European Commission

Distribution of the added value of the organic food chain

Final Report

AGRICULTURE AND RURAL DEVELOPMENT

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Directorate-General for Agriculture and Rural Development
Directorate B— Multilateral relations, quality policy
Unit B.4 — Organics

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Directorate-General for Agriculture and Rural Development

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Abstract

Over the last decade the organic market in the EU has grown faster than the organic agricultural area, which raises the question to what extent organic supply chains function effectively. Therefore, this study investigated the creation and distribution of added value in a number of organic supply chains in different EU countries. The results of the case studies suggest that higher added value is created in organic compared to conventional supply chains. However, no evidence was found that the relative share of organic farmers in the total added value differs substantially from that of conventional farmers. Also in organic food supply chains farmers capture a relative small proportion of added value. This can partly be explained by similarities of organic with conventional supply chains. It appears that the distribution of added value strongly depends on the structure and characteristics of the specific supply chain, such as level of chain integration and power relations between market players. No common patterns were identified regarding the impact of different types of retails and markets on the creation and distribution of added value. Investments in quality aspects, increased consumer interest in organic food, differentiation of products as well as efficiency in supply chain management are all relevant factors that contribute to higher added value.

Résumé

Au cours de la dernière décennie, le marché bio a connu dans l'UE une croissance supérieure à celle des surfaces agricoles cultivées en bio, ce qui pose la question de l'efficacité du fonctionnement de la filière biologique d'approvisionnement. Cette étude analyse la création et la distribution de la valeur ajoutée dans certaines filières biologiques d'approvisionnement de différents pays de l'UE. Les résultats des études de cas suggèrent que les filières biologiques d'approvisionnement créent davantage de valeur ajoutée que les conventionnelles. Il n'y a cependant rien qui indique que la proportion de la valeur ajoutée totale récoltée par les agriculteurs biologiques soit supérieure à celle de leurs collègues conventionnels – elle est tout aussi petite. Cela peut être en partie expliqué par les similitudes entre les filières d'approvisionnement biologiques et conventionnelles. Il semble que la répartition de la valeur ajoutée dépende fortement de la structure et des caractéristiques de chaque filière d'approvisionnement comme p. ex. le niveau d'intégration de la filière et les relations de pouvoir entre les acteurs du marché. Il n'y a pas non plus eu d'identification de schémas communs pour l'impact des différents types de magasins et de marchés sur la création et la distribution de la valeur ajoutée. Les investissements dans les aspects de la qualité, la progression de l'intérêt du consommateur pour la nourriture biologique, la différenciation des produits ainsi que l'efficience de la gestion des filières d'approvisionnement sont tous des facteurs importants qui contribuent à l'augmentation de la valeur ajoutée.

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List of Abbreviations

AHP	Analytical Hierarchy Process
AMI	Agrarmarkt Informations-Gesellschaft [Agricultural Market Information Company]
conv.	conventional
CZ	Czech Republic
DE	Germany
DG AGRI	Directorate-General for Agriculture and Rural Development
DK	Denmark
EE	Estonia
EU	European Union
FADN	Farm Accountancy Data Network
FARMIS	Farm Modelling Information System
FNVA	Farm Net Value Added
FiBL	Forschungsinstitut für biologischen Landbau [Research Institute of Organic Agriculture]
FR	France
GfK	Gesellschaft für Konsumforschung [Society for Consumer Research]
GVA	Gross Value Added
ha	Hectare
HU	Hungary
IT	Italy
l	Litre
Kg	Kilograms
LF	Landbrug og Fødevarer [Danish Agriculture & Food Council]
MAR	Missing at random
MCAR	Missing completely at random
MNAR	Missing not at random
na	Not available or specified
OMIARD	Organic Marketing Initiatives and Rural Development

PC	Principal Component
PCA	Principal Component Analysis
SOLID	Sustainable Organic and Low Input Dairying
t	Metric ton
UK	United Kingdom
VAT	Value added tax

List of experts in case study countries

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Executive summary

Background and objectives of the study

Organic farming has been identified as a key element in sustainable management of Europe's natural land-based resources. For this reason, the overall objective of the current EU political and legislative framework is to ensure sustainable growth in European organic production. This requires that organic farming develops in line with the organic market in the EU. Data on the development of organic land use and the market for organic food in the EU suggests that this is not the case. In the last ten years the EU organic market has grown twice as much as the EU organic land area. Consequently, the question arises, whether farmers are able to exploit the full potential of the EU organic market and how much of the added value created in the organic food sector is captured by farmers.

Against this background, this study investigates the distribution of added value along a number of organic food supply chains and focuses on whether organic supply chains function effectively and efficiently. More specifically, the following three issues are addressed:

- **Theme 1**: How much added value is generated by the organic food supply chain? How much is it in nominal and relative terms compared to the conventional sector, and who are the market players benefiting from it?
- **Theme 2**: How is the added value distributed among market players in the supply chain and how much of it returns to agricultural producers in particular?
- **Theme 3**: What factors influence the formation and distribution of added value for each relevant actor in the supply chain, including agricultural producers? How can added value be increased for the key market players?

By answering these questions, the study aims to contribute to a better understanding of the dynamics of the organic market and whether there is sufficient added value for European agricultural producers[1] to motivate them to take up organic farming.

Scope and approach

The **scope** of the analysis is the downstream stage of the food sector, with the production of agricultural raw commodities as a starting point. The term **added value** as used in this study is defined as product-related outputs valued at basic prices less product-related intermediate consumption valued at purchasers' prices. Hence, the analysis of added value does not include the entire economic activities of an actor or an industry but only those that are related to the production, processing and distribution of a particular product. To calculate the product-specific added value for each actor of the supply chain, it is necessary to specify the revenues and costs

[1] For reason of simplification, we call agricultural producers in this report either “producer” or “farmer”, while processors are called either “processors” or “ miller”, “pasta-maker” and “dairy”, respectively, but not “producer”.

related to the production, processing and/or distribution of the product at each supply chain stage. The total of the individual values added at each stage along the supply chain gives the total added value of the chain.

The in-depth analysis of the distribution of the added value was done in 18 case study supply chains in nine countries (Czech Republic, Germany, Denmark, Estonia, Spain, France, Hungary, Italy and the United Kingdom) and for three products (drinking milk, apples and durum wheat/pasta). The countries studied, represent three organisational structures of the EU organic market: (a) markets predominantly based on imports from third countries; (b) markets predominantly based on the internal production; and (c) markets that are currently emerging within the EU and still developing structurally. The products cover the following types of market dynamics: (a) high production volumes within the EU with stagnant or positive growth rates; (b) low production volumes within the EU but with strongly positive growth rates; and (c) low production volumes within the EU with low or no growth rates.

Creation of added value in organic food chains (Theme 1)

Theme 1 explores how value is added, which actors along the supply chain are benefiting from the added value and what is the value created in the supply chains of the three selected products in nominal and relative terms, as compared to the non-organic sector. The analysis is based on organic market statistics, relevant scientific literature, and quantitative and qualitative data derived from interviews with experts of the chosen product supply chains in nine case study countries.

The results indicate that organic supply chains do not differ substantially in **structure** from conventional supply chains in many countries. In contrast to literature that represents organic supply chains as an alternative to the mainstream food system, market data shows that in many European countries between 40 % and 90 % of organic food is sold in general retail. It is therefore not a surprise that the typical supply chains analysed in the framework of this study are mostly integrated into the mainstream food system, except for organic apple supply chains in Estonia and France, and organic pasta in Spain and Italy. According to the interviewed experts, the added value created in the organic sector reflects the specific quality of the organic products and the increasing consumer demand for organic food, which represent the main strengths of the sector.

Opportunities to create added value in the organic supply chains to the benefit of farmers, arise from co-operation among organic producers resulting in increased bargaining power and the creation of supplier or regional organic brands, special agreements between upstream actors and retailers for high quality products, investments in processing, direct marketing, and from product innovation and differentiation. The small scale of production and a limited number of actors was identified as a major weakness of the organic supply chains in the literature and by the experts. This results in fragmented chains and high transport costs, which may encourage producers to sell to larger and more powerful market actors, as illustrated by the processing stage of milk in the Czech Republic and Spain, and durum wheat in the Czech Republic, Hungary and Spain. Larger scale production allows producers to reduce costs, but product differentiation through innovation, supply chain integration, cooperation and bargaining power remains critical to obtain sufficient output prices. Collaboration

between upstream actors and retailers (either specialised or general) resulting in specific agreements can result in high quality (niche) products, which achieve a relatively high price (e.g. pasta in Italy).

To analyse **how much value is created** in organic compared to conventional supply chains, average organic and conventional farm-gate and retail prices were compared for the three products. The difference between the two prices can be understood as the value that is created in the supply chain or added to the agricultural raw commodity along the supply chain.

In the supply chain case studies, farm-gate and retail prices are premium prices for organic production and are thus higher for the organic supply chains compared to the relative conventional chains. In most cases, the difference between retail and farm-gate price is higher for the organic supply chains. The organic farm-gate prices represent a proportion of between 9 % and 62 % of the retail prices, while the proportion is between 6 % and 40 % in the conventional supply chains selected for the analysis. We also observed an asymmetrical price transmission from producers to consumers, especially for products like organic pasta, which involves more stages of processing operations (milling and pasta making). Organic farm-gate prices appear to be linked to the farm-gate price for conventional products. In countries with low farm-gate prices for the conventional product, the organic price premium is also lower than in countries with high farm-gate prices for the conventional product and vice versa. The type of market (emerging, internal, import reliant) is not a major factor influencing the opportunities for value adding in the organic supply chains.

Distribution of added value in organic food chains (Theme 2)

The distribution of added value is analysed across different actors of the supply chain (e.g. producers, wholesalers, processors, retailers) and how much of it returns to agricultural producers. For each organic supply chain and supply chain actor (a) the price and unitary[2] gross value added formation as well as (b) the distribution of the gross value added were calculated. However, it was only possible to calculate the total unitary gross value added for those organic supply chains for which a complete data set from all involved supply chain actors were available.

Seven specific **drinking milk supply chains** were analysed: two in the Czech Republic (emerging market), two in Estonia (emerging market), one in Germany and in France (both internal market) and one in Spain (import market). The total unitary gross value added in in the French and German cases representing internal markets is highest and very similar (France: 0.53 €/l; Germany: 0.51 €/l). It is lowest in the two Czech supply chains (Supermarket: 0.23 €/l and (Specialised food shop: 0.34 €/l). In the Czech, Estonian and Spanish case studies, the unitary gross value added at the producer level amounts to between 0.01 and 0.04 €/l milk and thus accounts only for 3 % to 12 % of the total unitary gross value added. The retailers in the Czech Republic and Spain and the processors in Estonia hold the highest share of the total unitary gross value added. The two internal market case studies, Germany and France, showed the highest share of added value at the farm level and a proportionally lower share at processor level. In the German drinking milk supply chain this is due to the fact that

[2] Unitary gross value added refers to one kg of pasta or apples, or to one litre of milk.

the producers formed a producer group, which pools the produced milk and negotiates the price with the dairies, putting the producers in a more powerful market position.

Eight organic **apple supply chains** were analysed: two in Italy and one in France (internal markets), two each in Hungary and Estonia (emerging countries) and one in the United Kingdom (import market). In the apple supply chain case studies, the total unitary gross value added ranges between 0.92 €/kg in Hungary (specialised shop) and 2.74 €/kg in the United Kingdom (supermarket). The apple producers hold between 21 % (Italy) and 64 % (Estonia) of the total unitary gross value added. In Estonia and Hungary (emerging markets), the highest share of the total unitary gross value added is obtained by the apple producers, whereas in Italy and the United Kingdom the highest share lies at the retail level. This result probably reflects the different market conditions across countries: Italy and the United Kingdom have a more mature organic market; with a structure that provides downstream supply chain actors greater market power. In emerging markets, producers are still able to get greater returns, given the limited domestic supply, niche domestic market demand and largely unstructured, emergent supply chain. The unitary gross value added varies considerably between the distributor and wholesale level, depending to what extent they provide or take over services such as cold storage, packing and distribution. For the Italian and the French case studies, the share of the unitary gross value added at wholesale level is remarkably high. These two case studies were conducted in regions which are highly specialised in organic fruit production. The wholesalers in these regions play a central role, providing services for transport, storage, calibrated packaging and distribution.

Eight organic **pasta supply chain** case studies were conducted: two each in Germany (import market) and Italy (internal market), and one each in the Czech Republic and Hungary (emerging markets), in Spain (internal market) and in the United Kingdom (import market). In the pasta supply chain case studies, the total unitary gross value added ranges from 1.50 €/kg pasta in Czech Republic (specialised shop) to 2.29 €/kg in Spain and 2.65 €/kg in Hungary. The unitary gross value added of the producers is lowest in the Spanish and the Czech case studies (0.08 €/kg and 0.09 €/kg respectively), and it is around 0.15 €/kg in Hungary and Italy. In relative terms, the total unitary gross value added of the pasta makers is the highest (54 %) in the Italian supermarket supply chain. In the Czech and Spanish as well as the German specialised shop supply chain, the retail share of the total unitary gross value added varies between 32 % and 48 %, and it is 7 % to 19 % higher than the share of the pasta makers. In four cases (Czech Republic, Spain, and the specialised shop supply chains in Germany and Italy), the distribution of pasta from the processor to the retail is undertaken by a wholesaler, which covers 16 % to 26 % of the total unitary gross value added. In the German and Italian case studies, a broker or elevator between the producer and the miller is included. However, the brokers' shares of the total unitary gross value added are quite low corresponding to about 1 %. Two pasta supply chains from Hungary and Italy operate in a niche market for special pasta types, and show high vertical integration which provides benefits in terms of added value particularly for processors but the producers seem to benefit less.

Factors influencing the formation and distribution of added value in organic food chains (Theme 3)

A panel of experts for the selected supply chains in the different countries provided views and evaluations regarding the repartition of added value along the different supply chains and countries involved in the study, aiming to identify possible differences in market power between the various market actors.

An Analytic Hierarchy Process (AHP) was used to elicit expert information on the **process of added value formation** for the three supply chains. Added value formation can be disaggregated for each supply chain actor into price-related and volume-related components. By doing so, the specific relevance of factors for the added value created in organic supply chains can be identified. The price component reflects the importance of the gap between output prices and intermediate input prices in the process of added value formation (the higher the gap, the greater the positive effect on the formation of added value, and vice versa). The volume component refers to the role of production capacity in the process of added value formation (the higher the quantities produced, the higher the positive effect on the formation of added value, and vice versa). AHP allows ranking the importance of these two added value components by supply chain, actor and country. The analysis considers three main actor categories: farmers, processors and distributors (including retailers and wholesalers) for the supply chains of pasta and drinking milk, while for the apple supply chain, the analysis was limited to farmers and distributors. Experts were asked to evaluate the perceived importance of the price and volume added value component.

For the added value in the drinking milk supply chain, generally, the experts perceive the importance of the farm level as particularly low, with processors and distributors playing a clearly dominant role. Some differences emerge in terms of the relative importance of producers in the added value formation. The results of the specific unitary gross value added analysis show a higher share of added value at farm level for Germany and France. The price component emerges as the main factor in the milk supply chain, for all market actors in most countries.

As far as the formation of added value in the organic apple supply chain is concerned, the relative importance of distributors is higher for the United Kingdom, Italy and Hungary, while farmers have the greatest importance in France and Estonia. The Estonian organic apple market is a small niche market with higher demand than supply which may explain the prevalence of the price component for farmers in the creation of added value. In the French case, this could be due to a growing demand but there are no robust price data for fruits in France, which would allow proving this statistically.

For the pasta supply chain the overall picture is quite diverse between countries in relation to the relative weight of market actors. Italy shows the lowest relative importance attributed to farmers in the added value formation process, and the highest for distributors. Germany shows a similar distribution, though with a higher share for farmers' added value component. Spain shows a rather balanced distribution of the importance attributed to processor and distributor, while processors dominate the distribution of components for Hungary. Also for this supply chain in general, price components are the most relevant in the process of added value formation, with some exceptions, especially for Spain.

In general, the price component is considered as the most relevant at farm-gate, processor and retail level, though with some exceptions. As a result, the retail price is the most relevant elementary added value component. Other highly ranked elementary added value components are: sale prices for processors, efficiency at distribution level, and the plant productivity for processors.

In addition to the evaluation of the contribution of price and volume components, we provide an analysis of the **factors** positively or negatively **influencing** the formation of added value and market share. Experts were asked to provide a list of relevant factors that refer to marketing aspects, management strategies, and consumer preferences etc. for each supply chain. Results show that on the supply side, the main opportunities are expected from increased price competitiveness at farm level, improved efficiency of production and improved production both in quantity and range, through bulk and wide-ranging supply as well as assurance of constant availability that should also result from improved storage facilities to ensure availability. Threats refer mainly to low profitability at farmer level and to low competitiveness of domestic production.

On the demand side, quality driven demand, consumer driven local production and consumer and retail driven market development are considered as the main aspects to consider for improving added value. The need for establishment of leader brands and market concentration is also considered to provide a positive effect, but an excess of market power concentration at retail level is also mentioned as having potential negative effects for added value creation. Other main obstacles are expected from the lack of marketing orientation and inefficient management at retail level.

Finally, several factors refer to general aspects of the supply chain organisation. Opportunities in terms of added value improvements are expected from a more quality-oriented and efficient supply chain organisation and improved product differentiation by local/premium brands. Government support and public sector procurement are also considered as having a positive role in the process of added value creation. Conversely, the main obstacles refer to the lack of critical mass due to inefficient small scale production, and to aspects related to standards and quality such as inefficient logistics to meet quality requirements as well as high costs and standards along the supply chain that represent a challenge in the organic supply chains.

Conclusions

This study shows that organic farmers receive higher prices than conventional farmers, but the producers' share of the total added value created in the entire supply chain remains relatively low. Comparisons of farm-gate and retail prices suggests that also in the organic sector there is a limited link between agricultural commodity prices and the price premium paid by consumers.

There are differences in how added value is created and distributed along the chain in the case studies in the countries. These differences are mainly due to the structure of the supply chains (including in particularly the level of supply chain integration) and the availability of special processing and marketing facilities for organic products. Such capacity is lacking mainly in some

emerging markets, for example for pasta making in Spain and for milk production in the Czech Republic.

A number of contingent conditions, such as power relations among market players and collaboration, play a major role as well. The market size also has an impact on the creation and distribution of added value in a limited number of cases, in which farmers obtain a greater share of gross value added in the bigger internal markets, where supply is lower than demand. The stage of development and the outlet or sales channel seem to only have a limited effect on the added value in the investigated organic supply chains.

All retail outlets provide opportunities for improving the farmer share of added value depending on their approaches to marketing organic products. Along with increased consumers demand for organic food in the EU, this presents a strong case for encouraging special agreements between producers and retailers, the development of producer brands and investments in quality aspects.

Small scale of production and the limited number of operators willing to invest in special facilities dedicated to organic produce still represent major barriers to the development of the organic market in most of the case study countries. However, there are a few exceptions such as in some emerging market countries where producers make use of niche market opportunities, or in some mature market countries on where cooperation is more likely to happen. Policy intervention should target both production as well as investment in post-production capacity so that market potentials represented by the growing market for organic products can be realised.

This study makes it clear that strategies and models for a fairer distribution of added value in organic supply chains exist, but they need to be adjusted to the specific contexts. In order to do so, availability of market data is a key issue and market transparency is critical in order to assist market players and policy makers in their decisions. The improvement of the availability of market data at all levels of the supply chains should be a key priority for the future development of the organic sector.

Résumé analytique

Contexte et objectifs de l'étude

L'agriculture biologique a été identifiée comme un élément clé dans la gestion durable des ressources naturelles des sols en Europe. C'est pourquoi l'objectif général du cadre politique et législatif actuel de l'UE est d'assurer une croissance durable de la production biologique européenne. Cela demande que l'agriculture biologique se développe parallèlement au marché bio de l'UE. Les données sur le développement de l'utilisation biologique des sols et sur celui du marché des produits alimentaires biologiques dans l'UE suggèrent que ce n'est pas le cas. Au cours des dix dernières années, le marché bio de l'UE a connu une croissance deux fois plus importante que celle de la surface des terres cultivées en bio dans l'UE. Il se pose par conséquent la question de savoir si les agriculteurs sont à même d'exploiter complétement le potentiel du marché de l'UE, et de se demander quelle proportion de la valeur ajoutée du secteur de l'alimentation biologique est captée par les agriculteurs.

Par rapport à ce contexte, cette étude analyse la distribution de la valeur ajoutée au long de plusieurs filières d'approvisionnement de produits alimentaires biologiques et se demande si la filière d'approvisionnement biologique fonctionne de manière efficace et efficiente. Les trois thèmes suivants ressortent plus spécifiquement:

- **Thème 1:** Quelle valeur ajoutée la filière d'approvisionnement en aliments biologiques génère-t-elle? Quelles sont les valeurs absolues et relatives en comparaison avec le secteur conventionnel, et quels sont les acteurs du marché qui en bénéficient?
- **Thème 2:** Comment la valeur ajoutée est-elle répartie entre les acteurs du marché dans la filière d'approvisionnement, et combien en revient en particulier aux producteurs agricoles?
- **Thème 3:** Quels facteurs influencent la création et la distribution de la valeur ajoutée pour chacun des acteurs importants de la filière d'approvisionnement y compris les producteurs agricoles? Comment la valeur ajoutée peut-elle être augmentée pour les acteurs-clés du marché?

En répondant à ces questions, cette étude vise à contribuer à mieux comprendre les dynamiques du marché bio et les facteurs qui mènent à la création de valeur ajoutée, comment la valeur ajoutée est partagée entre les différents acteurs des filières d'approvisionnement et en particulier s'il y a suffisamment de valeur ajoutée à disposition des producteurs agricoles européens pour les motiver à passer à l'agriculture biologique.

Étendue et approche

L'**étendue** de l'analyse est le flux aval du secteur alimentaire avec la production des matières premières agricoles comme point de départ. Le terme **valeur ajoutée** utilisé dans cette étude est défini comme la valeur de la vente des produits au prix de base moins la valeur au prix d'achat de la consommation intermédiaire liée aux produits. C'est pourquoi l'analyse de la valeur ajoutée n'inclut pas l'ensemble des activités économiques d'un acteur ou d'une industrie mais seulement celles qui sont en relation avec la production, la transformation et la distribution d'un produit donné. Pour calculer la valeur ajoutée spécifique d'un produit pour chaque acteur de la filière, il est nécessaire de

préciser les revenus et les coûts relatifs à la production, à la transformation et/ou à la distribution du produit à chaque étape de la filière. Le total des valeurs ajoutées individuelles de chaque étape de la filière d'approvisionnement donne le total de la valeur ajoutée créée par la filière.

L'analyse approfondie de la répartition de la valeur ajoutée a été faite dans 18 cas d'étude de filières d'approvisionnement dans 9 pays (République tchèque, Allemagne, Danemark, Estonie, Espagne, France, Hongrie, Italie et Royaume Uni) et pour trois produits (lait de consommation, pommes, pâtes au blé dur). Les pays étudiés représentent trois structures organisationnelles du marché bio de l'UE: (a) marchés majoritairement basés sur les importations venant d'autres pays; (b) marchés majoritairement basés sur la production interne; et (c) marchés en train d'émerger à l'intérieur de l'UE et qui sont encore en train de développer leurs structures. Les produits couvrent les types suivants de dynamiques de marché: (a) grands volumes de production à l'intérieur de l'UE avec des taux de croissance en stagnation ou en progression; (b) petits volumes de production à l'intérieur de l'UE avec des taux de croissance fortement positifs; (c) petits volumes de production à l'intérieur de l'UE avec des taux de croissance faibles ou nuls.

Création de valeur ajoutée dans les filières alimentaires biologiques (Thème 1)

Le thème n° 1 explore comment de la valeur s'ajoute, quels acteurs de la filière d'approvisionnement profitent de la valeur ajoutée et quelle est en termes absolus et relatifs la valeur ajoutée dans les filières d'approvisionnement des trois produits sélectionnés en comparaison avec le secteur non-biologique. L'analyse est basée sur des statistiques du marché bio, la littérature scientifique, ainsi que sur les données quantitatives et qualitatives provenant d'interviews menées avec des experts des filières d'approvisionnement choisies dans les neuf pays étudiés.

Les résultats indiquent que dans de nombreux pays les **structures** des filières d'approvisionnement biologiques ne diffèrent pas substantiellement de celles des filières d'approvisionnement conventionnelles. Contrairement à la littérature qui représente les filières d'approvisionnement biologiques comme une alternative au courant dominant du système alimentaire, les données commerciales montrent que, dans de nombreux pays européens, entre 40 % et 90 % de l'alimentation biologique est commercialisée dans la vente au détail générale. Il n'est donc pas surprenant que les filières d'approvisionnement typiques considérées dans le cadre de cette étude soient généralement intégrées dans le courant dominant du système alimentaire – sauf pour les filières d'approvisionnement en pommes biologiques en Estonie et en France et pour celles des pâtes bio en Espagne et en Italie. Selon les experts interviewés, la valeur ajoutée créée dans le secteur biologique reflète la qualité spécifique des produits bio et l'augmentation de la demande des consommateurs pour l'alimentation bio, ce qui représente les principales forces du secteur.

Les opportunités de créer dans les filières d'approvisionnement biologiques de la valeur ajoutée qui profite aux agriculteurs résultent d'une coopération entre les producteurs biologiques débouchant sur un plus grand pouvoir de négociation et sur la création de marques de fournisseurs ou de marques régionales, sur des accords spéciaux entre les acteurs en amont et les commerces de détail pour les produits de haute qualité, sur des investissements dans la transformation, sur du marketing direct et enfin sur de l'innovation et de la différenciation de produits. Une petite échelle de production ainsi qu'un nombre limité d'acteurs ont été identifiés dans la littérature et par les experts

comme une grande faiblesse des filières d'approvisionnement biologiques. Cela provoque une fragmentation des filières et une augmentation des frais de transport qui peuvent encourager les producteurs à vendre à des acteurs commerciaux plus grands et plus puissants, ce qui est illustré par la transformation du lait en République tchèque et en Espagne et par celle du blé dur en République tchèque, en Hongrie et en Espagne. La production à plus grande échelle permet aux fabricants de diminuer les coûts, mais la différenciation des produits par l'innovation, l'intégration des filières d'approvisionnement, la coopération et le pouvoir de négociation restent trop faibles pour obtenir des prix de vente décents. La collaboration entre les acteurs en amont et les détaillants (spécialisés ou généraux) résultant d'accords spécifiques peut déboucher sur des produits de haute qualité (et de niche) vendus à des prix relativement élevés (p. ex. les pâtes en Italie).

Pour analyser la **quantité de valeur ajoutée qui est créée** dans les filières d'approvisionnement biologiques comparées aux conventionnelles, les prix biologiques et conventionnels moyens départ ferme et les prix de vente finaux ont été comparés pour trois produits. La différence entre les deux prix peut être comprise comme étant la valeur ajouté à la matière première agricole jusqu'au produit fini.

Dans ces étude de cas de filières d'approvisionnement, les prix départ ferme et les prix de détail sont des prix premiums pour la production biologique et sont donc plus élevés pour les filières d'approvisionnement biologiques comparées aux filières conventionnelles relatives. La différence entre les prix départ ferme et les prix au détail est dans la plupart des cas plus élevée dans les filières d'approvisionnement biologiques. Les prix biologiques départ ferme représentent une proportion de 9 % à 62 % des prix au détail tandis que cette proportion est de 6 % à 40 % dans les filières d'approvisionnement conventionnelles sélectionnées pour l'analyse. Nous avons aussi constaté une transmission asymétrique du prix entre les producteurs et les consommateurs, spécialement pour des produits comme les pâtes biologiques, qui impliquent davantage d'étapes de transformation (meunerie puis fabrication des pâtes). Les prix bio aux producteurs semblent liés aux prix des produits conventionnels à la ferme. Le prix premium biologique est plus bas dans les pays où les prix départ ferme des produits conventionnels sont bas que dans les pays où les prix départ ferme des produits conventionnels sont élevés et vice-versa. Le type de marché (émergent, intérieur, dépendant des importations) n'est pas un facteur influençant de manière prépondérante les possibilités de créer de la valeur ajoutée dans les filières d'approvisionnement biologiques.

Distribution de la valeur ajoutée dans les filières alimentaires biologiques (Thème 2)

La distribution de la valeur ajoutée est analysée pour différents acteurs des filières d'approvisionnement (p. ex. producteurs, grossistes, transformateurs, détaillants) et pour savoir combien en revient aux producteurs agricoles. Les prix et la formation de la valeur ajoutée unitaire brute[3] (a) et la distribution de la valeur ajoutée (b) ont été calculés pour chaque filière d'approvisionnement bio et pour chaque acteur des filières d'approvisionnement. Il n'a cependant été possible de calculer la valeur ajoutée unitaire brute totale que pour les filières

[3] La valeur ajoutée unitaire brute se réfère à un kilo de pâtes ou de pommes ou à un litre de lait.

d'approvisionnement bio pour lesquelles un ensemble complet de données était disponible pour tous les acteurs impliqués dans la filière d'approvisionnement.

Sept **filières d'approvisionnement spécifiques pour le lait** de consommation ont été analysées: Deux en République tchèque et deux en Estonie (marchés émergents), une en Allemagne, une en France (marchés intérieurs) et une en Espagne (marché dépendant de l'importation). Les valeurs ajoutées unitaires totales brutes des cas français et allemands qui représentent les marchés intérieurs sont les plus élevées et sont très semblables (France: 0.53 €/l; Allemagne: 0.51 €/l). C'est en République tchèque qu'elles sont les plus basses avec une valeur ajoutée unitaire brute totale de 0.23 €/l (supermarché) et de 0.34 €/l (magasin spécialisé). Dans les études de cas tchèques, estoniennes et espagnoles, la valeur ajoutée unitaire brute atteignait au niveau de la production agricole des montants entre 0.01 et 0.04 €/l de lait et ne représentait par conséquent qu'entre 3 % et 12 % de la valeur ajoutée unitaire brute totale. En République tchèque et en Espagne ce sont les détaillants et en Estonie les transformateurs qui ont obtenu la plus grosse part de la valeur ajoutée unitaire brute totale. Les deux études de cas portant sur des marchés intérieurs, l'Allemagne et la France, ont montré la plus haute part de valeur ajoutée attribuée au niveau agricole et donc logiquement une moins grande proportion au niveau de la transformation. Dans la filière allemande d'approvisionnement du lait de consommation, cela est dû au fait que les producteurs ont formé un groupe qui met en commun le lait produit, négocie les prix avec les laiteries et confère aux producteurs une position commerciale plus forte.

Huit **filières biologiques d'approvisionnement en pommes** ont été analysées: Deux en Italie et une en France (marchés intérieurs), deux en Hongrie et deux en Estonie (marchés émergents) et une dans le Royaume Uni (marché dépendant des importations). Dans les études de cas des filières d'approvisionnement en pommes, la valeur ajoutée unitaire brute totale variait entre 0.92 €/kg en Hongrie (magasin spécialisé) et 2.74 €/kg dans le Royaume uni (supermarché). Les producteurs de pommes ont reçu entre 21 % (Italie) et 64 % (Estonie) de la valeur ajoutée unitaire brute totale. En Estonie et en Hongrie (marchés émergents), la plus grande partie de la valeur ajoutée unitaire brute totale est couverte par les producteurs de pommes, tandis qu'en Italie et au Royaume Uni la plus grande part revient au niveau du commerce de détail. Ce résultat reflète probablement les différentes conditions des marchés entre les pays: L'Italie et le Royaume Uni ont une structure plus mûre pour le marché bio où les acteurs aval de la filière d'approvisionnement ont un plus grand pouvoir commercial. Sur les marchés émergents, les producteurs sont encore capables de recevoir des bénéfices plus élevés à cause de la petite taille de la filière d'approvisionnement nationale, de la demande d'un marché de niche national et d'une filière d'approvisionnement émergeante fondamentalement non structurée. La valeur ajoutée unitaire brute totale varie considérablement entre le niveau du distributeur et celui du grossiste en fonction de l'étendue des prestations qu'ils fournissent ou utilisent (comme p. ex. stockage frigorifique, emballage, distribution). Pour les études de cas italienne et française, la part de la valeur ajoutée unitaire brute totale qui revient au niveau grossiste est remarquablement grande. Ces deux études de cas ont été menées dans des régions hautement spécialisées dans la production fruitière biologique. Les grossistes de ces régions jouent un rôle central en fournissant des services pour le transport, le stockage, le calibrage, l'emballage et la distribution.

