

Beyond ‘mainstream’ and ‘alternative’ in organic food supply chains: empirical examples of added value distribution from eight European countries

Stefano Orsini, Susanne Padel, Danilo Gambelli, Julia Lernoud, Jörn Sanders, Francesco Solfanelli, Matthias Stolze, Helga Willer, Raffaele Zanolli

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Abstract

Purpose – This research investigates the supply chains for organic milk, apples and pasta in eight European countries and how added value is distributed among market players.

Design/methodology/approach – Using secondary data and expert interviews, a market overview for the three products is provided as the basis of a more detailed analysis of the added value in twelve organic supply chain examples. For this, interviews with market players and an ‘added value calculator’ tool are employed.

Findings – The farm gate and retail price of organic products is higher than conventional. Supermarkets are the main outlet for organic milk and apples in the countries studied, whereas the situation for organic pasta is varied, suggesting that the use of different sale channels is influenced by the food product. The farmers’ share of added value ranges between 3% and 65% of the added value created in the organic supply chains analysed. Organic offers opportunities to increase the farmers’ share of added value both in supermarkets and alternative sale channels, by developing collaboration, physical infrastructures for organic and integrating operations upstream of the chain.

Research limitations/implications – While more research is needed into a larger number of chains, this paper indicates that there are dynamics and features at supply chain level, such as the distribution of added value and the target markets used, that cannot be interpreted according to the binary division between ‘mainstream’ and ‘alternative’ organic suggested by the conventionalisation hypothesis.

Originality/value – The distribution of added value for existing supply chains in eight European countries is calculated by using an effective added value calculator tool.

Key words Organic food supply chain, added value, added value calculator, conventionalisation

Paper type Research paper

Introduction

One goal of the EU political framework is to ensure a sustainable growth of European organic agriculture (Meredith *et al.*, 2018). Despite the steady increase in organic food consumption at the European level, growth in land area is less pronounced and there is uncertainty whether organic supply chains function efficiently and share rewards fairly between all partners involved (European Commission, 2014; Sanders *et al.*, 2016; Willer and Lernoud, 2016; Willer and Lernoud, 2019).

As stated by the European Commission in the ‘Action Plan for the future of Organic Production in the European Union’ (European Commission, 2014), there is a need to understand where the barriers to further uptake of organic practices amongst farmers in Europe lie. To date, various studies have analysed the relative profitability of organic and conventional farms (Sanders *et al.*, 2012; Crowder and Reganold, 2015). While such studies provide valuable information on financial attractiveness of organic production, they do not allow one to draw any conclusion on whether farmers are able to exploit the full potential of the EU organic market. In particular, there is little empirical knowledge on whether organic farmers are getting a ‘fair’ share of added value created along the supply chain.

The research presented in this paper aims to fill this gap by investigating the supply chains for three organic products – milk, apples and pasta – in eight European countries and how added value is distributed among market players.

Previous studies relating to the socioeconomics of the organic sector (e.g. Crowder and Reganold, 2015; Padel, 2008; Sutherland 2013; Dupré *et al.*, 2017; Herman *et al.*, 2018) have focused on analysis at the farm level. The reasons why studies on organic food supply chains are lacking and are normally limited to farm level analysis can be explained with the shortage of publicly available organic market data, especially product-specific data (Home *et al.*, 2017), and by a lack of willingness of market players to share market and financial information (Kottila and Ronni, 2013).

In our research, we account for all contributing supply chain stages and actors, i.e. farmers, wholesalers, distributors and retailers to understand how added value is distributed along the whole chain. We tried to overcome the limitations of other studies by using a mixed method approach, including interviews, an ‘added value calculator’ tool developed by the research team and some secondary statistics. The analysis of specific organic supply chains of three products in eight countries helped us identify the factors influencing the distribution of added value and the overall dynamics of organic food chains, including farmers’ opportunities to increase their share, target markets and the sale channels used.

The next section provides a brief review of the literature relating to organic food supply chains, followed by a description of the methods. The results are then presented, including an overview of the market characteristics for the selected products in the study countries, as well as a summary of the findings from twelve specific supply chain examples. A discussion and conclusions section closes the paper.

Background

Most of the socio-economic studies on the organic food sector are related either to literature on alternative food networks (van der Ploeg *et al.*, 2000; Renting *et al.*, 2003) or to the conventionalisation hypothesis (Buck *et al.*, 1997; Guthman, 2004; Clark, 2015; Constance *et al.*, 2015). The former represents the organic sector as mainly based on local and domestic short supply chains and specialised organic shops. According to the conventionalisation hypothesis, organic farming has increasingly incorporated elements of the conventional food sector, becoming entangled in the conventional food system with supermarkets appropriating the largest share of added value (Buck *et al.*, 1997; Guthman, 2004). Padel and Midmore (2005) distinguished between emerging and established markets and found in a Delphi study in Europe that most organic sales in emerging markets were either through direct marketing or organic shops, whereas supermarkets were more important in mature market countries. However, patterns of organic sales may also be influenced by product type, but studies and data distinguishing between product categories are lacking.

