Recent developments among dairy cooperatives in the European Union

Handbook of Research on Cooperatives and Mutuals

Höhler, J.; Bijman, J.

https://doi.org/10.4337/9781802202618.00035

23. Recent developments among dairy cooperatives in the European Union

Julia Höhler and Jos Bijman

DEVELOPMENTS IN THE EUROPEAN DAIRY MARKET

The European dairy industry is characterized by constant change. In 2012 the European Union (EU) launched the so-called milk package, a series of measures to strengthen the position of dairy farmers in the food supply chain (European Commission, 2016; Wijnands et al., 2017). One of the measures permits dairy farmers to negotiate contract terms collectively via recognized producer organizations. After abolishing the milk quota in 2015, the prices have remained volatile, the number of dairy farms has further reduced, and the average farm size has increased. At the same time, farm sizes, farm types, and dairy yields vary widely within and across member states (European Parliamentary Research Service, 2018), leaving dairy enterprises with a heterogeneous supplier base (Höhler and Kühl, 2018).

Next to these trends, several other developments are impacting the sector. The sector is driven by strong demand for sustainability from NGOs, national governments, the European Commission (2020b), retailers, and consumers. An increasing number of European dairies use bonus payments for farmer participation in sustainability programs and special milk flows, such as GMO-free, organic, or outdoor grazing milk (ZuivelNL, 2020). Even though EU regulations prohibit using dairy terms for their marketing, plant-based milk alternatives have emerged as a competing product and are gaining importance (Leialohilani and de Boer, 2020). The 2019 EU Green Deal and the Farm to Fork Strategy aim at making Europe the first climate-neutral continent by 2050. At the same time, concentration trends along the food supply chain are accompanied by increased public awareness of unfair trading practices and market power (Bijman and Hanisch, 2018; Di Marcantonio et al., 2020; Grau et al., 2018). The Covid-19 pandemic has disrupted marketing channels and altered consumer preferences (Höhler and Oude Lansink, 2021). Dairy enterprises took different actions to respond to the outlined challenges, ranging from focusing on brand policy to mergers and capacity expansions (Höhler and Kühl, 2019).

The 2012 EU-wide study "Support for farmers' cooperatives" has provided important insights into the status and development of agricultural cooperatives in the EU (Bijman and Iliopoulos, 2014). Cooperative experts from member states of the EU contributed their knowledge to 27 country reports and eight sector reports. The authors for the dairy sector estimated a market share of 57 percent for cooperatives in the EU-27 (Hanisch et al., 2012). Their report shows that the milk price in an EU member state is positively related to the combined market share of dairy cooperatives in that country, even if dairy cooperatives often pay prices below investor-owned firms (IOFs). The latter is often explained by the risk premium IOFs need to pay to attract milk suppliers (Liang and Hendrikse, 2016).

A decade of new research and structural developments has passed since the 2012 study. Our objective is threefold: First, to provide an overview of the relative importance of dairy

Table 23.1 Top 10 dairy enterprises in Europe 2020

Enterprise	Country	Cooperative	Placement Europe	Placement world	Dairy turnover 2020	
					USD billion	EURO billion
Lactalis	France	No	1	1	23.0	20.2
Nestlé	Switzerland	No	2	2	20.8	18.2
Danone	France	No	3	4	17.3	15.2
FrieslandCampina	Netherlands	Yes	4	7	12.7	11.1
Arla Foods	Denmark/ Sweden	Yes	5	8	12.1	10.6
Unilever	Netherlands/ UK	No	6	11	6.6	5.8
DMK	Germany	Yes	7	12	6.4	5.6
Savencia	France	No	8	14	5.9	5.2
Sodiaal	France	Yes	9	17	5.5	4.8
Müller	Germany	No	10	20	5.1	4.5

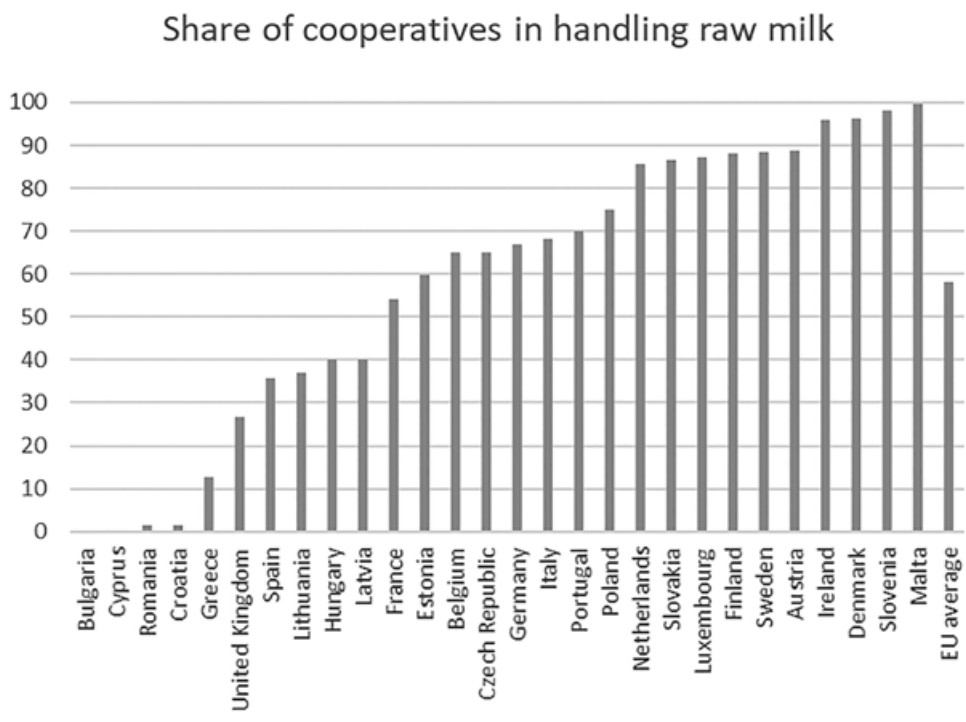
Source: Rabobank (2021).

cooperatives in the EU and the different member states; second, to outline trends and gaps in research on European dairy cooperatives taking into account the developments on the EU dairy market described above; third, to give an up-to-date overview of dairy cooperatives and their main differences to IOFs. While the 2012 study relied heavily on national data and expert judgments, we used accounting data from the ORBIS database[1] (Bureau van Dijk, 2021). By synthesizing developments in research and the real world, we can outline research gaps.

THE RELATIVE IMPORTANCE OF COOPERATIVES

In 2020, around 500,000 dairy farms in the EU produced 160 million metric tonnes[2] of milk. The majority of the milk (150 million tonnes) was delivered to dairies, which processed it into whey (55 million tonnes), drinking milk (24 million tonnes), cheese (10 million tonnes), milk powder (3 million tonnes), butter (2.3 million tonnes), and other products. The main producing countries in the EU-27 are Germany, France, and the Netherlands, followed by Italy, Poland, and Ireland (Eurostat 2018, 2021a, 2021b).

