAP model, yield only depends on a trend factor and on prices. The production structure used in this model implies that there are substitution possibilities among factors. If land becomes more expensive, the producer uses less land and more other production factors such as capital. The impact is that land productivity or yields will increase. Consequently, yield depends on an exogenous part (the 'trend' component) and on an endogenous part with relative factor prices (the 'management factor' component).

First, the exogenous trend of the yield is taken from the FAO study 'Agriculture towards 2030' (FAO, 2003), in which they combined macro-economic prospects with local expert knowledge. This approach led to best-guesses of the technological change for each country for the coming 30 years. Given the scientific status of the FAO work, these data are used as exogenous input for a first model run with the adjusted GTAP model. However, many studies indicated this change in productivity would be enhanced or reduced by other external factors, of which climate change is mentioned most often (Rosenzweig et al., 1995; Parry et al., 2004; Fischer et al., 1996). These studies indicated that increasing adverse global impacts because of climate change would be encountered with temperature increases above 3 to 4 °C compared to pre-industrial levels. These productivity changes need to be included in a global study. Moreover, the amount of land expansion or land abandonment will have an additional impact on productivity changes, since land productivity is not homogenously distributed over each region.

In our approach, the exogenous part of the yield is updated in an iterative process with the IMAGE model. The output of GTAP used for the IMAGE iteration is sectoral production growth rates and a management factor describing the degree of land intensification. Next, the IMAGE model calculates the yields, the demand for land and the environmental consequences on crop growth productivity. IMAGE simulates global land use and land cover changes by reconciling the land use demand with the land potential. The basic idea is to allocate gridded land cover within different

[53] This section concentrates on GTAP-IMAGE link concerning yield calculation.

[54] In this paper we focus on the yield and feed efficiency linkage and the environmental consequences are described in Eickhout *et al.* (2004).

world regions until the total demands for this region are satisfied. The results depend on changes in the demand for food and feed and a management factor as computed by GTAP. Crop productivity is also affected by climate change. The allocation of land use types is performed at grid cell level on the basis of specific land allocation rules like crop productivity, distance to existing agricultural land, distance to water bodies and a random factor (Alcamo et al., 1998). This procedure delivers additional changes in yields, which are given back to GTAP. A general feature is that yields decline if large land expansions occur since marginal lands are taken into production.

Segmentation of factor markets and endogenous production quota

If labour were perfectly mobile across domestic sectors, we would observe equalised wages throughout the economy for workers with comparable endowments. This is clearly not supported by evidence. Wage differentials between agriculture and non-agriculture can be sustained in many countries (especially developing countries) through limited off-farm labour migration (De Janvry, 1991). Returns to assets invested in agriculture also tend to diverge from returns of investment in other activities.

To capture these stylised facts, we incorporate segmented factor markets for labour and capital by specifying a CET structure that transforms agricultural labour (and capital) into non-agricultural labour (and capital) (Hertel and Keening, 2003). This specification has the advantage that it can be calibrated to available estimates of agricultural labour supply response. In order to have separate market clearing conditions for agriculture and non-agriculture, we need to segment these factor markets, with a finite elasticity of transformation. We also have separate market prices for each of these sets of endowments. The economy-wide endowment of labour (and capital) remains fixed, so that any increase in supply of labour (capital) to manufacturing labour (capital) has to be withdrawn from agriculture, and the economy-wide resources constraint remains satisfied. The elasticities of transformation can be calibrated to fit estimates of the elasticity of labour supply from OECD (2001).

Agricultural production quotas

An output quota places a restriction on the volume of production. If such a supply restriction is binding, it implies that consumers will pay a higher price than they would pay in the case of unrestricted interplay of demand and supply. A wedge is created between the prices that consumers pay and the marginal cost for the producer. The difference between the consumer price and the marginal costs is known as the tax equivalent of the quota rent.