The blunt division of organic farmers into either ‘purists’ or ‘pragmatists’ (Morgan and Murdoch 2000; Guthman, 2004; Clark, 2015) has been challenged by some authors (Padel, 2008; Rosin and Campbell, 2009; Lehtimäki, 2019), who argue that it is difficult and potentially misleading to differentiate between farmers only in regard to their attitudinal viewpoints and the marketing channels they deal with. Rosin and Campbell (2009) explicitly criticised the traditional political economy approach employed by the supporters of the conventionalisation hypothesis and argued that the binary interpretation of the organic sector (alternative organic/mainstream organic) does

not reveal the complexity connected with the specific contingencies in which the organic market players operate in.

A few scholars (Lockie and Halpin, 2005; Ilbery, 2010) usefully attempted to provide a 'whole chain' analysis, even though their investigations were based on, and limited to, farmer surveys and secondary data. They argued for the 'hybrid' nature of the organic food sector, reporting as an example the case of some organic farmers in Australia, England and Wales who sell part of their production direct to consumers *and* part to a retailer, often a supermarket (Lockie and Halpin, 2005; Ilbery, 2010).

There is a lack of studies analysing the distribution of added value along the whole organic food supply chain, which makes it difficult to know what the implications of dealing with different retail channels and markets are (Lockie and Halpin, 2006). Yet an argument often sustained (Guthman, 2004; Smith and Marsden, 2004; Bui *et al.*, 2019) is that the connection of organic farms with supermarkets undermines the viability of the organic sector by securing a cheaper and more consistent product supply. While this is certainly possible to an extent, there is no empirical evidence suggesting that this is always the case within the organic sector. For example, according to Aertsens *et al.* (2009), some supermarkets in Belgium played an active role in organising supply chains for organic beef in which farmers managed to get a relatively high price and were encouraged by the retailer to invest in product quality aspects. However, their analysis did not extend as far as comparing supermarket sales with other types of organic marketing channels. Although the relationship between organic suppliers and retailers is often a relationship between small and big volume actors (Wycherley, 2002), collaborative approaches between small suppliers and major retailer groups were found in organic supply chains in Finland, where trust and communication allow for collaborative planning and reciprocal advantages despite the power imbalances and differences in values between actors (Kottila and Ronni, 2013). Bonnet and Bouamra-Mechemache (2010), in a study on organic milk sold through a supermarket chain in France, found that the retailer's margins for organic milk were lower than for conventional and lower than the wholesaler's margins. The retailer's choice to sell organic milk was mostly driven by the need to avoid losing customers who want to purchase organic products. However, the analysis did not consider the farm stage.

Likewise, increases in organic export activities in some countries for some products have been regarded as a symptom of conventionalisation of the sector (Buck *et al.* 1997; Guthman, 2004). Motives for export have mainly been related to the farmers' marketing choice and the involvement of international retailers in the organic food system, but other potential reasons, such as a lack of domestic supply chain infrastructures or supply/demand mismatch in specific market contexts, were largely ignored in research. Attempts to draw generalisations on this might be misleading, as very few data on organic imports and exports exist and currently it is not possible to compare production data versus international trade data (Willer and Lernoud, 2019).

It seems fair to state that there is a lack of data as well as little empirical research on the underlying dynamics of the development of organic food supply chains, how they relate to the market environment and how they affect the distribution of added value. The research presented in this paper aims to fill these gaps.

Methods

A mixed method approach was used, focussed on the analysis of added value in selected product supply chains for organic apples, milk and pasta in the Czech Republic (CZ), Estonia (EE), France (FR), Germany (DE), Hungary (HU), Italy (IT), Spain (ES) and the United Kingdom (UK).

The three products selected include two crop and one livestock product and different levels of processing. Apples as an almost unprocessed product require only grading and packaging, whereas pasta making from durum wheat involves several stages. Milk is of intermediate processing level. In choosing which products we studied in each of the eight countries, we aimed to cover a diversity of types of organic markets to explore whether the market context affects the functioning of the organic food chain. The markets for the products in the study countries reflect three types of development based on expert judgement: (a) 'mature markets', predominantly based on domestic production, (b) 'emerging markets', currently emerging within the EU and still developing structurally, and (c) 'import markets', predominantly based on imports from third countries.

The approach to data gathering and analysis involved three steps.

At first, background information from secondary data (e.g. organic production data, when available) was collected from literature, Eurostat (2016) and AMI-FiBL (2016), to understand the market for organic apples, milk and pasta in the eight countries. Eurostat (2016) and EU-FADN (DG AGRI, 2016) provided some data for a basic comparison of organic and conventional prices at farm and supermarket levels. This analysis did not take the costs at different stages of the supply chain into account, as they are not available from secondary sources.