Huit études de cas ont été réalisées sur la **filière d'approvisionnement pour les pâtes** biologiques: Deux en Allemagne et une au Royaume Uni (marchés dépendants des importations), deux en Italie et une en Espagne (marchés intérieurs), une en République tchèque et une en Hongrie (marchés émergents). Dans les études de cas des filières d'approvisionnement pour les pâtes, la valeur ajoutée unitaire brute totale varie de 1.50 €/kg en République tchèque (magasin spécialisé) à 2.29 €/kg en Espagne et à 2.65 €/kg en Hongrie. La valeur ajoutée unitaire brute totale des producteurs est la plus basse dans les études de cas espagnole et tchèque (respectivement 0.08 €/kg et 0.09 €/kg) alors qu'elle est d'environ 0.15 €/kg en Hongrie et en Italie. En termes relatifs, c'est dans la filière italienne d'approvisionnement des supermarchés que la valeur ajoutée unitaire brute totale des fabricants de pâtes est la plus élevée (54 %). Dans les filières d'approvisionnement tchèques, espagnoles et allemandes des magasins spécialisés, la part de la valeur ajoutée unitaire brute totale qui revient au commerce de détail varie entre 32 % et 48 %, ce qui est de 7 % à 19 % plus élevé que la part des fabricants de pâtes. Dans quatre cas (République tchèque et Espagne ainsi que la filière d'approvisionnement des magasins spécialisés en Allemagne et en Italie) la distribution des pâtes entre le fabricant et le magasin de détail est effectuée par des grossistes qui prennent entre 16 % et 26 % de la valeur ajoutée unitaire brute totale. Dans les études de cas allemandes et italiennes, il y a un négociant ou un centre collecteur entre le producteur et le meunier. Les parts de la valeur ajoutée unitaire brute totale prises par les négociants correspondent à un petit pourcent. Deux filières d'approvisionnement de pâtes opèrent en Hongrie et en Italie dans un marché de niche pour des types de pâtes spéciaux et présentent une importante intégration verticale qui fournit des bénéfices en termes de valeur ajoutée qui profitent particulièrement aux transformateurs et apparemment moins aux producteurs.

Les facteurs influençant la formation et la distribution de valeur ajoutée dans les filières alimentaires biologiques (Thème 3)

Concernant les filières d'approvisionnement sélectionnées dans les différents pays, un panel d'experts a fourni des avis et des évaluations sur la distribution de la valeur ajoutée au sein des différentes filières d'approvisionnement et pays participant à l'étude, avec l'objectif d'identifier d'éventuelles différences concernant le pouvoir de marché entre les divers acteurs du marché.

Une Méthode de Hiérarchie Multicritère (MHM)[4] a été utilisée pour mettre en valeur les informations des experts sur le **processus de formation de valeur ajoutée** dans les trois filières d'approvisionnement. La formation de valeur ajoutée peut être décomposée entre les éléments liés au prix et ceux se rapportant au volume pour chaque acteur de la filière d'approvisionnement. Il est ainsi possible d'identifier l'importance de ces facteurs pour la création de la valeur ajoutée dans les filières d'approvisionnement bio. L'élément prix reflète l'importance de l'écart entre les prix aux producteurs et les prix des intrants intermédiaires dans le processus de formation de la valeur ajoutée (plus l'écart est grand, plus l'effet sera positif sur la formation de la valeur ajoutée et vice-versa). L'élément volume se rapporte au rôle que joue la capacité de production dans le processus de formation de la valeur ajoutée (plus les quantités produites sont élevées, plus l'effet sera positif sur

[4] Analytical Hierarchy Process (AHP)

la formation de valeur ajoutée et vice-versa). La MHM permet de hiérarchiser l'importance de ces deux éléments de valeur ajoutée par filière d'approvisionnement, acteur et pays. L'analyse prend en compte trois catégories principales d'acteurs pour les filières d'approvisionnement des pâtes et du lait de consommation: les agriculteurs, les transformateurs et les distributeurs (dont commerces de détail et grossistes), tandis que pour la filière d'approvisionnement des pommes, l'analyse est limitée aux producteurs et aux distributeurs. Les experts avaient pour tâche d'évaluer l'importance qu'ont les éléments de valeur ajoutée prix et volume.

Concernant la valeur ajoutée de la filière d'approvisionnement du lait de consommation en général, les experts estiment que l'importance est particulièrement basse au niveau des producteurs et que les transformateurs et les distributeurs jouent un rôle clairement dominant. Une certaine différence peut toutefois être constatée en termes d'importance relative des producteurs dans la formation de la valeur ajoutée. Les résultats de l'analyse de la valeur ajoutée unitaire spécifique montre qu'une plus grande partie de la valeur ajoutée unitaire, en Allemagne et en France, est partagée au niveau des producteurs. L'élément prix ressort comme le principal facteur de la filière d'approvisionnement du lait pour tous les acteurs du marché dans la majorité des pays.

En ce qui concerne la formation de la valeur ajoutée dans la filière d'approvisionnement des pommes bio, l'importance relative des distributeurs est plus élevée au Royaume Uni, en Italie et en Hongrie, tandis que les agriculteurs ont la plus grande importance en France et en Estonie. Le marché estonien des pommes bio est un marché de niche où la demande est supérieure à l'offre, ce qui peut expliquer la prévalence du facteur prix pour les agriculteurs dans la création de la valeur ajoutée.

Pour la filière d'approvisionnement des pâtes, la vue globale est assez variée dans les différents pays par rapport au poids relatif des acteurs du marché. C'est en Italie que l'importance donnée aux agriculteurs dans le processus de formation de valeur ajoutée est la plus basse tandis que les distributeurs profitent de la plus grande part. Si l'Allemagne présente une distribution semblable, les agriculteurs obtiennent toutefois une part de valeur ajoutée plus élevée. En Espagne, la distribution entre les transformateurs et les distributeurs est assez équilibrée, alors que les transformateurs dominent la répartition de la valeur ajoutée en Hongrie. Dans cette filière d'approvisionnement en général, les éléments qui touchent au prix sont les plus importants dans le processus de formation de valeur ajoutée, à quelques exceptions près, particulièrement en Espagne.

Le prix est en règle générale considéré comme l'élément le plus important de la valeur ajoutée au niveau du producteur, du transformateur et du commerçant, mais il existe des exceptions. Il en résulte que le prix de vente au détail est le composant primaire de la valeur ajoutée. D'autres composants primaires de valeur ajoutée très bien placés sont les prix de ventes pour les transformateurs, l'efficacité au niveau de la distribution et la productivité des usines pour les transformateurs.

En plus de l'évaluation analytique de la contribution des éléments prix et volume, nous fournissons une analyse des **facteurs qui influencent positivement ou négativement** la formation de valeur ajoutée et les parts de marché. Des experts ont été sollicités pour fournir pour chaque filière

d'approvisionnement une liste des facteurs révélateurs qui se réfèrent à des aspects de marketing, de stratégie de management, de préférences des consommateurs etc. Les résultats montrent que, du côté de la filière d'approvisionnement, les plus grandes opportunités sont à espérer d'une compétitivité accrue en matière de prix au niveau des producteurs, d'une plus grande efficacité dans la production et d'une meilleure production aussi bien en quantité qu'en qualité, mais aussi par un large approvisionnement en vrac et l'assurance d'une disponibilité constante, qui doit également être garantie par l'amélioration des structures de stockage pour assurer la disponibilité. Les risques concernent principalement une mauvaise rentabilité au niveau producteurs et une mauvaise compétitivité de la production intérieure.

Du côté de la demande, les principaux aspects à prendre en compte pour améliorer la valeur ajoutée sont la demande motivée par la qualité, la production locale motivée par les consommateurs et le développement du marché motivé par les consommateurs et les commerçants. Le besoin d'instaurer des marques leaders et de concentrer le marché semblerait également être à l'origine d'effets positifs. Une concentration excessive du pouvoir commercial au niveau du commerce de détail est toutefois aussi mentionnée comme ayant un effet potentiellement négatif sur la création de valeur ajoutée. D'autres obstacles majeurs sont l'absence d'orientation marketing et la gestion inefficace au niveau du commerce de détail.

Finalement, plusieurs facteurs se réfèrent à des aspects généraux d'organisation des filières d'approvisionnement. Des opportunités pour améliorer la valeur ajoutée peuvent être espérées en orientant davantage l'organisation de la filière d'approvisionnement sur la qualité et l'efficacité et en différentiant mieux les produits par le biais de marques locales ou premium. Le soutien gouvernemental et l'approvisionnement dans le secteur public sont également considérés comme jouant un rôle positif dans le processus de création de valeur ajoutée. À l'inverse, les principaux obstacles se rapportent à un manque de masse critique dû à une production inefficace à petite échelle et à des aspects liés aux normes et à la qualité comme une logistique inefficace avec des frais élevés, qui ne permet pas de répondre sur l'ensemble de la filière d'approvisionnement aux exigences de qualité et aux normes et qui constitue un réel défi dans les filières d'approvisionnement biologiques.

Conclusions

Cette étude montre que les agriculteurs bio reçoivent des prix plus élevés que les producteurs conventionnels, mais ces prix restent relativement faibles par rapport à la valeur ajoutée totale créée dans l'ensemble de la chaîne de valeur.

La comparaison des prix à la production (départ ferme) avec ceux au détail suggère que le lien entre les prix des produits agricoles et les prix premiums payés par les consommateurs est également peu important dans le secteur bio.

Il y a des différences dans la manière dont la valeur ajoutée est créée et distribuée au sein des filières des cas d'études réalisés dans les pays. Ces différences sont principalement dues à la structure de la filière d'approvisionnement (dont notamment le niveau d'intégration de la filière

d'approvisionnement) et à la disponibilité d'infrastructures spécifiques pour les produits bio. De telles capacités sont principalement manquantes dans quelques marchés émergents avec par exemple la production de pâtes en Espagne et la production de lait en République tchèque.

Un nombre de conditions précises comme les relations de pouvoir et la collaboration entre les acteurs du marché jouent également un rôle majeur. La taille du marché a une influence sur la création et la distribution de la valeur ajoutée dans un nombre limité de cas, dans lesquels les agriculteurs obtiennent une valeur ajoutée brute plus élevée dans les grands marchés intérieurs qui présentent une demande plus grande que l'offre. Le stade de développement et les débouchés ou canaux de distribution semblent avoir un effet que limité sur la valeur ajoutée dans les filières d'approvisionnement biologiques examinées.

Tous les points de vente offrent des opportunités d'améliorer la part de valeur ajoutée revenant aux agriculteurs en fonction de leur façon de commercialiser les produits bio. Ajoutée à la demande croissante d'aliment bio dans l'UE, cela présente un argument solide pour encourager des accords particuliers entre producteurs et commerçants, le développement de marques de producteurs et les investissements dans les aspects de la qualité.

La production à petite échelle et le nombre limité d'entrepreneurs désireux d'investir dans des infrastructures spécifiques à la production biologique représentent encore et toujours un obstacle majeur au développement du marché bio dans la plupart des pays de l'étude. Il existe toutefois quelques exceptions: d'une part, dans des pays avec des marchés émergents avec des producteurs qui profitent des opportunités que présentent les marchés de niches et d'autre part dans quelques pays avec des marchés développés et qui présentent une probabilité de coopération plus élevée. L'intervention au niveau politique devrait viser les deux types de production ainsi que les investissements dans les capacités en aval de la production afin de pouvoir réaliser le potentiel commercial représenté par le marché croissant des produits biologiques.

Cette étude démontre clairement qu'il existe des stratégies et des modèles permettant une distribution plus équitable de la valeur ajoutée dans les filières d'approvisionnement bio, mais ils doivent être adaptés aux contextes spécifiques. Pour ce faire, la disponibilité de données sur le marché joue un rôle essentiel. La transparence du marché est cruciale pour aider les acteurs du marché et les décideurs politiques à prendre leurs décisions. L'amélioration de la disponibilité des données sur le marché à tous les niveaux de la filière d'approvisionnement devrait être une priorité clé pour le développement futur du secteur bio.

1 Introduction

1.1 Background of the study

Organic farming has been identified as a key element in sustainable management of Europe's natural land-based resources (European Commission, 2014a). For this reason, the overall objective of the current EU political and legislative framework is to ensure a sustainable growth of European organic production (European Commission, 2014b). This requires that organic farming develops in line with the organic market in the European Union (EU). A steady growth of organic supply and demand is, however, facing a number of challenges. Recent analyses (Meredith, 2014, European Commission, 2014b, EEA, 2015) have identified in particular that:

- citizens have a willingness to pay a premium price for organic products but also have high expectations with regards to the standards and the integrity of organic production;
- market growth has been uneven, with moderate to strong growth in some countries with growing market reliance on imports and intra-European trade, compared to slow growth elsewhere;
- uptake of organic practices amongst farmers stagnates in some countries with established and/or growing markets;
- there is uncertainty for farmers and agricultural processors and retailers about business opportunities offered by the organic sector; and
- there is uncertainty whether organic supply chains function efficiently and share risks and rewards fairly between all partners involved whilst still maintaining consumer trust.

Against this background, the European Commission proposed a new draft of the organic legislation in 2014, with the objectives of: (a) removing obstacles to the sustainable development of organic production in the EU, (b) guaranteeing fair competition for farmers and operators and allowing the internal market to function more efficiently, and (c) maintaining or improving consumer confidence in organic products (EC-COM 2014 180 final).[5] The European Commission also adopted an Action Plan for the future of Organic Production in the European Union, to be carried out until 2020, in order to support the sector to develop in a sustainable manner.[6] This recognises that more effort is needed to ensure that potential opportunities can be realised by EU farmers and small and medium size food producers.

To date, various studies have analysed the relative profitability of organic and conventional farms (e.g. Crowder and Reganold, 2015; Sanders et. al., 2012). While such studies provide valuable information on the current economic attractiveness of organic production in comparison to conventional farming, they do not allow us to draw any conclusions as to whether farmers are able to exploit the full potential of the EU organic market. Data on the development of organic land use and

[5] See: http://eur-lex.europa.eu/procedure/EN/2014_100 (Accessed 21.10.2016)

[6] See: http://ec.europa.eu/agriculture/organic/sites/orgfarming/files/docs/body/act_en.pdf (Accessed 21.10.2016)

the market of organic food in the EU suggests that this may not always be the case (Willer et al., 2016); however, there is little empirical evidence about the added value and its distribution in the organic supply chain. The lack of statistical data about the organic food sector is clearly a contributing factor to this knowledge gap.

The organic action plan has recognised this problem and identified that the availability of statistical data is essential for shaping, monitoring and evaluating the implementation of the EU policy for organic production. It mentions in particular a need to improve knowledge about the production sector, prices along the organic food supply chain and about trade, consumer preferences and specific marketing channels.[7] In order to better understand the effectiveness and efficiency of organic supply chains, a study was proposed in Action 9 of the organic action plan on "How added value is distributed alongside the organic chain and to what extent it benefits the agricultural producers".[8] The results of this study are presented in this report.

1.2 Objectives of the study

This study investigates the distribution of value addition along a number of organic food supply chains, with a focus on whether organic supply chains function effectively and efficiently. More specifically, the following questions are addressed:

- **Theme 1**: How much added value is generated by the organic food supply chain? How much is it in nominal and relative terms compared to the conventional sector, and who are the market players benefiting from it?
- **Theme 2**: How is the added value distributed among market players in the supply chain and how much of it returns to agricultural producers in particular?
- **Theme 3**: What factors influence the formation and distribution of added value for each relevant actor in the supply chain, including agricultural producers? How can added value be increased for the key market players?

By answering these questions, this study aims to contribute to a better understanding of the dynamics of the organic market and whether there is sufficient added value for European agricultural producers to motivate them to take up organic farming.

[7] For this reason, the European Commission funded the research project "Data network for better European organic market information - Organic data network" (2012-2014), with the aim to increase the transparency of the European organic food market through better availability of market intelligence about the sector. The research project clearly identified that there is a lack of reliable data on the market for organic food and information about the organic supply chains, in particular in relation to trade-flows and price data.

[8] It is worth mentioning that the proper functioning of food supply chains in general is also a concern of the EU, since its work also includes protection of consumer interests and promotion of sustainable profit sharing along the supply chain (European Commission, 2009).

1.3 Structure of the report

The report is structured as follows. In Chapter 2, the scope and conceptual framework of the study is outlined. Furthermore, the specific approach and tools used to address the three study themes are described. To give a better understanding of the context of the study, Chapter 3 provides an overview of the EU organic market and the key features of organic supply chains. This study focuses on three key organic products: drinking milk, apples and pasta. For better clarity, Chapter 4 contains the results of all three study themes for organic milk supply chains, Chapter 5 those for organic apples, and Chapter 6 those for organic pasta supply chains. The conclusions of the study are then presented in Chapter 7.

2 Methodological approach

2.1 Scope of the analysis and geographical coverage

Food supply chains comprise the process of food production through from the production of agricultural raw products at a farm level to the sale of the food products at a retailer level. The main actors in this chain – as outlined by the European Commission – are the agricultural sector, the food processing industry, the distribution sector and the retail sector (Bukeviciute *et al.*, 2009). Along the chain's length, food products are subject to various alterations in terms of time, place, characteristics or form utility. Each alteration adds a specific value to the product.

Based on this general understanding of food supply chains, as well as the requirements of the tender specification[9]:

- the **scope** of our analysis is the downstream stage of the food sector, with the production of agricultural raw commodities as a starting point.
- **added value** – expressed in this study as gross value added[10] – is broken down with respect to intermediate consumption: the output valued at basic prices, less intermediate consumption valued at purchasers' prices.[11] Intermediate consumption covers purchases made by individual supply chain actors for raw and auxiliary materials that are used as inputs for the production.[12]

In order to carry out an in-depth analysis of the distribution of added value in organic supply chains, nine countries (Czech Republic, Germany, Denmark, Estonia, Spain, France, Hungary, Italy and the United Kingdom) and three products (drinking milk, apples and durum wheat/pasta) were selected as the focal areas of this study (see Figure 2.1). This results in the consideration of 18 different supply chains.

The countries studied represent the following three organisational structures of the EU organic market: (a) markets predominantly based on imports from third countries; (b) markets predominantly based on the internal production of a Member State; and (c) markets that are currently emerging within the EU and still developing structurally. The products, meanwhile, cover the following three types of market dynamics: (a) high production volumes within the EU with

[9] See: http://ec.europa.eu/agriculture/calls-for-tender/tender-documents/2015/263190/specs_en.pdf (Accessed 21.10.2016)

[10] Due to the product-related approach of the analysis (see also the conceptual framework described in Section 2.2) value added is expressed as unitary gross value added. Since supply chain actors usually produce more than just a single output, the calculation of the product-related net value added would require the allocation of fixed costs to the production of different outputs. This calculation bears the risk, however, that the results are misunderstood, – particularly if the quality of the data used for the estimates is limited.

[11] See also: http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:GVA (Accessed 21.10.2016)

[12] See also: http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Intermediate_consumption (Accessed 21.10.2016)

stagnant or positive growth rates; (b) low production volumes within the EU but with strongly positive growth rates; and (c) low production volumes within the EU with low or no growth rates.

Figure 2.1: Characterisation of selected countries and products

Market size / dynamic [13]	Product	Type of market [14]	CZ	DE	DK	EE	ES	FR	HU	IT	UK
Low production volumes High growth rates	Drinking Milk	Import market					■				
		Internal market		■	■			■			
		Emerging market	■			■					
High production volumes Positive growth rates	Apples	Import market			■						■
		Internal market						■		■	
		Emerging market				■			■		
Low production volumes Low growth rates	Pasta	Import market		■							■
		Internal market					■			■	
		Emerging market	■						■		

Source: Own illustration.

2.2 Conceptual framework

In order to choose the most appropriate approach for the study and the calculation of gross value added, a conceptual framework was developed. The definition of "added value" given above was used as a starting point for this. In addition, the following aspects were taken into account:

- Added value is usually given in reference to activities of an economic entity. For example, Eurostat compiles the Gross Value Added (GVA) for the agricultural industry based on national accounts, while the EU-FADN also includes information about the Farm Net Value Added (FNVA), i.e. the amount used to remunerate the fixed factors of a farm. Deviating from this, the tender specification requires an analysis of specific products. Hence, this analysis of added value does not include the entire economic activities of an actor or an industry but instead only those

[13] The characterisation of the three products for which the analysis would be carried out is based on the following criteria:

- The level of production volume is measured as the product-specific share of the total organic production (in terms of area or, for the case of drinking milk, the number of farm animals).
- "High production volume" is defined as a production volume higher than the share of organic production area in the total Utilised Agricultural Area (UAA) of the European Union in 2014; i.e. above 5.7 %.
- "Low production volume" is defined as a production volume lower than the share of organic production area in the total UAA in the European Union in 2014; i.e. below 5.7 %.
- "Positive growth rate" is defined as a growth rate above 0%.
- "High growth rate" is defined as an average annual product-specific growth rate more than twice as high as the growth in total organic area between 2011 and 2014 in the European Union; i.e. above 5.6 %.
- "Low growth rate" is defined as an average annual product-specific growth rate less than twice as high as the growth in total organic area between 2011 and 2014 in the European Union; i.e. below 5.6 %.

[14] Since product-specific data exists for very few countries, the classification of countries with regards to the type of market is based on expert judgements.

related to the production, processing and distribution of a particular product. Therefore, the current study uses product-related outputs, valued at basic prices, less product-related intermediate consumption, valued at purchasers' prices.

- In order to calculate the product-specific added value for each actor of the supply chain, it is necessary to specify the revenues and costs related to the production, processing and/or distribution of the product at each supply chain stage. By doing so, added value can be calculated and the distribution of added value along the supply chain can be described. The sum of the individual values added at each stage along the supply chain gives the total added value of the chain. The tender specification requires this detailed breakdown of added value along the supply chain for organic supply chains, but only total added value is needed for the comparison between organic and conventional supply chains.
- While supply chain data have been compiled previously for the agricultural sector as a whole (European Commission, 2009), no, or very little, information exists with regards to organic supply chains. This was clearly outlined in the final report of the EU-funded project OrganicDataNetwork (Zanoli et al., 2015). Furthermore, some information – panel data about retail prices or average farm-gate price data, for example – exists only in certain countries, with comparable quantitative data unavailable more widely. Thus, data availability is a major limitation of this study. Consistent data is a further problem: to ensure a high level of data consistency, relevant information needs to be collected from supply chain actors based on a common approach. However, possibilities for primary data collection within the framework of this study were limited. Furthermore, the economic data required for the analysis of the creation and distribution of added value is considered highly sensitive by supply chain actors. Due to the strong competition between processors and distributors and the sensitive nature of price calculations, they are usually not willing to share such data (Pauwelyn, 2015).

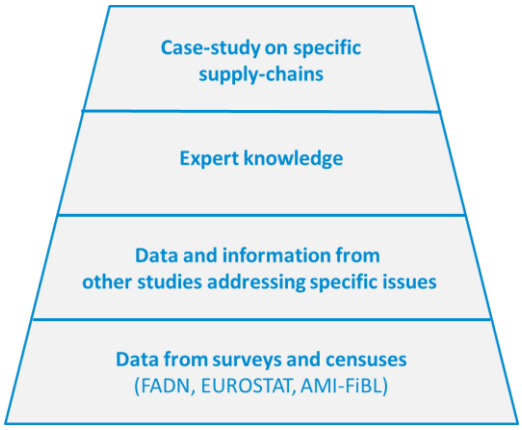
In view of these factors, the following general approach was employed for this study (see also Figure 2.2):

- A first overview of the organic supply chains of the three product categories selected for this study was gained by systematically reviewing **existing scientific and grey literature** (e.g. industry and policy reports). Furthermore, existing data collected by Eurostat and FiBL-AMI on production and the market environment were compiled.
- This information was complemented by the results of **other studies addressing specific issues** relevant to the analysis of the added value within the organic food supply chain (e.g. certification cost).
- Furthermore, **expert knowledge**, elicited through interviews and written surveys, was used to get a deeper understanding of organic food supply chains and gather further empirical information for the analysis.
- Finally, in order to compile a consistent dataset, economic data was collected for the eighteen specific supply chains (i.e. three products – milk, apples and durum wheat/pasta, each in six different countries). A prerequisite for the **case study** analysis was to gain access to data that supply chain actors are not usually willing to share. To address this challenge, national sub-contractors with longstanding relationships with actors of the organic sector carried out the data

collection in their respective countries. As described in more detail in Section 2.5, a single spreadsheet tool was developed and used for this data collection, which combines the concept of unitary value added and the breakdown of intermediate costs into one data collection tool.

Besides the limited resources for primary data collection, a case study approach, which provides a detailed picture of real-life situations, is considered well suited to this work. By studying specific, real examples, the approach is often more reliable than the outputs from survey research and more able to handle social complexities.[15] The limitation, however, is that while lessons learned *may* apply to the whole sector and to countries not studied, there will be no statistical evidence for this.

Figure 2.2: Overview of the general approach to data collection



Source: Own illustration.

Given the framework described above, added value is thus calculated in this study as follows:

(1) As a first step, a common weight unit is defined as a reference unit for the three products under analysis (€/litre for drinking milk, €/kg for apples and €/kg for durum wheat/pasta).

(2) As a second step, an average farm-gate and retail price for each of the three products are compared. The difference between the two prices can be understood as the value that is created along the product supply chain. This approach is based on Kristensen et al. (2003), who carried out a study on the value adding process in organic supply chains. While the approach provides simple, easy-to-understand results for dissemination, and is particularly useful, if a full set of

[15] Yin (2014) writes: "A fatal flaw in doing case studies is to consider statistical generalization to be the way of generalizing the findings from your case study. This is because your case or cases are not "sampling units" and also will be too small in number to serve as an adequately sized sample to represent any larger population.

Rather than thinking about your case as a sample, you should think of it as the opportunity to shed empirical light about some theoretical concepts or principles, not unlike the motive of a laboratory investigator in conceiving of and then conducting a new experiment. In this sense, both a case study and an experiment may have an interest in going beyond the specific case or experiment. Both kinds of studies are likely to strive for generalizable findings or lessons learned—that is, analytic generalizations—that go beyond the setting for the specific case or specific experiment that had been studied"

actor-specific data is not available (as in the case of the comparative analysis of organic and conventional supply chains), it does not, however, reflect the intermediate costs and profits that are also included in output prices.

(3) To account for this, as a third step, the added value at each stage of the supply chain is calculated based on information on output prices and intermediate inputs. As described above, this data is compiled from the actors within specific organic supply chains and is used also to analyse the distribution of added value in the selected supply chains. Data on prices and costs refers to specific products (e.g. a specific package of pasta of a certain brand and quality) that have been "followed" along the whole supply chain.

2.3 Approach for analysing the context of the study

Overview of the organic market in the EU

To present the general context of the study, first, the organic sector is briefly outlined. For this, data on the organic market and production, as well as on the specific supply chains, was taken from Eurostat and the FiBL/AMI annual collection and used to describe the current state of the organic market in the EU as a whole and in the case study countries. The calculation of overall totals (non-organic and organic) is based on Eurostat data and national databases. Where available, data on the markets of the specific products, as well as their broader market categories (e.g. fruit, in the case of apples), are also derived for the case study countries, taken from the same sources given above.

Features of organic supply chains

Based on a literature search covering grey and scientific literature, key features of organic supply chains are described. The literature search was carried out using Google Scholar and other literature databases. The list of search terms is shown in Table 2.1. In addition, the reference lists of identified studies were consulted to identify other relevant material, and the outcomes of recently completed EU research projects on subject of organic food – such as SOLID, Organic Data Network and OMIARD – considered. The search considered only literature dated from the year 2000 onwards and only papers considered relevant to the study theme under the following criteria were reviewed:

- We considered literature reviews supplied by the case study partners that focused on the selected supply chains in their own countries both in English and in their own national language. English language literature was also considered separately.
- We focused mainly on papers/reports from Europe, but did considered material from other countries regarding types of actors and contributing factors.
- We excluded papers/reports looking only at consumers' attitudes.
- We excluded papers/reports looking only at conventional supply chains.

Table 2.1: Terms used for the literature search

Domain A	Domain B	Domain C
Value added		
Supply chain		
Value chain		
Costs	Apples	
Price	Fruit	
Price margin	Milk	
Price formation	Dairy	Organic
Price transmission	Wheat	
Profit sharing	Pasta	
Producer	Food	
Distribution	Agriculture	
Bargaining power[1]		
Collaboration [a]		
Vertical integration		
Vertical coordination		
Market		
Market power		
Asymmetry power		

[a] Synonyms were also considered: bargaining=negotiating; collaboration=partnership=cooperation=coordination.

Source: Own presentation.

2.4 Approach for analysing the generation of added value along the supply chain as a whole (Theme 1)

General understanding of the theme

How much added value is generated in the organic food supply chain and who are the market players that are benefiting from it?

Theme 1 addresses two different but interlinked issues with respect to the added value within the organic supply chain. Firstly, it deals with the question of how value is added. For this, we provide a description of the organic dairy, apple and pasta industry and typical organic supply chains based on the literature reviewed and the analysis of selected supply chains – i.e. drinking milk, apples and pasta in the nine case study countries. As part of this, we have also identified which actors along the supply chain are benefiting from the added value. The second issue tackles is the amount of value created in the supply chains of the three selected products and added to the agricultural raw commodity in nominal and relative terms, as compared to the non-organic sector. For this, we compare farm-gate and retail prices between the conventional and organic supply chains for the products.

Data and methods

Market environment

The data on the organic market and production and the specific supply chains taken from Eurostat and the FiBL/AMI annual collection for the contextualisation of the study (Section 2.3) were also used to describe the market environment of the selected organic supply chains.

Structure of typical supply chains

In order to get a better understanding of the structure of the organic supply chains for selected products and the creation of added value in these supply chains, 65 semi-structured interviews were carried out by phone or face-to-face with industry experts of the specific product sector (see Table 2.2). Experts were selected based on their comprehensive expertise in the sector, making use of the contractors' existing contacts and a snowball procedure. An interview guide was developed that included questions about the structure of the supply chains, their most relevant actors, available market channels and the opportunities to add value. The outcomes were used as the basis for a general description of the supply chains in each country and to suggest specific supply chains to be analysed under Theme 2 in the next step of the study (Section 2.5).

Table 2.2: Number of industry experts interviewed per country and supply chain

	Organic milk supply chains	Organic apple supply chains	Organic pasta supply chains	Totals
	Number of experts			
Czech Republic	3	-	4	**7**
Germany	3	-	2	**5**
Denmark	3	5	-	**8**
Estonia	3	6	-	**9**
Spain	3	-	7	**10**
France	3	4	-	**7**
Hungary	-	3	4	**7**
Italy	-	4	2	**6**
United Kingdom	-	3	3	**6**
Totals	**18**	**25**	**22**	**65**

Source: Own presentation.

Value creation in organic and non-organic supply chains

Data on organic and conventional farm-gate and retailer prices were used to estimate how much value is created in nominal and relative terms in organic, as compared to non-organic, supply chains. The approach used allows comparison of organic price premiums and the farmer's share of the retail price between countries and products.

Statistics on organic farm-gate prices and retail prices remain very limited in most of the case study countries (OrganicDataNetwork, 2014). For the organic farm-gate and retail price data, we used

primary information from supply chain actors, collected in May 2016. In a few cases we used EU FADN data provided by DG AGRI, or national statistics. For the non-organic farm-gate and retail price data, the main source was Eurostat. Because Eurostat data refer to 2015, we adjusted prices for inflation using the harmonised indexes for the reference year 2016 provided by Eurostat. The same was done with FADN data provided by DG AGRI, which referred to the years 2010/2011–2012/2013. We chose to use general retail prices in order to make organic prices comparable with the non-organic price data from Eurostat[16], which also refers to general retail.

2.5 Approach for analysing the distribution of added value between supply chain actors (Theme 2)

General understanding of the theme

How is the added value distributed among market players in the supply chain and how much of it returns to agricultural producers in particular?

While Theme 1 provides a general picture about the structure and players in organic supply chains, along with some comparison with data on non-organic supply chains, the second theme assesses how the added value is distributed among key supply chain actors, particularly agricultural producers. To do so, it identifies the predominant beneficiaries in the selected supply chains. This requires specifying the individual components contributing to added value along the supply chain, as well as quantifying the added value by each chain element.

Data and methods

The distribution of the added value in organic apple, drinking milk and pasta supply chains is calculated based on FADN data and data elicited from interviews with downstream actors in the selected supply chains. The approach reflects the general limitations of this study arising from the scarcity and sensitivity of the data required.

Since the European Farm Accountancy Data Network (FADN) includes detailed financial data of agricultural holdings, this source was used to specify monetary outputs and intermediate costs at farm-level. In total, data from 991 milk and 592 durum wheat farm observations were used from the years 2010/11–2012/13. The enterprise allocation of individual costs is based on activity shares or normative correction factors, which were specified by means of the sector-consistent farm model EU-FARMIS (Bertelsmeier, 2005; Offermann et al., 2007).[17] Due to missing information in the EU-FADN for organic apple production, data from management handbooks was instead used to specify

[16] See: http://ec.europa.eu/eurostat/web/products-datasets/-/apri_ap_crpouta (Accessed 21.10.2016)

[17] EU-FARMIS is a comparative-static, process-analytical programming model based on Farm Accountancy Data Networks (FADNs) with individual farm data being aggregated into farm groups.

output-related prices and intermediate costs for organic apples. To ensure a consistent dataset, relative shares were used rather than absolute values, with these related to the farm-gate prices obtained from the expert survey.