In our model both the EU milk quota and the sugar quota are implemented at national level. Technically, this is achieved by formulating the quota as a complementary problem. This formulation allows for endogenous regime switches from a state when the output quota is binding to a state when the quota becomes non-binding. In addition, changes in the value of the quota rent are endogenously determined. If t denotes the tax equivalent of the quota rent, and r denotes the difference between the output quota and output q, then the complementary problem can be written as:

$$r = \bar{q} - q$$

and

either $t > 0$ and $r = 0$ the quota is binding

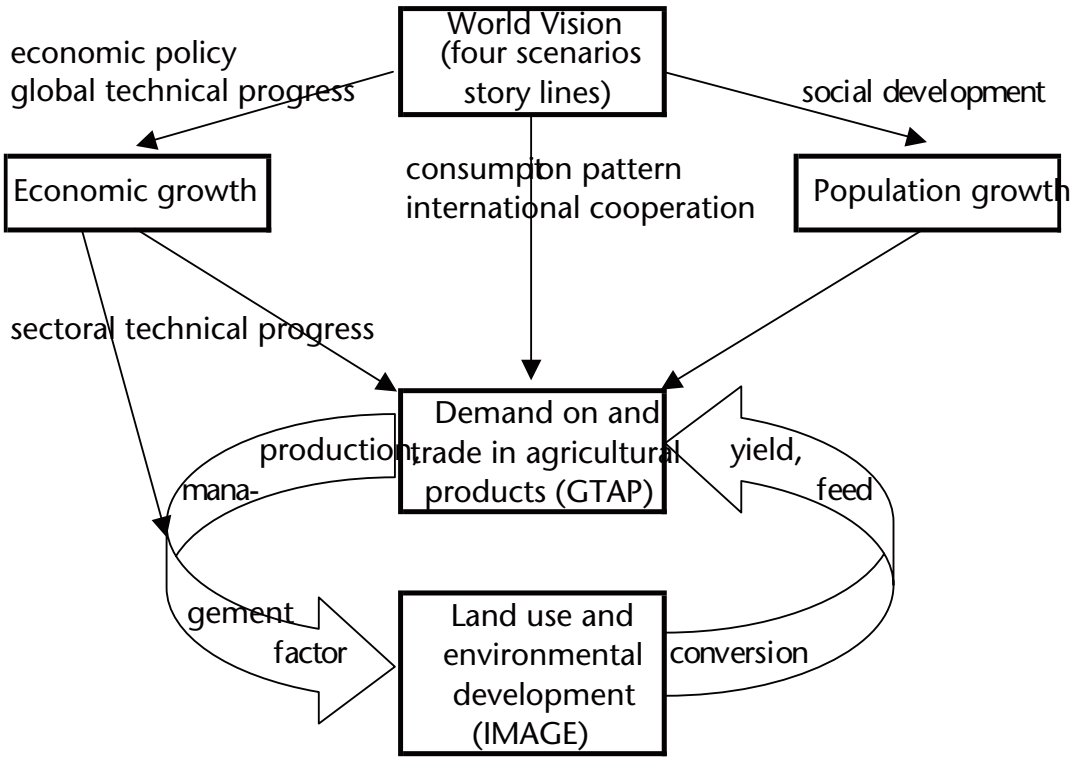
or $t = 0$ and $r \geq 0$ the quota is not binding.

Projection methodology

Figure B.5 shows the projection methodology. The three analysed scenarios differ by macroeconomic assumptions regarding the GDP, population and employment growth and productivity development in agricultural sector. The economic consequences for the agricultural system based on the scenario assumptions outlined in the section above are calculated by GTAP. The output of GTAP is, among others, sectoral production growth rates, land use and a management

factor describing the degree of land intensification. These are in turn used by IMAGE model to calculate yields, the demand for land, feed efficiency rates and environmental indicators. This procedure delivers new yields, which are given back to GTAP. The iteration process stops when land use is the same in both models.

Figure B.5 The modelling framework of GTAP and IMAGE



The scenarios are constructed through recursive updating of the database for the period 2005-2020 such that exogenous GDP targets are met and given exogenous estimates on factor endowments – skilled labour, unskilled labour, capital and natural resources and population. Therefore, scenario assumptions are made for each period separately.