Secondly, qualitative semi-structured interviews were conducted between April and May 2016, with 65 organic industry experts, including persons from certification bodies and market players (farmers, processors and wholesalers) in supply chains selling to different market outlets. The objectives of the interviews were to understand the structure of, and power relations within, the supply chains and to identify opportunities and constraints for market players to increase their added value. Experts were selected using a snowball process. The interviews were analysed by coding the information collected according to common themes.

Thirdly, we collected financial data on costs and sales prices at different stages of twelve organic supply chains in a second round of 60 interviews with market players, to calculate the distribution of added value. For organic apples and pasta in Italy, data were collected both on supermarkets' and specialised organic shops' supply chains, whereas the other supply chains analysed were based only on organic retailers. This was because many supermarkets in the other study countries did not respond to the interview requests. The interviews included also questions on how added value distribution was related to the specific supply chain dynamics and to the market context. To calculate the distribution of added value in the twelve chain examples, we used an 'added value calculator' tool developed by the research team. This is a spreadsheet-based tool where the sale price of each product at each supply chain stage represents the unitary gross revenue for that product. The gross margin can be automatically calculated using only information on costs provided by the interviewee, which made data collection easier and overcame market players unwillingness to disclose information on margins. The calculator allows for some flexibility to deal with data provided either as unit monetary costs or percentage costs through imputation with respect to output price. We limited the analysis to gross added value, focussing on the product-related outputs, valued at basic prices, less product-related intermediate consumption, valued at purchasers' prices. Some data on costs/supply chain stage/country could not be elicited and were considered as missing. The share of missing data referring to depreciation and other fixed costs was particularly high, and mainly in

the distribution stage of the supply chains/countries. Missing data for variable costs were randomly distributed across countries and supply chains, with no systematic pattern and at a much lower incidence [1]. We used Multiple Imputation (MI) to estimate missing data for variable costs in order to have a complete and comparable dataset of the breakdown of *gross added value* (not including the fixed costs) along the supply chains for all products and countries. MI is based on the creation of multiple estimates for each missing value based on observed data, which provide the necessary information for the predictions. These replace missing values with multiple sets of simulated and plausible values, representing the uncertainty about the correct value to impute (Rubin, 1996). The specification of the MI model was structured as follows. First, all 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, actors, etc. – were included. Thirdly, a truncated linear regression imputation method was specified, to bound imputation of missing data within the lowest and highest values observed. Following Graham *et al.* (2007), 150 iterations were run, a number that was a good balance between the time for computation 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.

Results

Overview of the market for organic apples, milk and pasta in the eight study countries

Table 1 indicates that the countries differ substantially in the level of organic consumption and production, particularly in relation to the share of conventional. The organic market is developed in Germany, France and Italy and is partly supplied by imports. The same is true in the UK, but because of low share organic land area the reliance on imports is likely to be stronger, but there are no official import statistics. Hungary, the Czech Republic and Estonia have emerging organic markets. All countries except France offer some support for organic land management as part of their Rural Development Programmes (RDP), but payment rates differ (Stolze *et al.*, 2016). Most countries do not have any special policy measures for supporting organic supply chains or market development (Sanders *et al.*, 2011).

Table 2 below summarises the key features of the markets of the three selected products in the eight study countries. Organic apples and milk are mostly sold in supermarkets, regardless of whether it is a mature organic market (France, Germany and Italy) or an emerging market (the Czech Republic and Hungary). The apple market in Estonia represents one exception, where the production of organic apples is very small – accounting for only 180 tonnes in 2016 (Eurostat, 2016). Here, specialised organic retailers are the main outlet for organic apples produced domestically, whereas imported apples are also sold in supermarkets. The situation is more varied for organic pasta, which in Germany and the United Kingdom is mainly sold in supermarkets, whilst in Italy and Spain it is mainly marketed through organic shops. The interviewees explained this with the relatively low consumption of organic pasta in Italy and Spain compared with conventional. The bulk of organic apples and milk is sold through intermediaries and processors, with a few farmers also selling a minor part directly to consumers or through ‘alternative’ chains such as specialised organic shops, box schemes, and farmers markets, which often allows farmers to get good financial rewards. Such market diversification strategies reduce the risks associated with the reliance on a single sales channel. However, some farmers interviewed found engaging in market diversification too onerous

for their businesses in terms of time, capital investments and skills and they preferred to sell their organic production to a single buyer, usually a wholesaler or a supermarket.