For the downstream stages of the supply chain, economic data were collected by means of interviews and a spreadsheet tool ("Value Added Calculator") developed for this study. In total, 60 interviews were conducted (see Table 2.3). The tool follows a "Unit Value Added" approach, where the sales price of each product by each supply chain actor becomes the first key element of the analysis and represents the (unitary) gross revenue for that product. All data refer to a common functional output unit (i.e. 1 litre of milk, 1 kg of apples and 1 kg of pasta).

During the interviews, supply chain actors were first asked to specify an average, minimum and maximum output price (sales price) of each product, as well as to confirm the purchase price. The price margin between the output price and the purchase price could then be calculated. This difference expresses the (market) value generated at a given stage of the supply chain to a particular product. As a third step, interviewees were asked to indicate the level of a typical marketing margin and the relative share of the intermediate costs. The Value Added Calculator includes an automatic procedure for checking the consistency and plausibility of the elicited data. Thereby it was possible to check immediately the information provided by the interviewee and to discuss any inconsistent data during the interview.

Table 2.3: Number of downstream supply chain actors involved in the analysis

	Organic milk supply chains	**Organic apple supply chains**	**Organic pasta supply chains**	**Totals**
		Number of actors		
Processor	7	-	9	**16**
Storage/Wholesaler	4	6	8	**18**
Retailer	11	4	6	**21**
Others	2	2	1	**5**
Totals	**24**	**12**	**24**	**60**

Source: Own presentation.

Some data on costs could not be elicited and was instead treated as missing data. Multiple Imputation was used for these cases, which replaces missing values with multiple sets of simulated and plausible values, representing the uncertainty about the correct value to impute (Little and Rubin, 1987; Rubin, 1987; Rubin, 1996). The imputation model was structured as follows. Firstly, all available relevant predictors for the imputation of missing data (i.e. all available data on costs) were used. Secondly, all relevant design variables representing the structure of the dataset – data on cost type, country, supply chain, supply chain actors, etc. – were included. Thirdly, a linear regression imputation method was specified, which is the most common method to fill in missing values of continuous variables (Rubin, 1987).

The data to estimate missing values was taken from other countries and supply chain actors involved in the survey. In order to adjust the transfer function for this data (Johnston et al., 2015), at least one subset of data is needed for the respective country/supply chain/supply chain actor. For this reason, it was not possible to use Multiple Imputation where the whole set of data on costs were missing.[18]

For each Multiple Imputation, 150 iterations were run, a number that, after different trials, has proved to be a good balance between the time for computation (which increases with the number of iterations) and the stability and precision of the results (convergence and standard deviation increase with the number of iterations). The final estimates for the missing data were taken as the average of the estimates produced in each iteration.

As stated above, all data refer to a common functional output unit. Due to processing, the reference quantity decreases along the supply chain. For example, one kilogram of durum wheat does not yield in one kilogram of pasta. In order to include the technical conversion in the calculation of the added value, supply chain actors were asked for case-specific conversion coefficients. In contrast to pasta, comparable technical conversions do not take place in the supply chains for drinking milk and apples.

2.6 Approach for analysing the factors that influence added value formation and distribution (Theme 3)

General understanding of the theme

What factors influence the formation and distribution of added value for each relevant actor in the supply chain, including agricultural producers?

Theme 3 builds on the analysis of the distribution of unitary gross value added based on specific case studies above to deal with the factors that influence the formation and distribution of added value across the whole supply chain. More specifically, this third part of the study addresses two key questions. Firstly, what are the most relevant factors influencing the formation of added value; secondly, which factors influence – positively or negatively – the added value for each actor and/or contribute to an increase in the market share for the selected supply chains. Comparing the partition of added value along the different supply chains can shed light on the possible differences in market power amongst the various market actors.

[18] This was the case for retail data in Estonia (drinking milk, apples) and Hungary (apples).

Data and methods

Determinants of the formation of added value

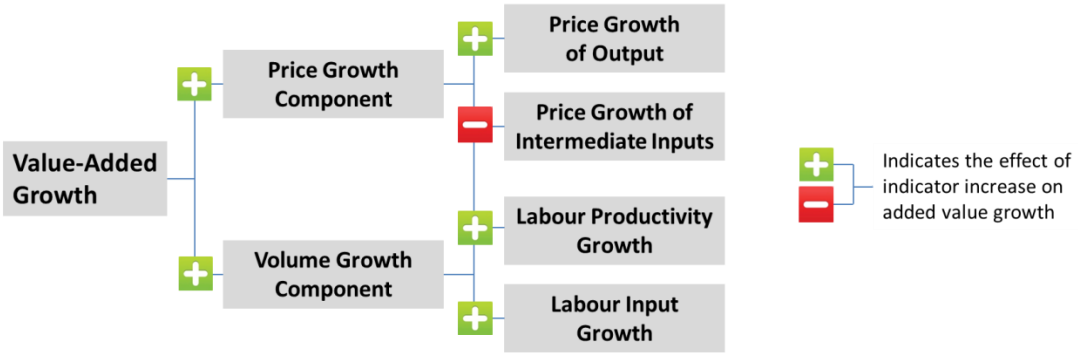
Given the lack of quantitative information on added value formation in organic supply chains, the analysis of factors influencing added value formation was based on expert knowledge. The information was obtained from 46 industry experts, who had already provided information about the structure of the selected organic supply chains (see Section 2.4).[19]

We used an Analytic Hierarchy Process (AHP) to elicit the expert information on the process of added value formation for the three supply chains.[20] AHP allows ranking of the importance of the different added value components by supply chain, actor and country. Conceptually, the ranking process is based on a scheme used by the EU Commission in 2009 for the analysis of European food supply chains (European Commission, 2009). In the process, added value formation is disaggregated for each supply chain actor into price-related and volume-related components (see Figure 2.3). Here the original scheme was adapted slightly by expressing the price and quantity components in terms of concrete concepts (e.g. land and yield, farm gate price and price of inputs) that could be more easily understood by experts with diverse background and education. The first hierarchy level we considered ranks the actors of the supply chain based on their contribution to the creation of added value. As it was necessary to balance comprehensive representation of the structures of the different supply chains in the surveyed countries with the need to maintain an analysis feasible and general enough for all countries, only three main categories of supply chain actor were considered in the AHP: farmers, processors and distributors (including wholesalers and retailers). For the supply chains of pasta and drinking milk, the hierarchy was built for all three categories. For the apple supply chain, meanwhile, we limited the analysis to farmers and distributors only, as processors are not part of the supply chain of fresh apples.

[19] In total, 13 experts on organic dairy supply chains, 18 experts on organic apple supply chains and 15 experts on organic pasta supply chains

[20] Thomas L. Saaty (1980) originally developed AHP as a method to support multi-criteria decision making. The use of AHP has since expanded to ranking concepts or factors that share a common hierarchical structure. AHP permits "translating" subjective opinions into measurable numeric relations (ratio scales) based on paired comparison of criteria. Once converted, numerical scores can be mathematically analysed and an index calculated to ensure that experts provided consistent judgments on the pairwise comparisons. The results of the pairwise comparisons are arranged in a matrix: the first (dominant) normalised right eigenvector of the matrix measures the weighting, while the eigenvalues are used to calculate the consistency ratio. The AHP therefore helps to ensure rationality and accountability in the evaluation process while involving experts in group sessions and making the evaluation process transparent and clearly understandable. We used an open-source online survey tool for managing the AHP group sessions for the three supply chains.

Figure 2.3: The process of added value formation for a given supply chain



Source: Adapted from European Commission (2009).

In the ranking of supply chain actors, we asked experts to evaluate the perceived importance of the price and volume components of added value. The price component reflects the importance of the gap between output prices and intermediate input prices in the process of added value formation (the higher the gap, the greater the added value and vice versa). For example, an increase in farm gate prices (or in sale prices for processors, wholesalers or retailers) indicates greater added value, provided it is not accompanied by a proportional increase of purchased inputs prices (assuming constant production levels and quantities of inputs). The component depends on the following added value components:

- farm-gate price and purchased input prices for farmers;
- sales price and intermediate input price for processors;
- retail price and intermediate input price for distributers.

The volume component, meanwhile, refers to the role of production capacity in the formation of added value. An increase in production at a farm level leads to greater added value (assuming constant prices of output and inputs) and vice versa. This increase may be achieved by higher inputs (e.g. increasing the plant capacity; enlarging the farm size) and/or by higher productivity/efficiency/yields. The volume component depends on the following added value components:

- land area (herd size for milk) and yields for farmers;
- plant capacity and productivity for processors;
- market size, logistical efficiency and marketing effectiveness for distributors.

Figure 2.4 – 2.6 show the hierarchical structures of the formation of added value in the three product supply chains, as they were presented to the experts for evaluation. For each level of the hierarchy, the experts conducted a pairwise comparison of added value components on a 9-point Likert scale. Consistency was ensured with an iterative procedure that, based on the computation of consistency index, guided experts to avoid inconsistent rankings.

We used an open-source online web interface developed to manage group sessions in AHP.[21] The concept and AHP tool was piloted by the project partners. Experts were identified by the national data collectors. A tutorial was developed to support experts in submitting their judgments with ease. Experts were invited by email to participate in the AHP assessment by sending each one a link to access the online AHP survey tool directly. Difficulties with the evaluation assignment and any open questions were discussed bilaterally between the experts and members of the study team.

Figure 2.4: Structure of factors influencing the added value along the supply chain: organic drinking milk supply chain

Added value formation	Producer component	Producer price component	Farm-gate milk price
			Purchased input price
		Producer volume component	Dairy herd size
			Milk yield
	Processor component	Processor price compoenent	Selling milk price
			Intermediate input price
		Processor volume component	Plant capacity
			Plant Productivity
	Distributor component	Distributor price component	Retail milk price
			Intermediate input price
		Distributor volume component	Market size
			Logistical efficiency
			Marketing efficiency

Question: Which criterion is more important, and how much more on a scale 1 to 9 for the added value formation? (pairwise comparison)

Source: Own presentation.

[21] BPMSG, licensed at Creative Commons Attribution-Non-commercial 3.0 Singapore, and available at: http://bpmsg.com (Accessed 21.10.2016)

Figure 2.5: Structure of factors influencing the added value along the supply chain: organic apple supply chain

Level 0	Level 1	Level 2	Level 3
Added value formation	Producer component	Producer price component	Farm-gate price
			Purchased input price
		Producer volume component	Land area
			Apple Yield
	Distributor compenent	Distributor compenent price	Retail apple price
			Intermediate input price
		Distributor compenent volume	Market size
			Logistical efficiency
			Marketing effectiveness

Question: Which criterion is more important, and how much more on a scale 1 to 9 for the added value formation? (pairwise comparison)

Source: Own presentation.

Figure 2.6: Structure of factors influencing the added value along the supply chain: organic pasta supply chain

Level 0	Level 1	Level 2	Level 3
Added value formation	Producer component	Producer price component	Farm-gate wheat price
			Purchased input price
		Producer volume component	Wheat area
			Wheat yield
	Processor component	Processor price component	Selling pasta price
			Intermediate input price
		Processor volume component	Plant capacity
			Plant productivity
	Distributor component	Distributor price component	Retail pasta price
			intermediate input price
		Distributor volume component	Market size
			Logistical efficiency
			Marketing effectiveness

Question: Which criterion is more important, and how much more on a scale 1 to 9 for the added value formation? (pairwise comparison)

Source: Own presentation.

Factors supporting or preventing added value formation

Concerning the second component of Theme 3, we analyse the specific factors identified above that may support or hamper the creation of added value, together with a list of policy and marketing options that should be taken into consideration to support the development of the three product supply chains analysed. This analysis also considers non–product related information, such as consumers' attitudes, information, bargaining power, etc.

The panel of experts selected for the analysis of the distribution of added value were asked to provide information about:

- the factors identified to influence – positively or negatively – the added value for each supply chain under analysis (see above);
- factors that may increase the organic market share for each supply chain under analysis.

The experts were interviewed face-to-face or by telephone in each case study country. Partners and subcontractors provided summary reports of the interviews, which constituted the raw data for semantic content analysis. The data were coded independently by two analysts from the study team and, to facilitate the interpretation, codes were grouped under general topics using a bottom-up approach. Inter-coder reliability was measured (Perrault and Leigh, 1989) and conflicts resolved.

Basic codes were identified and were summarised in more general categories using a two-level classification approach. Some categories were specific to each of the three different products explored while others were shared. The coding system used allowed a cross-national analysis of the assessments by experts of very different professional background and cultural settings.

As a result of the semantic content analysis, a list of factors was produced for each supply chain. These factors are the output of this preliminary coding and have formed the basis for the questionnaire that was distributed among all informants to produce a qualitative evaluation of the factors that influence added value formation and distribution at each stage along the investigated supply chains.

The factors are divided between those that (a) influence (either positively or negatively) the added value of a specific product supply chain, and (b) increase the organic market share for the specific product, therefore contributing to an increase in total added value. The relevance of factors was assessed by the panel of experts using a 5-point Likert scale ranging from "not at all important" to "extremely important". The questionnaire was prepared and administered via the Qualtrics online survey platform.[22]

Finally, the results of this evaluation process were analysed using Principal Component Analysis (PCA), to reduce the number of ranked factors to a limited number of more easily interpreted concepts (for an introduction to PCA, see among others Afifi et al. (2012). The original factors are

[22] Available at: https://www.qualtrics.com (Accessed 21.10.2016)

"summarised" in the principal components, which can be labelled according to the strength and sign of the relation they have with the original factors. Factor loading is the measure of such relationships and range between -1 (maximal inverse relationship between factor and principal component) and +1 (maximal positive relationship between factor and principal component). A varimax factor rotation has been used for the identification of the Principal Components.[23] The number of Principal Components extracted has been defined based on the joint conditions (a) total variance explained >70 % and (b) eigenvalues >1.[24] To facilitate the interpretation of the principal components, only factor loadings >|0.6| are taken into consideration.

[23] Varimax is an orthogonal rotation of the coordinate system defined by the principal components that maximises the variance of the squared loadings of a component on all the variables. Each component will tend to have either large or small loadings of a particular variable, and this helps in its interpretation. For more information on factor rotation see http://www.utd.edu/~herve/Abdi-rotations-pretty.pdf (Accessed: 21.10.216)

[24] Eigenvalues are associated to each principal component and measure the amount of variability associated to the respective principal component. The largest the variance explained by a principal component, the higher is the associated eigenvalue. According to the Kaiser criterion, eigenvalues <1 are usually an indicator of less relevant (i.e. less informative) principal components. Usually the Kaiser criterion is used jointly with other cut-off criteria such as a minimal amount of total explained variance.

3 Characteristics of organic food systems

To put the themes of this study into their wider context, this chapter provides an overview of the organic market in the EU, followed by a more focused look at selected Member States, based on data from Eurostat and the annual FiBL-AMI survey.[25] Key characteristics of organic supply chains, as derived from literature sources, are also presented.

3.1 Overview of the organic market in the EU

In 2014, the most recent year for which comprehensive data is available, the EU organic market continued its recent trend of growth, reaching a value of € 24 billion (Willer et al., 2016). Germany (€ 7.9 billion) remains the largest organic market in the EU, followed by France (€ 4.8 billion), the United Kingdom (€ 2.3 billion) and Italy (€ 2.1 billion). In relative terms, Denmark had the highest organic market share in total food spending (7.6 %). Over the past few years, the organic market in general has experienced dynamic growth. Between 2010 and 2014, EU retail sales increased by 33 %. Amongst the case study countries, the strongest growth was noted for France, where the organic market increased by 43 % (Table 3.1). As illustrated in Figure 3.1, the organic market in the EU is growing faster than the area of production. Domestic supply cannot meet demand.

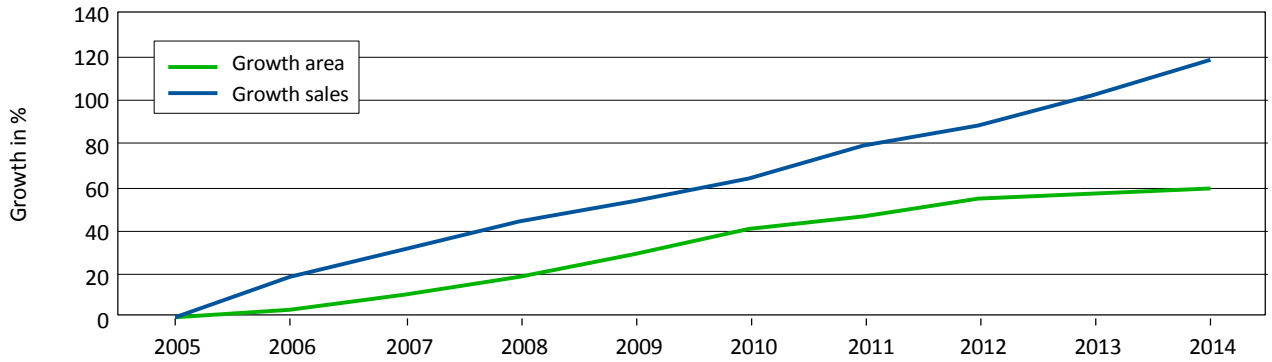
Table 3.1: Key data on organic retail sales for the EU and case study countries in 2014

	Retail sales	Share of total retail sales	Countries' share of EU organic retail sales	Retail sales growth 2010-2014
	Million €	%	%	%
EU-28	24 150	-	100	33.3
Czech Republic	74	0.7	0.3	27.0
Denmark	912	7.6	3.8	15.4
Estonia	-	-	-	-
France	4 830	2.5	20.0	42.7
Germany	7 910	4.4	32.8	31.4
Hungary	30	0.3	0.1	20.0
Italy	2 145	2.2	8.9	38.4
Spain	1 203	1.2	5.0	32.8
United Kingdom	2 307	1.3	9.6	10.0

Source: FiBL-AMI survey and own calculation based on national databases (Czech Republic: UZEI; Denmark: LF, France: Agence Bio; Germany: AMI; Hungary: expert estimate; Italy: AssoBio; Spain: Magrama; UK: Soil Association).

[25] Annually, the Research Institute of Organic Agriculture (FiBL) and the Agricultural Market Information Company (AMI) carry out a survey on organic sector data in Europe. The results of this survey are published in the FiBL-IFAOM yearbook "The World of Organic Agriculture" (Willer and Lernoud, 2016) and online at www.organic-world.net.

Figure 3.1: Comparison of the growth trends of organic retail sales and organic area in the EU, 2005 to 2014



Source: FiBL-AMI surveys 2007–2016.

In 2014, about 10 million hectares of farmland were managed organically in the EU, giving an organic share of 5.7 %. The country with the largest organic area in the EU was Spain (1.7 million hectares), while the largest share of organic land was in Austria (19.4 %). Among the case study countries, the largest organic share was found in Estonia (16.3 %). Between 2010 and 2014, the EU organic area grew by 13.3 %. Whilst there was substantial growth of organic land in some countries (more than 30 % in Estonia and France), others, such as Germany (+5.7 %) and Denmark (+1.8 %), have nearly stagnated. In the United Kingdom meanwhile, a substantial decrease in the organic area was reported (-25 %) (Table 3.2).

Table 3.2: Key data on the organic agricultural area in the EU and case study countries in 2014

	Organic agricultural area	**Organic share of total agricultural area**	**Area growth 2010-2014**	**Countries' share of EU organic area**
	ha	%	%	%
EU-28	10 250 741	5.7	13.3	100
Czech Republic	472 663	11.1	5.5	4.6
Denmark	165 773	6.3	1.8	1.6
Estonia	155 560	16.5	37.7	1.5
France	1 118 845	4.1	32.3	10.9
Germany	1 047 633	6.3	5.7	10.2
Hungary	124 841	3.0	-2.2	1.2
Italy	1 387 913	10.8	24.6	13.5
Spain	1 710 475	6.9	17.4	16.7
United Kingdom	521 475	3.0	-25.5	5.1

Source: FiBL-AMI survey and own calculation on Eurostat and national databases (Czech Republic: UZEI and Eurostat; Denmark: Eurostat; Estonia: Ministry of Agriculture and Eurostat; France: Agence Bio and Eurostat; Germany: BLE; Hungary: Nebih and Eurostat; Italy: SINAB and Eurostat; Spain: Magrama and Eurostat; UK: DEFRA and Eurostat).

The country with the largest absolute number of organic producers in 2014 was Italy (almost 50 000 holdings), whilst the largest relative share of organic producers was found in the Czech Republic (more than 14 %). The number of organic producers in the EU increased by 17 % between 2010 and 2014 (Table 3.3). The dynamic growth of the organic market – in particular in relation to domestic organic production trends – has also prompted an increasing number of import-oriented processors and retailers entering or expanding their organic business (Willer et al., 2016). At the moment, a large proportion of these processors and importers are located in the EU-15. Data shows, however, that new Member States and other European countries are currently developing their own processing capacities, in order to add value to their own products (Willer et al., 2016).

Table 3.3: Key data on organic producers and other operator types for the EU and case study countries in 2014

	Producers	Share of total Producers	Countries' share of EU organic producers	Growth of producers 2010-2014	Processors	Importers
	No.	%	%	%	No.	No.
EU-28	257 525	2.4	100	16.6	49 968	1 650
Czech Republic	3 866	14.7	1.5	9.9	506	110
Denmark	2 565	6.4	1.0	-4.2	787	
Estonia	1 542	8.1	0.6	13.7	109	9
France	26 466	5.6	10.3	28.5	11 198	148
Germany	23 398	8.2	9.1	6.6	9 497	326
Hungary	1 672	0.3	0.6	6.0	257	8
Italy	48 662	4.8	18.9	16.4	12 641	259
Spain	30 602	3.2	11.9	9.8	3 082	127
United Kingdom	3 526	1.9	1.4	-28.8	2 487	88

Source: FiBL-AMI survey and own calculation based on Eurostat and national databases (Czech Republic: UZEI and Eurostat; Denmark: Eurostat; Estonia: Ministry of Agriculture and Eurostat; France: Agence Bio and Eurostat; Germany: BLE; Hungary: Nebih and Eurostat; Italy: SINAB and Eurostat; Spain: Magrama and Eurostat; UK: DEFRA and Eurostat).

According to the FiBL-AMI survey, the "fruit and vegetables" category dominates the organic market in many countries, especially in Italy, Germany and France, followed by dairy products including drinking milk. Grain based products and pasta have a comparably lower market share, but are not consistently reported in any one category. It remains very difficult to obtain specific data on the share of the respective product categories in total food markets in each country, let alone on the market share of the specific products studied (drinking milk, apples and pasta). However, it can be said that milk and milk products, as well as fruit, are particularly successful in the organic sector. Regarding fruit, however, it has to be considered that imported tropical and subtropical fruit, such as bananas and oranges, usually play a more important role in the organic market than apples.

Table 3.4 demonstrates the scarcity of retail sales data on individual products and product groups. However, it does still give an idea of the importance of the selected products and product groups within particular national markets. In Denmark, for example, more than a 10 % market share is achieved for all categories for which data was available, whilst Germany similarly shows a share of

more than 5 % within all categories with data. Among the products analysed, milk is the most successful: nearly 30 % of the milk sold in Denmark and 10 % of that sold in France is organic.

Table 3.4: Organic share of products and product groups of retail sales (in value) of their total markets in the case study countries in 2014 [a]

	Fruit	Apples	Milk and dairy products	Milk	Noodles, couscous etc.	Pasta
	%	%	%	%	%	%
Czech Republic	0.7 [b]	1.6	0.9	1.4	2.2 [c]	2.2
Denmark	10.1	-	-	29.3	-	25.7
France	4.3	-	3.2	10.8	-	-
Germany	7.1	6.7	5.6 [d]	8.7	-	6.2
Spain	-	-	0.4	0.3	-	-
United Kingdom	2.0	-	3.4	5.3	1.0 [e]	-

[a] Data for Estonia, Hungary and Italy are not available.
[b] Refers to fruit and vegetables.
[c] Refers to bakery and confectionary products.
[d] Includes cheese.
[e] Includes rice.

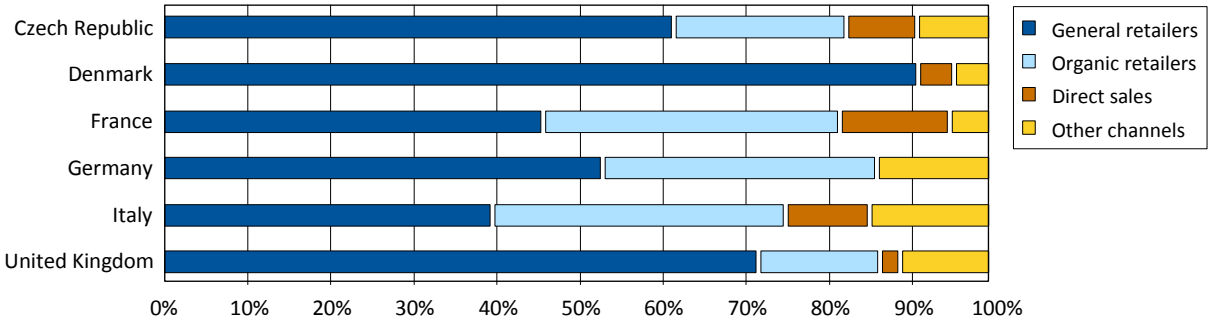
Sources: FiBL-AMI survey and own calculation based on national databases (Czech Republic: UZEI and expert estimate; Denmark: Organic Denmark and GfK Consumer Scan, compiled by LF; France: Agence Bio; Germany: AMI; Spain: Magrama; UK: AC Nielsen and Soil Association)

3.2 Features of organic supply chains

Organic food has generally been represented as an alternative to industrial food systems (e.g. Ilbery and Maye, 2006; Sonnino and Marsden, 2006). On the basis of available data on **market channels**, it appears that most of the organic food in many European countries is sold by general retailers (Willer and Lernoud 2016), with the result that organic chains are integrated into the mainstream food chains. However, it must be recognised that detailed statistical data on the importance of alternative sales outlets for organic food (i.e. non-multiple retail sales, such as farm shops, farmers markets and specialist organic shops) remains limited in most countries.

A breakdown of the different market channels shows that their relative importance differs from country to country. Among the case study countries, Italy, France and Germany are the only countries where up to 50 % of organic food is sold through specialised retailers and direct sales. In contrast, in the Czech Republic, Denmark and the United Kingdom, more than 70 % of organic food is sold through general retailers (see Figure 3.2). Data on the breakdown between different sale channels for organic food have not been published for Estonia, Hungary and Spain.

Figure 3.2: Share of organic retail sales of different sales channel (based on retail sales values) in the case study countries (2014) [a]



[a] Data on the breakdown between different sale channels for organic food have not been published for Estonia, Hungary and Spain.

Sources: FiBL-AMI survey and own calculation based on national databases (Czech Republic: UZEI; Denmark: LF; France: Agence Bio; Germany: AMI; Italy: AssoBio; UK: Soil Association).

The general observations above are in contrast to one prominent strand of literature, which has represented the organic market as more diversified, with farmers using a combination of different market channels (Ilbery and Maye, 2006; Sonnino and Marsden, 2006). More recent studies, however, support the above observations, and show that most organic farms tend to sell the majority of their products through just one type of market channel – often through multiple retailers (Pauwelyn, 2015; Kizos and Varaufakis, 2011; Ilbery et al., 2010; Aertsens et al., 2009). Different reasons for this pattern of market engagement have been identified in the literature. Firstly, reducing the number of points of contact to supply products derives benefits in terms of transaction, logistical and transport costs (Hingley et al., 2008). Secondly, farmers often report problems with selling organic products through alternative retailers and engaging in the associated value adding activities, particularly in regions where there is a limited demand for organic food (García, 2013; Baecke et al., 2002). Such activities – direct marketing, packing and processing, etc. – also require expensive investments and skills. Finally, general supermarkets allow organic farmers to reach a wider public and provide regular business through annual contracts (Hingley et al. 2008). Therefore, it is sometimes easier for farmers not to sell products directly to wholesalers, processors or multiple retailers (Petit and Aubry, 2014; Ilbery et al., 2010).

Despite this, there are clear benefits of selling through a more diverse range of channels. Farm-gate prices are usually higher when products are sold through alternative retailers, offering a potentially greater return for farmers. It can also be difficult for some organic products to meet supermarket standards (Weibel et al., 2013; Lobley et al., 2009; Hingley et al., 2008).

The **small scale of production,** combined with the need to keep organic and conventional products separate in storing and processing activities, are often presented as key weaknesses of organic supply chains. For example, Brunori et al. (2002) identify the small size of production, the need to separate conventional and organic wheat, and the lack of processors at a local level as the main limitations of the organic pasta supply chain in some marginal areas in Tuscany. Similarly for milk,

García et al. (2012) indicated that the Spanish organic milk and dairy sector has structural problems related to low production, spatial dispersion and fragmentation of the chain. These factors affect the development of the supply chain and make it difficult to develop specialist organic milk collection networks. The small size of holdings, their geographical dispersion and the limited volumes of production make it difficult for some regions and countries to have processors specialising in organic products such as milk and durum wheat (Zoltán, 2014; García, 2013). This explains, for instance, why organic durum wheat grown in Spain and Hungary is generally exported to Italy and Germany rather than being used to produce pasta domestically (García, 2013). In Italy, according to Tudisca et al. (2014), none of the grain brokers or millers are totally dedicated to organic products.

Cooperation and integration would allow producers and processors to reduce the effect of small production volumes by reaching the critical mass for collecting and processing organic produce more efficiently, while at the same time strengthening their bargaining power. This been studied in a number of EU countries. The positive effects of being part of cooperatives are found, for instance, in the Italian organic apple and pasta supply chains (Pirazzoli et al., 2010; Palmieri, 2007; Nardone and Sisto, 2005). Despite this, Naspetti et al. (2011) studied the role of collaborative planning in eight EU countries (Switzerland, Germany, Denmark, France, Hungary, Italy, The Netherlands and the United Kingdom) for organic apples, milk, eggs and pork and found a low level of collaboration among various actors, especially regarding cost and benefit sharing.

Perhaps because of this, studies in the United Kingdom have found that the relationship between organic suppliers, processors, food manufacturers and retailers in the mainstream food chain is a relationship between small and big volume actors, where organic suppliers are often highly dependent on a few conventional retailers that offer the only access to consumers (Smith and Marsden, 2004; Wycherley, 2002). However, there are also examples of constructive partnership between producers and large-scale retailers. For example, Aertsens et al. (2009) showed that a number of retailers have played an active role in organising successful supply chains for organic beef in Belgium, with the result that producers now get a relatively high price for selling high quality beef to the multiple retailers. More such retailer-driven interactions could provide an alternative to producer-driven cooperation to overcome the inhibitory small volumes of production.

4 Creation and distribution of added value in organic milk supply chains

The creation of added value through production, processing and distribution of organic drinking milk was studied in Denmark, France and Germany (internal markets), the Czech Republic and Estonia (emerging markets) and Spain (import market). In the following section, first, the market environment of the organic supply chains is described, and second, based on the information provided by industry experts, the structure of typical organic supply chains is presented. This will be followed by a comparison between organic and conventional supply chains and a detailed analysis of the distribution of added value in selected case studies. Finally, a general evaluation of the determinants of added value for organic milk will conclude this section.

4.1 Market environment

In many EU countries and in Northern Europe in particular, organic milk and dairy products constitute a high proportion of all organic products sold, 30 % in Denmark and the United Kingdom, 22 % in Czech Republic, 14 % in France and in Germany (Willer et al. 2016). The organic share of the total milk market reaches 30 % of all milk retail sales in Denmark and more than 10 % in France.

In the EU, Germany has the highest number of organic dairy cows (148 000), followed by France (140 097), and the United Kingdom (126 653); the total number of dairy cows amounts to more than 800 000 in the EU-28 (Table 4.1). In 2014, organic cows' milk production was about 4.2 million t, constituting 2.9 % of the total EU milk production from dairy cows. In response to increasing demand for organic milk and dairy products, in the EU, cows' milk production has increased substantially by around 50 % since 2010. However, it should be noted though that some of the increase is due to improved data availability. France is the country with the largest increase since 2010; here organic milk production almost doubled. In 2014, the United Kingdom was the largest producer, and organic cows' milk production accounted for more than 800 000 t which is almost 20 % of the total EU´s organic cows´ milk production. Germany produces 707 900 t organic cows' milk, France 534 000 t, and Italy 400 000 t. According to the data presented in Table 4.1 organic dairy farms appear to be relatively intensive in Italy with (average annual milk yield of 7.5 t/cow compared to 5.7 t/cow and year on conventional farms). In Denmark, the share of organic milk production on total milk production is highest (9.5 %).