The procedure implies that technological change is endogenously determined within the model (see also Hertel et al. 1999). In line with CPB, we assumed common trends for relative sectoral total factor productivity (TFP) growth (CPB, 2003). CPB assumed that all inputs achieve the same level of technical progress within a sector (i.e. Hicks neutral technical change). We deviate from this approach by using additional information on yields and feed conversion or efficiency rates from FAO and the IMAGE model. For the land-using sectors, yields are exogenous and obtained in the base run from scenario specific assumptions based on deviations of the FAO yield projections (FAO, 2003). In the iteration process yields are obtained from the IMAGE model. For the livestock sectors (cattle, pigs and poultry, dairy) we additionally obtain feed conversion or feed efficiency rates from the IMAGE model. For the non land-using sectors, we assume Hicks neutral technical change.

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Annex C. Sources of data and linking

Eurostat (Structural business statistics): EU-data
Comext trade data
OECD (structural analysis database STAN),
UN (Comtrade) (trade data)
FAO (supply and utilisation accounts)
US Census Bureau: US data
Amadeus, supplied by Bureau van Dijk.
Ausstat: Australian data (http://www.abs.gov.au/AUSSTATS/)
IBGE: Brazilian data (http://www.ibge.gov.br)
IC: Canadian data (http://strategis.ic.gc.ca/canadian_industry_statistics)

C.1 Linking SITC-codes with NACE codes

NACE code	SITC-code
da 151 Production, proc., pres. of meat/-products	
	011 - Bovine meat
	0121 - Meat of sheep or goats
	0122 - Meat of swine
	0124 - Meat of horses, mules, etc
	0125 - Edible offal
	0129 - Meat, edible offal, nes
	016 - Meat, ed. offal, dry, slt, smk
	0123 - Poultry, meat and offal
	017 - Meat, offal. prpd, prsvd, nes
da 152 processing and preserving of fish and fish pro	
	0341 - Fish, fresh, chilled, whole
	0342 – Fish, frozen ex. fillets
	0344 - Fish fillets, frozen
	0345 - Fish fillets, fresh, chilled
	035 - Fish, dried, salted, smoked
	036 - Crustaceans, molluscs etc
	037 - Fish etc. prepd, prsvd. nes
da 153 fruit and vegetables	
	0542 - Legumes, dried, shelled
	0546 - Vegetables frozen
	0547 - Vegetables prov. preserved
	05611 - Potatoes, dried
	05612 - Onions, dried
	05613 - Mushrooms, truffles, dried
	05619 - Oth. veg., mixed veg, dried
	05641 - Flour and meal of potato
	05642 - Flakes of potato
	05661 - Potatoes, unpickled, frozen
	05669 - Oth. veg. unpickled, frozen

NACE code	SITC-code
	05671 - Veg. etc. prsvd by vinegar
	05672 - Tomatoes, not pickled, whl
	05673 - Tomatoes, not pickled, nes
	05674 - Mushrooms etc. not pickled
	05675 - Sauerkraut unpickled, unfrz
	05676 - Potatoes, unpickled, unfrzn
	05677 - Sweet corn, prepd, presvrd
	05679 - Oth. veg. unpickled, unfrozen
	05752 - Grapes, dried (raisins)
	0576 - Figs, fresh or dried
	05796 - Dates, fresh or dried
	05799 - Fruit, dried, nes
	0581 - Jams, jellies, marmalades
	0582 - Fruit, nuts prov. preservd
	0583 - Fruit, nuts, frozen
	05893 - Pineapples
	05894 - Citrus fruit
	05895 - Apricots, cherries, peaches
	05896 - Fruits, prepd, presrvd, nes
	05897 - Mixtures of fruits, nes
	059 - Fruit, vegetable juices
	0590 - Not defined
da 154 oils and fats	
	091 - Margarine and shortening
	22 - Oil seed, oleaginus fruit
	4 - Animal, veg. oils, fats, wax
da 155 dairy	
	022 - Milk and cream
	023 - Butter, other fat of milk
	024 - Cheese and curd
da 1583 manufacture of sugar	
	05487 - Sugar beet
	05488 - Sugar cane
	0611 - Sugars, beet or cane, raw
	0612 - Other beet, cane sugar
	0619 - Other sugars
da 159 alc. beverages	
da 1591 manufacture of distilled potable alcoholic bev	
	1124 - Spirits
	1121 - Wine of fresh grapes
	1123 - Beer etc. made from malt
	05641 - Flour and meal of potato
	05642 - Flakes of potato
	05661 - Potatoes, unpickled, frozen
	05669 - Oth. veg. unpickled, frozen