Table 1. Characterisation of the organic market in 2015 and the product supply chains studied in the case study countries

Country	Share of land area organic ¹ (%)	Share of retail sales organic ¹ (%)	Share of organic producers ¹ (%)	Average organic area support as part of the RDP (€/ha, 2015) ¹	Product supply chains studied	Type of market (stage of development) ³
CZ	11.1	0.7	14.7	98	Milk Pasta	Emerging
EE	16.5	No data available	8.1	84	Apples Milk	Emerging
ES	6.9	1.2	3.2	28	Milk Pasta	Import Mature
DE	6.3	4.4	8.2	195	Milk Pasta	Mature Import
FR	4.1	2.5	5.6	No data available ^a	Apples Milk	Mature
HU	3.0	0.3	0.3	180 ^b	Apples Pasta	Emerging
IT	10.8	2.2	4.8	53	Apples Pasta	Mature
UK	3.0	1.3	1.9	11	Apples Pasta	Mature Import

¹ Source: <https://statistics.fibl.org/europe.html>

² Source: <https://agridata.ec.europa.eu/extensions/DashboardIndicators/OrganicProduction.html>

³ Source: expert assessment

^a France supports organic farmers under Pillar I payments, not the RDP.

^b Based on 2016 data, no data for Hungary for 2015 were found

According to the interviews, it appears that import/export-orientation is related to some specificities of the organic sector for the products in each country. For example, the lack of facilities for storage and processing dedicated to organic durum wheat in Spain and Hungary pushes farmers to sell their organic production abroad (usually to Italy) to be processed. The export of organic apples in Hungary and organic milk and pasta in the Czech Republic seems to be motivated by the relatively low consumption levels of these products in the domestic markets. Also, a number of organic farmers in the Czech Republic found it more convenient to sell organic milk and durum wheat abroad, in particular to Germany, where they can obtain a higher price, as demand for organic is higher than in their own country and the market context is more favourable. The interviews indicated that organic export opportunities are preferred over selling organic production as non-organic in the domestic market. A different reason lies behind the export of Italian organic pasta to several European countries; this is connected with the high internal production level together with an international reputation of Italian pasta, which boosts demand from other countries.

Table 2. Summary of key features of the market for organic apple, milk and pasta in the eight study countries. Source: interviews with experts, Eurostat (2016) and AMI-FiBL (2016) data

Products	Study countries ¹	Target market	Sale channels	Level of chain integration
Organic Apples	FR, IT, EE, HU, UK	Mainly internal, with France and Italy also exporting to other countries. Organic apples produced in Hungary are mostly exported	Mainly supermarkets, except Estonia where domestic organic apples are sold in specialised retailers	Horizontal integration is relatively common in France and Italy. Estonia has only recently started developing farmer cooperatives. Level of vertical integration varies with the specific supply chain
Organic milk	DE, FR, CZ, EE, ES	Mainly internal	Mainly supermarkets	Horizontal integration is relatively common in France and Germany. The Czech Republic has recently started developing farmer cooperatives. Level of vertical integration varies with the specific supply chain
Organic Pasta	IT, ES, CZ, DE, HU, UK	Mainly internal, with Italy also exporting. Spain, the Czech Republic and Hungary export durum wheat to Italy or Germany for processing. The UK is totally reliant on imports of organic pasta	Mainly supermarkets in Germany and the UK. In Italy and Spain, it is sold mostly in organic shops. In Hungary and the Czech Republic, approximately 50% is sold in organic shops and 50% in supermarkets	Generally low, except in Italy, where farmer cooperatives are common, sometimes undertaking processing as well