With a combined annual dairy turnover of 115.4 billion USD (101.2 billion euro) in 2020, the ten largest EU dairy enterprises range among the largest dairy enterprises in the world (Rabobank, 2021). Table 23.1 shows a ranking of the top ten dairy enterprises in Europe, their placement in the world ranking, and dairy turnover for 2020 in billion USD and euro. Four cooperatives—FrieslandCampina, Arla Foods, DMK, and Sodiaal—rank among the top ten.
In 2015, cooperatives handled about 58 percent of all EU cow's milk deliveries (see Figure 23.1). Cooperatives have high market shares of 70 percent or more in Northern Europe (Sweden, Finland, Denmark, Ireland), and in countries such as Austria, Malta, Slovakia, Slovenia, the Netherlands, Luxemburg, and Poland. Market shares between 40 percent and 70 percent have been reported in parts of Portugal, Italy, Germany, Belgium, the Czech Republic, Estonia, and France. Dairy cooperatives in other parts of Southern Europe (Greece, Spain) and a large part of Eastern Europe (Hungary, Latvia, Lithuania, Romania, Croatia) have low market shares. While these market shares are measured on the domestic market, some EU dairy cooperatives have become international or even multinational enterprises. Although export had been an internationalization strategy since the nineteenth century, several large



Source: Adapted from European Commission (2016).

Figure 23.1 Share of cow milk deliveries by type of contractual arrangement (2015)

dairy cooperatives now have milk-processing facilities in multiple EU countries (such as Arla Foods, with facilities in Denmark, Sweden, UK, Germany, Belgium, and the Netherlands) and some even produce dairy products in other parts of the world (such as FrieslandCampina). Whatever its internationalization strategy, no EU dairy cooperative has members beyond Europe (Bijman et al., 2014).

Most dairy cooperatives in the EU are processing cooperatives (Höhler and Kühl, 2014). However, some cooperatives only function as bargaining cooperatives, selling the milk of their members to IOFs. One of the main objectives of cooperatives (both bargaining and processing) is strengthening the position of the farmers in the value chain and thus supporting farmers in earning a decent living. As Figure 23.1 shows, not all EU member states have a large market share for cooperatives, often resulting in a weak bargaining position for dairy farmers.

In 2013 the European Commission introduced new legislation (the Milk Package) to strengthen the position of the farmer in the dairy value chain, by encouraging dairy farmers to establish a producer organization (PO) (European Commission, 2016; Fałkowski and Chlebicka, 2021; Wijnands et al., 2017). Member states were given the option to make written contracts between milk producers and processors compulsory. Farmers obtained the right to collectively negotiate contract terms such as price and delivery conditions via a registered PO. One of the key advantages of a registered PO is that it can negotiate about prices on behalf of

its members without having formal ownership of the product (under competition rules, this would not be allowed). Farmers are particularly encouraged to set up a bargaining PO in the situation where they sell to an IOF dairy. The European Commission wanted to strengthen the farmers' position in the dairy chain, particularly in those countries where cooperatives have a minor market share (such as Southern member states) or were almost absent (Eastern member states). The EU PO model was built on the tradition of the Erzeugergemeinschaft in Germany, a farmer-owned bargaining association. EU legislation does not prescribe a particular legal form for the PO. In the many EU member states, a PO has the legal form of a cooperative, but it can also be an association or a limited liability company. As legal forms differ across Europe, the European Commission delegated the decision on the legal form to the member states.

To prevent a PO from becoming a monopolist, the volume of milk that one PO can negotiate is limited to 3.5 percent of the total EU production and 33 percent of the national production of the member state involved. Individual POs can become a member of an Association of Producer Organizations (APO), which then negotiates on behalf of all members collectively (for the APO the same competition rules apply).

As of December 2019, the EU had 355 registered dairy POs and APOs (European Commission, 2020a), with three countries representing more than 90 percent of all POs: 172 in Germany, 81 in France, and 52 in Italy. Some 150 of these POs already existed before the new PO legislation was introduced, mainly in Germany, France, and Italy. These existing milk bargaining associations obtained legal recognition as a PO. In terms of the volume of milk negotiated by POs, Germany has been by far the largest: More than 46 percent of 2019 milk deliveries in Germany were traded through POs, with the largest APO in Germany negotiating delivery contracts on behalf of 137 POs, amounting to 5.8 billion kg of raw milk (Bayern MEG, 2021). The annual marketable production of the 355 POs recognized for dairy was 17.5 percent of total EU milk deliveries in 2019 (European Commission, 2020a).

For dairy farmers, the milk price is one of the main determinants of their income. Farmers are members of dairy cooperatives because of the economic benefits membership delivers. Therefore, farmers expect their cooperative to pay out a high milk price. While cooperatives strive to generate the best milk price for their members, they face limitations in achieving a high milk price. First, milk prices are determined in an international and very competitive market. Prices for dairy products are volatile. Second, cooperatives usually are not able to pay a price that is higher than the price paid by their IOF competitors.

IOFs can pay a higher price because they can make their supply chains as efficient as possible by cherry-picking the large farmers. In addition, IOFs have to pay a higher price because they offer short-term contracts. The higher price includes a risk premium for the farmer (for the risk that the IOF does not continue buying the milk after the contract period). Cooperatives do not have the freedom to choose their members or to enter short-term contracts.

There are quite some differences among cooperatives, even those located in the same region. To compare milk prices among cooperatives and between cooperatives and IOFs, data on milk prices are needed. An EU-wide registration of milk prices paid per (cooperative or IOF) dairy is lacking.

The Dutch dairy sector organization regularly publishes the monthly LTO international comparison of producer prices for milk (ZuivelNL, 2020). The 2019 report does not allow any clear conclusions to be drawn about differences in producer prices between leading cooperatives and IOFs. The highest payout price, 39.24 euro per 100 kilogram,[3] was paid by the

Italian dairy Granarolo, which is 80 percent owned by the Granlatte cooperative. The lowest price (30.76 euro per 100 kilogram) was paid by the Irish dairy Glanbia Plc, which is one-third owned by Glanbia Co-operative Society.[4] As a comparison, the average USA class III milk price in 2019 was 38.16 euro per 100 kilogram, and thus above the EU average of 34 euro. Milk payout prices to members of dairy cooperatives are often not finally determined until after delivery. Investigations by the German Federal Cartel Office (2017) indicated that when setting prices, IOFs usually follow the prices of cooperative dairies. The report also notes that cooperative dairies generally produce basic dairy products, such as fresh milk, butter, or milk powder, while IOFs tend to produce branded products. Several authors have explored the reasons for cooperatives focusing more on commodities and less on branded products. One explanation is the limited availability of equity capital for risky investments in product development (Van der Krogt et al., 2007). Another explanation is past EU market protection, which made it very attractive for cooperatives to focus on efficiency and thus on the production of commodities (Bijman, 2018). A third explanation is the self-selection of low-quality producers into cooperatives (Grashuis, 2017).