NACE code	SITC-code
	05671 - Veg. etc. prsvd by vinegar
	05672 - Tomatoes, not pickled, whl
	05673 - Tomatoes, not pickled, nes
	05674 - Mushrooms etc. not pickled
	05675 - Sauerkraut unpickled, unfrz
	05676 - Potatoes, unpickled, unfrzn
	05677 - Sweet corn, prepd, presvrd
	05679 - Oth. veg. unpickled, unfrozen
	05752 - Grapes, dried (raisins)
	0576 - Figs, fresh or dried
	05796 - Dates, fresh or dried
	05799 - Fruit, dried, nes
	0581 - Jams, jellies, marmalades
	0582 - Fruit, nuts prov. preservd
	0583 - Fruit, nuts, frozen
	05893 - Pineapples
	05894 - Citrus fruit
	05895 - Apricots, cherries, peaches
	05896 - Fruits, prepd, presrvd, nes
	05897 - Mixtures of fruits, nes
	059 - Fruit, vegetable juices
	0590 - Not defined
milling and cereals 156+1581+1582+1585	
da 156 manufacture of grain mill products and starch	
	047 - Other cereal meal, flours
da 1562 manufacture of starches	
	5921 - Starches, inulin, gluten
da 1581+1582+1585 food products cereals based	
da 1581 manufacture of bread	0412 - Oth. wheat, meslin, unmilled
	04849 - Other bread, baked goods
	0485 - Mixes, doughs for 048.4
da 1582 manufacture of biscuits, pastry	
	04841 - Toasted bread, etc.
	04842 - Sweet biscuits
da 1585 pasta products	
	0411 - Durum wheat, unmilled
	0483 - Pasta, uncooked, unpreprd.
	09891 - Pasta, cooked, stuffed

C 2 Conversion from NAICS to NACE-codes

NAICS	Description	NACE	Description
311211	Flour milling	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311212	Rice milling	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311213	Malt mfg	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311221	Wet corn milling	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311222	Soybean processing	DA154	Manufacture of vegetable and animal oils and fats
311223	Other oilseed processing	DA154	Manufacture of vegetable and animal oils and fats
311225	Fats and oils refining and blending	DA154	Manufacture of vegetable and animal oils and fats
311230	Breakfast cereal mfg	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311311	Sugarcane mills	DA1583	Manufacture of sugar
311312	Cane sugar refining	DA1583	Manufacture of sugar
311313	Beet sugar mfg	DA1583	Manufacture of sugar
311411	Frozen fruit, juice, and vegetable mfg	DA153	Processing and preserving of fruit and vegetables
311412	Frozen specialty food mfg	DA153	Processing and preserving of fruit and vegetables
311421	Fruit and vegetable canning	DA153	Processing and preserving of fruit and vegetables
311422	Specialty canning	DA153	Processing and preserving of fruit and vegetables
311423	Dried and dehydrated food mfg	DA153	Processing and preserving of fruit and vegetables
311511	Fluid milk mfg	DA155	Manufacture of dairy products
311512	Creamery butter mfg	DA155	Manufacture of dairy products
311513	Cheese mfg	DA155	Manufacture of dairy products
311514	Dry, condensed, and evaporated dairy product mfg	DA155	Manufacture of dairy products
311520	Ice cream and frozen dessert mfg	DA155	Manufacture of dairy products
311611	Animal (except poultry) slaughtering	DA151	Production, processing, preserving of meat, meat products
311612	Meat processed from carcasses	DA151	Production, processing, preserving of meat, meat products
311613	Rendering and meat by-product processing	DA151	Production, processing, preserving of meat, meat products
311615	Poultry processing	DA151	Production, processing, preserving of meat, meat products