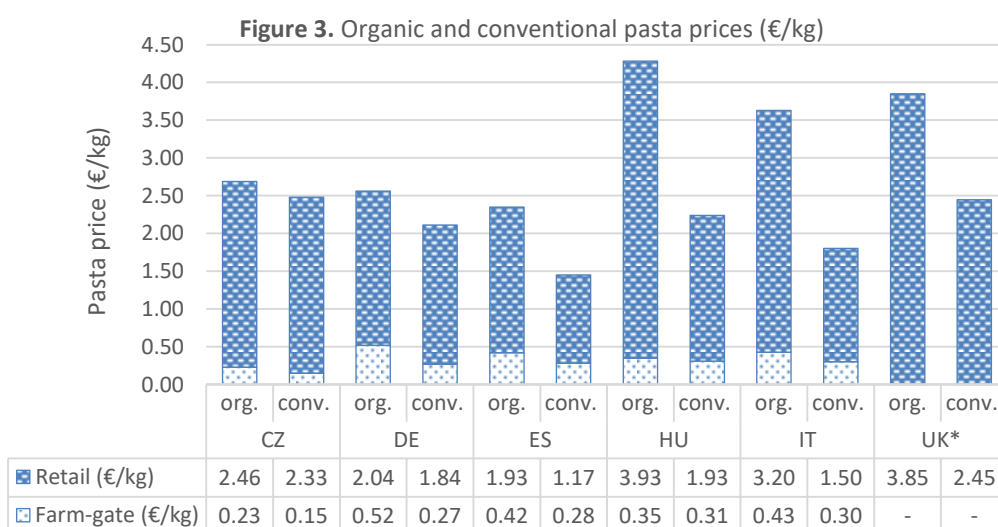
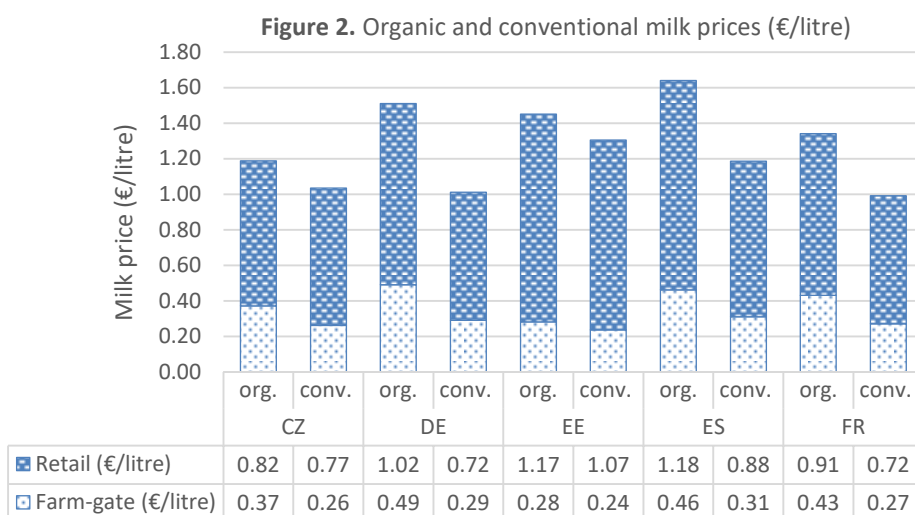
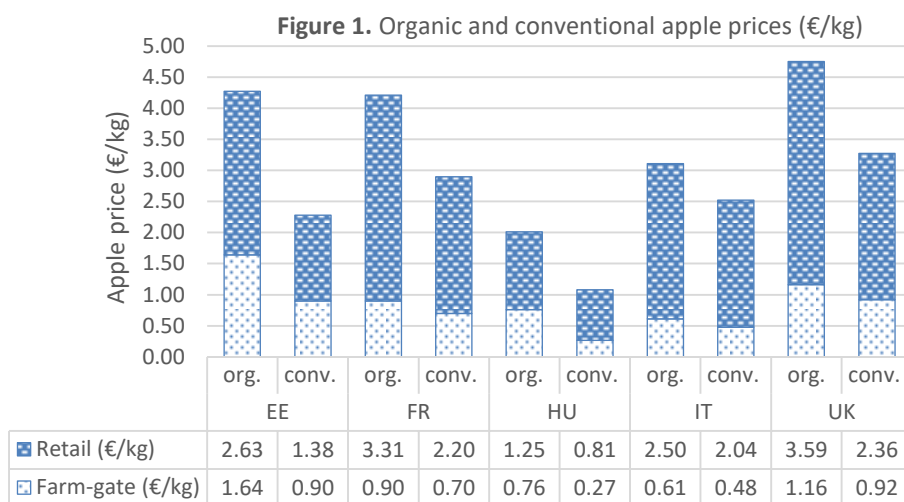
¹The main producer countries are in bold

Eurostat (2016) and EU-FADN (DG-AGRI, 2016) data were used to compare prices between organic and conventional products at farm gate and supermarket levels in the study countries [2] (Figure 1-3). As expected, prices for organic apples, milk and pasta are higher than for conventional, both at farm gate and retail levels.

Overall, we have not found any patterns of the prices in relation to the different stages of development of the organic markets in different countries. The farm gate price for durum wheat represents a relatively low share of the retail price both for conventional and organic pasta, compared to that of the less processed products, i.e. apples and milk.

The data indicate that the difference between farm gate and retail prices is higher for the organic products in most cases, which suggests that more value is created with the organic products. However, data relating to costs and the intermediary stages are not available from secondary data sources making it impossible to estimate how the added value is distributed. For this, we looked into specific organic supply chains by collecting primary data through interviews with market players and by using the added value calculator. The next section summarises these results for the twelve supply chains investigated.

Figures 1–3. Farm gate and retail prices for organic and conventional apples, milk and pasta per country in supermarkets, in €/kg (VAT excluded) (Reference year = 2016). Our own calculation based on data from Eurostat and EU-FADN data from DG-AGRI.



Distribution of gross added value in twelve organic supply chains

The results of the calculation of the distribution of gross added value for the twelve organic supply chains investigated vary substantially between countries and products (see Figures 4 to 6). The farmer's share of added value ranges from 3% in the supply chains for organic milk in Estonia and organic pasta in Spain, to 65% in the organic apple supply chain in Estonia. Intermediary values were found in the organic apple supply chains in France and Italy, with farmers getting between 20% and 40% of the total added value. As expected, farmers capture a lower share of added value for more processed food, in particular in the organic pasta supply chains, where the greatest share is with the pasta maker. Where it was possible to compare supermarket and organic shop supply chains (the organic apple and pasta supply chains in Italy), the share of added value captured by the farmer was higher in the supermarket rather than organic food shop chains. No clear pattern of added value distribution was found based on the stage of development of the market.