RESEARCH ON EU DAIRY COOPERATIVES

Reviewing the most recent literature (2011–21[5]) on dairy cooperatives in Europe reveals that some countries, for example the Netherlands, are more frequently the subject of research than others, for example Estonia (Iliopoulos et al., 2019). On the one hand, these differences could reflect the differing national importance of the dairy sector in general and of cooperatives in particular, for example in terms of membership numbers, turnover, or market share. Different research focuses in the countries could also be an explanation, since the papers were written in particular by researchers in Germany, the Netherlands, and Belgium. On the other hand, the low coverage of Eastern European dairy cooperatives could be related to problems of agricultural cooperatives in post-socialist transition economies, namely farmers' associations of cooperatives with socialist collectivized agriculture, a lack of trust among farmers, and a lack of understanding of the benefits that cooperation can bring (Hagedorn, 2014; Imami et al., 2021). Bijman and Iliopoulos (2014) acknowledge that there is also a lack of a "good overview of the number and types of other farmer-owned businesses" in Central and Eastern Europe. While most papers focus on one country, there are a number of cross-national studies (Bruszt and Karas, 2020; Hanisch et al., 2013; Müller et al., 2018; Soboh et al., 2011, 2012, 2014). This coincides with a lack of Europe-wide statistics, partly due to the lack of a uniform legal form of cooperative (Bijman and Iliopoulos, 2014).

Different topics are covered in the mostly empirical papers. We have identified several research strands and subtopics. We begin with current trends and strategies that are impacting dairy cooperatives on different dimensions. For example, not only is the political framework changing; the demands of consumers are too. As a result of these trends, the relationship with members is also being challenged, with some members leaving the cooperative and joining new forms of cooperation. All these developments also affect the financials and performance of cooperatives. In the following subsections, we briefly reflect on the most important findings.

Recent Trends and Strategies

The research strand with the largest number of publications deals with trends in the dairy sector and the strategies cooperatives apply in dealing with those trends. Examples of major developments in the dairy industry are the 2015 abolishment of the EU milk quota (Alavoine-Mornas et al., 2015; Boland and Cook, 2013; Bošková, 2013; Bruszt and Karas, 2020; Charlebois, 2016), increasing consumer demand for sustainability (Candemir et al., 2021; Fiore et al., 2020; Westerholz and Höhler, 2021; Zuba-Ciszewska et al., 2019), increasing market power of retailers (Bijman, 2018) and the changing structure of the national farm sector (Polacenko and Bugina, 2014).

Two case studies provide insights into the impact of emerging trends on individual small mountain cooperatives. In a case study of two French mountain cooperatives, Alavoine-Mornas et al. (2015) conclude that small, regionally active cooperatives are particularly hit by structural changes in the farming sector and the decreasing number of dairy producers. In contrast to these negative impacts, in a case study of an Italian mountain cooperative Charlebois (2016) emphasizes the advantages of a more homogeneous member base and fewer small members. However, he also highlights the need to find a balance between production orientation and market orientation, which may require a deviation from the traditional cooperative model. The traditional model is characterized by ownership rights limited to members; non-transferable, nonappreciable, and redeemable residual return rights; and a distribution of benefits in proportion to patronage of members (Chaddad and Cook, 2004). The extent to which the results for small mountain cooperatives can be applied to larger dairy cooperatives remains unclear.

The abolishment of the quota gave dairy farmers an incentive to increase milk production. In several member states, cooperatives were faced with a substantial and unexpected increase in milk supply. As cooperatives were obliged to take all milk, they had to rapidly expand their processing capacity. This expansion led to extra costs for the cooperatives, while members were not necessarily willing to provide additional equity capital. The unwillingness or inability of members to provide additional equity is a recurrent pattern in cooperatives (Chaddad and Cook, 2004; Cook, 1995). This lack of access to additional equity capital, in combination with the risk-averse nature of cooperatives, has led to the preference for mergers over acquisitions as the dominant growth strategy (Van der Krogt et al., 2007). As early as the 1980s and 1990s, the unwillingness or inability of members to provide additional equity capital was a reason for the (partial) demutualization of Irish dairy cooperatives (Boland and Cook, 2013; Harte, 1997; McCarthy and Ward, 2014).

Based on a case study of seven Czech milk producer organizations, Bošková (2013) concludes that their strategies do not match the market outlook as none of the examined cooperatives pursues a value-added strategy. Significant investments would be needed to do so. Bruszt and Karas (2020) contrast strategies in the Hungarian and the Polish dairy sectors. The Polish cooperative sector has strong ties with the government that helped the sector in increasing value-added and competitiveness. In contrast, Hungary's strategy of privatization and integrating farmers into multinational corporations is not seen as successful by the authors.

In their literature review, Candemir et al. (2021) stress the importance of cooperatives in enhancing sustainability at the farm level. They argue for more research on the role of cooperatives in the adoption of sustainable farm practices, especially in the realm of environmental and social sustainability. Westerholz and Höhler (2021) compare the corporate social responsibility (CSR) reporting of investor-owned and cooperatives dairies. Their results indicate that

cooperatives report more information, particularly on environmental and social sustainability. Fiore et al. (2020) conducted a case study of three Polish cooperatives to define a sustainable business model and explore stakeholder contribution to innovation processes. They find that multiple stakeholders, such as local communities, employees, and funding agencies, contribute to the adoption of sustainable business models and the creation of social, environmental, and economic value.

Zuba-Ciszewska et al. (2019) use secondary data to review the development of the organic milk market in Poland. In recent years, dairy cooperatives have increased their share in the market. However, according to these authors' analysis, further market growth is impeded by a lack of collaboration and coordination between dairies and local farmers.

Bijman (2018), in a review of historical literature, explores the paradox of high market shares and decreasing numbers of cooperatives in the Netherlands. He describes the sustained importance of cooperatives as a result of the pertaining uncertainty in the milk market and the increased concentration among cooperatives as a reaction first to technological developments that generated economies of scale, and second to the increasingly concentrated retail sector. The trend of increasing scale among EU dairy cooperatives in the twentieth century has been described by Nilsson and Van Dijk (1997).

Polacenko and Bugina (2014) analyze the development of cooperation in the Latvian dairy sector. Compared to other EU member states, the market share of cooperatives is relatively low here (26.5 percent). The authors see cooperatives as an answer to the fragmented dairy sector with many small, unproductive farms. Using secondary data, they also show an increase in the amount of milk processed by dairy cooperatives.

Farmer Members and Their Behavior

The second strand of research focuses on member behavior, including the stay or exit behavior of members and their alternatives to milk delivery (De Herde et al., 2019; Nilsson et al., 2017; Torquati et al., 2015; Viergutz et al., 2020), as well as the relationships of cooperatives with their members and the involvement of other stakeholders (Alho, 2015; Di Marcantonio et al., 2020; Pachoud et al., 2020).

Torquati et al. (2015) describe the increasing use of vending machines by Italian farmers as a result of low milk prices paid by regional cooperatives. De Herde et al. (2019) use a qualitative case study to examine the alternatives of Belgian dairy farmers delivering to a cooperative. They identify a number of lock-in effects that keep farmers from pursuing different ways of marketing their milk. Nilsson et al. (2017) surveyed 131 Swedish dairy farmers to identify push and pull factors for considering staying in the cooperative or exploring alternative sales options. In two logistic regressions, the membership role, expressed by aspects of member satisfaction and view on cooperative values, and the perceived need for restructuring the farm business were identified as major push factors. Dissatisfaction with the existing cooperative increased the odds of exiting and exploring alternatives. Viergutz et al. (2020) investigate the switching behavior of German dairy farmers by using a spatial panel model and data of 2,004 switching decisions provided by a German dairy cooperative. They find that prices, cooperative member density, and the processing volume of competitors have an impact on switching rates. Moreover, they find a spatial interdependence in the switching behavior of dairy farmers. The authors emphasize the crucial role of elected local member representatives in the communication between cooperative and local member groups.