Table 4.1: Key figures of the market for organic milk in the EU-28 and in the case study countries in 2014

	Organic dairy cows	Production of organic cows' milk	Organic share of total cows' milk production	Country's share of total EU organic cows' milk production	5-year growth of cows' milk production	Organic cows' milk production per capita	Retail sales of organic milk	Share of total retail sales
	n	t	%	%	%	kg/person	Million €	%
EU-28	815 756	4 285 317	2.9	100	50	8.5	-	-
Czech Republic	7 402	29 908	1.2	0.7	-	2.8	4.0	1.4
Denmark	63 261	487 100	9.5	11.4	2.1	86.6	125.7	29.3
Estonia	2 183	9 280	1.3	0.2	-11.1	7.1	-	-
France	140 097	534 000	2.1	12.5	87.0	8.1	290.0	10.8
Germany	148 000	707 900	2.3	16.5	18.9	8.8	~260.0	8.7 [b]
Hungary [a]	2 157	8 856	0.6	0.2	-	0.9	-	-
Italy [a]	53 181	400 000	3.6	9.3	-	6.6	-	-
Spain	4 045	11 883	0.2	0.3	5.6	0.3	6.1	0.3
United Kingdom [a]	126 653	808 600	5.5	18.9	-	12.6	-	5.3

[a] This current study does not analyse the typical organic milk supply chains in Italy, Hungary and the United Kingdom

[b] 17.9% for fresh milk.

Source: FiBL-AMI survey and own calculation based on Eurostat and national databases (Czech Republic: Eurostat, UZEI, expert estimates; Denmark: LF and Eurostat; Organic Denmark and GfK Consumer Scan; Estonia: Ministry of Agriculture and Eurostat; France: Agence Bio and Eurostat; Germany: AMI; Hungary: Nebih and Eurostat, for market data: expert estimates; Italy: SINAB; Eurostat and Assoil; Spain: Eurostat and Magrama, UK: Defra, Eurostat and Soil Association).

4.2 Structure of typical organic supply chains

As reported by the industry experts typical supply chains of organic milk consist mainly of the following actors and stages in the Czech Republic, Germany, Denmark, Estonia, Spain and France (see Figure 4.1 and Table 4.2):

- According to the experts' estimates, there are approximatively 3 000 organic milk producers in Germany, 2 150 in France, 350 in Denmark, 130-135 in Czech Republic and Estonia, and less than 100 in Spain. These numbers reflect the stage of development of the market, with the lowest value in Spain, which is the only import market for organic milk among the case study countries.
- The second stage of the chain usually consists of milk processing. The number of dairies varies between 155 in France and about 3 in Estonia. Data shown in Table 4.2 represent major processors (dairies); however in the emerging Czech and Estonian markets the number of farmers undertaking processing activities themselves has also been increasing, accounting for 31 in Czech Republic and 2 in Estonia.

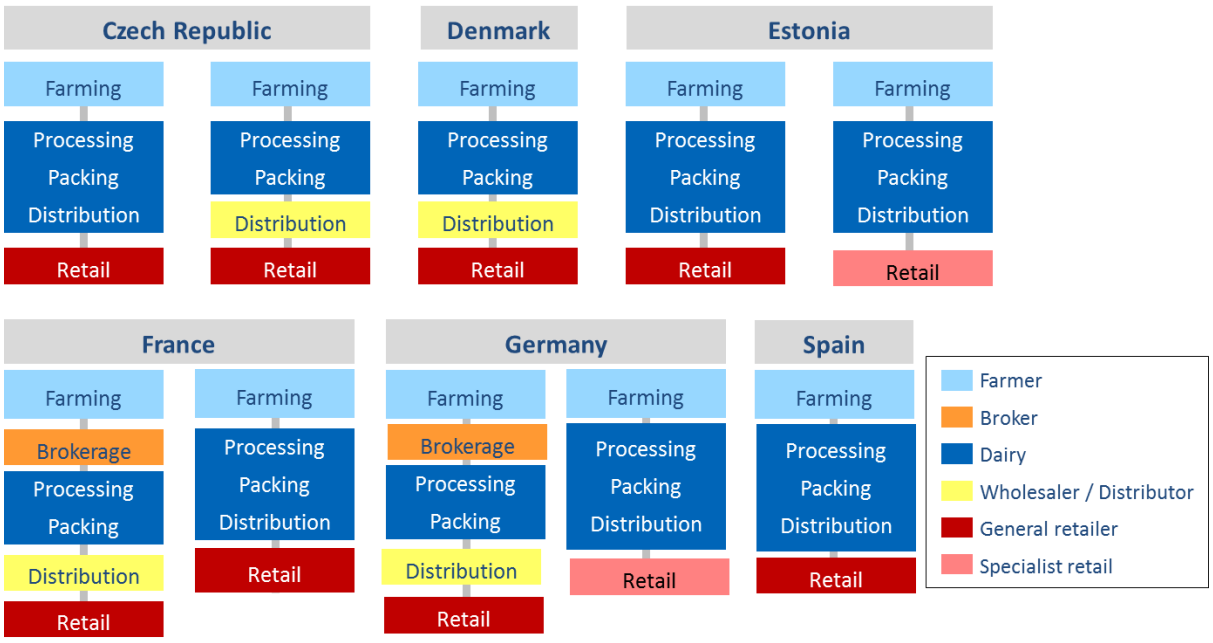
- A very few brokers dealing with imported milk are identified in France and Germany. The experts were not able to provide estimates for the number of brokers, as the brokerage stage is unusual in the organic supply chain and brokers usually deal only with imported organic milk.
- There are about 25 wholesalers in Germany, and only a few in the other countries.
- At the retail stage, supermarkets represent the main outlet channel in all the countries studied.

As far as the **size and the degree of development** are concerned, the longest supply chains can be observed in Germany and France. In the emerging markets of the Czech Republic and Estonia we have a limited number of market players involved in the organic milk sector. In particular, there are usually no wholesalers involved, with the exception of the very few wholesalers/distributors who deal with imported milk (Figure 4.1).

As an import market, Spain has the smallest number of producers, followed by the Estonian and the Czech emerging markets. In Spain we find the largest share (45 %), among the eight countries, of organic milk which is sold in specialised retailers. In the other countries most of the organic milk is sold in general retailers, even in the emerging markets (see Figure 4.1 and Table 4.2).

In Denmark, we can find one main prevalent chain representing more than 70 % of the typical organic milk supply chains in this country (see Figure 4.1 and Table 4.2). In Estonia, France, Germany and Spain the typical supply chains are dominated by the general retail chain (55 % in Spain, 60 % in Estonia and Germany and 80 % in France). Also in the Czech Republic, the most typical supply chain is represented by the general retail chain with more than 60 % of organic milk sales.

Figure 4.1: Typical organic milk supply chains in the case study countries



Source: Own presentation based on information from industry experts.

Table 4.2: Synoptic description of typical supply chains for organic drinking milk in the case study countries (based on expert interviews)

	CZ	DE	DK	EE	ES	FR
Main stages	1. Production (milk) 2. Dairy 3. Packing 4. Distribution 5. Retail	1. Production (milk) 2. Brokerage (imported milk) 3. Dairy 4. Packing 5. Distribution 6. Retail	1. Production (milk) 2. Dairy 3. Packing 4. Distribution 5. Retail	1. Production (milk) 2. Dairy 3. Packing 4. Distribution 5. Retail	1. Production (milk) 2. Dairy 3. Packing 4. Distribution 5. Retail	1. Production (milk) 2. Brokerage (imported milk) 3. Dairy 4. Packing 5- Distribution 6. Retail
Number of operators						
Producers	135	3 000	350	132	76	2 150
Broker	Very few dealing only with imported milk	Very few dealing only with imported milk	0	Very few dealing only with imported milk	0	Very few dealing only with imported milk
Dairies/processors	10 major dairies + 31 on-farm processors	50	7	1 major dairy + 2 on-farm processors	10	155
Wholesalers	Very few mainly dealing with imports	25	na	Very few dealing only with imported milk	Very few dealing only with imported milk	na
Import	No	Yes	No	Yes	Yes	No
Main retail channel	Mostly general retailers (> 80 %)	Mostly general retailers (about 60 %)	General retailers (>90 %)	Mostly general retailers (about 60 %)	General (55 %), specialised retailers (45 %)	Mostly general retailers (80 %)
Main target market	National (90 %)	National (90 %)	Export (60 %)	National (90 %)	National (90 %)	National (90 %)
Most powerful actors	Supermarkets	Cooperatives and supermarkets	Farmers' cooperatives and supermarkets	Larger processors and supermarkets	One big dairy dealing with both conventional and organic milk	Supermarkets
Possibilities to increase value added	Collaboration amongst upstream actors; use of different market channels, including public procurement	Producers' cooperatives for promotion and negotiation with dairies; regional brands	Product innovation product brands; vertical integration	Diversification of production	Diversification of production; collective purchase of farm inputs; regional brands	Short chains; regional brands
Strengths	Price stability	Increase in consumption short chain	High consumption; high investments in product innovation	Increase in consumption	Price stability	Increase in consumption
Weaknesses	Low consumption (but growing trend); small scale of production	Small diaries are not viable; not enough organic milk produced to meet increased consumption	None identified	Difficulties in realising economies of scale; limited n. of processors; low consumption but growing trend	Small production volumes; lack of cooperation; dependence on a limited n. of processors	Limited n. of processors
Differences with conventional supply chains	Costs and prices	Organic sector depends on import, conventional produce is also exported	None identified	None identified	Costs and prices	None identified

Source: Own presentation based on information provided by national industry experts.

The interviews indicated that the main supply chains for organic milk do not differ in structure from the conventional supply chains, with the exception of the relevance of the brokerage and wholesale stages, which are more developed in the conventional sector.

In some countries with well-established (internal) organic markets, the domestic production of organic milk is not sufficient to meet the demand. For example, in Germany organic milk consumption has experienced an exceptional growth during the last years and cannot be met by domestic production alone. Thus, Germany increasingly relies on organic milk imported from Denmark and Austria for processing, and more recently also from the Czech Republic.

4.3 Value creation in organic and conventional supply chains

In order to provide some insights into the value creation in organic compared to conventional chains, we compared farm-gate and retail prices for supplying to general retail only, looking at organic price premiums and the farmer's share in the supply chain. The farm-gate and retail prices for organic and conventional milk sold through general retail are presented in Figure 4.2. Prices are shown in €/litre for milk. They are based on the reference year of 2016 and do not include VAT.

The results should be regarded as illustrative case examples and the following limitations apply:

- Only supply chains using general retail are compared.
- One product supply chain cannot represent the full market in a country with variations in regional and seasonal balance of supply and demand.
- The same products are compared across countries, but they do not have the same relevance for the consumer, which also affects prices.
- Changes in currency exchange rates can affect comparability over time between countries.

In the organic supply chain case studies, farm-gate and retail prices are premium prices for organic production and are higher for the organic supply chains compared to the relative conventional chains. Regarding the difference between retail and farm-gate price, this is higher for the organic supply chains in most cases, with the only exception for milk in the Czech Republic, where the difference is higher in conventional (0.51 €/litre) than organic milk (0.45 €/litre). This indicates that the value created is higher in the organic than conventional milk supply chains in most of the cases.

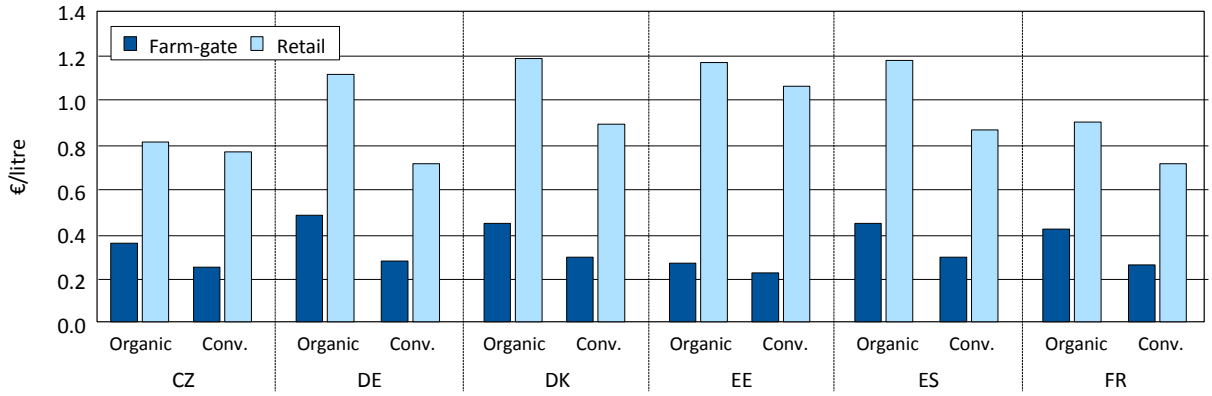
In general, also in the organic supply chains there is not a strong link between agricultural commodity prices and the relative retail prices. For instance, in Estonia we find among the highest retail price (1.17 €/litre), and the lowest farm-gate price (0.28 €/litre).

Figure 4.3 shows that the farm gate price share of the retail price is always higher in the organic compared to the conventional supply chains. The farm-gate prices represent a proportion of between 24 % (Estonia) and 48 % (Germany) of the retail price.

Overall, in countries with low farm-gate prices for the conventional product, the organic price premium is also relatively lower than in countries with high farm-gate prices for the conventional product and vice versa.

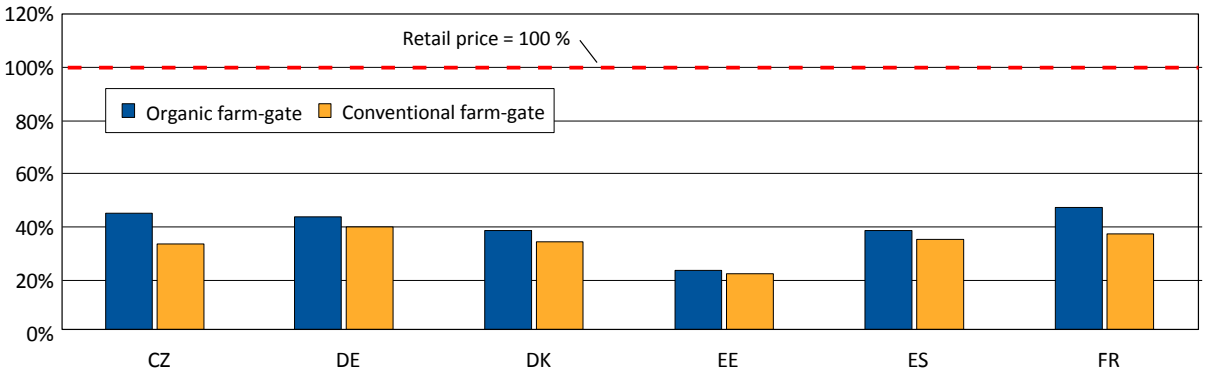
We observe that the emerging markets get the lowest organic price premiums both at farm-gate and retail levels, corresponding in the Czech Republic and Estonia to 42 % and 19 % at farm-gate, and 6 % and 9 % at retail level. The internal German and French markets get the highest farm-gate organic price premium (67 % and 59 % respectively).

Figure 4.2: Farm-gate and retail prices for organic and conventional milk per country at general retail, in €/litre (VAT excluded) (Reference year = 2016)



Source: Own calculation based on data from industry experts, Eurostat, EU-FADN - DG AGRI, Statistics Denmark and Observatoire de la formation des prix et des marges des produits alimentares

Figure 4.3: Relative share of farm-gate price for organic and conventional milk at general retail. Retail price = 100 %, reference year 2016 (VAT excluded)



Source: Own calculation based on data from industry experts, Eurostat, EU-FADN - DG AGRI, Statistics Denmark and Observatoire de la formation des prix et des marges des produits alimentares

4.4 Distribution of added value

To explore the distribution of added value in organic drinking milk supply chains, seven specific cases were analysed: two in the Czech Republic (emerging market), two in Estonia (emerging market), one in Germany (internal market), one in France (internal market) and one in Spain (import market). Among those, three supply chains include supermarkets as a final retail stage (the Czech Republic, Estonia, Spain) and three include specialised food shop (the Czech Republic, Estonia and Germany). The following specific **features** of some of the supply chains should be noted:

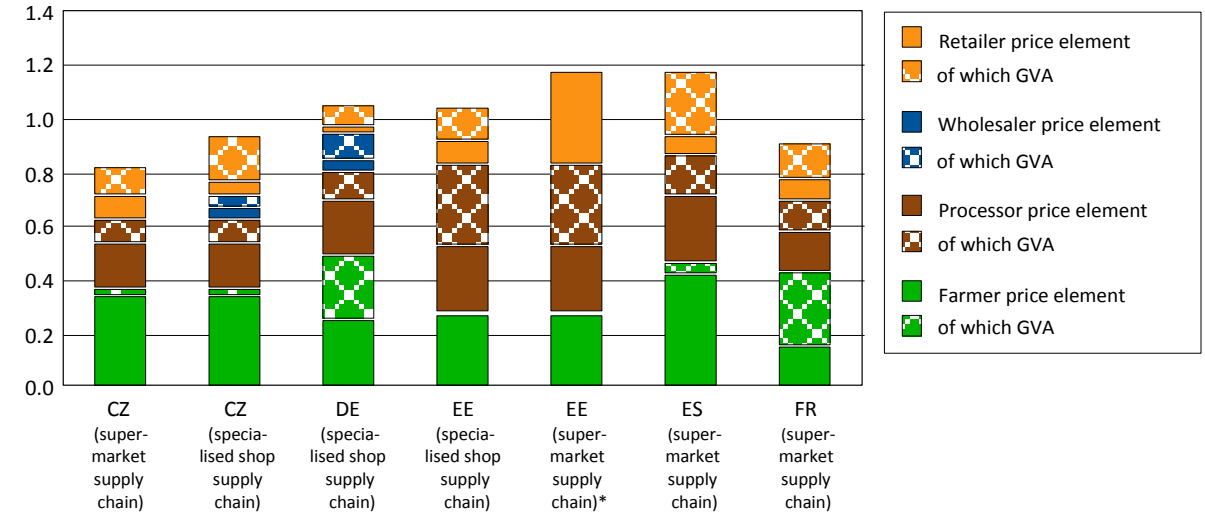
- In the Czech and the German specialist shop case, the dairy does not distribute the milk directly to the specialised shop. Distribution is done through a wholesaler.
- In the German supply chain, the producers cooperate in a producer group that is responsible for bargaining with the dairy on behalf of the producers.
- Data from the Estonian supermarket supply chain is incomplete as the supermarket level was not willing to provide data. This case-study has therefore not been included in the presentation of the unitary gross value added (Figure 4.5).

Figure 4.4 shows the extent to which the different supply chain actors (farmers, processors, wholesalers, retailers) contribute to the **price formation** of the organic drinking milk supply chains. Furthermore, the share of the GVA in the corresponding output price is presented at each supply chain stage. Prices are higher for the Estonian and Spanish case studies, and lower for the Czech one (Figure 4.4a). The share of the farmer price element accounts for 45 % in the first Czech supply chain (retail through supermarkets) and 40 % in the second Czech supply chain (retail through specialised food shop). In the German (supermarket) and the Spanish (supermarket) case studies the share of the farmer price element amounts to 47 % and 39 %, respectively. In contrast, the share of the farmer price element amounts to just 24 % (specialised food shop) and 27 % (supermarket) in Estonia. Data for farm gate prices are generally consistent with those discussed in Section 4.3, even if in this case they are referring to specific case studies. Results for farmers seem to confirm the general difficulty for countries less specialised in milk production in Europe. Except for Germany and France (both internal markets), the share of costs for purchase input at farmers' level is particularly high, leading to low levels of gross value added. Note that subsidies at farm level are not included here. They play therefore a fundamental role in maintaining the conditions of minimal profitability for milk producers.

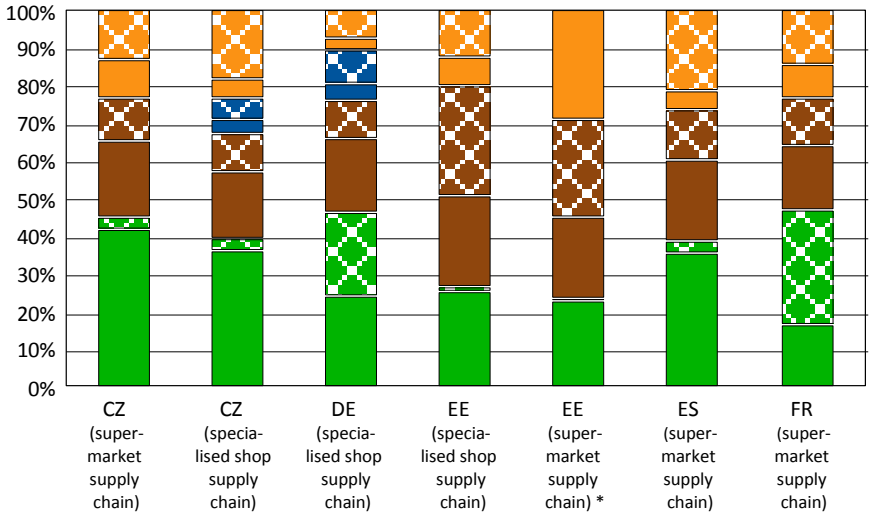
The processor takes the highest share of the price formation in both Estonian case studies, corresponding to respectively 44 % and 50 % for the supermarket and specialised shop supply chain. In all other case studies, the processor contributes about 30 % to the price formation. In all supply chains, except the German and one of the Estonian cases, the share of the retailer price element varies between 23 % and 26 % of the total price. In the Estonian supply chain, the retail price element varies between 32 % (supermarket) and 23 % (specialised food shop). Note that for the Estonian

Figure 4.4: Price formation and share of GVA in selected organic drinking milk supply chains

a) absolute (€/l; excl. VAT)



b) relative (retail price = 100 %; excl.VAT)



* Gross VA for retailer not available.

Source: Own calculation based on data collected from supply chains actors, farm management handbooks and EU-FADN - DG AGRI.

(supermarket) case gross value added could not be computed due to complete missing data on costs[26]. In the German case, the retailer price element is the lowest among the supply chain analysed, corresponding to only 10 %. In two milk supply chains which include specialised shops (the Czech Republic and Germany), where distribution from processor to retailer is undertaken by a wholesaler, the wholesale level contributes respectively 10 % (Czech Republic) and 13 % (Germany) to price

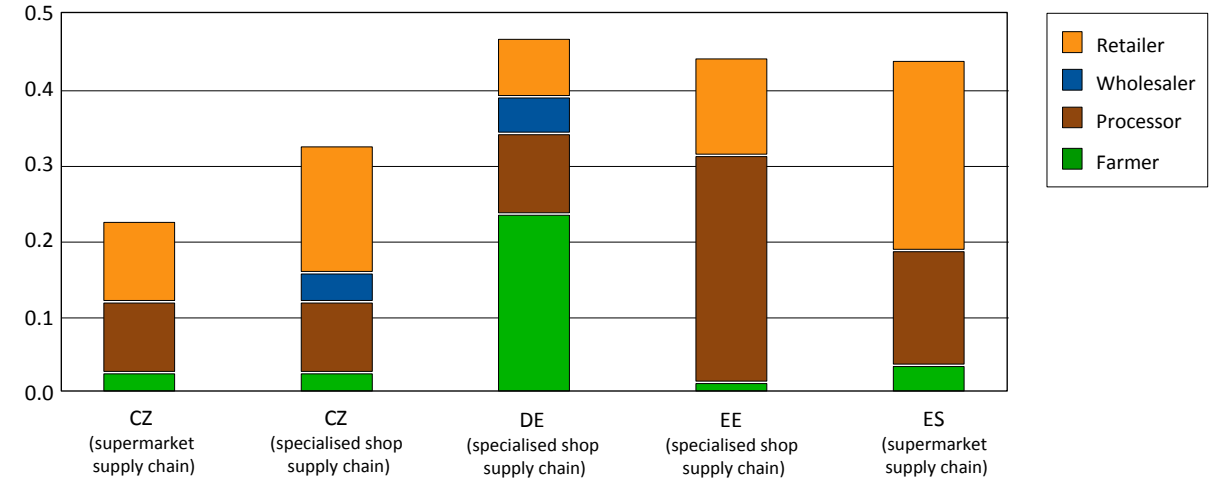
[26] As a matter of caution we decided not to estimate missing data through Multiple Imputation in supply chain steps with complete lack of data on any cost component, as this could yield less efficient (i.e. with higher variance) estimates.

formation. France and Germany are two internal markets, and actually the two case studies show similar results for what concerns values and relative share of the first two steps of the supply chain: farmer and processor level. The final retail price is also similar between the two case studies, but as the French case does not include a wholesaler, whose role is internalised by the supermarket, the price share for retailer in the French case that is remarkably higher.

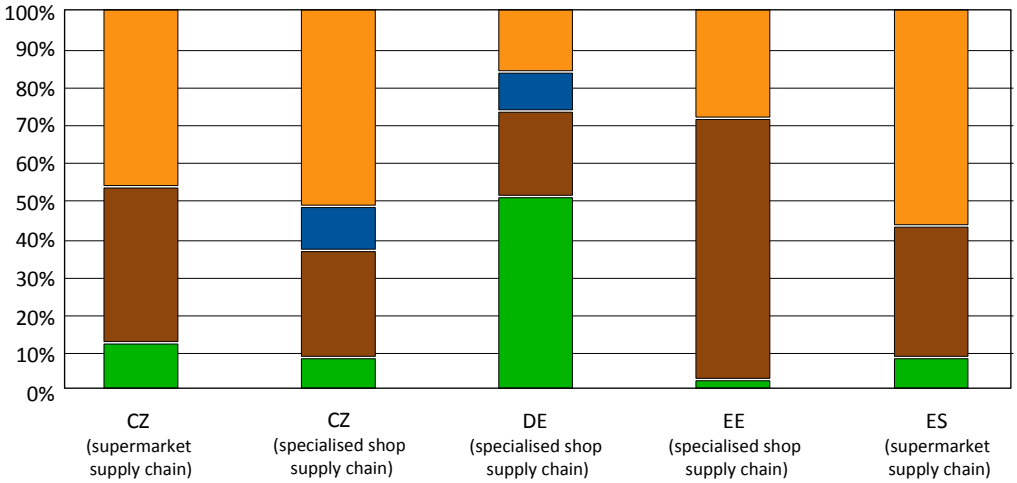
The **total gross value added** (Figure 4.5a) is highest and very similar in the French and German cases representing internal markets (France: 0.53 €/l; Germany: 0.51 €/l). It is lowest in the two Czech supply chains which created a total gross value added of 0.23 €/l (supermarket) and 0.34 €/l (specialised food shop).

Figure 4.5: Gross value added in selected organic drinking milk supply chains differentiated by supply chain actor

a) absolute (€/l; excl. VAT)



b) relative (retail price = 100 %, excl.VAT)



Source: Own calculation based on data collected from supply chains actors, farm management handbooks and EU-FADN - DG AGRI.

Clear differences among countries emerge particularly at farmer level, where the two case study countries (France and Germany) belonging to the category "internal market" show the highest share of added value. A similar situation can be observed regarding the share of added value at processor in France and Germany, which is proportionally lower compared to other countries. In the Czech, Estonian and Spanish supply chains the situation is substantially different and the gross value added created at the producer level amounts between 0.01 – 0.04 €/l. The German drinking milk supply chain is quite different from the other supply chains analysed. Similar to France, the producers create the highest gross value added of 0.24 €/l (46 % of the total gross value added). However, the gross value added at German retail level is only 0.08 €/l (10 % of total gross value added) and thus considerably lower than in the other supply chains including France. One explanation for this is that the German producers formed a producer group, which pools the produced milk and negotiates the price with the dairies. Thus, by strengthening their position through joint supply of milk to the dairy, the producer group enables individual producers to achieve a higher added value. Furthermore, it is important to note that the German organic milk market is characterised by a steady increase in demand but only a relatively slow increase in the organic milk production.

As far as the relative distribution of the unitary gross value added across the different supply chain actors is concerned (Figure 4.5b), the retail level (Czech Republic 47 % and 49 %, Spain 57 %) and the processor level (Estonia 62 %) take the largest share of the total gross value added. In all supply chains apart from the German case study, the producer shares of the gross value added are considerable lower than those of the other actors. Indeed, the producer shares of the total gross value added ranges from 3 % in Estonia (specialised food shop) to 12.5 % in the Czech Republic (supermarket). The wholesale levels accounts for 15 % to 18 % of the total gross value added.

4.5 Factors influencing added value formation and distribution

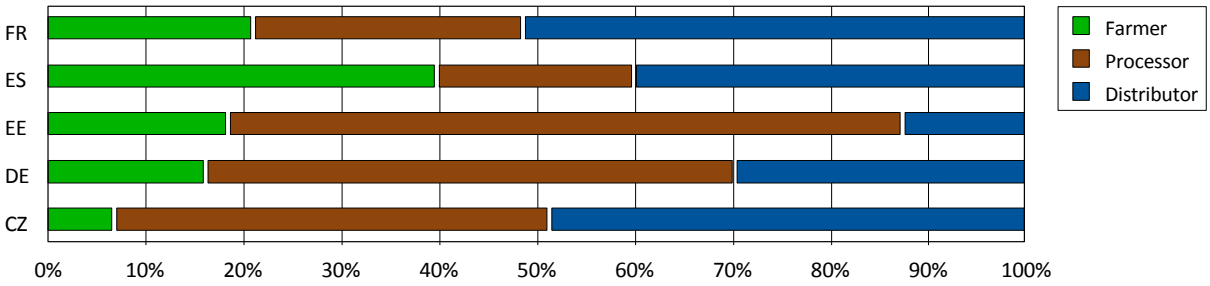
Determinants of the formation of added value

In this section we analyse the relative importance of the three main stages along the supply chain, and the analysis of the main determinants of the formation of added value in the supply chain for those categories based on an expert assessment. We will further consider the main factors that influence either positively or negatively the formation of added value. Thus, while individual cases are analysed in Section 4.4, we focus here on organic drinking milk supply chains in general. Due to different methodologies, source of data and scope of the analysis (compare Section 2), the results cannot be considered as directly comparable with those of the case studies of Section 4.4, rather they should contribute to integrate the information on the process of added value creation from a more general perspective.

Figure 4.6 below shows the results concerning the relative importance in the added value formation of the three **main stages** along the supply chain of drinking milk: farmers, processors and distributors. With the exception of Spain, the experts perceive the importance of the farming sector as relatively low. In general, the results of the expert assessment are in line with the data presented on the distribution of added value in Section 4.4. However, some differences can be observed;

particularly for Germany and France, where the experts have rated the importance of the farmer as much lower (compare Figure 4.5 and 4.6). Some differences emerge also for Spain, where the high level of farm gate price for milk might have been perceived as a related to high added value. These different perceptions may be ascribed to the different perceived role of the farming sector in internal market and import market countries. In France and Germany, the farmers actually receive quite a good share of the total added value, but the perception is that their role in the chain is marginal in a mature market, where market demand is governed by the distributors' marketing strategies and tactics. Milk being a commodity, distributors may decide to compress their margins on organic milk for attracting consumers, while profitability lies on other products in their range. France and Germany, the two highest producers of organic milk in this set of countries, broadly share a similar pattern for what concerns the relative importance of farmers, but differ for what concerns the role of processors and distributors. Also the two emerging markets, namely Czech Republic and Estonia, do not share a common pattern, with a remarkably higher importance attributed to processor in Estonia. The low score for the Spanish processor sector might reflect the dependence of Spain from imports, which refers mainly to processed milk.

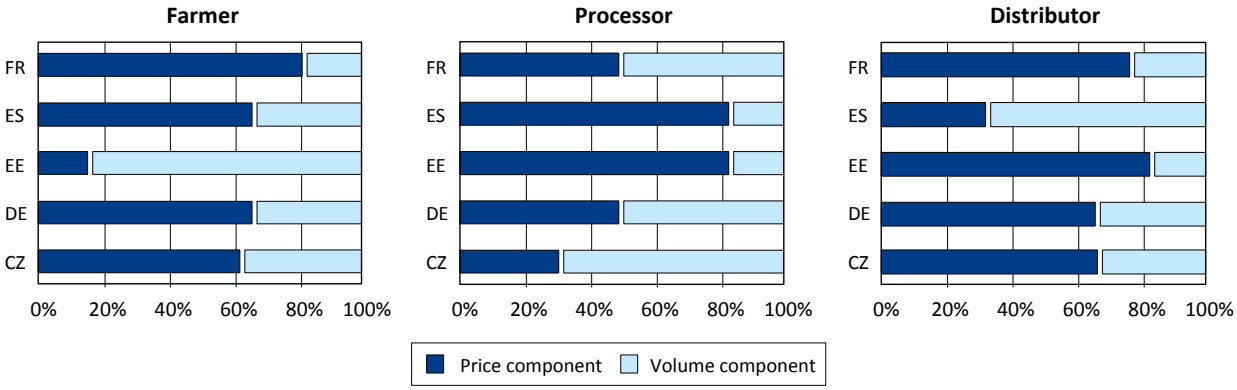
Figure 4.6: Added value formation in the supply chain of organic drinking milk: experts' evaluations on the contribution of the main actors



Source: Own calculation based on expert rating.