The Estonian apple producer, who integrates operations from production to storage and packing, has clearly the control of the chain, whereas the wholesaler and the retailer are the lead actors in the French and the Italian apple supply chains respectively. Amongst the milk supply chains, the producer cooperative in Germany is the focal player negotiating sales with the downstream actors, whereas the dairy and the retailer hold the leadership role in the Estonian and the Czech cases. The pasta maker has the central role in the Italian and Spanish supply chains, but not in the German case where durum wheat is imported and the supply chain leadership is with the retailer.

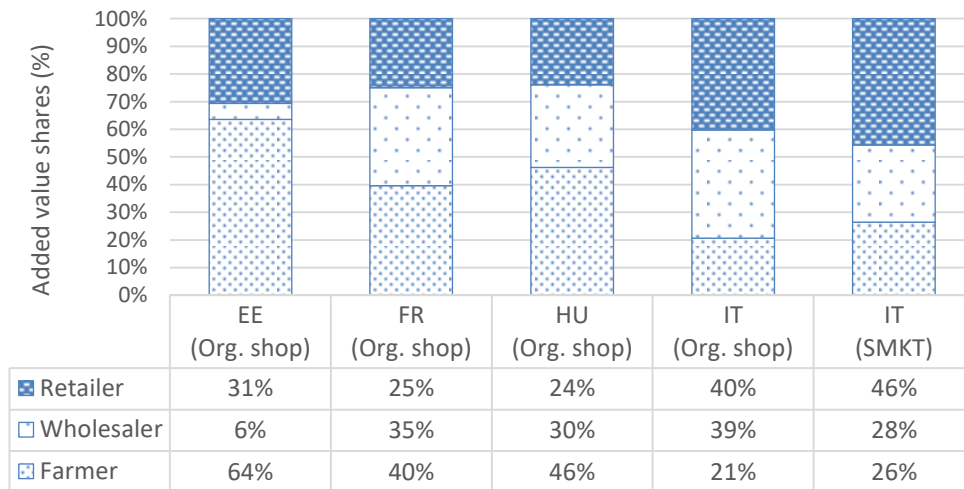
In the following sections, different accounts of the results of gross added value distribution are described in the context of the insights gained during the interviews.

Niche markets

Some markets are characterised by a low number of organic producers and lack of economies of scale, for example the market of organic apples in Estonia and Hungary and organic pasta in the Czech Republic and Hungary. The Estonian apple case represents an example of a very small market, with low levels of production and consumption, even though the latter has been increasing during the last few years. Based on our interviews, typical supply chains for organic apples in Estonia are characterised by the farmer, or in some cases small farmers' cooperatives, undertaking cold storage (which does not require major investments like controlled atmosphere storage), packing and selling directly to consumers or to a distributor (the wholesaler) of specialist organic stores. This integration of different operations allows the farmers to get a high share of added value (65% of total, see Figure 1). The interviews indicated that the organic apple sector in Estonia lacks market infrastructures and that there is a shortage of specialised operators investing in storage and packing for organic produce. In order to meet a growing consumer demand, organic apples are also imported from other countries. Unlike domestic production, imported organic apples are sold in supermarkets. This does not prevent Estonian organic apple producers from getting good added value though, as domestic and imported products seem to be targeted at different consumer segments.

Figures 4–6. Distribution of unitary gross added value in case study supply chains by market player (total unitary added value = 100%). Excl. VAT. Our own calculation based on data from interviews with supply chain actors