Alho (2015) has surveyed 682 Finnish milk and meat producers to investigate the value of cooperative membership. The results of her multivariate ordered probit analysis confirm the importance of market access. She further shows that the perceived value of cooperative membership increases with farm size. Pachoud et al. (2020) conducted a social network analysis of 45 members of an Italian dairy cooperative. While they find high levels of reciprocity, community and trust between members, they also describe a conflict arising from members' different views on intensifying their production. Di Marcantonio et al. (2020) survey 1,248 French, German, Polish, and Spanish dairy farmers to examine unfair trading practices in the EU dairy sector. The results of their Poisson regression indicate that members of cooperatives are more likely to report unfair trading practices in contract content or contract execution. At the same time, membership of a cooperative can mitigate negative effects of contract incompleteness. The authors stress the importance of taking specific characteristics of cooperatives into account, which may interact and offset each other in their effects. An example of such a characteristic is whether contracts are concluded individually or collectively.

New Forms of Cooperation

Another focus is newly formed cooperatives and alternative forms of organizations, such as producer and bargaining associations, as well as their interaction with established cooperatives (Bijman and Hanisch, 2018; De Herde et al., 2020; Hakelius et al., 2013; Szabó, 2015).

Bijman and Hanisch (2018) argue that the promotion of POs by the European Commission may pose extra competition for incumbent cooperatives. Farmers may leave the cooperative because they consider the milk price too low or fear having to provide additional equity capital because of management failures of the cooperative enterprise. These farmers will establish a PO and start bargaining on prices and delivery conditions with IOFs but also with cooperatives (who want to achieve full capacity at their processing facilities).

De Herde et al. (2020) describe the emergence of three new dairy cooperatives in the Belgian Walloon region as substitutes or complements to established cooperatives in the region. The new dairy cooperatives aim at providing value-added products and higher farmer revenues. The authors see them as possibilities to overcome lock-in effects and reconfigure the dairy landscape.

Hakelius et al. (2013) introduce the phenomenon of cooperative beehiving using the example of one Swedish dairy and one beef cooperative. Cooperative beehiving describes a situation in which existing members de-associate from the cooperative and form smaller cooperatives. The authors identify the failure of existing cooperatives to capture opportunities for product differentiation as a driver for entrepreneurial, risk-taking farmers to exit. Challenges for the newly formed cooperatives include investment in branding and the high unit costs associated with low production volumes. Outsourcing production capacity and start-up assistance can be helpful in overcoming these challenges. Szabó (2015) takes an anthropological perspective on the (re)establishment of a cooperative dairy in Hungary, which had previously existed until 1946. He concludes that the enterprise must create niches in the market, taking into account the background of its members and their experience, knowledge, and expectations.

Financials and Performance

Other research publications deal with financial indicators and the performance of and prices paid by dairy cooperatives. Soboh et al. (2011) use data from 170 EU dairy enterprises in a logistic regression to analyze financial ratios. Cooperatives outperform IOFs in their efficiency and financial position but underperform in their average profitability. They also find that cooperatives pay higher milk prices. Based on the analysis of secondary data and financial ratios, Grau et al. (2015) find that the revenue per kilogram of milk of cooperatives is lower than that of IOFs. They also note that dairy cooperatives have gained market shares in Germany and attribute this development primarily to mergers. The authors conclude that the focus on cost leadership and economies of scale has hindered cooperatives from diversifying their portfolios. Another observation is that many dairies have separated their operational businesses into non-cooperative subsidiaries.

Soboh et al. (2012, 2014) investigate the technical efficiency of dairy processing enterprises in six EU countries. In their 2012 paper they find that IOFs outperform cooperatives in input-oriented models, but perform similarly when accounting for the use of materials and output. They attribute their findings to the different objective functions of the two types of enterprises. In the 2014 paper the separate production frontiers for cooperatives and IOFs reveal that dairy cooperatives are slightly less efficient while having more productive technology. Differences occur across countries and are explained by differences in the cooperatives themselves as well as in market conditions. Based on their results, the authors conclude that the scale of operation is too large for some cooperatives.

Hanisch et al. (2013) study the effect of high cooperative market shares on dairy prices on a country level. Using a panel model and data on national farm-gate prices in the EU-27, they show a positive effect of cooperative market share on prices. As a consequence, all farmers in a country benefit from the presence of cooperatives, indicating their pro-competitive effect in dairy markets. Müller et al. (2018) estimate a panel model with data on national farm-gate prices from 27 EU member states and show how higher market shares of cooperatives result in a lower milk price volatility at the country level.

Summary of Main Research Lines

The above overview shows the diversity of research on dairy cooperatives, ranging from strategic issues such as responding to consumption trends and market liberalization to internal issues related to member governance and membership heterogeneity. Figure 23.2 presents the four lines of research that we have identified. These strands are related to each other. One strand deals with changes in the competitive environment and the strategies dairy cooperatives have developed in response to those changes. This literature deals with market structure, growth, mergers, and internationalization. Also, cooperative responses to changes in policies, such as the abolition of the EU milk quota system, are part of this body of literature. More recently, this literature deals with sustainability and how cooperatives can or should respond to the challenge of making dairy farming and the whole dairy chain more sustainable.

The second line of literature deals with the relationship between members and cooperatives. What influences member behavior? What determines member loyalty? How and to what extent are members involved in the decision-making process? As farms are changing into larger and larger entities, their relationship with the cooperative changes because large

farms have more options for selling their milk. This changing relationship has implications for member commitment and member loyalty. Also, the financial situation of large farms makes them more critical towards their cooperatives. Finally, the changes in member relations have implications for member participation in decision-making.