The relative importance of each actor in the supply chain has been further disaggregated in terms of **price and volume component** (Figure 4.7). The price component for farmers is predominant for all countries, particularly for France, with the exception of Estonia (emerging market), where farm gate prices are particularly low (see Figure 4.4a). Concerning processors, results for Germany and France, show an equal importance for price and volume components. In these two countries the organic milk market is more developed and mature. More specifically the price component is predominant for milk processors in Estonia and Spain, while the Czech Republic shows a higher importance for volume components. The picture emerging for distributors show a rather homogeneous situation for France, Estonia, Germany, Czech Republic, with a higher importance for the price component. Despite the similarity of results for processors between Estonia and Spain, in the case of distributors, the situation between the two countries is almost opposite, with a peculiar predominance of the volume component in Spain.

Figure 4.7: Relative importance of volume and price component for added value formation in the supply chain of organic drinking milk: farmers, processors and distributors level



Source: Own calculation based on expert rating.

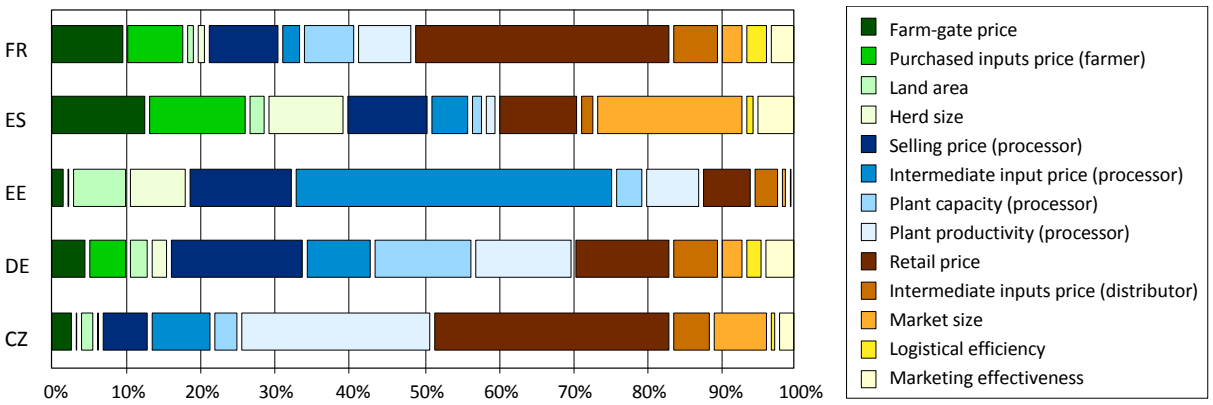
Figure 4.8 shows the relative importance of the **elementary added value components**, according to the evaluations of experts about the present state of the milk supply chain. While the overall importance of farmer and distributor component reflect those shown in Figure 4.6, here we can appreciate the specific influences of price and volume components for each actor of the supply chain as perceived by experts.

Spain shows the highest relevance for the elementary added value components at farm level. The importance attributed to the price component is equally distributed between farm gate prices and purchase input prices, while yields at farm level emerge as the most relevant factor in the volume component. A more uniform situation for land area and yields emerges for Estonia, France and Germany, though with a different overall importance.

Elementary component at the processor level show a highly differentiated pattern also for countries like Estonia, Germany and Czech Republic that show a high importance for processors in the added value creation process. The significance of intermediate input prices for Estonia, and of plant productivity for the Czech Republic, are the elementary added value components with the highest importance.

For what concerns distributors, retail price is considered as the most relevant elementary added value component for France and the Czech Republic, while market size is the most relevant component at retail level in Spain.

Figure 4.8: Relative importance of elementary added value components in the supply chain of organic drinking milk



Source: Own calculation based on expert rating.

Factors supporting or preventing added value formation

In order to obtain a more complete picture experts were asked to state relevant factors for the creation or reduction of added value and factors contributing to increase the market share for the milk supply chain. Results have been analysed and summarised for all countries and the list of factors has been ranked, according to their importance, by the experts. Factors have been further analysed using Principal Component Analysis to summarise the most relevant components influencing added value formation (see Section 2.5 for details). A label is attributed to each principal component reflecting the relations it has with the original list of factors (Tables 4.3 - 4.5). In order to simplify the interpretation of results, factors with the highest correlations with the principal components, either positive or negative, are shown with a + or – sign respectively (see Section 2.5 for details about the statistical criteria adopted for the definition of principal components).

The factors listed in the tables below cover a wide range of situation across countries. Nevertheless, a common main issue emerges for the supply chain of organic drinking milk and concerns the producer level. Experts define a situation of general difficulties for organic milk production, that range from low competitiveness due to high costs, and to limited efficiency at processing and distribution and storage level. The relative profitability at farm level is hampered by prices that are considered too low and make domestic production in emerging markets particularly vulnerable to import and international price instability (see principal components labelled “High costs and standards along the supply chain” and “Low relative profitability” in Table 4.4). Producers also find it difficult to meet quality standards, which contribute to increase costs and reduce competitiveness. Small volumes of production and small number of processors represent structural weaknesses of the organic dairy sector, because this prevents developing efficient systems of collection, processing and distribution. This is especially true in countries where fragmentation of production is more evident, i.e. Spain, Estonia and to a lesser extent the Czech Republic. Because of the small quantities of organic milk produced in certain regions, which makes collection and processing of organic products not worthwhile for dairies, farmers in Spain, Estonia and the Czech Republic may struggle to find processors and distributors interested in dealing with organic products in the local area. Therefore,

they sometimes sell their milk as conventional, or, for example, producers in the Czech Republic often sell organic milk to dairies in Germany, which represents a missed opportunity to create added value domestically. Product innovation has been mentioned only by the Danish experts as an opportunity to create added value and to increase market power, reporting in particular on the case of Arla skyr, which has become an important dairy product in many Northern European countries. While short supply chains are identified as important to increase added value, investing in activities like processing and direct marketing of milk requires substantial capital and skills.

Higher efficiency at farm level and in the supply chain organisation, better marketing and product differentiation and a general shift in consumers preferences for organic milk are all factors that might improve the added value in the supply chain and lead to a general development of the market of organic milk that necessarily goes through a more efficient role of distribution and retail sector (see principal components labelled “Increased price competitiveness at farm level”, “Consumer driven local production”, and “Quality oriented efficient supply chain organisation” in Table 4.3). However, the experts already consider big wholesalers, retailers and large processors as the most powerful market players (see e.g. Table 4.2, Figure 4.6). In some cases, the interviews also highlight the risk of concentration of market power among a few actors involved in the organic sector. This is the case for example of a big dairy in Spain, which processes both organic and conventional milk. The experts see the risk that this concentration could limit the bargaining power of farmers. Farmers may increase their benefit by establishing cooperatives or producer organisations, which also helped them to develop producer brands for organic milk (e.g. Bioland, Demeter and Naturland). However, according to the expert interviews, retailers in some countries like the Czech Republic have developed their own brands. This can allow them to increase added value through dedicated networks and agreements on specific quality traits, which can improve also the return to the farmer. However, retailer own brands can also be used to reduce the bargaining power of suppliers by giving the retailers the opportunity to change suppliers without consumers being able to detect the change.

Table 4.3: Principal components of factors that positively influence the added value in the supply chain of organic drinking milk [27]

	Increased competitiveness at price level	Consumer driven local production	Quality oriented efficient supply chain organisation
Minimum fair farm-gate price guaranteed	+		
On farm sales	+		
On-farm organic dairy processing	+		
Price stability organic milk	+		
Consumer intrest in healthy food		+	
Availability of local organic milk		+ [a]	
High price of other organic dairy products		–	
High quality of milk			+
Efficient supply chain organisation			+
Low retail price premium of organic milk			

[a] Factor load marginaly below the 0.6 trheshold.

Source: Own presentation based on expert rating.

Table 4.4: Principal components of factors that negatively influence the added value in the supply chain of organic drinking milk [28]

	High costs and standards along supply chains	Low relative profitability for farmers
Strict standard requirements for milk	+	
High costs for transport and logistics	+	
High costs along supply chain of organic mill	+	
Limited processing facilities	+	
High competition from impported milk		+
Unfair farm gate price level of organic milk		+
Decrease of support to organic farming		+
Local scarcity of organic milk		

Source: Own presentation based on expert rating.

[27] The first Principal Component (PC) is labelled "Increased price competitiveness at farm level", and refers to factors related to the profitability of dairy farmers arising from price related factors and on-farm marketing facilities. The second PC is labelled "Consumer driven local production", and is mainly defined by factors concerning the consumer side. The third PC is labelled "Quality oriented efficient supply chain organisation" as it involves factors concerning more efficient organisation of the supply chain oriented to high quality production. "Low retail price of organic milk" does not load to any PC.

[28] The first Principal component (PC) is labelled "High costs and standards along the supply chain" and includes factors that are related to high costs deriving from standards and structural limitation in the milk supply chain, mainly at processing and distribution level. The second PC is labelled "Low relative profitability for farmers" and includes factors that represent main obstacles for added value creation at farmers' level. The factor "Local scarcity of organic milk" does not load to any PC.

Table 4.5: Principal components of factors that may help in increasing the market share of organic drinking milk [29]

	Competitive product differentiation	Government support	Cost driven efficient supply chain	Public procurement
Reduction of retail price premium to increase market size	+			
On-farm organic dairy processing	+			
Effective positioning at point of sale	+			
Public support for organic farms		+		
Consumer interest in healthy food		+		
Efficient supply chain organisation			+	
Making milk more appealing to consumers			–	
Public sector procurement				+

Source: Own presentation based on expert rating.

[29] The first Principal component (PC) is labelled "Competitive product differentiation" and includes strategies for price and cost competitiveness that should also consider more effective product differentiation and communication. The second PC is labelled "Government support" as involves the public intervention both at supply (support to producers) and demand side (information campaigns for consumers). The third PC is labelled "Cost driven efficient supply chain" and focus on cost reduction mainly at the production and processing stages. The fourth PC is uniquely defined by the "Public sector procurement". "Improve marketing strategies at retail level" does not load to any PC.

5 Creation and distribution of added value in organic apple supply chains

The creation of added value in the production and distribution of organic apples was studied in France and Italy (internal markets), Estonia and Hungary (emerging markets) and Denmark and the United Kingdom (import markets). In the following section, first, the market environment of the organic supply chains is described. Subsequently, based on the information provided by industry experts, the structure of typical organic apple supply chains is presented for the case study countries. Next, the value creation in organic and conventional supply chains is compared and the distribution of added value is analysed in selected case study countries. A general evaluation of the determinants of added value for organic apples then concludes the section.

5.1 Market environment

Amongst fruit products, organic apples represent a noteworthy contributor to the organic market. According to Eurostat, at the EU level, the area used for production of organic apples in 2014 accounted for more than 58 000 ha, which represented almost 11.7 % of the total area used for apple production (Table 5.1). Since 2010, the area of apple trees has increased by 70 %, with the largest increase being noted for France. Among the case study countries, France (6 227 ha) in 2014 had the largest area of organic apple production, followed by Germany (4 800 ha) and Italy (3 950 ha). In terms of production, in 2014, at least 290 000 tonnes of organic apples were produced in the EU. Production data are not available for all individual countries, but Italy is by far the largest producer (84 000 t), followed by Germany (52 000 t).

The experts stated that Northern Italy, in particular South Tyrol, is among the most intensive and highly productive areas for apple production in the EU. This region is special in part because of the high level of cooperation at all levels of the supply chain. All farmers belong to one of the main cooperatives operating in the region and are well integrated in what is an extremely efficient supply chain. They have great support for technical assistance and can rely on the best agronomic techniques and facilities. Also, the geographical and climatic conditions are extremely favourable for apple production.

In the EU, the market for organic apples has experienced a steady growth during recent years. However, public data on retail sales volumes of individual organic tree fruits in different countries are mostly not available. Even if market research companies collect such data they are not in the public

domain.[30] Despite this, most countries have data on fruit retail sales, although these are likely to include data on tropical fruit. From the case study countries, Denmark and Germany show the highest fruit retail sales shares with 10.1 % and 7.1 % respectively. Notably, these are higher shares of retail sales than for the organic market overall, illustrating the importance of organic fruit for the sector.

Table 5.1: Key figures of the market for organic apples in the EU-28 and in the case study countries in 2014

	Organic apple production area	Organic share of total area	Share of EU organic area	Growth 2010-2014	Organic apple production [a,b]	Organic share of total production	Organic production per capita	Organic retail sales of apples	Share of total retail sales
	ha	%	%	%	t	%	kg/person	Million €	%
EU-28	58 540	11.7	100	69.1	292 992	1.8	0.5	-	-
Czech Republic [c]	1 995	22.3	1.7	7.9	3 054	2.4	0.3	1.0	1.6
Denmark	327	23.7	- 0.3	21.6	550	1.6	0.1	8.5	-
Estonia	385	42.8	0.2	22.6	227	18.9	0.2	-	-
France	6 227	12.4	9.5	109.0	-	-	-	-	-
Germany [c]	4 800	15.3	6.0	54.8	52 000	4.7	0.6	76	6.7
Hungary	854	2.6	6.3	21.0	6 903	0.9	0.7	-	-
Italy	3 950	7.6	9.9	-1.5	84 000	3.4	1.4	-	-
Spain [c]	765	2.5	5.8	15.7	13 665	2.2	0.3	-	-
United Kingdom	1 255	7.8	3.0	-8.4	14 240	5.3	0.2	-	-

[a] Please note that the differences in the share of production area (ha) and production (t) are due to the fact that the production is the production from the fully converted area; whereas the area given includes the conversion area. Please also note that – at least in the case of the Czech Republic – the comparison figure only includes the productive area and – other than for organic - not the plantations with not yet productive apple plants.

[b] Please note that the production data for the European Union are not complete as not all countries provide data.

[c] This current study does not analyse the typical organic apple supply chains in the Czech Republic, Germany and Spain

Source: FiBL-AMI survey and own calculation based on Eurostat and national databases (Czech Republic: Eurostat, UZEI, experts' estimates; Denmark: LF, Eurostat; Organic Denmark, GfK Consumer Scan; Estonia: Ministry of Agriculture and Eurostat; France: Agence Bio and Eurostat; Germany: AMI; Hungary: Nebih and Eurostat; Italy: SINAB and Eurostat; Spain: Eurostat and Magrama, UK: Defra, Eurostat and Soil Association. Apple production data for Italy, Germany based on data from the European Fruit Forum).

[30] Denmark is an exception to this: Statistics Denmark (2015) has compiled such data since 2003. For organic apples, the average annual growth rate of sales volume (metric tonnes of product) was 23 % during the period 2003–2015. Weibel et al. (2013), meanwhile, provided estimates of the organic share of all apple sales in Germany at about 10% in 2012, with fresh fruits and vegetables as a segment outselling organic foods as a whole. There are also growth opportunities in terms of intra-European trade in apples and fruit. For example, Germany is a major organic apple producer and the largest market for organic apples in Europe, but does not produce enough of its own apples to meet domestic demand. Organic apple imports into Germany were 43 % of total volume sold in 2012, and rose to 49 % in 2013, with Italy being the main supplier (Willer & Schaack, 2015).

5.2 Structure of typical organic supply chains

The typical supply chains for organic apples reported by the experts consist of the following main actors and stages (see also Figure 5.1 and Table 5.2):

Experts estimate the number of producers on a country-basis to range between 1 700 in France and about 30 in the United Kingdom, where organic apples are only grown in the counties of Kent, Herefordshire and Worcestershire.

- Storage and packing are rarely undertaken by the producers themselves but instead by a small number of wholesalers. In Italy and Estonia, farmers' cooperatives of producers often carry out these operations.
- Wholesale and distribution is often integrated with storage and packing.
- At the retail stage, most of the organic apples are sold in supermarkets, with the exception of Estonia and France where they are sold in specialised shops. In Estonia, it is possible to find apples produced domestically in specialised retailers, while supermarkets more commonly sell imported produce.

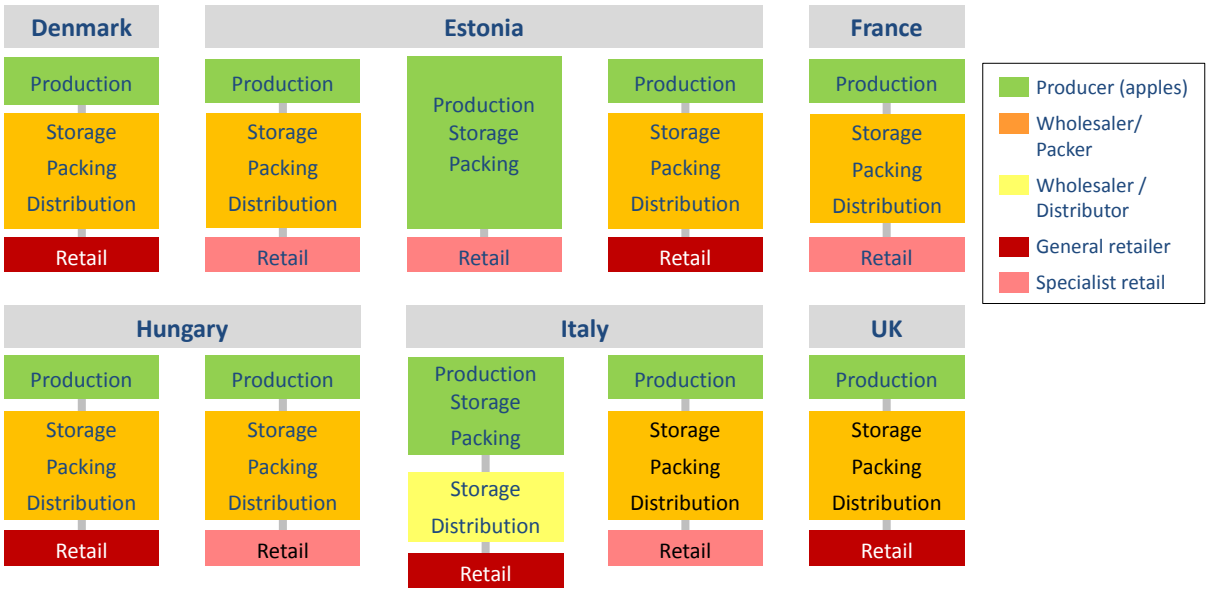
The experts were not able to provide estimates on the number of actors involved in some stages of the supply chains: specifically in the packing, storage and distribution. The estimation is complicated by the vertical integration with the other supply chain stages and the fact that some activities are undertaken by the wholesalers or the producers themselves (see Figure 5.1). Expert estimates of the number of wholesalers, meanwhile, are based on major operators only, leaving out the smaller wholesalers that trade only on a local scale and so are difficult to identify.

The apple supply chains differ regarding their **size and degree of development**. The supply chains for apples in Italy and France, both representing internal markets, are typically longer than in the other countries and include a greater number of actors. They may also include export/trade to other European countries, such as the United Kingdom, Estonia and Denmark and also to Germany, a large producer itself. The shortest supply chain was described in Estonia, where apples were reported to be stored by the producers themselves, with only a very few distributors then organising transport from producers to organic shops. Producers are usually very small and only 10 of the 45 farms are larger than 10 ha.

Figure 5.1 shows examples of typical organic apple supply chains in the case study countries, illustrating the integration of different operations that are undertaken by the same actors (for further details about the supply chains for apples, see also Table 5.2). For example, in Estonia, some producers also carry out cold storage, which does not require special storage facilities and so is feasible despite the limited production volumes. In Italy, storage (including C/A storage[31]) is often undertaken by cooperatives of producers, but also by wholesalers and packers.

[31] C/A is Controlled Atmosphere storage, with reduced O_2 and increased CO_2.

Figure 5.1: Typical organic apple supply chains in the case study countries



Source: Own presentation based on information from industry experts.

In Denmark, France and the United Kingdom, we can find one main chain representing more than 70 % of the typical supply chains. In Estonia, the most typical chain for organic apples is represented by the specialised shop chain (>70 %), where the operations of production, storage and packing are integrated. In Hungary and Italy, general retail (60 %) dominates the typical supply chains.

Estonia is the only case study country where most of the organic apples are sold in specialised shops or directly by farmers, and where predominantly imported apples (e.g. from France, Italy and Germany) are sold in supermarkets. As an emerging market, the Estonian organic apple supply chain occupies a small niche, and the lack of organisational and market infrastructures still prevents producers from achieving economies of scale and penetrating the mainstream food market to meet the growing demand. However, Hungary, which is the other emerging market studied for organic apples, shows different characteristics. According to the experts, organic apples produced in Hungary are either exported (90 %) or sold in domestic supermarkets, even if one case of a chain selling to specialist shops is illustrated by the case studies in this project. Production in Hungary is larger than in Estonia and there are distributors that also deal with (but not only) organic produce.

Table 5.2: Synoptic description of typical supply chains for organic apples in the case study countries (based on expert interviews)

	DK	EE	FR	HU	IT	UK
Main stages	1. Production (apples) 2. Storage and packing 3. Wholesale 4. Distribution 5. Retailer	1. Production (apples) and storage 2. Wholesale 3. Distribution 4. Retailer	1. Production (apples) 2. Storage and packing 3. Wholesale 4. Distribution 5. Retailer	1. Production (apples) 2. Storage and packing 3. Wholesale 4. Distribution 5. Retailer	1. Production (apples) 2. Storage and packing 3. Wholesale/brokerage 4. Distribution 5. Retailer	1. Production (apples) 2. Storage and packing 3. Wholesale 4. Distribution 5. Retailer
Number of operators						
Producers	170	45	1 700	140	1 000-1 500 t	25-30
Wholesalers	2	5	10	4	na	6
Retailers	na	na	na	na	na	na
Import	Yes	Yes	No	Yes	No	Yes
Main retail channel	General retailers (>70 %)	Mainly alternative retailers (>70 %)	70 % alternative retailers, 30 % general retailers	General retailers (about 60 %)	General retailers (about 60 %)	General retailers (>70 %)
Main target market	National	National	Mainly national, but also export (10 %)	Mainly export, national to a small extent	60 % export, 40 % national	National
Most powerful actors	2 major wholesalers and supermarkets	Producers' cooperatives	Farmers' associations	Wholesalers and supermarkets	Producers' cooperative and the retailer group EcorNaturaSi'	Wholesalers and supermarkets (e.g. through retailers' own brands)
Possibilities to increase value added	Product innovation	Short chain	Regional brands; short chain	Short chain	Short chain; collaboration through cooperatives; product innovation	Short chain
Strengths	Investment in innovation	Short chain	Sales through specialised retailers and fair distribution of margins among actors	Product quality	Cooperation among actors and big volumes of production	Product quality
Weaknesses	High installation costs for producers; low yields for some varieties; stricter regulation on organic production compared to other countries	Small scale of production; lack of storage facilities	High retailer prices, which discourages consumption	Poor cooperation among producers; low consumption; lack of investments in storage and logistics infrastructures	High retail prices; low consumption	Low farm gate prices; competition with imports
Differences with conventional supply chains	None identified	Price at all stages of the chain	Fairer distribution of margins among supply chain actors	None identified	Smaller volume s and storage capacity	None identified

Source: Own presentation, based on information provided by national industry experts.

Italy and France have established markets for organic apples and have the greatest number of producers. The two markets, however, differ in sales channels. In Italy, more than 70 % of sales are through general retailers, whereas in France organic apples are mostly sold in specialised retailers. This fact is reported by the French experts to be the main strength of the organic chain. Overall, the Italian and French markets have different characteristics, with Italy being more export oriented and characterised by low internal consumption.

Unsurprisingly, the two import markets, Denmark and the United Kingdom, have only a small number of producers. The experts identify the main weaknesses as being in the production stage of the supply chain (low yields, lack of suitable varieties, etc.).

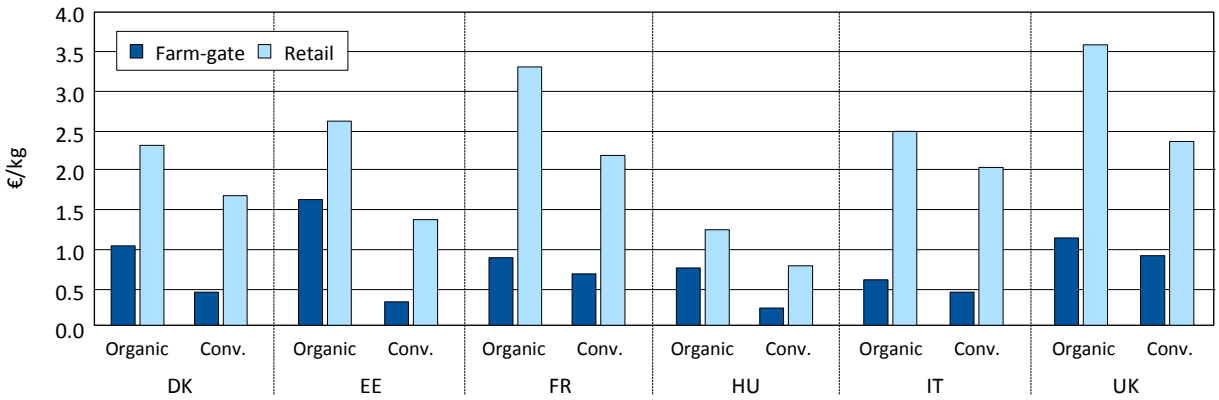
The interviews indicated that, in general, the supply chain for organic apples does not differ in structure from the conventional supply chain. Indeed, the experts in the United Kingdom and Hungary explicitly state that the organic sector has become increasingly integrated into "the mainstream". They report that this is because organic apples are mostly sold through general retailers and organic farmers therefore have to deal with big retailers operating with non-organic supply chains.

5.3 Value creation in organic and conventional supply chains

The farm-gate and retail prices (in €/kg) for organic and conventional apples sold through general retail are presented in Figure 5.2[32]. In most cases, the difference between retail and farm gate price is higher in the organic than the non-organic apple supply chains. The only exception for apples is in Hungary, where the difference in non-organic (0.49 €/kg) is lower than in organic (0.54 €/kg) apples. This indicates that the added value is higher in organic than non-organic apple supply chains in most cases. In general in the organic supply chains, there is also not a strong link between agricultural commodity prices and the relative retail prices. For instance, in Italy one of the highest retail prices (2.50 €/kg) was found, along with the lowest farm gate price (0.61 €/kg). Compared to organic milk and pasta (see Sections 4.3 and 6.3) organic apples have higher organic price premiums at farm level, but the organic premiums vary substantially among countries, spanning from 183 % in Hungary to 26 % in the United Kingdom. We did not find any specific patterns in different market categories. For example, farmers in the two import markets – Denmark and the United Kingdom – get the second highest and lowest organic price premium respectively: corresponding to 126 % and 26 %.

[32] See also notes on limitations of this approach in Section 4.3, page 31.

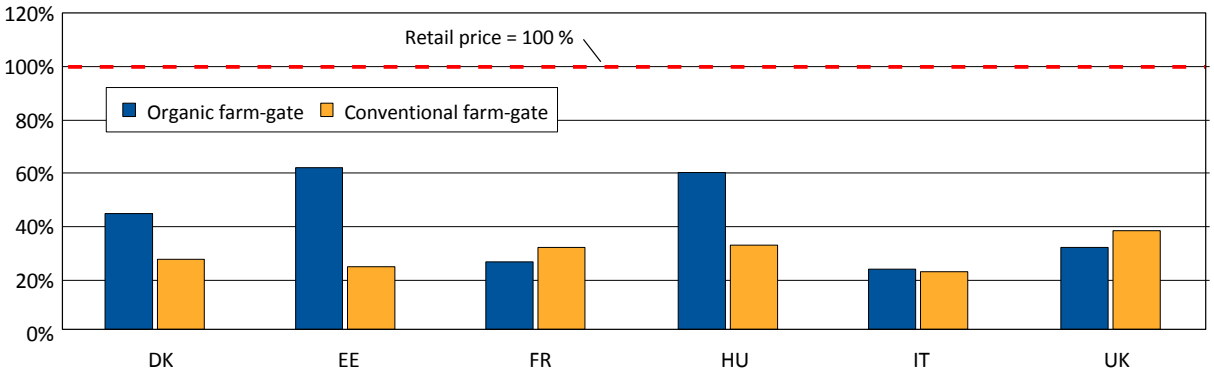
Figure 5.2: Farm gate and retail prices for organic and conventional apples per country at general retail, in €/kg (VAT excluded) (Reference year = 2016)



Source: Own calculation based on data from expert interviews, Eurostat and EU-FADN - DG AGRI.

The organic farm gate prices represent between 24 % (Italy) and 62 % (Estonia) of the retail price. Figure 5.3 below shows that the farm gate price share of the retail price is higher for organic compared to conventional chains in Denmark, Estonia, Hungary and Italy, while it is lower in, France and the United Kingdom. C

Figure 5.3: Relative share of farm gate price in selected organic supply chains for organic and conventional apples at general retail (VAT excluded). Retail price = 100 %, reference year = 2016



Source: Own calculation based on data from expert interviews, Eurostat, EU-FADN - DG AGRI.

5.4 Distribution of added value

To explore the distribution of added value in organic apple supply chain, eight specific cases were analysed: two in Italy and one in France (internal markets), two in Hungary and two in Estonia (emerging countries) and one in the United Kingdom (import market). Four supply chains featured "supermarket" as a final retail stage (Estonia, Hungary, Italy and the United Kingdom), while four supply chains included specialised organic food shop (France, Estonia, Hungary and Italy). The following specific features should be noted:

- In Hungary and the United Kingdom, the producers deliver apples to a wholesaler who packs and distributes the apples to the retailer.
- In Italy, the supply chain, including supermarkets, comprises a consortium of cooperatives. This consortium encompasses almost the entire supply chain, including production, and undertakes storage, sorting, packing, shipping, distribution to large-scale retail trade and general retailers. In the case of the Italian specialised food shop chain, distribution of apples to the stores is carried out by a distributor specialised in organic produce.
- In France, storage, packing and distribution to special retailers is conducted by a cooperative.
- In the Estonian case, apple production is pooled by a producer cooperative.
- The data sets from the supermarket retail stage were incomplete in the case of Estonia and Hungary; therefore, the total gross value added could not be calculated for these supply chains.

Figure 5.4 shows the **price formation** in the analysed organic apple supply chains, from the producer or producer cooperative, through packer and distributor/wholesaler, to the retail stage. The highest price level is seen in the United Kingdom case, mainly due to the highest price element for retailers. The lowest price level is seen in Hungary (Figure 5.4a). The farmer price element, however, is highest in Estonia, accounting for 1.50 €/kg. In the two Estonian and Hungarian supply chains, the farmer price element contributes more than 50 % to the retail price (Figure 5.4b). In contrast, the contribution of the producer level is substantially lower in the United Kingdom (32 %) and Italy (each 25 %). Instead, in Italy and the United Kingdom, the retail price level contributes more than 35 % to price formation, compared to around 20 % for the supply chains in Estonia (specialised food shop) and France and 10 % in Hungary (supermarket). Note, though, that for the supermarket supply chain in Hungary, we could not estimate the gross value added element due to missing data[33].

The stage of wholesale, meanwhile – covering storage, packing and distribution – shows the highest influence in price formation for Italy and France (the two main apples producers) and Hungary, although the high influence of the wholesaler in these countries refers in particular to supply chains ending in specialised shops. Values are lower for Estonia and the United Kingdom. However, this reflects two very different situations: the Estonian market is a small and emerging one and shows a limited importance of the retail sector in price formation, particularly at the supermarket level. On

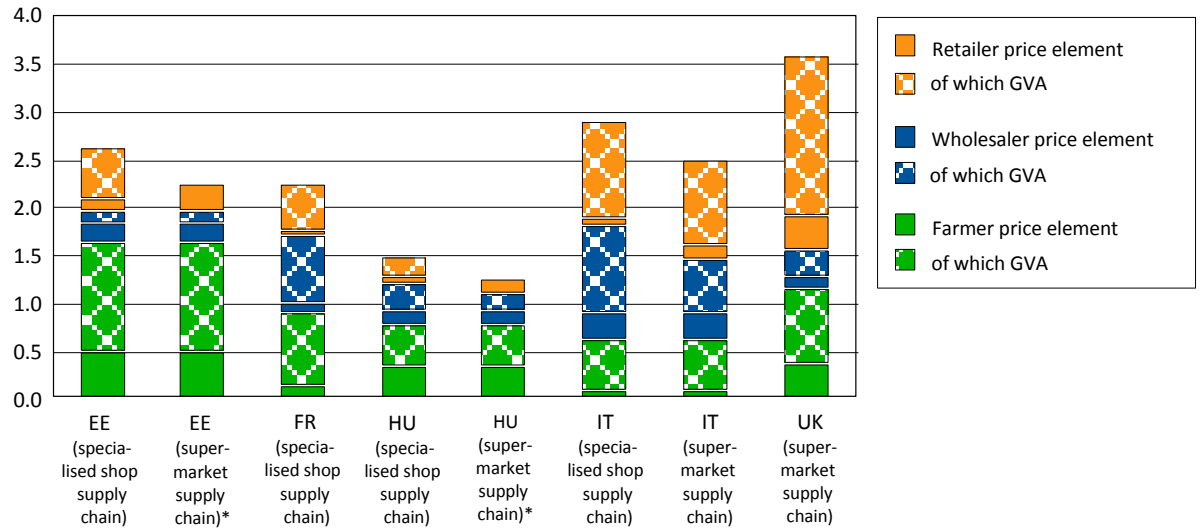
[33] As a matter of caution we decided not to estimate missing data through Multiple Imputation in supply chain steps with complete lack of data on any cost component, as this could yield less efficient (i.e. with higher variance) estimates.

the other hand, the United Kingdom is a large import market, where the limited weight of the wholesalers' price component might reflect the competition with import markets.