Figure 4. Distribution of added value in the organic apple SCs



SMKT: supermarket

Figure 5. Distribution of added value in the organic milk SCs

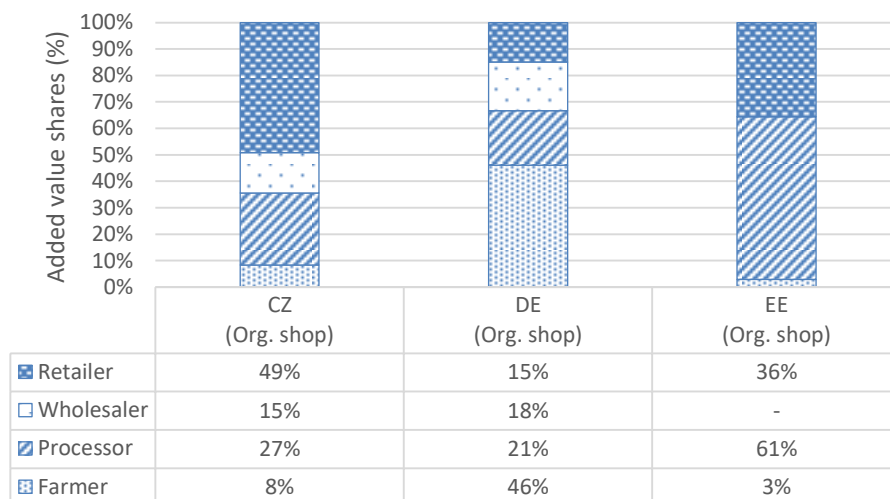
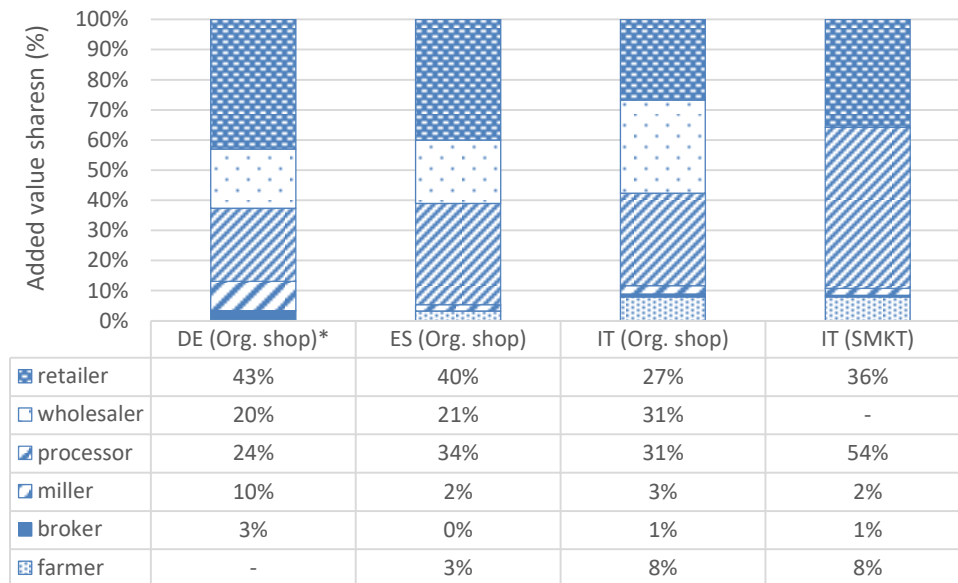


Figure 6. Distribution of added value in the organic pasta SCs



* In the German SC, organic durum wheat is imported and then processed in Germany

Mix of supply chain and production solutions

Other cases with a relatively high added value share for farmers revolved around collaboration, special agreements between market players, producer branding and product differentiation.

For example, the German organic milk producer gets a share of approximately 50% of the total added value, which is a substantially higher proportion compared to the other countries. The German producer in this example is a member of a cooperative, which pools the milk and negotiates the price with the dairies. Furthermore, the German organic milk market was characterised by undersupply at national level when the study was conducted, with a steady increase in demand but only a relatively slow increase in production (AMI-FiBL, 2016).

A similar example is the Italian supply chain that sells organic apples to supermarkets. It comprises a consortium of cooperatives, including farmers that undertake storage, sorting, packing and distribution to supermarkets, where apples are sold under the cooperative brand 'Bio Südtirol'. In this case, integration of operations, producer branding and a strengthened bargaining power allow the farmers in the cooperative to achieve a higher share of added value (26%) than the farmers selling organic apples to a specialised organic shop (21%).

In the two organic pasta supply chains analysed in Italy, the farmer in the supermarket chain captures a similar share of added value as in the organic shop chain, but a higher value in absolute terms (0.15 €/kg compared to 0.13 €/kg). This is the result of an agreement with the supermarket, which pays a higher price for traditional organic pasta that is produced under an agreement involving local actors (the farmer, the broker and the pasta maker).

Power relations

Cases of market power imbalances among supply chain actors seem to occur in supermarket and specialised organic shop supply chains alike. Downstream operators are often the most powerful players, especially for more processed food like pasta.

In many cases farmers seem to have little market power and thus get a low farm gate price, especially where there are only a few operators undertaking intermediary operations including collection, storage, processing and distribution of organic products. This is the case for the farmers

in the Czech and Estonian supply chains for organic milk. Ways to improve their power position exist through the cooperative approaches and agreements along the chain illustrated above.

However, retailers are not necessarily the most powerful players to capture high added value, especially where they need to deal with (and rely on) only one or a small number of suppliers in order to be able to offer organic products on their shelves for consumers. This is the case for the Estonian organic milk sector, where only a few organic dairies exist, or for organic apples in Italy and France, where the wholesaler provides services for transport, storage, calibrated packaging and distribution.

The organic shop supply chain for organic pasta in Italy offers an example of market concentration as pursued by an Italian company specialised in organic food distribution and retailing, which operates in a 'near-monopoly' situation according to some experts interviewed. This firm has strongly developed its positioning strategy at a domestic level and has appropriated value from other supply chain actors by dealing with the bulk of organic production in the country. This case suggests that power imbalance between producers and retailers is not necessarily only connected with supermarkets.

Discussion and conclusion

Distribution of added value in the organic food supply chain

The farm gate and retail price of organic products considered in this study was higher than conventional. The farmers' share of added value ranges between 3% and 65% of the added value created in the organic supply chains analysed.