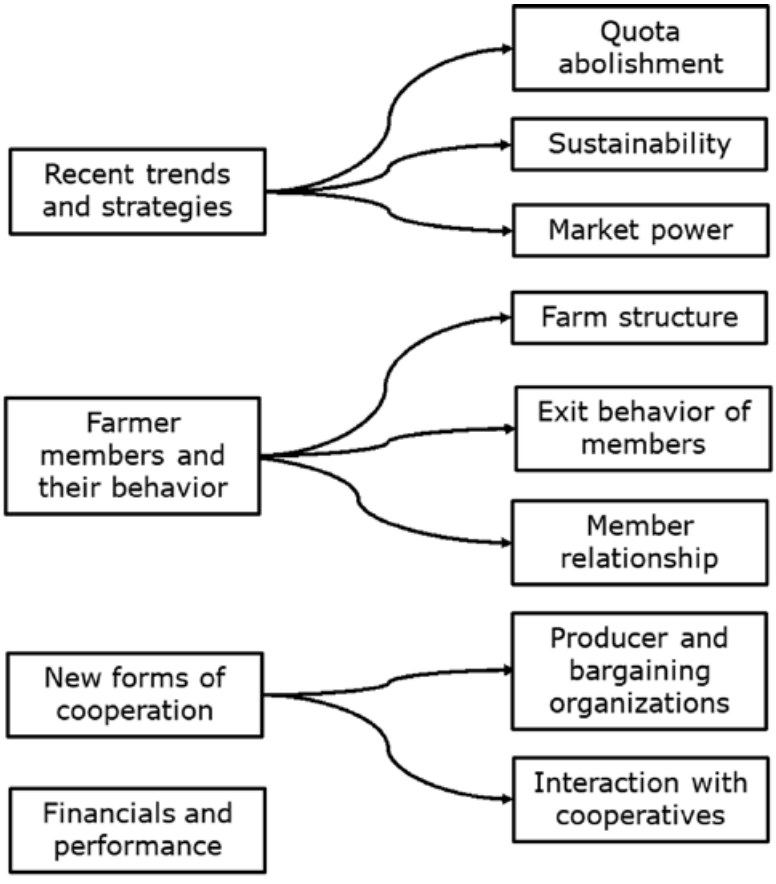
Partly related to the changing relationship between (large) dairy farmers and their cooperative is the rise of new producer organizations. Particularly in Germany, dairy farmers have left the cooperative to become members of the producer organization. In other countries, new producer organizations are strengthening the bargaining position of farmers selling to IOF dairies. These farmers do not necessarily want to set up a cooperative but do want to gain the bargaining power that joint sales bring. This rise of POs is also supported by EU legislation.

The fourth and last line of research deals with the financial performance of dairy cooperatives. Studies on performance are related to research on strategy. In a more liberalized dairy market, the strategy of the cooperative can make a difference to the milk price members receive. However, strategies also come with risks. More information on financial performance is important for members, but also for comparing cooperatives and IOFs.

Cooperatives and IOFs in the EU

In the following, the literature review will be supplemented by an overview of the number of dairy cooperatives and IOFs per EU country. Our dataset from the ORBIS database (Bureau van Dijk, 2021) comprises active enterprises in the EU-27 with the NACE Rev. 2 code 105 (Manufacture of dairy products) and the latest year of accounts between 2011 and 2020. NACE Rev. 2 is the statistical classification of economic activities in the European Community (Eurostat, 2008). In total, 10,886 enterprises were found. We cleaned the data by removing all enterprises without information on legal form (one exception is Arla Foods, which is known to be a cooperative). We further cleaned the data so that only the NACE Rev. 2 codes 1050 and 1051, Manufacture of dairy products and Operation of dairies and cheese making remained. Hence, we excluded dairy processors operating under the codes 1052, Manufacturing of ice cream, 1011, Processing and preserving of meat, and 1042, Manufacture of margarine and similar edible fats. We further removed all cases with no available data on turnover. In total, 15,502 entries remain. The year with the highest number of observations, 2019, contains 5,421 dairy enterprises, of which 761 can be clearly identified as cooperatives. Eurostat (2021) indicates the provisional number of enterprises in 2018 in the EU-27 as 6,025. The majority of the dairies mentioned in the market report of the Dutch dairy sector organization (ZuivelNL, 2021) are included in the dataset. However, some enterprises, such as Bel Leerdammer and Hochwald, are missing. This is because they are subsidiaries of, respectively, a French and a German dairy enterprise. Based on these two checks, we assume satisfactory coverage of the EU dairy sector.

We coded the legal forms 1 if cooperative, 0 if otherwise, according to the national legal forms. The legal forms were searched based on the names and abbreviations provided by the European Central Bank (2021). As already described, there is no uniform legal definition of the cooperative in all EU countries. In order to paint as accurate a picture as possible, we have chosen various approaches. Where possible, new generation cooperatives were coded as cooperatives. For example, the Finnish dairy Valio is a limited liability enterprise, but is owned by cooperatives. In addition, we have coded subsidiaries of cooperatives as cooperatives—for example, the German DMK GmbH, and all subsidiaries of Arla Foods and FrieslandCampina.



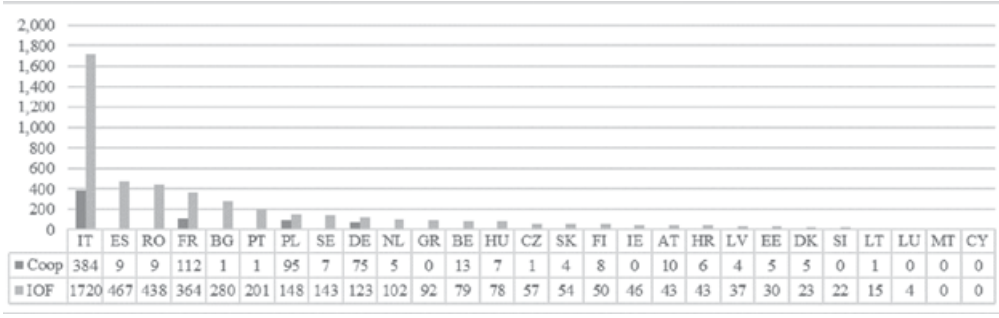
Source: Authors.

Figure 23.2 Research strands on EU dairy cooperatives and subtopics 2011–21

Enterprise websites and Google Translate were used to determine if a dairy enterprise was a cooperative. As a result, the Estonian enterprise Valio and E-Piim, originally listed as public limited companies, were coded as cooperatives.[6]

Figure 23.3 shows the number of cooperatives and IOFs per country as retrieved from our dataset.

Italy has the highest number of dairy companies and dairy cooperatives. High shares of cooperatives in the total number of dairy enterprises can also be seen in Poland and Germany. However, the figures could be misleading if used to infer the importance of cooperatives. In some countries, a small amount of cooperatives account for most of the turnover of domestic dairy enterprises, for example in Denmark and the Netherlands. The database does not provide information for all EU countries, which could be due to national disclosure requirements or the small size of the dairies.

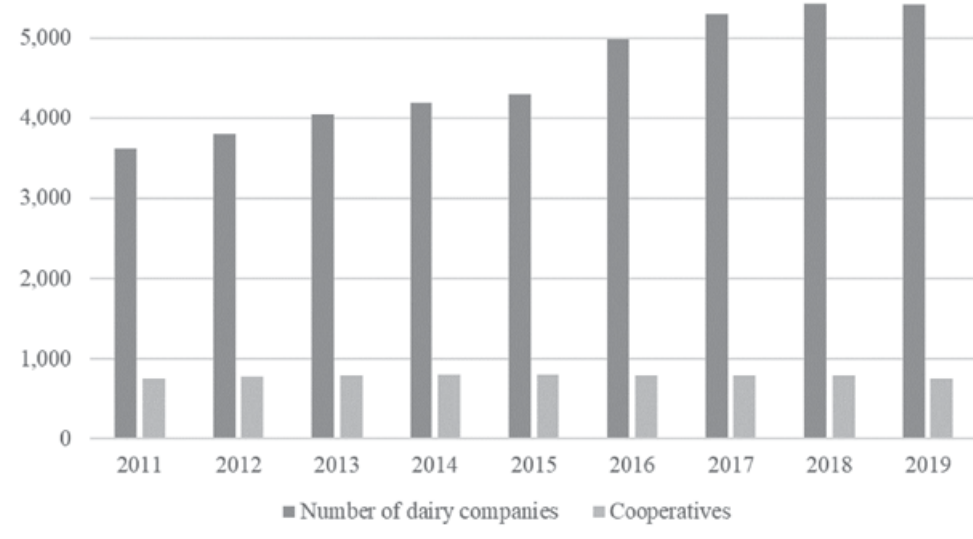


	IT	ES	RO	FR	BG	PT	PL	SE	DE	NL	GR	BE	HU	CZ	SK	FI	IE	AT	HR	LV	EE	DK	SI	LT	LU	MT	CY
Coop	384	9	9	112	1	1	95	7	75	5	0	13	7	1	4	8	0	10	6	4	5	5	0	1	0	0	0
IOF	1720	467	438	364	280	201	148	143	123	102	92	79	78	57	54	50	46	43	43	37	30	23	22	15	4	0	0

Source: Authors.