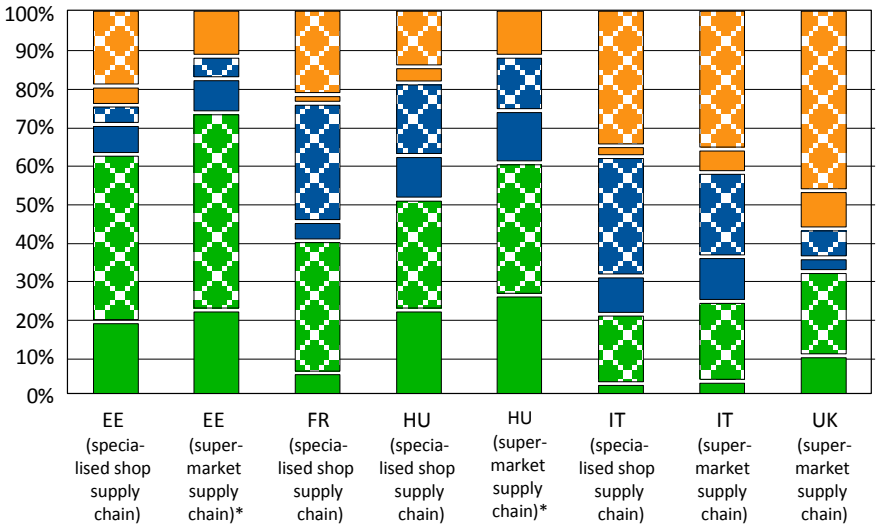
Instead, in the UK, supermarkets account for the largest share of price (and added value) formation. The role of supermarkets in the price formation process in emerging countries is in contrast limited, as confirmed by the Hungarian case. Italy has intermediate values, with similar shares of price formation for supermarkets and specialised shops. For the retailer contribution in general, the low prices in non-emerging markets limits their contribution, as exemplified by the case of France.

Figure 5.4: Price formation and share of GVA in selected organic apple supply chains

a) absolute (€/kg; excl. VAT)



b) relative (retail price = 100 %; excl.VAT)



* Gross value data added not available for supermarkets.

Source: Own calculation based on data collected from supply chains actors, farm management handbooks and EU-FADN - DG AGRI.

The **total gross value added** (Figure 5.5a) in the apple supply chains ranges between 0.92 €/kg in Hungary (specialised shop) and 2.74 €/kg in the United Kingdom (supermarket). The gross value added by producers in particular varies considerably between the case studies. The highest gross value added at a producer level can be observed in Estonia (specialised shop supply chain) with 1.14 €/kg, while in the Hungarian case study (specialised shop) the producers achieve a gross value added of just 0.43 €/kg. However, it is important to take into consideration the fact that the retail price is also relatively low.

In relative terms, the highest share of the total gross value added (Figure 5.5b) goes to the producers in France (40 %), Hungary (46 %) and Estonia (64 %), the latter two both emerging markets. In the Estonian case study, the producers also undertake cold storage and thus can increase the gross value added. In contrast to this, larger and more mature markets such as Italy (internal market) and the United Kingdom (import market) have the lowest share of gross value added at farm level. In Italy, the producers' share of the total gross value added is 21 % (specialised shop)/27 % (supermarket), while in the United Kingdom it is 29 %. France shows again intermediate figures with a proportionally higher share of gross value added at farm level.

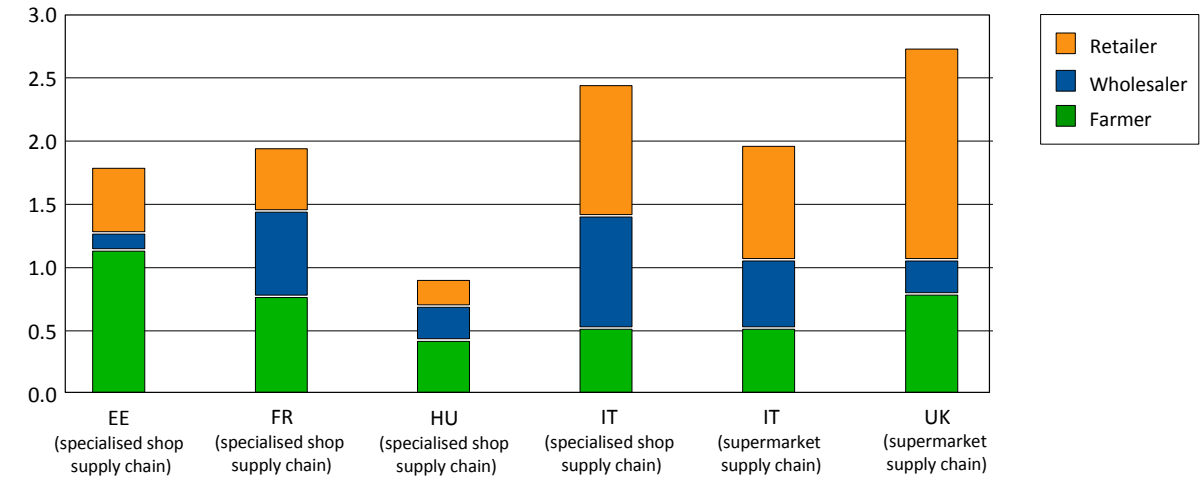
The gross value added also varies considerably at the distributor/wholesale level. The distributor level in Estonia, for example, accounts only for 6 % of the total gross value added, whereas it is 30 % – 40 % in the supply chains in Hungary, France and Italy. The reason for this is that in Estonia it is the wholesale level that focuses on distribution, while in France, Italy and Hungary the producer cooperatives take over services at the packer/distribution level. For the Italian (particularly for the specialised retailer) and French case studies, however, the share of gross value added at a wholesale level is remarkably high. Italy and France are among the main market players in the market of apples and their results are interesting as they refer to two regions highly specialised in organic fruit production (Bolzano and Languedoc Roussillon for Italy and France respectively). The role that wholesalers play in these regions is strategic. For Italy in particular, the wholesalers have a central role, providing services related to transport, storage, calibrated packaging and distribution in the context of highly integrated supply chain. In contrast, even though in the United Kingdom the wholesaler covers packing, distribution and contracting of cold storage, the share of the gross value added achieved at this supply chain level is only 10 % of the total gross value added. On the other hand, the United Kingdom retail level (supermarket) achieves in absolute and relative terms the highest gross value added per supply chain actor: namely 1.68 €/kg, which corresponds to 61 % of the total gross value added of the United Kingdom organic apple supply chain. The contribution of the retail level to the total gross value added is lower in the other case study countries. It amounts to 40 % (specialised shop) to 46 % (supermarket) in the Italian, 31 % in the Estonian and 24 % in the Hungarian organic apple supply chain.

Thus to summarise, for the organic apple supply chain case studies, the highest share of the total gross value added is achieved by the producers in Estonia and Hungary, whereas in Italy and the United Kingdom the highest share is at the retail level. This result probably reflects the different market conditions across countries. Italy and the United Kingdom have a more mature structure for the organic market, where downstream supply chain actors have higher market power. In emerging

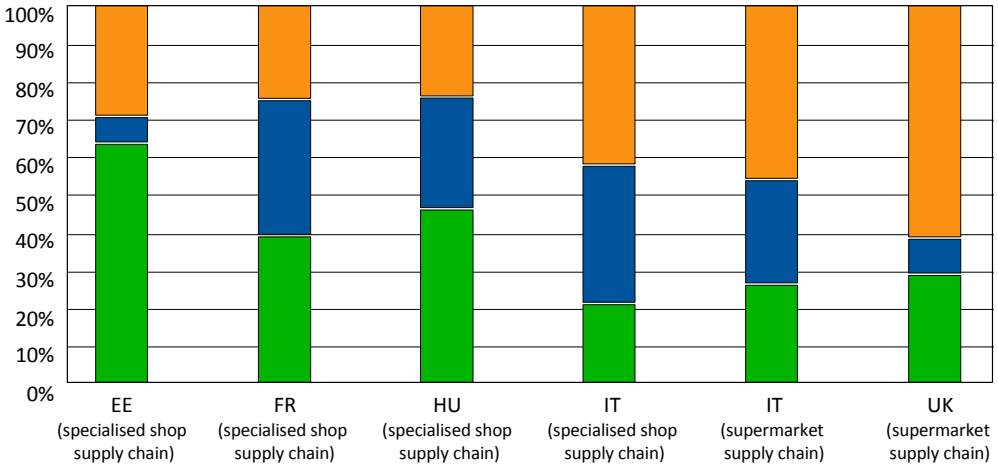
markets, the producers are still able to get higher returns, supported by the limited domestic supply, niche domestic market demand and a basically unstructured emergent supply chain.

Figure 5.5: Gross value added in selected organic apple supply chains, differentiated by supply chain actor

a) absolute (€/kg; excl. VAT)



b) relative (total GVA = 100%)



Source: Own calculation based on data collected from supply chains actors, farm management handbooks and EU-FADN - DG AGRI.

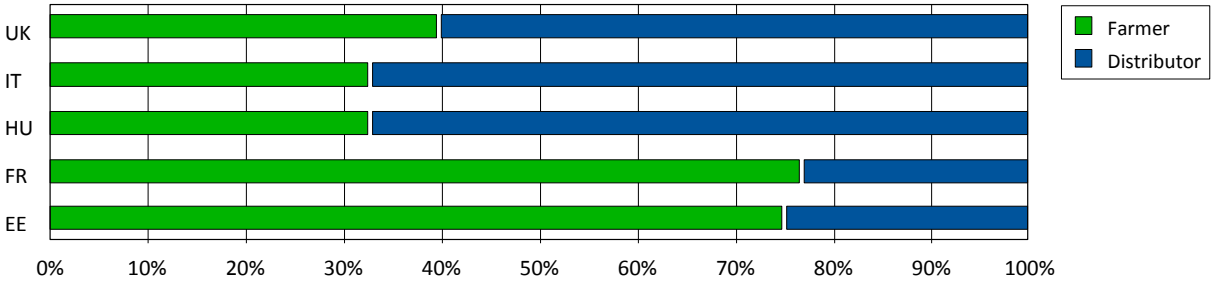
5.5 Factors influencing added value formation and distribution

Determinants of the formation of added value

As already described in Section 4.5, the analysis of the factors influencing added value formation and its distribution does not refer to individual cases but to organic apple supply chains in general and is based on an expert assessment. The results concerning the relative importance of the main stages along the organic apple supply chain are provided for each country in Figure 5.6. Results show a

dominant influence of distributors for the United Kingdom, Italy and Hungary and of farmers for France and Estonia. Though the results cannot be directly compared to those in Section 5.4, the two are generally consistent, with the main exception being France. The importance of farmers' contribution was also apparent in the analysis of the distribution of added value in Section 5.4, though to a lower extent. In particular, the analysis confirms the high importance of distributors in Italy and the United Kingdom found in Section 5.4. These both are mature organic markets, where the distributors play a central role in the coordination of the supply chain from producers to retailers, albeit with a dominant role of the retail sector in the United Kingdom and a more balanced situation between wholesale and retail in Italy.

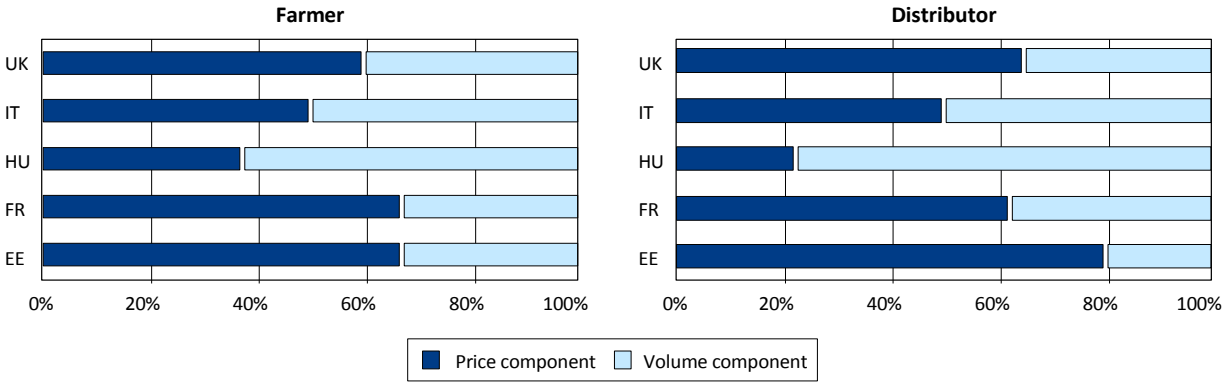
Figure 5.6: Added value in the supply chain of organic apples: contribution of the main actors



Source: Own calculation based on expert rating.

The relative importance of farmers and distributors in the supply chain has been further disaggregated in terms of the **price and volume components** (Figure 5.7). The farmer price component dominates in countries where the importance of farmers is higher (France and Estonia), with the volume and price components at the distributor level following the same pattern. Price dominates the formation of added value at both the farm and distributor level for four out of the five countries considered.

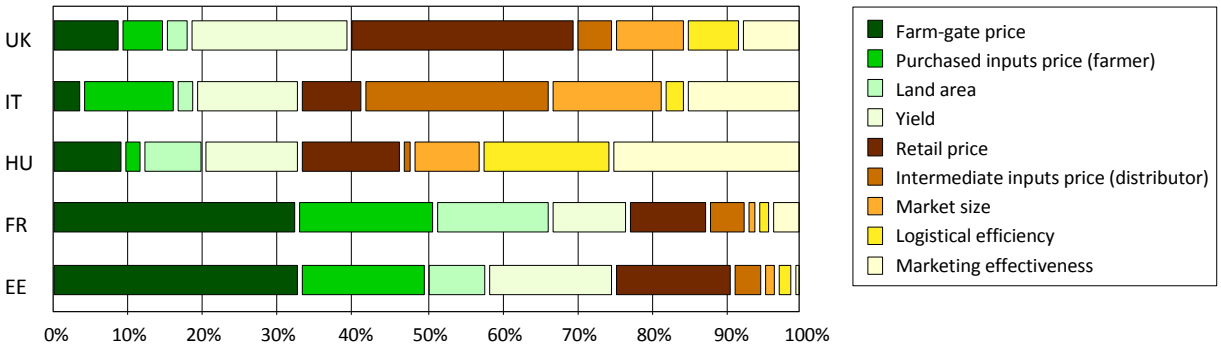
Figure 5.7: Relative importance of volume and price component for added value formation in the supply chain of organic apples: farmers' and distributors' level



Source: Own calculation based on expert rating.

Figure 5.8 shows the relative importance of the **elementary added value components** for the apple supply chains. While the overall importance of farmer and distributor components reflects those shown in Figure 5.6, here we can appreciate the specific influence assigned by the experts to the price and volume components for each actor category of the supply chain. In the United Kingdom, Italy and Hungary, despite the shared dominance of the distributor in added value formation, the elementary components appear to have very different weights in explaining the overall added value formation. In both Italy and United Kingdom, price components dominate. In the United Kingdom, the retail prices explain most of the added value, while in Italy, distributors' costs (input prices) appear to be the critical component. In Hungary, marketing effectiveness – which contributes to the volume component – is rated as the most relevant factor in explaining overall added value. France and Estonia share a similar pattern for what concerns the importance of the elementary added value components, with a clear dominance of the farm gate price and a limited relevance of all distributor level components.

Figure 5.8: Relative importance of elementary added value components in the supply chain of organic apples



Source: Own calculation based on expert rating.

Factors supporting or preventing added value formation

From the expert assessment of factors supporting or preventing formation of added value, some general indications emerge as common issues for the supply chain of organic apples. As indicated in Table 5.3, a major factor positively influencing added value formation is related to the availability of apples in adequate quality and quantity (see the principal components "Quality driven demand", "Availability of organic apples").[34] This is the main limit to further development of the organic market of apples, particularly in emerging markets (see the principal component "Bulk wide-range supply" and "Niche markets for apples" respectively – the factors that positively and negatively affect added value, Tables 5.3 and 5.4). The quality of apples is strictly connected with the availability of efficient storage facilities, which might also explain the necessary refrigeration and calibration phases (see the principal component labelled "Competitive and efficient supply chain" and "Inefficient logistic to meet quality requirements" in Tables 5.3 and 5.4) and might contribute to improved competitiveness

[34] In order to simplify the interpretation of results, factors with the highest correlations with the principal components, either positive or negative, are shown with a + or – sign respectively.

and profitability (see the principal component labelled “Low profitability along the supply chain”, Table 5.4). This seems particularly relevant for Hungary, for example, where due to low domestic consumption, there has been a lack of investment in special storage and logistics infrastructures and a scarcity of horizontal collaboration: producers find it easier to sell products directly to processors, wholesalers, general retailers or to intra EU/export traders. Particularly in the emerging markets of Estonia and Hungary, because of lack of the special storage facilities that would make it possible to have apples throughout the year, the domestic supply is concentrated only in a limited period of the year, with imbalances between undersupply and oversupply. In Italy, on the contrary, the availability of high capacity, highly technological storage facilities allow for a more constant supply of apples throughout the year and assure the maintenance of the high quality standards required by the retail sector (see the principal component “Improve storage facilities to ensure availability of quality apples” in Table 5.5). In general, experts consider the improvement of cooperation and partnership amongst market players to be good opportunities to share costs, increase margins and create added value.

Further to this, experts identify a central role for actors downstream in the value chain, something already achieved in developed markets and seen as a key factor for the development of emerging markets. The Italian case shows examples of successful cooperatives for organic apples (e.g. Cooperative Bio South Tyrol), who have played a pivotal role in the development of suppliers’ own brands through the improvement of horizontal cooperation and vertical integration. Short supply chains, allowing for direct marketing, are seen as crucial to increase added value for producers. However, investing in such value adding activities usually requires high costs, which, according to the experts, could only be compensated through the realisation of economies of scale arising from larger volumes of production and cooperation. Public support may also be necessary.

On the demand side, benefits are expected from a general shift in demand to higher quality organic apples, which should be more effectively marketed through the retail sector (see principal components labelled “Quality driven demand”, “Improvement of supply to meet consumer demand”, “Lack of marketing orientation”, “Inefficient management at retail level” and “Effective placement in supermarkets” in Tables 5.3 -5.5). The need for more active marketing is also addressed by experts, who consider the positive effects that could arise from the development of strong regional brands. This realisation might also catalyse efforts for more integrated supply chains and help ensure competitiveness (see principal component labelled ”Establishment of leader brands and market concentration” in Table 5.5)

Table 5.3: Principal components of factors that positively influence the added value in the supply chain of organic apples [35]

	Quality driven demand	Competitive and efficient supply chain	Bulk wide-range supply	Availability of organic fresh apple
Consumers interest in organic products	+			
High quality of organic apples	+			
Identification of origin	-			
Efficient management at the retail level		+		
Low retail price premium of organic fresh apples		+		
High efficiency in storage and logistics		+		
Establishment of a leader brand		+		
Wide range of organic apples			+	
Appealing packaging of apples for consumers			–	
Availability of organic fresh apples				+

Source: Own presentation based on expert rating.

[35] The first Principal component (PC) is labelled "quality driven demand" and refers to factors that relates to a shift in demand for apples based on high-quality, standardised production rather than small scale, local production. This factor refuses the idea of identifying the origin of apples as a tool to increasing added value, since it is likely to introduce barriers to supply volumes. The second PC is labelled "Competitive and efficient supply chain" and refers to factors related to a more competitive organisation of the whole apple supply chain. The third PC is labelled "Bulk wide-range supply" and refers to the impact on added value formation of increasing the variety and range of apples available to consumers in bulk, unpackaged, no matter how appealing the packaging could be. The fourth PC is fully explained by (more) availability of organic apples, which for many respondents is the only driver of added value growth in the sector.

Table 5.4: Principal components of factors that negatively influence the added value in the supply chain of organic apples [36]

	Niche market for fresh apples	No marketing orientation	Inefficient management at retail level	Inefficient logistic to meet quality requirements	Low profitability at farmer level
Small market size for organic apples	+				
High competition with processed apple products (e.g. juice)	+				
Low price paid by retailers to wholesalers and distributors	–				
Low farm-gate price	–				
Low packaging appeal of organic apples		+			
Limited promotion of organic products		+			
Low consumer interest in healthy food		+			
Ineffiicient management at the retailer level			+		
Insufficient domestic production of organic fresh apples			–		
Inefficient logistics				+	
Strict quality requirements for organic apples				+	
Low retail price of conventional apples					+
High costs along the organic apples supply chain					+
Poor quality of apples					

Source: Own presentation based on expert rating.

[36] The first Principal component (PC) is labelled "Niche market for apples" and considers the small size of the market for apples – especially as compared with the competition of the demand for apples for processing – one of the main barriers for higher added value. On the contrary, low farm gate or wholesale prices would not represent a barrier. The second PC is labelled "Lack of marketing orientation" and considers statements concerning limited marketing activities coupled with low consumers' interest as the main limiting factors hindering added value of organic apples. The third PC is labelled "Inefficient management at retail level" and considers managerial difficulties at the retail level as the main limits to vale added growth, while the lack of domestic production is not seen as a limiting factor. The fourth PC is labelled "Inefficient logistic to meet quality requirements", from the two factors that mainly explain it, and finally the fifth PC is labelled "Low profitability along the supply chain" as it summarises the relative low retail prices coupled with high cost along the supply chain. The variable "poor quality of apples" does not load into any PC.

Table 5.5: Principal components of factors that may help in increasing the market share of organic apples [37]

	Improve storage facility to ensure availability of quality apples	Establihsment of leader brand and market concentration	Improvements of supply to meet consumer demand	Effective placement in supermarkets for organic apples
Improve apple quality at storage and ditribution level	+			
Improve storage facilities to ensure continual availability of apples	+			
Establishment of a leader brand		+		
Common standard for packaging across Europe		+		
Wide range and high quality of organic apples			+	
Consumer interest in organic products			+	
Effective placement in supermarkets for organic apples				+
Competitive retail price of organic fresh apples				

Source: Own presentation based on expert rating.

[37] The first Principal component (PC) is labelled "Improved storage facilities to ensure availability of quality apples" and is self-explanatory: both underlying variables are related to storage facilities as essential to guarantee longer shelf-life and increase the market share of organic apples. The second PC is labelled "Establishment of leader brand and marketing concentration" and refers to factors concerning a higher market power for leader operators via branding and standard setting in the European market for organic apples. The third PC is labelled "Improvement of supply to meet consumers' demand" and considers how efforts at the supply side – especially in differentiating the offer and improving the product quality - can help catching new market opportunities. The fourth PC coincide with the variable "Effective placement in supermarkets for organic apples": it is a sufficient stand-alone condition for increasing the organic apple market share. The variable "Competitive retail price of organic apples" does not load into any PC.

6 Creation and distribution of added value in organic pasta supply chains

The creation of added value through production and distribution of organic pasta was studied in Italy and Spain (internal markets), the Czech Republic and Hungary (emerging markets) as well as Germany and the United Kingdom (import markets). In the following section, the market environment of the organic supply chains is described first. Subsequently, based on the information provided by industry experts, the structure of the typical supply chain is presented. Then, the value creation in organic and conventional supply chains are compared and the distribution of added value is analysed in selected case studies. The chapter concludes with a general evaluation of the determinants of added value for organic pasta.

6.1 Market environment

Regarding the organic pasta supply chain, Italy is the principal producer of organic durum wheat, with an area of 78 603 ha in 2014, and it is also the country with the greatest level of production (more than 140 000 t, constituting 3.5 % of the country's durum wheat production). Among the case study countries, Spain and France follow Italy, with 12 076 ha and 2 498 ha of farmland used for organic durum wheat production respectively in 2014 (Table 6.1). In Hungary, Germany and Czech Republic these figures are significantly lower, accounting for 445 ha, 200 ha and 60 ha. In the United Kingdom, there is no production of organic durum wheat. In the EU, organic durum wheat was grown on 110 000 hectares (4.5 % of the total durum wheat area). Durum wheat constitutes 20 % of the organic wheat area in the EU, which was at half a million hectares in 2014 (2 % of the total wheat area).

No studies estimating the market for organic pasta in any European country were identified. However, where sector data from the case study countries is available, it indicates that organic pasta accounts for a significant share of the total market: Denmark reported that 25.7 % of the pasta sales were organic; for Germany a share of 6.8 % was reported. It should be noted that pasta and noodle data are not consistently reported by the countries.

Table 6.1: Key figures of the market for organic durum wheat in the EU-28 and in the case study countries in 2014

	Organic durum area	Organic share of total durum area	5-years growth	Share of EU organic durum area	Organic durum production [a,b]	Share of total production	Organic Production per capita	Retail sales of organic pasta	Share of total pasta sales
	ha	%	%	%	t	%	kg/person	Million €	%
EU-28	109 446	4.5	-20.8	100	176 226	2.3	0.3	-	-
Czech Republic [c]	61	- [e]	-35.7	0.1	159	-	0.0	2.0 [f]	2.2
Denmark [d]	0	-	-	-	0	-	0.0	16.2	25.7
Estonia [d]	0	-	-	-	0	-	-	-	-
France [d]	2 498	0.8	-30.3	2.3	3 807	0.3	0.1	-	-
Germany	200	1.1	-	0.2	-	-	0.0	47.4 (2015)	6.8 (2015)
Hungary	445	2.3	18.8	0.4	1 379	2.1	0.1	-	-
Italy	78 603	5.9	-12.1	71.8	141 132	3.5	2.3	-	-
Spain	12 077	3.5	-50.0	11.0	10 388	1.3	0.2	-	-
United Kingdom	0	-	-	-	0	-	-	-	-

[a] Please note that the production refers to the production from the fully converted land.

[b] Please note that the production data for the European Union are not complete as not all countries provide data.

[c] For the Czech Republic, the data is for pasta and other types of noodles.

[d] This current study does not analyse the typical organic pasta supply chains in Denmark, Estonia and France

[e] Durum wheat is not grown in conventional agriculture in the Czech Republic.

[f] Includes noodles etc.

Source: FiBL-AMI survey and own calculation based on Eurostat and national databases (Czech Republic: Eurostat, UZEI and experts' estimates; Denmark: LF and Eurostat; Organic Denmark and GfK Consumer Scan; Estonia: Ministry of Agriculture and Eurostat; France: Agence Bio and Eurostat; Germany: AMI; Hungary: Nebih and Eurostat; Italy: SINAB, Eurostat and Assobio; Spain: Eurostat and Magrama, UK: Defra, Eurostat and Soil Association).

6.2 Structure of typical organic pasta supply chains

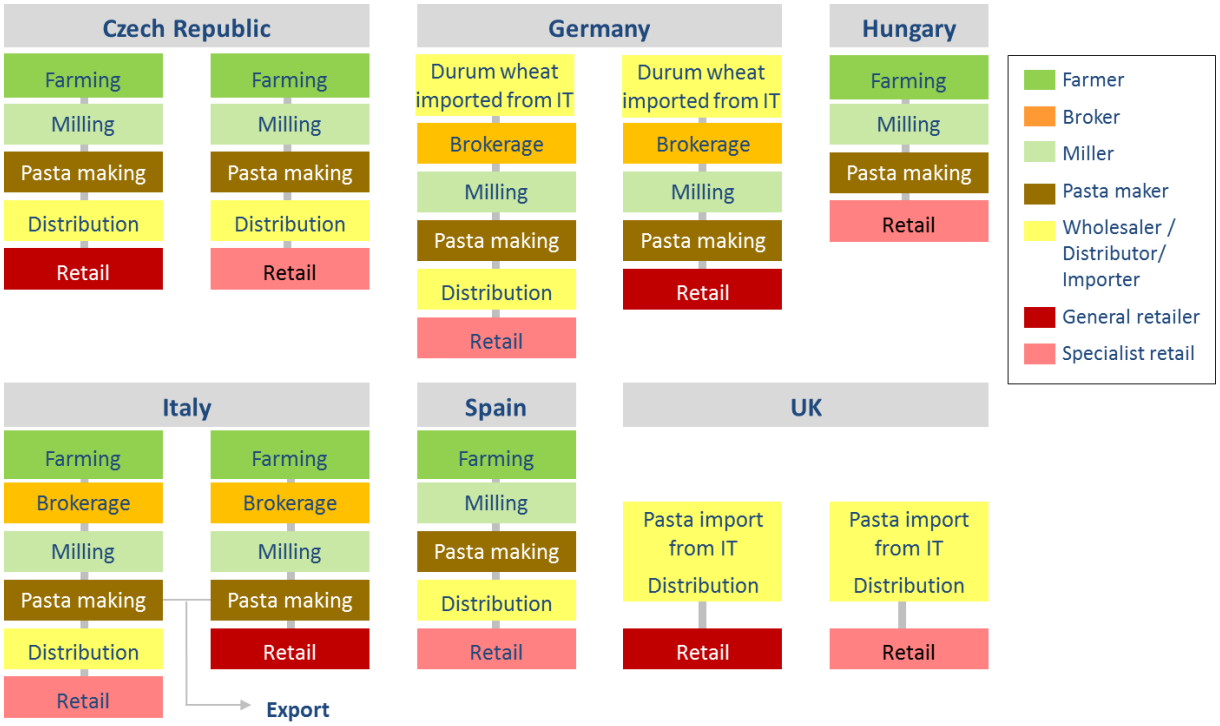
Typical supply chains reported by the experts mainly consist of the following actors and stages (see Figure 6.1 and Table 6.2):

- Production of durum wheat in Europe mainly takes place in Italy and Spain (around 6 000 and 726 organic durum wheat producers respectively). The United Kingdom and Germany are importing countries, importing both processed pasta and durum wheat (mainly from Italy).
- Milling takes places in most countries, with the number of operators usually between 3 and 5, although up to 11 in the Czech Republic and "several" in Italy. Most of the millers deal with both organic and conventional durum wheat, with exceptions in Spain and the Czech Republic where very few mills dedicated to organic produce are found. In Italy there are some small scale organic specialised millers, although mainly operating at artisanal/local level.
- In all countries but Italy, there are approximately 2 to 5 pasta making operators. In Italy however, a large number of pasta makers was found and Italy also exports organic pasta.
- There are several wholesale companies involved in most countries, except in the Czech Republic and Hungary where this is limited to two companies.

- Retailers display a varying split, ranging from most organic pasta being sold through multiple retailers in Germany and the United Kingdom (65 %), to about 70 % being sold through specialist outlets in Italy and Spain.

Experts in Italy were not able to provide figures for the number of pasta makers and wholesalers because there are a large number of small actors operating at a very local scale that the interviewees found difficult to identify.

Figure 6.1: Typical organic pasta supply chains in the case study countries



Source: Own presentation based on information from industry experts.

The **size and degree of development** differ substantially between the case study countries, according to the stage of development of each market. The supply chains for pasta in Italy often also include brokers after the production stage, whereas the shortest supply chain was described in the United Kingdom, where all sales identified are based on pasta that is manufactured in Italy (Figure 6.1). The main target market in most countries is the domestic market, but from Italy, organic pasta is exported to the United Kingdom, Germany and the Czech Republic. Organic durum wheat is exported to Italy from countries with limited storage/processing capacity (Spain, Hungary) and small volume of trade. The trade/export-orientation in many countries is related to a lack of storage and processing facilities for the organic wheat, as market players have little interest in undertaking the large investments required, given the small production and the need to separate organic from conventional.