NAICS	Description	NACE	Description
311711	Seafood canning	DA152	Processing and preserving of fish and fish products
311712	Fresh and frozen seafood processing	DA152	Processing and preserving of fish and fish products
NAICS	Description	NACE	Description
311811	Retail bakeries	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311812	Commercial bakeries	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311813	Frozen cakes, pies, and other pastries mfg	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311821	Cookie and cracker mfg	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311822	Flour mixes and dough mfg from purchased flour	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311823	Dry pasta mfg	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
311830	Tortilla mfg	DA156E	Manufacture of grain mill products, cereal related, starches and starch products
312111	Soft drink mfg	DA159	Manufacture of beverages
312112	Bottled water mfg	DA159	Manufacture of beverages
312113	Ice mfg	DA159	Manufacture of beverages
312120	Breweries	DA159	Manufacture of beverages
312130	Wineries	DA159	Manufacture of beverages
312140	Distilleries	DA159	Manufacture of beverages

Annex D. Presentation and assessment of the expert network

Many people contributed to this study by providing us with information or comments on our request. Especially for Chapter 3, many people were interviewed and completed our questionnaire. Furthermore we formed four groups of experts who commented on our study in detail: a group of international academics working in the field of international trade and business management; a Dutch group of agri-business representatives, a Brussels-oriented group of experts and a food law expert group meeting in Münster. The contents of the report remain the responsibility of the research team. The views of the experts might differ from the views expressed in this report. The compositions of these groups are as follows:

International group of academics on international trade and business management

Name	Background
Dr. C. Fischer	University of Bonn, Germany
Professor dr. G. Schiefer	University of Bonn, Germany
Dr. S Frandsen	Ag. Econ. Research Institute FOI, Copenhagen, Denmark.

Dutch group of agri-business representatives

Name	Background
Mr. A. van de Velde	Eurowet (Representing the Milling Industry)
Mr. M.N. Boerstra	FNL I(Dutch Federation of Food and Drink Industries)
Mrs C.T.F. Grit	FNLI (Dutch Federation of Food and Drink Industries)
Mr. J. M. Vrij	NZO (Dutch Dairy Association)
Mrs. C.J. van Dijk	Cargill/VNG/VNFG (Glucose Cereal Starch producers)
Mr. M. Berger	Unilever and BNMF (Dutch Margarine Producers)
Mr. S. Korver	VION Food group
Mr. J. Gatsonides	Ministry of Agriculture, Nature and Food Quality

Brussels oriented group of experts

Name	Background
Mr. M. Coomans	EU, Enterprise
Mr. M. Robert	EU, Enterprise
Mr. M. Pouliot	EU, Enterprise
Mr. G. Pastoors	EU Fish Processing
Mr. C. Verschueren	RABObank International
Mrs. L. Mizzi	Agri trade expert
Mr. J.L. Pelletier	USIPA, French Starch Association.
Mr. E. Arruga i Valeri	Nestle Spain
Mr. L. Peliccia	Italian Food and Drink F.
Mr. F. Tramontin	Kraft foods
Mrs. N. Lecocq	CIAA
Mrs. B. Masure	European Dairy Association

Food law expert meeting Münster

Name	Background
Jörg Bartel	Westfleisch eG
Daniela Brand	IFAL
Jochen Brose	Dr. Ing. Jochen Brose Sachverständigenbüro
Philipp Gregor	IFAL
Monika Günter	IFAL
Heinz Volker	Deutsches Institut für Lebensmitteltechnik
Heinrich Icking	AGRAVIS Raiffeisen AG
Hans-Detlef Jansen	Deutsches Institut für Lebensmitteltechnik
Beate Kolkmann	Food-Processing Initiative e.V.
Klaus Mittendorf	Eppendorf Biochip Systems
Hans Nelke	Veterinäramt Münster
Sylvia Pfaff	FIS-Europe
Andrea Stemmer	Roncadin GmbH
Erwin Weßling	Wessling Holding GmbH and Ko. KG