Figure 23.3 Number of cooperatives and IOFs per country in 2019 in the dataset

Figure 23.4 shows that the number of dairy enterprises in the EU-27 reported in the database increased from 2011 to 2019, while the number of cooperatives remained relatively stable. We explore possible reasons for this development in the discussion.



Source: Authors.

Figure 23.4 Total number of dairy enterprises and number of dairy cooperatives in the EU-27, 2011–19 (based on the data set)

Discussion

Our objectives in this chapter were threefold: first, to present the relative importance of dairy cooperatives in the EU; second, to outline trends and gaps in research on EU dairy cooperatives; third, to highlight recent developments in the number of dairy cooperatives and IOFs.

The relative importance of dairy cooperatives, measured by their market share, varies by EU country and is generally higher in major milk-production countries such as Germany, the Netherlands, France, Denmark and Ireland. The EU features a broad variety of dairy cooperatives, which differ in size (small versus large), strategy (cost leadership versus differentiation), products (conventional versus organic), or function (bargaining versus processing).

The literature review shows differences in the coverage of different EU countries and a lack of cross-country comparisons on a EU level. The low coverage of Eastern EU dairy cooperatives may reflect problems of agricultural cooperatives in post-socialist transition economies. Cross-country studies are needed to get a better understanding of trends among dairy cooperatives and their responses to various challenges. Likewise, replication studies in different EU countries could strengthen the empirical evidence and robustness of existing findings. However, these types of study require an EU-wide understanding of the relevant organizational forms as well as their institutional environments. Local expertise can help identify these organizational forms.

We have identified four different research strands, of which "market trends and enterprise strategies" resulted in the highest number of studies. Although the literature is often based on case studies from specific countries, cooperatives from different countries face similar problems. Structural changes in the farming sector have changed the membership base. In addition, an increase in the volume of milk, competitive pressures, and attempts to satisfy consumer demand have required investment, some of which was only possible by changing the ownership structure (that is, allowing external investors) or merging with other cooperatives.

The research strand on sustainability is relatively new and still limited to case studies of specialty cooperatives that sell in niche markets. While cooperatives increasingly pay their members for specific sustainability performance, research on this development is scarce. Given the special relationship that cooperatives have with their member-farmers, research on the sustainability impact of this relationship would be justified. While research on the environmental impact of cooperatives has so far mainly focused on the processing facilities, future studies should cover the whole dairy chain to gain a better understanding of the joint effort of members and cooperatives in achieving sustainability. The increase in specialty milk streams also raises important questions about member–cooperative relations. Will the heterogeneity of the membership further increase? If so, how will cooperatives react to these developments?

Research on member behavior reveals several factors that influence members to stay or exit. While more quantitative approaches appeared in this strand, the empirical evidence is mostly limited to individual countries and cooperatives. Moreover, the factors studied vary widely. A test of the different influencing factors could help to develop a theory of member behavior. In addition to existing empirical results, hypotheses about other factors should be taken into account. For instance, Höhler (2019) hypothesized that perceptions of fairness and identification with the cooperative drive exit behavior. Likewise, the literature on new forms of cooperation, such as in dairy producer organizations, consists of case studies from different countries and could benefit from a more systematic approach.

Data from the ORBIS database suggest that the number of dairy enterprises has increased. Various drivers might explain this. Market trends, such as regionality or sustainability, are increasing the membership heterogeneity and create space for new niches. Technological advances enable profitable processing of milk even on a small scale. As a result, more farmers act as entrepreneurs and establish individual or small group dairies. In addition, political support is leading to an increase in producer organizations. A systematic approach would be helpful to explore drivers and success factors for newly established dairy cooperatives and other forms of cooperation. The results could also provide valuable insights into the cooperative life cycle. All in all, we expect to see a larger number and greater variety of dairy cooperatives and dairy producer organizations.

Research on financial performance does not allow a clear picture of whether cooperatives or investor-owned firms fare better. It seems to depend on which indicators are used. However, several authors conclude that cooperatives may be too large, leading to member alienation. In addition, country differences have repeatedly been identified, which are reflected in different characteristics of cooperatives and market environments. However, two EU-wide studies show that cooperatives have an overall positive impact on milk prices in a country (Hanisch et al., 2013) and have the potential to reduce price volatility (Müller et al., 2018).

Our presentation of EU dairy cooperatives represents an attempt to provide an EU-wide comparison. It is limited by the lack of data on some enterprises in the ORBIS database. Another limitation lies in the fact that we have categorized cooperatives based on their legal forms. The broad variation among cooperatives requires further attention in research. The development of the number of cooperatives and IOFs shows a stable trend in the number of cooperatives and an increase in the number of IOFs. Because foreign subsidiaries are not run as cooperatives, the growth and internationalization of cooperatives may even partly explain the rise in IOFs. Startups could be another reason for the increase in numbers. Previous studies have often focused on large, established enterprises. The study of young enterprises could provide new insights into the internal processes of dairy cooperatives and their relationship with their environment. What kind of cooperatives were newly founded and how do they differ from existing dairy cooperatives? More research is needed to explain the observed patterns.

CONCLUSION

The purpose of this chapter was to review recent developments in EU dairy cooperatives. We have approached this aim with an overview of recent research publications and developments in the number of enterprises. We have been able to identify important strategic developments, such as increasing competitive pressures, changing consumer preferences, and the overall societal demand for higher levels of sustainability throughout the dairy chain. While some of these developments have been extensively explored and discussed in the literature, other trends have not received sufficient attention. One example of this underexposure is the impact of sustainability on member–cooperative relationships.

Another topic that could receive more attention from scholars is digitalization. What does digitalization imply for dairy cooperatives, and particularly what does it imply for the relationship between members and cooperative enterprise? Data is playing an increasingly important role in agriculture, and cooperatives could take a central role in guaranteeing that farm data is

used to the benefit of the members. An interesting development here is the establishment, in several countries, of a joint data cooperative by agricultural cooperatives.

Another trend that will impact cooperatives is the further differentiation in the market for dairy products. Consumers in the EU increasingly value specialty products, including regional products. The rise of new cooperatives is mainly in those specialty products. The combination of higher levels of farmer entrepreneurship, consumer preferences for regional specialties and advances in technology that allow efficient small-scale milk processing will lead to an increase in organizational heterogeneity in the dairy sector. The trend of further market differentiation and membership heterogeneity presents challenges to large incumbent cooperatives. However, large cooperatives continue to have the benefit of bargaining power in contracting with supermarkets. Future research will need to better describe these diverging trends among dairy cooperatives in the EU and analyze the impacts on members, cooperative enterprise, and society at large.