Organic does not automatically change *market power* imbalances. However, even though the market power of the actors downstream is generally strong, our examples illustrate opportunities to increase the farmers' *bargaining power* through horizontal and vertical collaboration and product differentiation, both in supermarket and specialised organic shop supply chains. The power models proposed by the traditional political economy literature have often ignored features that were found here and that are increasingly recognised as important to manage relationships in the agri-food chains, such as cooperative behaviour, agreements between retailers and suppliers and product differentiation (Bonanno *et al.*, 2017; Bryła, 2017; Simeone *et al.*, 2017; Baron and Dimitri, 2019). These features were also neglected by the supporters of the conventionalisation hypothesis. Overall, the examples presented here appear not to confirm the binary division between 'mainstream' and 'alternative' organic suggested by previous research.

The integration of intermediary operations at farm level in short supply chains can certainly provide an opportunity for some organic farmers, as reported by the interviewees. However, not all farmers can or want to engage in processing and selling, nor can they undertake all the investments that these operations require. In line with the study conducted on organic milk in Belgium (Baecke *et al.*, 2002), this paper suggests that a lack of post-production capacity at local/national level is indeed a barrier to realise the potential of the growing market for organic food, which is needed especially, but not only, for more processed products like pasta.

Retailers are not per se the actors who benefit the most from the added value created in organic food chains, as illustrated by cases where the wholesalers (such as the apple supply chain in France) or the food processors (such as some milk and pasta supply chains) are those who retain the largest share.

Finally, whereas it is not surprising that cooperation is likely to occur in countries and sectors with a long tradition (like organic milk in Germany and organic pasta in Italy), it is interesting to note that supply chain actors have started developing cooperatives in some emerging markets helping farmers get a decent share of added value.

Target markets and market channels in the organic food supply chain

Our results do not confirm a clear distinction between mature and emerging markets, as had been proposed by previous studies (Hamm and Grönefeld, 2004; Padel and Midmore, 2005). Supermarkets are the main sales channel for organic milk and apples in emerging and mature markets alike, whereas the situation for organic pasta is more varied. This suggests that the use of different sale channels is influenced by the food product, rather than just by the stage of organic market development. Our findings are in line with the data in Willer and Lernoud (2016), who show that most organic food in Europe is sold through supermarkets, although their data is not product specific. The conventionalisation literature has represented the connection between farmers and supermarkets as an increasing process, involving especially late adopters of organic farming. However, statistics show that in some countries like the United Kingdom, organic farmers had been selling their products mostly through supermarkets since a very early stage (Willer and Yussefi, 2000).

The distinction between export-oriented and domestically oriented organic farmers is not necessarily a distinction between corporate-driven and movement-based approaches to organic, as claimed by some authors (Buck *et al.*, 1997; Guthman, 2004). Our study indicates that the farmer might find it difficult to sell their organic production within the country, because of a lack of domestic supply chain infrastructures or consumer demand. Also, the export-orientation is not necessarily connected with the attitudes of recent entrants to the organic sector, as for example organic production in the Mediterranean countries was originally very much export-oriented and the main challenge was to develop local markets (Willer and Yussefi, 2000).

Concluding remarks

The main challenge for organic farmers and other market players is not simply related to the question of whether or not to deal with supermarkets, but rather how to develop collaboration, physical infrastructures within specific sectors and improve the integration of supply chain operations. This should be considered when setting strategies and investments to scale up organic production in a European or national context.

This study is limited to a relatively small number of organic supply chains, and it was possible to compare supermarket and specialised organic shop supply chains only in a few cases. The lack of *product-specific* data on the organic market on import/export, market channels used, typical costs and prices along all supply chain stages makes it difficult to go beyond the analysis of specific examples and identify general trends.

More analysis of supply chains for specific products as presented here is critical to identify models where the added value is 'fairly' shared. For this, the added value calculator has proved to be an effective tool to calculate the distribution of added value from the farm to the retail stages and to overcome some limitations in supply chain actors' unwillingness to share some financial data.

Future research efforts in the organic sector should focus on improving the availability of market data, as market transparency at all levels of the chain is critical to assist market players in their decisions (Home *et al.*, 2017). More investigations of specific supply chains are also needed to

understand factors that may improve organic farmers' rewards. These need to look beyond the individual and motivational characteristics of the farmers, and consider other factors, such as market infrastructures and the engagement of other market players.

Notes

1. Given the lack of any structural reason for the missingness the data, they were considered as Missing Completely at Random (Schaefer, 1997). On the other hand, missing data on fixed costs exceeded 50%, which is considered a critical threshold for the application of imputation methods (Holt and Benfer, 2000).
2. The figures should be regarded as illustrative and the following limitations apply: 1) Only prices at supermarket are compared; 2) One product cannot represent the full market in a country with variations in regional and seasonal balance of supply and demand; 3) The same products are compared across countries, but they do not have the same relevance for the consumer; 4) Changes in currency exchange rates can affect comparability between countries over time.

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