Annex E. **Respondents**

1. In which country is your company located?

EU		Non EU	
Country	**Frequency**	**Country**	**Frequency**
Austria	3	Bosnia	1
Belgium	5	Brazil	1
Czech Rep.	3	Bulgaria	1
Denmark	5	Canada	1
Estonia	1	Croatia	24
Finland	1	Japan	1
France	6	Macedonia	1
Germany	10	Norway	1
Greece	2	Romania	2
Hungary	4	Serbia	2
Italy	11	Switzerland	3
Luxemburg	1	USA	4
Netherlands	17		
Poland	5		
Portugal	2		
Slovakia	3		
Slovenia	3		
Spain	4		
Sweden	3		
UK	3		
Total	**92**		**42**

N=63; 1 Unknown
NB Companies could indicate more than one location

2. How many people (your staff and contractors) are currently working in your company?

Number of employees	Number of companies	Per cent
Less then 10	6	11.3
10 till 25	2	3.8
25 till 50	4	7.5
50 till 100	4	7.5
100 till 250	7	13.2
250 till 500	6	11.3
500 till 1000	12	22.6
1000 and more	12	22.6
Total	**53**	**100.0**

NB: Some respondents did not mention the number of employees.

3. What are the main food products your company has on the market?

Product:	Frequency	Per cent
Beverages	12	19.4
Sugar	2	3.2
Cereal based	3	4.8
Meat	8	12.9
Vegetables and fruit	6	9.7
Fish	1	1.6
Oil and fat	1	1.6
Dairy	11	17.7
Other	18	29.0
Total	**62**	**100.0**

NB Companies could indicate more than one product.

4. What is your position in the chain?

Activity	Frequency:	Per cent
Primary production	14	7.5
Production of end-products	48	25.8
Wholesaler	19	10.2
Store	18	9.7
Brand holder	19	10.2
Production of ingredients	16	8.6
Catering	5	2.7
Export	28	15.1
Import	16	8.6
Other	3	1.6
Total	**186**	**100.0**

NB Companies could indicate more than one position.

5. What percentage of your company's world wide turnover is achieved on the national and what percentage on the international market?)

Percentage on international market	Number of companies	Per cent
0=Only domestic sales	7	14.3
1 till 10	7	14.3
10 till 25	11	22.4
25 till 50	11	22.4
50 till 90	7	14.3
90 and more	6	12.2
Total	**49**	**100.0**

6. In which country does your company have its main sales?

Country	Frequency	Per cent
USA	6	5.8
Germany	13	12.5
Italy	9	8.7
Netherlands	6	5.8
Spain	2	1.9
Austria	8	7.7
Poland	5	4.8
Czech Republic	3	2.9
Belgium	2	1.9
UK	2	1.9
France	1	1.0
Romania	1	1.0
Greece	1	1.0
Luxemburg	1	1.0
Slovakia	1	1.0
Sweden	1	1.0
Denmark	3	2.9
Hungary	4	3.8
Slovenia	6	5.8
Switzerland	3	2.9
Other	26	25.0
Total	**104**	**100.0**

NB Companies have indicated more than one country.

7. Is your company certified for one or more Quality Assurance Systems?

Certificate:	Frequency	Per cent
ISO	29	26.4
HACCP	33	30.0
EFSIS	4	3.6
BRC	13	11.8
SQF	2	1.8
EUROGAP	3	2.7
QandS	2	1.8
EKO	1	0.9
IKZ	1	0.9
IFS	8	7.3
TUV	1	0.9
Hygiene	2	1.8
Other	11	10.0
Total	**110**	**100.0**

NB Companies could indicate more than one system.

Annex F. The research team

Who's Who in the project (LEI staff unless otherwise mentioned)

Project management

Krijn Poppe	Project leader
Jo Wijnands	Deputy project leader, project management
Bernd van der Meulen	Project leader Food legislation (Food Law, Wageningen University)
Pavel Salz	Project management (Framian B.V.)