NOTES

1. ORBIS is a resource for financial data with information on close to 400 million companies and entities from around the world. Website: https://orbis.bvdinfo.com.
2. 1 tonne is 1,000 kg (approximately 2,200 pounds).
3. Standard milk with 4.2 percent fat, 3.4 percent protein. 1 kilogram is equal to 2.2 pounds.
4. Glanbia Annual Report and Financial Statements 2020, Glanbia (2021).
5. Web of Science search for the keywords "dairy cooperative" OR "dairy cooperatives" on 19/04/2021. Supplemented by manual search for peer-reviewed journal articles and discussion papers on ("dairy cooperative" and country name) on Google Scholar.
6. Milk suppliers in other countries are not always members of the cooperative and operations are profit-driven. We recognize that it is therefore questionable whether they should be counted as part of the cooperatives.

REFERENCES

Alavoine-Mornas, F., & Madelrieux, S. (2015). Dairy cooperatives: what factors contribute to maintaining mountain dairy farming? *Journal of Alpine Research|Revue de géographie alpine*, 103-1. https://doi.org/10.4000/rga.2718

Alho, E. (2015). Farmers' self-reported value of cooperative membership: evidence from heterogeneous business and organization structures. *Agricultural and Food Economics*, 3(1), 1–22.

Bayern MEG (2021). Home. www.bayern-meg.de/

Bijman, J., & Iliopoulos, C. (2014). Farmers' cooperatives in the EU: policies, strategies, and organization. *Annals of Public and Cooperative Economics*, 85(4), 497–508.

Bijman, J., Pyykkönen, P., & Ollila, P. (2014). Transnationalization of agricultural cooperatives in Europe. *The Dovenschmidt Quarterly*, 4, 168–78. http://edepot.wur.nl/345357

Bijman, J. (2018). Exploring the sustainability of the cooperative model in dairy: the case of the Nether lands. *Sustainability*, 10(7), 2498.

Bijman, J., & Hanisch, M. (2018). Living apart together: how are member-cooperative relationships changing within European dairy cooperatives? www.agrar.hu-berlin.de/de/institut/departments/daoe/koopwiss/ifg/forschung/diss/bijman-hanisch-living-apart-together-30-october-2018-2-edit-jos2.pdf

Boland, M., & Cook, M.L. (2013). The Irish dairy industry and evolution of Glanbia. In Proceedings of the International Conferences on Economics and Management of Networks (EMNet) Agadir, Morocco.

Bošková, I. (2013). Collaboration in the Czech dairy chain. *Agris on-line Papers in Economics and Informatics*, 5(665-2016-44973), 35–45.
Bruszt, L., & Karas, D. (2020). Diverging developmental strategies beyond "lead sectors" in the EU's periphery: the politics of developmental alliances in the Hungarian and Polish dairy sectors. *Review of International Political Economy*, 27(5), 1020–40.
Bureau van Dijk (2021). Orbis database. https://orbis.bvdinfo.com
Candemir, A., Duvaleix, S., & Latruffe, L. (2021). Agricultural cooperatives and farm sustainability: a literature review. *Journal of Economic Surveys*, 35(4), 1118–44.
Chaddad, F.R., & Cook, M.L. (2004). Understanding new cooperative models: an ownership-control rights typology. *Review of Agricultural Economics*, 26(3), 348–60.
Charlebois, S. (2016). Policy-change triggered environmental uncertainty in a dairy cooperative: the case of Mila in South Tyrol. *International Journal on Food System Dynamics*, 7(3), 258–70.
Cook, M.L. (1995). The future of US agricultural cooperatives: a neo-institutional approach. *American Journal of Agricultural Economics*, 77(5), 1153–9.
De Herde, V., Maréchal, K., & Baret, P. V. (2019). Lock-ins and agency: towards an embedded approach of individual pathways in the Walloon dairy sector. *Sustainability*, 11(16), 4405.
De Herde, V., Baret, P.V., & Maréchal, K. (2020). Coexistence of cooperative models as structural answer to lock-ins in diversification pathways: the case of the Walloon dairy sector. *Frontiers in Sustainable Food Systems*, 4, 224.
Di Marcantonio, F., Ciaian, P., & Fałkowski, J. (2020). Contracting and farmers' perception of unfair trading practices in the EU dairy sector. *Journal of Agricultural Economics*, 71(3), 877–903.
European Central Bank (2021). List of legal forms. www.ecb.europa.eu/stats/money/aggregates/anacredit/shared/pdf/List_of_legal_forms.xlsx
European Commission (2016). Development of the dairy market situation and the operation of the "Milk Package" provisions. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52016DC0724&from=EN
European Commission (2020a). Milk Package Implementation Notifications Reg. 511/2012 for year 2019. Update May 2020 (DG Agricultural and Rural Development). PPT Presentation accessed on 1 December 2021, on: https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/animals_and_animal_products/documents/milk-package-implementation_en.pdf
European Commission (2020b). A Farm to Fork Strategy for a fair, healthy and environmentally-friendly food system. Brussels, Belgium. Online: https://eur-lex.europa.eu/resource.html?uri=cellar:ea0f9f73-9ab2-11ea-9d2d-01aa75ed71a1.0001.02/DOC_1&format=PDF
European Parliamentary Research Service (2018). Briefing. The EU dairy sector. Main features, challenges and prospects. www.europarl.europa.eu/RegData/etudes/BRIE/2018/630345/EPRS_BRI(2018)630345_EN.pdf
Eurostat (2008). NACE Rev. 2. Statistical classification of economic activities in the European Community. https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF.pdf/dd5443f5-b886-40e4-920d-9df03590ff91?t=1414781457000
Eurostat (2018). Farms and farmland in the European Union—statistics. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Farms_and_farmland_in_the_European_Union_-_statistics#Farms_in_2016
Eurostat (2021a). Milk and milk product statistics. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Milk_and_milk_product_statistics#Milk_production
Eurostat (2021b). Milk treated—distribution of enterprises by volume of annual production. http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=apro_mk_strmt&lan
Fałkowski, J., & Chlebicka, A. (2021). What product mix do they offer and what marketing channels do they use? Exploring agricultural producer organisations' heterogeneity. *Journal of Rural Studies*, 85, 1–12.
Fiore, M., Galati, A., Gołębiewski, J., & Drejerska, N. (2020). Stakeholders' involvement in establishing sustainable business models. *British Food Journal*, 122(5), 1671–91.
German Federal Cartel Office (2017). Interim report on conditions for the supply of raw milk. www.bundeskartellamt.de/SharedDocs/Meldung/EN/Pressemitteilungen/2017/13_03_2017_Milch.html
Glanbia (2021). Annual report. www.glanbia.com/sites/glanbia/files/glanbia/investors/annual-report/2021/Glanbia-Annual-Report-20.pdf