Table 6.2: Synoptic description of typical supply chains for organic pasta in the case study countries (based on expert interviews)

	CZ	DE	ES	HU	IT	UK
Main stages	1. Production (durum wheat) 2. Milling 3. Pasta maker 4. Wholesale 5. Retailer	1. Production (durum wheat) 2. Milling 3. Pasta maker 4. Wholesale 5. Retailer	1. Production (durum wheat) 2. Milling 3. Pasta maker 4. Wholesale 5. Retailer	1. Production (durum wheat) 2. Milling 3. Pasta maker 4. Wholesale 5. Retailer	1. Production (durum wheat) 2. Storage and brokerage 3. Milling 4. Pasta maker 5. Wholesale 6. Retailer	1. Import (pasta) 2. Wholesale 3. Retailer
Number of operators						
Producers	300	About 10	726	950	5 600 - 8 000	0
Millers	11	Some mills offering pasta flour	3	10	3 major millers (80 % of Italian durum production)	Some millers offering pasta flour
Pasta makers	3	2	4	5	Several pasta makers	0
Wholesalers	2	5	10	2	Several wholesalers	5
Import	Yes	Yes	Yes	Yes	No (export)	Yes
Main retail channel	General and specialised retailers (about 50:50)	Mostly supermarkets (about 65 %)	Mostly specialised retailers (about 70 %)	General and specialised retailers (about 50:50)	Mostly specialised retail (about 65 %)	Mostly supermarkets (70 %)
Main target market	National	National	National; export of organic durum wheat	National; export of organic durum wheat	National and export	National
Most powerful actors	Two big wholesalers	Supermarkets	Wholesalers and supermarkets	Retailers	Major millers and the retailer group Ecor NaturaSì	Wholesalers and supermarkets
Possibilities to increase value added	Partnership along the supply chain	Regional brands; product differentiation	Short chain/chain integration	Partnership along the supply chain; develop-ment of new brands; public procurement; product differentiation	Short chain/chain integration; regional brands; special agreements with retailers	The chain is poorly developed and possibilities to increase VA are little explored. “Made in Italy" is an asset for retailers
Strengths	Increase in consumption	Increase in consumption	Partnership along the chain; increase in consumption	None identified	Integration and costs sharing among the actors of the chain	None identified
Weaknesses	Wheat is mostly exported	None identified	Lack of cooperation; wheat is often exported; low margins to producers	Lack of cooperation Wheat is mostly exported; low farm-gate prices	Dependence on imports for organic durum wheat	None dentified
Differences with conv. supply chains	Higher farm-gate price	None identified	Higher production costs at farm level	None identified	None identified	Usually associated with additio-onal attributes (e.g. gluten free)

Source: Own presentation, based on information provided by national industry experts.

In Spain, there is one main, typical supply chain, dominated by specialised retailers (> 70 %). The specialised retail chain represents the main chain in Italy as well (corresponding to about 65 % of the supply chain), but we can also identify other chains. In Hungary and the Czech Republic, the situation is balanced, with 50 % of the market being represented by supermarket chains and 50 % by specialised retail. The supermarket chain represents the main chain in the United Kingdom and Germany (corresponding to about 70 % and 65 % respectively).

In Italy the market for organic pasta is well-established, and domestic production of organic durum wheat cannot meet the demand for pasta. Production of durum wheat has increasingly become a critical step, as current levels of production in Europe may not be able to provide sufficient raw material for future expansion of the market. Production of Italian organic pasta relies on imports from non-EU countries like Turkey and Canada, as well as internal trade from other EU countries including Spain and Hungary.

Organic pasta is sold through different market channels across the countries. Organic pasta in Italy and Spain, where the market is classified as internal market, is mostly sold in specialised retailers, while in Germany and the United Kingdom, where the market is classified as import market, organic pasta is generally sold in supermarkets. In the two countries classified as emerging market (Hungary and the Czech Republic) the situation is balanced between specialised and multiple retailers.

Even if the countries with the same type of market (i.e. internal, import and emerging market) have the same orientation in terms of prevalent market channel for the product (specialised/general retailers), the supply chains within each group are very different. Spain exports organic durum wheat and imports pasta, while Italy is the principal exporter of organic pasta worldwide. In Germany, there are few organic durum wheat producers and pasta makers, in the United Kingdom no durum production was identified and organic pasta is only imported.

6.3 Value creation in organic and conventional supply chains

In order to provide an insight into the value creation in organic chains compared to conventional, again we compared farm-gate and retail prices (for supplying to general retail only), looking at organic price premiums and the farmers' share in the supply chain.

In Germany, the analysis of the distribution of added value is based on a case where organic durum wheat is imported from abroad (Section 6.4). However, in this section, values on farm-gate prices in Figure 6.2 and Figure 6.3 are based on durum wheat produced in Germany and provided by FADN. In fact, according to FADN a few (about ten) farms producing organic durum wheat exist in Germany. Also, the supply chains in the Czech Republic and Hungary considered to study the distribution of added value in Section 6.4 refer to pasta produced with soft wheat and spelt respectively. Therefore, for comparability purposes, values in the figures below also refer to pasta which is produced with soft wheat in the Czech Republic and spelt in Hungary.

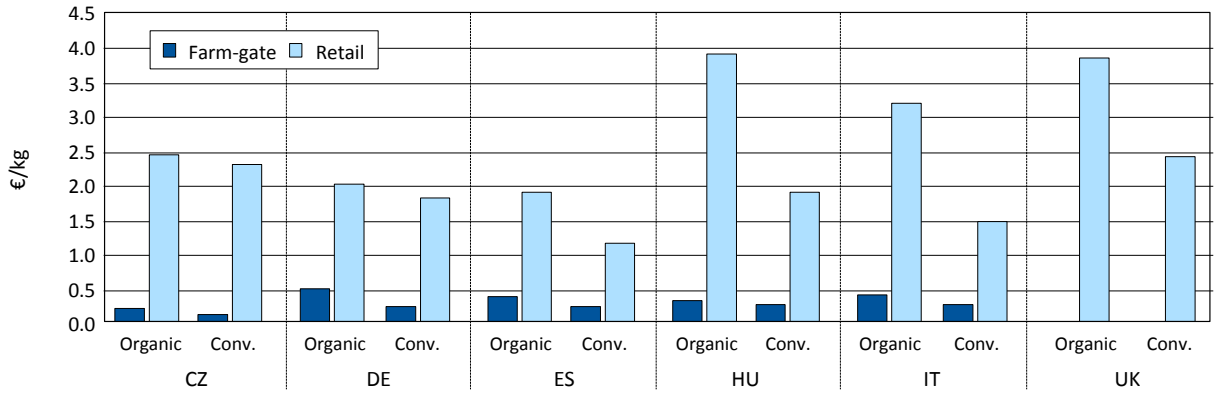
In the supply chain case studies, farm-gate and retail prices are higher for the organic supply chains compared to the relative conventional chains. Regarding the difference between retail and farm-gate

price, this is higher for the organic supply chains in the Czech Republic, Hungary, Italy and Spain (Figure 6.2 below), with the only exception for Germany, where the difference is slightly higher in conventional (1.57 €/kg) than organic pasta (1.52 €/kg). This indicates that in most cases more value is created in the organic compared to the conventional chains.

The organic price premiums at farm level vary considerably among the case study countries, from 13 % to 93 % in Hungary and Germany respectively. In countries with low farm-gate prices for conventional durum wheat, the organic price premium is also relatively lower than in countries with high farm-gate prices for the conventional product, and vice versa.

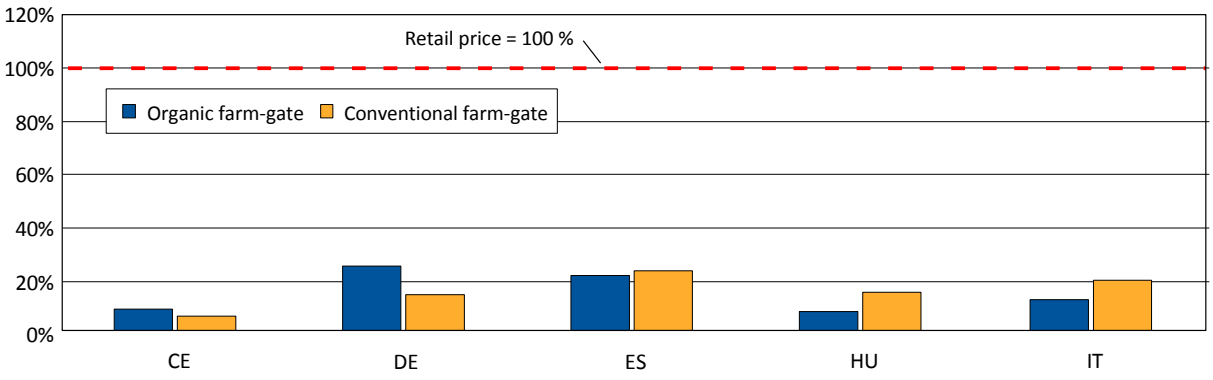
The farm-gate prices represent a proportion of between 9 % and 25 % of the retail price. In general this is much smaller than the farmers' share for organic apples, which can be as high as 62 % (Estonia), and organic milk, where it is 48 % (Germany). As shown in Figure 6.3, only in Hungary, Italy and Spain is the farmers' share of the retail price is higher in conventional pasta than organic.

Figure 6.2: Farm-gate and retail prices for organic and conventional pasta per country at general retail, in €/kg (VAT excluded). Reference year = 2016



Source: Own calculation based on data from Eurostat and industry experts as well as EU-FADN - DG AGRI.

Figure 6.3: Relative share of farm-gate price in selected organic supply chains for organic and conventional pasta at general retail. Retail price = 100 %, reference year = 2016 (VAT excluded)



Source: Own calculation based on data from Eurostat and industry experts as well as EU-FADN - DG AGRI.

6.4 Distribution of added value

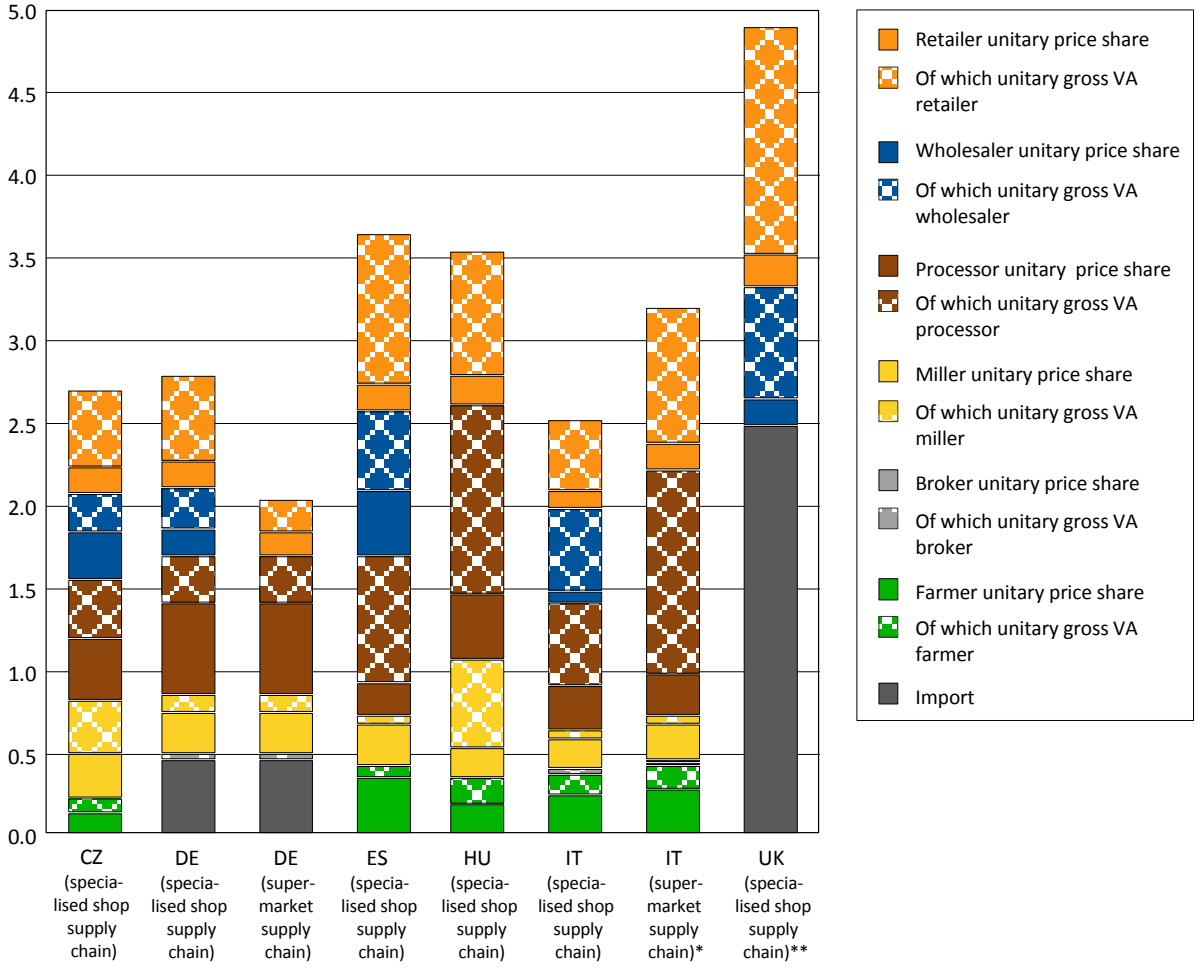
To explore the distribution of added value in organic pasta supply chains, eight specific cases were analysed: two in Germany (import market), two in Italy (internal market), as well as one in the Czech Republic and Hungary (emerging markets), in Spain (internal market) and in the United Kingdom (import market). Six supply chains included a specialised food shop as a final retail stage (the Czech Republic, Germany, Spain, Hungary, Italy and the United Kingdom) and two (Germany and Italy) included a supermarket. Compared to the apple and milk case studies, the pasta supply chains are more complex and include two processing stages: the miller and the pasta maker. In addition, the following **features** about some of the case studies should be noted:

- Unlike the other case studies, in Hungary pasta is made of spelt and not of durum wheat. Furthermore, this supply chain shows a high level of vertical integration between domestic organic spelt producers, a miller (who provides also elevator services) and a pasta maker who is contracted by the miller to produce pasta exclusively from organic spelt flour delivered by the miller.
- In the Czech Republic the supply chain refers to pasta from soft wheat.
- In the German pasta case study, the broker imports 98 % of durum wheat (mainly from Italy and Canada) and only 2 % is from domestic production.
- The Italian supermarket supply chain case study involves pasta that provides a “fair price” for farmers, that can be considered a niche product, sold in supermarkets at low volumes and high prices. Producers and the broker are working together in a co-operative to ensure fair producer prices. Therefore, the farm gate price is higher than the farm gate price in the specialised shop supply chain. Furthermore, the pasta maker also uses traditional processing techniques that are less efficient. Finally, due to a specific agreement between the supermarket and the co-operative, the retail price is higher than for other Italian organic pasta.
- In Spain, the subcontractor did not succeed in getting data on the added value along the same supply chain. Instead, actors from different supply chains referring to different market outlets were interviewed. Thus, in contrast to the other case studies, the Spanish pasta supply chain does not represent one supply chain.
- The United Kingdom pasta supply chain is characterised by the fact that there is no organic pasta maker in the United Kingdom at all, at present. All organic pasta sold in the United Kingdom is imported, mainly from Italy. The case study does not include the production and processing stages, and figures are adapted accordingly. It was not possible to calculate the total gross value added and the United Kingdom study is not included in Figure 6.6.

Figure 6.4 show the **price formation** of the analysed pasta supply chains. The highest prices are found in the United Kingdom case study, mainly due to the high price element associated with the importer. The price element of producers is below 0.50 € for all countries, and is lowest for the Czech case study. Due to the fact that pasta is the product with the highest processing intensity, the relative importance of the producers is the lowest among the three supply chain considered in this study (Figure 6.4a). In relative terms the farmer price element contributes around 10 % to the pasta retail price in the Czech Republic and in Spain, and 15 % in the two Italian pasta case studies (Figure 6.4b). For Germany wheat is imported and the first step of the supply chain refers to import prices –

accounting for 15 % and 22 % respectively for the specialised shop and the supermarket supply chain. Milling accounts for less than 10 % of the retail price in the Spanish and Italian case studies, while the highest share is found in the Czech Republic and Hungary, where it accounts for about 20 %. In all case studies, apart from the Spanish one, the contribution to price formation of the pasta maker is higher than that of the retailer. The broker level is only present in the German and Italian case studies and the contribution in terms of price formation is quite low (1 % - 2.5 %), whereas the wholesale (distribution from the pasta maker to the retailer) accounts for approximately 20 % in the Czech Republic, Spain, and Italy and is slightly lower in Germany and the United Kingdom case studies.

Figure 6.4: Price formation and share of GVA in organic pasta supply chains (€/kg; excl. VAT)

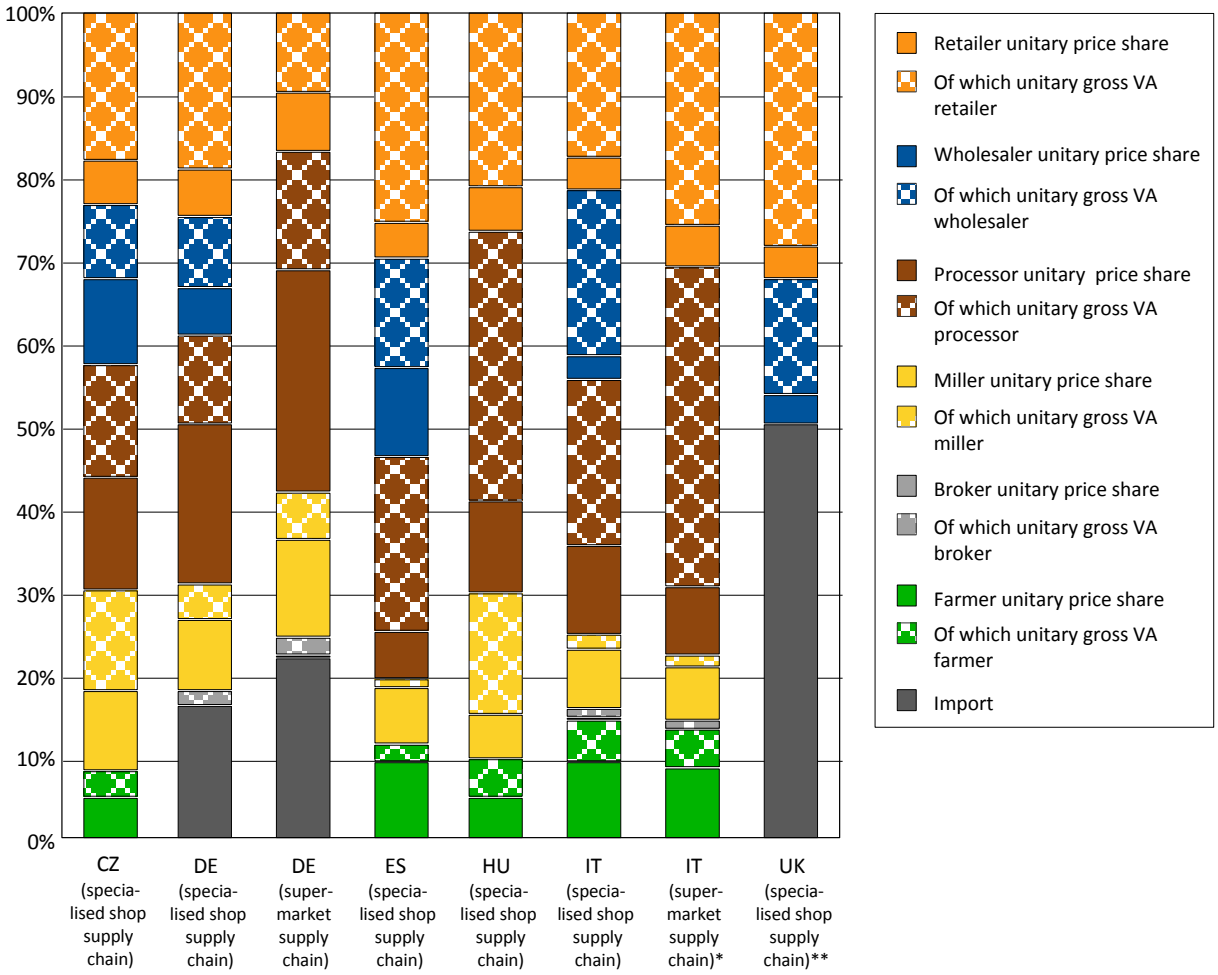


* High quality-"fair farmer price" pasta.

** Only imported pasta: no processing activity; grey area refers to importer price share.

Source: Own calculation based on data collected from supply chains actors, farm management handbooks and EU-FADN - DG AGRI.

Figure 6.5: Price formation and share of GVA in organic pasta supply chains (retail price = 100 %)



* High quality-"fair farmer price" pasta.

** Only imported pasta: no processing activity;grey area refers to importer price share.

Source: Own calculation based on data collected from supply chains actors, farm management handbooks and EU-FADN - DG AGRI.

The **total gross value added** (Figure 6.6) in the pasta supply chain case studies ranges from 1.50 €/kg pasta in Czech Republic (specialised shop) to 2.65 €/kg in Hungary and 2.29 €/kg in Spain (Figure 6.6a). The pasta supply chains in Hungary and in the Italian supermarket supply chain are highly integrated, selling a unique or niche product (spelt pasta in Hungary and traditionally processed "fair" pasta in Italy). The total gross value added calculated for Spain needs to be treated with some caution, because unlike the other cases, the data are not derived from one continuous chain. Note that for the United Kingdom and Germany, data on intermediate costs for imported goods (respectively pasta and durum wheat) is not available and is not included in the total gross value added for these countries.

The gross value added of the farmers is lowest in the Spanish (0.08 €/kg) and the Czech (0.09 €/kg) case study. It is around 0.15 €/kg in Hungary and Italy.

In relative terms the total gross value added of the pasta makers is the highest (54 %) in the second Italian supply chain (supermarket) and accounts for 32 % in the German supply chain (supermarket), 33 % in the Italian supply chain (specialised food shop) and 44 % in the Hungarian case study (Figure 6.6b). In these case studies, the retail share of the total gross value added is 4 % to 18 % lower than that of the pasta maker. In the Czech and Spanish as well as the German specialised shop supply chain, the retail share of the total gross value added varies between 32 % and 48 %, and it is from 7 % to 19 % higher than the share of the pasta makers.

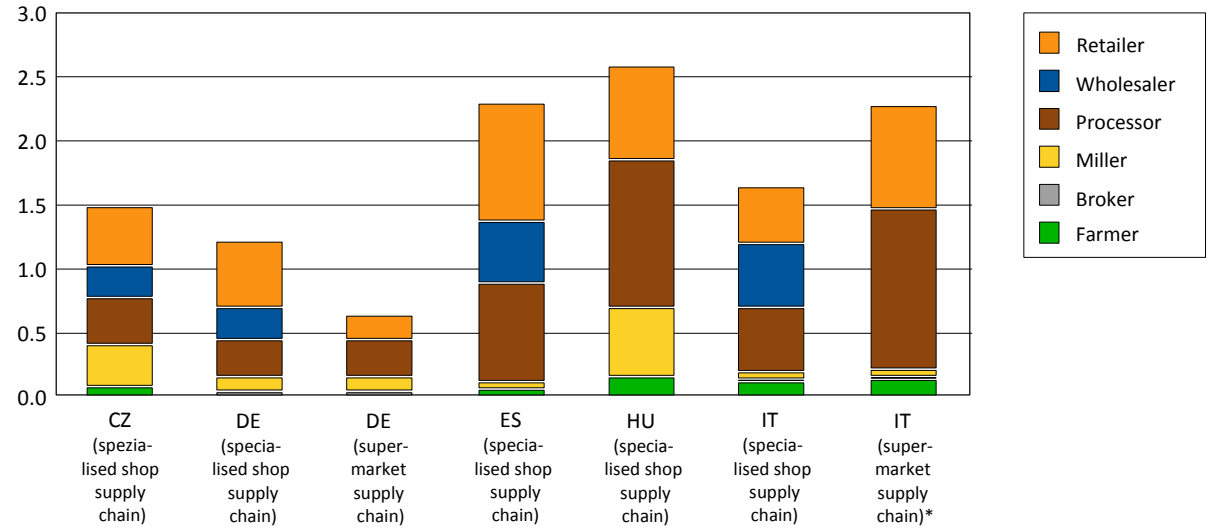
Only in the supply chains in the Czech Republic and Spain, as well as in the specialised shop supply chains in Germany and Italy, is the distribution of pasta from the processor to the retailer undertaken by a wholesaler, which covers 16 % to 26 % of the total gross value added. In the German and Italian case studies, a broker or elevator between the producer and the miller is included. In both countries, the brokers' shares of the total gross value added are quite low, corresponding to around 1 %. In the United Kingdom the weight of wholesalers and retailers is remarkably high, with the highest values among the countries considered in this analysis.

The pasta supply chains in Hungary as well as the supermarket supply chain in Italy are characterised by high vertical integration of the processing and distribution steps of the supply chain, and refer to highly differentiated products (spelt pasta for Hungary, and traditional high quality pasta for Italy). In both cases the highest gross value added goes to the pasta maker - that seems to benefit most from the market niche - whereas the producers seem to benefit less from this.

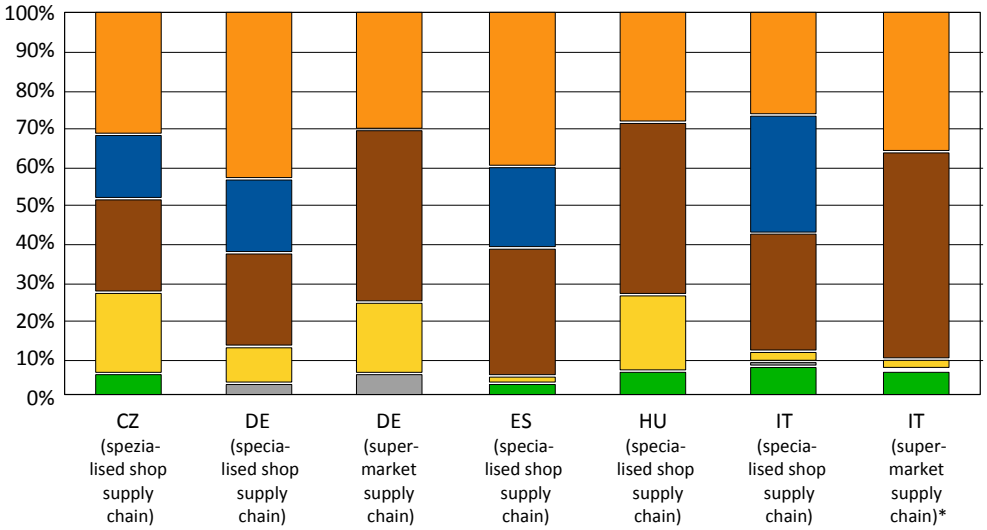
The total gross value added of the pasta makers is highest (54 %) in the second Italian supply chain (supermarket) and accounts for 32 % in the German supply chain (supermarket).

Figure 6.6: Domestic gross value added in selected organic pasta supply chains differentiated by supply chain actor

a) absolute (€/kg; excl. VAT)



b) relative (total GVA = 100 %)



* High quality-"fair farmer price" pasta.

Source: Own calculation based on data collected from supply chains actors, farm management handbooks and EU-FADN - DG AGRI.

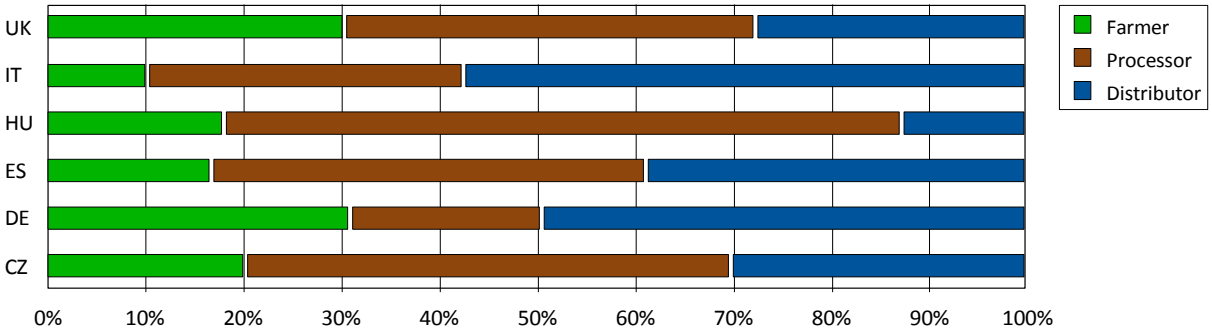
6.5 Factors influencing added value formation and distribution

Determinants of the added value formation

According to the expert assessment, there are relatively substantial differences regarding the key determinants of the process of added value formation across the countries (Figure 6.7). As far as the **supply chain stages** are concerned, Italy shows the lowest relative importance in the added value

formation process attributed to farmers, and the highest for distributors. Germany shows a similar distribution, though with a higher share for farmers. Spain shows a balanced distribution between the importance attributed to processor and distributor, while the distribution of components for Hungary is dominated by processors. Although the results cannot directly be compared, they are generally consistent to those in Section 6.4, with the exception for Spain that exhibited a predominance of the distributor stage in the added value analysis in Section 6.4. In particular, the analysis confirms the importance of processors for Hungary and the Czech Republic. Both are emerging organic markets, where the processor may play a central role in the coordination of the supply chain from producers to retailers. For both Germany and the United Kingdom it is interesting to note how the importance of farmers in added value formation is higher than in other countries. They both are importing markets, and this might reflect the perception of high dependence upon foreign production of wheat/pasta. In particular, the United Kingdom imports processed pasta, and actually attributes a high importance for processing as well. Italy is the main producer and consumer of organic pasta, with a well-established structure within the supply chain. The results in Figure 6.7 confirm the highest importance at the distribution level, in respect to added value formation.

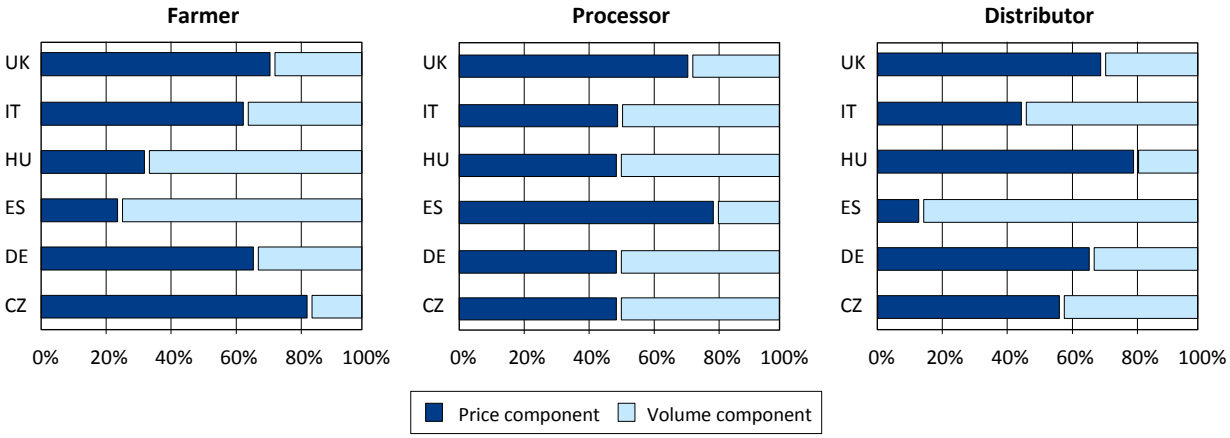
Figure 6.7: Added value formation in the supply chain of organic pasta: experts' evaluations on the contribution of the main actors



Source: Own calculation based on expert rating.

The relative importance of each actor in the supply chain has been further disaggregated in terms of **price and volume component** (Figure 6.8). The price component for farmers is predominant for the United Kingdom, Italy, Germany, and particularly for the Czech Republic, while Hungary and Spain show a higher importance for the farmers' volume component. Concerning processors, results are more balanced, with the exception of Spain where the processor price component is predominant. The picture emerging for distributors, points to a relatively diversified situation among countries, with Spain and Hungary showing the most polarised results. In this case, Spain displays by far the highest importance attributed to the distributor volume component and lowest for the price component, whereas the opposite is true for Hungary.

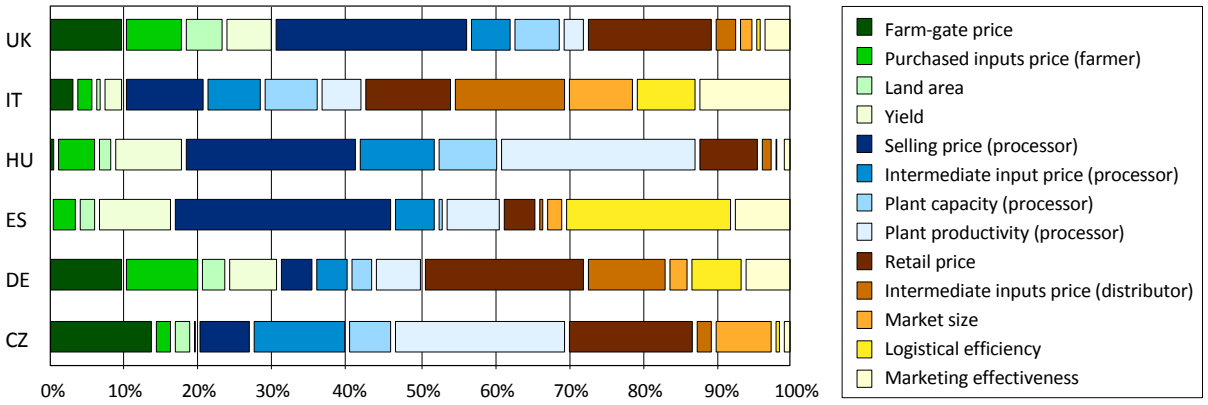
Figure 6.8: Relative importance of volume and price component for added value formation in the supply chain of organic pasta: farmer, processor and distributor level



Source: Own calculation based on expert rating.