Participants

Martin Banse	GTAP (Global Trade Analysis Project)-model expert
Siemen van Berkum	CAP and WTO analyst
Harry Bremmers	Food legislation (Management Studies, Wageningen University)
Myrtille Danse	Analyst processed fruit and vegetables
Janneke van Dijk	Data expert
John Doornbos	IT-specialist
Desiree den Heijer	Text processing
Robert Hoste	Analyst meat industry (pork and beef)
Peter van Horne	Analyst meat industry (chicken)
Victor Immink	Analyst oils and fats, beverages
Paul Ingenbleek	Expert in strategic business management and marketing
Henk Kelholt	Trade statistics
Boudewijn Koole	Data expert
Bernd van der Meulen	Food legislation (Food Law, Wageningen University)
Hans van Meijl	GTAP (Global Trade Analysis Project)-model expert
Eric ten Pierick	Data analyst Amadeus database
Krijn Poppe	External environment, recommendations
Bram Pronk	Data expert
Jos Smit	Analyst fish
Rob Stokkers	Analyst grain mill and starches, cereals, sugar
Gemma Tacken	Analyst dairy industry
David Verhoog	Data expert, management data-group in the project
Jo Wijnands	Methodology, external environment, SWOT
Hans Wijsman	Data expert

Annex G. Abbreviations and country codes

Abbreviations

ACP	African Caribean and Pacific countries
BSE	Bovine Spongiform Encephalopathy
BRC	British Retail Consortium
CAP	Common Agricultural Policy
CEEC	Central and Eastern European Countries
CIAA	Confederation of the European Food and Drink Industry
DG Sanco	EC Directorate General Health and Consumer Protection
DDA	Doha Development Agenda
EBA	Everything but Arms
ECJ	European Court of Justice
ECR	European Court Reports
EEA	European Economic Area
EESC	European Economic and Social Committee
EFSA	European Food Safety Authority
EFSIS	European Food Safety Inspection Service
EFTA	European Free Trade Association
EurepGap	Euro-Retailer Produce Working Group Good Agricultural Practices
FBO	Food business operator
FDA	Food and Drug Administration (USA)
FGIS	Federal Grain Inspection Service (USA)
FNLI	Federatie Nederlandse Levensmiddelenindustrie (NL)
FAO	Food and Agricultural Organization
FSA	Food Standards Agency (UK)
F&V	Fruit and Vegetables
GATT	General Agreement on Tariffs and Trade
GFL	General Food Law (Regulation 178/2002)
GFSI	Global Food Safety Initiative
GM	Genetically modified
GMO	Genetically modified organism
GMP	Good Manufacturing Practices
GRAS	Generally recognized as safe (USA)
GVA	Gross Value Added
HACCP	Hazard Analysis and Critical Control Points
ICT	Information and Communication Technology
IPPC	International Plant Protection Convention
ISO	International Standards Organisation
IFAL	Institut für angewandtes Lebensmittel- und Futtermittelrecht, Produktentwicklung und Lebensmittelqualität (D)
IFS	International Food Standard
IKZ	Intergale Kwaliteitszorg (NL)
JECFA	Joint FAO/WHO Expert Committee on Food Additives
KKM	Keten Kwaliteit Melk (NL)
LEI	Landbouw Economisch Instituut (NL)
N	Number of observations
NACE	General Industrial Classification of Economic Activities within the European Community (original in French)
NAICS	North American Industry Classification System
NMa	Nederlandse Mededingingsautoriteit (Dutch competition authority)
OIE	Organisation for Animal Health
OJ	Official Journal of the EU

QA	Quality assurance
QandS	Qualität und Sicherheit (D)
RCA	Revealed Comparative Advantage (Balassa index)
R&D	Research and Development
SD	Standard deviation
SFP	Single Farm Payment
SME	Small and Medium Sized Enterprise
SQF	Safe Quality Food
TÜV	Technischer Überwachungsverein (D)
URAA	Uraguay Round Agremeent on Agriculture
U.S.C.	United States Code
USDA	The US Department of Agriculture's (USA)
VWA	Voedsel en Waren Autoriteit (NL)
WTO	World Trade Organization, the successor to GATT as of 1995.
WUR	Wageningen University and Research Centre (NL)