Grashuis, N.J. (2017). Branding by US farmer cooperatives: an empirical study of trademark ownership. *Journal of Co-operative Organization and Management*, 5(2), 57–64.
Grau, A., Hockmann, H., & Levkovych, I. (2015). Dairy cooperatives at the crossroads. *British Food Journal*, 117(10), 2515–31.
Hagedorn, K. (2014). Post-socialist farmers' cooperatives in Central and Eastern Europe. *Annals of Public and Cooperative Economics*, 85(4), 555–77.
Hakelius, K., Karantininis, K., & Feng, L. (2013). The resilience of the cooperative form: cooperative beehiving by Swedish cooperatives. In: Ehrmann, T., Windsperger, J., Cliquet, G., & G. Hendrikse (eds), *Network Governance* (pp.127–47). Berlin, Heidelberg: Physica.
Hanisch, M., Rommel, J., & Müller, M. (2013). The cooperative yardstick revisited: panel evidence from the European dairy sectors. *Journal of Agricultural & Food Industrial Organization*, 11(1), 151–62.
Hanisch, M., Müller, M., & Rommel, J. (2012). *Support for Farmers' Cooperatives; Sector Report Dairy*. Wageningen: Wageningen UR.
Harte, L.N. (1997). Creeping privatisation of Irish co-operatives: a transaction cost explanation. In: J. Nilsson, & G. v. Dijk (eds), *Strategies and Structures in the Agro-food Industries* (pp.31–53). Assen: Van Gorcum.
Höhler, J., & Kühl, R. (2014). Position and performance of farmer cooperatives in the food supply chain of the EU-27. *Annals of Public and Cooperative Economics*, 85(4), 57995.
Höhler, J., & Kühl, R. (2018). Dimensions of member heterogeneity in cooperatives and their impact on organization—a literature review. *Annals of Public and Cooperative Economics*, 89(4), 697–712.
Höhler, J., & Kühl, R. (2019). What strategies do dairy companies realize? Using content analysis to examine strategies in the German dairy market. *International Food and Agribusiness Management Review*, 22, 635–50.
Höhler, J. (2019). Member heterogeneity and exit. In: Windsperger, J., Cliquet, G., Hendrikse, G., & M., Srećković (eds), *Design and Management of Interfirm Networks* (pp.197–215). Cham: Springer.
Höhler, J., & Oude Lansink, A. (2021). Measuring the impact of COVID-19 on stock prices and profits in the food supply chain. *Agribusiness*, 37(1), 171–86.
Iliopoulos, C., Värnik, R., Filippi, M., Võlli, L., & Laaneväli-Vinokurov, K. (2019). Organizational design in Estonian agricultural cooperatives. *Journal of Co-operative Organization and Management*, 7(2), 100093.
Imami, D., Valentinov, V., & Skreli, E. (2021). Food safety and value chain coordination in the context of a transition economy: the role of agricultural cooperatives. *International Journal of the Commons*, 15(1), 21–34.
Leialohilani, A., & de Boer, A. (2020). EU food legislation impacts innovation in the area of plant-based dairy alternatives. *Trends in Food Science & Technology*, 104, 262–7.
Liang, Q., & Hendrikse, G. (2016). Pooling and the yardstick effect of cooperatives. *Agricultural Systems*, 143, 97–105.
McCarthy, O., & Ward, M. (2014). Irish agricultural co-operative modelling and remodelling: responding to a dynamic business and policy environment. In: Mazzarol, T., Reboud, S., Limnios, E.M., & Clark, D.N. (eds), *Research Handbook on Sustainable Co-operative Enterprise* (pp.67–81). Cheltenham: Edward Elgar Publishing.
Müller, M., Hanisch, M., Malvido, A., Rommel, J., & Sagebiel, J. (2018). The structural effect of cooperatives on price volatility in the European dairy sector. *Applied Economics Letters*, 25(8), 576–9.
Nilsson, J., & G. v. Dijk (Eds.) (1997). *Strategies and Structures in the Agro-food Industries*. Assen: Van Gorcum.
Nilsson, L., Hansson, H., & Lagerkvist, C.J. (2017). Motivational factors for remaining in or exiting a cooperative. *Agribusiness*, 33(2), 209–25.
Pachoud, C., Delay, E., Da Re, R., Ramanzin, M., & Sturaro, E. (2020). A relational approach to studying collective action in dairy cooperatives producing mountain cheeses in the Alps: the case of the primiero cooperative in the Eastern Italians Alps. *Sustainability*, 12(11), 45–96.
Polacenko, K., & Bugina, V. (2014, April). Development of cooperation in dairy farming. In *Economic Science for Rural Development Conference Proceedings* (No. 34).
Rabobank (2021). Global Dairy Top 20. RaboResearch report. https://research.rabobank.com/far/en/sectors/dairy/dairy_top_20_2021.html

Soboh, R.A.M.E., Oude Lansink, A., & van Dijk, G. (2011). Distinguishing dairy cooperatives from investor-owned firms in Europe using financial indicators. *Agribusiness*, 27(1), 34–46.
Soboh, R., Lansink, A.O., & Van Dijk, G. (2012). Efficiency of cooperatives and investor owned firms revisited. *Journal of Agricultural Economics*, 63(1), 142–57.
Soboh, R.A., Lansink, A.O., & Van Dijk, G. (2014). Efficiency of European dairy processing firms. *NJAS-Wageningen Journal of Life Sciences*, 70, 53–9.
Szabó, Á.T. (2015). A dairy cooperative in the making: history, ethnicity and local culture in an economic enterprise. *Erdélyi Társadalom*, 13(3), 47–65.
Torquati, B., Taglioni, C., & Cavicchi, A. (2015). Evaluating the CO_2 emission of the milk supply chain in Italy: an exploratory study. *Sustainability*, 7(6), 7245–60.
Van der Krogt, D., Nilsson, J., & Høst, V. (2007). The impact of cooperatives' risk aversion and equity capital constraints on their inter-firm consolidation and collaboration strategies—with an empirical study of the European dairy industry. *Agribusiness: An International Journal*, 23(4), 453–72.
Viergutz, T., Zubek, N., & Schulze-Ehlers, B. (2020). The spatial variation of switching rates in large cooperative membership bases: empirical evidence from the dairy sector. *European Review of Agricultural Economics*, 47(4), 1438–72.
Westerholz, H.K., & Höhler, J. (2021). Corporate social responsibility reporting in the food industry—Comparison of co-operatives and investor-owned dairies. *Corporate Social Responsibility and Environmental Management*, 29(1), 211–22.
Wijnands, J.H., Bijman, J., & Tramnitzke, T. (2017). *Analyses of the Functioning of Milk Package Provisions as regards Producer Organisations and Collective Negotiations*. European Union: Luxembourg.
Zuba-Ciszewska, M., Kowalska, A., Manning, L., & Brodziak, A. (2019). Organic milk supply in Poland: market and policy developments. *British Food Journal*, 121(12), 3396–3412.
ZuivelNL (2020). LTO International comparison of producer prices for milk 2019. www.zuivelnl.org/uploads/images/Melkprijsonderzoek/MPV-REPORT-2019.pdf
ZuivelNL (2021). Dutch dairy in figures. www.zuivelnl.org/uploads/images/Publicaties/Dutch-Dairy-in-Figures-2020-spread.pdf