Figure 6.9 shows the relative importance of the **elementary added value components** for the pasta supply chain. While the overall importance of the farmer and distributor components reflect those shown in Figure 6.7, here we can appreciate the specific influence of price and volume components for each actor category of the supply chain.

Figure 6.9: Relative importance of elementary added value components in the supply chain of organic pasta



Source: Own calculation based on expert rating.

Farm gate price is considered as the main elementary added value component at farm level, with the exception of Hungary and Spain where higher importance is attributed to yields. At the processor level, selling price is considered the most influential component for the United Kingdom, Italy and Spain, while plant productivity has the highest scores for Hungary, the Czech Republic and Germany. Retail price is considered to have the highest influence in the two most developed markets: Italy and Germany, where the influence on added value attributed to marketing effectiveness is also particularly high. Conversely, the influence of retail price for pasta is lower in Spain, where marketing effectiveness as well as logistical efficiency (volume components) are ranked among the most influential factors in the formation of added value.

Factors supporting or preventing added value formation

The results of the expert assessment of the factors supporting or preventing added value formation in organic pasta supply chains are given in the Tables 6.3 – 6.5. The demand level for pasta at EU level can presently only be met thanks to imports from non-EU countries, with potential implications in terms of quality assurance and direct negative effects in terms of domestic (at EU level) added value creation. The need to improve high quality organic wheat production is varies between countries, but a common objective relates to the need for higher integration along the supply chain.

On the supply side, small-scale production and low competitiveness of domestic production are considered among the main issues hampering the potential development of the pasta supply chain, particularly in emerging markets (see the principal components "Inefficient, small scale production" and "Low competitiveness of domestic production" in Table 6.4).[38] Improving integration among producers and processors (including millers) could address these limitations, providing the critical mass required for higher competitiveness. Development of own brands, regional brands and cooperation amongst market players are also considered as opportunities to create added value in countries where cooperation is lacking, such as Spain and Hungary. In contrast, in Italy there are several cooperatives (e.g. La Terra e il Cielo) which buy organic durum wheat from local farmers who are members of the same cooperative, process raw material and sell organic pasta domestically as well as abroad to other countries (e.g. the United Kingdom and Germany), where the product is valued as a high quality product.

On the demand side, greater integration of the supply chain could create a link between the requirements and preferences of consumers and the production of pasta with an adequate level of quality and differentiation. The picture emerging at the retailer level shows opportunities as far as new and more aggressive marketing strategies are concerned, particularly with respect to premium brands, highly differentiated products and the use of innovative sales channels (see the principal components "Product differentiation by local/premium brands", "Consumer an retail driven market development", "Aggressive market strategies" and "E-commerce product differentiation" in Tables 6.3 and 6.5). Experts also identified direct marketing and short supply chains as opportunities to increase added value. However, investing in the development of short supply chains usually requires high costs and skills. Storage and processing facilities dedicated to organic products require substantial investments, and producers in countries like Spain, Hungary and the Czech Republic find it easier and even more convenient selling organic durum wheat to Italy and Germany.

However, the risk is that the increasing role of marketing as a general strategy in the pasta supply chain could lead to an excess of concentration of market power at the retail level. The interviews with experts highlight the risk of concentration of market power among a few actors involved in the organic pasta sector. This is apparent in the case of a big distributor/retailer specialised in organic products in Italy, who has become a "giant" in the distribution and retail of organic food, and many farmers and co-operatives that want to distribute their organic products have to deal with it. One interviewee described such concentration as a "near-monopoly situation", limiting the opportunity

[38] In order to simplify the interpretation of results, factors with the highest correlations with the principal components, either positive or negative, are shown with a + or – sign respectively.

for farmers to benefit from the value created in the organic chain. In contrast, in Italy a cooperative of durum producers and pasta processors was also identified, selling small volumes of high quality pasta to supermarkets and receiving a relatively high price. This supermarket pasta chain guarantees a "fair price" to farmers through a specific agreement with supermarkets. In this case, even if the scale of production is small due to the traditional process used to produce the high quality pasta, cooperation puts the upstream actors in a position, which enables them to bargain with supermarkets.

Table 6.3: Principal components of factors that positively influence the added value in the supply chain of organic pasta[39]

	Product differentiation by local/premium brands	Consumer and retail driven market development
Product differentiation	+	
Availability of local quality wheat	+	
Producing pasta for a premium brand	+	
Increasing consumers interest in organic and healthy food		+
Integration and stable relationships in the organic pasta supply chain		–
Public support for pasta-making supply chain		

Source: Own presentation based on expert rating.

[39] The first Principal component (PC) is labelled "Product differentiation by local/premium brands" and includes factors that refer to highly differentiated production based on top quality producers also with specific geographical reputation. The second PC has been labelled "Consumer and retail driven market development" as it considers a market development driven by the demand side, due to high interest of consumers in organic pasta, where most of added value is maintained at retail level because of the low level of integration within the supply chain. "public support for pasta-making supply chain" does not load to any PC.

Table 6.4 Principal components of factors that negatively influence the added value in the supply chain of organic pasta[40]

	Inefficient low scale production	Market power concentration at retail level	Low competitiveness domestic production
Small economic size of supply chain actors	+		
Low integration among actors of the supply chain	+		
Decreasing demand	–		
Low quality of flour	–		
Market power concentration at retail level		+	
Dependence on pasta imports		–	
Price volatility for wheat and flour		–	
Low wheat yields			+
High input prices			+
High international competition			+

Source: Own presentation based on expert rating.

Table 6.5 Principal components of factors that may help in increasing the market share of organic pasta[41]

	Aggressive marketing strategies	E-commerce and prod differentiation	Improve efficiency of organic wheat production
Focus on specialised retailers	+		
Improve brand image	+		
Develop public sector procurement	+		
Effective positioning in supermarkets	+		
Increase range of pasta varieties including pasta specialities		+	
Develop online sales		+	
Improve efficiency of organic wheat production			+

Source: Own presentation based on expert rating.

[40] The first Principal component (PC) is labelled "Inefficient small scale production" and refers to factors related to small and non-integrated operators. This factor does not consider demand and input quality as limiting factors for organic pasta added value. The second PC is labelled "Market power concentration at retail level" and considers low domestic production coupled with high volatility of prices and a retail sector that monopolises the market as relevant limiting factors hindering added value of organic pasta. The third PC is "Low competitiveness of domestic production", and mainly refers to farm-level obstacles to added value creation.

[41] The first Principal component (PC) is labelled "Aggressive marketing strategies" as it refers to marketing initiatives that may increase the market share by stimulating the demand. The second PC is "E-commerce and product differentiation" and again considers demand-driven factors for market development, which in this case are more oriented to customer satisfaction. The third PC is mainly referring to higher efficiency of production at farm level.

7 Conclusions

This study investigated the distribution of added value along a number of organic food supply chains and has focused on whether organic supply chains function effectively and efficiently. More specifically, the following three issues were addressed:

- **Theme 1**: How much added value is generated by the organic food supply chain? How much is it in nominal and relative terms compared to the conventional sector, and who are the market players benefiting from it?
- **Theme 2**: How is the added value distributed among market players in the supply chain and how much of it returns to agricultural producers in particular?
- **Theme 3**: What factors influence the formation and distribution of added value for each relevant actor in the supply chain, including agricultural producers? How can added value be increased for the key market players?

In line with the tender specifications, three products (milk, apples and pasta) were chosen to represent different production and market growth patterns and different levels of processing. In addition, the markets for the three products in each country were classified into market types (emerging, internal and import). As further required in the tender specification, the analysis focussed on the different dynamics in added value formation and distribution for the relevant market players in the chain, including agricultural producers. In the following, based on the results presented in the previous chapters, the main insights contributing to a better understanding of the mechanisms behind the creation of added value in the organic supply chains are summarised.

How is added value created in organic supply chains?

Findings of this study indicate that there is a strong integration of the organic supply chains into the mainstream food system. Much of the organic apples, milk and pasta of the studied supply chains are sold in general retailers (i.e. supermarkets). We found only a few cases of high reliance on alternative outlets (e.g. organic apples in France and Estonia, and organic pasta in Italy and Spain). This is in contrast to some literature that associates organic with alternative outlets and short supply chains. In most cases the organic and conventional supply chains have a similar structure in terms of the main stages involved, but some differences including some strengths and weaknesses of the organic sector were identified (see Box 1).

Import markets usually have a small number of actors especially at the production level (e.g. pasta in the United Kingdom with no domestic production or processing; milk in Spain with low producer numbers). However, we found no strong patterns in all categories. For instance, one of the typical supply chains for organic apples in Estonia (emerging market) is short, characterised by integration of production/storage/packing operations. The same observation is true for one of the typical supply chains for organic apples in Italy, which is an internal market. In general, long supply chains can be found in import, emerging and in internal markets.

Box 1 Strengths and Weaknesses of Organic Supply Chains

The main **strengths** of the organic industry are represented by the specific quality of the organic products, and increasing consumer interest in organic food in many countries (especially France, Germany, Denmark, Spain and Estonia). Organic supply chains also rely on the individuals' skills, investments and aptitude for product innovation.

Small scale of production and a limited number of actors involved can result in fragmented supply chains, which the interviewees describe as potential **weaknesses** of the organic industry. For instance, experts in Hungary, Spain and the Czech Republic identified high logistic and transport costs related to small scale of production as the main structural weaknesses of the organic supply chains in these three countries.

The market for each product seems to have its own characteristics within each country and we did not find strong similarities in terms of marketing strategies among countries at the same chronological stage of development of their organic food sector. For example, the emerging market for organic apples in Estonia relies mainly on specialist organic shops and short supply chains, but in Hungary (also an emerging market) 70 % of organic apples are sold in general outlets. It was not possible to compare these specific features with other data on different products and countries because public data on national organic retail sales for specific products do not exist in all case study countries.

Integration and cooperation are important factors that can strengthen organic supply chains. The case study examples illustrated that this can result in the development of supplier own brands or regional brands, or in special agreements between retailers (including supermarkets) and the upstream actors producing and selling high quality products. Cooperation among upstream actors (through cooperatives or producer organisations) is usually more common in internal markets (e.g. the organic milk market in Germany and Denmark and organic apple and pasta in Italy), but not in the pasta market in Spain. Market players have started developing cooperatives also in some emerging markets, for example in Estonia and the Czech Republic, but not in Hungary for apples and pasta. We found no examples of collaboration in the import markets for organic milk in Spain, and apples and pasta in the UK.

The experts identified integration and cooperation among producers and processors as "best practice" to developing effective networks for product collection, storage and processing, but initiating collaboration is not an easy task. For example, the experts in Spain claimed that cooperation is more difficult for organic than for conventional milk and pasta, because of the limited number of actors involved and the inherent difficulties in processing and storing organic produce. It appears that context matters, including the culture of cooperation in the agricultural sector in different countries. Experts also consider product innovation and differentiation to be important for

the creation of added value, for example through the development of new dairy products in Denmark, new varieties of organic apples in Italy, and traditional pasta in Italy.

How much added value is created in organic supply chains?

The study estimated how much added value is created in nominal and relative terms for the selected organic product case studies by comparing the difference between farm-gate and retail prices in organic supply chains selling to general retail with conventional. Our results suggest that the difference between retail and farm-gate prices is higher for the organic than conventional products. This would indicate that more added value is created in organic compared to conventional chains, but the price difference does not consider any costs and therefore only represents an approximate indication of the added value. For example greater fragmentation of organic supply chains might lead to higher costs for example for transport in organic supply chains.

The organic farm-gate price for milk and apples appears to be related to the conventional price. In countries with low farm-gate prices for conventional, the organic price premium is also lower than in countries with high conventional farm-gate prices and vice versa. The organic farm-gate prices either follow trends in the conventional sector or both prices are influenced by external (regional) factors. Low organic farm gate prices seem to occur more frequently in the emerging markets of smaller markets, at least for milk. For example, the emerging organic milk market in Estonia and in the Czech Republic have low conventional and organic farm-gate prices (0.24 and 0.28 €/litre in Estonia, and 0.26 and 0.37 €/litre in the Czech Republic), whereas the German demand-driven market has the highest organic farm-gate prices (0.49 €/litre) and an intermediate conventional price (0.29 €/litre). However, for the other products there is no a real pattern.

In relative terms, the farmers' share of the price formation represents a proportion of between 9 % and 62 % of the retail prices. While the farmers' share is higher in organic apples and milk supply chains compared to conventional ones, this is not the case for pasta. This would indicate that the farmers' share of the added value in food chains with more processing stages (e.g. milling and pasta making) can be even lower in organic than in conventional value chains, which could be related to a lack of economies of scale. In some cases, high farm-gate prices are associated with high retailer prices but in the many cases there is no direct link between producer and retail prices also in the organic sector.

Box 2 Some reflections on market development dynamics and the farmers' share of added value

It could be expected that the market dynamics have an impact on added value creation and the farmers' share. If demand is higher than supply then farmers should be in a strong position to get a good price and a high share of added value, whereas it is likely that oversupply would lead to a downward pressure on prices. The case study examples illustrate this in some instances, but make clear that other factors are important making it more difficult to establish clear trends.

Drinking milk was studied as an example of a product with **low production volume** but **high market growth** rates. In 2014, organic cows' milk production represented approximately 2.9 % of the total EU milk production (i.e. a share lower than the average for organic production) but this is not true in all countries studied. In the EU market, organic dairy products (including drinking milk) constitute up to a third of all organic products sold (e.g. 30 % in Denmark, 10 % in France).

Germany and France represent the principal producers of organic milk in the EU. Farmers in these two countries create the highest unitary gross value added (0.24 €/l in Germany and 0.28 €/Kg in France) among the six case study countries. The farmers' share is high in Germany (46 %), but this is at the expense of the retail share (only 10 % of total unitary gross value added) which is considerably lower than in other countries including France. There are two potential explanations for this: the German organic milk market is characterised by a slow increase in the organic milk production (19 % in 2010-2014) and undersupply which may justify the high farmers' unitary gross value added, while the French organic milk sector is the fastest growing in the EU (87 % in 2010-2014). The other explanation is that the German producers in the case study formed a producer group which negotiates the price with the downstream actors.

Apples were studied as products with above **average production volume** and **some market growth**. In 2014, organic apples accounted for 11.7 % of the total area used for apple production, i.e. more than average for total organic production. France and Italy are the largest producers in the EU, but have different growth dynamics: France has the fastest growing organic apple production area (+109 % in 2010 to 2014), while the production area in Italy slightly decreased (-1.5 % in 2010 to 2014). In the EU market environment, Denmark and Germany show the highest retail sales for fruit (including apples but also tropical fruit), accounting for 10.1 % and 7.1 % respectively. In the case study countries, we found the lowest farmers' share of unitary gross value added (0.52 €/kg) in Italy, and the highest share in Estonia (1.14 €/kg) and an intermediate value in France (0.77 €/Kg). The result refers to two regions in Italy and France (Bolzano and Languedoc Roussillon) which are highly specialised in organic fruit production. The wholesalers play a strategic role in these regions, providing services for transport, storage, calibrated packaging and distribution in a context of a highly integrated supply chain. The wholesalers in France and Italy have a similar share of unitary gross value added (between 30 % and 40 %). The Estonian case, on the other hand, should more be seen as an example of producers making use of niche market opportunities. The Estonian organic apple production accounts for more than 40 % of total apple production in the country, but only for 0.2 % of the EU organic apple area. In this case, the farmers seem to be able to benefit from this with a strongly integrated organic supply chain.

Box 2 Some reflections on market development dynamics and the farmers' share of added value *(continuation)*

Pasta was studied as example of a processed product with **low production** and **growth** of the respective grain at European level. Durum wheat constitutes 20 % of the organic wheat area in the EU, and Italy and Spain are the principal producers of organic durum wheat. In both countries there was a decrease in organic durum wheat production in the period 2010-2014, corresponding to -12 % in Italy and -50 % in Spain. However, the markets in the two countries differ in relation to processing capacity: Italy has a large number of millers and pasta makers, but has been experiencing undersupply and needs to import organic durum wheat from other countries (Hungary, Spain and the Czech Republic) in order to meet the demand for organic pasta for internal consumption and export. Spain, on the other hand, exports most of the organic durum wheat because it has little domestic processing capacity to produce pasta. These different characteristics may explain the differences in farmers' share of unitary gross value added in Italy (0.13 €/Kg) and Spain (0.08 €/Kg), despite being both internal markets and the principal producers of durum wheat in the EU. The case study in Hungary on the other hand is based on spelt wheat and illustrates the potential of product differentiation.

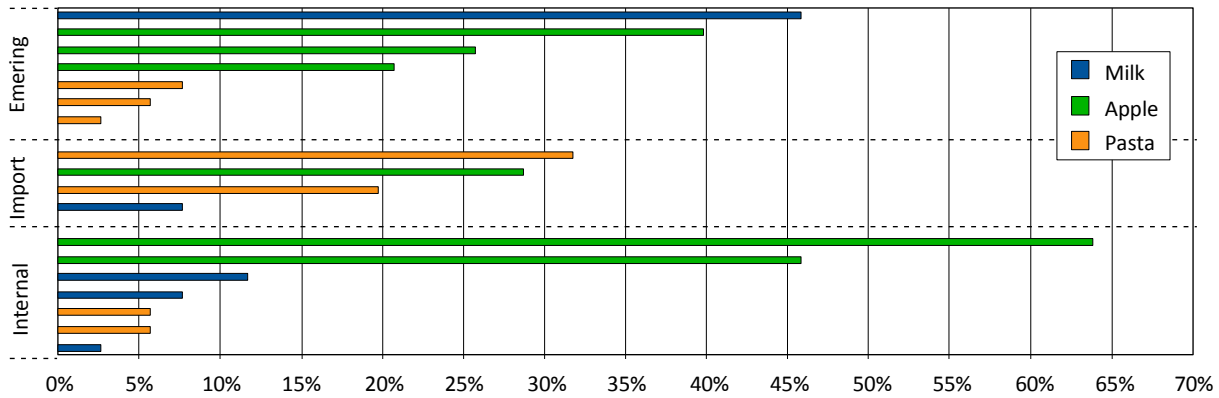
How is added value distributed in the organic supply chain among market players?

In the organic supply chains for the three investigated products, the distribution of added value differs greatly both within and between the supply chains, and across the countries. The analysis of unitary gross value added in 18 organic case studies shows that farmers have a share between 3 % and 64 % of the total unitary gross value added, whereas the intermediary stages (brokerage, processing and wholesale) gain a share between 6 % to 66 % and retail between 15 % and 61 % of unitary gross value added. However, the values are based on a limited number of observations only. It appears that the distribution of added value depends strongly on the structure and characteristics of the specific supply chain, such as level of integration and product innovation, as well as the power relations of the supply chain actors. We were able to identify several cases where the farmers' share is higher than average. For example, the milk producers in the German specialised shop supply chain and the French supermarket supply chain achieve the highest share of the total unitary gross value added, but in all other case studies of milk the highest share goes either to the retail (three cases) or to the processing stage (one case). Apple producers in Estonia, France and Hungary hold the highest share of the total unitary gross value added, whereas in Italy and the UK the highest share goes to retail. Regarding pasta, the highest share of the total unitary gross value added is held by the processor in Hungary and by the retailer in Italian, Czech, Spanish and German supermarket chains. If all the intermediary actors (between farm-gate and retail) are taken together, they take the highest level of gross value added in all the pasta supply chains. Overall, there is no common pattern which actors are able to realise the highest GVA.

The data shows no clear trend in the distribution of the unitary gross value added for the different market types (emerging, internal and import markets). Low and high farmers' shares of unitary gross value added were found in all three types of markets (see Figure 7.1). Also we found no common

patterns of unitary gross value added for retailers, wholesaler or processor. It seems that the type of market does not have a strong impact on either the distribution of the added value or on the total unitary gross value added. Unlike Padel and Midmore (2005), who found differences in marketing strategies in relation to the stage of market development in European countries in a Delphi survey, the case studies in our study indicate that the market for each product within a country seems to have its own characteristics.

Figure 7.1: Farmers' share in the total GVA in different supply chains differentiated by the type of market



Source: Own calculation based on data collected from supply chains actors.

There are also no clear trends in the farmers' share regarding the type of retailing (supermarket or specialised shop) but it has to be kept in mind that more specialist supply chains were studied than supermarkets, because the willingness to share confidential data was found to be greater in specialist than multiple retail chains. There is no substantial difference between the two outlets, although across all cases the farmers' share is marginally higher in the specialist stores (23 % compared to 19 % respectively). However, looking at the cases where it was possible to gather comparable data for both types of outlets, the farmers' share is higher in general retail than in specialist organic store supply chains. For instance, in the case of organic pasta in Italy, the farmers get a unitary gross value added of 0.13 €/kg in the specialist supply chain, while they get 0.15 €/kg in the supermarket supply chain. In the Spanish and Italian specialised food shop supply chains, the distribution is undertaken by organic wholesalers that are considered to be among the most powerful supply chain actors. It can therefore be concluded that there is no clear advantage favouring one supply chain to one sales outlet over the other and the opportunity for farmers to achieve a higher share of the gross value added exists in both types of outlets and is likely to depend on other factors, including market power.

Product innovation such as spelt pasta in Hungary or traditionally processed pasta in Italy leads to a high unitary gross value added for the processors or pasta maker respectively. However, even though this leads to higher producer prices, it seems not to have a huge impact on the producers' share of the total unitary gross value added. The pasta makers appear to benefit more from vertical integration and product innovation than the farmers do.

Which factors influence added value formation and distribution?

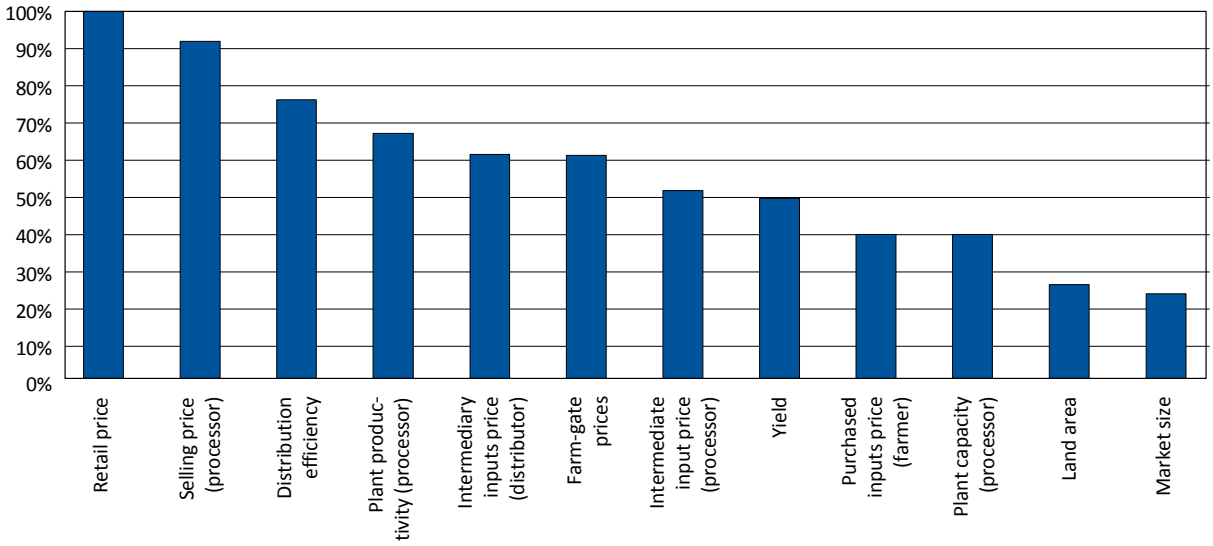
The question was analysed in two parts, establishing at first the most relevant factors influencing added value formation for the different actors, followed by ranking them into factors that influence added value formation positively or negatively. A better understanding of factors that are important in added value formation for the supply chains in general was gained from the literature, interviews with experts and supply chain actors. The first of two on-line expert surveys used an analytical hierarchy process (AHP) followed by the second survey providing a ranking of relevant factors into those that have positive and negative impacts.

The relative importance of the different actors (i.e. supply chains levels) in the formation of added value varies across countries and supply chains. This is not surprising, because the selection of case studies was aimed to cover a wide range of market situations. Farmers are generally considered to have the lowest influence on added value while wholesalers, retailers and large processors are considered to be the most powerful market players. In pasta supply chains, the experts raised the risk of concentration of market power. Thus, it is important that competition is ensured at all stages of the supply chain.

Our analysis shows that in most cases the price component dominates over the volume component in contributing to added value formation at all stages in the supply chain (see Section 2.5 for details on the definition of price and volume components). There are few exceptions to this observed pattern: in Spain, Hungary and Estonia the volume component dominates in the case of pasta (farmer and distributor only), apples, and milk (farmer only), respectively. These results are reflected in the analysis of the most influential components across all the supply chains. In Figure 7.2 the elementary added value components have been ranked according to their overall scores for the selected supply chains. The most relevant added value component is “Retail price” (referring to the distributor level) followed by “Selling Prices” for processors. The relevance of distribution and processing is confirmed by the scores of “Distribution efficiency” (aggregating logistical efficiency and marketing effectiveness)[42] and “Plant productivity”. It is relevant to note that while price and productivity/efficiency of processing aspects are ranked among the top, the components related to farm size, plant dimension and market size are ranked as the least relevant ones by the experts.

[42] Logistical efficiency and marketing effectiveness refers respectively to wholesalers and retailers, which have been jointly considered in the distributor category. However in order to keep results comparable with those of other categories (i.e. yields and plant productivity) here they have been aggregated.

Figure 7.2: Ranking of elementary added value components (most relevant component = 100 %)



Source: Own calculation based on expert rating.

The second expert survey resulted in the identification of some common aspects for the three supply chains. In particular, the following factors influence the formation and distribution of added value:

- Factors positively impacting on added value are adequate availability of the primary product (milk, apples and wheat), good supply chain organisation, improving integration of and cooperation between supply chain actors and good marketing.
- Factors negatively impacting on added value are high input costs, insufficient domestic production of the primary products and dependence on imports, inefficiencies along the supply chain, high volatility of prices, inadequate facilities for storage and logistics, lack of marketing orientation and low market development.

It can be concluded that across all products attention to quality, increased consumer interest in organic and healthy food, wider range and differentiation of products as well as supply chain management are all factors that can lead to higher price premiums and thus could contribute to higher added value. In terms of product specific conclusions it looks as if for drinking milk and apples there is a strong demand for standardised, high-quality products rather than small scale, local production. This stands in contrast to pasta, where product differentiation based on quality and/or specific geographical origin impacts on added value formation.

Limitations of the study

Results are based on the observation of 18 case studies of typical organic supply chains of three different products. These case studies provide insights and are likely to reflect the different types of organic supply chains that can be found in the EU, but the study has some limitations. The products and countries were chosen carefully in order to reflect a wide range of market dynamics and types. However, the number of observations in each group is relatively low so it is not possible to state with confidence that the trends are representative and can be generalised across all products and

markets. Also, more supply chains delivering to specialist organic shops were studied than general retail supply chains, because the willingness to share confidential data was found to be greater in those chains.

The main data sources for the study were interviews with supply chain actors, expert surveys, published data (Eurostat, FIBL/AMI surveys and national sources), scientific literature and EU FADN data provided by DG AGRI. Several private market research companies collect data on organic retail sales (e.g. AC Nielsen, GfK, Kantar), which usually cover general retail outlets only and which can be purchased, but such data are not in the public domain in all the case study countries. The fact that in general, and in some countries in particular, there is a lack of public data on the organic market, especially for specific products, was the main reason for basing the approach on specific case studies using interviews with supply chain experts and actors, but lack of data nevertheless has limited some part of the analysis.

Overall conclusions

This study provides evidence on how added value is created and distributed in the supply chains for organic milk, apples and pasta in nine EU case study countries. The results indicate that organic producers get higher farm gate prices than conventional but the producers' share of added value remains relatively low.

Specialist processing capacity is lacking in some (mainly emerging) markets

There is limited indication that the type of market (emerging, internal or import oriented) has a strong influence on the farmers' share of added value, except that import markets appear to be potentially less favourable towards primary producers. There is some indication that in some markets classified as internal or emerging, producers favour export rather than domestic supply chains, in particular where there is low domestic demand or structural weakness regarding processing capacity (as reported for durum wheat in Spain and milk in the Czech Republic). Supply chain fragmentation and the difficulties to develop effective networks for collection, storage and processing organic products is a common problem in the emerging and also import markets, and to a lesser extent in some internal markets. This usually relates to the small scale of production and the limited number of operators willing to invest in special facilities. Export of organic raw material might represent a missed opportunity for farmers to add value, if there is domestic demand for processed products which could be supplied by domestic producers. There would be a strong case for supporting investments in post-production operations at farm level or at a local scale (so that geographical dispersion is avoided) in such contexts, and for boosting cooperation and integration. Policy intervention could target the reduction of fragmentation, improve marketing strategies and support the right investments so that market opportunities represented by the growing market for organic products can be realised.

All retail outlets provide opportunities for improving the farmer share of added value

The analysis of the market environment for organic products in general and for the specific products analysed indicates a growing importance of the general retail. The case studies show that the retail channel (multiple retail or specialist organic shop) does not seem to affect the added value

distribution along the investigated organic chains as such, but contingent conditions, such as power relations among market players and attitude to collaboration, play a major role.

When comparing the distribution of added value for the same product in the supermarket and specialised retail chains in one country, the share of gross value added that producers hold in the supermarket chains is similar to or even higher than in specialised retail chains. This challenges the findings of some previous studies (e.g. Lobley et al., 2009). Some of the specialised retail supply chain cases analysed have more stages than the supermarket chain, which would explain the similar or relatively lower farmers' share of added value. Increasing the cooperation and integration along the chain to potentially reduce the number of stages represents a real opportunity to increase the farmers' share of added value. This opportunity for one market player to undertake more than one operation is dependent on skill and capital, both of which could be further supported by policy, especially for small organic operators struggling to realise economies of scale.

The examples in this study also illustrate that power relations matter and that concentration of power can occur in different types of outlets. For example, in the case of the Italian pasta, the upstream actors have a special agreement with a supermarket chain which commits to buy small quantities of high quality organic pasta at a "fair" farm-gate price, whereas a specialist store chain is heavily reliant on one specialist organic distributor/retailer that operates in a "near-monopoly" situation. Retailers, which at first glance have similar characteristics (e.g. all general retailers, or all specialised retailers), can have different approaches to marketing organic products, with different effects on the distribution of added value. In this specific case it is the general retail that creates a more favourable condition for the organic farmers than the specialist organic outlet. This might encourage producers to invest in quality aspects, and help retailers to differentiate themselves from other outlets (Aertsens et al., 2009). The German example of organic milk clearly suggests that horizontal collaboration can improve the farmers' bargaining power in supplying specialist stores.

Both general and specialised retail can present opportunities, and also present risks of power concentration and imbalance. Upstream actors would benefit from good price transparency and also need have enough bargaining power in order to get decent prices. In general, it is also recommended to rely on more than just one marketing channel as a way to cope with uncertainty related to prices and demand (Aertsens, 2011). It can be concluded that to improve the farmers' share of the added value the length of the supply chain and the power relations between market players are at least as important as the supply chain type.

There is a need for supporting collaboration and vertical integration in organic supply chains

Previous studies showed that market players were often reluctant to collaborate and considered it as impacting on their independence and flexibility (Naspetti et al., 2011). However, the supply chain experts and the market players interviewed in this study look favourably at collaboration between upstream actors, and see it as vital to increase added value at the production level of the value chain through improved efficiency and bargaining power, and realise that it is the supply chain organisation that affects the creation and distribution of added value, and not the individual actor. If market players really now have a greater stake in building collaboration than in the past, policy support could more easily boost cooperation among farmers through policy measures targeted at the organic

sector. While Rural Development Programmes support conversion to, and maintenance of organic farming, sometimes national or regional authorities do not prioritise the organic sector in other support measures related to cooperation and market development. Support programmes and initiatives aimed at both conventional and organic farmers may not be immediately relevant to the needs of organic supply chain actors (Meredith and Chatzinikolaou, 2015). Policy intervention supporting cooperation should therefore be targeted not only at the specific chronological stage of development that the organic market has reached, but also consider the specific local context and actors involved.

Need to improve the market transparency for the organic sector

Strategies and models for a fairer distribution of added value do exist, but they need to be adjusted to the specific contexts. In order to do so, availability of market data is a key issue. The lack of public data on the organic market for specific products and in certain countries has represented one of the main challenges of this current study. The use of different sources and expert estimates made it possible to obtain insights into the specific supply chains, but better availability of market data for specific products in all EU countries would allow more robust comparisons and broader generalisation. Market transparency is not only important for similar studies, but it is vital also to assist market players in their investment decisions. More should be done to improve the availability of market data at all levels of the organic supply chains in the EU.

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