Country codes

AR	Argentina
AU	Australia
BE	Belgium
BR	Brasilia
CA	Canada
CH	Switzerland
CN	China
CY	Cyprus
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
EU	European Union
EU-3C	Exports from the EU to 3rd
EU-15 < >non-EU	Exports from the EU-15 to 3rd Countries
FI	Finland
FR	France
GR	Greece
HU	Hungary
ID	Indonesia
IE	Ireland
IS	Iceland
IT	Italy
JP	Japan
LV	Latvia
LT	Lithuanian
LU	Luxembourg
ML	Malta
MX	Mexico
MY	Malaysia
NL	Netherlands
NO	Norwegian
NZ	New Zealand
OC	Oceania (NZ and AU)
PL	Poland
PT	Portugal
RF	Russian Federation
RO	Romania
SE	Sweden

SK	Slovakia
SI	Slovenia
TH	Thailand
UK	United Kingdom
US	United states of America

Annex H. **Acknowledgements**

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[55] Ms. Brand translated the questionnaire into German language.

Annex I. Expendable food legislation according to VWA

The original list comprises legislation applicable in the Netherlands, i.e. EU regulations and national legislation. In the overview of national legislation below, the EU directives have been added on which they are based.

National legislation	EU legislation
	1. Regulation (EEC) 1898/87 on the protection of designations used in marketing of milk and milk products
	2. Regulation (EC) 2597/97 on the common organisation of the market in milk and milk products for drinking milk
	3. Verordening (EG) 1760/2000 establishing a system for the identification and registration of bovine animals and regarding the labelling of beef and beef products
	4. Regulation (EEC) 1576/89 laying down general rules on the definition, description and presentation of spirit drinks
	5. Regulation (EC) 2991/94 laying down standards for spreadable fats
6. Warenwetbesluit visserijproducten, slakken en kikkerbillen	6. Directive 91/493/EEC laying down the health conditions for the production and the placing on the market of fishery products 6. Directive 91/492/EEC laying down the health conditions for the production and the placing on the market of live bivalve molluscs
7. Warenwetregeling handelsbenamingen vis	7. Regulation (EC) 104/2000 Art. 4(2) on the common organisation of the markets in fishery and aquaculture products
8.Warenwetbesluit vlees, gehakt en vleesproducten	8. Decision nr. 97/534/EC on the prohibition of the use of material presenting risks as regards transmissible spongiform encephalopathies
9. Warenwetbesluit meel en brood	---
10. Warenwetbesluit suikers	10. Directive 2001/111/EC relating to certain sugars intended for human consumption
11. Warenwetbesluit honing	11. Directive 2001/110/EC relating to honey
12. Warenwetbesluit cacao en chocolade	12. Directive 2000/36/EC relating to cocoa and chocolate products intended for human consumption
13.Warenwetbesluit gereserveerde aanduidingen	---
14. Warenwetbesluit specerijen en kruiden	---
15. Warenwetbesluit verpakte waters	15. Directive 96/70/EG amending Dir. 80/777/EEC on the approximation of the laws of the Member States relating to the exploitation and marketing of natural mineral waters
16. Warenwetregeling gedehydrateerde melk 2003	16. Directive 2001/114/EC relating to certain partly or wholly dehydrated preserved milk for human consumption

17. Bierverordening productschap dranken 2003	---
18. Verordening GZP droge stof brood 2003	---
19. Verordening GZP snijkoek 1983	---
20. Verordening HPA wijn 2002	20. Reg. (EC) nr. 1493/1999, Reg. (EC) nr. 753/2002, Reg. (EEC) nr. 1601/91, Dir. 75/106/EEC on wine.
21. Verordening PT kwaliteitsvoorschriften appelmoes 2003	---
22. Verordening GZP speculaas 2003	---
23. Verordening dagvers gerookte paling 2000	---
24. Verordening PT verduurzaamde champignons 2000	---
25. Verordening PT vruchtensappen en bepaalde aanverwante producten 2003	---
26. Verordening benaming gedistilleerde en zwak gedistilleerde dranken PD 2005	---
27. Verordening PGF 1981 verduurzaamde groenten	---

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